Attachment A:
HMP susceptibility map

Alameda Countywide
Clean Water Program
November 13, 2006

LEGEND (see text also)

- Major highways
- Major watersheds
- County boundary
- Streets

Channel type

- Natural creek or stream (susceptible)
- Earthen channel or connector
- Engineered channel - materials unknown
- Engineered channel - concrete
- Enclosed pipe or culvert

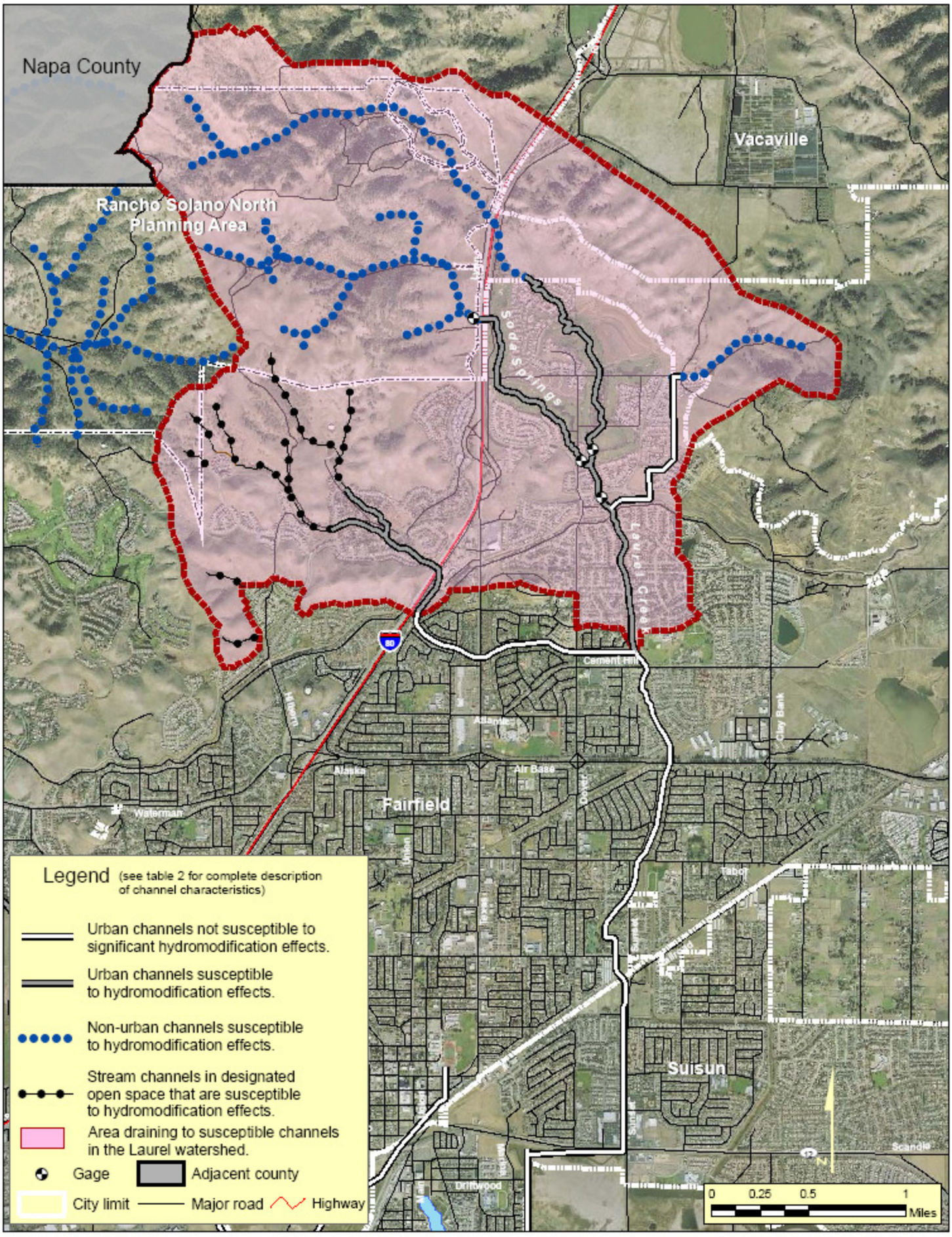
- Special consideration - San Lorenzo & Alameda Creeks
- Special consideration - Codornices Creek
- Hill or high slope region (susceptible)
- Tidally influenced / depositional - exempt
- Not included in HMP

Data sources:
Alameda County Flood Control and Water Conservation District; ACCWP;
Zone 7 Water Agency; U.S. Census Bureau; U.S. Geological Survey;
William Lettis Associates (Oakland Museum creek and watershed mapping project);
Balance Hydrologics and EIP Associates (Proposed test of the approach for the
ACCWP HMM Preliminary Map, July 2003)

N
W E
S

2 0 2 4 6 Miles

Contra Costa County
Alameda County
Contra Costa County
Alameda County
Alameda County
Santa Clara County
Alameda County
Santa Clara County
Alameda County
San Joaquin County



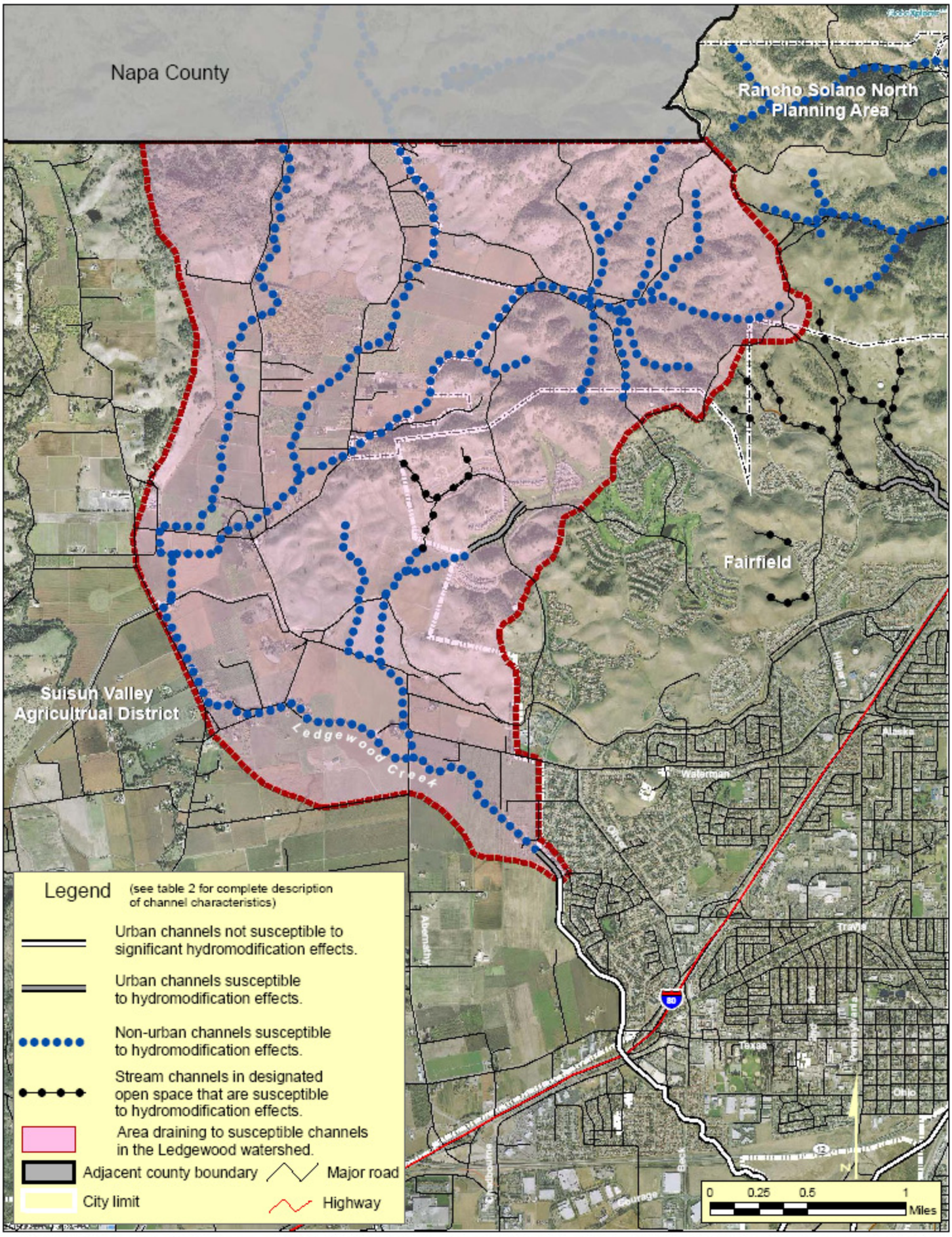
Source: Basemap data provided by Fairfield-Suisun Sewer District. Note that the roads layer does not include the most recently urbanized areas (north of Cement Hill Road, for example).

Balance Hydrologics, Inc.

Figure 2. Map showing HMP channel Classification for the Laurel Creek watershed. The mid- to upper reaches include all channels within the watershed that are susceptible to hydromodification effects (dotted and gray-shaded channels on this map). Hydromodification controls are not required for projects that drain directly to non-susceptible urban channels.

W:\Projects\204126 Fairfield HMP\204003\204126_Figure2_edits.mxd

©2006 Balance Hydrologics, Inc.



Basemap data provided by Fairfield-Suisun Sewer District. Note that the roads layer does not include the most recently urbanized areas, as shown in the aerial photo.

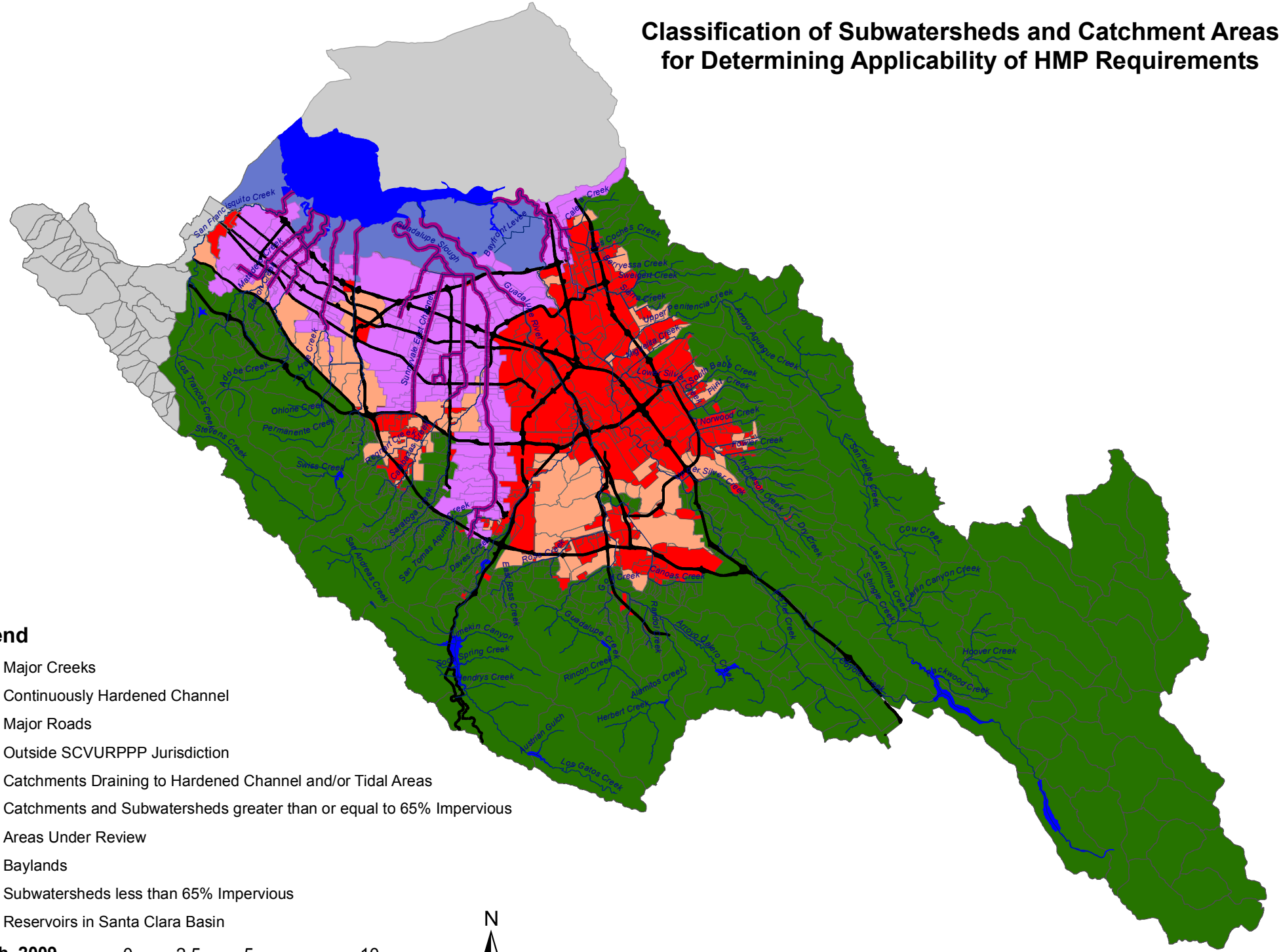
Balance Hydrologics, Inc.

Figure 3. Map showing HMP channel Classification for the Ledgewood Creek watershed. The mid- to upper reaches include all channels within the watershed that are susceptible to hydromodification effects (dotted and gray-shaded channels on this map), however areas outside the City of Fairfield are not included in this permit unless annexed by the city. The non-developed areas within the current city limits are designated open space in relatively steep terrain, and are unlikely to be converted to urban areas however the HMP still applies in these areas.

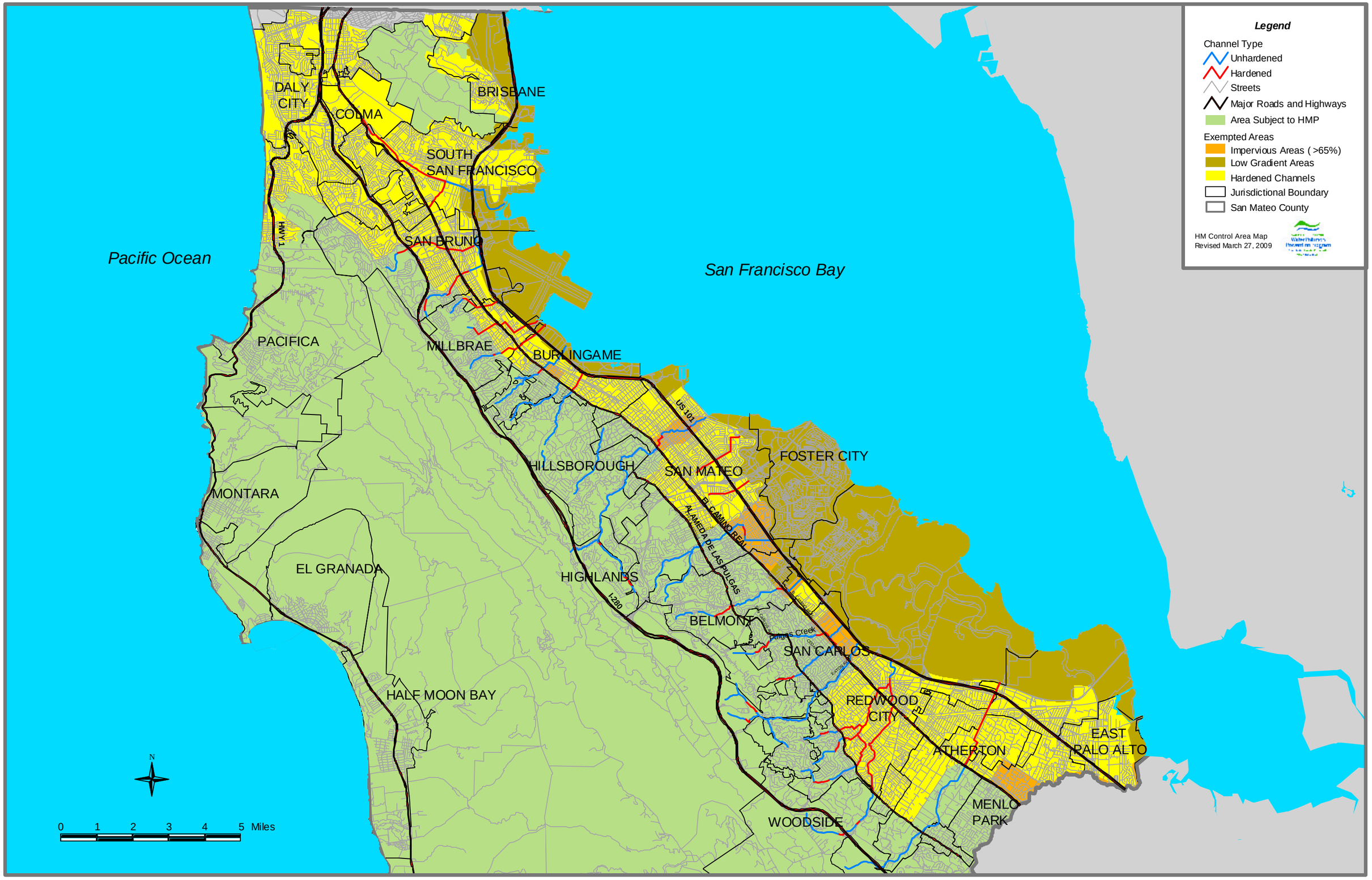
W:\Projects\204126 Fairfield HMP\204003\204126_Figure3_edits.mxd

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Classification of Subwatersheds and Catchment Areas for Determining Applicability of HMP Requirements



This map contains: 1) a revision to the November 2007 version to correct a mapping error; and 2) two revisions to Areas Under Review in Palo Alto and North Santa Clara County to reflect updated impervious surface data, consistent with the HM applicability criteria set forth in Attachment F, Section 4 of the MRP


Legend
Channel Type
Unhardened
Hardened
Streets
Major Roads and Highways
Area Subject to HMP
Exempted Areas
Impervious Areas (>65%)
Low Gradient Areas
Hardened Channels
Jurisdictional Boundary
San Mateo County
HM Control Area Map
Revised March 27, 2009
Pacific Ocean
San Francisco Bay
DALY CITY
COLMA
BRISBANE
SOUTH SAN FRANCISCO
SAN BRUNO
HWY 1
PACIFICA
MILLBRAE
BURLINGAME
US-101
FOSTER CITY
HILLSBOROUGH
SAN MATEO
EL CAMINO REAL
ALAMEDA DE LAS PULGAS
MONTARA
EL GRANADA
HIGHLANDS
I-280
BELMONT
Pulgas Creek
SAN CARLOS
HALF MOON BAY
REDWOOD CITY
EAST PALO ALTO
ATHERTON
MENLO PARK
WOODSIDE
N
0 1 2 3 4 5 Miles

Environmental, Health & Regulatory Services
101 Prospect Avenue NW
Cleveland, Ohio 44115-1075
Facsimile: (216) 566-2730

January 8, 2015

Ms. Juanita Bacey
Project Manager
Brownfields and Environmental Restoration Program
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, California 94710-2721

Subject: Data Summary Report for Groundwater Monitoring Activities for the Period from July 1, 2014 through December 31, 2014, Sherwin-Williams Site, 1450 Sherwin Avenue, Emeryville, California, DTSC Docket No. HSA-O&MEA 11/12-096

Dear Ms. Bacey:

The Sherwin-Williams Company is pleased to present the enclosed data summary report for groundwater monitoring activities conducted during the period from July 1, 2014 through December 31, 2014 ("the reporting period"), prepared by ARCADIS U.S., Inc. (ARCADIS) for the Sherwin-Williams Company facility in Emeryville, California ("the Site").

This data summary report is submitted pursuant to the requirements of the Operations and Maintenance Agreement (O&M Agreement) between the Sherwin-Williams Company and the Department of Toxic Substances Control (DTSC) executed on January 23, 2013. The O&M Plan considered that reporting would be conducted on an annual basis after the July 2014 Data Summary Report submission. However, per DTSC's request in communication dated July 1, 2014, this additional Data Summary Report summarizes third and fourth quarter 2014 groundwater monitoring results to continue to evaluate groundwater arsenic trends at the Site. This report presents data collected as part of the established groundwater monitoring program, in accordance with the Operations and Maintenance Plan (O&M Plan), prepared by CDM Smith, dated December 11, 2012 and approved by DTSC in a letter dated December 17, 2012.

The O&M Plan established the groundwater monitoring program for the Site. During the reporting period, groundwater self-monitoring activities were performed by ARCADIS in accordance with the O&M Plan and subsequent DTSC direction. This summary report presents groundwater monitoring data collected during the reporting period.

In accordance with the O&M Plan, and as discussed in the Data Summary Report, groundwater monitoring wells CDM-110 and CDM-111 transitioned from semiannual sampling to annual sampling because criteria were met for reducing the monitoring schedule.

Groundwater samples were collected from 20 monitoring wells during the October 2014 semiannual monitoring event for analysis of dissolved arsenic, and from four wells for analysis of volatile organic compounds, as part of the groundwater sampling event outlined in the O&M Plan. Additionally, contingency quarterly monitoring was conducted at monitoring location CDM-108 in July 2014 in accordance with the Contingency Monitoring letter submitted on July 29, 2014 to reevaluate the statistically increasing groundwater arsenic concentration trend. Data from the current reporting period and historical groundwater monitoring data are presented in the enclosed report.

Although the dissolved arsenic concentration was lower than the previous quarter at well CDM-108, a statistically increasing trend was still observed, and LF-41 and RP-2 had arsenic detections above historical maximums in October 2014, groundwater elevation and sampling data collected post remedy implementation from April 2012 through October 2014 at all other groundwater monitoring locations demonstrate that the remedy at the Site is consistent with the remedy effectiveness criteria, and that contingency actions (other than presented in the Contingency Monitoring letter) are currently not necessary. Site construction and/or operations have not impacted the effectiveness of the remedy components.

If you have any questions, please call Lucas Goldstein of ARCADIS at 510-652-4500 or me at 216-566-1768.

Sincerely,



Larry R. Mencin
Sr. Environmental Project Manager

Enclosure

DISTRIBUTION LIST:

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Burlingame, California 94010

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ENVIRONMENT

Larry R. Mencin
The Sherwin-Williams Company
101 Prospect Avenue, N.W.
Cleveland, Ohio 44115-1075

Subject:
Data Summary Report for Groundwater Monitoring Activities for the Period from July 1, 2014 through December 31, 2014, Sherwin-Williams Site, 1450 Sherwin Avenue, Emeryville, California, DTSC Docket No. HSA-O&MEA 11/12-096

Date:
January 8, 2015

Contact:
Lucas Goldstein

Phone:
510.596.9535

Email:
Lucas.Goldstein@arcadis-us.com

Our ref:
EM002616.0014

Dear Mr. Mencin:

On behalf of The Sherwin-Williams Company, ARCADIS U.S., Inc. (ARCADIS) has prepared this report summarizing the groundwater monitoring data collected by ARCADIS at 1450 Sherwin Avenue in Emeryville, California ("the Site"; Figure 1). This report presents data collected as part of the established groundwater monitoring program, in accordance with the Operations and Maintenance Plan (O&M Plan), dated December 11, 2012 (CDM Smith 2012), and under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). The data were collected between July 1, 2014 and December 31, 2014 ("the reporting period"). Site construction and/or operations have not impacted the effectiveness of the remedy components.

The O&M Plan establishes the groundwater monitoring program for the Site. The O&M Plan was approved by DTSC in a letter dated December 17, 2012 (DTSC 2012).

In agreement with DTSC's letter dated August 22, 2006 (DTSC 2006), this report includes a summary of analytical results from groundwater samples collected during the October 2014 monitoring event conducted to support the South Bayfront Project Area (SBPA), located directly west of the Site (Figure 1). The SBPA site is under a separate agreement between the City of Emeryville and DTSC to conduct its own post remedy implementation groundwater monitoring; monitoring at the SBPA site is conducted by others. These SBPA results are presented in this report per agreement with DTSC primarily as additional information and are not specifically evaluated in conjunction with the results of groundwater monitoring conducted at the Site during the reporting period.

Although the O&M Plan considered that reporting would be conducted on an annual basis after submission of the July 2014 Data Summary Report, per DTSC's request in its comments to the July 2014 Data Summary Report in email dated July 1, 2014, this Data Summary Report summarizes third and fourth quarter 2014 groundwater monitoring results to continue to evaluate groundwater arsenic trends at the Site.

Summary

Groundwater monitoring data were evaluated to determine the effectiveness of the remedy and to determine if contingency actions are needed to achieve cleanup goals. Remedy effectiveness criteria for the Site are provided in Table C-2 of the O&M Plan and in Table 7 of this report[1]. The groundwater monitoring data collected post remedy implementation from April 2012 through October 2014 demonstrated that the remedy is meeting the established effectiveness criteria for the Site, with the exception of an increasing concentration trend that was determined for arsenic in groundwater from well CDM-108. This well first showed an increasing concentration following the October 2013 monitoring event (CDM Smith 2014a). Monitoring well CDM-108 is located along the western property line of the Site, immediately west of the middle slurry wall breach (Figure 1).

As specified in the O&M Plan, if a statistically increasing contaminant of concern (COC) concentration trend is observed, the frequency of monitoring for that well will increase to monthly for 3 months, and the Mann-Kendall trend will be reevaluated using the concentrations from the most recent four monitoring events. Monthly monitoring was initiated at well CDM-108 in early December 2013 and continued through February 2014. Concentrations of arsenic in these three monthly groundwater samples and subsequent sample results from this reporting period continue to show this trend for CDM-108. Proposed contingency action for CDM-108 was presented within the Proposed Contingency Action for Monitoring Well CDM-108 letter submitted to DTSC on July 29, 2014 (CDM Smith 2014c). The proposed contingency action includes quarterly groundwater monitoring for dissolved arsenic at CDM-108 from

[1] Effectiveness criteria for CDM-101 and CDM-102: COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing for 4 years after remedy implementation, and arsenic is less than 5 milligrams per liter (mg/L) 4 years after remedy implementation.
Effectiveness criteria for CDM-103, CDM-104, CDM-107, CDM-108, CDM-109, CDM-112, RP-1, RP-2, RP-4, RP-5, LF-18, LF-24, LF-25, LF-36, and LF-41: COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing.

July 2014 through April 2016, and reevaluation of the trend following the July 2015 monitoring event. Contingency monitoring on a quarterly frequency at CDM-108 in accordance with the aforementioned letter began in July 2014.

As presented previously to DTSC, arsenic concentrations reported from well CDM-108 since its installation in April 2012 are consistent with pre remedy implementation observations from a former nearby well (LF-21, abandoned in 2007; see Figure 1), and the increasing arsenic trend from well CDM-108 may not indicate spreading of arsenic in groundwater in the vicinity of CDM-108. The range of arsenic concentrations from CDM-108 (0.032 milligram per liter [mg/L] to 0.23 mg/L) is similar to the range of concentrations observed between 2005 and 2007 from LF-21 (0.011 mg/L to 0.15 mg/L). These concentrations of arsenic in groundwater in this portion of the site groundwater plume, coupled with arsenic present upgradient and downgradient from this area, are considered to be representative of an overall stable to decreasing groundwater plume.

Two monitoring wells (LF-41 and RP-2) had detections of arsenic in groundwater in October 2014 higher than their historically reported values prior to remedy implementation. Although arsenic concentrations in October 2014 were measured above historical maximum concentrations at LF-41 and RP-2, statistical trends post remedy implementation still indicate no trend and are below contingency criteria for implementing active groundwater extraction (Table C-3 of the O&M Plan [CDM Smith 2012]).

Groundwater elevation and sampling data collected post remedy implementation from April 2012 through October 2014 at all other groundwater monitoring locations demonstrate that the remedy at the Site is consistent with the remedy effectiveness criteria, and that contingency actions (other than presented in the Proposed Contingency Action for Monitoring Well CDM-108 letter [Contingency Monitoring letter; CDM Smith 2014c]) are currently not necessary. Site construction and/or operations have not impacted the effectiveness of the remedy components.

As part of the Data Summary Report for the previous period, ARCADIS requested that the monitoring schedule be modified from semiannually to annually for monitoring wells CDM-110 and CDM-111 based on results of the Mann-Kendall trend analyses post remedy implementation. The Data Summary Report for the previous period was approved in the letter from DTSC dated August 11, 2014. Wells CDM-110 and CDM-111 will be monitored as part of the next annual monitoring event to be conducted in April 2015.

Groundwater Monitoring Program

This report presents groundwater monitoring data collected during the July 1, 2014 to December 31, 2014 reporting period. During the reporting period, quarterly groundwater elevations were measured in July and October, a contingency quarterly monitoring event was conducted at monitoring location CDM-108 in July, and a semiannual groundwater quality sampling event was conducted in October.

Work during the reporting period was conducted in accordance with the O&M Plan (CDM Smith 2012), the Quality Assurance Project Plan (QAPP; LFR 2006), the Health and Safety Plan for the Site (ARCADIS 2012), the current Standard Operating Procedure for Groundwater Sample Collection (SOP; CDM Smith 2014b), and the Contingency Monitoring letter (CDM Smith 2014c).

Groundwater Elevation Measurements

ARCADIS conducted two separate quarterly water-level measurement events during the reporting period. Groundwater elevation data obtained during the reporting period are presented in Table 1. For reference, well construction details are also included in Table 1. Groundwater elevations and interpreted contour intervals for the two quarterly water-level measurement events are presented on Figures 2 and 3. Current and historical groundwater elevation data are provided in Table D-1 of Appendix D.

Groundwater elevations were measured on a quarterly basis from July to December 2014 as specified in the O&M Plan (CDM Smith 2012). In accordance with the O&M Plan, and because groundwater movement patterns have been consistent with the projected groundwater model design conditions, water-level measurement events were transitioned from monthly to quarterly starting with the July 2013 water-level measurement event. If groundwater flow conditions become inconsistent with projected design conditions, monthly collection events will be initiated, per the O&M Plan.

Supplemental to the schedule presented in the O&M Plan, ARCADIS measured groundwater elevations at additional monitoring wells during the monitoring events to further monitor water-level trends at the Site. Details for each event are provided below:

- On July 8, 2014 and October 27, 2014, depth-to-water measurements were collected at 35 monitoring wells and two piezometers. All wells required to be monitored in accordance with the O&M Plan were measured during the quarterly

water-level events. Supplemental to the monitoring schedule presented in the O&M Plan, the following wells were also gauged for depth to groundwater during the quarterly water-level events: upgradient wells LF-13, LF-27, and LF-29, and downgradient off-site well MD-5 (located on the SBPA site, directly west of the Site [Figure 1]).

- During the October 27, 2014 water-level monitoring event, the water-level sounders used to measure the depth to groundwater at the Site and the SBPA site were calibrated to each other. The water-level sounder calibration was conducted by field personnel teams for each site at well MD-5, located on the SBPA site, before the event began. Based on the results of the calibration, the other field personnel teams adjusted their depth-to-water measurements to match the ARCADIS depth-to-water measurements.

Groundwater Quality Sampling

ARCADIS performed groundwater quality sampling on July 8, 2014 (quarterly event) and October 27 through October 31, 2014 (semiannual event). In accordance with the Contingency Monitoring letter, ARCADIS performed groundwater quality sampling at CDM-108 on July 8, 2014.

In accordance with the O&M Plan, groundwater samples collected during the sampling events were analyzed for dissolved arsenic using United States Environmental Protection Agency (EPA) Method 6010B. Groundwater samples (CDM-101, CDM-102, CDM-107, and CDM-108) collected during the October 2014 semiannual monitoring event were also analyzed for volatile organic compounds (VOCs) using EPA Method 8260B. Analytical results are presented in Table 2 for VOCs and Table 3 for laboratory-filtered dissolved arsenic concentrations. Figure 4 presents the arsenic concentrations detected in groundwater samples collected from the monitoring wells sampled during the July and October 2014 events. Complete analytical results for the reporting period are presented in Appendix C. Field parameters collected during groundwater sampling (temperature, pH, and specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity) are presented in Table B-1 of Appendix B. Appendix D Tables D-2 through D-4 present current and historical analytical data collected at the Site.

Groundwater Sampling Methods

In accordance with the QAPP (LFR 2006) and the current SOP (CDM Smith 2014b) approved by DTSC (DTSC 2014a), monitoring wells were purged using a submersible

pump and sampled using HydraSleeves™ during the July and October 2014 monitoring events.

A minimum of three well-casing volumes of water was purged from each monitoring well before sampling. Field parameters were also recorded during purging. Wells were sampled once stabilization of temperature, pH, and specific conductance parameters was achieved and the initial well volume recovered to a minimum of 80% (or for a minimum of 2 hours and a maximum of 24 hours [LFR 2006]). All wells recovered to a minimum 80% of the initial well volume within 2 hours of purging.

The samples designated for chemical analysis were analyzed according to EPA method protocol by Curtis & Tompkins, Ltd., a state-certified analytical laboratory located in Berkeley, California. Appendix A includes a quality assurance/quality control (QA/QC) review of groundwater sampling and analytical results. Analytical laboratory reports and chain-of-custody forms for field and QA/QC samples are presented in Appendix F. Field data sheets and other QA/QC data are kept on file and available upon request.

Quality Assurance/Quality Control

In accordance with the QAPP (LFR 2006), QA/QC measures were implemented to maintain data quality and minimize the potential for field and laboratory cross contamination of samples. QA/QC procedures include collecting duplicate samples, HydraSleeve™ and submersible pump rinsate samples, trip blanks, and a water blank sample; controlling sampling order; and using single-use disposable sampling equipment (i.e., HydraSleeves™). Tables A-1 and A-2 provide user data typically included in laboratory reports and were prepared for the reporting period (Appendix A).

No QA/QC issues were encountered during the July 2014 quarterly event. The QA/QC issues encountered during the October 2014 semiannual event are summarized in Appendix A Tables A-1b and A-2b. Aside from the analytes mentioned in Appendix A Table A-2b, no other analytes were detected above laboratory reporting limits in any of the QA/QC samples, and the relative percent differences in concentrations of analytes between the primary and duplicate groundwater samples collected during the sampling events were below 30%.

Groundwater Results from the South Bayfront Project Area

The SBPA is the property located nearby to the west of the Site. The southern portion of the SBPA is bounded to the north by Temescal Creek and a portion may be

considered hydraulically related to the Site. Five groundwater monitoring wells are located within the southern portion of the SBPA; a figure from the Annual 2013 Groundwater Monitoring Report (Erler & Kalinowski, Inc. [EKI] 2013) showing the monitoring network associated with the SBPA site is provided in Appendix G. Selected analytical results from the most recent groundwater monitoring event conducted at the SBPA in October 2014 are summarized in the following table.

Well ID	Date Measured or Sampled	Groundwater Elevation (ft NAVD 88)	Arsenic (mg/L)	Total VOCs (mg/L)	TPHd (mg/L)
MD1 (SLR)	10/27/14	7.80	0.049	0.510[a]	2.5
MD2 (SLR)	10/27/14	4.52	0.019/ 0.02 [DUP]	ND/ ND [DUP]	2.7 Y/ 2.9 Y [DUP]
MD3 (SLR)	10/27/14	5.08	0.26	0.05[b]	1.6 Y
MD4 (SLR)	10/27/14	7.81	<0.005	ND	0.14 Y
MD5 (EKI)	10/27/13	5.48	0.00977/ 0.00971 [DUP]	ND/ ND [DUP]	--

Notes:

ft NAVD 88 = feet relative to North American Vertical Datum of 1988

mg/L = milligrams per liter

[a] Methyl tertiary-butyl ether detected at 0.0018 mg/L, benzene detected at 0.2 mg/L, toluene detected at 0.002 mg/L, chlorobenzene detected at 0.27 mg/L, isopropylbenzene detected at 0.017 mg/L, propylbenzene detected at 0.017 mg/L, and sec-butylbenzene detected at 0.0019 mg/L

[b] Acetone detected at 0.05 mg/L.

DUP = duplicate

ND = not detected; reporting limit not provided

< = less than reporting limit provided

-- = sample not analyzed for given compound

Y = sample exhibits chromatographic pattern that does not resemble standard

SLR = monitoring results were provided by SLR Consulting.

EKI = monitoring results were provided by Erler & Kalinowski, Inc.

Groundwater Remedy Effectiveness

Groundwater monitoring data were evaluated to determine the effectiveness of the remedy and to determine if contingency actions are needed to achieve cleanup goals; these data are presented in Table 7 and summarized below.

Although the dissolved arsenic concentration was lower than the previous quarter at well CDM-108, a statistically increasing trend was still observed. The groundwater

elevation and sampling data collected post remedy implementation at all other groundwater monitoring locations from April 2012 through October 2014 demonstrate that the remedy at the Site is consistent with the remedy effectiveness criteria. CDM-108 is currently being monitored quarterly in accordance with the Contingency Monitoring letter (CDM Smith 2014c) approved by DTSC in July 2014 (DTSC 2014b).

Groundwater Quality Effectiveness Criteria

Groundwater quality effectiveness criteria are summarized in Table C-2 of the O&M Plan (CDM Smith 2012). With the exception of trend analyses criteria identified for monitoring location CDM-108, all wells with effectiveness criteria indicated that COC concentrations are below cleanup goals and/or COC concentration trends are statistically stable to decreasing.

Table 7 provides a summary of evaluation criteria wells and their status with respect to the October 2014 semiannual event results. Effectiveness criteria wells with arsenic concentrations above their cleanup goals are CDM-101, CDM-108, CDM-109, RP-1, RP-2, LF-36, and LF-41. Monitoring wells CDM-101, CDM-109, RP-1, RP-2, LF-36, and LF-41 indicated no trend (i.e., statistically stable) for arsenic concentrations post remedy implementation. These findings indicate that stabilizing conditions exist at the majority of the Site.

Laboratory results for arsenic from samples collected during the reporting period from groundwater wells that existed prior to remedy implementation were within historical arsenic concentration ranges with the exception of the concentrations of arsenic at wells LF-41 and RP-2. Arsenic concentrations at monitoring wells that were installed during remedy implementation (CDM-101 through CDM-114) are less than historically reported concentrations for monitoring wells that previously existed within the vicinity of these wells.

As shown in Table 4, arsenic concentration trends calculated using the Mann-Kendall trend evaluation method (Gilbert 1987) performed for arsenic concentrations over the entire period at wells existing pre remedy implementation indicate statistically stable or decreasing arsenic concentration trends for all wells (that have sufficient data to establish a trend) except MW-3, RP-2, and RP-4. As shown in Table 5, the results of the Mann-Kendall trend analyses post remedy implementation indicate no trend for monitoring wells MW-3 and RP-2 and a decreasing concentration trend for monitoring well RP-4. These findings are indicative of stabilizing conditions at wells MW-3 and RP-4, as arsenic concentrations post remedy implementation are not detected above historical maximum concentrations. Although arsenic concentrations in October 2014

were measured above historical maximum concentrations at LF-41 and RP-2, statistical trends post remedy implementation still indicate no trend and are still below contingency criteria for implementing active groundwater extraction (Table C-3 of the O&M Plan [CDM Smith 2012]).

Results of the Mann-Kendall trend analysis continue to indicate a statistically increasing concentration trend for arsenic in groundwater at CDM-108, based on groundwater data collected post remedy implementation (Table 5). Concentrations of arsenic at monitoring well CDM-108 have ranged from 0.032 mg/L in April 2012 to 0.22 mg/L (0.23 mg/L in duplicate sample) in July 2014; the most recent detection was 0.17 mg/L in October 2014. Arsenic concentration trend plots for CDM-108 are provided in Appendix E. Concentrations of arsenic in groundwater at CDM-108 are well below contingency criteria for implementing active groundwater extraction (0.50 mg/L).

VOC concentrations detected in samples collected from evaluation criteria wells at or above their cleanup goals during the October 2014 semiannual monitoring event were 1,2-dichloroethane at CDM-101 (0.0008 mg/L) and CDM-102 (0.0011 mg/L); these concentrations are above the cleanup goal of 0.0005 mg/L. Consistent with historical observation, VOC concentrations attenuate across the Site and continue to be below the cleanup goals near the downgradient site boundary.

Groundwater Movement Effectiveness Criteria

Groundwater movement effectiveness criteria, as summarized in Table C-2 of the O&M Plan, are being met at the Site. Based on groundwater elevations collected at the Site from April 2012 through October 2014, groundwater movement patterns are consistent with the projected design conditions (CDM Smith 2012). Data collected post remedy implementation demonstrate the effectiveness of the slurry wall segments to divert groundwater, the effectiveness of the slurry wall breaches to facilitate groundwater movement without mounding, and the effectiveness of high-permeability backfill placement to control groundwater movement westward at the Rifkin/Sherwin-Williams property line between CDM-101/CDM-102 and PZ-101/CDM-104. In addition, depths to groundwater at monitored site wells have been consistently greater than 3 feet below ground surface post remedy implementation.

Arsenic mass flux was calculated within the excavated and backfilled area between CDM-101 and CDM-102 using groundwater monitoring data collected at the Site from April 2012 through October 2014 and is presented in Table 6. The net arsenic mass flux evaluation through the CDM-101/CDM-102 area indicates movement of arsenic

away from the former Rifkin property toward the Sherwin-Williams property and a total arsenic mass through the transect of approximately 7.40×10^{-4} pounds per year from April 2012 through October 2014. These results are indicative of remedy effectiveness based on maintaining a net mass flux from the former Rifkin property to the Sherwin-Williams property.

Closing

In accordance with the O&M Plan and subsequent DTSC direction, the following activities will be performed during the next reporting period (January 2015 through April 2015): quarterly groundwater elevation collections are scheduled to be performed in January 2015, and annual groundwater sampling is scheduled to be performed in April 2015. Groundwater monitoring for monitoring well CDM-108 will continue on a quarterly basis and is scheduled to be performed in January and April 2015 within the next reporting period. The next data summary report, for the first half of 2015, will be submitted on July 31, 2015.

If you have any questions or comments regarding the contents of this report, please call Larry Mencin of Sherwin-Williams at 216.566.1768 or Lucas Goldstein of ARCADIS at 510.596.9535.

Sincerely,

ARCADIS U.S., Inc.

Lucas Goldstein, P.G., P.E.
Principal Engineer
(PG-CA, #7035; PE-CA #C72455)

REGISTERED PROFESSIONAL ENGINEER
LUCAS GOLDSTEIN
C 72455
EXP 6/30/16
CIVIL
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
LUCAS GOLDSTEIN
No. 7035
STATE OF CALIFORNIA
Exp. September 30, 2016

Erica Whiting
Project Geologist

References

ARCADIS U.S., Inc. (ARCADIS). 2012. Site Specific Health and Safety Plan for the Sherwin-Williams Site located at 1450 Sherwin Avenue, Emeryville, California. November 19.

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 2006. Letter providing approval of the June 28, 2006 Groundwater Monitoring Plan Assessment. August 22.

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Attachments

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Tables

Table 1
Well Construction Details and Groundwater Elevation Data, Third and Fourth Quarters 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Top of Casing Elevation (ft NAVD 88)	Approximate Screen Interval Depths (ft toc) Top	Approximate Screen Interval Depths (ft toc) Bottom	Approximate Screen Interval Elevations (ft NAVD 88) Top	Approximate Screen Interval Elevations (ft NAVD 88) Bottom	Hydraulic Zone Monitored	Date	Measured Depth to Water (ft toc)	Groundwater Elevation (ft NAVD 88)
Existing Wells and Piezometers									
Former Rifkin Property									
CDM-101	18.97	10.67	20.67	8.3	-1.7	A	7/8/2014	9.53	9.44
							10/28/2014	9.84	9.13
CDM-102	17.61	10.47	20.47	8.08	-1.92	A	7/8/2014	8.60	9.01
							10/28/2014	8.89	8.72
LF-35	18.93	24	27	-5.1	-8.1	A	7/8/2014	9.07	9.86
							10/28/2014	9.41	9.52
LF-36	18.87	7	16	11.9	2.9	A	7/8/2014	9.17	9.70
							10/28/2014	9.35	9.52
LF-37	18.54	7	16	11.5	2.5	A	7/8/2014	8.87	9.67
							10/28/2014	9.05	9.49
LF-38	18.51	20	27	-1.5	-8.5	A	7/8/2014	8.82	9.69
							10/28/2014	9.01	9.50
LF-39	18.97	18	26	1	-7	A	7/8/2014	9.19	9.78
							10/28/2014	9.40	9.57
LF-40	18.84	7	15	11.8	3.8	A	7/8/2014	9.08	9.76
							10/28/2014	9.30	9.54
LF-41	18.24	7	15	11.2	3.2	A	7/8/2014	8.44	9.80

Table 1
Well Construction Details and Groundwater Elevation Data, Third and Fourth Quarters 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Top of Casing Elevation (ft NAVD 88)	Approximate Screen Interval Depths		Approximate Screen Interval Elevations		Hydraulic Zone Monitored	Date	Measured Depth to Water (ft toc)	Groundwater Elevation (ft NAVD 88)
		(ft toc) Top	(ft toc) Bottom	(ft NAVD 88) Top	(ft NAVD 88) Bottom				
LF-41	18.24	7	15	11.2	3.2	A	10/28/2014	8.61	9.63
MW-3	17.30	6.5	19.5	10.8	-2.2	A	7/8/2014	7.42	9.88
							10/28/2014	7.62	9.68
RP-1	17.84	7	12	10.8	5.8	A	7/8/2014	7.98	9.86
							10/28/2014	8.21	9.63
RP-2	17.94	8.5	14.5	9.4	3.4	A	7/8/2014	8.19	9.75
							10/28/2014	8.35	9.59
RP-3	17.87	8	13	9.9	4.9	A	7/8/2014	8.22	9.65
							10/28/2014	8.52	9.35
RP-4	17.83	7	17	10.8	0.8	A	7/8/2014	8.14	9.69
							10/28/2014	8.32	9.51
RP-5	17.74	7	15	10.7	2.7	A	7/8/2014	8.09	9.65
							10/28/2014	8.27	9.47
Horton Street									
LF-12	17.65	7.5	17.5	10.2	0.1	A	7/8/2014	7.02	10.63
							10/28/2014	7.05	10.60
LF-13	17.48	7	17	10.5	0.5	A	7/8/2014	6.43	11.05
							10/28/2014	6.53	10.95
LF-27	17.83	10	18	7.8	-0.2	A	7/8/2014	7.44	10.39

Table 1
Well Construction Details and Groundwater Elevation Data, Third and Fourth Quarters 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Top of Casing Elevation (ft NAVD 88)	Approximate Screen Interval Depths		Approximate Screen Interval Elevations		Hydraulic Zone Monitored	Date	Measured Depth to Water (ft toc)	Groundwater Elevation (ft NAVD 88)
		(ft toc) Top	(ft toc) Bottom	(ft NAVD 88) Top	(ft NAVD 88) Bottom				
LF-27	17.83	10	18	7.8	-0.2	A	10/28/2014	7.51	10.32
LF-28	17.09	10	18	7.1	-0.9	A	7/8/2014	7.30	9.79
							10/28/2014	7.47	9.62
LF-29	16.40	6	19	10.4	-2.6	A	7/8/2014	6.83	9.57
							10/28/2014	6.95	9.45
Other Properties									
MD-5	12.03	5.77	15.77	6.26	-3.74	A	7/8/2014	6.16	5.87
							10/28/2014	6.55	5.48
Sherwin-Williams Property									
CDM-103	20.56	12.77	22.77	7.79	-2.21	A	7/8/2014	11.64	8.92
							10/28/2014	11.15	9.41
CDM-104	18.60	10.79	20.79	7.81	-2.19	A	7/8/2014	9.47	9.13
							10/28/2014	9.69	8.91
CDM-105	15.83	7.63	17.63	8.2	-1.8	A	7/8/2014	8.60	7.23
							10/28/2014	9.11	6.72
CDM-106	16.21	8.31	18.31	7.9	-2.1	A	7/8/2014	8.62	7.59
							10/28/2014	8.90	7.31
CDM-107	17.38	9.49	19.49	7.89	-2.11	A	7/8/2014	10.79	6.59
							10/28/2014	10.92	6.46

Table 1
Well Construction Details and Groundwater Elevation Data, Third and Fourth Quarters 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Top of Casing Elevation (ft NAVD 88)	Approximate Screen Interval Depths		Approximate Screen Interval Elevations		Hydraulic Zone Monitored	Date	Measured Depth to Water (ft toc)	Groundwater Elevation (ft NAVD 88)
		(ft toc) Top	(ft toc) Bottom	(ft NAVD 88) Top	(ft NAVD 88) Bottom				
CDM-108	17.71	9.64	19.64	8.07	-1.93	A	7/8/2014	10.63	7.08
							10/28/2014	10.84	6.87
CDM-109	15.44	7.08	17.08	8.36	-1.64	A	7/8/2014	8.06	7.38
							10/28/2014	8.21	7.23
CDM-110	15.62	7.62	17.62	8	-2	A	7/8/2014	5.56	10.06
							10/28/2014	5.72	9.90
CDM-111	18.14	10.33	20.33	7.81	-2.19	A	7/8/2014	8.58	9.56
							10/28/2014	8.81	9.33
CDM-112	15.70	7.65	17.65	8.05	-1.95	A	7/8/2014	5.64	10.06
							10/28/2014	5.69	10.01
CDM-113	15.47	7.51	17.51	7.96	-2.04	A	7/8/2014	5.68	9.79
							10/28/2014	5.89	9.58
CDM-114	14.72	6.73	16.73	7.99	-2.01	A	7/8/2014	4.43	10.29
							10/28/2014	4.66	10.06
LF-18	15.75	8	18	7.8	-2.3	A	7/8/2014	9.98	5.77
							10/28/2014	10.07	5.68
LF-42	17.29	7	16	10.3	1.3	A	7/8/2014	7.82	9.47
							10/28/2014	8.02	9.27
PZ-101	19.01	11.5	21.5	7.51	-2.49	A	7/8/2014	10.08	8.93

Table 1
Well Construction Details and Groundwater Elevation Data, Third and Fourth Quarters 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Top of Casing Elevation (ft NAVD 88)	Approximate Screen Interval Depths		Approximate Screen Interval Elevations		Hydraulic Zone Monitored	Date	Measured Depth to Water (ft toc)	Groundwater Elevation (ft NAVD 88)
		(ft toc) Top	(ft toc) Bottom	(ft NAVD 88) Top	(ft NAVD 88) Bottom				
PZ-101	19.01	11.5	21.5	7.51	-2.49	A	10/28/2014	10.34	8.67
PZ-102	16.64	8.62	18.62	8.02	-1.98	A	7/8/2014	9.32	7.32
							10/28/2014	9.78	6.86

Data updated by MSM. Proofed by ENW.

Notes:

ft toc = Feet below top of casing

ft NAVD 88 = Feet relative to North American Vertical Datum of 1988

Table 2
Volatile Organic Compounds (EPA 8260) in Groundwater Monitoring Wells, Fourth Quarter 2014
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
CDM-101	29-Oct-14	<0.0005	0.0008	<0.0005	<0.01	<0.01 U12	0.0002 J	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	29-Oct-14	<0.0005	0.0008	<0.0005	<0.01	<0.01 U12	0.0002 J	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-102	29-Oct-14	<0.0005	0.0011	<0.0005	<0.01	<0.01 U5	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-107	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-108	29-Oct-14	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table 2
Volatile Organic Compounds (EPA 8260) in Groundwater Monitoring Wells, Fourth Quarter 2014
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloroethane	1,2,3-Trichloropropane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-pentanone	Bromobenzene	Carbon Disulfide	Chloroethane	Chloromethane	Dichlorodifluoromethane	Isopropylbenzene	n-Butylbenzene
CDM-101	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-102	29-Oct-14	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-107	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-108	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table 2
Volatile Organic Compounds (EPA 8260) in Groundwater Monitoring Wells, Fourth Quarter 2014
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chloromethane
CDM-101	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
DUP	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
CDM-102	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-107	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-108	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0002 J	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table 2
Volatile Organic Compounds (EPA 8260) in Groundwater Monitoring Wells, Fourth Quarter 2014
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total

Data QA/QC performed by OM.

Notes:

< = Analyte was not detected at or greater than the detection limit reported.

DUP = Duplicate sample (field duplicate)

J = Concentration is estimated.

U5 = Quantified as nondetect (U) based on field blank contamination evaluation.

U12 = Quantified as nondetect (U) based on source water contamination evaluation.

Abbreviations for analytes:

1,1,1-TCA = 1,1,1-Trichloroethane
1,1,2-TCA = 1,1,2-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
1,2,4-TMB = 1,2,4-Trimethylbenzene
1,2-DCA = 1,2-Dichloroethane
1,2-DCB = 1,2-Dichlorobenzene
1,2-DCP = 1,2-Dichloropropane
1,3,5-TMB = 1,3,5-Trimethylbenzene
cis-1,2-DCE = cis-1,2-Dichloroethene
PCE = Tetrachloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
TCE = Trichloroethene
MTBE = Methyl tertiary-butyl ether

Table 3
Arsenic in Groundwater Monitoring Wells
Third and Fourth Quarters 2014
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

DTSC Cleanup Goal (mg/L)			0.036
Well Number	**Notes**	**Date Sampled**	**Arsenic**
CDM-101		29-Oct-14	**0.049**
DUP		29-Oct-14	**0.05**
CDM-102		29-Oct-14	0.0076
CDM-103		27-Oct-14	< 0.005
DUP		27-Oct-14	< 0.005
CDM-104		30-Oct-14	< 0.005
CDM-105		28-Oct-14	**0.06**
CDM-106		28-Oct-14	**1.8**
CDM-107		29-Oct-14	0.0098
CDM-108		08-Jul-14	**0.22**
DUP		08-Jul-14	**0.23**
CDM-108		29-Oct-14	**0.17**
CDM-109		30-Oct-14	**0.25**
LF-36		31-Oct-14	**0.039**
DUP		31-Oct-14	0.035
LF-37		28-Oct-14	0.0069
LF-40		28-Oct-14	0.0093
LF-41		28-Oct-14	**0.069**
DUP		28-Oct-14	**0.069**
LF-42		30-Oct-14	< 0.005
DUP		30-Oct-14	< 0.005
MW-3		30-Oct-14	**0.074**
RP-1		31-Oct-14	**0.08**
RP-2		30-Oct-14	**0.045**
RP-3		28-Oct-14	0.0057
RP-4		30-Oct-14	0.0061
RP-5		30-Oct-14	0.012

Notes: All notes are listed at the end of this table - see last page.

Table 3
Arsenic in Groundwater Monitoring Wells
Third and Fourth Quarters 2014
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

DTSC Cleanup Goal (mg/L)			0.036
Well Number	**Notes**	**Date Sampled**	**Arsenic**

Data QA/QC performed by EW.

Notes:

Samples were analyzed using EPA Method 6010B.

< = Analyte was not detected at or greater than the detection limit reported.

DUP = Duplicate sample (field duplicate)

Screening levels shown are the DTSC cleanup goals assigned to the Sherwin-Williams site.

Results shown in bold are above the DTSC cleanup goal for arsenic.

Table 4
Mann-Kendall Trend Test Evaluation for Arsenic in Groundwater
Pre- and Post-Remedy Data through October 2014
The Sherwin-Williams Company
Emeryville, California

Location	Number of Samples	Number of Detections	Sum of Trend	Trend	Date Last Sampled
LF-36	48	43	-154	No Trend	10/31/2014
LF-37	36	20	-56	No Trend	10/28/2014
LF-40	36	24	34	No Trend	10/28/2014
LF-41	36	34	114	No Trend	10/28/2014
LF-42	36	19	-203	Decreasing	10/30/2014
MW-3	63	60	944	Increasing	10/30/2014
RP-1	67	65	-168	No Trend	10/31/2014
RP-2	70	61	842	Increasing	10/30/2014
RP-3	59	27	-429	Decreasing	10/28/2014
RP-4	73	64	1091	Increasing	10/30/2014
RP-5	64	51	88	No Trend	10/30/2014

Notes:

One-half of the detection limit is assumed as the actual value when the result is below the detection limit. In the case of duplicate sample results, only the primary sample result was used.

The 0.05 confidence limit is used to evaluate trend.

When the number of observations (sample size, "n") is greater than 40, a normal approximation to the Mann-Kendall test is used (Gilbert 1987). This approximation entails calculating the variance of S and using a normal distribution to test for trend.

Table 5
Mann-Kendall Trend Test Evaluation for Arsenic in Groundwater, Post-Remedy Data
April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Location	Number of Samples	Number of Detections	Sum of Trend	Trend	Date Last Sampled
CDM-101	6	6	1	No Trend	10/29/2014
CDM-102	6	3	9	Insufficient Detections	10/29/2014
CDM-103	6	3	-1	Insufficient Detections	10/27/2014
CDM-104	6	0	0	Insufficient Detections	10/30/2014
CDM-105	6	6	6	No Trend	10/28/2014
CDM-106	6	6	1	No Trend	10/28/2014
CDM-107	6	2	9	Insufficient Detections	10/29/2014
CDM-108	10	9	41	Increasing	10/29/2014
CDM-109	6	6	5	No Trend	10/30/2014
LF-36	6	6	3	No Trend	10/31/2014
LF-37	6	2	1	Insufficient Detections	10/28/2014
LF-40	6	5	1	No Trend	10/28/2014
LF-41	6	5	8	No Trend	10/28/2014
LF-42	6	0	0	Insufficient Detections	10/30/2014
MW-3	10	10	-16	No Trend	10/30/2014
RP-1	10	10	6	No Trend	10/31/2014
RP-2	6	6	3	No Trend	10/30/2014
RP-3	6	3	1	Insufficient Detections	10/28/2014
RP-4	10	10	-27	Decreasing	10/30/2014
RP-5	6	6	-2	No Trend	10/30/2014

Table 5
Mann-Kendall Trend Test Evaluation for Arsenic in Groundwater, Post-Remedy Data
April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Location	Number of Samples	Number of Detections	Sum of Trend	Trend	Date Last Sampled

Notes:

One-half of the detection limit is assumed as the actual value when the result is below the detection limit. In the case of duplicate sample results, only the primary sample result was used.

The 0.05 confidence limit is used to evaluate trend.

When the number of observations (sample size, "n") is greater than 40, a normal approximation to the Mann-Kendall test is used (Gilbert 1987). This approximation entails calculating the variance of S and using a normal distribution to test for trend.

Mann-Kendall analysis requires a minimum of four results to establish a trend. Trends were not performed for locations with less than four detections; these locations were identified as insufficient detects. All locations with insufficient detects are currently below the cleanup goal for arsenic, or are currently non-detect at a reporting limit below the cleanup goal.

Table 6
Arsenic Mass Flux in Groundwater
The Sherwin-Williams Company
Emeryville, California

Depth-to-Water Measurement Date	Sampling Date	Arsenic in Groundwater at CDM-101 (mg/L)	Arsenic in Groundwater at CDM-102 (mg/L)	C (mg/L)	K (cm/s)	i (cm/cm)	Width of transect (ft)	Saturated Thickness of Transect (ft)	A (ft^2)	CF (ft/cm)/[(sec/day) (L/ft^3)(g/mg)]	w (g/day)
4/16/2012	4/17/2012	0.033	< 0.005	0.018	1.00E-04	-0.012	70	12.72	890.40	80.3	-1.58E-03
5/14/2012				0.018	1.00E-04	-0.013	70	11.71	819.35	80.3	-1.47E-03
6/11/2012				0.018	1.00E-04	-0.008	70	11.83	827.75	80.3	-8.95E-04
7/18/2012				0.018	1.00E-04	-0.010	70	11.49	804.30	80.3	-1.15E-03
8/15/2012				0.018	1.00E-04	-0.007	70	11.73	821.10	80.3	-8.70E-04
9/13/2012				0.018	1.00E-04	-0.007	70	11.76	822.85	80.3	-8.76E-04
10/17/2012	10/19/2012	0.040	< 0.005	0.021	1.00E-04	-0.006	70	11.79	825.30	80.3	-7.84E-04
11/16/2012				0.021	1.00E-04	-0.006	70	12.11	847.70	80.3	-8.21E-04
12/14/2012				0.021	1.00E-04	-0.008	70	12.93	904.75	80.3	-1.18E-03
1/18/2013				0.021	1.00E-04	-0.007	70	12.51	875.35	80.3	-1.05E-03
2/22/2013				0.021	1.00E-04	-0.008	70	11.94	835.80	80.3	-1.07E-03
3/21/2013				0.021	1.00E-04	-0.006	70	12.16	850.85	80.3	-8.49E-04
4/19/2013	4/22/2013	0.043	< 0.005	0.023	1.00E-04	-0.008	70	12.25	857.15	80.3	-1.27E-03
7/16/2013				0.023	1.00E-04	-0.006	70	11.67	816.55	80.3	-8.94E-04
10/7/2013	10/7/2013	0.032	< 0.005	0.017	1.00E-04	-0.005	70	11.39	797.30	80.3	-4.97E-04
1/3/2014				0.017	1.00E-04	-0.005	70	11.48	803.60	80.3	-6.08E-04
4/22/2014	4/28/2014	0.016	0.0064	0.011	1.00E-04	-0.006	70	12.12	848.05	80.3	-4.37E-04
7/8/2014				0.011	1.00E-04	-0.005	70	11.51	805.35	80.3	-3.38E-04
10/27/2014	10/29/2014	0.049	0.0076	0.028	1.00E-04	-0.005	70	11.21	784.35	80.3	-8.30E-04
Average arsenic mass through transect (g/day):											**-9.20E-04**
Total annual arsenic mass through transect (based on average g/day, lb/year)											*-7.40E-04*

Notes:

Chemical mass flux through transect is calculated by (CDM Smith 2012): w = (C) (K) (i) (A) (CF)

C = concentration of chemical through transect: as stated in Section C.5.5 of O&M Plan (CDM Smith 2012), if groundwater movement is away from the former Rifkin property, C will be the average concentration of CDM-101 and CDM-102. For non-detect values, half of the reporting limit was used in the calculation

K = hydraulic conductivity: hydraulic conductivity of low permeability backfill; K value from Appendix N of the Remedy Design Implementation Plan (CDM 2011).

i = hydraulic gradient: hydraulic gradient is the average hydraulic gradient between CDM-101 and RP-3, and CDM-102 and RP-3 for each water-level event. Negative hydraulic gradient indicates flow of groundwater is away from former Rifkin property toward Sherwin-Williams property.

A = cross-sectional area associated with the transect: area is calculated using distance of CDM-101 and CDM-102, and the average saturated thickness of the transect; saturated thickness is the average saturated thickness of CDM-101 and CDM-102 during each water-level measurement event.

CF = conversion factor, 80.3 (ft/cm)/(sec/day)(L/ft^3)(g/mg); (CDM Smith 2012)

w = chemical mass through transect mg = milligram cm = centimeter ft = feet lb = pounds

< = non-detect at reporting limit shown L = liter s = second g = grams

Data entered by MG, QC by ENW.

Table 7
Groundwater Quality Remedy Effectiveness Evaluation Summary
through Fourth Quarter 2014
The Sherwin-Williams Company
Emeryville, California

Well[1]	Remedy Effectiveness Evaluation Criteria	Current Effectiveness Status	Arsenic less than CG?	VOCs less than CG?	Historical Arsenic Trend [6]	Post-Remedy Arsenic Trend	Max. Arsenic Conc. Prior to and During Remedy Implementation (mg/L)	Max. Arsenic Conc. Post Remedy Implementation (mg/L)	Most Recent Arsenic Conc. (mg/L)
Former Rifkin Property									
CDM-101	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing four years after remedy implementation, and arsenic is less than 5 mg/L four years after remedy implementation	Meets Criteria [5]	No	No[2]	NA	No Trend	NA	0.05	0.049/0.05[DUP]
CDM-102	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing four years after remedy implementation, and arsenic is less than 5 mg/L four years after remedy implementation	Meets Criteria [5]	Yes	No[3]	NA	Insufficient Detections	NA	0.0076	0.0076
RP-1[a]	Arsenic concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	No	Yes [7]	No Trend	No Trend	0.14	0.08	0.08
RP-2[a]	Arsenic concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	No	Yes [7]	Increasing	No Trend	0.042	0.045	0.045
RP-4[a]	Arsenic concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	Yes	Yes [7]	Increasing	Decreasing	0.025	0.02	0.0061
RP-5[a]	Arsenic concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	Yes	Yes [7]	No Trend	No Trend	0.038	0.012	0.012
LF-36[a]	Arsenic concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	No	Yes [7]	No Trend	No Trend	0.065	0.039	0.039 / 0.035[DUP]
LF-41[a]	Arsenic concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	No	Yes [7]	No Trend	No Trend	0.097	0.069	0.069/0.069[DUP]
Sherwin-Williams Property									
LF-18 [7]	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	Yes	Yes [7]	Decreasing	Insufficient Data	0.048	< 0.005	< 0.005
CDM-103	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	Yes	Yes [7]	NA	Insufficient Detections	NA	0.015	< 0.005/ < 0.005[DUP]
CDM-104	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria [5]	Yes	No [4][7]	NA	Insufficient Detections	NA	< 0.005	< 0.005
CDM-107	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	Yes	Yes	NA	Insufficient Detections	NA	0.0098	0.0098
CDM-108	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Does Not Meet Criteria	No	Yes	NA	Increasing	NA	0.22/0.23 [DUP]	0.17
CDM-109	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	No	Yes [7]	NA	No Trend	NA	0.38	0.25
CDM-112 [7]	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	Yes	Yes [7]	NA	Insufficient Data	NA	< 0.005	< 0.005
Union Pacific Property									
LF-24 [7]	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	Yes	Yes [7]	Decreasing	Insufficient Data	0.024	< 0.005	< 0.005
LF-25 [7]	COC concentrations are less than site cleanup goals or their trends are statistically stable to decreasing	Meets Criteria	Yes	Yes [7]	Decreasing	Insufficient Data	0.16	0.031	0.021

Notes:
All arsenic concentrations presented in mg/L.
Groundwater quality effectiveness based on criteria established in O&M Plan (CDM Smith 2012).
1 - Table limited to wells with established groundwater quality remedy effectiveness evaluation criteria; see O&M Plan Table C-2.
2 - 1,2-dichloroethane detected at 0.0008 mg/L in October 2014; cleanup goal for 1,2-dichloroethane is 0.0005 mg/L.
3 - 1,2-dichloroethane detected at 0.0011 mg/L in October 2014; cleanup goal for 1,2-dichloroethane is 0.0005 mg/L.
4 - 1,2-dichloroethane detected at 0.0008 mg/L in April 2014; cleanup goal for 1,2-dichloroethane is 0.0005 mg/L.
5 - Meets criteria based on natural attenuation remedy; VOC trends will be evaluated during 5-year review.
6 - Trend includes pre remedy implementation data.
7 - Not monitored during October 2014 event.
a - Designated Rifkin Guard Well.
COC - contaminant of concern
[DUP] - duplicate sample for same event
mg/L - milligram per liter
VOCs - volatile organic compounds
Conc. - concentration
CG - cleanup goal: 0.036 mg/L for arsenic, varies for VOCs

Mann-Kendall analysis requires a minimum of four results to establish a trend. Trends were not performed for locations with less than four detections; these locations were identified as insufficient detects.
All locations with insufficient detects are currently below the cleanup goal for arsenic, or are currently non-detect at a reporting limit below the cleanup goal.
NA - not available. CDM-101 through CDM-114 were installed in 2012 as part of remedy implementation.

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Figures



LEGEND

LF-12	⊕	A-zone monitoring well
PZ-101	⊕	A-zone piezometer
EX-8	⊘	Extraction well
LF-10	⊕	A-zone monitoring well abandoned
LF-B3	◑	B-zone monitoring well abandoned
LF-PZ1	⊕	A-zone piezometer abandoned
EX-8	⊘	Extraction well abandoned
MD-5	⊠	South Bayfront Project Area monitoring well

- Property Boundary
- Original Slurry Wall
- Slurry Wall Extension
- Slurry Wall Breach
- Interceptor Trench and Membrane Barrier

- Water channel (aboveground/underground)
- Building
- Former building
- Saturated Zone Excavation, Excavated to EL -11 Feet. Backfilled with High Permeability Backfill from EL -11 Feet to 10 Feet, and Low Permeability Backfill from EL 10 Feet to Surface
- Excavated to EL 0 Feet and Backfilled with Low Permeability Backfill
- Excavated to EL -11 Feet and Backfilled with Low Permeability Backfill

N E S W

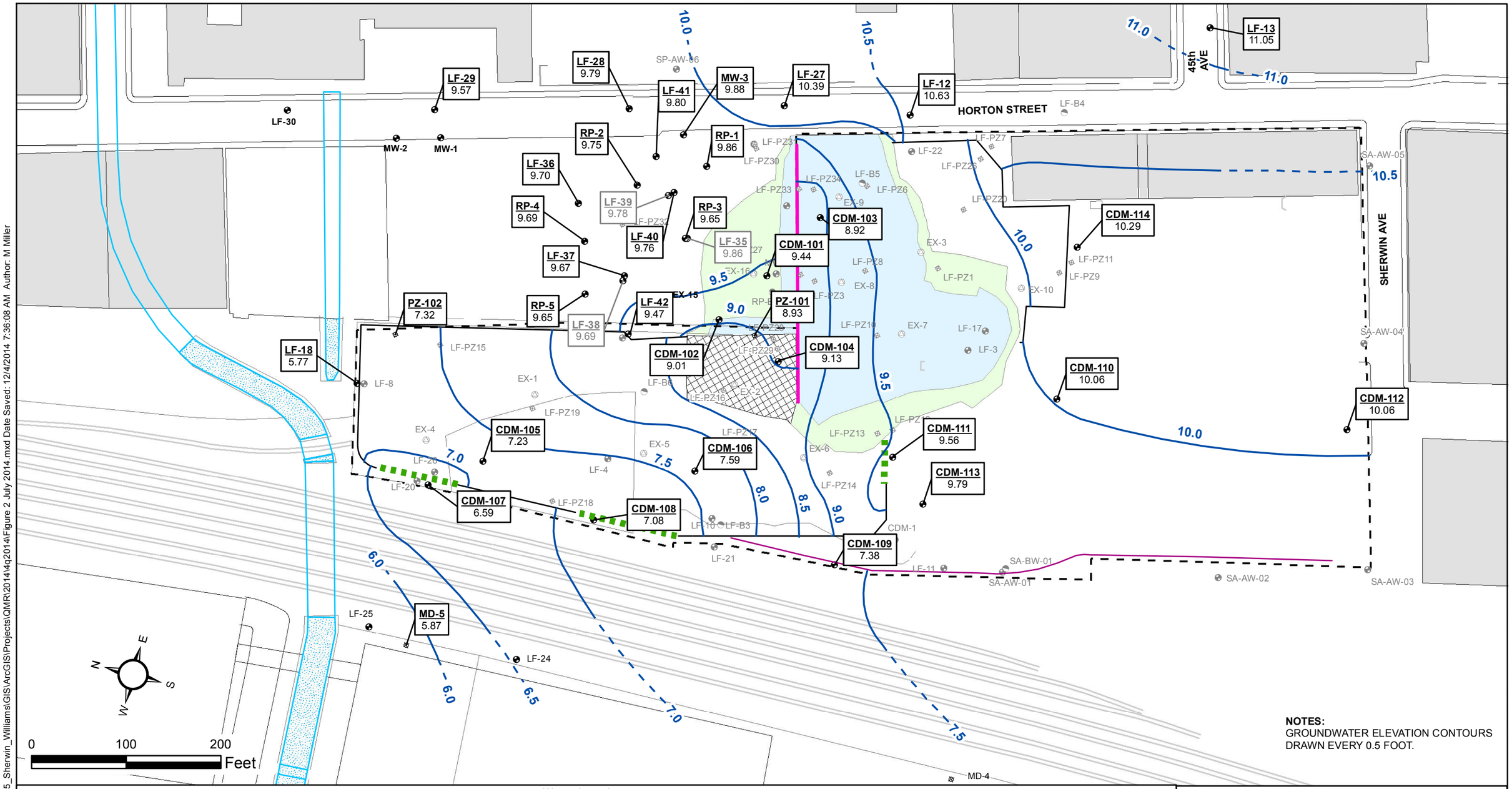
0 100 200 Feet

SHERWIN-WILLIAMS COMPANY, EMERYVILLE, CA

SITE PLAN

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FIGURE 1



NOTES:
GROUNDWATER ELEVATION CONTOURS DRAWN EVERY 0.5 FOOT.

LEGEND

LF-12	A-zone monitoring well
PZ-101	A-zone piezometer
EX-15	Extraction well
LF-10	A-zone monitoring well abandoned
LF-B3	B-zone monitoring well abandoned
LF-PZ1	A-zone piezometer abandoned
EX-8	Extraction well abandoned
MD-5	South Bayfront Project Area monitoring well

- Property boundary
- Original Slurry Wall
- Slurry Wall Extension
- Slurry Wall Breach
- Interceptor Trench and Membrane Barrier
- Groundwater Elevation Contour (Dashed Where Inferred)
- Water channel (aboveground/underground)
- Building
- Former building
- Saturated Zone Excavation, Excavated to EL -11 Feet. Backfilled with High Permeability Backfill from EL -11 Feet to 10 Feet, and Low Permeability Backfill from EL 10 Feet to Surface
- Excavated to EL 0 Feet and Backfilled with Low Permeability Backfill
- Excavated to EL -11 Feet and Backfilled with Low Permeability Backfill

LF-42 9.47 — LOCATION ID; GROUNDWATER ELEVATION (FEET NAVD 88)

LF-35 9.86 — A-ZONE WELLS SCREENED IN THE LOWER PORTION OF THE A-ZONE. DATA NOT USED IN CONTOURING

SHERWIN-WILLIAMS COMPANY, EMERYVILLE, CA

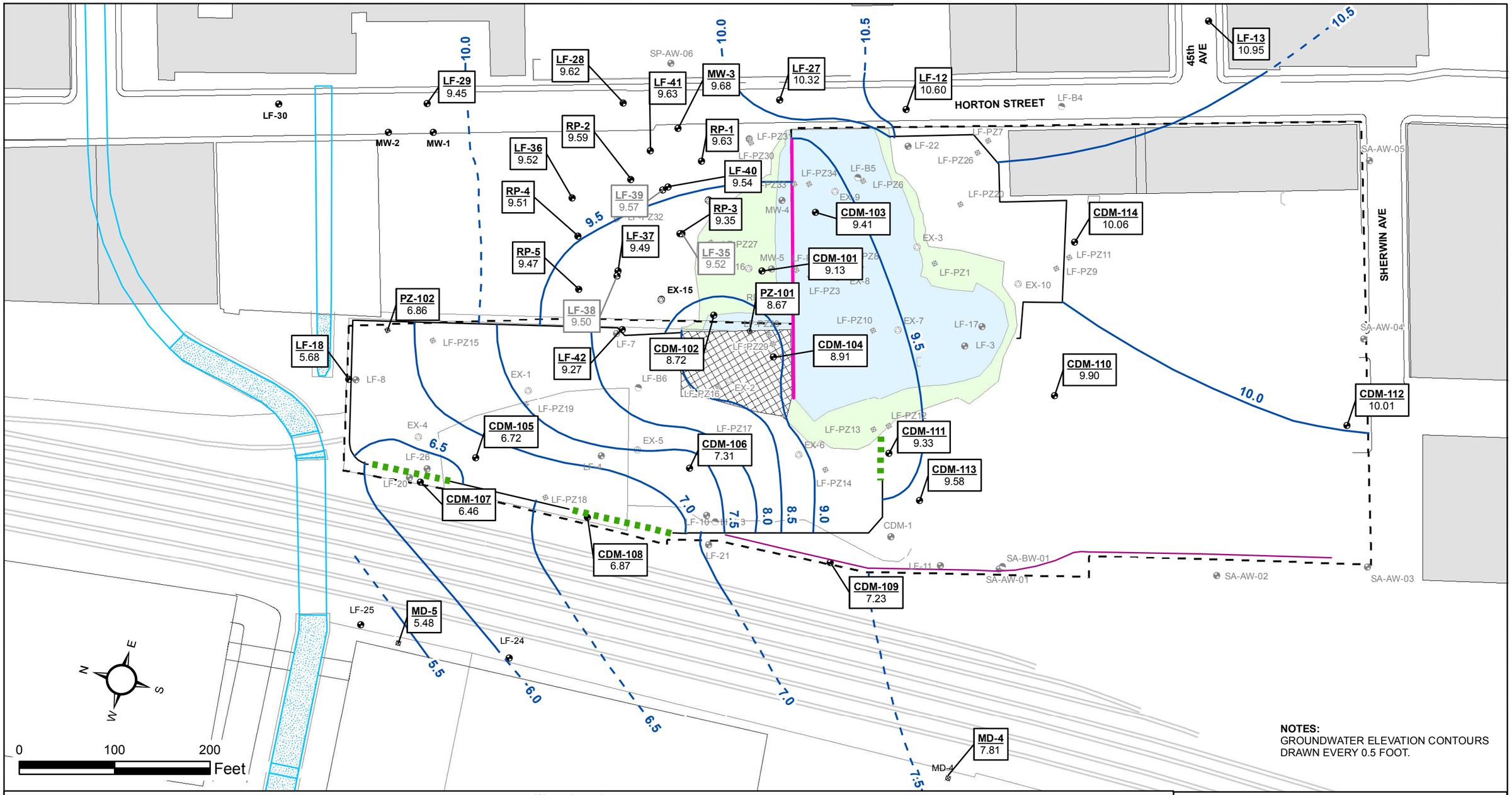
GROUNDWATER ELEVATION CONTOURS A-ZONE GROUNDWATER JULY 8, 2014

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FIGURE 2

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NOTES:
GROUNDWATER ELEVATION CONTOURS DRAWN EVERY 0.5 FOOT.

LEGEND

- LF-12 — A-zone monitoring well
- PZ-101 — A-zone piezometer
- EX-15 — Extraction well
- LF-10 — A-zone monitoring well abandoned
- LF-B3 — B-zone monitoring well abandoned
- LF-PZ1 — A-zone piezometer abandoned
- EX-8 — Extraction well abandoned
- MD-5 — South Bayfront Project Area monitoring well

- Property boundary
- Original Slurry Wall
- Slurry Wall Extension
- Slurry Wall Breach
- Interceptor Trench and Membrane Barrier
- Groundwater Elevation Contour (Dashed Where Inferred)

- Water channel (aboveground/underground)
- Building
- Former building
- Saturated Zone Excavation, Excavated to EL -11 Feet. Backfilled with High Permeability Backfill from EL -11 Feet to 10 Feet, and Low Permeability Backfill from EL 10 Feet to Surface
- Excavated to EL 0 Feet and Backfilled with Low Permeability Backfill
- Excavated to EL -11 Feet and Backfilled with Low Permeability Backfill

CDM-110 9.90 — LOCATION ID; GROUNDWATER ELEVATION (FEET NAVD 88)

LF-38 9.50 — A-ZONE WELLS SCREENED IN THE LOWER PORTION OF THE A-ZONE. DATA NOT USED IN CONTOURING

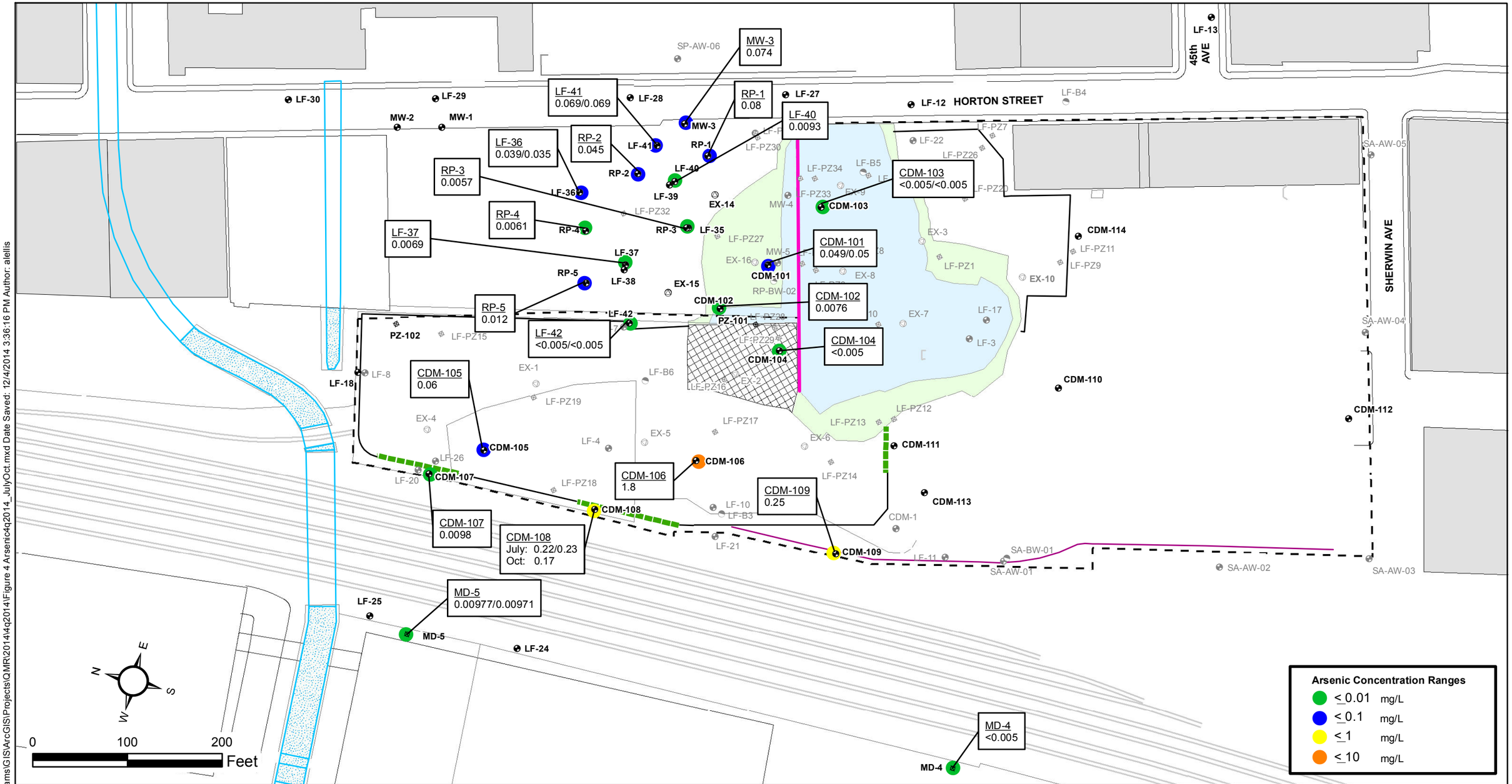
NOTES:
MD-4 Monitored By SLR Consulting
MD-5 Monitored By EKI Personnel

SHERWIN-WILLIAMS COMPANY, EMERYVILLE, CA

GROUNDWATER ELEVATION CONTOURS A-ZONE GROUNDWATER OCTOBER 27, 2014

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FIGURE 3



LEGEND

- LF-12 — A-zone monitoring well
- PZ-101 — A-zone piezometer
- EX-8 — Extraction well
- LF-10 — A-zone monitoring well abandoned
- LF-B3 — B-zone monitoring well abandoned
- LF-PZ1 — A-zone piezometer abandoned
- EX-8 — Extraction well abandoned
- MD-5 — South Bayfront Project Area monitoring well

- Property boundary
- Original Slurry Wall
- Slurry Wall Extension
- Slurry Wall Breach
- Interceptor Trench and Membrane Barrier

- Water channel (aboveground/underground)
- Building
- Former building
- Saturated Zone Excavation, Excavated to EL -11 Feet. Backfilled with High Permeability Backfill from EL -11 Feet to 10 Feet, and Low Permeability Backfill from EL 10 Feet to Surface
- Excavated to EL 0 Feet and Backfilled with Low Permeability Backfill
- Excavated to EL -11 Feet and Backfilled with Low Permeability Backfill

NOTES:
MD-4 IS MONITORED BY SLR PERSONNEL AND MD-5 IS MONITORED BY EKI PERSONNEL

CDM-108 (Location ID)
July: 0.22/0.23
Oct: 0.17 (Duplicate Result)
Result (Data is from October 2014 unless noted)

SHERWIN-WILLIAMS COMPANY, EMERYVILLE, CA

CONCENTRATIONS OF DISSOLVED ARSENIC, A-ZONE GROUNDWATER, JULY AND OCTOBER 2014

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FIGURE 4

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Appendix A

Summary of QA/QC

Table A-1a
Summary of Sampling QA/QC - Third Quarter 2014
Groundwater Extraction and Monitoring Wells
The Sherwin-Williams Company, Emeryville, California

Site Name:	**Site Address:**	**Monitoring Period Covered:**
The Sherwin-Williams Facility (EM002616.0014)	1450 Sherwin Avenue Emeryville, California	July 1, 2014 through September 30, 2014

Sampling Performed By: Miljan Draganic and Adam Kinnard

Firm Name: ARCADIS U.S., Inc.
Firm Address: 2000 Powell Street, 7th Floor, Emeryville, California
Firm Contact: Lucas Goldstein
Firm Telephone Number: (510) 652-4500

Were chain-of-custody forms completed for all samples?	☑ Yes	☐ No
Were field parameters stabilized prior to taking samples?	☑ Yes	☐ No
For VOCs samples, was there zero head space in sample containers?	☑ Yes	☐ No
Were samples preserved according to analytical method?	☑ Yes	☐ No
Were the required field QA/QC samples taken?	☑ Yes	☐ No

For any questions above answered with "No", please provide an explanation:

Data entered by ENW; proofed by MG.

Table A-1b
Summary of Sampling QA/QC - Fourth Quarter 2014
Groundwater Extraction and Monitoring Wells
The Sherwin-Williams Company, Emeryville, California

Site Name:	**Site Address:**	**Monitoring Period Covered:**
The Sherwin-Williams Facility (EM002616.0014)	1450 Sherwin Avenue Emeryville, California	October 1, 2014 through December 31, 2014

Sampling Performed By: Miljan Draganic, and Miguel Gomez

Firm Name: ARCADIS U.S., Inc.
Firm Address: 2000 Powell Street, 7th Floor, Emeryville, California
Firm Contact: Lucas Goldstein
Firm Telephone Number: (510) 652-4500

Were chain-of-custody forms completed for all samples?	☑ Yes	☐ No
Were field parameters stabilized prior to taking samples?	☑ Yes	☐ No
For VOCs samples, was there zero head space in sample containers?	☑ Yes	☐ No
Were samples preserved according to analytical method?	☑ Yes	☐ No
Were the required field QA/QC samples taken?	☑ Yes	☐ No

For any questions above answered with "No", please provide an explanation:

Data entered by ENW; proofed by MG.

Table A-2a
Summary of Analytical QA/QC - Third Quarter 2014
Groundwater Extraction and Monitoring Wells
The Sherwin-Williams Company, Emeryville, California

Site Name:	**Site Address:**	**Monitoring Period Covered:**
The Sherwin-Williams Facility (EM002616.0014)	1450 Sherwin Avenue Emeryville, California	July 1, 2014 through September 30, 2014

Sampling Performed By: Miljan Draganic and Adam Kinnard
Lab Name: Curtis & Tompkins, Ltd.
Lab Address: 2323 Fifth Street, Berkeley, California 94710
Lab Contact: Tracy Babjar
Lab Telephone Number: (510) 486-0900

Analytical QA/QC Performed By:
Firm Name: ARCADIS U.S., Inc.
Firm Address: 1100 Olive Way, Suite 800, Seattle, WA 98101
Firm Contact: Erica Whiting
Firm Telephone Number: (206) 726-4743

Analytical Method Used: (check applicable methods)

- ☑ Arsenic by EPA Method 6010 B
- ☐ Cadmium by EPA Method_____
- ☐ Chromium (total) by EPA Method_____
- ☐ Chromium (hexavalent)
- ☐ Copper by EPA Method_____
- ☐ Lead by EPA Method_____
- ☐ Mercury by EPA Method_____
- ☐ Nickel by EPA Method_____
- ☐ Selenium by EPA Method_____
- ☐ Silver by EPA Method_____
- ☐ Zinc by EPA Method_____
- ☐ Halogenated Volatile Organics by EPA Method 601 or 8010
- ☐ Aromatic and Unsaturated Volatile Organics by EPA 602 or 8020
- ☐ Volatile Organics by EPA Method 624 or 8240 or 8260
- ☐ Semivolatile Organics by EPA Method 625 or 8270
- ☐ EDB and DBCP by EPA Method 504
- ☐ TPH gasoline by EPA Method 8260
- ☐ TPH diesel by EPA Method 8015 modified
- ☐ TPH motor oil by EPA Method 8015 modified

Is the lab state-certified for the above analytical method(s)?	☑ Yes ☐ No
Were analyses performed according to standard methods?	☑ Yes ☐ No
Were sample holding times met?	☑ Yes ☐ No
Were all reported analytical results values above MDLs?	☑ Yes ☐ No
Were QA/QC samples (i.e., blanks, field replicates, spikes, and surrogates) analyzed in accordance and consistent with the analytical method?	☑ Yes ☐ No
Did QA/QC results meet all acceptance criteria?	☑ Yes ☐ No
Are QA/QC results and acceptance criteria on file?	☑ Yes ☐ No

For any questions above answered with "No", please provide an explanation: *

Data entered by ENW; proofed by MG.

Table A-2b
Summary of Analytical QA/QC - Fourth Quarter 2014
Groundwater Extraction and Monitoring Wells
The Sherwin-Williams Company, Emeryville, California

Site Name:	**Site Address:**	**Monitoring Period Covered:**
The Sherwin-Williams Facility (EM002616.0014)	1450 Sherwin Avenue Emeryville, California	October 1, 2014 through December 31, 2014

Sampling Performed By: Miljan Draganic and Miguel Gomez
Lab Name: Curtis & Tompkins, Ltd.
Lab Address: 2323 Fifth Street, Berkeley, California 94710
Lab Contact: Tracy Babjar
Lab Telephone Number: (510) 486-0900

Analytical QA/QC Performed By:
Firm Name: ARCADIS U.S., Inc.
Firm Address: 1100 Olive Way, Suite 800, Seattle, WA 98101
Firm Contact: Erica Whiting
Firm Telephone Number: (206) 726-4743

Analytical Method Used: (check applicable methods)

- [x] Arsenic by EPA Method 6010 B
- [ ] Cadmium by EPA Method_____
- [ ] Chromium (total) by EPA Method_____
- [ ] Chromium (hexavalent)
- [ ] Copper by EPA Method_____
- [ ] Lead by EPA Method_____
- [ ] Mercury by EPA Method_____
- [ ] Nickel by EPA Method_____
- [ ] Selenium by EPA Method_____
- [ ] Silver by EPA Method_____
- [ ] Zinc by EPA Method_____
- [ ] Halogenated Volatile Organics by EPA Method 601 or 8010
- [ ] Aromatic and Unsaturated Volatile Organics by EPA 602 or 8020
- [x] Volatile Organics by EPA Method 624 or 8240 or 8260
- [ ] Semivolatile Organics by EPA Method 625 or 8270
- [ ] EDB and DBCP by EPA Method 504
- [ ] TPH gasoline by EPA Method 8260
- [ ] TPH diesel by EPA Method 8015 modified
- [ ] TPH motor oil by EPA Method 8015 modified

Is the lab state-certified for the above analytical method(s)?	[x] Yes [ ] No
Were analyses performed according to standard methods?	[x] Yes [ ] No
Were sample holding times met?	[x] Yes [ ] No
Were all reported analytical results values above MDLs?	[x] Yes [ ] No
Were QA/QC samples (i.e., blanks, field replicates, spikes, and surrogates) analyzed in accordance and consistent with the analytical method?	[x] Yes [ ] No
Did QA/QC results meet all acceptance criteria?	[x] Yes [ ] No
Are QA/QC results and acceptance criteria on file?	[x] Yes [ ] No

Table A-2b
Summary of Analytical QA/QC - Fourth Quarter 2014
Groundwater Extraction and Monitoring Wells
The Sherwin-Williams Company, Emeryville, California

Site Name:	Site Address:	Monitoring Period Covered:
The Sherwin-Williams Facility (EM002616.0014)	1450 Sherwin Avenue Emeryville, California	October 1, 2014 through December 31, 2014

For any questions above answered with "No", please provide an explanation: *

-The analytical laboratory reported that many analytes were detected between the method detection limit and the reporting limit in the method blank for batch 217173; these analytes were not detected in samples at or above the reporting limit; therefore, no corrective actions were necessary.

-Common laboratory contaminant compound acetone, and compounds benzene, toluene, and 2-hexanone were detected in the blank samples listed below. Where compounds were detected in blanks, associated groundwater samples collected may be qualified. In accordance with the Quality Assurance Project Plan (QAPP; LFR 2006), field sample results are considered positive results only if the concentrations in the field sample exceed 10 times the maximum amount detected in their associated blank for common laboratory contaminants, and exceed 5 times the maximum amount detected in their associated blank for other compounds. If the detected concentration in a field sample is less than 5 or 10 times the concentration detected in the blank, then the result was qualified non-detect. Because acetone was detected in the field blank and associated samples in estimated concentrations, groundwater samples associated with the field blanks were qualified as non-detect equal to their respective reporting limits.

-Acetone was detected at a concentration of 0.0011 mg/L in the trip blank sample submitted on October 29, 2014. In accordance with the QAPP, samples collected during the same day may be qualified. Acetone was detected in the primary and duplicate samples from CDM-101, and in the sample from CDM-102. Because the acetone detections in the source and submersible field blank samples were higher than the trip blank sample, these detections of acetone were qualified as described below.

-Acetone, benzene, toluene, and 2-hexanone were detected at a concentration of 0.02 mg/L, an estimated concentration of 0.0001 mg/L, an estimated concentration of 0.0003 mg/L, and an estimated concentration of 0.0006 mg/L, respectively, in the HydraSleeve field blank sample collected from associated monitoring well CDM-102. Acetone, benzene, toluene, and 2-hexanone were also detected at a concentration of 0.021 mg/L, an estimated concentration of 0.0001 mg/L, an estimated concentration of 0.0003 mg/L, and an estimated concentration of 0.0007 mg/L, respectively, in the submersible pump field blank sample. Acetone was detected at estimated concentrations of 0.0006 mg/L and 0.0009 mg/L in the sample collected from CDM-102. Because the acetone result in CDM-102 was less than 10 times the blank concentration, the result was qualified as non-detect with a reporting limit of 0.01 mg/L.

-Acetone, toluene, and 2-hexanone were detected at a concentration of 0.015 mg/L, an estimated concentration of 0.0003 mg/l, and an estimated concentration of 0.0004 mg/L, respectively, in the source blank sample collected on October 29, 2014. In accordance with the QAPP, samples collected within the same batch as the water blank sample may be qualified. Acetone was detected in the primary and duplicate samples from CDM-101 at estimated concentrations of 0.0008 mg/L and 0.0009 mg/L, respectively. Because the acetone results in CDM-101 were less than 10 times the blank concentration, the results were qualified as non-detect with a reporting limit of 0.01 mg/L.

Data entered by ENW; proofed by MG.

ARCADIS

Appendix B

Field Parameters Measured
Post Remedy Implementation

Appendix B-1
Field Parameters Measured During Purging and Sampling, April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Date Sampled	Well Volume (gallons)	Approximate Volume Purged (gallons)	pH	Temperature (degrees Celsius)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTU)	Notes
CDM-101	04/17/12	2.0	6.0	6.17	17.7	2.522	2.03	-68.7	1103.4	
CDM-101	10/19/12	1.8	5.8	6.38	19.7	2.740	3.72	-55.6	1,112.6	
CDM-101	04/22/13	1.9	8.0	6.10	18.7	2.556	2.67	-67.1	86.9	
CDM-101	10/07/13	1.7	6.5	6.22	22.8	3.638	3.27	-41.0	282.1	
CDM-101	04/28/14	1.8	6.0	6.44	21.8	3.453	1.82	-9.5	668.0	
CDM-101	10/29/14	1.7	6.0	6.11	22.9	3.744	2.30	-59.1	45.8	
CDM-102	04/17/12	2.0	6.0	6.05	17.9	4.209	1.81	-56.7	669.8	
CDM-102	10/19/12	1.8	5.5	6.25	20.1	4.354	5.11	-76.8	349.5	
CDM-102	04/22/13	1.8	8.0	6.00	18.9	3.753	2.83	-78.1	46.6	
CDM-102	10/07/13	1.7	6.8	6.20	22.0	3.745	3.33	-65.5	222.2	
CDM-102	04/28/14	1.8	6.0	6.33	23.9	3.961	1.09	-38.1	148.0	
CDM-102	10/29/14	1.7	6.0	5.98	20.6	3.364	2.19	-105.6	22.5	
CDM-103	04/18/12	1.7	5.2	6.57	17.1	4.207	2.21	138.4	306.1	
CDM-103	10/22/12	2.0	6.0	7.39	19.2	4.488	5.35	27.5	1,250.7	
CDM-103	04/24/13	2.0	6.5	6.48	18.2	3.987	2.41	-34.1	17.3	
CDM-103	10/09/13	2.0	6.0	6.29	20.3	4.458	4.09	66.9	410.3	
CDM-103	04/29/14	2.0	6.0	6.69	25.9	4.960	2.28	-6.0	7.7	
CDM-103	10/27/14	1.8	6.0	6.68	21.6	5.505	2.40	13.5	5.2	
CDM-104	04/18/12	1.9	5.6	6.41	16.8	2.126	1.15	125.7	1606.7	
CDM-104	10/22/12	1.8	5.8	7.55	20.3	1.894	3.60	21.2	2,218.2	
CDM-104	04/24/13	1.9	12.0	6.54	17.8	1.759	3.44	1.9	388.0	
CDM-104	10/09/13	1.7	6.0	6.44	22.0	1.947	2.67	51.3	817.0	
CDM-104	04/25/14	1.9	6.0	6.82	17.9	1.664	0.87	-22.0	57.3	
CDM-104	05/13/14	1.8	12.0	7.02	22.9	1.395	1.23	37.3	522.0	
CDM-104	10/30/14	1.7	6.0	6.72	21.9	1.655	1.42	96.3	734.0	
CDM-105	04/18/12	1.7	5.1	6.46	17.7	1.083	0.43	-56.3	711.0	
CDM-105	10/22/12	1.5	4.5	6.58	20.7	1.099	4.68	-109.5	490.2	
CDM-105	04/24/13	1.6	6.0	6.51	16.6	1.011	3.46	-107.1	210.1	
CDM-105	10/07/13	1.4	4.2	6.71	21.8	1.153	8.37	-96.9	138.5	(1)
CDM-105	04/25/14	1.6	4.5	6.56	15.4	1.071	1.35	-49.3	24.9	

Appendix B-1
Field Parameters Measured During Purging and Sampling, April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Date Sampled	Well Volume (gallons)	Approximate Volume Purged (gallons)	pH	Temperature (degrees Celsius)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTU)	Notes
CDM-105	05/13/14	1.6	8.0	6.75	24.7	0.947	1.98	-91.1	171.0	
CDM-105	10/28/14	1.4	4.5	6.53	22.2	1.201	1.08	-96.9	43.5	
CDM-106	04/18/12	1.7	5.2	6.39	17.0	0.906	1.08	-101.6	727.4	
CDM-106	10/22/12	1.5	4.5	6.33	20.9	1.454	4.36	-114.2	866.1	
CDM-106	04/24/13	1.5	5.0	6.35	17.0	1.245	2.91	-105.9	80.2	
CDM-106	10/09/13	1.5	4.5	6.29	21.1	1.168	2.28	-2.0	626.3	
CDM-106	04/25/14	1.6	4.5	6.37	17.6	1.095	1.49	-4.5	63.0	
CDM-106	05/13/14	1.5	4.5	6.87	29.4	0.997	0.94	-49.9	431.0	
CDM-106	10/28/14	1.5	4.5	6.35	23.0	1.085	0.87	-98.6	83.0	
CDM-107	04/18/12	1.4	4.1	6.60	16.9	1.490	0.10	-59.9	856.3	
CDM-107	10/19/12	1.3	4.5	7.15	19.2	1.481	3.90	-117.5	905.5	
CDM-107	04/23/13	1.4	4.5	6.60	17.4	1.236	2.14	-100.1	329.0	
CDM-107	10/07/13	1.3	3.9	6.70	20.1	1.548	7.48	-96.9	264.7	(1)
CDM-107	04/25/14	1.4	4.5	7.47	17.0	1.458	0.44	-129.0	68.5	
CDM-107	05/13/14	1.4	4.2	7.36	22.3	1.324	2.73	-125.4	63.3	
CDM-107	10/29/14	1.3	4.5	6.52	21.7	1.530	2.33	-41.3	30.4	
CDM-108	04/18/12	1.5	4.5	6.69	17.5	1.212	2.27	-127.1	1356.8	
CDM-108	10/19/12	1.5	4.5	7.15	19.5	1.204	3.95	-115.7	1,192.4	
CDM-108	04/24/13	1.5	6.0	6.71	17.3	1.151	3.09	-108.0	364.0	
CDM-108	10/07/13	1.6	5.8	6.79	20.7	1.408	7.49	-91.6	1,083.6	(1)
CDM-108	12/02/13	1.5	6.0	6.74	18.5	1.306	1.85	-91.6	987.0	
CDM-108	01/03/14	1.5	4.5	6.66	19.1	1.224	0.91	-130.2	144.0	
CDM-108	02/12/14	1.6	6.0	6.63	17.7	1.294	1.06	-84.6	348.0	
CDM-108	04/25/14	1.4	6.0	7.20	17.0	1.141	2.00	-185.0	61.3	
CDM-108	05/13/14	1.5	4.5	7.41	22.6	1.363	0.78	-91.0	357.0	
CDM-108	07/08/14	1.5	7.5	7.78	20.5	1.290	0.64	-148.0	124.0	
CDM-108	10/29/14	1.5	4.5	6.60	22.7	1.473	0.79	-116.4	75.8	
CDM-109	04/19/12	1.5	6.0	6.83	17.3	1.655	3.34	-16.4	2329.5	
CDM-109	10/22/12	1.4	4.5	6.83	21.0	1.433	3.09	-7.6	480.6	
CDM-109	04/24/13	1.5	4.5	6.71	16.7	1.549	3.96	107.1	499.1	

Appendix B-1
Field Parameters Measured During Purging and Sampling, April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Date Sampled	Well Volume (gallons)	Approximate Volume Purged (gallons)	pH	Temperature (degrees Celsius)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTU)	Notes
CDM-109	10/09/13	1.4	6.0	6.62	21.6	1.539	2.52	92.6	812.0	
CDM-109	04/25/14	1.5	6.0	6.92	15.6	1.763	2.28	-11.2	35.6	
CDM-109	05/13/14	1.5	4.5	7.28	26.3	1.706	2.19	-13.3	131.0	
CDM-109	10/30/14	1.4	4.5	6.90	22.4	1.668	0.79	-32.7	26.9	
CDM-110	04/18/12	2.3	6.9	6.72	16.5	0.820	3.82	-29.6	521.2	
CDM-110	10/22/12	2.0	10.0	6.75	21.3	0.820	3.01	-135.5	300.3	
CDM-110	04/23/13	2.0	8.0	6.76	18.0	0.672	2.02	-119.1	83.5	
CDM-110	10/08/13	1.9	8.0	6.71	22.7	0.797	1.60	-114.3	204.0	
CDM-110	04/24/14	2.1	6.0	6.80	19.6	0.939	2.50	-47.7	816.0	
CDM-111	04/18/12	2.3	6.9	6.72	16.5	0.983	1.93	-137.1	541.0	
CDM-111	10/22/12	1.9	5.8	7.79	19.7	0.883	2.72	-137.8	1,898.2	
CDM-111	04/23/13	2.0	6.0	6.59	16.6	0.867	2.22	-130.1	349.1	
CDM-111	10/08/13	2.4	7.2	6.71	21.9	1.130	4.10	-91.2	404.2	
CDM-111	04/24/14	2.0	6.0	6.75	19.3	1.021	0.80	-47.2	1,219.0	
CDM-112	04/19/12	2.2	6.6	6.77	17.4	0.636	3.00	133.2	690.1	
CDM-112	04/24/13	2.0	6.0	6.70	17.1	0.550	2.52	-80.6	167.1	
CDM-112	04/29/14	2.1	6.3	6.76	21.4	0.766	1.11	-20.4	867.0	
CDM-113	04/19/12	2.1	6.3	6.71	16.8	1.060	2.67	-88.6	869.9	
CDM-113	04/24/13	2.0	6.0	6.69	16.9	0.936	3.81	-132.1	165.1	
CDM-113	04/24/14	2.0	7.5	6.74	20.2	1.041	0.79	-36.0	2,020.0	
CDM-114	04/18/12	2.4	7.2	6.54	16.9	1.772	3.96	-104.1	340.0	
CDM-114	10/19/12	1.7	6.0	7.09	20.5	1.841	3.70	-140.4	549.0	
CDM-114	04/23/13	2.1	7.5	6.63	15.9	0.976	2.62	-111.1	12.7	
CDM-114	04/24/14	2.2	6.0	7.00	20.9	1.143	1.53	-14.9	20.0	
LF-12	04/18/12	1.6	4.7	6.35	17.6	0.384	4.81	63.8	685.1	
LF-12	04/23/13	1.5	4.5	6.56	18.3	0.295	4.37	61.3	341.0	
LF-12	04/24/14	1.6	6.0	7.30	18.2	0.384	1.09	76.0	82.0	
LF-18	04/16/12	1.8	7.2	6.44	18.0	0.604	5.21	182.0	7.3	
LF-18	04/23/13	1.4	4.5	6.50	18.1	0.662	2.39	-37.1	6.8	
LF-18	04/29/14	1.4	4.5	6.89	23.9	0.839	2.43	-23.0	4.7	

Appendix B-1
Field Parameters Measured During Purging and Sampling, April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Date Sampled	Well Volume (gallons)	Approximate Volume Purged (gallons)	pH	Temperature (degrees Celsius)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTU)	Notes
LF-24	04/16/12	2.2	8.8	6.34	16.5	0.781	3.25	195.8	124.8	
LF-24	04/19/13	2.1	8.5	6.53	16.8	0.580	1.52	14.7	4.0	
LF-24	05/13/14	2.1	6.0	6.94	25.9	0.675	2.01	37.2	35.5	
LF-25	04/16/12	2.1	10.3	6.79	15.5	1.222	4.71	-100.1	49.1	
LF-25	04/19/13	1.9	6.0	7.05	15.9	0.865	3.23	-96.1	11.2	
LF-25	05/13/14	1.9	6.0	7.30	20.1	1.372	2.19	-6.1	235.0	
LF-28	04/18/12	1.9	5.8	6.55	18.6	0.287	1.54	-26.4	65.1	
LF-28	04/23/13	1.8	6.0	6.64	19.6	0.210	3.49	2.4	39.7	
LF-28	04/24/14	1.7	6.0	7.40	18.0	0.284	5.16	-14.1	39.0	
LF-35	04/17/12	3.3	9.9	6.18	20.0	1.832	5.34	-43.6	26.1	
LF-35	10/23/12	2.9	18.0	6.31	20.1	1.616	2.70	-47.3	12.3	
LF-35	04/22/13	3.0	9.0	6.22	20.8	1.271	2.79	-20.1	39.2	
LF-35	04/28/14	3.0	9.0	6.48	25.1	1.483	3.05	9.7	77.7	
LF-36	04/17/12	1.3	4.0	6.57	18.4	0.147	2.87	6.8	846.2	
LF-36	10/23/12	1.1	3.4	7.07	21.0	0.163	3.93	-72.4	774.0	
LF-36	04/22/13	1.2	4.0	6.72	18.4	0.190	2.86	-69.7	12.7	
LF-36	10/08/13	1.0	3.2	6.69	22.8	0.359	3.14	-57.4	308.4	
LF-36	04/29/14	1.3	3.9	6.63	20.9	0.292	1.50	-64.0	99.7	
LF-36	10/31/14	1.0	3.0	6.61	20.5	0.313	1.33	-17.2	64.9	
LF-37	04/17/12	1.6	4.8	6.36	18.9	1.128	3.31	-81.1	75.1	
LF-37	10/23/12	1.2	11.5	6.40	23.2	1.209	2.30	-92.0	49.7	
LF-37	04/22/13	1.3	5.0	6.48	19.5	0.932	2.67	-107.9	10.9	
LF-37	10/07/13	1.1	3.5	6.11	24.1	1.378	2.63	-55.1	557.9	
LF-37	04/23/14	1.2	4.0	6.46	21.7	1.176	0.58	-74.1	97.1	
LF-37	10/28/14	1.1	4.0	6.26	23.8	1.323	0.87	-62.4	90.5	
LF-38	04/17/12	3.2	9.6	5.86	19.9	1.756	2.62	-11.6	11.9	
LF-38	04/22/13	3.0	12.0	6.04	20.1	1.423	4.64	-10.6	4.4	
LF-38	04/23/14	2.9	9.0	6.21	22.9	1.370	0.83	-13.9	41.7	
LF-39	04/17/12	2.9	9.0	5.99	19.8	0.364	5.00	84.4	13.4	
LF-39	04/22/13	2.9	9.0	6.32	20.2	0.347	3.71	60.2	12.6	

Appendix B-1
Field Parameters Measured During Purging and Sampling, April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Date Sampled	Well Volume (gallons)	Approximate Volume Purged (gallons)	pH	Temperature (degrees Celsius)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTU)	Notes
LF-39	04/22/14	2.8	12.0	7.10	20.3	0.451	1.36	23.7	40.0	
LF-40	04/17/12	1.2	3.6	6.18	18.6	0.414	2.17	-41.1	268.9	
LF-40	10/23/12	0.9	3.0	6.30	21.5	0.476	2.80	-78.1	104.7	
LF-40	04/22/13	1.0	3.0	6.39	19.7	0.422	2.71	-37.1	121.2	
LF-40	10/07/13	0.9	4.0	6.36	23.4	0.653	2.74	-61.3	173.0	
LF-40	04/22/14	1.0	4.0	6.33	20.8	0.656	4.25	-53.0	154.0	
LF-40	10/28/14	0.9	4.0	5.94	23.7	0.522	2.21	-7.1	102.0	
LF-41	04/17/12	1.4	4.1	6.63	17.7	0.180	2.60	-31.9	118.6	
LF-41	10/23/12	1.1	4.5	6.68	21.1	0.171	2.36	-69.0	65.0	
LF-41	04/22/13	1.2	4.5	6.64	19.3	0.134	2.29	-39.1	68.1	
LF-41	10/08/13	1.0	3.5	6.67	21.4	0.208	3.15	-36.1	68.2	
LF-41	04/23/14	1.2	4.0	6.51	17.7	0.200	1.34	-37.8	32.3	
LF-41	10/28/14	1.0	3.0	6.34	21.9	0.228	0.76	-44.7	23.7	
LF-42	04/17/12	1.6	4.8	6.25	18.5	1.103	2.43	-67.5	51.4	
LF-42	10/22/12	1.4	6.9	7.39	21.5	0.973	4.60	-104.3	194.0	
LF-42	04/24/13	1.5	4.5	6.32	18.2	0.991	3.45	-118.1	65.1	
LF-42	10/09/13	1.3	3.9	6.27	22.4	1.097	3.08	2.4	151.3	
LF-42	04/25/14	1.5	4.5	6.52	18.1	1.043	1.98	3.8	36.2	
LF-42	05/13/14	1.2	3.6	6.88	22.4	0.915	10.65	-117.2	320.0	
LF-42	10/30/14	1.3	4.5	6.45	22.9	1.019	0.94	-24.3	20.1	
MW-3	04/17/12	2.2	6.6	6.49	17.0	0.197	1.57	-62.9	150.5	
MW-3	07/18/12	2.0	6.0	6.54	20.0	0.211	1.84	-88.6	181.1	
MW-3	10/23/12	2.0	6.0	7.29	19.6	0.224	3.43	-93.2	144.6	
MW-3	01/18/13	2.0	6.0	6.66	18.4	0.302	2.89	-54.5	218.8	
MW-3	04/22/13	2.0	6.0	6.77	20.5	0.174	1.73	-61.2	35.4	
MW-3	07/16/13	1.9	10.0	6.45	21.0	0.238	3.09	-131.3	24.5	
MW-3	10/08/13	1.8	5.4	6.78	21.5	0.239	2.08	-37.6	256.9	
MW-3	01/03/14	1.9	8.0	6.63	19.8	0.258	0.87	-103.6	215.0	
MW-3	4/29/2014	2.0	5.9	6.62	20.0	0.264	1.28	17.7	86.9	
MW-3	10/30/2014	1.8	6.0	6.70	20.9	0.264	1.26	-18.7	40.8	

Appendix B-1
Field Parameters Measured During Purging and Sampling, April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Date Sampled	Well Volume (gallons)	Approximate Volume Purged (gallons)	pH	Temperature (degrees Celsius)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTU)	Notes
RP-1	04/17/12	1.0	3.0	6.12	18.2	0.415	3.62	-12.8	105.5	
RP-1	07/18/12	0.7	2.8	6.22	21.3	0.366	1.87	-76.4	230.8	
RP-1	10/23/12	0.7	2.1	7.23	21.8	0.384	4.09	-88.9	188.9	
RP-1	01/18/13	0.8	3.0	6.32	19.6	0.504	3.31	-6.0	34.5	
RP-1	04/22/13	0.8	2.3	6.41	19.6	0.362	2.82	-72.9	33.2	
RP-1	07/16/13	0.6	2.0	6.22	21.6	0.404	4.33	-105.4	13.9	
RP-1	10/07/13	0.7	2.9	6.31	23.5	0.423	2.93	-84.6	30.6	
RP-1	01/03/14	0.6	3.0	6.29	20.7	0.407	0.67	-108.7	18.1	
RP-1	04/23/14	0.7	4.0	6.37	20.0	0.451	1.05	-12.4	79.9	
RP-1	10/31/14	0.6	1.5	6.40	21.3	0.429	1.02	-62.8	219.0	
RP-2	04/17/12	1.3	3.8	6.54	18.8	0.364	1.08	-73.0	76.6	
RP-2	10/23/12	1.1	3.2	6.95	21.3	0.315	4.15	-87.1	229.1	
RP-2	04/19/13	1.1	4.5	6.57	18.5	0.238	1.65	-95.1	40.2	
RP-2	10/08/13	1.0	4.5	6.69	21.7	0.317	3.26	-44.0	314.4	
RP-2	04/23/14	1.1	4.0	6.60	21.5	0.339	3.57	-31.3	82.3	
RP-2	10/30/14	1.0	3.0	6.51	23.0	0.297	1.02	-15.5	144.0	
RP-3	04/17/12	1.0	5.0	6.15	18.4	1.325	4.48	-39.0	101.9	
RP-3	12/20/12	1.0	3.0	6.38	21.0	1.499	1.30	-10.8	424.2	
RP-3	04/19/13	0.9	3.0	6.09	18.7	1.476	2.71	-33.1	52.1	
RP-3	10/08/13	0.9	4.0	6.34	23.6	1.972	2.19	26.3	94.2	
RP-3	04/28/14	0.9	5.0	6.38	22.1	1.070	3.37	-21.0	121.0	
RP-3	10/28/14	0.7	5.0	6.07	24.1	2.394	1.43	-17.5	227.0	
RP-4	04/17/12	1.7	6.7	6.65	19.5	0.186	6.33	-21.9	27.9	
RP-4	07/18/12	1.5	4.5	6.29	21.7	0.171	2.11	31.1	112.5	
RP-4	10/23/12	1.5	4.5	6.78	21.2	0.187	4.70	-15.5	324.7	
RP-4	01/18/13	1.5	5.0	6.67	20.7	0.206	3.59	29.5	188.6	
RP-4	04/19/13	1.5	5.0	6.54	20.5	0.167	2.33	17.1	16.2	
RP-4	07/16/13	1.4	6.0	6.31	21.5	0.212	3.63	-84.3	19.8	
RP-4	10/08/13	1.3	6.0	6.36	22.9	0.266	2.86	16.8	85.4	
RP-4	01/03/14	1.8	8.0	6.34	21.5	0.277	1.33	-24.1	6.28	

Appendix B-1
Field Parameters Measured During Purging and Sampling, April 2012 through October 2014
The Sherwin-Williams Company
Emeryville, California

Well Number	Date Sampled	Well Volume (gallons)	Approximate Volume Purged (gallons)	pH	Temperature (degrees Celsius)	Specific Conductance (mS/cm)	Dissolved Oxygen (mg/L)	Oxygen Reduction Potential (mV)	Turbidity (NTU)	Notes
RP-4	4/29/2014	1.5	4.5	6.43	22.1	0.408	1.31	-19.0	60.9	
RP-4	10/30/2014	1.4	4.5	6.32	22.1	0.286	1.30	23.2	74.8	
RP-5	04/17/12	1.5	4.5	6.34	19.3	0.325	4.06	31.8	51.0	
RP-5	10/23/12	1.2	3.5	6.74	21.7	0.286	3.87	-79.9	393.7	
RP-5	04/19/13	1.3	4.0	6.42	20.7	0.230	2.18	-45.6	56.4	
RP-5	10/08/13	1.0	3.3	6.31	23.6	0.301	3.98	-22.5	115.6	
RP-5	04/29/14	1.2	3.60	6.49	22.0	0.382	0.90	-19.2	55.0	
RP-5	10/30/14	1.1	4.00	6.37	24.0	0.336	0.62	-31.9	54.9	

Data entered by MD. Proofed by ENW.

Notes:
mS/cm = milliSiemens per centimeter
mg/L = milligrams per liter
mV = milliVolts
NTU = nephelometric turbidity units
(1) = dissolved oxygen probe malfunctioning

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Appendix C

Complete Analytical Results for Reporting Period

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-108	07/08/14	Metals (SW6010AS)	**ARSENIC**	**220**		5	ug/L	30-36-108-070814
CDM-108-DUP	07/08/14	Metals (SW6010AS)	**ARSENIC**	**230**		5	ug/L	30-36-108-070814-D
CDM-103	10/27/14	Metals (SW6010AS)	ARSENIC	< 5	U	5	ug/L	50-36-103-102714
CDM-103-DUP	10/27/14	Metals (SW6010AS)	ARSENIC	< 5	U	5	ug/L	50-36-103-102714-D
CDM-105	10/28/14	Metals (SW6010AS)	**ARSENIC**	**60**		5	ug/L	50-36-105-102814
CDM-106	10/28/14	Metals (SW6010AS)	**ARSENIC**	**1800**		5	ug/L	50-36-106-102814
LF-37	10/28/14	Metals (SW6010AS)	**ARSENIC**	**6.9**		5	ug/L	40-36-037-102814
LF-40	10/28/14	Metals (SW6010AS)	**ARSENIC**	**9.3**		5	ug/L	40-36-040-102814
LF-41	10/28/14	Metals (SW6010AS)	**ARSENIC**	**69**		5	ug/L	40-36-041-102814
RP-3	10/28/14	Metals (SW6010AS)	**ARSENIC**	**5.7**		5	ug/L	40-36-003-102814
LF-41-DUP	10/28/14	Metals (SW6010AS)	**ARSENIC**	**69**		5	ug/L	40-36-041-102814-D
CDM-101	10/29/14	(SW8260B)	1,1,1,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	40-36-101-102914
			1,1,1-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHENE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,2,4-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,4-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DIBROMO-3-CHLOROPROPANE	< 2	U	2	ug/L	
			1,2-DIBROMOETHANE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROETHANE	**0.8**		0.5	ug/L	
			1,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-101	10/29/14	(SW8260B)	1,3,5-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	40-36-101-102914
			1,3-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,4-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			2,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			2-BUTANONE	< 10	U	10	ug/L	
			2-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			2-HEXANONE	< 10	U	10	ug/L	
			4-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			4-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			4-METHYL-2-PENTANONE (MIBK)	< 10	U	10	ug/L	
			ACETONE	< 0.01	U12	10	ug/L	
			BENZENE	**0.2**	**J**	0.5	ug/L	
			BROMOBENZENE	< 0.5	U	0.5	ug/L	
			BROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMODICHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMOFORM	< 1	U	1	ug/L	
			BROMOMETHANE	< 1	U	1	ug/L	
			BROMOMETHANE (METHYL BROMIDE)	< 1	U	1	ug/L	
			CARBON DISULFIDE	< 0.5	U	0.5	ug/L	
			CARBON TETRACHLORIDE	< 0.5	U	0.5	ug/L	
			CHLOROBENZENE	< 0.5	U	0.5	ug/L	
			CHLOROETHANE	< 1	U	1	ug/L	
			CHLOROFORM	< 0.5	U	0.5	ug/L	
			CHLOROMETHANE	< 1	U	1	ug/L	
			CIS-1,2-DICHLOROETHENE	**0.7**		0.5	ug/L	
			CIS-1,3-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			DIBROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			DIBROMOMETHANE	< 0.5	U	0.5	ug/L	
			ETHYLBENZENE	< 0.5	U	0.5	ug/L	
			FREON 113	< 2	U	2	ug/L	
			FREON 12	< 1	U	1	ug/L	
			HEXACHLOROBUTADIENE	< 2	U	2	ug/L	
			ISOPROPYLBENZENE	< 0.5	U	0.5	ug/L	
			M,P-XYLENES	< 0.5	U	0.5	ug/L	
			M-DICHLORBENZENE	< 0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-101	10/29/14	(SW8260B)	METHYLENE CHLORIDE	< 10	U	10	ug/L	40-36-101-102914
			MTBE	**0.8**		0.5	ug/L	
			N-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			N-PROPYLBENZENE	< 0.5	U	0.5	ug/L	
			NAPHTHALENE	< 2	U	2	ug/L	
			O-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			O-XYLENE	< 0.5	U	0.5	ug/L	
			P-CYMENE	< 0.5	U	0.5	ug/L	
			P-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			PARA-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			PROPYLBENZENE	< 0.5	U	0.5	ug/L	
			SEC-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			STYRENE	< 0.5	U	0.5	ug/L	
			TERT-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			TETRACHLOROETHENE	< 0.5	U	0.5	ug/L	
			TOLUENE	< 0.5	U	0.5	ug/L	
			TRANS-1,2-DICHLOROETHENE	< 0.5	U	0.5	ug/L	
			TRANS-1,3-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			TRICHLOROETHENE	< 0.5	U	0.5	ug/L	
			TRICHLOROFLUOROMETHANE	< 1	U	1	ug/L	
			VINYL ACETATE	< 10	U	10	ug/L	
			VINYL CHLORIDE	< 0.5	U	0.5	ug/L	
			XYLENES (TOTAL)	< 1	U	0.5	ug/L	
		Metals (SW6010AS)	**ARSENIC**	**49**		5	ug/L	
CDM-102	10/29/14	(SW8260B)	1,1,1,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	40-36-102-102914
			1,1,1-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHANE	**0.2**	**J**	0.5	ug/L	
			1,1-DICHLOROETHENE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,2,4-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,4-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-102	10/29/14	(SW8260B)	1,2-DIBROMO-3-CHLOROPROPANE	< 2	U	2	ug/L	40-36-102-102914
			1,2-DIBROMOETHANE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROETHANE	**1.1**		0.5	ug/L	
			1,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,3,5-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,4-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			2,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			2-BUTANONE	< 10	U	10	ug/L	
			2-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			2-HEXANONE	< 10	U	10	ug/L	
			4-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			4-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			4-METHYL-2-PENTANONE (MIBK)	< 10	U	10	ug/L	
			ACETONE	< 0.01	U5	10	ug/L	
			BENZENE	< 0.5	U	0.5	ug/L	
			BROMOBENZENE	< 0.5	U	0.5	ug/L	
			BROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMODICHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMOFORM	< 1	U	1	ug/L	
			BROMOMETHANE	< 1	U	1	ug/L	
			BROMOMETHANE (METHYL BROMIDE)	< 1	U	1	ug/L	
			CARBON DISULFIDE	< 0.5	U	0.5	ug/L	
			CARBON TETRACHLORIDE	< 0.5	U	0.5	ug/L	
			CHLOROBENZENE	< 0.5	U	0.5	ug/L	
			CHLOROETHANE	< 1	U	1	ug/L	
			CHLOROFORM	< 0.5	U	0.5	ug/L	
			CHLOROMETHANE	< 1	U	1	ug/L	
			CIS-1,2-DICHLOROETHENE	**1.6**		0.5	ug/L	
			CIS-1,3-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			DIBROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			DIBROMOMETHANE	< 0.5	U	0.5	ug/L	
			ETHYLBENZENE	< 0.5	U	0.5	ug/L	
			FREON 113	< 2	U	2	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-102	10/29/14	(SW8260B)	FREON 12	< 1	U	1	ug/L	40-36-102-102914
			HEXACHLOROBUTADIENE	< 2	U	2	ug/L	
			ISOPROPYLBENZENE	< 0.5	U	0.5	ug/L	
			M,P-XYLENES	< 0.5	U	0.5	ug/L	
			M-DICHLORBENZENE	< 0.5	U	0.5	ug/L	
			METHYLENE CHLORIDE	< 10	U	10	ug/L	
			MTBE	**0.5**	**J**	0.5	ug/L	
			N-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			N-PROPYLBENZENE	< 0.5	U	0.5	ug/L	
			NAPHTHALENE	< 2	U	2	ug/L	
			O-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			O-XYLENE	< 0.5	U	0.5	ug/L	
			P-CYMENE	< 0.5	U	0.5	ug/L	
			P-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			PARA-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			PROPYLBENZENE	< 0.5	U	0.5	ug/L	
			SEC-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			STYRENE	< 0.5	U	0.5	ug/L	
			TERT-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			TETRACHLOROETHENE	< 0.5	U	0.5	ug/L	
			TOLUENE	< 0.5	U	0.5	ug/L	
			TRANS-1,2-DICHLOROETHENE	< 0.5	U	0.5	ug/L	
			TRANS-1,3-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			TRICHLOROETHENE	< 0.5	U	0.5	ug/L	
			TRICHLOROFLUOROMETHANE	< 1	U	1	ug/L	
			VINYL ACETATE	< 10	U	10	ug/L	
			VINYL CHLORIDE	< 0.5	U	0.5	ug/L	
			XYLENES (TOTAL)	< 1	U	0.5	ug/L	
		Metals (SW6010AS)	**ARSENIC**	**7.6**		5	ug/L	
CDM-107	10/29/14	(SW8260B)	1,1,1,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	30-36-107-102914
			1,1,1-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHENE	< 0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-107	10/29/14	(SW8260B)	1,1-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	30-36-107-102914
			1,2,3-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,2,4-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,4-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DIBROMO-3-CHLOROPROPANE	< 2	U	2	ug/L	
			1,2-DIBROMOETHANE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,3,5-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,4-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			2,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			2-BUTANONE	< 10	U	10	ug/L	
			2-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			2-HEXANONE	< 10	U	10	ug/L	
			4-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			4-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			4-METHYL-2-PENTANONE (MIBK)	< 10	U	10	ug/L	
			ACETONE	< 10	U	10	ug/L	
			BENZENE	< 0.5	U	0.5	ug/L	
			BROMOBENZENE	< 0.5	U	0.5	ug/L	
			BROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMODICHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMOFORM	< 1	U	1	ug/L	
			BROMOMETHANE	< 1	U	1	ug/L	
			BROMOMETHANE (METHYL BROMIDE)	< 1	U	1	ug/L	
			CARBON DISULFIDE	< 0.5	U	0.5	ug/L	
			CARBON TETRACHLORIDE	< 0.5	U	0.5	ug/L	
			CHLOROBENZENE	**0.1**	**J**	0.5	ug/L	
			CHLOROETHANE	< 1	U	1	ug/L	
			CHLOROFORM	< 0.5	U	0.5	ug/L	
			CHLOROMETHANE	< 1	U	1	ug/L	
			CIS-1,2-DICHLOROETHENE	< 0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
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Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-107	10/29/14	(SW8260B)	CIS-1,3-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	30-36-107-102914
			DIBROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			DIBROMOMETHANE	< 0.5	U	0.5	ug/L	
			ETHYLBENZENE	< 0.5	U	0.5	ug/L	
			FREON 113	< 2	U	2	ug/L	
			FREON 12	< 1	U	1	ug/L	
			HEXACHLOROBUTADIENE	< 2	U	2	ug/L	
			ISOPROPYLBENZENE	< 0.5	U	0.5	ug/L	
			M,P-XYLENES	< 0.5	U	0.5	ug/L	
			M-DICHLORBENZENE	< 0.5	U	0.5	ug/L	
			METHYLENE CHLORIDE	< 10	U	10	ug/L	
			MTBE	**0.5**	**J**	0.5	ug/L	
			N-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			N-PROPYLBENZENE	< 0.5	U	0.5	ug/L	
			NAPHTHALENE	< 2	U	2	ug/L	
			O-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			O-XYLENE	< 0.5	U	0.5	ug/L	
			P-CYMENE	< 0.5	U	0.5	ug/L	
			P-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			PARA-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			PROPYLBENZENE	< 0.5	U	0.5	ug/L	
			SEC-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			STYRENE	< 0.5	U	0.5	ug/L	
			TERT-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			TETRACHLOROETHENE	< 0.5	U	0.5	ug/L	
			TOLUENE	< 0.5	U	0.5	ug/L	
			TRANS-1,2-DICHLOROETHENE	< 0.5	U	0.5	ug/L	
			TRANS-1,3-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			TRICHLOROETHENE	< 0.5	U	0.5	ug/L	
			TRICHLOROFLUOROMETHANE	< 1	U	1	ug/L	
			VINYL ACETATE	< 10	U	10	ug/L	
			VINYL CHLORIDE	< 0.5	U	0.5	ug/L	
			XYLENES (TOTAL)	< 1	U	0.5	ug/L	
		Metals (SW6010AS)	**ARSENIC**	**9.8**		5	ug/L	
CDM-108	10/29/14	(SW8260B)	1,1,1,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	30-36-108-102914

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-108	10/29/14	(SW8260B)	1,1,1-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	30-36-108-102914
			1,1,2,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHENE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,2,4-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,4-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DIBROMO-3-CHLOROPROPANE	< 2	U	2	ug/L	
			1,2-DIBROMOETHANE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROETHANE	**0.2**	**J**	0.5	ug/L	
			1,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,3,5-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,4-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			2,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			2-BUTANONE	< 10	U	10	ug/L	
			2-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			2-HEXANONE	< 10	U	10	ug/L	
			4-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			4-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			4-METHYL-2-PENTANONE (MIBK)	< 10	U	10	ug/L	
			ACETONE	< 10	U	10	ug/L	
			BENZENE	< 0.5	U	0.5	ug/L	
			BROMOBENZENE	< 0.5	U	0.5	ug/L	
			BROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMODICHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMOFORM	< 1	U	1	ug/L	
			BROMOMETHANE	< 1	U	1	ug/L	
			BROMOMETHANE (METHYL BROMIDE)	< 1	U	1	ug/L	
			CARBON DISULFIDE	< 0.5	U	0.5	ug/L	
			CARBON TETRACHLORIDE	< 0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-108	10/29/14	(SW8260B)	**CHLOROBENZENE**	**0.2**	J	0.5	ug/L	30-36-108-102914
			CHLOROETHANE	<1	U	1	ug/L	
			CHLOROFORM	<0.5	U	0.5	ug/L	
			CHLOROMETHANE	<1	U	1	ug/L	
			CIS-1,2-DICHLOROETHENE	**0.3**	J	0.5	ug/L	
			CIS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	
			DIBROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	
			DIBROMOMETHANE	<0.5	U	0.5	ug/L	
			ETHYLBENZENE	<0.5	U	0.5	ug/L	
			FREON 113	<2	U	2	ug/L	
			FREON 12	<1	U	1	ug/L	
			HEXACHLOROBUTADIENE	<2	U	2	ug/L	
			ISOPROPYLBENZENE	<0.5	U	0.5	ug/L	
			M,P-XYLENES	<0.5	U	0.5	ug/L	
			M-DICHLORBENZENE	<0.5	U	0.5	ug/L	
			METHYLENE CHLORIDE	<10	U	10	ug/L	
			MTBE	**0.3**	J	0.5	ug/L	
			N-BUTYLBENZENE	<0.5	U	0.5	ug/L	
			N-PROPYLBENZENE	<0.5	U	0.5	ug/L	
			NAPHTHALENE	<2	U	2	ug/L	
			O-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			O-XYLENE	<0.5	U	0.5	ug/L	
			P-CYMENE	<0.5	U	0.5	ug/L	
			P-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			PARA-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	
			PROPYLBENZENE	<0.5	U	0.5	ug/L	
			SEC-BUTYLBENZENE	<0.5	U	0.5	ug/L	
			STYRENE	<0.5	U	0.5	ug/L	
			TERT-BUTYLBENZENE	**0.2**	J	0.5	ug/L	
			TETRACHLOROETHENE	<0.5	U	0.5	ug/L	
			TOLUENE	<0.5	U	0.5	ug/L	
			TRANS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			TRANS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	
			TRICHLOROETHENE	<0.5	U	0.5	ug/L	
			TRICHLOROFLUOROMETHANE	<1	U	1	ug/L	
			VINYL ACETATE	<10	U	10	ug/L	

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Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-108	10/29/14	(SW8260B)	VINYL CHLORIDE	< 0.5	U	0.5	ug/L	30-36-108-102914
			XYLENES (TOTAL)	< 1	U	0.5	ug/L	
		Metals (SW6010AS)	**ARSENIC**	**170**		5	ug/L	
CDM-101-DUP	10/29/14	(SW8260B)	1,1,1,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	40-36-101-102914-D
			1,1,1-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2,2-TETRACHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1,2-TRICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHANE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROETHENE	< 0.5	U	0.5	ug/L	
			1,1-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,2,4-TRICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2,4-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DIBROMO-3-CHLOROPROPANE	< 2	U	2	ug/L	
			1,2-DIBROMOETHANE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,2-DICHLOROETHANE	**0.8**		0.5	ug/L	
			1,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,3,5-TRIMETHYLBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			1,3-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			1,4-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			2,2-DICHLOROPROPANE	< 0.5	U	0.5	ug/L	
			2-BUTANONE	< 10	U	10	ug/L	
			2-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			2-HEXANONE	< 10	U	10	ug/L	
			4-CHLOROTOLUENE	< 0.5	U	0.5	ug/L	
			4-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			4-METHYL-2-PENTANONE (MIBK)	< 10	U	10	ug/L	
			ACETONE	< 0.01	U12	10	ug/L	
			BENZENE	**0.2**	**J**	0.5	ug/L	
			BROMOBENZENE	< 0.5	U	0.5	ug/L	
			BROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			BROMODICHLOROMETHANE	< 0.5	U	0.5	ug/L	

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Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-101-DUP	10/29/14	(SW8260B)	BROMOFORM	< 1	U	1	ug/L	40-36-101-102914-D
			BROMOMETHANE	< 1	U	1	ug/L	
			BROMOMETHANE (METHYL BROMIDE)	< 1	U	1	ug/L	
			CARBON DISULFIDE	< 0.5	U	0.5	ug/L	
			CARBON TETRACHLORIDE	< 0.5	U	0.5	ug/L	
			CHLOROBENZENE	< 0.5	U	0.5	ug/L	
			CHLOROETHANE	< 1	U	1	ug/L	
			CHLOROFORM	< 0.5	U	0.5	ug/L	
			CHLOROMETHANE	< 1	U	1	ug/L	
			CIS-1,2-DICHLOROETHENE	**0.7**		0.5	ug/L	
			CIS-1,3-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			DIBROMOCHLOROMETHANE	< 0.5	U	0.5	ug/L	
			DIBROMOMETHANE	< 0.5	U	0.5	ug/L	
			ETHYLBENZENE	< 0.5	U	0.5	ug/L	
			FREON 113	< 2	U	2	ug/L	
			FREON 12	< 1	U	1	ug/L	
			HEXACHLOROBUTADIENE	< 2	U	2	ug/L	
			ISOPROPYLBENZENE	< 0.5	U	0.5	ug/L	
			M,P-XYLENES	< 0.5	U	0.5	ug/L	
			M-DICHLORBENZENE	< 0.5	U	0.5	ug/L	
			METHYLENE CHLORIDE	< 10	U	10	ug/L	
			MTBE	**0.8**		0.5	ug/L	
			N-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			N-PROPYLBENZENE	< 0.5	U	0.5	ug/L	
			NAPHTHALENE	< 2	U	2	ug/L	
			O-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			O-XYLENE	< 0.5	U	0.5	ug/L	
			P-CYMENE	< 0.5	U	0.5	ug/L	
			P-DICHLOROBENZENE	< 0.5	U	0.5	ug/L	
			PARA-ISOPROPYL TOLUENE	< 0.5	U	0.5	ug/L	
			PROPYLBENZENE	< 0.5	U	0.5	ug/L	
			SEC-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			STYRENE	< 0.5	U	0.5	ug/L	
			TERT-BUTYLBENZENE	< 0.5	U	0.5	ug/L	
			TETRACHLOROETHENE	< 0.5	U	0.5	ug/L	
			TOLUENE	< 0.5	U	0.5	ug/L	

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Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
CDM-101-DUP	10/29/14	(SW8260B)	TRANS-1,2-DICHLOROETHENE	< 0.5	U	0.5	ug/L	40-36-101-102914-D
			TRANS-1,3-DICHLOROPROPENE	< 0.5	U	0.5	ug/L	
			TRICHLOROETHENE	< 0.5	U	0.5	ug/L	
			TRICHLOROFLUOROMETHANE	< 1	U	1	ug/L	
			VINYL ACETATE	< 10	U	10	ug/L	
			VINYL CHLORIDE	< 0.5	U	0.5	ug/L	
			XYLENES (TOTAL)	< 1	U	0.5	ug/L	
		Metals (SW6010AS)	**ARSENIC**	**50**		5	ug/L	
CDM-104	10/30/14	Metals (SW6010AS)	ARSENIC	< 5	U	5	ug/L	50-36-104-103014
CDM-109	10/30/14	Metals (SW6010AS)	**ARSENIC**	**250**		5	ug/L	30-36-109-103014
LF-42	10/30/14	Metals (SW6010AS)	ARSENIC	< 5	U	5	ug/L	40-36-042-103014
MW-3	10/30/14	Metals (SW6010AS)	**ARSENIC**	**74**		5	ug/L	10-36-003-103014
RP-2	10/30/14	Metals (SW6010AS)	**ARSENIC**	**45**		5	ug/L	40-36-002-103014
RP-4	10/30/14	Metals (SW6010AS)	**ARSENIC**	**6.1**		5	ug/L	40-36-004R-103014
RP-5	10/30/14	Metals (SW6010AS)	**ARSENIC**	**12**		5	ug/L	40-36-005R-103014
LF-42-DUP	10/30/14	Metals (SW6010AS)	ARSENIC	< 5	U	5	ug/L	40-36-042-103014-D
LF-36	10/31/14	Metals (SW6010AS)	**ARSENIC**	**39**		5	ug/L	40-36-036-103114
RP-1	10/31/14	Metals (SW6010AS)	**ARSENIC**	**80**		5	ug/L	40-36-001-103114
LF-36-DUP	10/31/14	Metals (SW6010AS)	**ARSENIC**	**35**		5	ug/L	40-36-036-103114-D

Notes: All notes are listed at the end of this table - see last page.

Table C-1
Complete Analytical Results for Groundwater Monitoring Wells, July and October
(Third and Fourth Quarter 2014 Monitoring)
The Sherwin-Williams Company
Emeryville, California

Well Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID

Notes:

< = Analyte was not detected at or greater than the detection limit reported

ug/L = micrograms per liter

Abbreviations:

DUP = Duplicate sample (field duplicate)

Data Qualifiers:

U = Not detected at or greater than the detection limit reported

J = Concentration is estimated

U5 = Qualified as nondetect (U) based on field blank contamination evaluation.

U12 = Quantified as nondetect (U) based on source water contamination evaluation.

Table C-2

Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
FIELD BLANK	07/08/14	Metals (SW6010AS)	ARSENIC	<5	U	5	ug/L	991A-070814
			ARSENIC	<5	U	5	ug/L	991B-070814
			ARSENIC, INORGANIC	<5	U	5	ug/L	
			ARSENIC, INORGANIC	<5	U	5	ug/L	991A-070814
			ARSENIC, SPLP	<5	U	5	ug/L	991B-070814
			ARSENIC, SPLP	<5	U	5	ug/L	991A-070814
	10/27/14		ARSENIC	<5	U	5	ug/L	991A-102714
			ARSENIC	<5	U	5	ug/L	991B-102714
			ARSENIC, INORGANIC	<5	U	5	ug/L	991A-102714
			ARSENIC, INORGANIC	<5	U	5	ug/L	991B-102714
			ARSENIC, SPLP	<5	U	5	ug/L	
			ARSENIC, SPLP	<5	U	5	ug/L	991A-102714
	10/28/14		ARSENIC	<5	U	5	ug/L	991A-102814
			ARSENIC	<5	U	5	ug/L	991B-102814
			ARSENIC, INORGANIC	<5	U	5	ug/L	991A-102814
			ARSENIC, INORGANIC	<5	U	5	ug/L	991B-102814
			ARSENIC, SPLP	<5	U	5	ug/L	991A-102814
			ARSENIC, SPLP	<5	U	5	ug/L	991B-102814
	10/29/14	(SW8260B)	1,1,1,2-TETRACHLOROETHANE	<0.5	U	0.5	ug/L	991B-102914
			1,1,1,2-TETRACHLOROETHANE	<0.5	U	0.5	ug/L	991A-102914
			1,1,1-TRICHLOROETHANE	<0.5	U	0.5	ug/L	991B-102914
			1,1,1-TRICHLOROETHANE	<0.5	U	0.5	ug/L	991A-102914
			1,1,2,2-TETRACHLOROETHANE	<0.5	U	0.5	ug/L	991B-102914
			1,1,2,2-TETRACHLOROETHANE	<0.5	U	0.5	ug/L	991A-102914
			1,1,2-TRICHLOROETHANE	<0.5	U	0.5	ug/L	991B-102914
			1,1,2-TRICHLOROETHANE	<0.5	U	0.5	ug/L	991A-102914
			1,1-DICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1-DICHLOROETHANE	<0.5	U	0.5	ug/L	991B-102914
			1,1-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			1,1-DICHLOROETHENE	<0.5	U	0.5	ug/L	991A-102914
			1,1-DICHLOROPROPENE	<0.5	U	0.5	ug/L	991B-102914
			1,1-DICHLOROPROPENE	<0.5	U	0.5	ug/L	991A-102914
			1,2,3-TRICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROBENZENE	<0.5	U	0.5	ug/L	991B-102914
			1,2,3-TRICHLOROPROPANE	<0.5	U	0.5	ug/L	991A-102914
			1,2,3-TRICHLOROPROPANE	<0.5	U	0.5	ug/L	991B-102914
			1,2,4-TRICHLOROBENZENE	<0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-2

Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
FIELD BLANK	10/29/14	(SW8260B)	1,2,4-TRICHLOROBENZENE	<0.5	U	0.5	ug/L	991A-102914
			1,2,4-TRIMETHYLBENZENE	<0.5	U	0.5	ug/L	991B-102914
			1,2,4-TRIMETHYLBENZENE	<0.5	U	0.5	ug/L	991A-102914
			1,2-DIBROMO-3-CHLOROPROPANE	<2	U	2	ug/L	991B-102914
			1,2-DIBROMO-3-CHLOROPROPANE	<2	U	2	ug/L	991A-102914
			1,2-DIBROMOETHANE	<0.5	U	0.5	ug/L	991B-102914
			1,2-DIBROMOETHANE	<0.5	U	0.5	ug/L	991A-102914
			1,2-DICHLOROBENZENE	<0.5	U	0.5	ug/L	991B-102914
			1,2-DICHLOROBENZENE	<0.5	U	0.5	ug/L	991A-102914
			1,2-DICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,2-DICHLOROETHANE	<0.5	U	0.5	ug/L	991B-102914
			1,2-DICHLOROPROPANE	<0.5	U	0.5	ug/L	
			1,2-DICHLOROPROPANE	<0.5	U	0.5	ug/L	991A-102914
			1,3,5-TRIMETHYLBENZENE	<0.5	U	0.5	ug/L	
			1,3,5-TRIMETHYLBENZENE	<0.5	U	0.5	ug/L	991B-102914
			1,3-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,3-DICHLOROBENZENE	<0.5	U	0.5	ug/L	991A-102914
			1,3-DICHLOROPROPANE	<0.5	U	0.5	ug/L	991B-102914
			1,3-DICHLOROPROPANE	<0.5	U	0.5	ug/L	991A-102914
			1,4-DICHLOROBENZENE	<0.5	U	0.5	ug/L	991B-102914
			1,4-DICHLOROBENZENE	<0.5	U	0.5	ug/L	991A-102914
			2,2-DICHLOROPROPANE	<0.5	U	0.5	ug/L	991B-102914
			2,2-DICHLOROPROPANE	<0.5	U	0.5	ug/L	991A-102914
			2-BUTANONE	<10	U	10	ug/L	991B-102914
			2-BUTANONE	<10	U	10	ug/L	991A-102914
			2-CHLOROTOLUENE	<0.5	U	0.5	ug/L	991B-102914
			2-CHLOROTOLUENE	<0.5	U	0.5	ug/L	991A-102914
			2-HEXANONE	**0.6**	J	10	ug/L	991B-102914
			2-HEXANONE	**0.7**	J	10	ug/L	991A-102914
			4-CHLOROTOLUENE	<0.5	U	0.5	ug/L	991B-102914
			4-CHLOROTOLUENE	<0.5	U	0.5	ug/L	991A-102914
			4-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	
			4-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	991B-102914
			4-METHYL-2-PENTANONE (MIBK)	<10	U	10	ug/L	991A-102914
			4-METHYL-2-PENTANONE (MIBK)	<10	U	10	ug/L	991B-102914
			ACETONE	**20**		10	ug/L	
			ACETONE	**21**		10	ug/L	991A-102914

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Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
FIELD BLANK	10/29/14	(SW8260B)	**BENZENE**	**0.1**	J	0.5	ug/L	991B-102914
			BENZENE	**0.1**	J	0.5	ug/L	991A-102914
			BROMOBENZENE	<0.5	U	0.5	ug/L	
			BROMOBENZENE	<0.5	U	0.5	ug/L	991B-102914
			BROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	
			BROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	991A-102914
			BROMODICHLOROMETHANE	<0.5	U	0.5	ug/L	
			BROMODICHLOROMETHANE	<0.5	U	0.5	ug/L	991B-102914
			BROMOFORM	<1	U	1	ug/L	991A-102914
			BROMOFORM	<1	U	1	ug/L	991B-102914
			BROMOMETHANE	<1	U	1	ug/L	991A-102914
			BROMOMETHANE	<1	U	1	ug/L	991B-102914
			BROMOMETHANE (METHYL BROMIDE)	<1	U	1	ug/L	991A-102914
			BROMOMETHANE (METHYL BROMIDE)	<1	U	1	ug/L	991B-102914
			CARBON DISULFIDE	<0.5	U	0.5	ug/L	
			CARBON DISULFIDE	<0.5	U	0.5	ug/L	991A-102914
			CARBON TETRACHLORIDE	<0.5	U	0.5	ug/L	
			CARBON TETRACHLORIDE	<0.5	U	0.5	ug/L	991B-102914
			CHLOROBENZENE	<0.5	U	0.5	ug/L	991A-102914
			CHLOROBENZENE	<0.5	U	0.5	ug/L	991B-102914
			CHLOROETHANE	<1	U	1	ug/L	
			CHLOROETHANE	<1	U	1	ug/L	991A-102914
			CHLOROFORM	<0.5	U	0.5	ug/L	991B-102914
			CHLOROFORM	<0.5	U	0.5	ug/L	991A-102914
			CHLOROMETHANE	<1	U	1	ug/L	991B-102914
			CHLOROMETHANE	<1	U	1	ug/L	991A-102914
			CIS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			CIS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	991B-102914
			CIS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	991A-102914
			CIS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	991B-102914
			DIBROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	
			DIBROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	991A-102914
			DIBROMOMETHANE	<0.5	U	0.5	ug/L	991B-102914
			DIBROMOMETHANE	<0.5	U	0.5	ug/L	991A-102914
			ETHYLBENZENE	<0.5	U	0.5	ug/L	991B-102914
			ETHYLBENZENE	<0.5	U	0.5	ug/L	991A-102914
			FREON 113	<2	U	2	ug/L	991B-102914

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Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
FIELD BLANK	10/29/14	(SW8260B)	FREON 113	<2	U	2	ug/L	991A-102914
			FREON 12	<1	U	1	ug/L	
			FREON 12	<1	U	1	ug/L	991B-102914
			HEXACHLOROBUTADIENE	<2	U	2	ug/L	
			HEXACHLOROBUTADIENE	<2	U	2	ug/L	991A-102914
			ISOPROPYLBENZENE	<0.5	U	0.5	ug/L	991B-102914
			ISOPROPYLBENZENE	<0.5	U	0.5	ug/L	991A-102914
			M,P-XYLENES	<0.5	U	0.5	ug/L	
			M,P-XYLENES	<0.5	U	0.5	ug/L	991B-102914
			M-DICHLORBENZENE	<0.5	U	0.5	ug/L	991A-102914
			M-DICHLORBENZENE	<0.5	U	0.5	ug/L	991B-102914
			METHYLENE CHLORIDE	<10	U	10	ug/L	
			METHYLENE CHLORIDE	<10	U	10	ug/L	991A-102914
			MTBE	<0.5	U	0.5	ug/L	
			MTBE	<0.5	U	0.5	ug/L	991B-102914
			N-BUTYLBENZENE	<0.5	U	0.5	ug/L	991A-102914
			N-BUTYLBENZENE	<0.5	U	0.5	ug/L	991B-102914
			N-PROPYLBENZENE	<0.5	U	0.5	ug/L	991A-102914
			N-PROPYLBENZENE	<0.5	U	0.5	ug/L	991B-102914
			NAPHTHALENE	<2	U	2	ug/L	
			NAPHTHALENE	<2	U	2	ug/L	991A-102914
			O-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			O-DICHLOROBENZENE	<0.5	U	0.5	ug/L	991B-102914
			O-XYLENE	<0.5	U	0.5	ug/L	991A-102914
			O-XYLENE	<0.5	U	0.5	ug/L	991B-102914
			P-CYMENE	<0.5	U	0.5	ug/L	991A-102914
			P-CYMENE	<0.5	U	0.5	ug/L	991B-102914
			P-DICHLOROBENZENE	<0.5	U	0.5	ug/L	991A-102914
			P-DICHLOROBENZENE	<0.5	U	0.5	ug/L	991B-102914
			PARA-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	991A-102914
			PARA-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	991B-102914
			PROPYLBENZENE	<0.5	U	0.5	ug/L	
			PROPYLBENZENE	<0.5	U	0.5	ug/L	991A-102914
			SEC-BUTYLBENZENE	<0.5	U	0.5	ug/L	991B-102914
			SEC-BUTYLBENZENE	<0.5	U	0.5	ug/L	991A-102914
			STYRENE	<0.5	U	0.5	ug/L	
			STYRENE	<0.5	U	0.5	ug/L	991B-102914

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Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
FIELD BLANK	10/29/14	(SW8260B)	TERT-BUTYLBENZENE	<0.5	U	0.5	ug/L	991A-102914
			TERT-BUTYLBENZENE	<0.5	U	0.5	ug/L	991B-102914
			TETRACHLOROETHENE	<0.5	U	0.5	ug/L	
			TETRACHLOROETHENE	<0.5	U	0.5	ug/L	991A-102914
			TOLUENE	**0.3**	J	0.5	ug/L	
			TOLUENE	**0.3**	J	0.5	ug/L	991B-102914
			TRANS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			TRANS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	991A-102914
			TRANS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	991B-102914
			TRANS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	991A-102914
			TRICHLOROETHENE	<0.5	U	0.5	ug/L	991B-102914
			TRICHLOROETHENE	<0.5	U	0.5	ug/L	991A-102914
			TRICHLOROFLUOROMETHANE	<1	U	1	ug/L	
			TRICHLOROFLUOROMETHANE	<1	U	1	ug/L	991B-102914
			VINYL ACETATE	<10	U	10	ug/L	
			VINYL ACETATE	<10	U	10	ug/L	991A-102914
			VINYL CHLORIDE	<0.5	U	0.5	ug/L	991B-102914
			VINYL CHLORIDE	<0.5	U	0.5	ug/L	991A-102914
		Metals (SW6010AS)	ARSENIC	<5	U	5	ug/L	
			ARSENIC	<5	U	5	ug/L	991B-102914
			ARSENIC, INORGANIC	<5	U	5	ug/L	991A-102914
			ARSENIC, INORGANIC	<5	U	5	ug/L	991B-102914
			ARSENIC, SPLP	<5	U	5	ug/L	
			ARSENIC, SPLP	<5	U	5	ug/L	991A-102914
	10/30/14		ARSENIC	<5	U	5	ug/L	991B-103014
			ARSENIC	<5	U	5	ug/L	991A-103014
			ARSENIC, INORGANIC	<5	U	5	ug/L	
			ARSENIC, INORGANIC	<5	U	5	ug/L	991B-103014
			ARSENIC, SPLP	<5	U	5	ug/L	991A-103014
			ARSENIC, SPLP	<5	U	5	ug/L	991B-103014
	10/31/14		ARSENIC	<5	U	5	ug/L	991B-103114
			ARSENIC	<5	U	5	ug/L	991A-103114
			ARSENIC, INORGANIC	<5	U	5	ug/L	
			ARSENIC, INORGANIC	<5	U	5	ug/L	991B-103114
			ARSENIC, SPLP	<5	U	5	ug/L	
			ARSENIC, SPLP	<5	U	5	ug/L	991A-103114

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Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
SOURCE WATER BLANK	07/08/14	Metals (SW6010AS)	ARSENIC	<5	U	5	ug/L	971-070814
			ARSENIC, INORGANIC	<5	U	5	ug/L	
			ARSENIC, SPLP	<5	U	5	ug/L	
	10/29/14	(SW8260B)	1,1,1,2-TETRACHLOROETHANE	<0.5	U	0.5	ug/L	971-102914
			1,1,1-TRICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1,2,2-TETRACHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1,2-TRICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1-DICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			1,1-DICHLOROPROPENE	<0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROPROPANE	<0.5	U	0.5	ug/L	
			1,2,4-TRICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,2,4-TRIMETHYLBENZENE	<0.5	U	0.5	ug/L	
			1,2-DIBROMO-3-CHLOROPROPANE	<2	U	2	ug/L	
			1,2-DIBROMOETHANE	<0.5	U	0.5	ug/L	
			1,2-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,2-DICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,2-DICHLOROPROPANE	<0.5	U	0.5	ug/L	
			1,3,5-TRIMETHYLBENZENE	<0.5	U	0.5	ug/L	
			1,3-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,3-DICHLOROPROPANE	<0.5	U	0.5	ug/L	
			1,4-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			2,2-DICHLOROPROPANE	<0.5	U	0.5	ug/L	
			2-BUTANONE	<10	U	10	ug/L	
			2-CHLOROTOLUENE	<0.5	U	0.5	ug/L	
			2-HEXANONE	**0.4**	J	10	ug/L	
			4-CHLOROTOLUENE	<0.5	U	0.5	ug/L	
			4-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	
			4-METHYL-2-PENTANONE (MIBK)	<10	U	10	ug/L	
			ACETONE	**15**		10	ug/L	
			BENZENE	<0.5	U	0.5	ug/L	
			BROMOBENZENE	<0.5	U	0.5	ug/L	
			BROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	
			BROMODICHLOROMETHANE	<0.5	U	0.5	ug/L	

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Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
SOURCE WATER BLANK	10/29/14	(SW8260B)	BROMOFORM	<1	U	1	ug/L	971-102914
			BROMOMETHANE	<1	U	1	ug/L	
			BROMOMETHANE (METHYL BROMIDE)	<1	U	1	ug/L	
			CARBON DISULFIDE	<0.5	U	0.5	ug/L	
			CARBON TETRACHLORIDE	<0.5	U	0.5	ug/L	
			CHLOROBENZENE	<0.5	U	0.5	ug/L	
			CHLOROETHANE	<1	U	1	ug/L	
			CHLOROFORM	<0.5	U	0.5	ug/L	
			CHLOROMETHANE	<1	U	1	ug/L	
			CIS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			CIS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	
			DIBROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	
			DIBROMOMETHANE	<0.5	U	0.5	ug/L	
			ETHYLBENZENE	<0.5	U	0.5	ug/L	
			FREON 113	<2	U	2	ug/L	
			FREON 12	<1	U	1	ug/L	
			HEXACHLOROBUTADIENE	<2	U	2	ug/L	
			ISOPROPYLBENZENE	<0.5	U	0.5	ug/L	
			M,P-XYLENES	<0.5	U	0.5	ug/L	
			M-DICHLORBENZENE	<0.5	U	0.5	ug/L	
			METHYLENE CHLORIDE	<10	U	10	ug/L	
			MTBE	<0.5	U	0.5	ug/L	
			N-BUTYLBENZENE	<0.5	U	0.5	ug/L	
			N-PROPYLBENZENE	<0.5	U	0.5	ug/L	
			NAPHTHALENE	<2	U	2	ug/L	
			O-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			O-XYLENE	<0.5	U	0.5	ug/L	
			P-CYMENE	<0.5	U	0.5	ug/L	
			P-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			PARA-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	
			PROPYLBENZENE	<0.5	U	0.5	ug/L	
			SEC-BUTYLBENZENE	<0.5	U	0.5	ug/L	
			STYRENE	<0.5	U	0.5	ug/L	
			TERT-BUTYLBENZENE	<0.5	U	0.5	ug/L	
			TETRACHLOROETHENE	<0.5	U	0.5	ug/L	

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Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
SOURCE WATER BLANK	10/29/14	(SW8260B)	**TOLUENE**	**0.3**	J	0.5	ug/L	971-102914
			TRANS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			TRANS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	
			TRICHLOROETHENE	<0.5	U	0.5	ug/L	
			TRICHLOROFLUOROMETHANE	<1	U	1	ug/L	
			VINYL ACETATE	<10	U	10	ug/L	
			VINYL CHLORIDE	<0.5	U	0.5	ug/L	
		Metals (SW6010AS)	ARSENIC	<5	U	5	ug/L	
			ARSENIC, INORGANIC	<5	U	5	ug/L	
			ARSENIC, SPLP	<5	U	5	ug/L	
TRIP BLANK	10/29/14	(SW8260B)	1,1,1,2-TETRACHLOROETHANE	<0.5	U	0.5	ug/L	981-102914
			1,1,1-TRICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1,2,2-TETRACHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1,2-TRICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1-DICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,1-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			1,1-DICHLOROPROPENE	<0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,2,3-TRICHLOROPROPANE	<0.5	U	0.5	ug/L	
			1,2,4-TRICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,2,4-TRIMETHYLBENZENE	<0.5	U	0.5	ug/L	
			1,2-DIBROMO-3-CHLOROPROPANE	<2	U	2	ug/L	
			1,2-DIBROMOETHANE	<0.5	U	0.5	ug/L	
			1,2-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,2-DICHLOROETHANE	<0.5	U	0.5	ug/L	
			1,2-DICHLOROPROPANE	<0.5	U	0.5	ug/L	
			1,3,5-TRIMETHYLBENZENE	<0.5	U	0.5	ug/L	
			1,3-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			1,3-DICHLOROPROPANE	<0.5	U	0.5	ug/L	
			1,4-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			2,2-DICHLOROPROPANE	<0.5	U	0.5	ug/L	
			2-BUTANONE	<10	U	10	ug/L	
			2-CHLOROTOLUENE	<0.5	U	0.5	ug/L	
			2-HEXANONE	<10	U	10	ug/L	
			4-CHLOROTOLUENE	<0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-2

Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
TRIP BLANK	10/29/14	(SW8260B)	4-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	981-102914
			4-METHYL-2-PENTANONE (MIBK)	<10	U	10	ug/L	
			ACETONE	**1.1**	J	10	ug/L	
			BENZENE	<0.5	U	0.5	ug/L	
			BROMOBENZENE	<0.5	U	0.5	ug/L	
			BROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	
			BROMODICHLOROMETHANE	<0.5	U	0.5	ug/L	
			BROMOFORM	<1	U	1	ug/L	
			BROMOMETHANE	<1	U	1	ug/L	
			BROMOMETHANE (METHYL BROMIDE)	<1	U	1	ug/L	
			CARBON DISULFIDE	<0.5	U	0.5	ug/L	
			CARBON TETRACHLORIDE	<0.5	U	0.5	ug/L	
			CHLOROBENZENE	<0.5	U	0.5	ug/L	
			CHLOROETHANE	<1	U	1	ug/L	
			CHLOROFORM	<0.5	U	0.5	ug/L	
			CHLOROMETHANE	<1	U	1	ug/L	
			CIS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			CIS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	
			DIBROMOCHLOROMETHANE	<0.5	U	0.5	ug/L	
			DIBROMOMETHANE	<0.5	U	0.5	ug/L	
			ETHYLBENZENE	<0.5	U	0.5	ug/L	
			FREON 113	<2	U	2	ug/L	
			FREON 12	<1	U	1	ug/L	
			HEXACHLOROBUTADIENE	<2	U	2	ug/L	
			ISOPROPYLBENZENE	<0.5	U	0.5	ug/L	
			M,P-XYLENES	<0.5	U	0.5	ug/L	
			M-DICHLORBENZENE	<0.5	U	0.5	ug/L	
			METHYLENE CHLORIDE	<10	U	10	ug/L	
			MTBE	<0.5	U	0.5	ug/L	
			N-BUTYLBENZENE	<0.5	U	0.5	ug/L	
			N-PROPYLBENZENE	<0.5	U	0.5	ug/L	
			NAPHTHALENE	<2	U	2	ug/L	
			O-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			O-XYLENE	<0.5	U	0.5	ug/L	
			P-CYMENE	<0.5	U	0.5	ug/L	
			P-DICHLOROBENZENE	<0.5	U	0.5	ug/L	
			PARA-ISOPROPYL TOLUENE	<0.5	U	0.5	ug/L	

Notes: All notes are listed at the end of this table - see last page.

Table C-2

Complete Analytical Results for Field QC (Field and Trip Blanks and Source Water)
Third and Fourth Quarter 2014 Monitoring
The Sherwin-Williams Company
Emeryville, California

Sample Number	Sample Date	Analytical Group (Method)	Analyte	Result	Quals	Detection Limit	Units	Field Sample ID
TRIP BLANK	10/29/14	(SW8260B)	PROPYLBENZENE	<0.5	U	0.5	ug/L	981-102914
			SEC-BUTYLBENZENE	<0.5	U	0.5	ug/L	
			STYRENE	<0.5	U	0.5	ug/L	
			TERT-BUTYLBENZENE	<0.5	U	0.5	ug/L	
			TETRACHLOROETHENE	<0.5	U	0.5	ug/L	
			TOLUENE	<0.5	U	0.5	ug/L	
			TRANS-1,2-DICHLOROETHENE	<0.5	U	0.5	ug/L	
			TRANS-1,3-DICHLOROPROPENE	<0.5	U	0.5	ug/L	
			TRICHLOROETHENE	<0.5	U	0.5	ug/L	
			TRICHLOROFLUOROMETHANE	<1	U	1	ug/L	
			VINYL ACETATE	<10	U	10	ug/L	
			VINYL CHLORIDE	<0.5	U	0.5	ug/L	

Notes:

< = Analyte was not detected at or greater than the detection limit reported

ug/L = micrograms per liter

Data Qualifiers:

U = Not detected at or greater than the detection limit reported

J = Concentrations estimated

ARCADIS

Appendix D

Electronic Copies of Current and Historical Groundwater Monitoring Well Elevation and Analytical Data

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
CDM-1	01/18/2007	13.60	4.57	9.03
	04/12/2007		4.61	8.99
	07/19/2007		4.85	8.75
	10/12/2007		3.26	10.34
	01/17/2008		3.49	10.11
	04/10/2008		4.83	8.77
	07/24/2008		5.34	8.26
	10/22/2008		4.93	8.67
	01/08/2009		4.02	9.58
	04/09/2009		4.22	9.38
	07/16/2009		4.86	8.74
	10/16/2009		3.05	10.53
	01/14/2010		4.00	9.60
	04/23/2010		3.11	10.49
	07/23/2010		4.80	8.80
	10/15/2010		4.92	8.67
	01/28/2011		4.09	9.51
	04/19/2011		4.03	9.57
CDM-101	03/20/2012	18.97	9.80	9.17
	04/16/2012		8.55	10.42
	05/14/2012		9.35	9.62
	06/11/2012		9.21	9.76
	07/18/2012		9.50	9.47
	08/15/2012		9.25	9.72
	09/13/2012		9.29	9.68
	10/17/2012		9.28	9.69
	11/16/2012		8.96	10.01
	12/14/2012		8.17	10.80
	01/18/2013		8.58	10.39
	02/22/2013		9.10	9.87
	03/21/2013		8.89	10.08
	04/19/2013		8.75	10.22
	07/16/2013		9.26	9.71
	10/07/2013		9.63	9.34
	01/03/2014		9.58	9.39
	04/22/2014		8.96	10.01
	07/08/2014		9.53	9.44
	10/28/2014		9.84	9.13
CDM-102	03/20/2012	17.61	8.62	8.99
	04/16/2012		7.15	10.46
	05/14/2012		8.38	9.23
	06/11/2012		8.28	9.33
	07/18/2012		8.66	8.95
	08/15/2012		8.43	9.18
	09/13/2012		8.34	9.27

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
CDM-102	10/17/2012	17.61	8.28	9.33
	11/16/2012		7.96	9.65
	12/14/2012		7.12	10.49
	01/18/2013		7.55	10.06
	02/22/2013		8.16	9.45
	03/21/2013		7.94	9.67
	04/19/2013		7.90	9.71
	07/16/2013		8.55	9.06
	10/07/2013		8.73	8.88
	01/03/2014		8.60	9.01
	04/22/2014		7.95	9.66
	07/08/2014		8.60	9.01
	10/28/2014		8.89	8.72
CDM-103	03/20/2012	20.56	12.25	8.31
	04/16/2012		11.30	9.26
	05/14/2012		11.03	9.53
	06/11/2012		12.03	8.53
	07/18/2012		11.30	9.26
	08/15/2012		11.10	9.46
	09/13/2012		11.04	9.52
	10/17/2012		10.72	9.84
	11/16/2012		10.42	10.14
	12/14/2012		9.73	10.83
	01/18/2013		10.09	10.47
	02/22/2013		10.66	9.90
	03/21/2013		10.44	10.12
	04/19/2013		10.35	10.21
	07/16/2013		10.60	9.96
	10/07/2013		10.93	9.63
	01/03/2014		11.05	9.51
	04/22/2014		10.29	10.27
	07/08/2014		11.64	8.92
	10/28/2014		11.15	9.41
CDM-104	03/20/2012	18.60	8.51	10.09
	04/16/2012		8.07	10.53
	05/14/2012		8.73	9.87
	06/11/2012		8.99	9.61
	07/18/2012		9.14	9.46
	08/15/2012		9.14	9.46
	09/13/2012		9.25	9.35
	10/17/2012		9.18	9.42
	11/16/2012		8.80	9.80
	12/14/2012		8.09	10.51
	01/18/2013		8.45	10.15
	02/22/2013		9.00	9.60

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
CDM-104	03/21/2013	18.60	8.81	9.79
	04/19/2013		8.68	9.92
	07/16/2013		9.33	9.27
	10/07/2013		9.59	9.01
	01/03/2014		9.46	9.14
	04/22/2014		8.85	9.75
	07/08/2014		9.47	9.13
	10/28/2014		9.69	8.91
CDM-105	03/20/2012	15.83	7.82	8.01
	04/16/2012		6.92	8.91
	05/14/2012		7.63	8.20
	06/11/2012		7.80	8.03
	07/18/2012		7.85	7.98
	08/15/2012		8.01	7.82
	09/13/2012		8.03	7.80
	10/17/2012		8.14	7.69
	11/16/2012		7.85	7.98
	12/14/2012		7.25	8.58
	01/18/2013		7.48	8.35
	02/22/2013		7.80	8.03
	03/21/2013		7.99	7.84
	04/19/2013		7.89	7.94
	07/16/2013		8.55	7.28
	10/07/2013		8.96	6.87
	12/02/2013		8.17	7.66
	01/03/2014		8.47	7.36
	02/12/2014		5.96	9.87
	04/22/2014		7.60	8.23
	07/08/2014		8.60	7.23
	10/28/2014		9.11	6.72
CDM-106	03/20/2012	16.21	6.78	9.43
	04/16/2012		6.78	9.43
	05/14/2012		7.41	8.80
	06/11/2012		7.72	8.49
	07/18/2012		7.90	8.31
	08/15/2012		8.01	8.20
	09/13/2012		8.16	8.05
	10/17/2012		8.26	7.95
	11/16/2012		7.97	8.24
	12/14/2012		7.35	8.86
	01/18/2013		7.73	8.48
	02/22/2013		8.14	8.07
	03/21/2013		8.15	8.06
	04/19/2013		8.05	8.16
	07/16/2013		8.56	7.65

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
CDM-106	10/07/2013	16.21	8.81	7.40
	01/03/2014		8.58	7.63
	04/22/2014		7.94	8.27
	07/08/2014		8.62	7.59
	10/28/2014		8.90	7.31
CDM-107	02/23/2012	17.38	10.13	7.25
	03/20/2012		10.35	7.03
	04/16/2012		10.43	6.95
	05/14/2012		10.94	6.44
	06/11/2012		11.00	6.38
	07/18/2012		10.98	6.40
	08/15/2012		11.02	6.36
	09/13/2012		11.05	6.33
	10/17/2012		10.98	6.40
	11/16/2012		10.75	6.63
	12/14/2012		10.52	6.86
	01/18/2013		10.79	6.59
	02/22/2013		10.75	6.63
	03/21/2013		10.71	6.67
	04/19/2013		10.70	6.68
	07/16/2013		10.83	6.55
	10/07/2013		10.95	6.43
	12/02/2013		10.77	6.61
	01/03/2014		10.78	6.60
	02/12/2014		10.26	7.12
	04/22/2014		10.65	6.73
	07/08/2014		10.79	6.59
	10/28/2014		10.92	6.46
CDM-108	02/23/2012	17.71	9.83	7.88
	03/20/2012		10.15	7.56
	04/16/2012		10.30	7.41
	05/14/2012		10.54	7.17
	06/11/2012		10.56	7.15
	07/18/2012		10.60	7.11
	08/15/2012		10.70	7.01
	09/13/2012		10.70	7.01
	10/17/2012		10.74	6.97
	11/16/2012		10.55	7.16
	12/14/2012		10.23	7.48
	01/18/2013		10.38	7.33
	02/22/2013		10.49	7.22
	03/21/2013		10.50	7.21
	04/19/2013		10.48	7.23
	07/16/2013		10.71	7.00
	10/07/2013		10.85	6.86

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
CDM-108	12/02/2013	17.71	10.58	7.13
	01/03/2014		10.67	7.04
	02/12/2014		9.89	7.82
	04/22/2014		10.34	7.37
	07/08/2014		10.63	7.08
	10/28/2014		10.84	6.87
CDM-109	02/23/2012	15.44	7.49	7.95
	03/20/2012		7.86	7.58
	04/16/2012		7.88	7.56
	05/14/2012		7.91	7.53
	06/11/2012		7.95	7.49
	07/18/2012		7.94	7.50
	08/15/2012		7.99	7.45
	09/13/2012		7.99	7.45
	10/17/2012		8.00	7.44
	11/16/2012		7.91	7.53
	12/14/2012		7.88	7.56
	01/18/2013		7.94	7.50
	02/22/2013		7.93	7.51
	03/21/2013		7.96	7.48
	04/19/2013		7.95	7.49
	07/16/2013		8.06	7.38
	10/07/2013		8.16	7.28
	01/03/2014		8.00	7.44
	04/22/2014		7.93	7.51
	07/08/2014		8.06	7.38
	10/28/2014		8.21	7.23
CDM-110	03/20/2012	15.62	4.65	10.97
	04/16/2012		3.75	11.87
	05/14/2012		4.77	10.85
	06/11/2012		5.18	10.44
	07/18/2012		5.32	10.30
	08/15/2012		5.37	10.25
	09/13/2012		5.52	10.10
	10/17/2012		5.51	10.11
	11/16/2012		4.93	10.69
	12/14/2012		4.15	11.47
	01/18/2013		4.64	10.98
	02/22/2013		5.10	10.52
	03/21/2013		5.00	10.62
	04/19/2013		4.77	10.85
	07/16/2013		5.47	10.15
	10/07/2013		5.59	10.03
	01/03/2014		5.62	10.00
	04/22/2014		4.85	10.77

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
CDM-110	07/08/2014	15.62	5.56	10.06
	10/28/2014		5.72	9.90
CDM-111	03/20/2012	18.14	6.84	11.30
	04/16/2012		6.38	11.76
	05/14/2012		7.49	10.65
	06/11/2012		7.89	10.25
	07/18/2012		8.10	10.04
	08/15/2012		8.19	9.95
	09/13/2012		8.34	9.80
	10/17/2012		8.33	9.81
	11/16/2012		7.75	10.39
	12/14/2012		6.89	11.25
	01/18/2013		7.40	10.74
	02/22/2013		8.02	10.12
	03/21/2013		7.94	10.20
	04/19/2013		7.66	10.48
	07/16/2013		8.41	9.73
	10/07/2013		8.56	9.58
	01/03/2014		8.51	9.63
	04/22/2014		7.80	10.34
	07/08/2014		8.58	9.56
	10/28/2014		8.81	9.33
CDM-112	03/20/2012	15.70	4.81	10.89
	04/16/2012		4.63	11.07
	05/14/2012		5.30	10.40
	06/11/2012		5.54	10.16
	07/18/2012		5.73	9.97
	08/15/2012		5.54	10.16
	09/13/2012		5.78	9.92
	10/17/2012		5.70	10.00
	11/16/2012		5.34	10.36
	12/14/2012		4.83	10.87
	01/18/2013		5.17	10.53
	02/22/2013		5.40	10.30
	03/21/2013		5.38	10.32
	04/19/2013		5.26	10.44
	07/16/2013		5.56	10.14
	10/07/2013		5.65	10.05
	01/03/2014		5.76	9.94
	04/22/2014		5.25	10.45
	07/08/2014		5.64	10.06
	10/28/2014		5.69	10.01
CDM-113	03/20/2012	15.47	4.11	11.36
	04/16/2012		3.66	11.81

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
CDM-113	05/14/2012	15.47	4.78	10.69
	06/11/2012		5.18	10.29
	07/18/2012		5.38	10.09
	08/15/2012		5.43	10.04
	09/13/2012		5.60	9.87
	10/17/2012		5.58	9.89
	11/16/2012		4.99	10.48
	12/14/2012		4.12	11.35
	01/18/2013		4.63	10.84
	02/22/2013		5.25	10.22
	03/21/2013		5.10	10.37
	04/19/2013		4.61	10.86
	07/16/2013		5.58	9.89
	10/07/2013		5.70	9.77
	01/03/2014		5.71	9.76
	04/22/2014		4.95	10.52
	07/08/2014		5.68	9.79
	10/28/2014		5.89	9.58
CDM-114	03/20/2012	14.72	3.02	11.70
	04/16/2012		2.60	12.12
	05/14/2012		3.66	11.06
	06/11/2012		3.90	10.82
	07/18/2012		4.13	10.59
	08/15/2012		4.33	10.39
	09/13/2012		4.41	10.31
	10/17/2012		4.42	10.30
	11/16/2012		3.73	10.99
	12/14/2012		2.90	11.82
	01/18/2013		3.50	11.22
	02/22/2013		3.88	10.84
	03/21/2013		3.83	10.89
	04/19/2013		3.62	11.10
	07/16/2013		4.34	10.38
	10/07/2013		4.55	10.17
	01/03/2014		4.51	10.21
	04/22/2014		3.68	11.04
	07/08/2014		4.43	10.29
	10/28/2014		4.66	10.06
EX-1	04/24/1996	12.78	15.42	-2.64
	07/29/1996		15.70	-2.92
	12/13/1996		3.20	9.58
	04/15/1997		15.50	-2.72
	09/19/1997		4.34	8.44
	12/03/1997		3.35	9.43
	12/15/1997		1.99	10.79

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-1	01/13/1998	12.78	2.15	10.63
	01/30/1998		0.67	12.11
	02/24/1998		13.80	-1.02
	04/06/1998		3.43	9.35
	07/02/1998		5.68	7.10
	07/13/1998		15.38	-2.60
	09/28/1998		15.36	-2.58
	10/16/1998		15.50	-2.72
	01/08/1999		13.84	-1.06
	04/16/1999		15.50	-2.72
	06/21/1999		15.40	-2.62
	07/12/1999		15.60	-2.82
	10/08/1999		15.80	-3.02
	01/17/2000		5.43	7.35
	04/25/2000		3.00	9.78
	05/30/2000		3.83	8.95
	06/26/2000		NM	NM
	08/10/2000		12.70	8.00
	10/06/2000		9.61	3.17
	01/15/2001		15.63	-2.85
	04/19/2001		3.00	9.78
	07/02/2001		15.40	-2.62
	09/07/2001		NM	NM
	10/18/2001		11.10	1.68
	11/02/2001		NM	NM
	12/14/2001		1.25	11.53
	01/18/2002		2.39	10.39
	02/21/2002		NM	NM
	03/25/2002		3.39	9.39
	04/18/2002		15.45	-2.67
	05/10/2002		4.59	8.19
	06/04/2002		4.11	8.67
	07/10/2002		NM	NM
	08/15/2002		4.90	7.88
	09/11/2002		5.05	7.73
	10/08/2002		5.31	7.47
	11/07/2002		4.15	8.63
	12/12/2002		16.51	-3.73
	01/13/2003		16.48	-3.70
	02/26/2003		8.50	4.28
	03/19/2003		14.32	-1.54
	04/14/2003		3.80	8.98
	05/13/2003		14.40	-1.62
	06/13/2003		5.51	7.27
	07/07/2003		8.75	4.03

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-1	08/13/2003	12.78	5.90	6.88
	09/17/2003		14.70	-1.92
	10/27/2003		6.01	6.77
	11/18/2003		5.23	7.55
	12/19/2003		18.40	-5.62
	01/15/2004		3.75	9.03
	02/17/2004		12.16	0.62
	03/18/2004		11.04	1.74
	04/21/2004		14.75	-1.97
	05/18/2004		14.80	-2.02
	06/10/2004		14.20	-1.42
	07/15/2004		8.15	4.63
	08/12/2004		14.55	-1.77
	09/16/2004		6.00	6.78
	10/12/2004		5.62	7.16
	11/17/2004		13.75	-0.97
	12/15/2004		14.10	-1.32
	01/24/2005		11.97	0.81
	02/15/2005		13.20	-0.42
	03/15/2005		6.52	6.26
	04/25/2005		14.29	-1.51
	05/20/2005		13.80	-1.02
	06/21/2005		4.90	7.88
	07/20/2005		10.70	2.08
	08/19/2005		15.35	-2.57
	09/16/2005		18.25	-5.47
	10/21/2005		15.00	-2.22
	11/18/2005		5.78	7.00
	12/16/2005		17.69	-4.91
	01/20/2006		4.00	8.78
	02/22/2006		15.90	-3.12
	03/30/2006		14.86	-2.08
	04/27/2006		15.11	-2.33
	05/18/2006		15.09	-2.31
	06/22/2006		5.42	7.36
	07/20/2006		16.84	-4.06
	08/17/2006		17.20	-4.42
	09/14/2006		17.53	-4.75
	10/19/2006		14.70	-1.92
	11/21/2006		17.75	-4.97
	12/21/2006		6.35	6.43
	01/18/2007		16.58	-3.80
	02/06/2007		16.60	-3.82
	03/08/2007		16.68	-3.90
	04/12/2007		16.69	-3.91

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-1	05/10/2007	12.78	4.62	8.16
	06/07/2007		16.90	-4.12
	07/19/2007		16.95	-4.17
	08/09/2007		15.93	-3.15
	08/17/2007		6.13	6.65
	08/24/2007		6.00	6.78
	08/30/2007		5.98	6.80
	09/06/2007		5.81	6.97
	09/14/2007		5.76	7.02
	09/21/2007		5.58	7.20
	09/28/2007		5.43	7.35
	10/05/2007		5.33	7.45
	10/12/2007		4.25	8.53
	10/19/2007		NM	NM
	10/26/2007		3.90	8.88
	11/02/2007		3.89	8.89
	11/09/2007		3.79	8.99
	11/15/2007		3.33	9.45
	11/21/2007		3.28	9.50
	11/29/2007		3.25	9.53
	12/14/2007		2.97	9.81
	01/17/2008		16.60	-3.82
	02/21/2008		16.62	-3.84
	03/20/2008		14.93	-2.15
	04/10/2008		9.71	3.07
	05/08/2008		14.92	-2.14
	06/12/2008		14.64	-1.86
	07/24/2008		14.75	-1.97
	08/14/2008		15.00	-2.22
	09/18/2008		14.85	-2.07
	10/22/2008		14.87	-2.09
	11/13/2008		14.86	-2.08
	12/04/2008		14.80	-2.02
	01/08/2009		14.82	-2.04
	02/11/2009		14.45	-1.67
	03/12/2009		14.76	-1.98
	04/09/2009		15.20	-2.42
	05/20/2009		14.43	-1.65
	06/17/2009		14.54	-1.76
	07/16/2009		14.48	-1.70
	08/13/2009		14.60	-1.82
	09/10/2009		14.75	-1.97
	10/16/2009		14.64	-1.88
	11/12/2009		17.47	-4.69
	12/03/2009		14.80	-2.02

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-1	01/14/2010	12.78	14.23	-1.45
	02/18/2010		14.20	-1.42
	03/25/2010		14.34	-1.56
	04/23/2010		14.91	-2.13
	05/21/2010		14.12	-1.34
	06/10/2010		16.53	-3.75
	07/23/2010		16.67	-3.89
	08/12/2010		14.81	-2.03
	09/10/2010		14.87	-2.09
	10/15/2010		15.39	-2.62
	11/04/2010		14.53	-1.75
	12/03/2010		13.80	-1.02
	01/28/2011		15.43	-2.65
	02/10/2011		16.65	-3.87
	03/31/2011		8.57	4.21
	04/19/2011		15.22	-2.44
EX-10	09/28/1998	14.49	5.71	8.77
	10/16/1998		5.96	8.52
	01/08/1999		15.11	-0.62
	04/16/1999		18.00	-3.51
	06/21/1999		18.30	-3.81
	07/12/1999		18.58	-4.09
	10/08/1999		9.95	4.54
	01/17/2000		10.50	3.99
	04/25/2000		3.98	10.51
	05/30/2000		6.60	7.89
	06/26/2000		NM	NM
	08/10/2000		6.35	8.14
	10/06/2000		6.20	8.29
	01/15/2001		5.49	9.00
	04/19/2001		4.50	9.99
	07/02/2001		6.61	7.88
	09/07/2001		NM	NM
	10/18/2001		5.17	9.32
	11/02/2001		NM	NM
	12/14/2001		1.30	13.19
	01/18/2002		18.28	-3.79
	02/21/2002		NM	NM
	03/25/2002		18.20	-3.71
	04/18/2002		18.35	-3.86
	05/10/2002		10.57	3.92
	06/04/2002		18.20	-3.71
	07/10/2002		18.10	-3.61
	08/15/2002		18.40	-3.91
	09/11/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-10	10/08/2002	14.49	5.71	8.78
	11/07/2002		18.21	-3.72
	12/12/2002		18.33	-3.84
	01/13/2003		18.26	-3.77
	02/26/2003		18.20	-3.71
	03/19/2003		17.61	-3.12
	04/14/2003		7.00	7.49
	05/13/2003		4.90	9.59
	06/13/2003		17.75	-3.26
	07/07/2003		5.92	8.57
	08/13/2003		18.05	-3.56
	09/17/2003		16.70	-2.21
	10/27/2003		9.95	4.54
	11/18/2003		16.72	-2.23
	12/19/2003		8.48	6.01
	01/15/2004		7.25	7.24
	02/17/2004		5.50	8.99
	03/18/2004		11.55	2.94
	04/21/2004		7.54	6.95
	05/18/2004		7.85	6.64
	06/10/2004		12.65	1.84
	07/13/2004		6.35	8.14
	08/12/2004		16.42	-1.93
	09/16/2004		6.12	8.37
	10/12/2004		6.41	8.08
	11/17/2004		14.92	-0.43
	12/15/2004		15.85	-1.36
	01/25/2005		15.05	-0.56
	02/15/2005		3.86	10.63
	03/15/2005		10.30	4.19
	04/25/2005		4.31	10.18
	05/20/2005		15.31	-0.82
	06/21/2005		16.00	-1.51
	07/20/2005		16.40	-1.91
	08/19/2005		9.30	5.19
	09/16/2005		17.46	-2.97
	10/21/2005		17.52	-3.03
	11/18/2005		4.81	9.68
	12/16/2005		16.73	-2.24
	01/20/2006		15.55	-1.06
	02/22/2006		8.10	6.39
	03/30/2006		8.30	6.19
	04/27/2006		16.89	-2.40
	05/18/2006		17.05	-2.56
	06/22/2006		5.91	8.58

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-10	07/20/2006	14.49	17.10	-2.61
	08/17/2006		13.55	0.94
	09/14/2006		5.26	9.23
	10/19/2006		17.05	-2.56
	11/21/2006		20.18	-5.69
	12/21/2006		20.00	-5.51
	01/18/2007		18.61	-4.12
	02/06/2007		4.77	9.72
	03/08/2007		9.36	5.13
	04/12/2007		8.46	6.03
	05/10/2007		5.08	9.41
	06/07/2007		19.15	-4.66
	07/19/2007		5.59	8.90
	08/09/2007		19.05	-4.56
	09/14/2007		4.89	9.60
	10/05/2007		4.51	9.98
	10/12/2007		2.89	11.60
	10/26/2007		3.72	10.77
	11/02/2007		3.90	10.59
	11/09/2007		4.01	10.48
	12/14/2007		10.80	3.69
	01/17/2008		7.06	7.43
	02/21/2008		4.16	10.33
	03/20/2008		6.55	7.94
	04/10/2008		6.23	8.26
	05/08/2008		17.12	-2.63
	06/12/2008		7.37	7.12
	07/24/2008		8.45	6.04
	08/14/2008		19.62	-5.13
	09/18/2008		11.05	3.44
	10/22/2008		19.49	-5.00
	11/13/2008		15.50	-1.01
	12/04/2008		15.40	-0.91
	01/08/2009		11.50	2.99
	02/11/2009		7.85	6.64
	03/12/2009		19.33	-4.84
	04/09/2009		15.08	-0.59
	05/20/2009		17.85	-3.36
	06/17/2009		10.97	3.52
	07/16/2009		16.94	-2.45
	08/13/2009		20.10	-5.61
	09/10/2009		16.60	-2.11
	10/16/2009		7.35	7.12
	11/12/2009		20.39	-5.90
	12/03/2009		17.39	-2.90

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-10	01/14/2010	14.49	19.48	-4.99
	02/18/2010		16.74	-2.25
	03/25/2010		18.73	-4.24
	04/23/2010		7.66	6.83
	05/21/2010		19.67	-5.18
	06/10/2010		9.14	5.35
	07/23/2010		17.27	-2.78
	08/12/2010		17.60	-3.11
	09/10/2010		13.25	1.24
	10/15/2010		17.94	-3.46
	11/04/2010		15.34	-0.85
	12/03/2010		11.25	3.24
	01/28/2011		18.90	-4.41
	02/10/2011		10.35	4.14
	03/31/2011		10.01	4.48
	04/19/2011		11.71	2.78
	10/05/2011		9.88	4.61
	10/12/2011		8.48	6.01
	10/19/2011		10.10	4.39
	10/26/2011		12.03	2.46
	11/02/2011		11.75	2.74
	11/09/2011		11.21	3.28
	11/16/2011		11.08	3.41
	11/23/2011		10.20	4.29
	11/30/2011		10.64	3.85
	12/06/2011		10.83	3.66
	01/27/2012		NM	NM
	02/23/2012		4.63	9.86
	03/20/2012		NM	NM
EX-11	06/21/1999	17.97	8.79	9.18
	07/12/1999		9.07	8.90
	10/08/1999		9.17	8.80
EX-12	06/21/1999	18.33	8.97	9.36
	07/12/1999		9.15	9.18
	10/08/1999		9.35	8.98
EX-13	06/21/1999	17.20	7.86	9.34
	07/12/1999		8.20	9.00
	10/08/1999		8.30	8.90
EX-14	10/08/1999	18.74	14.15	4.94
	01/17/2000		10.32	9.28
	04/25/2000		9.74	9.86
	05/30/2000		14.08	5.52
	06/26/2000		14.40	5.20
	08/10/2000		14.50	5.10

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-14	08/31/2000	18.74	10.19	9.41
	09/25/2000		14.51	5.09
	10/06/2000		14.50	5.10
	11/21/2000		10.54	9.06
	12/18/2000		10.13	9.47
	01/15/2001		15.30	4.30
	02/14/2001		9.51	10.09
	03/01/2001		14.12	5.48
	04/19/2001		9.99	9.61
	05/23/2001		12.85	5.89
	06/14/2001		9.93	8.81
	07/02/2001		13.04	5.70
	08/10/2001		13.04	5.70
	09/07/2001		9.65	9.09
	10/18/2001		15.96	10.70
	11/02/2001		10.05	8.69
	12/14/2001		12.75	5.99
	01/18/2002		12.39	6.35
	02/21/2002		NM	NM
	03/25/2002		12.76	5.98
	04/18/2002		12.94	5.80
	05/10/2002		12.99	5.75
	06/04/2002		12.72	6.02
	07/10/2002		9.59	9.15
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		9.03	9.71
	11/07/2002		13.11	5.63
	12/12/2002		14.84	3.90
	01/13/2003		8.30	10.44
	02/26/2003		7.67	11.07
	03/19/2003		13.61	5.13
	04/14/2003		13.46	5.28
	05/13/2003		8.64	10.10
	06/13/2003		12.84	5.90
	07/07/2003		8.83	9.91
	08/13/2003		13.18	5.56
	09/17/2003		13.02	5.72
	10/27/2003		12.84	5.90
	11/18/2003		9.05	9.69
	12/19/2003		9.14	9.60
	01/15/2004		9.10	9.64
	02/17/2004		9.09	9.65
	03/18/2004		8.75	9.99
	04/21/2004		13.95	4.79

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-14	05/18/2004	18.74	12.82	5.92
	06/10/2004		9.40	9.34
	07/13/2004		9.02	9.72
	08/12/2004		13.30	5.44
	09/16/2004		9.30	9.44
	10/12/2004		9.13	9.61
	11/17/2004		13.05	5.69
	12/15/2004		13.20	5.54
	01/25/2005		8.24	10.50
	02/15/2005		8.70	10.04
	03/15/2005		12.70	6.04
	04/25/2005		8.38	10.36
	05/20/2005		8.52	10.22
	06/21/2005		8.80	9.94
	07/20/2005		12.20	6.54
	08/19/2005		11.55	7.19
	09/16/2005		12.50	6.24
	10/21/2005		13.25	5.49
	11/18/2005		13.13	5.61
	12/16/2005		11.52	7.22
	01/20/2006		7.86	10.88
	02/22/2006		8.97	9.77
	03/30/2006		9.03	9.71
	04/27/2006		8.70	10.04
	05/18/2006		9.08	9.66
	06/22/2006		8.94	9.80
	07/20/2006		9.22	9.52
	08/17/2006		12.60	6.14
	09/14/2006		9.14	9.60
	10/19/2006		9.54	9.20
	11/21/2006		8.64	10.10
	12/21/2006		7.77	10.97
	01/18/2007		14.48	4.26
	02/06/2007		14.48	4.26
	03/08/2007		12.90	5.84
	04/12/2007		10.72	8.02
	05/10/2007		10.76	7.98
	06/07/2007		10.49	8.25
	07/19/2007		12.80	5.94
	08/09/2007		8.33	10.41
	09/14/2007		8.41	10.33
	10/12/2007		8.20	10.54
	11/09/2007		NM	NM
	12/14/2007		8.12	10.62
	01/17/2008		10.15	8.59

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-14	02/21/2008	18.74	NM	NM
	03/20/2008		13.26	5.48
	04/10/2008		14.61	4.13
	05/08/2008		14.60	4.14
	06/12/2008		10.87	7.87
	07/24/2008		7.02	11.72
	08/14/2008		9.03	9.71
	09/18/2008		8.66	10.08
	10/22/2008		13.16	5.58
	11/13/2008		13.25	5.49
	12/04/2008		9.29	9.45
	01/08/2009		9.45	9.29
	02/11/2009		11.31	7.43
	03/12/2009		13.45	5.29
	04/09/2009		12.30	6.44
	05/20/2009		NM	NM
	06/17/2009		NM	NM
	07/16/2009		12.58	6.16
	08/13/2009		12.70	6.04
	09/10/2009		12.47	6.27
	10/16/2009		7.96	10.76
	11/12/2009		9.60	9.14
	12/03/2009		8.25	10.49
	01/14/2010		12.45	6.29
	02/18/2010		11.26	7.48
	03/25/2010		12.28	6.46
	04/23/2010		10.13	8.61
	05/21/2010		12.63	6.11
	06/10/2010		10.97	7.77
	07/23/2010		11.74	7.00
	08/12/2010		11.48	7.26
	09/10/2010		12.05	6.69
	10/15/2010		13.25	5.48
	11/04/2010		10.93	7.81
	12/03/2010		11.44	7.30
	01/28/2011		10.13	8.61
	02/10/2011		11.93	6.81
	03/31/2011		11.68	7.06
	04/19/2011		11.59	7.15
	03/20/2012		8.39	10.35
EX-15	01/17/2000	17.88	NM	NM
	04/25/2000		8.08	9.81
	05/30/2000		12.15	5.74
	06/26/2000		15.25	-3.30
	08/10/2000		15.11	10.70

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-15	08/31/2000	17.88	8.70	9.19
	09/25/2000		10.14	7.75
	10/06/2000		12.65	5.24
	11/21/2000		8.75	9.14
	12/18/2000		8.60	9.29
	01/15/2001		15.40	2.49
	02/14/2001		7.82	10.07
	03/01/2001		14.96	2.93
	04/19/2001		14.17	3.72
	05/23/2001		14.68	3.20
	06/14/2001		9.61	8.27
	07/02/2001		14.65	3.23
	08/10/2001		14.56	3.32
	09/07/2001		14.40	3.48
	10/18/2001		16.02	1.86
	11/02/2001		12.10	5.78
	12/14/2001		14.54	3.34
	01/18/2002		14.40	3.48
	02/21/2002		14.34	3.54
	03/25/2002		14.41	3.47
	04/18/2002		14.48	3.40
	05/10/2002		14.55	3.33
	06/04/2002		NM	NM
	07/10/2002		13.41	4.47
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		8.43	9.45
	11/07/2002		14.09	3.79
	12/12/2002		14.41	3.47
	01/13/2003		14.22	3.66
	02/26/2003		14.51	3.37
	03/19/2003		14.32	3.56
	04/14/2003		14.12	3.76
	05/13/2003		14.32	3.56
	06/13/2003		13.44	4.44
	07/07/2003		13.71	4.17
	09/17/2003		12.48	5.40
	10/27/2003		12.50	5.38
	11/18/2003		13.69	4.19
	12/19/2003		12.61	5.27
	01/15/2004		13.10	4.78
	02/17/2004		13.30	4.58
	03/18/2004		13.53	4.35
	04/21/2004		13.50	4.38
	05/18/2004		12.95	4.93

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-15	06/10/2004	17.88	13.68	4.20
	07/13/2004		13.55	4.33
	08/12/2004		13.85	4.03
	09/16/2004		13.38	4.50
	10/12/2004		13.82	4.06
	11/17/2004		13.72	4.16
	12/15/2004		13.43	4.45
	01/25/2005		12.95	4.93
	02/15/2005		13.58	4.30
	03/15/2005		12.75	5.13
	04/25/2005		7.70	10.18
	05/20/2005		7.83	10.05
	06/21/2005		10.80	7.08
	07/20/2005		13.48	4.40
	08/19/2005		12.10	5.78
	09/16/2005		13.55	4.33
	10/21/2005		13.05	4.83
	11/18/2005		12.82	5.06
	12/16/2005		13.01	4.87
	01/20/2006		7.00	10.88
	02/22/2006		10.71	7.17
	03/30/2006		9.70	8.18
	04/27/2006		9.55	8.33
	05/18/2006		NM	NM
	06/22/2006		11.45	6.43
	07/20/2006		7.80	10.08
	08/17/2006		10.90	6.98
	09/14/2006		10.58	7.30
	10/19/2006		10.65	7.23
	11/21/2006		10.36	7.52
	12/21/2006		11.80	6.08
	01/18/2007		7.51	10.37
	02/06/2007		10.39	7.49
	03/08/2007		11.99	5.89
	04/12/2007		11.63	6.25
	05/10/2007		10.15	7.73
	06/07/2007		11.75	6.13
	07/19/2007		7.78	10.10
	08/09/2007		14.92	2.96
	09/14/2007		7.58	10.30
	10/12/2007		7.37	10.51
	11/09/2007		7.31	10.57
	12/14/2007		12.34	5.54
	01/17/2008		14.65	3.23
	02/21/2008		6.83	11.05

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-15	03/20/2008	17.88	11.25	6.63
	04/10/2008		14.52	3.36
	05/08/2008		12.34	5.54
	06/12/2008		8.80	9.08
	07/24/2008		12.00	5.88
	08/14/2008		16.19	1.69
	09/18/2008		8.14	9.74
	10/22/2008		15.00	2.88
	11/13/2008		10.53	7.35
	12/04/2008		7.95	9.93
	01/08/2009		16.25	1.63
	02/11/2009		10.02	7.86
	03/12/2009		15.55	2.33
	04/09/2009		12.33	5.55
	05/20/2009		11.67	6.21
	06/17/2009		12.17	5.71
	07/16/2009		12.35	5.53
	08/13/2009		12.35	5.53
	09/10/2009		11.55	6.33
	10/16/2009		7.91	9.95
	11/12/2009		12.29	5.59
	12/03/2009		12.40	5.48
	01/14/2010		8.75	9.13
	02/18/2010		12.37	5.51
	03/25/2010		11.95	5.93
	04/23/2010		NM	NM
	05/21/2010		12.47	5.41
	06/10/2010		12.13	5.75
	07/23/2010		11.62	6.26
	08/12/2010		12.41	5.47
	09/10/2010		11.78	6.10
	10/15/2010		11.35	6.52
	11/04/2010		11.42	6.46
	12/03/2010		12.19	5.69
	01/28/2011		10.05	7.83
	02/10/2011		16.01	1.87
	03/31/2011		11.12	6.76
	04/19/2011		12.63	5.25
	03/20/2012		7.45	10.43
EX-16	01/17/2000	18.49	9.77	9.16
	04/25/2000		9.15	9.78
	05/30/2000		10.00	8.93
	06/26/2000		10.05	8.88
	08/10/2000		10.17	8.76
	08/31/2000		9.51	9.42

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-16	09/25/2000	18.49	9.66	9.27
	10/06/2000		9.84	9.09
	11/21/2000		16.04	2.89
	12/18/2000		15.31	3.62
	01/15/2001		9.52	9.41
	02/14/2001		8.83	10.10
	03/01/2001		8.19	10.74
	04/19/2001		15.98	2.95
	05/23/2001		15.05	3.44
	06/14/2001		14.91	3.58
	07/02/2001		9.79	8.70
	08/10/2001		13.71	4.78
	09/07/2001		15.01	3.48
	10/18/2001		14.69	3.80
	11/02/2001		9.66	8.83
	12/14/2001		10.91	7.58
	01/18/2002		8.98	9.51
	02/21/2002		8.15	10.34
	03/25/2002		7.33	11.16
	04/18/2002		8.84	9.65
	05/10/2002		9.25	9.24
	06/04/2002		8.76	9.73
	07/10/2002		9.25	9.24
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		8.52	9.97
	11/07/2002		14.62	3.87
	12/12/2002		14.97	3.52
	01/13/2003		7.97	10.52
	02/26/2003		14.20	4.29
	03/19/2003		15.12	3.37
	04/14/2003		14.46	4.03
	05/13/2003		10.43	8.06
	06/13/2003		8.66	9.83
	07/07/2003		8.72	9.77
	08/13/2003		11.45	7.04
	09/17/2003		11.15	7.34
	10/27/2003		8.10	10.39
	11/18/2003		12.05	6.44
	12/19/2003		8.53	9.96
	01/15/2004		12.05	6.44
	02/17/2004		12.65	5.84
	03/18/2004		12.65	5.84
	04/21/2004		12.65	5.84
	05/18/2004		13.15	5.34

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-16	06/10/2004	18.49	16.80	1.69
	07/13/2004		13.70	4.79
	08/12/2004		13.65	4.84
	09/16/2004		12.61	5.88
	10/12/2004		12.68	5.81
	11/17/2004		12.82	5.67
	12/15/2004		13.70	4.79
	01/25/2005		13.40	5.09
	02/15/2005		14.20	4.29
	03/15/2005		13.31	5.18
	04/25/2005		14.20	4.29
	05/20/2005		12.14	6.35
	06/21/2005		10.51	7.98
	07/20/2005		12.88	5.00
	08/19/2005		12.45	5.43
	09/16/2005		11.79	6.70
	10/21/2005		11.71	6.78
	11/18/2005		11.49	7.00
	12/16/2005		11.76	6.73
	01/23/2006		11.54	6.95
	02/22/2006		10.10	8.39
	03/30/2006		9.23	9.26
	04/27/2006		9.93	8.56
	05/18/2006		11.83	6.66
	06/22/2006		11.95	6.54
	07/20/2006		11.48	7.01
	08/17/2006		11.30	7.19
	09/14/2006		10.88	7.61
	10/19/2006		12.35	6.14
	11/21/2006		12.18	6.31
	12/21/2006		12.00	6.49
	01/18/2007		8.43	10.06
	02/06/2007		8.71	9.78
	03/08/2007		7.69	10.80
	04/12/2007		8.24	10.25
	05/10/2007		NM	NM
	06/07/2007		16.28	2.21
	07/19/2007		10.15	8.34
	08/09/2007		9.90	8.59
	09/14/2007		8.23	10.26
	10/12/2007		7.99	10.50
	11/09/2007		7.96	10.53
	12/14/2007		8.02	10.47
	01/17/2008		10.48	8.01
	02/21/2008		8.23	10.26

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-16	03/20/2008	18.49	11.10	7.39
	04/10/2008		11.16	7.33
	05/08/2008		11.25	7.24
	06/12/2008		10.15	8.34
	07/24/2008		6.86	11.63
	08/14/2008		13.93	4.56
	09/18/2008		11.29	7.20
	10/22/2008		10.09	8.40
	11/13/2008		14.03	4.46
	12/04/2008		12.47	6.02
	01/08/2009		12.47	6.02
	02/11/2009		15.59	2.90
	03/12/2009		7.01	11.48
	04/09/2009		12.57	5.92
	05/20/2009		11.22	7.27
	06/17/2009		13.55	4.94
	07/16/2009		13.51	4.98
	08/13/2009		11.19	7.30
	09/10/2009		13.21	5.28
	10/16/2009		9.42	9.05
	11/12/2009		9.18	9.31
	12/03/2009		9.35	9.14
	01/14/2010		11.51	6.98
	02/18/2010		8.36	10.13
	03/25/2010		8.62	9.87
	04/23/2010		10.03	8.46
	05/21/2010		9.05	9.44
	06/10/2010		11.03	7.46
	07/23/2010		10.20	8.29
	08/12/2010		11.13	7.36
	09/10/2010		9.08	9.41
	10/15/2010		10.33	8.15
	11/04/2010		10.34	8.15
	12/03/2010		10.10	8.39
	01/28/2011		9.73	8.76
	02/10/2011		9.20	9.29
	03/31/2011		7.12	11.37
	04/19/2011		8.52	9.97
EX-2	04/24/1996	12.78	14.87	-2.09
	07/29/1996		14.50	-1.72
	12/13/1996		2.21	10.57
	04/15/1997		10.55	2.23
	09/19/1997		3.80	8.98
	12/03/1997		3.19	9.59
	12/15/1997		1.75	11.03

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-2	01/13/1998	12.78	0.34	12.44
	01/30/1998		0.66	12.12
	02/24/1998		2.50	10.28
	04/06/1998		3.02	9.76
	07/02/1998		5.68	7.10
	07/13/1998		5.20	7.58
	09/28/1998		15.53	-2.75
	10/16/1998		15.30	-2.52
	01/08/1999		7.15	5.63
	04/16/1999		4.46	8.32
	06/21/1999		11.40	1.38
	07/12/1999		15.65	-2.87
	10/08/1999		15.70	-2.92
	01/17/2000		6.30	6.48
	04/25/2000		2.48	10.30
	05/30/2000		3.55	9.23
	06/26/2000		NM	NM
	08/10/2000		12.20	0.58
	10/06/2000		13.71	-0.93
	01/15/2001		4.58	8.20
	04/19/2001		3.05	9.73
	07/02/2001		14.70	-1.92
	09/07/2001		NM	NM
	10/18/2001		7.16	5.62
	11/02/2001		NM	NM
	12/14/2001		0.08	12.70
	01/18/2002		5.55	7.23
	02/21/2002		NM	NM
	03/25/2002		4.01	8.77
	04/18/2002		15.09	-2.31
	05/10/2002		12.99	-0.21
	06/04/2002		6.00	6.78
	07/10/2002		4.80	7.98
	08/15/2002		16.11	-3.33
	09/11/2002		16.44	-3.66
	10/08/2002		15.32	-2.54
	11/07/2002		17.64	-4.86
	12/12/2002		13.92	-1.14
	01/13/2003		10.62	2.16
	02/26/2003		13.73	-0.95
	03/19/2003		12.41	0.37
	04/14/2003		13.20	-0.42
	05/13/2003		12.35	0.43
	06/13/2003		13.40	-0.62
	07/07/2003		13.49	-0.71

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-2	08/13/2003	12.78	13.74	-0.96
	09/17/2003		12.12	0.66
	10/27/2003		13.58	-0.80
	11/18/2003		13.74	-0.96
	12/19/2003		13.67	-0.89
	01/15/2004		14.20	-1.42
	02/17/2004		13.27	-0.49
	03/18/2004		5.12	7.66
	04/21/2004		12.91	-0.13
	05/18/2004		5.60	7.18
	06/10/2004		5.70	7.08
	07/13/2004		13.01	-0.23
	08/12/2004		12.90	-0.12
	09/16/2004		12.63	0.15
	10/12/2004		11.00	1.78
	11/17/2004		13.30	-0.52
	12/15/2004		12.80	-0.02
	01/25/2005		5.95	6.83
	02/15/2005		13.34	-0.56
	03/15/2005		6.09	6.69
	04/25/2005		8.90	3.88
	05/20/2005		6.99	5.79
	06/21/2005		13.20	-0.42
	07/20/2005		12.64	0.14
	08/19/2005		13.00	-0.22
	09/16/2005		13.07	-0.29
	10/21/2005		12.94	-0.16
	11/18/2005		7.56	5.22
	12/16/2005		13.24	-0.46
	01/20/2006		3.20	9.58
	02/22/2006		18.20	-5.42
	03/30/2006		4.75	8.03
	04/27/2006		13.32	-0.54
	05/18/2006		11.79	0.99
	06/22/2006		17.79	-5.01
	07/20/2006		13.27	-0.49
	08/17/2006		17.98	-5.20
	09/14/2006		14.45	-1.67
	10/19/2006		17.28	-4.50
	11/21/2006		17.24	-4.46
	12/21/2006		15.50	-2.72
	01/18/2007		5.17	7.61
	02/06/2007		5.25	7.53
	03/08/2007		12.11	0.67
	04/12/2007		16.97	-4.19

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-2	05/10/2007	12.78	4.74	8.04
	06/07/2007		6.25	6.53
	07/19/2007		16.05	-3.27
	08/09/2007		16.28	-3.50
	08/17/2007		6.40	6.38
	08/24/2007		6.14	6.64
	08/30/2007		5.91	6.87
	09/06/2007		5.65	7.13
	09/14/2007		5.52	7.26
	09/21/2007		5.27	7.51
	09/28/2007		5.07	7.71
	10/05/2007		4.93	7.85
	10/12/2007		4.19	8.59
	10/19/2007		NM	NM
	10/26/2007		3.55	9.23
	11/02/2007		3.55	9.23
	11/09/2007		3.51	9.27
	11/15/2007		2.96	9.82
	11/21/2007		3.02	9.76
	11/29/2007		3.01	9.77
	12/14/2007		11.90	0.88
	01/17/2008		12.48	0.30
	02/21/2008		4.15	8.63
	03/20/2008		13.75	-0.97
	04/10/2008		11.25	1.53
	05/08/2008		14.62	-1.84
	06/12/2008		14.20	-1.42
	07/24/2008		14.87	-2.09
	08/14/2008		14.65	-1.87
	09/18/2008		15.10	-2.32
	10/22/2008		14.87	-2.09
	11/13/2008		12.85	-7.00
	12/04/2008		14.06	-1.28
	01/08/2009		13.12	-0.34
	02/11/2009		17.80	-5.02
	03/12/2009		18.23	-5.45
	04/09/2009		15.38	-2.60
	05/20/2009		16.05	-3.27
	06/17/2009		16.11	-3.33
	07/16/2009		15.98	-3.20
	08/13/2009		15.13	-2.35
	09/10/2009		15.98	-3.20
	10/16/2009		6.18	6.58
	11/12/2009		15.92	-3.14
	12/03/2009		15.39	-2.61

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-2	01/14/2010	12.78	14.29	-1.51
	02/18/2010		17.45	-4.67
	03/25/2010		15.46	-2.68
	04/23/2010		13.86	-1.08
	05/21/2010		11.18	1.60
	06/10/2010		15.95	-3.17
	07/23/2010		15.55	-2.77
	08/12/2010		15.85	-3.07
	09/10/2010		15.65	-2.87
	10/15/2010		16.02	-3.25
	11/04/2010		15.44	-2.66
	12/03/2010		13.10	-0.32
	01/28/2011		12.90	-0.12
	02/10/2011		13.60	-0.82
	03/31/2011		17.95	-5.17
	04/19/2011		10.90	1.88
EX-3	04/24/1996	18.98	16.95	0.65
	07/29/1996		17.20	0.40
	12/13/1996		5.10	12.50
	04/15/1997		17.20	0.40
	09/19/1997		6.15	11.45
	12/03/1997		6.92	10.68
	12/15/1997		NM	NM
	01/13/1998		5.17	12.43
	01/30/1998		5.28	12.32
	02/24/1998		4.72	12.88
	04/06/1998		6.64	10.96
	07/02/1998		8.82	8.78
	07/13/1998		16.95	0.65
	09/28/1998		16.95	0.65
	10/16/1998		16.90	0.70
	01/08/1999		20.00	-2.40
	04/16/1999		16.92	0.68
	06/21/1999		16.95	0.65
	07/12/1999		16.99	0.61
	10/08/1999		17.22	0.38
	01/17/2000		8.71	8.89
	04/25/2000		7.15	10.45
	05/30/2000		17.00	0.60
	06/26/2000		NM	NM
	08/10/2000		14.00	3.60
	10/06/2000		15.55	2.05
	01/15/2001		15.50	2.10
	04/19/2001		15.61	1.99
	07/02/2001		16.00	1.60

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-3	09/07/2001	18.98	NM	NM
	10/18/2001		15.65	1.95
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		15.54	2.06
	02/21/2002		NM	NM
	03/25/2002		15.51	2.09
	04/18/2002		15.70	1.90
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		NM	NM
	08/15/2002		9.54	8.06
	09/11/2002		16.01	1.59
	10/08/2002		17.61	-10.00
	11/07/2002		15.69	1.91
	12/12/2002		15.41	2.19
	01/13/2003		18.00	-0.40
	02/26/2003		15.67	1.93
	03/19/2003		8.69	8.91
	04/14/2003		8.45	9.15
	05/13/2003		15.59	2.01
	06/13/2003		15.28	2.32
	07/07/2003		15.28	2.32
	08/13/2003		17.02	0.58
	09/17/2003		17.30	0.30
	10/27/2003		17.04	0.56
	11/18/2003		17.01	0.59
	12/19/2003		16.98	0.62
	01/15/2004		16.93	0.67
	02/17/2004		16.91	0.69
	03/22/2004		17.10	0.50
	04/21/2004		17.00	0.60
	05/18/2004		17.05	0.55
	06/10/2004		17.00	0.60
	07/13/2004		16.99	0.61
	08/12/2004		17.00	0.60
	09/16/2004		16.93	0.67
	10/12/2004		8.10	9.50
	11/17/2004		17.02	0.58
	12/15/2004		16.90	0.70
	01/25/2005		16.93	0.67
	02/15/2005		7.40	10.20
	03/15/2005		16.15	1.45
	04/25/2005		17.02	0.58
	05/20/2005		16.98	0.62

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-3	06/21/2005	18.98	16.95	0.65
	07/20/2005		16.94	0.66
	08/19/2005		17.15	0.45
	09/16/2005		17.02	0.58
	10/21/2005		16.99	0.61
	11/18/2005		7.87	9.73
	12/16/2005		14.40	3.20
	01/20/2006		7.75	9.85
	02/22/2006		7.88	9.72
	03/30/2006		15.70	1.90
	04/27/2006		19.30	-1.70
	05/18/2006		19.49	-1.89
	06/22/2006		19.18	-1.58
	07/20/2006		18.96	-1.36
	08/17/2006		12.78	4.82
	09/14/2006		19.18	-1.58
	10/19/2006		10.78	6.82
	11/21/2006		18.70	-1.10
	12/21/2006		19.20	-1.60
	01/18/2007		19.02	-1.42
	02/06/2007		19.11	-1.51
	03/08/2007		19.11	-1.51
	04/12/2007		19.25	-1.65
	05/10/2007		7.40	10.20
	06/07/2007		8.46	9.14
	07/19/2007		19.05	-1.45
	08/09/2007		19.04	-1.44
	09/14/2007		7.84	9.76
	10/05/2007		7.55	10.05
	10/12/2007		6.45	11.15
	10/26/2007		6.83	10.77
	11/02/2007		7.01	10.59
	11/09/2007		7.11	10.49
	12/14/2007		11.20	6.40
	01/17/2008		6.92	12.06
	02/21/2008		16.40	2.58
	03/20/2008		12.77	6.21
	04/10/2008		8.31	10.67
	05/08/2008		8.61	10.37
	06/12/2008		16.80	2.18
	07/24/2008		19.85	-0.87
	08/14/2008		17.77	1.21
	09/18/2008		17.51	1.47
	10/22/2008		18.06	0.92
	11/13/2008		18.15	0.83

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-3	12/04/2008	18.98	16.70	2.28
	01/08/2009		16.65	2.33
	02/11/2009		16.09	2.89
	03/12/2009		17.28	1.70
	04/09/2009		8.46	10.52
	05/20/2009		17.76	1.22
	06/17/2009		17.21	1.77
	07/16/2009		17.59	1.39
	08/13/2009		18.00	0.98
	09/10/2009		17.59	1.39
	10/16/2009		10.93	8.03
	11/12/2009		16.71	2.27
	12/03/2009		15.50	3.48
	01/14/2010		17.62	1.36
	02/18/2010		17.25	1.73
	03/25/2010		17.03	1.95
	04/23/2010		16.70	2.28
	05/21/2010		17.09	1.89
	06/10/2010		17.55	1.43
	07/23/2010		17.61	1.37
	08/12/2010		17.56	1.42
	09/10/2010		17.58	1.40
	10/15/2010		18.21	0.76
	11/04/2010		16.91	2.07
	12/03/2010		17.36	1.62
	01/28/2011		19.45	-0.47
	02/10/2011		17.50	1.48
	03/31/2011		19.93	-0.95
	04/19/2011		17.33	1.65
EX-4	09/28/1998	13.11	6.33	7.21
	10/16/1998		6.60	6.94
	01/08/1999		4.21	8.90
	04/16/1999		19.80	-6.69
	06/21/1999		5.89	7.22
	07/12/1999		20.20	-7.09
	10/08/1999		19.95	-6.84
	01/17/2000		13.43	-0.32
	04/25/2000		2.96	10.15
	05/30/2000		6.85	6.26
	06/26/2000		NM	NM
	08/10/2000		6.75	6.36
	10/06/2000		19.87	-6.76
	01/15/2001		19.73	-6.62
	04/19/2001		3.55	9.56
	07/02/2001		19.91	-6.80

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-4	09/07/2001	13.11	NM	NM
	10/18/2001		5.71	7.40
	11/02/2001		NM	NM
	12/14/2001		1.32	11.79
	01/18/2002		2.60	10.51
	02/21/2002		NM	NM
	03/25/2002		3.62	9.49
	04/18/2002		4.50	8.61
	05/10/2002		4.77	8.34
	06/04/2002		4.32	8.79
	07/10/2002		NM	NM
	08/15/2002		5.41	7.70
	09/11/2002		5.15	7.96
	10/08/2002		19.95	-6.84
	11/07/2002		15.63	-2.52
	12/12/2002		21.25	-8.14
	01/13/2003		20.74	-7.63
	02/26/2003		20.54	-7.43
	03/19/2003		20.14	-7.03
	04/14/2003		23.50	-10.39
	05/13/2003		23.35	-10.24
	06/13/2003		12.46	0.65
	07/07/2003		12.81	0.30
	08/13/2003		20.86	-7.75
	09/17/2003		20.85	-7.74
	10/27/2003		6.07	7.04
	11/18/2003		20.63	-7.52
	12/19/2003		20.90	-7.79
	01/15/2004		20.95	-7.84
	02/17/2004		20.60	-7.49
	03/18/2004		7.90	5.21
	04/21/2004		20.68	-7.57
	05/18/2004		20.63	-7.52
	06/10/2004		20.12	-7.01
	07/15/2004		20.50	-7.39
	08/12/2004		19.15	-6.04
	09/16/2004		11.57	1.54
	10/12/2004		20.93	-7.82
	11/17/2004		21.16	-8.05
	12/15/2004		20.82	-7.71
	01/25/2005		9.18	3.93
	02/15/2005		3.95	9.16
	03/15/2005		20.57	-7.46
	04/25/2005		11.80	1.31
	05/20/2005		17.00	-3.89

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-4	06/21/2005	13.11	18.60	-5.49
	07/20/2005		19.15	-6.04
	08/19/2005		10.80	2.31
	09/16/2005		24.05	-10.94
	10/21/2005		16.22	-3.11
	11/18/2005		17.81	-4.70
	12/16/2005		18.43	-5.32
	01/20/2006		17.05	-3.94
	02/22/2006		17.55	-4.44
	03/30/2006		14.75	-1.64
	04/27/2006		20.82	-7.71
	05/18/2006		21.01	-7.90
	06/22/2006		22.77	-9.66
	07/20/2006		15.75	-2.64
	08/17/2006		23.61	-10.50
	09/14/2006		16.30	-3.19
	10/19/2006		23.01	-9.90
	11/21/2006		15.23	-2.12
	12/21/2006		8.20	4.91
	01/18/2007		4.21	8.90
	02/06/2007		12.54	0.57
	03/08/2007		11.42	1.69
	04/12/2007		23.98	-10.87
	05/10/2007		19.18	-6.07
	06/07/2007		6.48	6.63
	07/19/2007		5.78	7.33
	08/09/2007		21.74	-8.63
	09/14/2007		5.89	7.22
	10/12/2007		4.24	8.87
	11/09/2007		4.06	9.05
	12/14/2007		3.23	9.88
	01/17/2008		23.21	-10.10
	02/21/2008		2.98	10.13
	03/20/2008		4.80	8.31
	04/10/2008		23.17	-10.06
	05/08/2008		22.41	-9.30
	06/12/2008		20.70	-7.59
	07/24/2008		20.30	-7.19
	08/14/2008		17.24	-4.13
	09/18/2008		20.11	-7.00
	10/22/2008		20.33	-7.22
	11/13/2008		20.50	-7.39
	12/04/2008		20.87	-7.76
	01/08/2009		20.50	-7.39
	02/11/2009		20.51	-7.40

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-4	03/12/2009	13.11	21.03	-7.92
	04/09/2009		22.61	-9.50
	05/20/2009		18.42	-5.31
	06/17/2009		10.52	2.59
	07/16/2009		20.18	-7.07
	08/13/2009		20.58	-7.47
	09/10/2009		20.09	-6.98
	10/16/2009		22.13	-9.04
	11/12/2009		22.28	-9.17
	12/03/2009		21.96	-8.85
	01/14/2010		22.02	-8.91
	02/18/2010		21.96	-8.85
	03/25/2010		21.51	-8.40
	04/23/2010		21.58	-8.47
	05/21/2010		21.70	-8.59
	06/10/2010		21.65	-8.54
	07/23/2010		21.70	-8.59
	08/12/2010		21.61	-8.50
	09/10/2010		21.38	-8.27
	10/15/2010		21.38	-8.28
	11/04/2010		21.43	-8.32
	12/03/2010		21.42	-8.31
	01/28/2011		22.42	-9.31
	02/10/2011		22.40	-9.29
	03/31/2011		22.56	-9.45
	04/19/2011		8.90	4.21
EX-5	09/28/1998	13.04	6.89	6.89
	10/16/1998		7.03	6.75
	01/08/1999		4.90	8.14
	04/16/1999		6.20	6.84
	06/21/1999		15.88	-2.84
	07/12/1999		7.31	5.73
	10/08/1999		16.00	-2.96
	01/17/2000		9.05	3.99
	04/25/2000		2.82	10.22
	05/30/2000		NM	NM
	06/26/2000		NM	NM
	08/10/2000		15.72	-2.68
	10/06/2000		6.46	6.58
	01/15/2001		4.31	8.73
	04/19/2001		3.21	9.83
	07/02/2001		5.36	7.68
	09/07/2001		NM	NM
	10/18/2001		6.00	7.04
	11/02/2001		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-5	12/14/2001	13.04	1.61	11.43
	01/18/2002		2.40	10.64
	02/21/2002		NM	NM
	03/25/2002		8.02	5.02
	04/18/2002		5.64	7.40
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		16.95	-3.91
	08/15/2002		17.30	-4.26
	09/11/2002		NM	NM
	10/08/2002		16.01	-2.97
	11/07/2002		17.25	-4.21
	12/12/2002		7.42	5.62
	01/13/2003		10.88	2.16
	02/26/2003		5.40	7.64
	03/19/2003		11.21	1.83
	04/14/2003		11.80	1.24
	05/13/2003		9.46	3.58
	06/13/2003		11.70	1.34
	07/07/2003		6.63	6.41
	08/13/2003		12.27	0.77
	09/17/2003		7.60	5.44
	10/27/2003		6.60	6.44
	11/18/2003		6.15	6.89
	12/19/2003		7.73	5.31
	01/15/2004		7.75	5.29
	02/17/2004		6.60	6.44
	03/18/2004		9.15	3.89
	04/21/2004		11.88	1.16
	05/18/2004		12.97	7.00
	06/11/2004		10.80	2.24
	07/13/2004		13.05	-10.00
	08/12/2004		13.45	-0.41
	09/16/2004		11.20	1.84
	10/12/2004		5.90	7.14
	11/17/2004		12.61	0.43
	12/15/2004		5.98	7.06
	01/25/2005		5.20	7.84
	02/15/2005		10.37	-0.30
	03/15/2005		4.90	8.14
	04/25/2005		5.24	7.80
	05/20/2005		8.08	4.96
	06/21/2005		9.70	3.34
	07/20/2005		9.81	3.23
	08/19/2005		19.59	-6.55

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-5	09/16/2005	13.04	9.21	3.83
	10/21/2005		13.55	-0.51
	11/18/2005		8.41	4.63
	12/16/2005		6.95	6.09
	01/20/2006		4.00	9.04
	02/22/2006		8.55	4.49
	03/30/2006		4.80	8.24
	04/27/2006		4.50	8.54
	05/18/2006		19.78	-6.74
	06/22/2006		7.47	5.57
	07/20/2006		11.89	1.15
	08/17/2006		19.36	-6.32
	09/14/2006		7.13	5.91
	10/19/2006		6.25	6.79
	11/21/2006		10.05	2.99
	12/21/2006		3.70	9.34
	01/18/2007		5.65	7.39
	02/06/2007		8.20	4.84
	03/08/2007		5.02	8.02
	04/12/2007		15.92	-2.88
	05/10/2007		5.99	7.05
	06/07/2007		6.92	6.12
	07/19/2007		7.65	5.39
	08/09/2007		7.38	5.66
	09/14/2007		5.88	7.16
	10/12/2007		4.87	8.17
	11/09/2007		3.62	9.42
	12/14/2007		3.96	9.08
	01/17/2008		5.07	7.97
	02/21/2008		5.71	7.33
	03/20/2008		9.15	3.89
	04/10/2008		16.31	-3.27
	05/08/2008		16.97	-3.93
	06/12/2008		16.90	-3.86
	07/24/2008		17.15	-4.11
	08/14/2008		17.20	-4.16
	09/18/2008		17.25	-4.21
	10/22/2008		17.09	-4.05
	11/13/2008		16.80	-3.76
	12/04/2008		16.66	-3.62
	01/08/2009		6.05	6.99
	02/11/2009		6.42	6.62
	03/12/2009		18.05	-5.01
	04/09/2009		7.72	5.32
	05/20/2009		19.47	-6.43

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-5	06/17/2009	13.04	13.70	-0.66
	07/16/2009		19.28	-6.24
	08/13/2009		12.02	1.02
	09/10/2009		19.12	-6.08
	10/16/2009		4.39	8.63
	11/12/2009		16.02	-2.98
	12/03/2009		7.75	5.29
	01/14/2010		16.94	-3.90
	02/18/2010		5.90	7.14
	03/25/2010		12.30	0.74
	04/23/2010		7.40	5.64
	05/21/2010		19.67	-6.63
	06/10/2010		5.81	7.23
	07/23/2010		17.49	-4.45
	08/12/2010		17.30	-4.26
	09/10/2010		16.96	-3.92
	10/15/2010		16.91	-3.88
	11/04/2010		16.16	-3.12
	12/03/2010		13.70	-0.66
	01/28/2011		5.80	7.24
	02/10/2011		15.90	-2.86
	03/31/2011		5.11	7.93
	04/19/2011		5.73	7.31
EX-6	09/28/1998	12.46	5.93	7.05
	10/16/1998		6.07	6.91
	01/08/1999		3.70	8.76
	04/16/1999		4.45	8.01
	06/21/1999		15.65	-3.19
	07/12/1999		9.60	2.86
	10/08/1999		15.55	-3.09
	01/17/2000		15.58	-3.12
	04/25/2000		2.31	10.15
	05/30/2000		3.45	9.01
	06/26/2000		NM	NM
	08/10/2000		9.00	3.46
	10/06/2000		6.45	6.01
	01/15/2001		4.44	8.02
	04/19/2001		2.81	9.65
	07/02/2001		5.91	6.55
	09/07/2001		NM	NM
	10/18/2001		5.50	6.96
	11/02/2001		NM	NM
	12/14/2001		1.00	11.46
	01/18/2002		3.25	9.21
	02/21/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-6	03/25/2002	12.46	4.26	8.20
	04/18/2002		15.50	-3.04
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		10.90	1.56
	08/15/2002		4.71	7.75
	09/11/2002		5.42	7.04
	10/08/2002		5.21	7.25
	11/07/2002		15.65	-3.19
	12/12/2002		15.91	-3.45
	01/13/2003		3.12	9.34
	02/26/2003		3.46	9.00
	03/19/2003		NM	NM
	04/14/2003		12.10	0.36
	05/13/2003		14.75	-2.29
	06/13/2003		15.85	-3.39
	07/07/2003		16.36	-3.90
	08/13/2003		15.91	-3.45
	09/17/2003		15.46	-3.00
	10/27/2003		15.95	-3.49
	11/18/2003		15.81	-3.35
	12/19/2003		15.70	-3.24
	01/15/2004		12.05	0.41
	02/17/2004		9.79	-0.30
	03/18/2004		4.79	7.67
	04/21/2004		15.85	-3.39
	05/18/2004		13.20	-0.74
	06/11/2004		14.70	-2.24
	07/15/2004		13.30	-0.84
	08/12/2004		13.10	-0.64
	09/16/2004		5.70	6.76
	10/12/2004		5.20	7.26
	11/17/2004		16.10	-3.64
	12/15/2004		4.80	7.66
	01/25/2005		5.19	7.27
	02/15/2005		9.25	3.21
	03/15/2005		4.12	8.34
	04/25/2005		7.27	5.19
	05/20/2005		5.90	6.56
	06/21/2005		18.90	-6.44
	07/20/2005		9.18	3.28
	08/19/2005		9.32	3.14
	09/16/2005		19.28	-6.82
	10/21/2005		18.90	-6.44
	11/18/2005		8.53	3.93

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-6	12/16/2005	12.46	5.99	6.47
	01/20/2006		4.70	7.76
	02/22/2006		7.00	5.46
	03/30/2006		NM	NM
	04/27/2006		NM	NM
	05/18/2006		16.19	-3.73
	06/22/2006		5.59	6.87
	07/20/2006		5.51	6.95
	08/17/2006		11.52	0.94
	09/14/2006		6.54	5.92
	10/19/2006		6.48	5.98
	11/21/2006		6.50	5.96
	12/21/2006		5.50	6.96
	01/18/2007		19.54	-7.08
	02/06/2007		9.28	3.18
	03/08/2007		3.18	9.28
	04/12/2007		15.43	-2.97
	05/10/2007		4.34	8.12
	06/07/2007		6.75	5.71
	07/19/2007		7.03	5.43
	08/09/2007		7.63	4.83
	09/14/2007		5.12	7.34
	10/12/2007		4.17	8.29
	11/09/2007		3.15	9.31
	12/14/2007		14.72	-2.26
	01/17/2008		6.61	5.85
	02/21/2008		5.73	6.73
	03/20/2008		16.08	-3.62
	04/10/2008		8.66	3.80
	05/08/2008		16.70	-4.24
	06/12/2008		15.30	-2.84
	07/24/2008		15.75	-3.29
	08/14/2008		16.20	-3.74
	09/18/2008		11.60	0.86
	10/22/2008		13.81	-1.35
	11/13/2008		16.60	-4.14
	12/04/2008		16.38	-3.92
	01/08/2009		12.20	0.26
	02/11/2009		6.48	5.98
	03/12/2009		16.70	-4.24
	04/09/2009		13.41	-0.95
	05/20/2009		16.60	-4.14
	06/17/2009		13.05	-0.59
	07/16/2009		15.79	-3.33
	08/13/2009		16.35	-3.89

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-6	09/10/2009	12.46	16.47	-4.01
	10/16/2009		16.39	-3.95
	11/12/2009		16.33	-3.87
	12/03/2009		16.17	-3.71
	01/14/2010		13.84	-1.38
	02/18/2010		16.66	-4.20
	03/25/2010		19.38	-6.92
	04/23/2010		5.89	6.57
	05/21/2010		15.46	-3.00
	06/10/2010		11.71	0.75
	07/23/2010		14.12	-1.66
	08/12/2010		16.39	-3.93
	09/10/2010		16.42	-3.96
	10/15/2010		16.95	-4.50
	11/04/2010		16.64	-4.18
	12/03/2010		7.40	5.06
	01/28/2011		13.30	-0.84
	02/10/2011		5.90	6.56
	03/31/2011		17.15	-4.69
	04/19/2011		19.15	-6.69
EX-7	09/28/1998	14.02	5.83	8.58
	10/16/1998		5.95	8.46
	01/08/1999		12.38	1.64
	04/16/1999		15.38	-1.36
	06/21/1999		14.20	-0.18
	07/12/1999		15.48	-1.46
	10/08/1999		15.75	-1.73
	01/17/2000		5.80	8.22
	04/25/2000		3.55	10.47
	05/30/2000		4.90	9.12
	06/26/2000		NM	NM
	08/10/2000		16.00	-1.98
	10/06/2000		9.45	4.57
	01/15/2001		15.43	-1.41
	04/19/2001		15.24	-1.22
	07/02/2001		6.20	7.82
	09/07/2001		NM	NM
	10/18/2001		10.56	3.46
	11/02/2001		NM	NM
	12/14/2001		15.45	-1.43
	01/18/2002		5.50	8.52
	02/21/2002		NM	NM
	03/25/2002		15.45	-1.43
	04/18/2002		15.56	-1.54
	05/10/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-7	06/04/2002	14.02	NM	NM
	07/10/2002		11.85	2.17
	08/15/2002		14.50	-0.48
	09/11/2002		10.01	4.01
	10/08/2002		12.31	1.71
	11/07/2002		14.39	-0.37
	12/12/2002		9.22	4.80
	01/13/2003		13.64	0.38
	02/26/2003		11.56	2.46
	03/19/2003		12.01	2.01
	04/14/2003		11.55	2.47
	05/13/2003		11.65	2.37
	06/13/2003		7.30	6.72
	07/07/2003		11.61	2.41
	08/13/2003		13.31	0.71
	09/17/2003		13.27	0.75
	10/27/2003		13.27	0.75
	11/18/2003		12.69	1.33
	12/19/2003		11.40	-5.30
	01/15/2004		10.37	3.65
	02/17/2004		13.05	0.97
	03/18/2004		11.38	-3.30
	04/21/2004		13.28	0.74
	05/18/2004		13.20	0.82
	06/10/2004		12.40	1.62
	07/13/2004		13.13	0.89
	08/12/2004		12.10	1.92
	09/16/2004		13.10	0.92
	10/12/2004		4.98	9.04
	11/17/2004		10.28	3.74
	12/15/2004		12.20	1.82
	01/25/2005		9.12	4.90
	02/15/2005		12.38	1.64
	03/15/2005		18.10	-4.08
	04/25/2005		6.65	7.37
	05/20/2005		4.10	9.92
	06/21/2005		5.75	8.27
	07/20/2005		19.50	-5.48
	08/19/2005		19.20	-5.18
	09/16/2005		18.55	-4.53
	10/21/2005		18.30	-4.28
	11/18/2005		4.64	9.38
	12/16/2005		19.50	-5.48
	01/20/2006		4.70	9.32
	02/22/2006		19.40	-5.38

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-7	03/30/2006	14.02	19.42	-5.40
	04/27/2006		19.44	-5.42
	05/18/2006		19.63	-5.61
	06/22/2006		8.12	5.90
	07/20/2006		10.62	3.40
	08/17/2006		19.35	-5.33
	09/14/2006		19.29	-5.27
	10/19/2006		19.30	-5.28
	11/21/2006		18.90	-4.88
	12/21/2006		9.70	4.32
	01/18/2007		8.59	5.43
	02/06/2007		11.49	2.53
	03/08/2007		19.11	-5.09
	04/12/2007		16.94	-2.92
	05/10/2007		9.75	4.27
	06/07/2007		11.60	2.42
	07/19/2007		15.60	-1.58
	08/09/2007		19.22	-5.20
	09/14/2007		4.68	9.34
	10/05/2007		4.31	9.71
	10/12/2007		2.33	11.69
	10/26/2007		3.59	10.43
	11/02/2007		3.71	10.31
	11/09/2007		3.79	10.23
	12/14/2007		8.70	5.32
	01/17/2008		8.32	5.70
	02/21/2008		16.55	-2.53
	03/20/2008		16.34	-2.32
	04/10/2008		9.57	4.45
	05/08/2008		17.55	-3.53
	06/12/2008		17.41	-3.39
	07/24/2008		15.05	-1.03
	08/14/2008		17.68	-3.66
	09/18/2008		17.35	-3.33
	10/22/2008		17.67	-3.65
	11/13/2008		17.26	-3.24
	12/04/2008		17.00	-2.98
	01/08/2009		17.07	-3.05
	02/11/2009		17.60	-3.58
	03/12/2009		18.71	-4.69
	04/09/2009		18.75	-4.73
	05/20/2009		9.83	4.19
	06/17/2009		12.86	1.16
	07/16/2009		19.02	-5.00
	08/13/2009		18.89	-4.87

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-7	09/10/2009	14.02	19.01	-4.99
	10/16/2009		7.65	6.35
	11/12/2009		19.30	-5.28
	12/03/2009		14.41	-0.39
	01/14/2010		18.73	-4.71
	02/18/2010		10.53	3.49
	03/25/2010		19.04	-5.02
	04/23/2010		14.75	-0.73
	05/21/2010		18.76	-4.74
	06/10/2010		11.90	2.12
	07/23/2010		17.70	-3.68
	08/12/2010		8.99	5.03
	09/10/2010		19.62	-5.60
	10/15/2010		18.43	-4.42
	11/04/2010		18.55	-4.53
	12/03/2010		17.35	-3.33
	01/28/2011		8.70	5.32
	02/10/2011		13.10	0.92
	03/31/2011		19.45	-5.43
	04/19/2011		17.70	-3.68
EX-8	09/28/1998	20.15	10.68	8.67
	10/16/1998		10.78	8.57
	01/08/1999		17.00	1.98
	04/16/1999		24.03	-5.05
	06/21/1999		23.98	-5.00
	07/12/1999		24.28	-5.30
	10/08/1999		24.10	-5.12
	01/17/2000		11.60	7.38
	04/25/2000		8.55	10.43
	05/30/2000		21.00	-2.02
	06/26/2000		NM	NM
	08/10/2000		21.90	-2.92
	10/06/2000		12.20	6.78
	01/15/2001		9.57	9.41
	04/19/2001		11.36	7.62
	07/02/2001		12.09	6.89
	09/07/2001		NM	NM
	10/18/2001		11.81	7.17
	11/02/2001		NM	NM
	12/14/2001		7.18	11.80
	01/18/2002		8.40	10.58
	02/21/2002		NM	NM
	03/25/2002		9.18	9.80
	04/18/2002		10.00	8.98
	05/10/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-8	06/04/2002	20.15	NM	NM
	07/10/2002		NM	NM
	08/15/2002		NM	NM
	09/11/2002		13.81	5.17
	10/08/2002		11.91	7.07
	11/07/2002		27.62	-8.64
	12/12/2002		27.41	-8.43
	01/13/2003		21.95	-2.97
	02/26/2003		11.80	7.18
	03/19/2003		20.85	-1.87
	04/14/2003		21.85	-2.87
	05/13/2003		21.79	-2.81
	06/13/2003		9.37	9.61
	07/07/2003		10.60	8.38
	08/13/2003		12.08	6.90
	09/17/2003		21.78	-2.80
	10/27/2003		10.90	8.08
	11/18/2003		21.50	-2.52
	12/19/2003		19.30	-0.32
	01/15/2004		14.50	4.48
	02/17/2004		21.65	-2.67
	03/18/2004		24.73	-5.75
	04/21/2004		21.15	-2.17
	05/18/2004		21.31	-2.33
	06/10/2004		21.40	-2.42
	07/13/2004		21.02	-2.04
	08/12/2004		18.20	0.78
	09/16/2004		18.05	0.93
	10/12/2004		21.30	-2.32
	11/17/2004		21.51	-2.53
	12/15/2004		21.20	-2.22
	01/25/2005		19.48	-0.50
	02/15/2005		19.99	-1.01
	03/15/2005		10.97	8.01
	04/25/2005		8.93	10.05
	05/20/2005		23.65	-4.67
	06/21/2005		21.97	-2.99
	07/20/2005		28.45	-9.47
	08/19/2005		27.35	-8.37
	09/16/2005		27.70	-8.72
	10/21/2005		27.80	-8.82
	11/18/2005		28.42	-9.44
	12/16/2005		20.84	-1.86
	01/20/2006		28.50	-9.52
	02/22/2006		28.30	-9.32

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-8	03/30/2006	20.15	8.54	10.44
	04/27/2006		28.20	-9.22
	05/18/2006		28.25	-9.27
	06/22/2006		27.70	-8.72
	07/20/2006		11.05	7.93
	08/17/2006		27.60	-8.62
	09/14/2006		28.38	-9.40
	10/19/2006		12.40	6.58
	11/21/2006		28.10	-9.12
	12/21/2006		28.40	-9.42
	01/18/2007		24.33	-5.35
	02/06/2007		12.09	6.89
	03/08/2007		26.05	-7.07
	04/12/2007		28.03	-9.05
	05/10/2007		28.16	-9.18
	06/07/2007		28.03	-9.05
	07/19/2007		28.25	-9.27
	08/09/2007		21.84	-2.86
	09/14/2007		9.74	9.24
	10/05/2007		9.22	9.76
	10/12/2007		6.63	12.35
	10/26/2007		8.36	10.62
	11/02/2007		8.49	10.49
	11/09/2007		8.56	10.42
	12/14/2007		11.10	7.88
	01/17/2008		13.95	6.20
	02/21/2008		20.76	-0.61
	03/20/2008		DRY	NM
	04/10/2008		18.67	1.48
	05/08/2008		28.37	-8.22
	06/12/2008		24.75	-4.60
	07/24/2008		25.08	-4.93
	08/14/2008		28.28	-8.13
	09/18/2008		10.89	9.26
	10/22/2008		28.39	-8.24
	11/13/2008		21.54	-1.39
	12/04/2008		25.44	-5.29
	01/08/2009		28.06	-7.91
	02/11/2009		28.44	-8.29
	03/12/2009		28.52	-8.37
	04/09/2009		27.78	-7.63
	05/20/2009		27.84	-7.69
	06/17/2009		27.40	-7.25
	07/16/2009		28.06	-7.91
	08/13/2009		28.02	-7.87

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-8	09/10/2009	20.15	28.07	-7.92
	10/16/2009		28.02	-7.89
	11/12/2009		27.96	-7.81
	12/03/2009		24.09	-3.94
	01/14/2010		27.94	-7.79
	02/18/2010		27.68	-7.53
	03/25/2010		27.60	-7.45
	04/23/2010		27.89	-7.74
	05/21/2010		28.03	-7.88
	06/10/2010		27.93	-7.78
	07/23/2010		28.04	-7.89
	08/12/2010		27.51	-7.36
	09/10/2010		22.43	-2.28
	10/15/2010		27.89	-7.75
	11/04/2010		26.30	-6.15
	12/03/2010		19.82	0.33
	01/28/2011		27.90	-7.75
	02/10/2011		28.20	-8.05
	03/31/2011		28.16	-8.01
	04/19/2011		28.20	-8.05
EX-9	09/28/1998	17.60	11.04	9.60
	10/16/1998		11.17	9.47
	01/08/1999		24.25	-4.10
	04/16/1999		20.00	0.15
	06/21/1999		20.15	0.00
	07/12/1999		11.03	9.12
	10/08/1999		20.31	-0.16
	01/17/2000		20.10	5.00
	04/25/2000		9.65	10.50
	05/30/2000		20.18	-3.00
	06/26/2000		NM	NM
	08/10/2000		11.85	8.30
	10/06/2000		20.10	5.00
	01/15/2001		20.03	0.12
	04/19/2001		10.60	9.55
	07/02/2001		10.80	9.35
	09/07/2001		NM	NM
	10/18/2001		16.65	3.50
	11/02/2001		NM	NM
	12/14/2001		8.60	11.55
	01/18/2002		8.79	11.36
	02/21/2002		NM	NM
	03/25/2002		9.87	10.28
	04/18/2002		10.27	9.88
	05/10/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-9	06/04/2002	17.60	NM	NM
	07/10/2002		NM	NM
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		10.11	10.04
	11/07/2002		21.82	-1.67
	12/12/2002		22.24	-2.09
	01/13/2003		23.20	-3.05
	02/26/2003		23.10	-2.95
	03/19/2003		9.92	10.23
	04/14/2003		22.80	-2.65
	05/13/2003		22.88	-2.73
	06/13/2003		22.85	-2.70
	07/07/2003		22.71	-2.56
	08/13/2003		22.68	-2.53
	09/17/2003		22.59	-2.44
	10/27/2003		22.57	-2.42
	11/18/2003		22.66	-2.51
	12/19/2003		22.65	-2.50
	01/15/2004		22.42	-2.27
	02/17/2004		22.34	-2.19
	03/18/2004		22.44	-2.29
	04/21/2004		22.30	-2.15
	05/18/2004		22.40	-2.25
	06/10/2004		22.40	-2.25
	07/13/2004		22.61	-2.46
	08/12/2004		23.45	-3.30
	09/16/2004		23.00	-2.85
	10/12/2004		21.93	-1.78
	11/17/2004		22.62	-2.47
	12/15/2004		23.25	-3.10
	01/25/2005		23.12	-2.97
	02/15/2005		23.13	-2.98
	03/15/2005		21.49	-1.34
	04/25/2005		23.30	-3.15
	05/20/2005		23.10	-2.95
	06/21/2005		24.48	-4.33
	07/20/2005		23.20	-3.05
	08/19/2005		23.30	-3.15
	09/16/2005		23.22	-3.07
	10/21/2005		23.22	-3.07
	11/18/2005		23.04	-2.89
	12/16/2005		23.01	-2.86
	01/20/2006		21.90	-1.75
	02/22/2006		22.95	-2.80

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-9	03/30/2006	17.60	21.42	-1.27
	04/27/2006		22.62	-2.47
	05/18/2006		22.75	-2.60
	06/22/2006		20.25	-10.00
	07/20/2006		21.49	-1.34
	08/17/2006		18.10	2.05
	09/14/2006		20.83	-0.68
	10/19/2006		21.60	-1.45
	11/21/2006		21.50	-1.35
	12/21/2006		22.40	-2.25
	01/18/2007		22.43	-2.28
	02/06/2007		22.43	-2.28
	03/08/2007		11.83	8.32
	04/12/2007		13.12	7.03
	05/10/2007		15.24	4.91
	06/07/2007		10.98	9.17
	07/19/2007		20.62	-0.47
	08/09/2007		20.67	-0.52
	09/14/2007		9.73	10.42
	10/05/2007		9.70	10.45
	10/12/2007		9.28	10.87
	10/26/2007		9.22	10.93
	11/02/2007		9.36	10.79
	11/09/2007		9.43	10.72
	12/14/2007		23.70	-3.55
	01/17/2008		18.17	-0.57
	02/21/2008		23.47	-5.87
	03/20/2008		16.57	1.03
	04/10/2008		21.26	-3.66
	05/08/2008		21.89	-4.29
	06/12/2008		21.10	-3.50
	07/24/2008		22.50	-4.90
	08/14/2008		22.25	-4.65
	09/18/2008		21.61	-4.01
	10/22/2008		22.39	-4.79
	11/13/2008		22.62	-5.02
	12/04/2008		22.19	-4.59
	01/08/2009		22.03	-4.43
	02/11/2009		22.44	-4.84
	03/12/2009		22.50	-4.90
	04/09/2009		22.78	-5.18
	05/20/2009		18.89	-1.29
	06/17/2009		19.82	-2.22
	07/16/2009		22.95	-5.35
	08/13/2009		22.86	-5.26

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
EX-9	09/10/2009	17.60	22.74	-5.14
	10/16/2009		22.78	-5.20
	11/12/2009		20.49	-2.89
	12/03/2009		15.90	1.70
	01/14/2010		20.23	-2.63
	02/18/2010		20.03	-2.43
	03/25/2010		24.20	-6.60
	04/23/2010		23.36	-5.76
	05/21/2010		23.43	-5.83
	06/10/2010		21.77	-4.17
	07/23/2010		22.24	-4.64
	08/12/2010		11.80	5.80
	09/10/2010		21.70	-4.10
	10/15/2010		21.73	-4.14
	11/04/2010		21.70	-4.10
	12/03/2010		21.44	-3.84
	01/28/2011		24.60	-7.00
	02/10/2011		24.40	-6.80
	03/31/2011		24.20	-6.60
	04/19/2011		24.85	-7.25
LF-1	06/14/1989	19.62	8.56	11.06
	01/10/1990 (a)		8.31	11.31
	01/18/1990 (b)		7.83	11.79
	01/18/1990 (c)		7.84	11.78
	01/30/1991		8.97	10.65
	06/19/1991		8.86	10.76
	12/16/1991		9.07	10.55
	07/10/1992		9.08	10.54
	12/30/1992		8.22	11.40
	06/08/1993		8.89	10.73
	01/05/1994		NM	NM
LF-10	01/10/1990 (a)	13.69	3.36	9.78
	01/18/1990 (b)		2.65	10.49
	01/18/1990 (c)		2.71	10.43
	01/30/1991		4.15	8.87
	06/19/1991		4.13	8.89
	12/16/1991		4.28	8.74
	07/10/1992		4.17	8.85
	12/30/1992		2.70	10.32
	06/08/1993		3.87	9.15
	01/05/1994		3.72	9.30
	04/24/1996		5.10	8.59
	07/29/1996		NM	NM
	12/13/1996		3.68	10.01
	04/15/1997		4.67	9.02

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-10	09/19/1997	13.69	4.65	9.04
	12/03/1997		4.05	9.64
	12/15/1997		2.81	10.88
	01/13/1998		1.77	11.92
	01/30/1998		1.95	11.74
	02/24/1998		2.13	11.56
	04/06/1998		4.36	9.33
	07/02/1998		6.16	7.53
	07/13/1998		6.26	7.43
	09/28/1998		6.83	6.86
	10/16/1998		7.00	6.69
	01/08/1999		4.96	8.73
	04/16/1999		4.35	9.34
	06/21/1999		8.09	5.60
	07/12/1999		8.04	5.65
	10/08/1999		8.17	5.52
	01/17/2000		7.53	6.16
	04/25/2000		3.53	10.16
	05/30/2000		4.53	9.16
	06/26/2000		NM	NM
	08/10/2000		6.82	6.87
	10/06/2000		6.98	6.71
	01/15/2001		5.11	8.58
	04/19/2001		4.01	9.68
	07/02/2001		6.94	6.75
	09/07/2001		NM	NM
	10/18/2001		6.72	6.97
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		3.55	10.14
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.50	7.19
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		5.77	7.92
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		NM	NM
	01/13/2003		4.01	9.68
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		5.89	7.80
	07/07/2003		7.41	6.28
	10/27/2003		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-10	11/18/2003	13.69	NM	NM
	01/15/2004		6.51	7.18
	04/21/2004		6.75	6.94
	07/13/2004		7.32	6.37
	10/12/2004		6.53	7.16
	01/24/2005		4.42	9.27
	04/25/2005		5.55	8.14
	07/20/2005		7.49	6.20
	08/19/2005		9.30	4.39
	10/21/2005		7.78	5.91
	01/20/2006		2.52	11.17
	04/27/2006		4.41	9.28
	07/20/2006		6.97	6.72
	10/19/2006		6.92	6.77
	01/18/2007		5.66	8.03
	04/12/2007		6.71	6.98
	07/19/2007		7.79	5.90
	08/17/2007		7.37	6.32
	08/24/2007		7.11	6.58
	08/30/2007		6.91	6.78
	09/06/2007		6.69	7.00
	09/14/2007		6.50	7.19
	09/21/2007		6.29	7.40
	09/28/2007		6.07	7.62
	10/05/2007		5.97	7.72
	10/12/2007		5.60	8.09
	10/19/2007		4.78	8.91
	10/26/2007		4.59	9.10
	11/02/2007		4.46	9.23
	11/09/2007		4.52	9.17
	11/15/2007		4.03	9.66
	11/21/2007		3.97	9.72
	11/29/2007		4.03	9.66
	01/17/2008		4.65	9.04
	04/10/2008		7.53	6.16
	07/24/2008		7.83	5.86
	10/22/2008		7.98	5.71
	01/08/2009		5.37	8.32
	04/09/2009		5.23	8.46
	07/16/2009		7.19	6.50
	10/16/2009		5.13	8.54
	01/14/2010		6.60	7.09
	04/23/2010		4.80	8.89
	07/23/2010		7.17	6.52
	10/15/2010		7.71	5.97

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-10	01/28/2011	13.69	4.68	9.01
	04/19/2011		5.20	8.49
LF-11	01/10/1990 (a)	12.75	3.18	9.60
	01/18/1990 (b)		2.28	10.50
	01/18/1990 (c)		2.33	10.45
	01/30/1991		3.69	9.09
	06/19/1991		3.68	9.10
	12/16/1991		3.80	8.98
	07/10/1992		3.68	9.10
	12/30/1992		2.33	10.45
	06/08/1993		3.43	9.35
	01/05/1994		3.42	9.36
	04/24/1996		3.19	9.56
	07/29/1996		3.93	8.82
	12/13/1996		4.31	8.44
	04/15/1997		4.76	7.99
	09/19/1997		4.63	8.12
	12/03/1997		4.39	8.36
	12/15/1997		4.28	8.47
	01/13/1998		3.94	8.81
	01/30/1998		4.07	8.68
	02/24/1998		4.00	8.75
	04/06/1998		4.27	8.48
	07/02/1998		4.61	8.14
	07/13/1998		4.63	8.12
	09/28/1998		4.70	8.05
	10/16/1998		4.68	8.07
	01/08/1999		4.25	8.50
	04/16/1999		2.96	9.79
	06/21/1999		4.62	8.13
	07/12/1999		4.60	8.15
	10/08/1999		4.41	8.34
	01/17/2000		4.36	8.39
	04/25/2000		3.71	9.04
	05/30/2000		4.20	8.55
	06/26/2000		NM	NM
	08/10/2000		4.65	8.10
	10/06/2000		4.45	8.30
	01/15/2001		2.74	10.01
	04/19/2001		3.93	8.82
	07/02/2001		4.26	8.49
	09/07/2001		NM	NM
	10/18/2001		4.21	8.54
	11/02/2001		NM	NM
	12/14/2001		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-11	01/18/2002	12.75	3.40	9.35
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		3.93	8.82
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		4.15	8.60
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		4.21	8.54
	01/13/2003		2.34	10.41
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		2.34	10.41
	07/07/2003		4.12	8.63
	10/27/2003		NM	NM
	11/18/2003		3.86	8.89
	01/15/2004		3.30	9.45
	04/21/2004		3.80	8.95
	07/13/2004		4.09	8.66
	10/12/2004		4.13	8.62
	01/24/2005		3.25	9.50
	04/25/2005		3.65	9.10
	07/20/2005		3.97	8.78
	10/21/2005		4.27	8.48
	01/20/2006		1.70	11.05
	04/27/2006		3.26	9.49
	07/20/2006		3.93	8.82
	10/19/2006		4.00	8.75
	01/18/2007		3.68	9.07
	04/12/2007		3.73	9.02
	07/19/2007		4.00	8.75
	10/12/2007		2.63	10.12
	01/17/2008		2.65	10.10
	04/10/2008		3.93	8.82
	07/24/2008		4.48	8.27
	10/22/2008		4.09	8.66
	01/08/2009		3.12	9.63
	04/09/2009		3.33	9.42
	07/16/2009		3.99	8.76
	10/16/2009		2.14	10.59
	01/14/2010		3.13	9.62
	04/23/2010		2.31	10.44
	07/23/2010		3.96	8.79
	10/15/2010		4.11	8.63

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-11	01/28/2011	12.75	3.26	9.49
	04/19/2011		3.18	9.57
LF-12	01/10/1990 (a)	17.65	6.32	11.35
	01/18/1990 (b)		5.86	11.81
	01/18/1990 (c)		5.87	11.80
	01/30/1991		6.95	10.72
	06/19/1991		6.90	10.77
	12/16/1991		7.09	10.58
	07/10/1992		7.08	10.59
	12/30/1992		6.26	11.41
	06/08/1993		6.90	10.77
	01/05/1994		6.98	10.69
	04/24/1996		6.57	11.08
	07/29/1996		7.29	10.36
	12/13/1996		5.69	11.96
	04/15/1997		6.94	10.71
	09/19/1997		7.00	10.65
	12/03/1997		6.12	11.53
	12/15/1997		6.11	11.54
	01/13/1998		5.53	12.12
	01/30/1998		5.85	11.80
	02/24/1998		5.57	12.08
	04/06/1998		6.27	11.38
	07/02/1998		6.95	10.70
	07/13/1998		7.01	10.64
	09/28/1998		7.14	10.51
	10/16/1998		7.31	10.34
	01/08/1999		7.06	10.59
	04/16/1999		6.39	11.26
	06/21/1999		7.16	10.49
	07/12/1999		7.25	10.40
	10/08/1999		7.24	10.41
	01/17/2000		6.81	10.84
	04/25/2000		6.54	11.11
	05/30/2000		6.80	10.85
	06/26/2000		NM	NM
	08/10/2000		7.20	10.45
	10/06/2000		7.19	10.46
	01/15/2001		6.45	11.20
	04/19/2001		6.72	10.93
	07/02/2001		6.94	10.71
	09/07/2001		NM	NM
	10/18/2001		6.84	10.81
	11/02/2001		NM	NM
	12/14/2001		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-12	01/18/2002	17.65	6.23	11.42
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.61	11.04
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		6.79	10.86
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		6.83	10.82
	01/13/2003		5.89	11.76
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		6.00	11.65
	07/07/2003		6.65	11.00
	10/27/2003		NM	NM
	11/18/2003		6.60	11.05
	01/15/2004		6.15	11.50
	04/21/2004		6.48	11.17
	07/13/2004		6.79	10.86
	10/12/2004		6.82	10.83
	01/24/2005		6.22	11.43
	04/25/2005		6.31	11.34
	07/20/2005		6.55	11.10
	09/16/2005		6.95	10.70
	10/21/2005		7.11	10.54
	01/20/2006		5.75	11.90
	04/27/2006		6.19	11.46
	07/20/2006		6.65	11.00
	10/19/2006		6.74	10.91
	01/18/2007		6.54	11.11
	04/12/2007		6.51	11.14
	07/19/2007		6.80	10.85
	08/17/2007		NM	NM
	08/24/2007		NM	NM
	08/30/2007		NM	NM
	09/06/2007		NM	NM
	09/14/2007		NM	NM
	09/21/2007		NM	NM
	09/28/2007		NM	NM
	10/05/2007		6.77	10.88
	10/12/2007		6.50	11.15
	10/19/2007		6.34	11.31
	10/26/2007		6.48	11.17
	11/02/2007		6.59	11.06

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-12	11/09/2007	17.65	6.65	11.00
	11/15/2007		7.06	10.59
	11/21/2007		7.02	10.63
	11/29/2007		6.69	10.96
	01/17/2008		6.16	11.49
	04/10/2008		6.77	10.88
	07/24/2008		7.02	10.63
	10/22/2008		7.05	10.60
	01/08/2009		6.29	11.36
	04/09/2009		6.26	11.39
	07/16/2009		6.76	10.89
	10/16/2009		6.09	11.54
	01/14/2010		6.30	11.35
	04/23/2010		6.08	11.57
	07/23/2010		6.66	10.99
	10/15/2010		6.89	10.75
	01/28/2011		6.37	11.28
	04/19/2011		6.31	11.34
	10/05/2011		9.95	7.70
	10/12/2011		NM	NM
	10/19/2011		10.61	7.04
	10/26/2011		NM	NM
	11/02/2011		9.99	7.66
	11/09/2011		NM	NM
	11/16/2011		8.42	9.23
	11/23/2011		NM	NM
	11/30/2011		8.06	9.59
	12/06/2011		NM	NM
	01/27/2012		6.82	10.83
	02/23/2012		6.82	10.83
	03/20/2012		6.02	11.63
	04/16/2012		5.87	11.78
	05/14/2012		6.51	11.14
	06/11/2012		6.75	10.90
	07/18/2012		6.76	10.89
	08/15/2012		6.82	10.83
	09/13/2012		6.90	10.75
	10/17/2012		6.92	10.73
	11/16/2012		6.51	11.14
	12/14/2012		5.99	11.66
	01/18/2013		6.25	11.40
	02/22/2013		6.40	11.25
	03/21/2013		6.24	11.41
	04/19/2013		6.21	11.44
	07/16/2013		6.87	10.78

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-12	10/07/2013	17.65	7.19	10.46
	01/03/2014		7.14	10.51
	04/22/2014		6.59	11.06
	07/08/2014		7.02	10.63
	10/28/2014		7.05	10.60
LF-13	01/10/1990 (a)	17.48	6.12	11.34
	01/18/1990 (b)		5.69	11.77
	01/18/1990 (c)		5.72	11.74
	01/30/1991		6.70	10.76
	06/19/1991		6.60	10.86
	12/16/1991		6.76	10.70
	07/10/1992		6.68	10.78
	12/30/1992		5.93	11.53
	06/08/1993		6.52	10.94
	01/05/1994		6.62	10.84
	04/24/1996		6.21	11.27
	07/29/1996		6.96	10.52
	12/13/1996		5.50	11.98
	04/15/1997		6.71	10.77
	09/19/1997		6.76	10.72
	12/03/1997		NM	NM
	12/15/1997		NM	NM
	01/13/1998		5.22	12.26
	01/30/1998		5.53	11.95
	02/24/1998		5.31	12.17
	04/06/1998		5.91	11.57
	07/02/1998		6.50	10.98
	07/13/1998		6.54	10.94
	09/28/1998		6.73	10.75
	10/16/1998		6.89	10.59
	01/08/1999		6.64	10.84
	04/16/1999		5.94	11.54
	06/21/1999		6.70	10.78
	07/12/1999		6.78	10.70
	10/08/1999		6.78	10.70
	01/17/2000		6.32	11.16
	04/25/2000		6.13	11.35
	05/30/2000		6.39	11.09
	06/26/2000		NM	NM
	08/10/2000		6.75	10.73
	10/06/2000		6.75	10.73
	01/15/2001		6.01	11.47
	04/19/2001		6.31	11.17
	07/02/2001		6.51	10.97
	08/10/2001		6.42	11.06

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-13	09/07/2001	17.48	NM	NM
	10/18/2001		6.43	11.05
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		5.95	11.53
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.22	11.26
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		6.43	11.05
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		6.45	11.03
	01/13/2003		5.61	11.87
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		5.60	11.88
	07/07/2003		7.21	10.27
	10/27/2003		NM	NM
	11/18/2003		6.19	11.29
	01/15/2004		6.77	10.71
	04/21/2004		6.05	11.43
	07/13/2004		6.36	11.12
	10/12/2004		13.70	3.78
	01/24/2005		5.80	11.68
	04/25/2005		5.96	11.52
	07/20/2005		6.28	11.20
	09/16/2005		6.45	11.03
	10/21/2005		6.59	10.89
	01/20/2006		5.61	11.87
	04/27/2006		6.85	10.63
	07/20/2006		6.28	11.20
	10/19/2006		6.36	11.12
	01/18/2007		6.14	11.34
	04/12/2007		6.08	11.40
	07/19/2007		6.42	11.06
	10/12/2007		5.97	11.51
	01/17/2008		5.79	11.69
	04/10/2008		6.35	11.13
	07/24/2008		6.73	10.75
	10/22/2008		6.70	10.78
	01/08/2009		5.87	11.61
	04/09/2009		5.81	11.67
	07/16/2009		7.18	10.30

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-13	10/16/2009	17.48	5.61	11.85
	01/14/2010		6.93	10.55
	04/23/2010		5.73	11.75
	07/23/2010		6.36	11.12
	10/15/2010		6.54	10.93
	01/28/2011		6.07	11.41
	04/19/2011		5.96	11.52
	10/05/2011		7.29	10.19
	10/12/2011		NM	NM
	10/19/2011		7.86	9.62
	10/26/2011		NM	NM
	11/02/2011		8.06	9.42
	11/09/2011		NM	NM
	11/16/2011		7.53	9.95
	11/23/2011		NM	NM
	11/30/2011		7.24	10.24
	12/06/2011		NM	NM
	01/27/2012		5.96	11.52
	02/23/2012		6.20	11.28
	03/20/2012		5.35	12.13
	04/16/2012		5.35	12.13
	05/14/2012		5.96	11.52
	06/11/2012		6.31	11.17
	07/18/2012		6.20	11.28
	08/15/2012		6.26	11.22
	09/13/2012		6.35	11.13
	10/17/2012		6.41	11.07
	11/16/2012		6.00	11.48
	12/14/2012		5.50	11.98
	01/18/2013		5.85	11.63
	02/22/2013		6.05	11.43
	03/21/2013		6.02	11.46
	04/19/2013		5.94	11.54
	07/16/2013		6.35	11.13
	10/07/2013		6.56	10.92
	01/03/2014		6.59	10.89
	04/22/2014		6.04	11.44
	07/08/2014		6.43	11.05
	10/28/2014		6.53	10.95
LF-14	01/30/1991	12.73	5.89	6.84
	06/19/1991		5.87	6.86
	12/16/1991		5.99	6.74
	07/10/1992		5.74	6.99
	12/30/1992		4.38	8.35
	06/08/1993		5.45	7.28

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-14	01/05/1994	12.73	NM	NM
LF-15	01/30/1991	12.50	5.02	7.48
	06/19/1991		4.83	7.67
	12/16/1991		5.02	7.48
	07/10/1992		4.83	7.67
	12/30/1992		3.44	9.06
	06/08/1993		4.40	8.10
	01/05/1994		NM	NM
LF-16	01/30/1991	12.80	4.68	8.12
	06/19/1991		4.53	8.27
	12/16/1991		4.71	8.09
	07/10/1992		4.56	8.24
	12/30/1992		3.46	9.34
	06/08/1993		4.17	8.63
	01/05/1994		NM	NM
LF-17	04/24/1996	15.26	5.35	9.88
	07/29/1996		6.10	9.13
	12/13/1996		2.59	12.64
	04/15/1997		4.04	11.19
	09/19/1997		4.00	11.23
	12/03/1997		4.55	10.68
	12/15/1997		3.79	11.44
	01/13/1998		2.45	12.78
	01/30/1998		2.80	12.43
	02/24/1998		2.40	12.83
	04/06/1998		4.13	11.10
	07/02/1998		6.21	9.02
	07/13/1998		6.40	8.86
	09/28/1998		6.51	8.75
	10/16/1998		6.68	8.58
	01/08/1999		6.80	8.46
	04/16/1999		6.34	8.92
	06/21/1999		8.01	7.25
	07/12/1999		8.15	7.11
	10/08/1999		8.00	7.26
	01/17/2000		6.70	8.56
	04/25/2000		4.71	10.55
	05/30/2000		5.84	9.42
	06/26/2000		NM	NM
	08/10/2000		6.90	8.36
	10/06/2000		6.62	8.64
	01/15/2001		5.84	9.42
	04/19/2001		5.00	10.26
	07/02/2001		6.79	8.47

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-17	09/07/2001	15.26	NM	NM
	10/18/2001		6.29	8.97
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.91	10.35
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		7.09	8.17
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		7.19	8.07
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		6.12	9.14
	01/13/2003		4.33	10.93
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		4.80	10.46
	07/07/2003		6.34	8.92
	10/27/2003		NM	NM
	11/18/2003		6.11	9.15
	01/15/2004		5.95	9.31
	04/21/2004		6.84	8.42
	07/13/2004		7.22	8.04
	10/12/2004		6.50	8.76
	01/24/2005		5.36	9.90
	04/25/2005		5.11	10.15
	07/20/2005		7.15	8.11
	10/21/2005		7.44	7.82
	01/20/2006		3.62	11.64
	04/27/2006		5.99	9.27
	07/20/2006		6.20	9.06
	10/19/2006		5.70	9.56
	01/18/2007		5.64	9.62
	04/12/2007		6.39	8.87
	07/19/2007		6.43	8.83
	08/17/2007		6.70	8.56
	08/24/2007		6.45	8.81
	08/30/2007		6.16	9.10
	09/06/2007		5.95	9.31
	09/14/2007		5.75	9.51
	09/21/2007		5.53	9.73
	09/28/2007		5.26	10.00
	10/05/2007		5.30	9.96
	10/12/2007		4.31	10.95

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-17	10/19/2007	15.26	4.21	11.05
	10/26/2007		4.47	10.79
	11/02/2007		4.64	10.62
	11/09/2007		4.79	10.47
	11/15/2007		4.02	11.24
	11/21/2007		4.41	10.85
	11/29/2007		4.63	10.63
	01/17/2008		5.01	10.25
	04/10/2008		6.28	8.98
	07/24/2008		7.49	7.77
	10/22/2008		6.63	8.63
	01/08/2009		4.71	10.55
	04/09/2009		5.43	9.83
	07/16/2009		6.49	8.77
	10/16/2009		4.63	10.61
	01/14/2010		5.42	9.84
	04/23/2010		4.45	10.81
	07/23/2010		6.60	8.66
	10/15/2010		6.80	8.45
	01/28/2011		4.90	10.36
	04/19/2011		5.38	9.88
LF-18	04/24/1996	15.75	8.21	7.54
	07/29/1996		8.65	7.10
	12/13/1996		6.44	9.31
	04/15/1997		8.50	7.25
	09/19/1997		8.31	7.44
	12/03/1997		7.32	8.43
	12/15/1997		7.02	8.73
	01/13/1998		5.89	9.86
	01/30/1998		6.32	9.43
	02/24/1998		6.34	9.41
	04/06/1998		7.49	8.26
	07/02/1998		8.51	7.24
	07/13/1998		8.39	7.36
	09/28/1998		8.62	7.13
	10/16/1998		8.75	7.00
	01/08/1999		8.62	7.13
	04/16/1999		7.63	8.12
	06/21/1999		8.71	7.04
	07/12/1999		8.61	7.14
	10/08/1999		9.25	6.50
	01/17/2000		8.28	7.47
	04/25/2000		7.97	7.78
	05/30/2000		8.42	7.33
	06/26/2000		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-18	08/10/2000	15.75	8.99	6.76
	10/06/2000		9.01	6.74
	01/15/2001		7.99	7.76
	04/19/2001		8.15	7.60
	07/02/2001		8.89	6.86
	09/07/2001		NM	NM
	10/18/2001		8.97	6.78
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		7.50	8.25
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		8.67	7.08
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		8.71	7.04
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		8.45	7.30
	01/13/2003		6.93	8.82
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		7.59	8.16
	07/07/2003		8.86	6.89
	10/27/2003		NM	NM
	11/18/2003		8.85	6.90
	01/15/2004		8.03	7.72
	04/21/2004		8.88	6.87
	07/13/2004		9.10	6.65
	10/12/2004		9.55	6.20
	01/24/2005		7.82	7.93
	04/25/2005		8.24	7.51
	07/20/2005		8.95	6.80
	10/21/2005		9.46	6.29
	01/20/2006		7.49	8.26
	04/27/2006		7.90	7.85
	07/20/2006		8.78	6.97
	10/19/2006		9.07	6.68
	01/18/2007		8.64	7.11
	04/12/2007		8.77	6.98
	07/19/2007		9.25	6.50
	08/17/2007		9.39	6.36
	08/24/2007		9.32	6.43
	08/30/2007		9.24	6.51
	09/06/2007		9.26	6.49

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-18	09/14/2007	15.75	9.40	6.35
	09/21/2007		9.39	6.36
	09/28/2007		9.01	6.74
	10/05/2007		9.22	6.53
	10/12/2007		8.11	7.64
	10/19/2007		8.80	6.95
	10/26/2007		8.70	7.05
	11/02/2007		9.02	6.73
	11/09/2007		8.91	6.84
	11/15/2007		8.43	7.32
	11/21/2007		8.43	7.32
	11/29/2007		8.50	7.25
	01/17/2008		7.97	7.78
	04/10/2008		9.15	6.60
	07/24/2008		9.80	5.95
	10/22/2008		9.98	5.77
	01/08/2009		9.35	6.40
	04/09/2009		8.51	7.24
	07/16/2009		9.40	6.35
	10/16/2009		8.32	7.41
	01/14/2010		8.87	6.88
	04/23/2010		8.27	7.48
	07/23/2010		9.14	6.61
	10/15/2010		9.63	6.11
	01/28/2011		8.60	7.15
	04/19/2011		8.48	7.27
	03/20/2012		9.33	6.42
	04/16/2012		9.85	5.90
	05/14/2012		9.90	5.85
	06/11/2012		10.26	5.49
	07/18/2012		10.08	5.67
	08/15/2012		10.15	5.60
	09/13/2012		10.37	5.38
	10/17/2012		10.32	5.43
	11/16/2012		9.80	5.95
	12/14/2012		8.62	7.13
	01/18/2013		9.70	6.05
	02/22/2013		9.90	5.85
	03/21/2013		9.95	5.80
	04/19/2013		9.76	5.99
	07/16/2013		10.08	5.67
	10/07/2013		10.38	5.37
	01/03/2014		9.96	5.79
	04/22/2014		9.64	6.11
	07/08/2014		9.98	5.77

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-18	10/28/2014	15.75	10.07	5.68
LF-19	04/24/1996	16.88	7.92	8.96
	07/29/1996		7.76	9.12
	12/13/1996		4.85	12.03
	04/15/1997		7.36	9.52
	09/19/1997		7.69	9.19
	12/03/1997		6.80	10.08
	12/15/1997		7.86	9.02
	01/13/1998		NM	NM
	01/30/1998		6.01	10.87
	02/24/1998		5.28	11.60
	04/06/1998		6.51	10.37
	07/02/1998		7.17	9.71
	07/13/1998		7.32	9.56
	09/28/1998		7.60	9.28
	10/16/1998		7.70	9.18
	01/08/1999		7.48	9.40
	04/16/1999		6.44	10.44
	06/21/1999		7.57	9.31
	07/12/1999		7.83	9.05
	10/08/1999		7.96	8.92
LF-2	06/14/1989	14.94	4.99	9.95
	01/10/1990 (a)		4.65	10.29
	01/18/1990 (b)		3.99	10.95
	01/18/1990 (c)		4.05	10.89
	01/30/1991		5.60	9.34
	06/19/1991		5.57	9.37
	12/16/1991		5.49	9.45
	07/10/1992		NM	NM
	12/30/1992		NM	NM
	06/08/1993		5.11	9.83
	01/05/1994		4.19	10.75
LF-20	04/24/1996	14.47	7.55	6.92
	07/29/1996		7.91	6.56
	12/13/1996		7.71	6.76
	04/15/1997		7.85	6.62
	09/19/1997		7.91	6.56
	12/03/1997		7.58	6.89
	12/15/1997		7.53	6.94
	01/13/1998		7.30	7.17
	01/30/1998		7.42	7.05
	02/24/1998		7.43	7.04
	04/06/1998		7.61	6.86
	07/02/1998		7.81	6.66

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-20	07/13/1998	14.47	7.86	6.61
	09/28/1998		6.98	7.49
	10/16/1998		6.78	7.69
	01/08/1999		6.24	8.23
	04/16/1999		4.89	9.58
	06/21/1999		6.68	7.79
	07/12/1999		6.67	7.80
	10/08/1999		8.01	6.46
	01/17/2000		6.65	7.82
	04/25/2000		5.79	8.68
	05/30/2000		6.27	8.20
	06/26/2000		NM	NM
	08/10/2000		6.75	7.72
	10/06/2000		7.23	7.24
	01/15/2001		5.36	9.11
	04/19/2001		6.68	7.79
	07/02/2001		7.57	6.90
	09/07/2001		NM	NM
	10/18/2001		7.55	6.92
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		6.35	8.12
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		7.14	7.33
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		7.52	6.95
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		7.35	7.12
	01/13/2003		5.45	9.02
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		5.54	8.93
	07/07/2003		7.29	7.18
	10/27/2003		NM	NM
	11/18/2003		7.16	7.31
	01/15/2004		5.58	8.89
	04/21/2004		7.15	7.32
	07/13/2004		7.50	6.97
	10/12/2004		7.29	7.18
	01/24/2005		6.39	8.08
	04/25/2005		6.60	7.87
	07/20/2005		7.07	7.40

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-20	10/21/2005	14.47	7.46	7.01
	01/20/2006		5.35	9.12
	04/27/2006		6.55	7.92
	07/20/2006		7.15	7.32
	10/19/2006		7.16	7.31
	01/18/2007		7.12	7.35
	04/12/2007		7.21	7.26
	07/19/2007		7.67	6.80
	08/17/2007		7.76	6.71
	08/24/2007		7.77	6.70
	08/30/2007		7.78	6.69
	09/06/2007		7.79	6.68
	09/14/2007		7.78	6.69
	09/21/2007		7.75	6.72
	09/28/2007		7.69	6.78
	10/05/2007		7.68	6.79
	10/12/2007		6.97	7.50
	10/19/2007		6.95	7.52
	10/26/2007		7.07	7.40
	11/02/2007		7.11	7.36
	11/09/2007		7.20	7.27
	11/15/2007		6.68	7.79
	11/21/2007		7.01	7.46
	11/29/2007		7.19	7.28
	01/17/2008		6.76	7.71
	04/10/2008		7.53	6.94
	07/24/2008		7.96	6.51
	10/22/2008		7.93	6.54
	01/08/2009		7.03	7.44
	04/09/2009		7.04	7.43
	07/16/2009		7.65	6.82
	10/16/2009		5.66	8.79
	01/14/2010		6.82	7.65
	04/23/2010		6.56	7.91
	07/23/2010		7.61	6.86
	10/15/2010		7.68	6.78
	01/28/2011		7.87	6.60
	04/19/2011		7.63	6.84
LF-21	04/24/1996	13.17	3.65	9.42
	07/29/1996		4.61	8.46
	12/13/1996		5.06	8.01
	04/15/1997		5.58	7.49
	09/19/1997		5.42	7.65
	12/03/1997		5.32	7.75
	12/15/1997		5.27	7.80

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-21	01/13/1998	13.17	5.03	8.04
	01/30/1998		5.04	8.03
	02/24/1998		4.83	8.24
	04/06/1998		5.00	8.07
	07/02/1998		5.35	7.72
	07/13/1998		5.37	7.80
	09/28/1998		5.33	7.84
	10/16/1998		5.24	7.93
	01/08/1999		4.81	8.36
	04/16/1999		3.37	9.80
	06/21/1999		5.22	7.95
	07/12/1999		5.18	7.99
	10/08/1999		5.11	8.06
	01/17/2000		4.92	8.25
	04/25/2000		4.32	8.85
	05/30/2000		4.81	8.36
	06/26/2000		NM	NM
	08/10/2000		5.27	7.90
	10/06/2000		5.18	7.99
	01/15/2001		3.14	10.03
	04/19/2001		4.60	8.57
	07/02/2001		5.02	8.15
	09/07/2001		NM	NM
	10/18/2001		5.00	8.17
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		3.99	9.18
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		4.65	8.52
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		4.87	8.30
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		5.00	8.17
	01/13/2003		2.69	10.48
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		2.50	10.67
	07/07/2003		4.81	8.36
	10/27/2003		NM	NM
	11/18/2003		4.55	8.62
	01/15/2004		3.78	9.39
	04/21/2004		4.50	8.67

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-21	07/13/2004	13.17	4.80	8.37
	10/12/2004		4.83	8.34
	01/24/2005		3.81	9.36
	04/25/2005		4.29	8.88
	07/20/2005		5.67	7.50
	10/21/2005		4.95	8.22
	01/20/2006		2.63	10.54
	04/27/2006		3.75	9.42
	07/20/2006		4.65	8.52
	10/19/2006		4.70	8.47
	01/18/2007		4.31	8.86
	04/12/2007		4.38	8.79
	07/19/2007		4.66	8.51
	08/17/2007 (d)		3.91	9.26
	08/24/2007		4.71	8.46
	08/30/2007		4.72	8.45
	09/06/2007 (d)		3.90	9.27
	09/14/2007 (d)		3.85	9.32
	09/21/2007 (d)		3.74	9.43
	09/28/2007 (d)		3.68	9.49
	10/05/2007		3.66	9.51
	10/12/2007		2.77	10.40
	10/19/2007		3.00	10.17
	10/26/2007		3.82	9.35
	11/02/2007		4.12	9.05
	11/09/2007		5.28	7.89
	11/15/2007		3.00	10.17
	11/21/2007		3.83	9.34
	11/29/2007		4.17	9.00
	01/17/2008		3.05	10.12
LF-22	04/24/1996	21.86	11.55	10.31
	07/29/1996		12.22	9.64
	12/13/1996		9.07	12.79
	04/15/1997		10.14	11.72
	09/19/1997		10.01	11.85
	12/03/1997		10.72	11.14
	12/15/1997		10.40	11.46
	01/13/1998		9.57	12.29
	01/30/1998		9.60	12.26
	02/24/1998		9.08	12.78
	04/06/1998		10.74	11.12
	07/02/1998		12.34	9.52
	07/13/1998		12.58	9.28
	09/28/1998		12.66	9.20
	10/16/1998		12.86	9.00

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-22	01/08/1999	21.86	12.03	9.83
	04/16/1999		11.33	10.53
	06/21/1999		12.71	9.15
	07/12/1999		12.83	9.03
	10/08/1999		13.20	8.66
	01/17/2000		12.41	9.45
	04/25/2000		11.22	10.64
	05/30/2000		12.16	9.70
	06/26/2000		NM	NM
	08/10/2000		12.80	9.06
	10/06/2000		12.70	9.16
	01/15/2001		11.77	10.09
	04/19/2001		11.75	10.11
	07/02/2001		12.63	9.23
	09/07/2001		NM	NM
	10/18/2001		12.28	9.58
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		10.95	10.91
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		12.20	9.66
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		11.93	9.93
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		11.77	10.09
	01/13/2003		10.91	10.95
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		10.90	10.96
	07/07/2003		12.31	9.55
	10/27/2003		NM	NM
	11/18/2003		12.11	9.75
	01/15/2004		11.63	10.23
	04/21/2004		12.07	9.79
	07/13/2004		12.42	9.44
	10/12/2004		11.92	9.94
	01/24/2005		11.20	10.66
	04/25/2005		11.53	10.33
	07/20/2005		12.35	9.51
	10/21/2005		12.65	9.21
	01/20/2006		9.72	12.14
	04/27/2006		11.42	10.44

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-22	07/20/2006	21.86	12.13	9.73
	10/19/2006		11.79	10.07
	01/18/2007		11.74	10.12
	04/12/2007		11.85	10.01
	07/19/2007		12.13	9.73
	08/17/2007		NM	NM
	08/24/2007		NM	NM
	08/30/2007		NM	NM
	09/06/2007		NM	NM
	09/14/2007		NM	NM
	09/21/2007		NM	NM
	09/28/2007		NM	NM
	10/05/2007		11.56	10.30
	10/12/2007		10.65	11.21
	10/19/2007		10.80	11.06
	10/26/2007		10.98	10.88
	11/02/2007		11.14	10.72
	11/09/2007		11.22	10.64
	11/15/2007		10.70	11.16
	11/21/2007		10.96	10.90
	11/29/2007		11.14	10.72
	01/17/2008		10.95	10.91
	04/10/2008		11.95	9.91
	07/24/2008		12.46	9.40
	10/22/2008		12.27	9.59
	01/08/2009		11.17	10.69
	04/09/2009		11.43	10.43
	07/16/2009		12.04	9.82
	10/16/2009		10.90	10.94
	01/14/2010		11.27	10.59
	04/23/2010		10.92	10.94
	07/23/2010		11.81	10.05
	10/15/2010		12.17	9.68
	01/28/2011		11.28	10.58
	04/19/2011		11.42	10.44
LF-23	04/24/1996	13.34	4.08	9.26
	07/29/1996		5.28	8.06
	12/13/1996		3.76	9.58
	04/15/1997		5.51	7.83
	09/19/1997		5.90	7.44
	12/03/1997		4.37	8.97
	12/15/1997		4.08	9.26
	01/13/1998		3.33	10.01
	01/30/1998		3.32	10.02
	02/24/1998		2.75	10.59

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-23	04/06/1998	13.34	3.88	9.46
	07/02/1998		5.30	8.04
	07/13/1998		5.39	7.95
	09/28/1998		5.73	7.61
	10/16/1998		5.69	7.65
	01/08/1999		5.20	8.14
	04/16/1999		4.11	9.23
	06/21/1999		5.76	7.58
	07/12/1999		5.80	7.54
	01/17/2000		NM	NM
	08/10/2000		6.12	7.22
	10/06/2000		6.13	7.21
	01/15/2001		NM	NM
	04/19/2001		NM	NM
	07/02/2001		NM	NM
	09/07/2001		NM	NM
	10/18/2001		NM	NM
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		NM	NM
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		NM	NM
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		NM	NM
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		NM	NM
	01/13/2003		NM	NM
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	07/07/2003		NM	NM
	01/15/2004		NM	NM
	04/21/2004		NM	NM
LF-24	04/24/1996	12.92	4.40	8.52
	07/29/1996		5.24	7.68
	12/13/1996		4.10	8.82
	04/15/1997		5.56	7.36
	09/19/1997		6.15	6.77
	12/03/1997		4.51	8.41
	12/15/1997		4.26	8.66
	01/13/1998		3.56	9.36
	01/30/1998		3.33	9.59
	02/24/1998		2.48	10.44

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-24	04/06/1998	12.92	4.01	8.91
	07/02/1998		5.34	7.58
	07/13/1998		5.42	7.50
	09/28/1998		5.74	7.18
	10/16/1998		5.67	7.25
	01/08/1999		5.11	7.81
	04/16/1999		4.41	8.51
	06/21/1999		5.96	6.96
	07/12/1999		5.96	6.96
	01/17/2000		NM	NM
	08/10/2000		6.53	6.39
	10/06/2000		6.52	6.40
	01/15/2001		NM	NM
	04/19/2001		NM	NM
	07/02/2001		NM	NM
	09/07/2001		NM	NM
	10/18/2001		NM	NM
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		NM	NM
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		NM	NM
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		NM	NM
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		NM	NM
	01/13/2003		NM	NM
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	07/07/2003		NM	NM
	01/15/2004		NM	NM
	04/21/2004		NM	NM
	10/19/2006		6.00	6.92
	01/18/2007		5.67	7.25
	04/12/2007		5.99	6.93
	07/19/2007		6.07	6.85
	10/12/2007		5.65	7.27
	01/17/2008		5.48	7.44
	04/10/2008		6.16	6.76
	07/24/2008		6.35	6.57
	10/22/2008		6.29	6.63
	01/08/2009		5.68	7.24

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-24	04/09/2009	12.92	5.68	7.24
	07/16/2009		6.18	6.74
	10/16/2009		NM	NM
	01/14/2010		NM	NM
	04/23/2010		NM	NM
	07/23/2010		NM	NM
	10/15/2010		6.18	2.69
	01/28/2011		NM	NM
	04/19/2011		NM	NM
	02/23/2012		6.18	6.74
	03/20/2012		NM	NM
	04/16/2012		5.81	7.11
	05/14/2012		6.30	6.62
	06/11/2012		6.37	6.55
	04/19/2013		6.29	6.63
	05/13/2014		6.34	6.58
LF-25	04/24/1996	14.01	7.15	6.86
	07/29/1996		7.66	6.35
	12/13/1996		6.85	7.16
	04/15/1997		8.02	5.99
	09/19/1997		7.86	6.15
	12/03/1997		7.07	6.94
	12/15/1997		6.99	7.02
	01/13/1998		6.43	7.58
	01/30/1998		6.52	7.49
	02/24/1998		5.91	8.10
	04/06/1998		7.09	6.92
	07/02/1998		7.92	6.09
	07/13/1998		7.90	6.11
	09/28/1998		7.73	6.28
	10/16/1998		8.56	5.45
	01/08/1999		7.31	6.70
	04/16/1999		6.51	7.50
	06/21/1999		7.80	6.21
	07/12/1999		7.74	6.27
	01/17/2000		NM	NM
	08/10/2000		8.55	5.46
	10/06/2000		8.75	5.26
	01/15/2001		NM	NM
	04/19/2001		NM	NM
	07/02/2001		NM	NM
	09/07/2001		NM	NM
	10/18/2001		NM	NM
	11/02/2001		NM	NM
	12/14/2001		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-25	01/18/2002	14.01	NM	NM
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		NM	NM
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		NM	NM
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		NM	NM
	01/13/2003		NM	NM
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	07/07/2003		NM	NM
	01/15/2004		NM	NM
	04/21/2004		NM	NM
	10/19/2006		7.67	6.34
	01/18/2007		7.35	6.66
	04/12/2007		7.59	6.42
	07/19/2007		7.84	6.17
	10/12/2007		7.25	6.76
	01/17/2008		7.09	6.92
	04/10/2008		7.93	6.08
	07/24/2008		8.38	5.63
	10/22/2008		8.24	5.77
	01/08/2009		7.34	6.67
	04/09/2009		7.48	6.53
	07/16/2009		8.06	5.95
	10/16/2009		NM	NM
	01/14/2010		NM	NM
	04/23/2010		NM	NM
	07/23/2010		NM	NM
	10/15/2010		8.06	2.69
	01/28/2011		NM	NM
	04/19/2011		NM	NM
	02/23/2012		7.97	6.04
	03/20/2012		NM	NM
	04/16/2012		7.64	6.37
	05/14/2012		8.17	5.84
	06/11/2012		8.35	5.66
	04/19/2013		8.24	5.77
	05/13/2014		8.29	5.72
LF-26	04/24/1996	15.60	7.90	7.70
	07/29/1996		8.08	7.52
	12/13/1996		6.75	8.85

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-26	04/15/1997	15.60	7.21	8.39
	09/19/1997		7.61	7.99
	12/03/1997		8.96	6.64
	12/15/1997		7.11	8.49
	01/13/1998		4.05	11.55
	01/30/1998		3.85	11.75
	02/24/1998		3.89	11.71
	04/06/1998		5.91	9.69
	07/02/1998		8.12	7.48
	07/13/1998		7.96	7.64
	09/28/1998		9.07	6.53
	10/16/1998		9.00	6.60
	01/08/1999		6.61	8.99
	04/16/1999		5.88	9.72
	06/21/1999		8.39	7.21
	07/12/1999		8.73	6.87
	10/08/1999		9.44	6.16
	01/17/2000		8.70	6.90
	04/25/2000		5.28	10.32
	05/30/2000		6.24	9.36
	06/26/2000		NM	NM
	08/10/2000		7.52	8.08
	10/06/2000		8.23	7.37
	01/15/2001		6.77	8.83
	04/19/2001		5.01	10.59
	07/02/2001		7.03	8.57
	09/07/2001		NM	NM
	10/18/2001		8.29	7.31
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		5.10	10.50
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		5.95	9.65
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		7.27	8.33
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		7.91	7.69
	01/13/2003		5.81	9.79
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		6.70	8.90
	07/07/2003		8.36	7.24

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-26	10/27/2003	15.60	NM	NM
	11/18/2003		7.85	7.75
	01/15/2004		6.51	9.09
	04/21/2004		7.43	8.17
	07/13/2004		8.51	7.09
	10/12/2004		8.33	7.27
	01/24/2005		7.70	7.90
	04/25/2005		7.04	8.56
	07/20/2005		8.06	7.54
	10/21/2005		8.89	6.71
	01/20/2006		4.40	11.20
	04/27/2006		6.17	9.43
	07/20/2006		8.20	7.40
	10/19/2006		8.65	6.95
	01/18/2007		6.71	8.89
	04/12/2007		7.23	8.37
	07/19/2007		8.89	6.71
	08/17/2007		8.95	6.65
	08/24/2007		8.91	6.69
	08/30/2007		8.62	6.98
	09/06/2007		8.57	7.03
	09/14/2007		8.54	7.06
	09/21/2007		8.51	7.09
	09/28/2007		8.36	7.24
	10/05/2007		8.20	7.40
	10/12/2007		7.22	8.38
	10/19/2007		7.00	8.60
	10/26/2007		6.89	8.71
	11/02/2007		6.79	8.81
	11/09/2007		6.70	8.90
	11/15/2007		5.92	9.68
	11/21/2007		6.08	9.52
	11/29/2007		6.10	9.50
	01/17/2008		5.98	9.62
	04/10/2008		7.59	8.01
	07/24/2008		9.05	6.55
	10/22/2008		9.06	6.54
	01/08/2009		7.30	8.30
	04/09/2009		6.54	9.06
	07/16/2009		8.22	7.38
	10/16/2009		6.69	8.89
	01/14/2010		7.92	7.68
	04/23/2010		6.40	9.20
	07/23/2010		8.18	7.42
	10/15/2010		8.75	6.84

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-26	01/28/2011	15.60	7.28	8.32
	04/19/2011		7.86	7.74
LF-27	12/29/1997	17.83	7.07	10.76
	01/30/1998		6.25	11.58
	02/24/1998		5.92	11.91
	04/06/1998		6.67	11.16
	07/02/1998		7.08	10.75
	07/13/1998		7.38	10.45
	09/28/1998		7.53	10.30
	10/16/1998		7.70	10.13
	01/08/1999		7.47	10.36
	04/16/1999		6.83	11.00
	06/21/1999		7.60	10.23
	07/12/1999		7.71	10.12
	10/08/1999		7.71	10.12
	01/17/2000		7.36	10.47
	04/25/2000		7.03	10.80
	05/30/2000		7.28	10.55
	06/26/2000		NM	NM
	08/10/2000		7.69	10.14
	08/31/2000		7.57	10.26
	09/25/2000		7.65	10.18
	10/06/2000		7.66	10.17
	11/21/2000		7.44	10.39
	12/18/2000		7.16	10.67
	01/15/2001		7.00	10.83
	02/14/2001		6.56	11.27
	03/01/2001		6.45	11.38
	04/19/2001		7.20	10.63
	05/23/2001		7.52	10.31
	06/14/2001		7.45	10.38
	07/02/2001		7.46	10.37
	08/10/2001		7.33	10.50
	09/07/2001		7.33	10.50
	10/18/2001		7.38	10.45
	11/02/2001		7.34	10.49
	12/14/2001		5.31	12.52
	01/18/2002		6.65	11.18
	02/21/2002		6.63	11.20
	03/25/2002		6.73	11.10
	04/18/2002		7.08	10.75
	05/10/2002		7.25	10.58
	06/04/2002		7.10	10.73
	07/10/2002		7.26	10.57
	08/15/2002		7.33	10.50

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-27	09/11/2002	17.83	7.21	10.62
	10/08/2002		7.21	10.62
	11/07/2002		7.18	10.65
	12/12/2002		7.04	10.79
	01/13/2003		6.26	11.57
	02/26/2003		6.62	11.21
	03/19/2003		6.59	11.24
	04/14/2003		6.50	11.33
	05/13/2003		6.36	11.47
	06/13/2003		7.60	10.23
	07/07/2003		7.11	10.72
	08/13/2003		7.20	10.63
	09/17/2003		7.20	10.63
	10/27/2003		7.27	10.56
	11/18/2003		7.11	10.72
	12/19/2003		6.67	11.16
	01/15/2004		5.57	12.26
	02/17/2004		6.28	11.55
	03/18/2004		6.82	11.01
	04/21/2004		6.99	10.84
	05/18/2004		6.60	11.23
	06/10/2004		7.04	10.79
	07/13/2004		7.19	10.64
	08/12/2004		7.25	10.58
	09/16/2004		7.39	10.44
	10/12/2004		7.28	10.55
	11/17/2004		6.83	11.00
	12/15/2004		6.63	11.20
	01/24/2005		6.65	11.18
	02/15/2005		6.67	11.16
	03/15/2005		6.67	11.16
	04/25/2005		6.68	11.15
	05/20/2005		6.82	11.01
	06/21/2005		7.01	10.82
	07/20/2005		7.25	10.58
	08/19/2005		7.38	10.45
	09/16/2005		7.40	10.43
	10/21/2005		7.56	10.27
	11/18/2005		7.22	10.61
	12/16/2005		7.08	10.75
	01/20/2006		6.07	11.76
	02/22/2006		6.53	11.30
	03/30/2006		5.79	12.04
	04/27/2006		6.38	11.45
	05/18/2006		6.72	11.11

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-27	06/22/2006	17.83	6.91	10.92
	07/20/2006		6.96	10.87
	08/17/2006		7.00	10.83
	09/14/2006		7.04	10.79
	10/19/2006		6.99	10.84
	11/21/2006		6.89	10.94
	12/21/2006		6.46	11.37
	01/18/2007		6.87	10.96
	02/06/2007		7.04	10.79
	03/08/2007		6.55	11.28
	04/12/2007		6.84	10.99
	05/10/2007		6.71	11.12
	06/07/2007		7.05	10.78
	07/19/2007		7.08	10.75
	08/09/2007		7.12	10.71
	09/14/2007		6.86	10.97
	10/12/2007		6.76	11.07
	11/09/2007		6.92	10.91
	12/14/2007		6.68	11.15
	01/17/2008		6.42	11.41
	02/21/2008		6.30	11.53
	03/20/2008		6.87	10.96
	04/10/2008		7.10	10.73
	05/08/2008		7.13	10.70
	06/12/2008		7.15	10.68
	07/24/2008		7.32	10.51
	08/14/2008		7.31	10.52
	09/18/2008		7.26	10.57
	10/22/2008		7.34	10.49
	11/13/2008		6.80	11.03
	12/04/2008		6.95	10.88
	01/08/2009		6.63	11.20
	02/11/2009		6.48	11.35
	03/12/2009		6.05	11.78
	04/09/2009		6.51	11.32
	05/20/2009		6.70	11.13
	06/17/2009		6.89	10.94
	07/16/2009		6.98	10.85
	08/13/2009		6.94	10.89
	09/10/2009		7.08	10.75
	10/16/2009		6.34	11.47
	11/12/2009		6.71	11.12
	12/03/2009		6.86	10.97
	01/14/2010		6.60	11.23
	02/18/2010		6.26	11.57

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-27	03/25/2010	17.83	6.40	11.43
	04/23/2010		6.31	11.52
	05/21/2010		6.63	11.20
	06/10/2010		6.78	11.05
	07/23/2010		6.88	10.95
	08/12/2010		6.98	10.85
	09/10/2010		7.05	10.78
	10/15/2010		7.16	10.66
	11/04/2010		6.81	11.02
	12/03/2010		6.61	11.22
	01/28/2011		6.61	11.22
	02/10/2011		6.73	11.10
	03/31/2011		5.80	12.03
	04/19/2011		6.51	11.32
	10/05/2011		10.34	7.49
	10/12/2011		NM	NM
	10/19/2011		9.96	7.87
	10/26/2011		NM	NM
	11/02/2011		10.98	6.85
	11/09/2011		NM	NM
	11/16/2011		8.91	8.92
	11/23/2011		NM	NM
	11/30/2011		8.54	9.29
	12/06/2011		NM	NM
	01/27/2012		7.39	10.44
	02/23/2012		7.23	10.60
	03/20/2012		6.41	11.42
	04/16/2012		6.15	11.68
	05/14/2012		6.88	10.95
	06/14/2012		7.11	10.72
	07/18/2012		7.14	10.69
	08/15/2012		7.19	10.64
	09/13/2012		7.22	10.61
	10/17/2012		7.24	10.59
	11/16/2012		6.83	11.00
	12/14/2012		6.31	11.52
	01/18/2013		6.56	11.27
	02/22/2013		6.72	11.11
	03/21/2013		6.56	11.27
	04/19/2013		6.52	11.31
	07/16/2013		7.24	10.59
	10/07/2013		7.59	10.24
	01/03/2014		7.52	10.31
	04/22/2014		6.96	10.87
	07/08/2014		7.44	10.39

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-27	10/28/2014	17.83	7.51	10.32
LF-28	12/29/1997	17.09	7.52	9.57
	01/30/1998		6.17	10.92
	02/24/1998		5.51	11.58
	04/06/1998		6.62	10.47
	07/02/1998		7.37	9.72
	07/13/1998		7.17	9.92
	09/28/1998		7.72	9.37
	10/16/1998		7.81	9.28
	01/08/1999		7.18	9.91
	04/16/1999		6.62	10.47
	06/21/1999		7.73	9.36
	07/12/1999		7.90	9.19
	10/08/1999		8.03	9.06
	01/17/2000		7.77	9.32
	04/25/2000		6.83	10.26
	05/30/2000		7.57	9.52
	06/26/2000		NM	NM
	08/10/2000		8.02	9.07
	08/31/2000		7.51	9.58
	09/25/2000		7.70	9.39
	10/06/2000		7.76	9.33
	11/21/2000		7.81	9.28
	12/18/2000		7.60	9.49
	01/15/2001		7.51	9.58
	02/14/2001		7.02	10.07
	03/01/2001		6.90	10.19
	04/19/2001		7.29	9.80
	05/23/2001		7.60	9.49
	06/14/2001		7.73	9.36
	07/02/2001		7.78	9.31
	08/10/2001		7.48	9.61
	09/07/2001		7.56	9.53
	10/18/2001		7.72	9.37
	11/02/2001		NM	NM
	12/14/2001		6.26	10.83
	01/18/2002		6.46	10.63
	02/21/2002		6.83	10.26
	03/25/2002		6.82	10.27
	04/18/2002		7.22	9.87
	05/10/2002		7.47	9.62
	06/04/2002		7.46	9.63
	07/10/2002		7.57	9.52
	08/15/2002		7.51	9.58
	09/11/2002		7.29	9.80

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-28	10/08/2002	17.09	7.43	9.66
	11/07/2002		7.55	9.54
	12/12/2002		7.45	9.64
	01/13/2003		5.73	11.36
	02/26/2003		6.86	10.23
	03/19/2003		6.64	10.45
	04/14/2003		7.29	9.80
	05/13/2003		6.61	10.48
	06/13/2003		7.01	10.08
	07/07/2003		7.12	9.97
	08/13/2003		7.24	9.85
	09/17/2003		7.27	9.82
	10/27/2003		7.45	9.64
	12/19/2003		6.73	10.36
	01/15/2004		6.30	10.79
	02/17/2004		6.79	10.30
	03/18/2004		6.65	10.44
	04/21/2004		7.03	10.06
	05/18/2004		7.25	9.84
	06/10/2004		7.15	9.94
	07/13/2004		7.21	9.88
	08/12/2004		7.24	9.85
	09/16/2004		7.45	9.64
	10/12/2004		7.49	9.60
	11/17/2004		7.13	9.96
	12/15/2004		6.78	10.31
	01/24/2005		6.41	10.68
	02/15/2005		6.71	10.38
	03/15/2005		6.39	10.70
	04/25/2005		6.62	10.47
	05/20/2005		6.62	10.47
	06/21/2005		6.73	10.36
	07/20/2005		7.28	9.81
	08/19/2005		7.49	9.60
	09/16/2005		7.52	9.57
	10/21/2005		7.69	9.40
	11/18/2005		7.49	10.34
	12/16/2005		7.33	9.76
	01/23/2006		6.08	11.01
	02/22/2006		5.28	11.81
	03/30/2006		5.11	11.98
	04/27/2006		5.71	11.38
	05/18/2006		6.21	10.88
	06/22/2006		6.60	10.49
	07/20/2006		6.50	10.59

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-28	08/17/2006	17.09	6.33	10.76
	09/14/2006		6.54	10.55
	10/19/2006		6.53	10.56
	11/21/2006		6.68	10.41
	12/21/2006		6.06	11.03
	01/18/2007		6.59	10.50
	02/06/2007		6.74	10.35
	03/08/2007		6.19	10.90
	04/12/2007		6.55	10.54
	05/10/2007		6.74	10.35
	06/07/2007		6.80	10.29
	07/19/2007		6.76	10.33
	08/09/2007		6.74	10.35
	09/14/2007		6.71	10.38
	10/12/2007		6.57	10.52
	11/09/2007		6.57	10.52
	12/14/2007		6.36	10.73
	01/17/2008		5.99	11.10
	02/21/2008		5.93	11.16
	03/20/2008		5.59	11.50
	04/10/2008		6.78	10.31
	05/08/2008		6.98	10.11
	06/12/2008		6.81	10.28
	07/24/2008		7.05	10.04
	08/14/2008		6.96	10.13
	09/18/2008		6.87	10.22
	10/22/2008		7.06	10.03
	11/13/2008		6.78	10.31
	12/04/2008		6.77	10.32
	01/08/2009		6.51	10.58
	02/11/2009		6.27	10.82
	03/12/2009		5.29	11.80
	04/09/2009		6.00	11.09
	05/20/2009		6.18	10.91
	06/17/2009		6.40	10.69
	07/16/2009		6.41	10.68
	08/13/2009		6.30	10.79
	09/10/2009		6.59	10.50
	10/16/2009		5.78	11.29
	11/12/2009		6.27	10.82
	12/03/2009		6.41	10.68
	01/14/2010		6.27	10.82
	02/18/2010		5.59	11.50
	03/25/2010		5.74	11.35
	04/23/2010		5.68	11.41

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-28	05/21/2010	17.09	6.13	10.96
	06/10/2010		6.34	10.75
	07/23/2010		6.28	10.81
	08/12/2010		6.45	10.64
	09/10/2010		6.50	10.59
	10/15/2010		6.76	10.32
	11/04/2010		6.56	10.53
	12/03/2010		6.22	10.87
	01/28/2011		6.01	11.08
	02/10/2011		6.20	10.89
	03/31/2011		4.88	12.21
	04/19/2011		5.83	11.26
	10/05/2011		NM	NM
	10/12/2011		9.89	7.20
	10/19/2011		10.18	6.91
	10/26/2011		NM	NM
	11/02/2011		10.32	6.77
	11/09/2011		NM	NM
	11/16/2011		9.62	7.47
	11/23/2011		NM	NM
	11/30/2011		9.21	7.88
	12/06/2011		NM	NM
	01/27/2012		7.90	9.19
	02/23/2012		7.58	9.51
	03/20/2012		6.82	10.27
	04/16/2012		5.07	12.02
	05/14/2012		6.24	10.85
	06/11/2012		6.64	10.45
	07/18/2012		6.68	10.41
	08/15/2012		6.69	10.40
	09/13/2012		6.67	10.42
	10/17/2012		6.84	10.25
	11/16/2012		6.58	10.51
	12/14/2012		5.55	11.54
	01/18/2013		6.08	11.01
	02/22/2013		6.50	10.59
	03/21/2013		6.46	10.63
	04/19/2013		6.19	10.90
	07/16/2013		6.84	10.25
	10/07/2013		7.38	9.71
	01/03/2014		7.03	10.06
	04/22/2014		6.62	10.47
	07/08/2014		7.30	9.79
	10/28/2014		7.47	9.62
LF-29	12/29/1997	16.40	6.79	9.61

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-29	01/30/1998	16.40	5.57	10.83
	02/24/1998		4.95	11.45
	04/06/1998		6.61	9.79
	07/02/1998		6.95	9.45
	07/13/1998		7.01	9.39
	09/28/1998		7.22	9.18
	10/16/1998		7.35	9.05
	01/08/1999		7.10	9.30
	04/16/1999		6.14	10.26
	06/21/1999		7.26	9.14
	07/12/1999		7.44	8.96
	10/08/1999		7.53	8.87
	01/17/2000		7.47	8.93
	04/25/2000		6.84	9.56
	05/30/2000		7.08	9.32
	06/26/2000		NM	NM
	08/10/2000		7.54	8.86
	08/31/2000		6.80	9.60
	09/25/2000		7.08	9.32
	10/06/2000		7.21	9.19
	11/21/2000		7.35	9.05
	12/18/2000		7.14	9.26
	01/15/2001		6.93	9.47
	02/14/2001		6.51	9.89
	03/01/2001		5.81	10.59
	04/19/2001		6.91	9.49
	05/23/2001		7.12	9.28
	06/14/2001		7.40	9.00
	07/02/2001		7.43	8.97
	08/10/2001		7.05	9.35
	09/07/2001		7.02	9.38
	10/18/2001		7.24	9.16
	11/02/2001		7.20	9.20
	12/14/2001		5.87	10.53
	01/18/2002		6.02	10.38
	02/21/2002		6.16	10.24
	03/25/2002		6.38	10.02
	04/18/2002		6.73	9.67
	05/10/2002		7.03	9.37
	06/04/2002		6.81	9.59
	07/10/2002		7.11	9.29
	08/15/2002		6.92	9.48
	09/11/2002		6.46	9.94
	10/08/2002		6.94	9.46
	11/07/2002		6.97	9.43

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-29	12/12/2002	16.40	6.75	9.65
	01/13/2003		5.39	11.01
	02/26/2003		5.51	10.89
	03/19/2003		6.24	10.16
	04/14/2003		5.90	10.50
	05/13/2003		6.30	10.10
	06/13/2003		6.51	9.89
	07/07/2003		6.80	9.60
	08/13/2003		6.62	9.78
	09/17/2003		6.67	9.73
	10/27/2003		6.91	9.49
	11/18/2003		6.71	9.69
	12/19/2003		6.15	10.25
	01/15/2004		6.02	10.38
	02/17/2004		5.70	10.70
	03/18/2004		6.35	10.05
	04/21/2004		6.64	9.76
	05/18/2004		6.75	9.65
	06/10/2004		6.95	9.45
	07/13/2004		6.68	9.72
	08/12/2004		6.70	9.70
	09/16/2004		6.93	9.47
	10/12/2004		6.89	9.51
	11/17/2004		6.49	9.91
	12/15/2004		6.10	10.30
	01/24/2005		5.94	10.46
	02/15/2005		6.07	10.33
	03/15/2005		5.97	10.43
	04/25/2005		5.76	10.64
	05/20/2005		6.05	10.35
	06/21/2005		6.39	10.01
	07/20/2005		6.17	10.23
	08/19/2005		6.23	10.17
	09/16/2005		6.99	9.41
	10/21/2005		7.20	9.20
	11/18/2005		7.02	9.38
	12/16/2005		6.66	9.74
	01/20/2006		5.66	10.74
	02/22/2006		5.41	10.99
	03/30/2006		4.60	11.80
	04/27/2006		5.30	11.10
	05/18/2006		5.85	10.55
	06/22/2006		6.16	10.24
	07/20/2006		6.08	10.32
	08/17/2006		5.97	10.43

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-29	09/14/2006	16.40	6.11	10.29
	10/19/2006		6.11	10.29
	11/21/2006		6.29	10.11
	12/21/2006		5.72	10.68
	01/18/2007		6.22	10.18
	02/06/2007		6.42	9.98
	03/08/2007		5.73	10.67
	04/12/2007		6.24	10.16
	05/10/2007		6.05	10.35
	06/07/2007		6.34	10.06
	07/19/2007		6.28	10.12
	08/09/2007		6.44	9.96
	09/14/2007		6.50	9.90
	10/12/2007		5.88	10.52
	11/09/2007		6.15	10.25
	12/14/2007		5.95	10.45
	01/17/2008		5.55	10.85
	02/21/2008		8.45	7.95
	03/20/2008		6.15	10.25
	04/10/2008		6.44	9.96
	05/08/2008		6.49	9.91
	06/12/2008		6.25	10.15
	07/24/2008		6.55	9.85
	08/14/2008		6.46	9.94
	09/18/2008		6.37	10.03
	10/22/2008		6.66	9.74
	11/13/2008		6.24	10.16
	12/04/2008		6.37	10.03
	01/08/2009		5.98	10.42
	02/11/2009		5.87	10.53
	03/12/2009		4.89	11.51
	04/09/2009		5.54	10.86
	05/20/2009		5.71	10.69
	06/17/2009		5.95	10.45
	07/16/2009		5.88	10.52
	08/13/2009		5.79	10.61
	09/10/2009		6.13	10.27
	10/16/2009		5.28	11.10
	11/12/2009		5.76	10.64
	12/03/2009		5.98	10.42
	01/14/2010		5.88	10.52
	02/18/2010		5.11	11.29
	03/25/2010		5.30	11.10
	04/23/2010		5.27	11.13
	05/21/2010		5.66	10.74

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-29	06/10/2010	16.40	5.86	10.54
	07/23/2010		5.77	10.63
	08/12/2010		5.98	10.42
	09/10/2010		6.01	10.39
	10/15/2010		6.26	10.13
	11/04/2010		6.03	10.37
	12/03/2010		5.75	10.65
	01/28/2011		5.58	10.82
	02/10/2011		5.72	10.68
	03/31/2011		4.44	11.96
	04/19/2011		5.38	11.02
	03/20/2012		5.97	10.43
	04/16/2012		NM	NM
	05/14/2012		6.00	10.40
	06/11/2012		6.30	10.10
	07/18/2012		6.33	10.07
	08/15/2012		6.19	10.21
	09/13/2012		6.12	10.28
	10/17/2012		6.46	9.94
	11/16/2012		6.10	10.30
	12/14/2012		5.16	11.24
	01/18/2013		5.70	10.70
	02/22/2013		6.08	10.32
	03/21/2013		6.05	10.35
	04/19/2013		5.69	10.71
	07/16/2013		6.43	9.97
	10/07/2013		6.87	9.53
	01/03/2014		6.52	9.88
	04/22/2014		NM	NM
	07/08/2014		6.83	9.57
	10/28/2014		6.95	9.45
LF-3	06/14/1989	14.70	4.95	9.73
	01/10/1990 (a)		4.60	10.08
	01/18/1990 (b)		3.87	10.81
	01/18/1990 (c)		3.92	10.76
	01/30/1991		5.11	9.57
	06/19/1991		5.10	9.58
	12/16/1991		5.19	9.49
	07/10/1992		5.09	9.59
	12/30/1992		4.08	10.60
	06/08/1993		4.79	9.89
	01/05/1994		5.09	9.59
	09/08/1994		5.70	8.98
	03/29/1995		NM	NM
	04/24/1996		4.87	9.83

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-3	07/29/1996	14.70	5.57	9.13
	12/13/1996		4.89	9.81
	04/15/1997		5.78	8.92
	09/19/1997		5.71	8.99
	12/03/1997		5.18	9.52
	12/15/1997		4.61	10.09
	01/13/1998		3.62	11.08
	01/30/1998		4.18	10.52
	02/24/1998		3.65	11.05
	04/06/1998		5.05	9.65
	07/02/1998		5.85	8.85
	07/13/1998		5.89	8.81
	09/28/1998		6.06	8.64
	10/16/1998		6.07	8.63
	01/08/1999		5.63	9.07
	04/16/1999		4.41	10.29
	06/21/1999		6.03	8.67
	07/12/1999		6.06	8.64
	10/08/1999		5.91	8.79
	01/17/2000		5.67	9.03
	04/25/2000		4.95	9.75
	05/30/2000		5.48	9.22
	06/26/2000		NM	NM
	08/10/2000		6.00	8.70
	10/06/2000		5.85	8.85
	01/15/2001		4.34	10.36
	04/19/2001		5.21	9.49
	07/02/2001		5.65	9.05
	09/07/2001		NM	NM
	10/18/2001		5.50	9.20
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.73	9.97
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		5.37	9.33
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		5.54	9.16
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		5.59	9.11
	01/13/2003		4.02	10.68
	02/26/2003		NM	NM
	03/19/2003		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-3	04/14/2003	14.70	4.08	10.62
	07/07/2003		5.53	9.17
	10/27/2003		NM	NM
	11/18/2003		5.19	9.51
	01/15/2004		4.60	10.10
	04/21/2004		5.20	9.50
	07/13/2004		5.60	9.10
	10/12/2004		5.57	9.13
	01/24/2005		4.65	10.05
	04/25/2005		5.00	9.70
	07/20/2005		5.44	9.26
	10/21/2005		5.68	9.02
	01/20/2006		3.60	11.10
	04/27/2006		4.62	10.08
	07/20/2006		5.40	9.30
	10/19/2006		5.41	9.29
	01/18/2007		5.02	9.68
	04/12/2007		5.18	9.52
	07/19/2007		5.45	9.25
	08/17/2007		5.48	9.22
	08/24/2007		5.54	9.16
	08/30/2007		5.55	9.15
	09/06/2007		5.54	9.16
	09/14/2007		5.44	9.26
	09/21/2007		5.32	9.38
	09/28/2007		5.30	9.40
	10/05/2007		5.36	9.34
	10/12/2007		4.20	10.50
	10/19/2007		4.21	10.49
	10/26/2007		4.67	10.03
	11/02/2007		4.91	9.79
	11/09/2007		5.08	9.62
	11/15/2007		4.21	10.49
	11/21/2007		4.71	9.99
	11/29/2007		5.01	9.69
	01/17/2008		4.16	10.54
	04/10/2008		5.35	9.35
	07/24/2008		5.96	8.74
	10/22/2008		5.56	9.14
	01/08/2009		4.44	10.26
	04/09/2009		4.70	10.00
	07/16/2009		5.45	9.25
	10/16/2009		3.40	11.28
	01/14/2010		4.58	10.12
	04/23/2010		3.88	10.82

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-3	07/23/2010	14.70	5.39	9.31
	10/15/2010		5.55	9.14
	01/28/2011		4.71	9.99
	04/19/2011		4.54	10.16
LF-30	12/29/1997	15.86	10.43	5.43
	01/30/1998		9.24	6.62
	02/24/1998		9.05	6.81
	04/06/1998		6.14	9.72
	07/02/1998		10.29	5.57
	07/13/1998		10.21	5.65
	09/28/1998		10.23	5.63
	10/16/1998		10.21	5.65
	01/08/1999		10.66	5.20
	04/16/1999		10.25	5.61
	06/21/1999		10.81	5.05
	07/12/1999		10.58	5.28
	10/08/1999		11.08	4.78
	01/17/2000		10.77	5.09
	04/25/2000		10.72	5.14
	05/30/2000		11.00	4.86
	06/26/2000		NM	NM
	08/10/2000		10.94	4.92
	10/06/2000		10.85	5.01
	01/15/2001		10.38	5.48
	04/19/2001		10.81	5.05
	07/02/2001		11.75	4.11
	09/07/2001		NM	NM
	10/18/2001		11.02	4.84
	11/02/2001		NM	NM
	12/14/2001		10.08	5.78
	01/18/2002		10.55	5.31
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		10.88	4.98
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		10.87	4.99
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		10.25	5.61
	01/13/2003		10.37	5.49
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		10.59	5.27
	07/07/2003		11.31	4.55

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-30	10/27/2003	15.86	NM	NM
	11/18/2003		11.01	4.85
	01/15/2004		10.20	5.66
	04/21/2004		10.75	5.11
	07/13/2004		10.12	5.74
	10/12/2004		10.58	5.28
	01/24/2005		10.31	5.55
	04/25/2005		10.40	5.46
	06/21/2005		10.60	5.26
	07/20/2005		10.26	5.60
	10/21/2005		10.93	4.93
	01/20/2006		10.12	5.74
	04/27/2006		10.05	5.81
	07/20/2006		10.29	5.57
	10/19/2006		9.82	6.04
	01/18/2007		10.94	4.92
	04/12/2007		10.49	5.37
	07/19/2007		10.60	5.26
	10/12/2007		10.50	5.36
	01/17/2008		10.21	5.65
	04/10/2008		10.97	4.89
	07/24/2008		10.48	5.38
	10/22/2008		10.79	5.07
	01/08/2009		10.77	5.09
	04/09/2009		10.57	5.29
	07/16/2009		10.35	5.51
	10/16/2009		9.35	6.49
	01/14/2010		10.50	5.36
	04/23/2010		10.02	5.84
	07/23/2010		10.33	5.53
	10/15/2010		10.60	5.25
	01/28/2011		10.50	5.36
	04/19/2011		10.38	5.48
	03/20/2012		9.44	6.42
LF-31	06/21/1999	18.40	9.06	9.34
	07/12/1999		9.26	9.14
	10/08/1999		9.40	9.00
LF-32	06/21/1999	18.73	9.42	9.31
	07/12/1999		9.62	9.11
	10/08/1999		9.78	8.95
LF-33	06/21/1999	18.55	9.28	9.27
	07/12/1999		9.51	9.04
	10/08/1999		9.67	8.88
LF-34	06/21/1999	18.96	9.74	9.22

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-34	07/12/1999	18.96	9.91	9.05
	10/08/1999		10.08	8.88
LF-35	10/08/1999	18.93	10.05	8.88
	02/11/2000		9.62	9.31
	04/25/2000		9.07	9.86
	05/30/2000		9.45	9.48
	06/26/2000		NM	NM
	08/10/2000		10.01	8.92
	08/31/2000		9.65	9.28
	09/25/2000		9.71	9.22
	10/06/2000		9.85	9.08
	11/21/2000		9.66	9.27
	12/18/2000		9.52	9.41
	01/15/2001		9.38	9.55
	02/14/2001		8.81	10.12
	03/01/2001		8.25	10.68
	04/19/2001		9.31	9.62
	05/23/2001		9.76	9.17
	06/14/2001		9.75	9.18
	07/02/2001		9.79	9.14
	08/10/2001		9.56	9.37
	09/07/2001		9.28	9.65
	10/18/2001		9.84	9.09
	11/02/2001		9.70	9.23
	12/14/2001		8.75	10.18
	01/18/2002		8.58	10.35
	02/21/2002		8.71	10.22
	03/25/2002		8.86	10.07
	04/18/2002		9.31	9.62
	05/10/2002		9.55	9.38
	06/04/2002		9.31	9.62
	07/10/2002		9.55	9.38
	08/15/2002		9.62	9.31
	09/11/2002		9.31	9.62
	10/08/2002		9.39	9.54
	11/07/2002		9.44	9.49
	12/12/2002		9.40	9.53
	01/13/2003		7.85	11.08
	02/26/2003		6.85	12.08
	03/19/2003		8.63	10.30
	04/14/2003		8.78	10.15
	05/13/2003		8.94	9.99
	06/13/2003		9.11	9.82
	07/07/2003		8.21	10.72
	08/13/2003		9.27	9.66

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-35	09/17/2003	18.93	9.31	9.62
	10/27/2003		9.40	9.53
	11/18/2003		9.30	9.63
	12/19/2003		8.67	10.26
	01/15/2004		8.80	10.13
	02/17/2004		8.51	10.42
	03/18/2004		8.89	10.04
	04/21/2004		9.15	9.78
	05/18/2004		9.45	9.48
	06/10/2004		9.32	9.61
	07/13/2004		9.35	9.58
	08/12/2004		9.30	9.63
	09/16/2004		9.46	9.47
	10/12/2004		9.35	9.58
	11/17/2004		9.00	9.93
	12/15/2004		8.72	10.21
	01/24/2005		8.51	10.42
	02/15/2005		8.89	10.04
	03/15/2005		8.81	10.12
	04/25/2005		8.59	10.34
	05/20/2005		8.70	10.23
	06/21/2005		8.93	10.00
	07/20/2005		9.43	9.50
	08/19/2005		9.54	9.39
	09/16/2005		9.56	9.37
	10/21/2005		9.69	9.24
	01/20/2006		8.50	10.43
	02/22/2006		8.35	10.58
	03/30/2006		7.80	11.13
	04/27/2006		8.95	9.98
	05/18/2006		8.35	10.58
	06/22/2006		8.65	10.28
	07/20/2006		8.68	10.25
	08/17/2006		8.73	10.20
	09/14/2006		8.78	10.15
	10/19/2006		8.70	10.23
	11/21/2006		8.74	10.19
	12/21/2006		8.24	10.69
	01/18/2007		8.48	10.45
	02/06/2007		8.79	10.14
	03/08/2007		8.20	10.73
	04/12/2007		8.62	10.31
	05/10/2007		8.60	10.33
	06/07/2007		8.85	10.08
	07/19/2007		8.91	10.02

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-35	08/09/2007	18.93	8.92	10.01
	09/14/2007		8.82	10.11
	10/12/2007		8.52	10.41
	11/09/2007		8.48	10.45
	12/14/2007		8.46	10.47
	01/17/2008		8.20	10.73
	02/21/2008		7.95	10.98
	03/20/2008		8.70	10.23
	04/10/2008		9.12	9.81
	05/08/2008		9.18	9.75
	06/12/2008		9.01	9.92
	07/24/2008		9.13	9.80
	08/14/2008		9.14	9.79
	09/18/2008		8.94	9.99
	10/22/2008		9.21	9.72
	11/13/2008		8.77	10.16
	12/04/2008		8.80	10.13
	01/08/2009		8.50	10.43
	02/11/2009		8.45	10.48
	03/12/2009		7.35	11.58
	04/09/2009		8.16	10.77
	05/20/2009		8.32	10.61
	06/17/2009		8.51	10.42
	07/16/2009		8.63	10.30
	08/13/2009		8.52	10.41
	09/10/2009		8.70	10.23
	10/16/2009		7.95	10.96
	11/12/2009		8.34	10.59
	12/03/2009		8.50	10.43
	01/14/2010		8.48	10.45
	02/18/2010		7.66	11.27
	03/25/2010		7.89	11.04
	04/23/2010		7.76	11.17
	05/21/2010		8.31	10.62
	06/10/2010		8.53	10.40
	07/23/2010		8.47	10.46
	08/12/2010		8.60	10.33
	09/10/2010		8.71	10.22
	10/15/2010		8.94	9.98
	11/04/2010		8.60	10.33
	12/03/2010		8.40	10.53
	01/28/2011		8.15	10.78
	02/10/2011		8.29	10.64
	03/31/2011		6.89	12.04
	04/19/2011		7.94	10.99

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-35	03/20/2012	18.93	8.48	10.45
	04/16/2012		7.51	11.42
	05/14/2012		8.39	10.54
	06/11/2012		8.68	10.25
	07/18/2012		8.75	10.18
	08/15/2012		8.76	10.17
	09/13/2012		8.74	10.19
	10/17/2012		8.87	10.06
	11/16/2012		8.50	10.43
	12/14/2012		7.67	11.26
	01/18/2013		8.18	10.75
	02/22/2013		8.57	10.36
	03/21/2013		8.51	10.42
	04/19/2013		8.29	10.64
	07/16/2013		8.94	9.99
	10/07/2013		9.31	9.62
	01/03/2014		9.21	9.72
	04/22/2014		8.70	10.23
	07/08/2014		9.07	9.86
	10/28/2014		9.41	9.52
LF-36	01/17/2000	18.87	9.76	9.11
	04/25/2000		9.15	9.72
	05/30/2000		9.47	9.40
	06/26/2000		9.73	9.14
	08/10/2000		9.97	8.90
	08/31/2000		9.41	9.46
	09/25/2000		9.63	9.24
	10/06/2000		9.67	9.20
	11/21/2000		9.76	9.11
	12/18/2000		9.51	9.36
	01/15/2001		9.35	9.52
	02/14/2001		8.81	10.06
	03/01/2001		8.24	10.63
	04/19/2001		9.21	9.66
	05/23/2001		9.50	9.37
	06/14/2001		9.65	9.22
	07/02/2001		9.67	9.20
	08/10/2001		9.41	9.46
	09/07/2001		9.52	9.35
	10/18/2001		9.69	9.18
	11/02/2001		9.70	9.17
	12/14/2001		8.20	10.67
	01/18/2002		8.35	10.52
	02/21/2002		8.65	10.22
	03/25/2002		7.71	11.16

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-36	04/18/2002	18.87	9.19	9.68
	05/10/2002		NM	NM
	06/04/2002		8.19	10.68
	07/10/2002		9.50	9.37
	08/15/2002		9.43	9.44
	09/11/2002		9.31	9.56
	10/08/2002		9.35	9.52
	11/07/2002		NM	NM
	12/12/2002		9.25	9.62
	01/13/2003		7.75	11.12
	02/26/2003		7.78	11.09
	03/19/2003		NM	NM
	04/14/2003		8.35	10.52
	05/13/2003		8.64	10.23
	06/13/2003		8.84	10.03
	07/07/2003		8.98	9.89
	08/13/2003		9.11	9.76
	09/17/2003		9.18	9.69
	10/27/2003		9.38	9.49
	11/18/2003		9.21	9.66
	12/19/2003		8.54	10.33
	01/15/2004		8.32	10.55
	02/17/2004		8.25	10.62
	03/18/2004		8.70	10.17
	04/21/2004		9.12	9.75
	05/18/2004		9.20	9.67
	06/10/2004		9.10	9.77
	07/13/2004		9.14	9.73
	08/12/2004		9.18	9.69
	09/16/2004		9.35	9.52
	10/12/2004		9.29	9.58
	11/17/2004		8.89	9.98
	12/15/2004		8.49	10.38
	01/24/2005		8.34	10.53
	02/15/2005		8.67	10.20
	03/15/2005		8.38	10.49
	04/25/2005		8.37	10.50
	05/20/2005		8.55	10.32
	06/21/2005		8.87	10.00
	07/20/2005		9.23	9.64
	08/19/2005		9.44	9.43
	09/16/2005		9.46	9.41
	10/21/2005		9.63	9.24
	11/18/2005		9.44	9.43
	12/16/2005		9.08	9.79

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-36	01/20/2006	18.87	8.05	10.82
	02/22/2006		7.72	11.15
	03/30/2006		6.94	11.93
	04/27/2006		7.60	11.27
	05/18/2006		8.22	10.65
	06/22/2006		8.53	10.34
	07/20/2006		8.49	10.38
	08/17/2006		8.39	10.48
	09/14/2006		8.51	10.36
	10/19/2006		8.51	10.36
	11/21/2006		8.65	10.22
	12/21/2006		8.00	10.87
	01/18/2007		8.55	10.32
	02/06/2007		8.79	10.08
	03/08/2007		8.11	10.76
	04/12/2007		8.56	10.31
	05/10/2007		8.39	10.48
	06/07/2007		8.76	10.11
	07/19/2007		8.70	10.17
	08/09/2007		8.69	10.18
	09/14/2007		8.62	10.25
	10/12/2007		8.32	10.55
	11/09/2007		8.43	10.44
	12/14/2007		8.26	10.61
	01/17/2008		7.97	10.90
	02/21/2008		7.82	11.05
	03/20/2008		8.58	10.29
	04/10/2008		8.93	9.94
	05/08/2008		8.92	9.95
	06/12/2008		8.75	10.12
	07/24/2008		8.98	9.89
	08/14/2008		8.91	9.96
	09/18/2008		8.77	10.10
	10/22/2008		9.05	9.82
	11/13/2008		8.64	10.23
	12/04/2008		8.75	10.12
	01/08/2009		8.37	10.50
	02/11/2009		8.21	10.66
	03/12/2009		7.15	11.72
	04/09/2009		7.95	10.92
	05/20/2009		8.13	10.74
	06/17/2009		8.34	10.53
	07/16/2009		8.37	10.50
	08/13/2009		8.25	10.62
	09/10/2009		8.54	10.33

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-36	10/16/2009	18.87	7.78	11.07
	11/12/2009		8.19	10.68
	12/03/2009		8.34	10.53
	01/14/2010		8.23	10.64
	02/18/2010		7.49	11.38
	03/25/2010		7.64	11.23
	04/23/2010		7.59	11.28
	05/21/2010		8.06	10.81
	06/10/2010		8.31	10.56
	07/23/2010		8.21	10.66
	08/12/2010		8.38	10.49
	09/10/2010		8.43	10.44
	10/15/2010		8.70	10.16
	11/04/2010		8.42	10.45
	12/03/2010		8.16	10.71
	01/28/2011		7.90	10.97
	02/10/2011		8.10	10.77
	03/31/2011		6.66	12.21
	04/19/2011		7.74	11.13
	06/27/2011		8.20	10.67
	07/21/2011		8.23	10.64
	08/22/2011		9.28	9.59
	09/23/2011		11.44	7.43
	09/30/2011		11.80	7.07
	10/05/2011		11.92	6.95
	10/12/2011		12.07	6.80
	10/19/2011		12.30	6.57
	10/26/2011		12.37	6.50
	11/02/2011		12.44	6.43
	11/09/2011		11.93	6.94
	11/16/2011		11.64	7.23
	11/23/2011		11.33	7.54
	11/30/2011		11.17	7.70
	12/06/2011		11.06	7.81
	01/27/2012		9.80	9.07
	02/23/2012		9.45	9.42
	03/20/2012		8.31	10.56
	04/16/2012		7.12	11.75
	05/14/2012		8.35	10.52
	06/11/2012		8.63	10.24
	07/18/2012		8.73	10.14
	08/15/2012		8.63	10.24
	09/13/2012		8.61	10.26
	10/17/2012		8.79	10.08
	11/16/2012		8.44	10.43

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-36	12/14/2012	18.87	7.49	11.38
	01/18/2013		8.04	10.83
	02/22/2013		8.43	10.44
	03/21/2013		8.40	10.47
	04/19/2013		8.07	10.80
	07/16/2013		8.79	10.08
	10/07/2013		9.25	9.62
	01/03/2014		9.05	9.82
	04/22/2014		8.46	10.41
	07/08/2014		9.17	9.70
	10/28/2014		9.35	9.52
LF-37	01/17/2000	18.54	9.38	9.16
	04/25/2000		8.80	9.74
	05/30/2000		9.21	9.33
	06/26/2000		9.84	8.70
	08/10/2000		9.76	8.78
	08/31/2000		9.14	9.40
	09/25/2000		9.35	9.19
	10/06/2000		9.45	9.09
	11/21/2000		9.48	9.06
	12/18/2000		9.20	9.34
	01/15/2001		9.09	9.45
	02/14/2001		8.50	10.04
	03/01/2001		7.95	10.59
	04/19/2001		8.94	9.60
	05/23/2001		9.27	9.27
	06/14/2001		9.43	9.11
	07/02/2001		9.41	9.13
	08/10/2001		9.21	9.33
	09/07/2001		9.29	9.25
	10/18/2001		9.47	9.07
	11/02/2001		9.45	9.09
	12/14/2001		8.24	10.30
	01/18/2002		7.96	10.58
	02/21/2002		8.32	10.22
	03/25/2002		7.44	11.10
	04/18/2002		8.93	9.61
	05/10/2002		9.22	9.32
	06/04/2002		8.86	9.68
	07/10/2002		9.22	9.32
	08/15/2002		9.11	9.43
	09/11/2002		8.86	9.68
	10/08/2002		9.01	9.53
	11/07/2002		9.17	9.37
	12/12/2002		8.95	9.59

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-37	01/13/2003	18.54	8.11	10.43
	02/26/2003		7.47	11.07
	03/19/2003		8.32	10.22
	04/14/2003		8.30	10.24
	05/13/2003		8.41	10.13
	06/13/2003		8.64	9.90
	07/07/2003		8.70	9.84
	08/13/2003		8.87	9.67
	09/17/2003		8.89	9.65
	10/27/2003		NM	NM
	11/18/2003		8.95	9.59
	12/19/2003		8.25	10.29
	01/15/2004		8.03	10.51
	02/17/2004		8.06	10.48
	03/18/2004		8.38	10.16
	04/21/2004		8.90	9.64
	05/18/2004		8.54	10.00
	06/10/2004		8.86	9.68
	07/13/2004		8.88	9.66
	08/12/2004		8.95	9.59
	09/16/2004		9.10	9.44
	10/12/2004		8.99	9.55
	11/17/2004		8.65	9.89
	12/15/2004		8.27	10.27
	01/24/2005		8.05	10.49
	02/15/2005		8.40	10.14
	03/15/2005		8.16	10.38
	04/25/2005		8.19	10.35
	05/20/2005		8.30	10.24
	06/21/2005		8.62	9.92
	07/20/2005		9.01	9.53
	08/19/2005		9.24	9.30
	09/16/2005		9.24	9.30
	10/21/2005		9.39	9.15
	11/18/2005		9.21	9.33
	12/16/2005		8.84	9.70
	01/20/2006		7.70	10.84
	02/22/2006		7.60	10.94
	03/30/2006		6.60	11.94
	04/27/2006		7.26	11.28
	05/18/2006		7.93	10.61
	06/22/2006		8.26	10.28
	07/20/2006		8.24	10.30
	08/17/2006		8.19	10.35
	09/14/2006		8.26	10.28

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-37	10/19/2006	18.54	8.24	10.30
	11/21/2006		8.42	10.12
	12/21/2006		7.67	10.87
	01/18/2007		8.13	10.41
	02/06/2007		8.42	10.12
	03/08/2007		7.84	10.70
	04/12/2007		8.26	10.28
	05/10/2007		8.15	10.39
	06/07/2007		8.54	10.00
	07/19/2007		8.43	10.11
	08/09/2007		8.42	10.12
	09/14/2007		8.28	10.26
	10/12/2007		8.02	10.52
	11/09/2007		8.07	10.47
	12/14/2007		7.93	10.61
	01/17/2008		7.67	10.87
	02/21/2008		7.50	11.04
	03/20/2008		8.31	10.23
	04/10/2008		8.77	9.77
	05/08/2008		8.73	9.81
	06/12/2008		8.51	10.03
	07/24/2008		8.79	9.75
	08/14/2008		8.69	9.85
	09/18/2008		8.47	10.07
	10/22/2008		8.82	9.72
	11/13/2008		8.41	10.13
	12/04/2008		8.49	10.05
	01/08/2009		8.13	10.41
	02/11/2009		7.94	10.60
	03/12/2009		6.74	11.80
	04/09/2009		7.70	10.84
	05/20/2009		7.86	10.68
	06/17/2009		8.06	10.48
	07/16/2009		8.14	10.40
	08/13/2009		8.01	10.53
	09/10/2009		8.30	10.24
	10/16/2009		7.47	11.05
	11/12/2009		7.87	10.67
	12/03/2009		8.05	10.49
	01/14/2010		7.99	10.55
	02/18/2010		7.13	11.41
	03/25/2010		7.35	11.19
	04/23/2010		7.26	11.28
	05/21/2010		7.80	10.74
	06/10/2010		8.08	10.46

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-37	07/23/2010	18.54	7.95	10.59
	08/12/2010		8.10	10.44
	09/10/2010		8.19	10.35
	10/15/2010		8.45	10.08
	11/04/2010		8.16	10.38
	12/03/2010		7.91	10.63
	01/28/2011		7.54	11.00
	02/10/2011		7.73	10.81
	03/31/2011		6.28	12.26
	04/19/2011		7.41	11.13
	03/20/2012		8.02	10.52
	04/16/2012		6.81	11.73
	05/14/2012		8.00	10.54
	06/11/2012		8.29	10.25
	07/18/2012		8.39	10.15
	08/15/2012		8.31	10.23
	09/13/2012		8.33	10.21
	10/17/2012		8.50	10.04
	11/16/2012		8.14	10.40
	12/14/2012		7.13	11.41
	01/18/2013		7.70	10.84
	02/22/2013		8.10	10.44
	03/21/2013		8.11	10.43
	04/19/2013		7.80	10.74
	07/16/2013		8.48	10.06
	10/07/2013		8.96	9.58
	01/03/2014		8.73	9.81
	04/22/2014		8.14	10.40
	07/08/2014		8.87	9.67
	10/28/2014		9.05	9.49
LF-38	01/17/2000	18.51	9.44	9.07
	04/25/2000		8.74	9.77
	05/30/2000		9.46	9.05
	06/26/2000		9.78	8.73
	08/10/2000		9.82	8.69
	08/31/2000		9.28	9.23
	09/25/2000		9.30	9.21
	10/06/2000		10.17	8.34
	11/21/2000		9.41	9.10
	12/18/2000		9.11	9.40
	01/15/2001		9.11	9.40
	02/14/2001		8.66	9.85
	03/01/2001		7.98	10.53
	04/19/2001		8.92	9.59
	05/23/2001		9.26	9.25

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-38	06/14/2001	18.51	9.29	9.22
	07/02/2001		9.28	9.23
	08/10/2001		9.07	9.44
	09/07/2001		9.13	9.38
	10/18/2001		9.86	8.65
	11/02/2001		9.33	9.18
	12/14/2001		8.02	10.49
	01/18/2002		7.96	10.55
	02/21/2002		8.28	10.23
	03/25/2002		7.39	11.12
	04/18/2002		8.84	9.67
	05/10/2002		9.09	9.42
	06/04/2002		9.06	9.45
	07/10/2002		9.50	9.01
	08/15/2002		9.04	9.47
	09/11/2002		8.65	9.86
	10/08/2002		8.91	9.60
	11/07/2002		9.05	9.46
	12/12/2002		8.78	9.73
	01/13/2003		7.46	11.05
	02/26/2003		7.51	11.00
	03/19/2003		8.22	10.29
	04/14/2003		8.30	10.21
	05/13/2003		8.42	10.09
	06/13/2003		8.60	9.91
	07/07/2003		8.63	9.88
	08/13/2003		8.77	9.74
	09/17/2003		8.80	9.71
	10/27/2003		NM	NM
	11/18/2003		8.88	9.63
	12/19/2003		8.30	10.21
	01/15/2004		8.10	10.41
	02/17/2004		8.05	10.46
	03/18/2004		8.35	10.16
	04/21/2004		8.69	9.82
	05/18/2004		8.55	9.96
	06/10/2004		8.94	9.57
	07/13/2004		8.88	9.63
	08/12/2004		8.85	9.66
	09/16/2004		9.00	9.51
	10/12/2004		8.91	9.60
	11/17/2004		8.60	9.91
	12/15/2004		8.49	10.02
	01/24/2005		7.98	10.53
	02/15/2005		8.40	10.11

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-38	03/15/2005	18.51	7.27	11.24
	04/25/2005		8.16	10.35
	05/20/2005		8.24	10.27
	06/21/2005		8.45	10.06
	07/20/2005		8.90	9.61
	08/19/2005		9.04	9.47
	09/16/2005		9.14	9.37
	10/21/2005		9.26	9.25
	11/18/2005		9.11	9.40
	12/16/2005		8.89	9.62
	01/20/2006		7.70	10.81
	02/22/2006		7.70	10.81
	03/30/2006		7.21	11.30
	04/27/2006		7.31	11.20
	05/18/2006		7.80	10.71
	06/22/2006		8.10	10.41
	07/20/2006		8.18	10.33
	08/17/2006		8.17	10.34
	09/14/2006		8.18	10.33
	10/19/2006		8.12	10.39
	11/21/2006		8.22	10.29
	12/21/2006		7.68	10.83
	01/18/2007		7.99	10.52
	02/06/2007		8.30	10.21
	03/08/2007		7.85	10.66
	04/12/2007		8.12	10.39
	05/10/2007		8.19	10.32
	06/07/2007		8.42	10.09
	07/19/2007		8.41	10.10
	08/09/2007		8.41	10.10
	09/14/2007		8.32	10.19
	10/12/2007		7.93	10.58
	11/09/2007		7.91	10.60
	12/14/2007		7.67	10.84
	01/17/2008		7.76	10.75
	02/21/2008		7.45	11.06
	03/20/2008		8.25	10.26
	04/10/2008		8.66	9.85
	05/08/2008		8.67	9.84
	06/12/2008		8.43	10.08
	07/24/2008		8.68	9.83
	08/14/2008		8.59	9.92
	09/18/2008		8.41	10.10
	10/22/2008		8.70	9.81
	11/13/2008		8.41	10.10

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-38	12/04/2008	18.51	8.44	10.07
	01/08/2009		8.06	10.45
	02/11/2009		8.07	10.44
	03/12/2009		6.89	11.62
	04/09/2009		7.59	10.92
	05/20/2009		7.84	10.67
	06/17/2009		7.98	10.53
	07/16/2009		8.10	10.41
	08/13/2009		8.09	10.42
	09/10/2009		8.16	10.35
	10/16/2009		7.45	11.04
	11/12/2009		7.81	10.70
	12/03/2009		7.99	10.52
	01/14/2010		7.99	10.52
	02/18/2010		7.47	11.04
	03/25/2010		7.30	11.21
	04/23/2010		7.27	11.24
	05/21/2010		7.75	10.76
	06/10/2010		8.00	10.51
	07/23/2010		7.89	10.62
	08/12/2010		8.04	10.47
	09/10/2010		8.12	10.39
	10/15/2010		8.39	10.11
	11/04/2010		8.09	10.42
	12/03/2010		7.88	10.63
	01/28/2011		7.48	11.03
	02/10/2011		7.67	10.84
	03/31/2011		6.43	12.08
	04/19/2011		7.21	11.30
	03/20/2012		8.05	10.46
	04/16/2012		6.85	11.66
	05/14/2012		7.94	10.57
	06/11/2012		8.25	10.26
	07/18/2012		8.32	10.19
	08/15/2012		8.25	10.26
	09/13/2012		8.26	10.25
	10/17/2012		8.42	10.09
	11/16/2012		8.05	10.46
	12/14/2012		7.13	11.38
	01/18/2013		7.65	10.86
	02/22/2013		8.06	10.45
	03/21/2013		8.08	10.43
	04/19/2013		7.75	10.76
	07/16/2013		8.42	10.09
	10/07/2013		8.90	9.61

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-38	01/03/2014	18.51	8.76	9.75
	04/22/2014		8.11	10.40
	07/08/2014		8.82	9.69
	10/28/2014		9.01	9.50
LF-39	01/17/2000	18.97	9.75	9.22
	04/25/2000		9.12	9.85
	05/30/2000		9.50	9.47
	06/26/2000		9.78	9.19
	08/10/2000		10.04	8.93
	08/31/2000		9.48	9.49
	09/25/2000		9.74	9.23
	10/06/2000		9.83	9.14
	11/21/2000		9.75	9.22
	12/18/2000		9.46	9.51
	01/15/2001		9.39	9.58
	02/14/2001		8.81	10.16
	03/01/2001		8.31	10.66
	04/19/2001		9.26	9.71
	05/23/2001		9.69	9.28
	06/14/2001		9.73	9.24
	07/02/2001		9.75	9.22
	08/10/2001		9.34	9.63
	09/07/2001		9.44	9.53
	10/18/2001		9.75	9.22
	11/02/2001		9.70	9.27
	12/14/2001		8.35	10.62
	01/18/2002		8.46	10.51
	02/21/2002		8.74	10.23
	03/25/2002		7.83	11.14
	04/18/2002		9.30	9.67
	05/10/2002		9.56	9.41
	06/04/2002		9.15	9.82
	07/10/2002		9.52	9.45
	08/15/2002		9.48	9.49
	09/11/2002		9.24	9.73
	10/08/2002		9.34	9.63
	11/07/2002		9.36	9.61
	12/12/2002		9.30	9.67
	01/13/2003		7.89	11.08
	02/26/2003		8.01	10.96
	03/19/2003		8.75	10.22
	04/14/2003		8.63	10.34
	05/13/2003		8.76	10.21
	06/13/2003		9.05	9.92
	07/07/2003		9.01	9.96

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-39	08/13/2003	18.97	9.24	9.73
	09/17/2003		9.27	9.70
	10/27/2003		9.47	9.50
	11/18/2003		9.27	9.70
	12/19/2003		8.63	10.34
	01/15/2004		8.45	10.52
	02/17/2004		8.35	10.62
	03/18/2004		8.83	10.14
	04/21/2004		9.24	9.73
	05/18/2004		9.30	9.67
	06/10/2004		9.21	9.76
	07/13/2004		9.23	9.74
	08/12/2004		9.30	9.67
	09/16/2004		9.45	9.52
	10/12/2004		9.34	9.63
	11/17/2004		8.96	10.01
	12/15/2004		8.60	10.37
	01/24/2005		8.46	10.51
	02/15/2005		8.78	10.19
	03/15/2005		8.53	10.44
	04/25/2005		8.53	10.44
	05/20/2005		8.56	10.41
	06/21/2005		9.00	9.97
	07/20/2005		9.38	9.59
	08/19/2005		9.55	9.42
	09/16/2005		9.58	9.39
	10/21/2005		9.71	9.26
	11/18/2005		9.52	9.45
	12/16/2005		9.17	9.80
	01/20/2006		8.10	10.87
	02/22/2006		8.02	10.95
	03/30/2006		7.15	11.82
	04/27/2006		7.77	11.20
	05/18/2006		8.37	10.60
	06/22/2006		8.70	10.27
	07/20/2006		8.66	10.31
	08/17/2006		8.57	10.40
	09/14/2006		8.67	10.30
	10/19/2006		8.68	10.29
	11/21/2006		8.77	10.20
	12/21/2006		8.07	10.90
	01/18/2007		8.65	10.32
	02/06/2007		8.92	10.05
	03/08/2007		8.27	10.70
	04/12/2007		8.71	10.26

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-39	05/10/2007	18.97	8.53	10.44
	06/07/2007		8.90	10.07
	07/19/2007		8.85	10.12
	08/09/2007		8.83	10.14
	09/14/2007		8.69	10.28
	10/12/2007		NM	NM
	11/09/2007		NM	NM
	12/14/2007		8.36	10.61
	01/17/2008		8.07	10.90
	02/21/2008		NM	NM
	03/20/2008		NM	NM
	04/10/2008		NM	NM
	05/08/2008		9.10	9.87
	06/12/2008		8.91	10.06
	07/24/2008		NM	NM
	08/14/2008		NM	NM
	09/18/2008		8.89	10.08
	10/22/2008		9.21	9.76
	11/13/2008		8.72	10.25
	12/04/2008		NM	NM
	01/08/2009		8.45	10.52
	02/11/2009		8.31	10.66
	03/12/2009		7.25	11.72
	04/09/2009		8.13	10.84
	05/20/2009		8.32	10.65
	06/17/2009		8.48	10.49
	07/16/2009		8.60	10.37
	08/13/2009		8.42	10.55
	09/10/2009		8.72	10.25
	10/16/2009		7.89	11.06
	11/12/2009		8.29	10.68
	12/03/2009		8.46	10.51
	01/14/2010		8.39	10.58
	02/18/2010		7.58	11.39
	03/25/2010		7.79	11.18
	04/23/2010		7.72	11.25
	05/21/2010		8.24	10.73
	06/10/2010		8.49	10.48
	07/23/2010		8.39	10.58
	08/12/2010		8.51	10.46
	09/10/2010		8.64	10.33
	10/15/2010		8.91	10.05
	11/04/2010		8.55	10.42
	12/03/2010		8.30	10.67
	01/28/2011		8.00	10.97

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-39	02/10/2011	18.97	8.26	10.71
	03/31/2011		6.80	12.17
	04/19/2011		7.93	11.04
	03/20/2012		8.40	10.57
	04/16/2012		7.29	11.68
	05/14/2012		8.40	10.57
	06/11/2012		8.68	10.29
	07/18/2012		8.79	10.18
	08/15/2012		8.72	10.25
	09/13/2012		8.72	10.25
	10/17/2012		8.85	10.12
	11/16/2012		8.52	10.45
	12/14/2012		7.61	11.36
	01/18/2013		8.11	10.86
	02/22/2013		8.51	10.46
	03/21/2013		8.48	10.49
	04/19/2013		8.21	10.76
	07/16/2013		8.92	10.05
	10/07/2013		9.31	9.66
	01/03/2014		9.15	9.82
	04/22/2014		8.55	10.42
	07/08/2014		9.19	9.78
	10/28/2014		9.40	9.57
LF-4	06/14/1989	15.31	7.14	8.61
	01/10/1990 (a)		6.71	9.04
	01/18/1990 (b)		5.64	10.11
	01/18/1990 (c)		5.70	10.05
	01/30/1991		7.23	8.52
	06/19/1991		7.12	8.63
	12/16/1991		7.33	8.42
	07/10/1992		7.21	8.54
	12/30/1992		5.84	9.91
	06/08/1993		6.86	8.89
	01/05/1994		NM	NM
	04/24/1996		6.72	8.51
	07/29/1996		NM	NM
	12/13/1996		5.62	9.61
	04/15/1997		NM	NM
	09/19/1997		6.37	8.86
	12/03/1997		5.64	9.59
	12/15/1997		4.29	10.94
	01/13/1998		4.24	10.99
	01/30/1998		3.33	11.90
	02/24/1998		3.58	11.65
	04/06/1998		5.92	9.31

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-4	07/02/1998	15.31	7.68	7.55
	07/13/1998		7.81	7.50
	09/28/1998		8.38	6.93
	10/16/1998		8.54	6.77
	01/08/1999		6.64	8.67
	04/16/1999		6.20	9.11
	06/21/1999		9.73	5.58
	07/12/1999		9.52	5.79
	10/08/1999		9.79	5.52
	01/17/2000		8.92	6.39
	04/25/2000		5.03	10.28
	05/30/2000		6.00	9.31
	06/26/2000		NM	NM
	08/10/2000		8.41	6.90
	10/06/2000		8.46	6.85
	01/15/2001		6.56	8.75
	04/19/2001		5.42	9.89
	07/02/2001		8.31	7.00
	09/07/2001		NM	NM
	10/18/2001		8.20	7.11
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.83	10.48
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		7.68	7.63
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		7.31	8.00
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		8.15	7.16
	01/13/2003		5.72	9.59
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		7.61	7.70
	07/07/2003		8.80	6.51
	10/27/2003		NM	NM
	11/18/2003		8.32	6.99
	01/15/2004		7.10	8.21
	04/21/2004		8.28	7.03
	07/13/2004		8.99	6.32
	10/12/2004		8.10	7.21
	01/24/2005		6.01	9.30
	04/25/2005		6.98	8.33

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-4	07/20/2005	15.31	9.00	6.31
	10/21/2005		9.42	5.89
	01/23/2006		4.22	11.09
	04/27/2006		6.20	9.11
	07/20/2006		8.79	6.52
	10/19/2006		8.52	6.79
	01/18/2007		7.15	8.16
	04/12/2007		8.33	6.98
	07/19/2007		9.44	5.87
	08/17/2007		8.91	6.40
	08/24/2007		8.69	6.62
	08/30/2007		8.46	6.85
	09/06/2007		8.24	7.07
	09/14/2007		8.13	7.18
	09/21/2007		7.94	7.37
	09/28/2007		7.77	7.54
	10/05/2007		7.62	7.69
	10/12/2007		7.21	8.10
	10/19/2007		NM	NM
	10/26/2007		6.23	9.08
	11/02/2007		6.15	9.16
	11/09/2007		6.10	9.21
	11/15/2007		5.66	9.65
	11/21/2007		5.57	9.74
	11/29/2007		5.56	9.75
	01/17/2008		6.16	9.15
	04/10/2008		9.11	6.20
	07/24/2008		9.47	5.84
	10/22/2008		9.67	5.64
	01/08/2009		7.17	8.14
	04/09/2009		6.61	8.70
	07/16/2009		8.80	6.51
	10/16/2009		6.53	8.76
	01/14/2010		D	NM
	04/23/2010		6.13	9.18
	07/23/2010		8.76	6.55
	10/15/2010		9.31	5.99
	01/28/2011		6.20	9.11
	04/19/2011		5.81	9.50
LF-40	01/17/2000	18.84	9.61	9.23
	04/25/2000		9.00	9.84
	05/30/2000		9.43	9.41
	06/26/2000		9.84	9.00
	08/10/2000		10.02	8.82
	08/31/2000		9.40	9.44

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-40	09/25/2000	18.84	9.67	9.17
	10/06/2000		9.75	9.09
	11/21/2000		9.68	9.16
	12/18/2000		9.39	9.45
	01/15/2001		9.36	9.48
	02/14/2001		8.74	10.10
	03/01/2001		8.25	10.59
	04/19/2001		9.12	9.72
	05/23/2001		9.58	9.26
	06/14/2001		9.70	9.14
	07/02/2001		9.71	9.13
	08/10/2001		9.48	9.36
	09/07/2001		9.49	9.35
	10/18/2001		9.39	9.45
	11/02/2001		9.64	9.20
	12/14/2001		8.26	10.58
	01/18/2002		8.19	10.65
	02/21/2002		8.54	10.30
	03/25/2002		7.73	11.11
	04/18/2002		9.22	9.62
	05/10/2002		9.51	9.33
	06/04/2002		9.25	9.59
	07/10/2002		9.43	9.41
	08/15/2002		9.34	9.50
	09/11/2002		9.05	9.79
	10/08/2002		9.21	9.63
	11/07/2002		9.42	9.42
	12/12/2002		9.21	9.63
	01/13/2003		7.68	11.16
	02/26/2003		7.74	11.10
	03/19/2003		8.57	10.27
	04/14/2003		8.60	10.24
	05/13/2003		8.65	10.19
	06/13/2003		8.91	9.93
	07/07/2003		8.91	9.93
	08/13/2003		9.10	9.74
	09/17/2003		9.15	9.69
	10/27/2003		9.35	9.49
	11/18/2003		9.18	9.66
	12/19/2003		8.50	10.34
	01/15/2004		8.23	10.61
	02/17/2004		8.31	10.53
	03/18/2004		8.69	10.15
	04/21/2004		9.21	9.63
	05/18/2004		9.25	9.59

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-40	06/10/2004	18.84	9.10	9.74
	07/13/2004		9.14	9.70
	08/12/2004		9.23	9.61
	09/16/2004		9.35	9.49
	10/12/2004		9.21	9.63
	11/17/2004		8.88	9.96
	12/15/2004		8.50	10.34
	01/24/2005		8.33	10.51
	02/15/2005		8.73	10.11
	03/15/2005		8.35	10.49
	04/25/2005		8.43	10.41
	05/20/2005		8.70	10.14
	06/21/2005		8.85	9.99
	07/20/2005		9.34	9.50
	08/19/2005		9.54	9.30
	09/16/2005		9.55	9.29
	10/21/2005		9.66	9.18
	11/18/2005		9.58	9.26
	12/16/2005		9.19	9.65
	01/20/2006		7.85	10.99
	02/22/2006		7.95	10.89
	03/30/2006		7.30	11.54
	04/27/2006		7.55	11.29
	05/18/2006		8.14	10.70
	06/22/2006		8.50	10.34
	07/20/2006		8.54	10.30
	08/17/2006		8.43	10.41
	09/14/2006		8.53	10.31
	10/19/2006		8.56	10.28
	11/21/2006		8.66	10.18
	12/21/2006		7.92	10.92
	01/18/2007		8.42	10.42
	02/06/2007		8.73	10.11
	03/08/2007		8.24	10.60
	04/12/2007		8.58	10.26
	05/10/2007		8.56	10.28
	06/07/2007		8.85	9.99
	07/19/2007		8.78	10.06
	08/09/2007		8.65	10.19
	09/14/2007		8.51	10.33
	10/12/2007		8.29	10.55
	11/09/2007		8.29	10.55
	12/14/2007		8.14	10.70
	01/17/2008		7.97	10.87
	02/21/2008		7.82	11.02

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-40	03/20/2008	18.84	8.59	10.25
	04/10/2008		9.10	9.74
	05/08/2008		9.05	9.79
	06/12/2008		8.80	10.04
	07/24/2008		9.01	9.83
	08/14/2008		8.91	9.93
	09/18/2008		8.73	10.11
	10/22/2008		9.13	9.71
	11/13/2008		NM	NM
	12/04/2008		8.73	10.11
	01/08/2009		8.39	10.45
	02/11/2009		8.22	10.62
	03/12/2009		7.04	11.80
	04/09/2009		8.04	10.80
	05/20/2009		8.22	10.62
	06/17/2009		8.31	10.53
	07/16/2009		8.49	10.35
	08/13/2009		8.27	10.57
	09/10/2009		8.61	10.23
	10/16/2009		7.76	11.06
	11/12/2009		8.12	10.72
	12/03/2009		8.29	10.55
	01/14/2010		8.25	10.59
	02/18/2010		7.38	11.46
	03/25/2010		7.55	11.29
	04/23/2010		7.55	11.29
	05/21/2010		8.13	10.71
	06/10/2010		8.38	10.46
	07/23/2010		8.21	10.63
	08/12/2010		8.36	10.48
	09/10/2010		8.51	10.33
	10/15/2010		8.80	10.03
	11/04/2010		8.39	10.45
	12/03/2010		8.15	10.69
	01/28/2011		7.82	11.02
	02/10/2011		7.98	10.86
	03/31/2011		6.56	12.28
	04/19/2011		7.62	11.22
	03/20/2012		8.40	10.44
	04/16/2012		7.15	11.69
	05/14/2012		8.22	10.62
	06/11/2012		8.54	10.30
	07/18/2012		8.63	10.21
	08/15/2012		8.54	10.30
	09/13/2012		8.59	10.25

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-40	10/17/2012	18.84	8.72	10.12
	11/16/2012		8.45	10.39
	12/14/2012		7.43	11.41
	01/18/2013		7.93	10.91
	02/22/2013		8.29	10.55
	03/21/2013		8.33	10.51
	04/19/2013		8.05	10.79
	07/16/2013		8.77	10.07
	10/07/2013		9.16	9.68
	01/03/2014		8.99	9.85
	04/22/2014		8.39	10.45
	07/08/2014		9.08	9.76
	10/28/2014		9.30	9.54
LF-41	01/17/2000	18.24	9.01	9.23
	04/25/2000		8.41	9.83
	05/30/2000		8.75	9.49
	06/26/2000		9.02	9.22
	08/10/2000		9.25	8.99
	08/31/2000		8.74	9.50
	09/25/2000		8.95	9.29
	10/06/2000		9.00	9.24
	11/21/2000		7.99	10.25
	12/18/2000		8.76	9.48
	01/15/2001		8.63	9.61
	02/14/2001		8.06	10.18
	03/01/2001		7.55	10.69
	04/19/2001		8.49	9.75
	05/23/2001		8.82	9.42
	06/14/2001		8.95	9.29
	07/02/2001		8.97	9.27
	08/10/2001		8.71	9.53
	09/07/2001		8.78	9.46
	10/18/2001		8.98	9.26
	11/02/2001		8.95	9.29
	12/14/2001		7.20	11.04
	01/18/2002		7.68	10.56
	02/21/2002		7.84	10.40
	03/25/2002		7.96	10.28
	04/18/2002		8.49	9.75
	05/10/2002		8.74	9.50
	06/04/2002		8.49	9.75
	07/10/2002		8.78	9.46
	08/15/2002		8.71	9.53
	09/11/2002		8.46	9.78
	10/08/2002		8.61	9.63

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-41	11/07/2002	18.24	8.71	9.53
	12/12/2002		8.72	9.52
	01/13/2003		7.08	11.16
	02/26/2003		7.14	11.10
	03/19/2003		7.93	10.31
	04/14/2003		7.83	10.41
	05/13/2003		8.01	10.23
	06/13/2003		8.26	9.98
	07/07/2003		8.31	9.93
	08/13/2003		8.44	9.80
	09/17/2003		8.49	9.75
	10/27/2003		8.68	9.56
	11/18/2003		8.50	9.74
	12/19/2003		7.82	10.42
	01/15/2004		7.67	10.57
	02/17/2004		7.61	10.63
	03/18/2004		7.88	10.36
	04/21/2004		8.45	9.79
	05/18/2004		8.52	9.72
	06/10/2004		8.42	9.82
	07/13/2004		8.45	9.79
	08/12/2004		8.50	9.74
	09/16/2004		8.68	9.56
	10/12/2004		8.58	9.66
	11/17/2004		8.19	10.05
	12/15/2004		7.78	10.46
	01/24/2005		7.63	10.61
	02/15/2005		7.81	10.43
	03/15/2005		7.56	10.68
	04/25/2005		7.78	10.46
	05/20/2005		7.89	10.35
	06/21/2005		8.15	10.09
	07/20/2005		8.59	9.65
	08/19/2005		8.78	9.46
	09/16/2005		8.80	9.44
	10/21/2005		8.95	9.29
	11/18/2005		8.76	9.48
	12/16/2005		8.41	9.83
	01/20/2006		7.34	10.90
	02/22/2006		7.15	11.09
	03/30/2006		6.50	11.74
	04/27/2006		6.88	11.36
	05/18/2006		7.51	10.73
	06/22/2006		7.81	10.43
	07/20/2006		7.83	10.41

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-41	08/17/2006	18.24	7.67	10.57
	09/14/2006		7.81	10.43
	10/19/2006		7.74	10.50
	11/21/2006		7.75	10.49
	12/21/2006		7.22	11.02
	01/18/2007		7.64	10.60
	02/06/2007		8.10	10.14
	03/08/2007		7.41	10.83
	04/12/2007		7.82	10.42
	05/10/2007		7.74	10.50
	06/07/2007		8.02	10.22
	07/19/2007		7.99	10.25
	08/09/2007		8.00	10.24
	09/14/2007		7.87	10.37
	10/12/2007		7.63	10.61
	11/09/2007		7.66	10.58
	12/14/2007		7.45	10.79
	01/17/2008		7.30	10.94
	02/21/2008		7.11	11.13
	03/20/2008		7.71	10.53
	04/10/2008		8.25	9.99
	05/08/2008		8.22	10.02
	06/12/2008		8.05	10.19
	07/24/2008		8.28	9.96
	08/14/2008		8.20	10.04
	09/18/2008		8.02	10.22
	10/22/2008		8.34	9.90
	11/13/2008		7.91	10.33
	12/04/2008		8.00	10.24
	01/08/2009		7.68	10.56
	02/11/2009		7.48	10.76
	03/12/2009		6.42	11.82
	04/09/2009		7.25	10.99
	05/20/2009		7.44	10.80
	06/17/2009		7.61	10.63
	07/16/2009		7.71	10.53
	08/13/2009		7.55	10.69
	09/10/2009		7.82	10.42
	10/16/2009		7.04	11.18
	11/12/2009		7.47	10.77
	12/03/2009		7.61	10.63
	01/14/2010		7.54	10.70
	02/18/2010		6.80	11.44
	03/25/2010		6.93	11.31
	04/23/2010		6.87	11.37

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-41	05/21/2010	18.24	7.45	10.79
	06/10/2010		7.67	10.57
	07/23/2010		7.59	10.65
	08/12/2010		7.69	10.55
	09/10/2010		7.76	10.48
	10/15/2010		8.02	10.21
	11/04/2010		7.72	10.52
	12/03/2010		7.47	10.77
	01/28/2011		7.20	11.04
	02/10/2011		7.39	10.85
	03/31/2011		5.95	12.29
	04/19/2011		7.07	11.17
	06/27/2011		7.53	10.71
	07/21/2011		7.60	10.64
	08/22/2011		8.71	9.53
	09/23/2011		11.33	6.91
	09/30/2011		11.64	6.60
	10/05/2011		11.72	6.52
	10/12/2011		11.78	6.46
	10/19/2011		13.95	4.29
	10/26/2011		14.14	4.10
	11/02/2011		13.78	4.46
	11/09/2011		13.02	5.22
	11/16/2011		10.91	7.33
	11/23/2011		10.59	7.65
	11/30/2011		10.41	7.83
	12/06/2011		10.32	7.92
	01/27/2012		8.96	9.28
	02/23/2012		8.57	9.67
	03/20/2012		7.56	10.68
	04/16/2012		6.35	11.89
	05/14/2012		7.59	10.65
	06/11/2012		7.86	10.38
	07/18/2012		7.94	10.30
	08/15/2012		7.87	10.37
	09/13/2012		7.85	10.39
	10/17/2012		8.01	10.23
	11/16/2012		7.68	10.56
	12/14/2012		6.78	11.46
	01/18/2013		7.30	10.94
	02/22/2013		7.64	10.60
	03/21/2013		7.64	10.60
	04/19/2013		7.35	10.89
	07/16/2013		8.06	10.18
	10/07/2013		8.52	9.72

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-41	01/03/2014	18.24	8.26	9.98
	04/22/2014		7.76	10.48
	07/08/2014		8.44	9.80
	10/28/2014		8.61	9.63
LF-42	01/17/2000	17.29	8.17	9.12
	04/25/2000		7.51	9.78
	05/30/2000		8.03	9.26
	06/26/2000		8.34	8.95
	08/10/2000		8.60	8.69
	08/31/2000		7.95	9.34
	09/25/2000		8.15	9.14
	10/06/2000		8.29	9.00
	11/21/2000		8.28	9.01
	12/18/2000		8.03	9.26
	01/15/2001		7.84	9.45
	02/14/2001		7.31	9.98
	03/01/2001		6.58	10.71
	04/19/2001		7.67	9.62
	05/23/2001		8.20	9.09
	06/14/2001		8.51	8.78
	07/02/2001		8.31	8.98
	08/10/2001		8.23	9.06
	09/07/2001		8.37	8.92
	10/18/2001		8.33	8.96
	11/02/2001		8.36	8.93
	12/14/2001		6.93	10.36
	01/18/2002		6.68	10.61
	02/21/2002		7.20	10.09
	03/25/2002		7.31	9.98
	04/18/2002		7.65	9.64
	05/10/2002		7.87	9.42
	06/04/2002		7.85	9.44
	07/10/2002		8.09	9.20
	08/15/2002		8.09	9.20
	09/11/2002		8.16	9.13
	10/08/2002		7.69	9.60
	11/07/2002		7.85	9.44
	12/12/2002		7.76	9.53
	01/13/2003		6.33	10.96
	02/26/2003		6.22	11.07
	03/19/2003		7.21	10.08
	04/14/2003		7.32	9.97
	05/13/2003		7.44	9.85
	06/13/2003		7.34	9.95
	07/07/2003		7.28	10.01

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-42	08/13/2003	17.29	7.48	9.81
	09/17/2003		7.67	9.62
	10/27/2003		7.74	9.55
	11/18/2003		7.75	9.54
	12/19/2003		7.32	9.97
	01/15/2004		6.58	10.71
	02/17/2004		7.11	10.18
	03/18/2004		7.37	9.92
	04/21/2004		7.64	9.65
	05/18/2004		7.53	9.76
	06/10/2004		7.66	9.63
	07/13/2004		7.75	9.54
	08/12/2004		7.88	9.41
	09/16/2004		7.90	9.39
	10/12/2004		7.81	9.48
	11/17/2004		7.57	9.72
	12/15/2004		7.22	10.07
	01/24/2005		6.88	10.41
	02/15/2005		7.43	9.86
	03/15/2005		7.00	10.29
	04/25/2005		7.10	10.19
	05/20/2005		7.12	10.17
	06/21/2005		7.45	9.84
	07/20/2005		8.05	9.24
	08/19/2005		8.10	9.19
	09/16/2005		8.11	9.18
	10/21/2005		8.18	9.11
	11/18/2005		8.23	9.06
	12/16/2005		8.10	9.19
	01/20/2006		6.34	10.95
	02/22/2006		6.61	10.68
	03/30/2006		5.14	12.15
	04/27/2006		5.86	11.43
	05/18/2006		6.79	10.50
	06/22/2006		7.24	10.05
	07/20/2006		7.27	10.02
	08/17/2006		7.42	9.87
	09/14/2006		7.36	9.93
	10/19/2006		7.19	10.10
	11/21/2006		7.25	10.04
	12/21/2006		6.51	10.78
	01/18/2007		7.00	10.29
	02/06/2007		7.28	10.01
	03/08/2007		6.53	10.76
	04/12/2007		7.09	10.20

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-42	05/10/2007	17.29	6.92	10.37
	06/07/2007		7.46	9.83
	07/19/2007		7.23	10.06
	08/09/2007		7.30	9.99
	08/17/2007		7.23	10.06
	08/24/2007		7.15	10.14
	08/30/2007		7.40	9.89
	09/06/2007		7.10	10.19
	09/14/2007		7.02	10.27
	09/21/2007		6.96	10.33
	09/28/2007		6.92	10.37
	10/05/2007		6.94	10.35
	10/12/2007		6.85	10.44
	10/19/2007		6.54	10.75
	10/26/2007		6.56	10.73
	11/02/2007		6.64	10.65
	11/09/2007		6.76	10.53
	11/15/2007		6.67	10.62
	11/21/2007		6.65	10.64
	11/29/2007		6.75	10.54
	12/14/2007		6.70	10.59
	01/17/2008		6.46	10.83
	02/21/2008		6.18	11.11
	03/20/2008		7.28	10.01
	04/10/2008		7.82	9.47
	05/08/2008		7.61	9.68
	06/12/2008		7.56	9.73
	07/24/2008		7.70	9.59
	08/14/2008		7.68	9.61
	09/18/2008		7.35	9.94
	10/22/2008		7.71	9.58
	11/13/2008		7.45	9.84
	12/04/2008		7.49	9.80
	01/08/2009		7.01	10.28
	02/11/2009		6.84	10.45
	03/12/2009		5.34	11.95
	04/09/2009		6.54	10.75
	05/20/2009		6.68	10.61
	06/17/2009		6.97	10.32
	07/16/2009		7.05	10.24
	08/13/2009		6.95	10.34
	09/10/2009		7.17	10.12
	10/16/2009		6.29	10.98
	11/12/2009		6.80	10.49
	12/03/2009		6.96	10.33

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-42	01/14/2010	17.29	6.97	10.32
	02/18/2010		5.81	11.48
	03/25/2010		6.13	11.16
	04/23/2010		6.10	11.19
	05/21/2010		6.67	10.62
	06/10/2010		6.99	10.30
	07/23/2010		6.90	10.39
	08/12/2010		6.97	10.32
	09/10/2010		6.96	10.33
	10/15/2010		7.35	9.93
	11/04/2010		7.08	10.21
	12/03/2010		6.82	10.47
	01/28/2011		6.23	11.06
	02/10/2011		6.57	10.72
	03/31/2011		4.82	12.47
	04/19/2011		6.08	11.21
	03/20/2012		6.36	10.93
	04/16/2012		5.73	11.56
	05/14/2012		6.78	10.51
	06/11/2012		7.23	10.06
	07/18/2012		7.31	9.98
	08/15/2012		7.33	9.96
	09/13/2012		7.32	9.97
	10/17/2012		7.43	9.86
	11/16/2012		7.08	10.21
	12/14/2012		5.95	11.34
	01/18/2013		6.50	10.79
	02/22/2013		7.06	10.23
	03/21/2013		7.08	10.21
	04/19/2013		6.76	10.53
	07/16/2013		7.48	9.81
	10/07/2013		7.89	9.40
	01/03/2014		7.70	9.59
	04/22/2014		6.95	10.34
	07/08/2014		7.82	9.47
	10/28/2014		8.02	9.27
LF-5	06/14/1989	13.18	4.75	8.43
	01/10/1990 (a)		4.83	8.35
	01/18/1990 (b)		2.49	10.69
	01/18/1990 (c)		2.55	10.63
	01/30/1991		4.24	8.94
	06/19/1991		4.28	8.67
	12/16/1991		4.68	8.27
	07/10/1992		4.21	8.74
	12/30/1992		1.96	10.99

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-5	06/08/1993	13.18	3.71	9.24
	01/05/1994		3.65	9.30
LF-6	06/14/1989	13.37	4.89	8.48
	01/10/1990 (a)		4.26	9.11
	01/18/1990 (b)		3.15	10.22
	01/18/1990 (c)		3.21	10.16
LF-7	06/14/1989	17.14	5.79	7.99
	01/10/1990 (a)		4.31	9.47
	01/18/1990 (b)		3.30	10.48
	01/18/1990 (c)		3.35	10.43
	01/30/1991		4.82	8.96
	06/19/1991		4.73	9.05
	12/16/1991		4.87	8.91
	07/10/1992		4.82	8.96
	12/30/1992		3.10	10.68
	06/08/1993		4.31	9.47
	01/05/1994		4.36	9.42
	09/08/1994		4.97	8.81
	03/29/1995		3.77	10.01
	08/09/1995		NM	NM
	04/24/1996		8.65	8.49
	07/29/1996		9.70	7.44
	12/13/1996		6.99	10.15
	04/15/1997		8.21	8.93
	09/19/1997		8.22	8.92
	12/03/1997		7.42	9.72
	12/15/1997		5.95	11.19
	01/13/1998		4.89	12.25
	01/30/1998		5.02	12.12
	02/24/1998		5.22	11.92
	04/06/1998		7.52	9.62
	07/02/1998		9.74	7.40
	07/13/1998		9.85	7.29
	09/28/1998		10.40	6.74
	10/16/1998		10.55	6.59
	01/08/1999		8.45	8.69
	04/16/1999		7.63	9.51
	06/21/1999		11.07	6.07
	07/12/1999		11.23	5.91
	10/08/1999		11.34	5.80
	01/17/2000		10.51	6.63
	04/25/2000		6.92	10.22
	05/30/2000		7.87	9.27
	06/26/2000		8.59	8.55
	08/10/2000		9.89	7.25

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-7	08/31/2000	17.14	9.87	7.27
	09/25/2000		9.83	7.31
	10/06/2000		10.14	7.00
	11/21/2000		9.14	8.00
	12/18/2000		8.40	8.74
	01/15/2001		8.29	8.85
	02/14/2001		6.57	10.57
	03/01/2001		5.51	11.63
	04/19/2001		7.30	9.84
	05/23/2001		8.75	8.39
	06/14/2001		9.45	7.69
	07/02/2001		10.10	7.04
	08/10/2001		9.69	7.45
	09/07/2001		10.11	7.03
	10/18/2001		10.04	7.10
	11/02/2001		10.15	6.99
	12/14/2001		5.00	12.14
	01/18/2002		6.72	10.42
	02/21/2002		8.19	8.95
	03/25/2002		7.26	9.88
	04/18/2002		9.34	7.80
	05/10/2002		9.17	7.97
	06/04/2002		8.67	8.47
	07/10/2002		9.05	8.09
	08/15/2002		10.71	6.43
	09/11/2002		10.01	7.13
	10/08/2002		9.86	7.28
	11/07/2002		10.12	7.02
	12/12/2002		9.64	7.50
	01/13/2003		7.23	9.91
	02/26/2003		8.01	9.13
	03/19/2003		8.42	8.72
	04/14/2003		8.74	8.40
	05/13/2003		9.50	7.64
	06/13/2003		10.39	6.75
	07/07/2003		10.56	6.58
	08/13/2003		10.69	6.45
	09/17/2003		10.57	6.57
	10/27/2003		10.62	6.52
	11/18/2003		10.05	7.09
	12/19/2003		9.18	7.96
	01/15/2004		8.46	8.68
	02/17/2004		8.31	8.83
	03/18/2004		9.39	7.75
	04/21/2004		9.79	7.35

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-7	05/18/2004	17.14	9.92	7.22
	06/10/2004		10.15	6.99
	07/13/2004		10.63	6.51
	08/12/2004		10.70	6.44
	09/16/2004		10.50	6.64
	10/12/2004		9.98	7.16
	11/17/2004		8.46	8.68
	12/15/2004		8.01	9.13
	01/24/2005		7.56	9.58
	02/15/2005		9.58	7.56
	03/15/2005		7.94	9.20
	04/25/2005		8.63	8.51
	05/20/2005		9.21	7.93
	06/21/2005		9.41	7.73
	07/20/2005		10.57	6.57
	08/19/2005		11.05	6.09
	09/16/2005		10.73	6.41
	10/21/2005		11.17	5.97
	11/18/2005		10.69	6.45
	12/16/2005		10.94	6.20
	01/20/2006		5.92	11.22
	02/22/2006		8.92	8.22
	03/30/2006		6.10	11.04
	04/27/2006		10.51	6.63
	05/18/2006		9.52	7.62
	06/22/2006		10.42	6.72
	07/20/2006		10.37	6.77
	08/17/2006		10.50	6.64
	09/14/2006		10.53	6.61
	10/19/2006		10.38	6.76
	11/21/2006		9.64	7.50
	12/21/2006		8.09	9.05
	01/18/2007		8.71	8.43
	02/06/2007		9.60	7.54
	03/08/2007		7.74	9.40
	04/12/2007		9.53	7.61
	05/10/2007		9.27	7.87
	06/07/2007		10.36	6.78
	07/19/2007		11.04	6.10
	08/09/2007		11.14	6.00
	08/17/2007		10.81	6.33
	08/24/2007		10.57	6.57
	08/30/2007		10.39	6.75
	09/06/2007		10.21	6.93
	09/14/2007		10.04	7.10

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-7	09/21/2007	17.14	9.86	7.28
	09/28/2007		9.69	7.45
	10/05/2007		9.53	7.61
	10/12/2007		9.06	8.08
	10/19/2007		8.38	8.76
	10/26/2007		8.11	9.03
	11/02/2007		8.05	9.09
	11/09/2007		7.97	9.17
	11/15/2007		7.50	9.64
	11/21/2007		7.43	9.71
	11/29/2007		7.45	9.69
	12/14/2007		7.44	9.70
	01/17/2008		7.78	9.36
	02/21/2008		7.79	9.35
	03/20/2008		9.77	7.37
	04/10/2008		10.64	6.50
	05/08/2008		10.61	6.53
	06/12/2008		10.99	6.15
	07/24/2008		11.15	5.99
	08/14/2008		11.32	5.82
	09/18/2008		11.36	5.78
	10/22/2008		11.35	5.79
	11/13/2008		9.77	7.37
	12/04/2008		10.19	6.95
	01/08/2009		8.82	8.32
	02/11/2009		9.37	7.77
	03/12/2009		6.37	10.77
	04/09/2009		8.36	8.78
	05/20/2009		8.82	8.32
	06/17/2009		10.01	7.13
	07/16/2009		10.44	6.70
	08/13/2009		10.74	6.40
	09/10/2009		10.74	6.40
	10/16/2009		8.30	8.82
	11/12/2009		10.37	6.77
	12/03/2009		10.30	6.84
	01/14/2010		9.74	7.40
	02/18/2010		7.13	10.01
	03/25/2010		8.39	8.75
	04/23/2010		7.98	9.16
	05/21/2010		9.34	7.80
	06/10/2010		9.30	7.84
	07/23/2010		10.39	6.75
	08/12/2010		10.09	7.05
	09/10/2010		10.94	6.20

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-7	10/15/2010	17.14	10.98	6.15
	11/04/2010		10.39	6.75
	12/03/2010		8.74	8.40
	01/28/2011		7.98	9.16
	02/10/2011		8.36	8.78
	03/31/2011		5.91	11.23
	04/19/2011		8.20	8.94
LF-8	01/10/1990 (a)	15.61	7.08	8.09
	01/18/1990 (b)		6.22	8.95
	01/18/1990 (c)		6.27	8.90
	01/30/1991		7.32	8.13
	06/19/1991		7.22	8.23
	12/16/1991		7.18	8.27
	07/10/1992		7.14	8.31
	12/30/1992		5.85	9.60
	06/08/1993		6.57	8.88
	01/05/1994		6.72	8.73
	09/08/1994		7.34	8.11
	03/29/1995		4.88	10.57
	08/09/1995		NM	NM
	04/24/1996		7.14	8.47
	07/29/1996		8.21	7.40
	12/13/1996		5.12	10.49
	04/15/1997		7.21	8.40
	09/19/1997		7.25	8.36
	12/03/1997		5.65	9.96
	12/15/1997		4.56	11.05
	01/13/1998		3.51	12.10
	01/30/1998		3.63	11.98
	02/24/1998		3.68	11.93
	04/06/1998		5.91	9.70
	07/02/1998		7.97	7.64
	07/13/1998		8.18	7.43
	09/28/1998		8.59	7.02
	10/16/1998		8.78	6.83
	01/08/1999		6.71	8.90
	04/16/1999		5.95	9.66
	06/21/1999		8.46	7.15
	07/12/1999		8.79	6.82
	10/08/1999		9.24	6.37
	01/17/2000		8.09	7.52
	04/25/2000		5.72	9.89
	05/30/2000		6.38	9.23
	06/26/2000		NM	NM
	08/10/2000		7.76	7.85

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-8	10/06/2000	15.61	8.08	7.53
	01/15/2001		6.54	9.07
	04/19/2001		7.55	8.06
	07/02/2001		7.98	7.63
	09/07/2001		NM	NM
	10/18/2001		8.24	7.37
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		5.60	10.01
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.98	8.63
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		7.29	8.32
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		7.90	7.71
	01/13/2003		6.90	8.71
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		6.53	9.08
	07/07/2003		8.34	7.27
	10/27/2003		NM	NM
	11/18/2003		7.91	7.70
	01/15/2004		6.51	9.10
	04/21/2004		7.36	8.25
	07/13/2004		8.37	7.24
	10/12/2004		8.30	7.31
	01/24/2005		6.16	9.45
	04/25/2005		6.79	8.82
	07/20/2005		8.09	7.52
	10/21/2005		8.94	6.67
	01/20/2006		5.20	10.41
	04/27/2006		6.38	9.23
	07/20/2006		8.20	7.41
	10/19/2006		8.37	7.24
	01/18/2007		6.78	8.83
	04/12/2007		6.98	8.63
	07/19/2007		8.44	7.17
	08/17/2007		8.68	6.93
	08/24/2007		8.67	6.94
	08/30/2007		8.64	6.97
	09/06/2007		8.56	7.05
	09/14/2007		8.51	7.10

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-8	09/21/2007	15.61	8.40	7.21
	09/28/2007		8.25	7.36
	10/05/2007		8.20	7.41
	10/12/2007		7.47	8.14
	10/19/2007		7.00	8.61
	10/26/2007		6.83	8.78
	11/02/2007		6.81	8.80
	11/09/2007		6.80	8.81
	11/15/2007		6.32	9.29
	11/21/2007		6.35	9.26
	11/29/2007		6.35	9.26
	01/17/2008		6.20	9.41
	04/10/2008		7.83	7.78
	07/24/2008		8.84	6.77
	10/22/2008		9.06	6.55
	01/08/2009		7.16	8.45
	04/09/2009		6.50	9.11
	07/16/2009		8.14	7.47
	10/16/2009		6.50	9.09
	01/14/2010		7.22	8.39
	04/23/2010		6.42	9.19
	07/23/2010		8.04	7.57
	10/15/2010		8.72	6.88
	01/28/2011		6.39	9.22
	04/19/2011		6.53	9.08
LF-9	01/10/1990 (a)	13.14	4.81	8.33
	01/18/1990 (b)		3.24	9.90
	01/18/1990 (c)		3.29	9.85
	01/30/1991		5.39	7.75
	06/19/1991		5.01	8.13
	12/16/1991		5.46	7.68
	07/10/1992		5.27	7.87
	12/30/1992		3.65	9.49
	06/08/1993		4.88	8.26
	01/05/1994		NM	NM
LF-B1	01/10/1990 (a)	19.82	10.68	9.14
	01/18/1990 (b)		10.24	9.58
	01/18/1990 (c)		10.27	9.55
	01/30/1991		10.77	9.05
	06/19/1991		10.38	9.43
	12/16/1991		10.32	9.49
	07/10/1992		10.09	9.72
	12/30/1992		9.54	10.27
	06/08/1993		9.68	10.13
	01/05/1994		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-B2	01/10/1990 (a)	13.93	4.25	9.68
	01/18/1990 (b)		3.65	10.28
	01/18/1990 (c)		3.66	10.27
	01/30/1991		3.25	10.68
	06/19/1991		NM	NM
	12/16/1991		3.27	9.15
	07/10/1992		3.20	9.22
	12/30/1992		NM	NM
	06/08/1993		2.96	9.46
	01/05/1994		3.05	9.37
LF-B3	01/10/1990 (a)	13.00	3.30	9.76
	01/18/1990 (b)		2.79	10.27
	01/18/1990 (c)		2.80	10.26
	01/30/1991		3.88	9.18
	06/19/1991		3.81	9.24
	12/16/1991		3.89	9.16
	07/10/1992		3.81	9.24
	12/30/1992		3.03	10.02
	06/08/1993		3.56	9.49
	01/05/1994		3.68	9.37
	04/24/1996		3.44	9.56
	07/29/1996		4.12	8.88
	12/13/1996		2.70	10.30
	04/15/1997		3.95	9.05
	09/19/1997		4.08	8.92
	12/03/1997		3.10	9.90
	12/15/1997		NM	NM
	01/13/1998		2.54	10.46
	01/30/1998		2.62	10.38
	02/24/1998		1.70	11.30
	04/06/1998		2.76	10.24
	07/02/1998		3.86	9.14
	07/13/1998		3.95	9.05
	09/28/1998		4.21	8.79
	10/16/1998		4.22	8.78
	01/08/1999		4.01	8.99
	04/16/1999		3.24	9.76
	06/21/1999		4.41	8.59
	07/12/1999		4.40	8.60
	10/08/1999		4.59	8.41
	01/17/2000		4.26	8.74
	04/25/2000		3.53	9.47
	05/30/2000		3.85	9.15
	06/26/2000		NM	NM
	08/10/2000		4.47	8.53

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-B3	10/06/2000	13.00	4.45	8.55
	01/15/2001		3.56	9.44
	04/19/2001		3.74	9.26
	07/02/2001		4.17	8.83
	09/07/2001		NM	NM
	10/18/2001		4.30	8.70
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		3.29	9.71
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		4.08	8.92
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		4.16	8.84
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		6.48	6.52
	01/13/2003		3.13	9.87
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		3.50	9.50
	07/07/2003		4.06	8.94
	10/27/2003		NM	NM
	11/18/2003		4.02	8.98
	01/15/2004		3.00	10.00
	04/21/2004		3.75	9.25
	07/13/2004		4.07	8.93
	10/12/2004		4.05	8.95
	01/24/2005		3.24	9.76
	04/25/2005		3.14	9.86
	07/20/2005		3.95	9.05
	10/21/2005		4.14	8.86
	01/20/2006		2.38	10.62
	04/27/2006		2.92	10.08
	07/20/2006		3.75	9.25
	10/19/2006		3.69	9.31
	01/18/2007		3.44	9.56
	04/12/2007		2.23	10.77
	07/19/2007		3.90	9.10
	10/12/2007		NM	NM
	01/17/2008		2.91	10.09
	04/10/2008		3.86	9.14
	07/24/2008		4.00	9.00
	10/22/2008		4.01	8.99

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-B3	01/08/2009	13.00	3.12	9.88
	04/09/2009		3.16	9.84
	07/16/2009		3.77	9.23
	10/16/2009		3.01	9.97
	01/14/2010		3.54	9.46
	04/23/2010		2.63	10.37
	07/23/2010		3.73	9.27
	10/15/2010		4.00	8.99
	01/28/2011		3.28	9.72
	04/19/2011		3.20	9.80
LF-B4	01/30/1991	17.25	6.88	10.36
	06/19/1991		6.78	10.46
	12/16/1991		6.85	10.39
	07/10/1992		6.79	10.45
	12/30/1992		6.17	11.07
	06/08/1993		6.53	10.71
	01/05/1994		6.62	10.62
	04/24/1996		6.39	10.86
	07/29/1996		6.97	10.28
	12/13/1996		5.64	11.61
	04/15/1997		6.68	10.57
	09/19/1997		6.75	10.50
	12/03/1997		5.90	11.35
	12/15/1997		5.89	11.36
	01/13/1998		5.45	11.80
	01/30/1998		5.69	11.56
	02/24/1998		5.26	11.99
	04/06/1998		5.99	11.26
	07/02/1998		6.61	10.64
	07/13/1998		6.67	10.58
	09/28/1998		6.85	10.40
	10/16/1998		6.99	10.26
	01/08/1999		6.85	10.40
	04/16/1999		6.35	10.90
	06/21/1999		7.18	10.07
	07/12/1999		7.22	10.03
	10/08/1999		7.11	10.14
	01/17/2000		6.75	10.50
	04/25/2000		6.32	10.93
	05/30/2000		6.60	10.65
	06/26/2000		NM	NM
	08/10/2000		6.98	10.27
	10/06/2000		7.01	10.24
	01/15/2001		6.30	10.95
	04/19/2001		6.52	10.73

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-B4	07/02/2001	17.25	6.75	10.50
	09/07/2001		NM	NM
	10/18/2001		6.74	10.51
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		6.10	11.15
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.53	10.72
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		6.73	10.52
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		6.64	10.61
	01/13/2003		5.72	11.53
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		5.90	11.35
	07/07/2003		6.57	10.68
	10/27/2003		NM	NM
	11/18/2003		6.50	10.75
	01/15/2004		5.96	11.29
	04/21/2004		6.36	10.89
	07/13/2004		6.61	10.64
	10/12/2004		6.59	10.66
	01/24/2005		6.01	11.24
	04/25/2005		6.09	11.16
	07/20/2005		6.79	10.46
	10/21/2005		6.83	10.42
	01/20/2006		5.75	11.50
	04/27/2006		5.91	11.34
	07/20/2006		6.41	10.84
	10/19/2006		6.44	10.81
	01/18/2007		6.27	10.98
	04/12/2007		6.29	10.96
	07/19/2007		6.53	10.72
	10/12/2007		6.23	11.02
	01/17/2008		5.92	11.33
	04/10/2008		6.57	10.68
	07/24/2008		6.86	10.39
	10/22/2008		6.82	10.43
	01/08/2009		6.08	11.17
	04/09/2009		6.08	11.17
	07/16/2009		6.54	10.71

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-B4	10/16/2009	17.25	5.84	11.39
	01/14/2010		6.14	11.11
	04/23/2010		5.76	11.49
	07/23/2010		6.40	10.85
	10/15/2010		6.68	10.56
	01/28/2011		6.10	11.15
	04/19/2011		6.02	11.23
LF-B5	06/14/1989	20.99	35.40	-14.41
	04/24/1996		10.35	10.64
	07/29/1996		11.03	9.96
	12/13/1996		9.25	11.74
	04/15/1997		10.68	10.31
	09/19/1997		10.78	10.21
	12/03/1997		9.94	11.05
	12/15/1997		2.88	18.11
	01/13/1998		9.33	11.66
	01/30/1998		9.48	11.51
	02/24/1998		9.07	11.92
	04/06/1998		9.93	11.06
	07/02/1998		10.67	10.32
	07/13/1998		10.71	10.28
	09/28/1998		10.95	10.04
	10/16/1998		11.07	9.92
	01/08/1999		11.31	9.68
	04/16/1999		10.78	10.21
	06/21/1999		11.54	9.45
	07/12/1999		11.36	9.63
	10/08/1999		11.63	9.36
	01/17/2000		11.23	9.76
	04/25/2000		10.34	10.65
	05/30/2000		11.22	9.77
	06/26/2000		NM	NM
	08/10/2000		11.22	9.77
	10/06/2000		11.50	9.49
	01/15/2001		10.81	10.18
	04/19/2001		10.94	10.05
	07/02/2001		10.93	10.06
	09/07/2001		NM	NM
	10/18/2001		11.22	9.77
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		9.93	11.06
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		10.40	10.59

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-B5	05/10/2002	20.99	NM	NM
	06/04/2002		NM	NM
	07/10/2002		10.78	10.21
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		10.52	10.47
	01/13/2003		9.76	11.23
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		9.80	11.19
	07/07/2003		10.62	10.37
	10/27/2003		NM	NM
	11/18/2003		10.67	10.32
	01/15/2004		10.05	10.94
	04/21/2004		10.50	10.49
	07/13/2004		10.64	10.35
	10/12/2004		10.75	10.24
	01/24/2005		10.05	10.94
	04/25/2005		10.14	10.85
	07/20/2005		10.70	10.29
	10/21/2005		11.02	9.97
	01/20/2006		9.72	11.27
	04/27/2006		9.61	11.38
	07/20/2006		11.50	9.49
	10/19/2006		10.30	10.69
	01/18/2007		10.18	10.81
	04/12/2007		10.12	10.87
	07/19/2007		10.46	10.53
	10/12/2007		9.88	11.11
	01/17/2008		9.79	11.20
	04/10/2008		10.49	10.50
	07/24/2008		10.72	10.27
	10/22/2008		10.72	10.27
	01/08/2009		10.00	10.99
	04/17/2009		9.91	11.08
	07/16/2009		10.79	10.20
	10/16/2009		9.72	11.25
	01/14/2010		10.00	10.99
	04/23/2010		9.57	11.42
	07/23/2010		10.20	10.79
	10/15/2010		10.55	10.43
	01/28/2011		33.04	-12.05
	04/19/2011		NM	NM
LF-B6	04/24/1996	14.69	5.12	9.57
	07/29/1996		5.81	8.88

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-B6	12/13/1996	14.69	4.33	10.36
	04/15/1997		5.61	9.08
	09/19/1997		5.75	8.94
	12/03/1997		4.82	9.87
	12/15/1997		4.71	9.98
	01/13/1998		4.25	10.44
	01/30/1998		5.41	9.28
	02/24/1998		3.83	10.86
	04/06/1998		4.67	10.02
	07/02/1998		5.54	9.15
	07/13/1998		5.61	9.08
	09/28/1998		5.87	8.82
	10/16/1998		5.89	8.80
	01/08/1999		5.65	9.04
	04/16/1999		4.97	9.72
	06/21/1999		6.00	8.69
	07/12/1999		6.10	8.59
	10/08/1999		6.27	8.42
	01/17/2000		6.03	8.66
	04/25/2000		5.15	9.54
	05/30/2000		5.51	9.18
	06/26/2000		NM	NM
	08/10/2000		6.10	8.59
	10/06/2000		6.09	8.60
	01/15/2001		5.34	9.35
	04/19/2001		5.44	9.25
	07/02/2001		5.89	8.80
	09/07/2001		NM	NM
	10/18/2001		5.92	8.77
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.85	9.84
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		5.75	8.94
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		5.87	8.82
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		5.86	8.83
	01/13/2003		4.69	10.00
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		5.18	9.51

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-B6	07/07/2003	14.69	5.72	8.97
	10/27/2003		NM	NM
	11/18/2003		5.74	8.95
	01/15/2004		4.98	9.71
	04/21/2004		5.55	9.14
	07/13/2004		5.77	8.92
	10/12/2004		5.77	8.92
	01/24/2005		4.88	9.81
	04/25/2005		5.12	9.57
	07/20/2005		5.74	8.95
	10/21/2005		6.01	8.68
	01/20/2006		4.55	10.14
	04/27/2006		4.70	9.99
	07/20/2006		5.47	9.22
	10/19/2006		5.46	9.23
	01/18/2007		5.28	9.41
	04/12/2007		5.36	9.33
	07/19/2007		5.60	9.09
	10/12/2007		5.05	9.64
	01/17/2008		4.65	10.04
	04/10/2008		5.57	9.12
	07/24/2008		5.61	9.08
	10/22/2008		5.66	9.03
	01/08/2009		4.92	9.77
	04/09/2009		4.86	9.83
	07/16/2009		5.42	9.27
	10/16/2009		4.68	9.99
	01/14/2010		5.18	9.51
	04/23/2010		4.58	10.11
	07/23/2010		5.34	9.35
	10/15/2010		5.64	9.04
	01/28/2011		4.93	9.76
	04/19/2011		4.82	9.87
LF-PZ1	12/15/1997	17.62	6.13	11.49
	01/13/1998		4.94	12.68
	01/30/1998		5.20	12.42
	02/24/1998		4.77	12.85
	04/06/1998		6.67	10.95
	07/02/1998		8.62	9.00
	07/13/1998		9.05	8.57
	09/28/1998		9.20	8.42
	10/16/1998		9.33	8.29
	01/08/1999		9.04	8.58
	04/16/1999		7.93	9.69
	06/21/1999		10.34	7.28

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ1	07/12/1999	17.62	10.51	7.11
	10/08/1999		10.46	7.16
	01/17/2000		8.75	8.87
	04/25/2000		7.20	10.42
	05/30/2000		8.21	9.41
	06/26/2000		NM	NM
	08/10/2000		9.54	8.08
	10/06/2000		9.17	8.45
	01/15/2001		7.79	9.83
	04/19/2001		7.32	10.30
	07/02/2001		9.51	8.11
	09/07/2001		NM	NM
	10/18/2001		8.80	8.82
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		6.80	10.82
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		9.61	8.01
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		8.07	9.55
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		8.32	9.30
	01/13/2003		6.82	10.80
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		6.70	10.92
	07/07/2003		8.48	9.14
	10/27/2003		NM	NM
	11/18/2003		8.57	9.05
	01/15/2004		7.60	10.02
	04/21/2004		8.63	8.99
	07/13/2004		9.55	8.07
	10/12/2004		8.45	9.17
	01/25/2005		7.45	10.17
	04/25/2005		7.52	10.10
	07/20/2005		8.28	9.34
	10/21/2005		9.76	7.86
	01/20/2006		5.45	12.17
	04/27/2006		8.23	9.39
	07/20/2006		8.75	8.87
	10/19/2006		8.12	9.50
	01/18/2007		7.27	10.35

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ1	04/12/2007	17.62	8.01	9.61
	07/19/2007		9.18	8.44
	10/05/2007		7.67	9.95
	10/12/2007		5.59	12.03
	10/26/2007		6.85	10.77
	11/02/2007		6.93	10.69
	01/17/2008		6.87	10.75
	04/10/2008		8.52	9.10
	07/24/2008		9.70	7.92
	10/22/2008		9.04	8.58
	01/08/2009		7.32	10.30
	04/09/2009		7.45	10.17
	07/16/2009		8.75	8.87
	10/16/2009		6.77	10.83
	01/14/2010		7.04	10.58
	04/23/2010		6.94	10.68
	07/23/2010		8.58	9.04
	10/15/2010		9.03	8.58
	01/28/2011		6.84	10.78
	04/19/2011		6.81	10.81
LF-PZ10	12/15/1997	14.96	3.49	11.47
	01/13/1998		2.33	12.63
	01/30/1998		2.69	12.27
	02/24/1998		2.31	12.65
	04/06/1998		4.27	10.69
	07/02/1998		6.11	8.85
	07/13/1998		6.29	8.67
	09/28/1998		6.52	8.44
	10/16/1998		6.66	8.30
	01/08/1999		6.22	8.74
	04/16/1999		5.34	9.62
	06/21/1999		7.72	7.24
	07/12/1999		7.90	7.06
	10/08/1999		7.95	7.01
	01/17/2000		6.40	8.56
	04/25/2000		4.49	10.47
	05/30/2000		5.81	9.15
	06/26/2000		NM	NM
	08/10/2000		7.76	7.20
	10/06/2000		6.78	8.18
	01/15/2001		5.15	9.81
	04/19/2001		5.20	9.76
	07/02/2001		6.97	7.99
	09/07/2001		NM	NM
	10/18/2001		6.20	8.76

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ10	11/02/2001	14.96	NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.40	10.56
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.65	8.31
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		6.36	8.60
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		5.91	9.05
	01/13/2003		4.29	10.67
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		4.15	10.81
	07/07/2003		7.10	7.86
	10/27/2003		NM	NM
	11/18/2003		5.82	9.14
	01/15/2004		5.35	9.61
	04/21/2004		6.20	8.76
	07/13/2004		7.09	7.87
	10/12/2004		5.92	9.04
	01/25/2005		4.64	10.32
	04/25/2005		5.18	9.78
	07/20/2005		6.82	8.14
	10/21/2005		7.14	7.82
	01/20/2006		2.88	12.08
	04/27/2006		5.22	9.74
	07/20/2006		6.35	8.61
	10/19/2006		5.64	9.32
	01/18/2007		5.32	9.64
	04/12/2007		5.78	9.18
	07/19/2007		6.75	8.21
	10/05/2007		5.23	9.73
	10/12/2007		3.94	11.02
	10/26/2007		NM	NM
	11/02/2007		4.49	10.47
	01/17/2008		4.42	10.54
	04/10/2008		6.21	8.75
	07/24/2008		7.36	7.60
	10/22/2008		6.80	8.16
	01/08/2009		4.86	10.10
	04/09/2009		5.06	9.90
	07/16/2009		6.40	8.56

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ10	10/16/2009	14.96	4.58	10.36
	01/14/2010		5.23	9.73
	04/23/2010		4.37	10.59
	07/23/2010		6.03	8.93
	10/15/2010		6.74	8.21
	01/28/2011		4.63	10.33
	04/19/2011		5.00	9.96
LF-PZ11	12/15/1997	15.49	5.92	9.57
	01/13/1998		3.77	11.72
	01/30/1998		4.41	11.08
	02/24/1998		4.04	11.45
	04/06/1998		5.15	10.34
	07/02/1998		5.85	9.64
	07/13/1998		5.88	9.61
	09/28/1998		6.14	9.35
	10/16/1998		6.22	9.27
	01/08/1999		5.81	9.68
	04/16/1999		4.78	10.71
	06/21/1999		6.19	9.30
	07/12/1999		6.21	9.28
	10/08/1999		6.15	9.34
	01/17/2000		5.66	9.83
	04/25/2000		5.25	10.24
	05/30/2000		5.70	9.79
	06/26/2000		NM	NM
	08/10/2000		6.15	9.34
	10/06/2000		6.09	9.40
	01/15/2001		4.97	10.52
	04/19/2001		5.34	10.15
	07/02/2001		5.86	9.63
	09/07/2001		NM	NM
	10/18/2001		5.83	9.66
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.80	10.69
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		5.36	10.13
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		5.81	9.68
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		5.83	9.66
	01/13/2003		4.32	11.17

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ11	02/26/2003	15.49	NM	NM
	03/19/2003		NM	NM
	04/14/2003		4.78	10.71
	07/07/2003		5.75	9.74
	10/27/2003		NM	NM
	11/18/2003		5.53	9.96
	01/15/2004		5.10	10.39
	04/21/2004		5.45	10.04
	07/13/2004		5.76	9.73
	10/12/2004		5.80	9.69
	01/25/2005		4.72	10.77
	04/25/2005		5.25	10.24
	07/20/2005		5.68	9.81
	10/21/2005		5.96	9.53
	01/20/2006		4.06	11.43
	04/27/2006		4.92	10.57
	07/20/2006		5.63	9.86
	10/19/2006		5.68	9.81
	01/18/2007		5.28	10.21
	04/12/2007		5.40	10.09
	07/19/2007		5.70	9.79
	08/17/2007		5.77	9.72
	08/24/2007		5.74	9.75
	08/30/2007		5.78	9.71
	09/06/2007		5.76	9.73
	09/14/2007		5.65	9.84
	09/21/2007		5.53	9.96
	09/28/2007		5.56	9.93
	10/05/2007		5.64	9.85
	10/12/2007		4.60	10.89
	10/19/2007		4.69	10.80
	10/26/2007		5.04	10.45
	11/02/2007		5.28	10.21
	11/09/2007		5.41	10.08
	11/15/2007		4.61	10.88
	11/21/2007		4.99	10.50
	11/29/2007		5.33	10.16
	01/17/2008		4.69	10.80
	04/10/2008		5.61	9.88
	07/24/2008		6.15	9.34
	10/22/2008		5.93	9.56
	01/08/2009		4.84	10.65
	04/09/2009		4.98	10.51
	07/16/2009		5.75	9.74
	10/16/2009		4.10	11.37

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ11	01/14/2010	15.49	4.98	10.51
	04/23/2010		4.42	11.07
	07/23/2010		5.69	9.80
	10/15/2010		5.85	9.63
	01/28/2011		4.94	10.55
	04/19/2011		5.01	10.48
LF-PZ12	12/15/1997	13.71	4.38	9.33
	01/13/1998		3.67	10.04
	01/30/1998		4.04	9.67
	02/24/1998		3.68	10.03
	04/07/1998		4.61	9.10
	07/02/1998		5.21	8.50
	07/13/1998		5.23	8.48
	09/28/1998		5.38	8.33
	10/16/1998		5.38	8.33
	01/08/1999		4.89	8.82
	04/16/1999		3.64	10.07
	06/21/1999		5.37	8.34
	07/12/1999		5.36	8.35
	10/08/1999		5.28	8.43
	01/17/2000		5.06	8.65
	02/11/2000		3.45	10.26
	04/25/2000		4.33	9.38
	05/30/2000		4.86	8.85
	06/26/2000		NM	NM
	08/10/2000		5.31	8.40
	10/06/2000		5.02	8.69
	01/15/2001		3.58	10.13
	04/19/2001		4.54	9.17
	07/02/2001		5.01	8.70
	09/07/2001		NM	NM
	10/18/2001		4.91	8.80
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.00	9.71
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		4.64	9.07
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		4.86	8.85
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		4.92	8.79
	01/13/2003		2.01	11.70

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ12	02/26/2003	13.71	NM	NM
	03/19/2003		NM	NM
	04/14/2003		3.40	10.31
	07/07/2003		4.79	8.92
	10/27/2003		NM	NM
	11/18/2003		4.55	9.16
	01/15/2004		3.90	9.81
	04/21/2004		4.51	9.20
	07/13/2004		4.82	8.89
	10/12/2004		4.84	8.87
	01/25/2005		4.28	9.43
	04/25/2005		4.30	9.41
	07/20/2005		4.73	8.98
	10/21/2005		4.97	8.74
	01/20/2006		2.98	10.73
	04/27/2006		NM	NM
	07/20/2006		4.67	9.04
	10/19/2006		4.70	9.01
	01/18/2007		4.33	9.38
	04/12/2007		4.42	9.29
	07/19/2007		4.65	9.06
	08/17/2007		4.71	9.00
	08/24/2007		4.69	9.02
	08/30/2007		4.70	9.01
	09/06/2007		4.66	9.05
	09/14/2007		4.68	9.03
	09/21/2007		4.52	9.19
	09/28/2007		4.47	9.24
	10/05/2007		4.51	9.20
	10/12/2007		NM	NM
	10/19/2007		3.41	10.30
	10/26/2007		3.88	9.83
	11/02/2007		4.14	9.57
	11/09/2007		4.26	9.45
	11/15/2007		3.35	10.36
	11/21/2007		3.91	9.80
	11/29/2007		4.21	9.50
	01/17/2008		4.16	9.55
	04/10/2008		4.17	9.54
	07/24/2008		5.22	8.49
	10/22/2008		4.76	8.95
	01/08/2009		3.71	10.00
	04/09/2009		3.96	9.75
	07/16/2009		4.65	9.06
	10/16/2009		2.69	11.00

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ12	01/14/2010	13.71	4.26	9.45
	04/23/2010		3.09	10.62
	07/23/2010		4.58	9.13
	10/15/2010		4.76	8.94
	01/28/2011		3.87	9.84
	04/19/2011		3.85	9.86
LF-PZ13	12/15/1997	13.63	2.78	10.85
	01/13/1998		1.78	11.85
	01/30/1998		2.05	11.58
	02/24/1998		2.01	11.62
	04/07/1998		4.03	9.60
	07/02/1998		5.76	7.87
	07/13/1998		5.87	7.76
	09/28/1998		6.41	7.22
	10/16/1998		6.55	7.08
	01/08/1999		4.80	8.83
	04/16/1999		3.80	9.83
	06/21/1999		7.45	6.18
	07/12/1999		7.56	6.07
	10/08/1999		7.60	6.03
	02/11/2000		4.71	8.92
	04/25/2000		3.54	10.09
	05/30/2000		4.40	9.23
	06/26/2000		NM	NM
	08/10/2000		6.42	7.21
	10/06/2000		6.52	7.11
	01/15/2001		4.89	8.74
	04/19/2001		4.02	9.61
	07/02/2001		6.70	6.93
	09/07/2001		NM	NM
	10/18/2001		6.40	7.23
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		3.35	10.28
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.31	7.32
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		5.51	8.12
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		8.05	5.58
	01/13/2003		3.65	9.98
	02/26/2003		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ13	03/19/2003	13.63	NM	NM
	04/14/2003		4.88	8.75
	07/07/2003		6.92	6.71
	10/27/2003		NM	NM
	11/18/2003		6.62	7.01
	01/15/2004		5.21	8.42
	04/21/2004		6.31	7.32
	07/13/2004		6.84	6.79
	10/12/2004		6.21	7.42
	01/25/2005		3.95	9.68
	04/25/2005		5.29	8.34
	07/20/2005		7.00	6.63
	10/21/2005		7.26	6.37
	01/20/2006		2.38	11.25
	04/27/2006		NM	NM
	07/20/2006		6.41	7.22
	10/19/2006		6.39	7.24
	01/18/2007		5.30	8.33
	04/12/2007		5.96	7.67
	07/19/2007		7.08	6.55
	08/17/2007		6.90	6.73
	08/24/2007		6.57	7.06
	08/30/2007		6.45	7.18
	09/06/2007		6.26	7.37
	09/14/2007		6.12	7.51
	09/21/2007		5.89	7.74
	09/28/2007		5.72	7.91
	10/05/2007		5.58	8.05
	10/12/2007		NM	NM
	10/19/2007		4.41	9.22
	10/26/2007		4.31	9.32
	11/02/2007		4.30	9.33
	11/09/2007		4.30	9.33
	11/15/2007		3.78	9.85
	11/21/2007		3.79	9.84
	11/29/2007		3.87	9.76
	01/17/2008		4.18	9.45
	04/10/2008		6.72	6.91
	07/24/2008		7.29	6.34
	10/22/2008		7.28	6.35
	01/08/2009		4.89	8.74
	04/09/2009		4.86	8.77
	07/16/2009		6.63	7.00
	10/16/2009		4.67	8.94
	01/14/2010		5.81	7.82

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ13	04/23/2010	13.63	4.57	9.06
	07/23/2010		6.59	7.04
	10/15/2010		7.14	6.48
	01/28/2011		4.30	9.33
	04/19/2011		4.58	9.05
LF-PZ14	12/15/1997	12.91	2.05	10.86
	01/13/1998		1.02	11.89
	01/30/1998		1.23	11.68
	02/24/1998		1.35	11.56
	04/06/1998		3.46	9.45
	07/02/1998		5.20	7.71
	07/13/1998		5.29	7.62
	09/28/1998		5.86	7.05
	10/16/1998		6.01	6.90
	01/08/1999		4.09	8.82
	04/16/1999		3.19	9.72
	06/21/1999		7.07	5.84
	07/12/1999		7.07	5.84
	10/08/1999		7.15	5.76
	01/17/2000		6.35	6.56
	04/25/2000		2.73	10.18
	05/30/2000		3.72	9.19
	06/26/2000		NM	NM
	08/10/2000		5.80	7.11
	10/06/2000		5.99	6.92
	01/15/2001		4.28	8.63
	04/19/2001		3.25	9.66
	07/02/2001		6.12	6.79
	09/07/2001		NM	NM
	10/18/2001		5.87	7.04
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		2.85	10.06
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		5.90	7.01
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		4.85	8.06
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		5.51	7.40
	01/13/2003		3.01	9.90
	02/26/2003		NM	NM
	03/19/2003		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ14	04/14/2003	12.91	5.00	7.91
	07/07/2003		6.44	6.47
	10/27/2003		NM	NM
	11/18/2003		6.20	6.71
	01/15/2004		4.82	8.09
	04/21/2004		5.91	7.00
	07/13/2004		6.34	6.57
	10/12/2004		5.65	7.26
	01/25/2005		3.61	9.30
	04/25/2005		4.83	8.08
	07/20/2005		6.68	6.23
	10/21/2005		6.81	6.10
	01/23/2006		1.85	11.06
	04/27/2006		5.02	7.89
	07/20/2006		5.93	6.98
	10/19/2006		5.98	6.93
	01/18/2007		4.92	7.99
	04/12/2007		5.79	7.12
	07/19/2007		6.71	6.20
	10/12/2007		NM	NM
	01/17/2008		3.16	9.75
	04/10/2008		6.47	6.44
	07/24/2008		6.82	6.09
	10/22/2008		6.88	6.03
	01/08/2009		4.35	8.56
	04/09/2009		4.38	8.53
	07/16/2009		6.23	6.68
	10/16/2009		4.30	8.59
	01/14/2010		5.48	7.43
	04/23/2010		4.14	8.77
	07/23/2010		6.24	6.67
	10/15/2010		6.74	6.16
	01/28/2011		3.79	9.12
	04/19/2011		4.09	8.82
LF-PZ15	12/15/1997	17.03	5.84	11.19
	01/13/1998		4.81	12.22
	01/30/1998		4.91	12.12
	02/24/1998		5.09	11.94
	04/06/1998		7.25	9.78
	07/02/1998		9.37	7.66
	07/13/1998		9.57	7.46
	09/28/1998		10.00	7.03
	10/16/1998		10.17	6.86
	01/08/1999		8.15	8.88
	04/16/1999		7.30	9.73

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ15	06/21/1999	17.03	9.87	7.16
	07/12/1999		10.19	6.84
	10/08/1999		10.64	6.39
	01/17/2000		9.47	7.56
	04/25/2000		6.92	10.11
	05/30/2000		7.72	9.31
	06/26/2000		NM	NM
	08/10/2000		9.15	7.88
	10/06/2000		9.41	7.62
	01/15/2001		7.91	9.12
	04/19/2001		7.24	9.79
	07/02/2001		9.35	7.68
	09/07/2001		NM	NM
	10/18/2001		9.61	7.42
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		6.63	10.40
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		8.36	8.67
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		8.63	8.40
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		9.35	7.68
	01/13/2003		7.20	9.83
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		7.80	9.23
	07/07/2003		9.75	7.28
	10/27/2003		NM	NM
	11/18/2003		9.25	7.78
	01/15/2004		7.87	9.16
	04/21/2004		8.72	8.31
	07/13/2004		9.79	7.24
	10/12/2004		9.70	7.33
	01/25/2005		7.37	9.66
	04/25/2005		8.11	8.92
	07/20/2005		9.55	7.48
	10/21/2005		10.35	6.68
	01/20/2006		5.90	11.13
	04/27/2006		7.63	9.40
	07/20/2006		9.61	7.42
	10/19/2006		9.75	7.28

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ15	01/18/2007	17.03	8.14	8.89
	04/12/2007		8.38	8.65
	07/19/2007		9.84	7.19
	10/12/2007		8.71	8.32
	01/17/2008		7.42	9.61
	04/10/2008		9.31	7.72
	07/24/2008		10.25	6.78
	10/22/2008		10.44	6.59
	01/08/2009		8.38	8.65
	04/09/2009		7.74	9.29
	07/16/2009		9.52	7.51
	10/16/2009		7.90	9.11
	01/14/2010		8.69	8.34
	04/23/2010		7.70	9.33
	07/23/2010		9.44	7.59
	10/15/2010		10.10	6.92
	01/28/2011		7.65	9.38
	04/19/2011		7.82	9.21
LF-PZ16	12/15/1997	13.73	2.52	11.21
	01/13/1998		1.35	12.38
	01/30/1998		1.61	12.12
	02/24/1998		2.41	11.32
	04/06/1998		3.99	9.74
	07/02/1998		6.55	7.18
	07/13/1998		6.50	7.23
	09/28/1998		7.33	6.40
	10/16/1998		7.46	6.27
	01/08/1999		5.10	8.63
	04/16/1999		4.09	9.64
	06/21/1999		7.90	5.83
	07/12/1999		8.28	5.45
	10/08/1999		8.28	5.45
	01/17/2000		7.20	6.53
	04/25/2000		3.44	10.29
	05/30/2000		4.38	9.35
	06/26/2000		NM	NM
	08/10/2000		6.90	6.83
	10/06/2000		7.20	6.53
	01/15/2001		5.02	8.71
	04/19/2001		3.94	9.79
	07/02/2001		7.34	6.39
	09/07/2001		NM	NM
	10/18/2001		7.02	6.71
	11/02/2001		NM	NM
	12/14/2001		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ16	01/18/2002	13.73	3.90	9.83
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.75	6.98
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		5.76	7.97
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		6.58	7.15
	01/13/2003		3.81	9.92
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		5.31	8.42
	07/07/2003		7.53	6.20
	10/27/2003		NM	NM
	11/18/2003		7.00	6.73
	01/15/2004		5.55	8.18
	04/21/2004		6.63	7.10
	07/13/2004		7.32	6.41
	10/12/2004		6.77	6.96
	01/25/2005		4.50	9.23
	04/25/2005		5.47	8.26
	07/20/2005		7.52	6.21
	10/21/2005		7.95	5.78
	01/20/2006		2.80	10.93
	04/27/2006		10.00	3.73
	07/20/2006		6.85	6.88
	10/19/2006		7.03	6.70
	01/18/2007		5.44	8.29
	04/12/2007		6.31	7.42
	07/19/2007		7.96	5.77
	10/12/2007		5.25	8.48
	01/17/2008		4.86	8.87
	04/10/2008		7.31	6.42
	07/24/2008		7.76	5.97
	10/22/2008		8.02	5.71
	01/08/2009		5.35	8.38
	04/09/2009		5.10	8.63
	07/16/2009		7.20	6.53
	10/16/2009		5.27	8.44
	01/14/2010		7.59	6.14
	04/23/2010		4.77	8.96
	07/23/2010		7.05	6.68
	10/15/2010		7.69	6.03

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ16	01/28/2011	13.73	4.58	9.15
	04/19/2011		5.08	8.65
LF-PZ17	12/15/1997	12.82	1.72	11.10
	01/13/1998		0.62	12.20
	01/30/1998		0.82	12.00
	02/24/1998		1.16	11.66
	04/06/1998		3.54	9.28
	07/02/1998		5.36	7.46
	07/13/1998		5.41	7.41
	09/28/1998		6.05	6.77
	10/16/1998		6.19	6.63
	01/08/1999		3.92	8.90
	04/16/1999		3.37	9.45
	06/21/1999		7.09	5.73
	07/12/1999		7.14	5.68
	10/08/1999		7.21	5.61
	01/17/2000		6.39	6.43
	04/25/2000		2.57	10.25
	05/30/2000		3.62	9.20
	06/26/2000		NM	NM
	08/10/2000		5.85	6.97
	10/06/2000		6.05	6.77
	01/15/2001		4.11	8.71
	04/19/2001		3.15	9.67
	07/02/2001		6.07	6.75
	09/07/2001		NM	NM
	10/18/2001		5.85	6.97
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		2.70	10.12
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		5.54	7.28
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		4.80	8.02
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		5.81	7.01
	01/13/2003		2.91	9.91
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		4.65	8.17
	07/07/2003		6.42	6.40
	10/27/2003		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ17	11/18/2003	12.82	6.04	6.78
	01/15/2004		4.45	8.37
	04/21/2004		5.72	7.10
	07/13/2004		6.34	6.48
	10/12/2004		5.65	7.17
	01/25/2005		3.50	9.32
	04/25/2005		4.53	8.29
	07/20/2005		6.50	6.32
	10/21/2005		6.89	5.93
	01/20/2006		1.52	11.30
	04/27/2006		3.54	9.28
	07/20/2006		6.01	6.81
	10/19/2006		5.95	6.87
	01/18/2007		4.63	8.19
	04/12/2007		5.61	7.21
	07/19/2007		6.80	6.02
	10/12/2007		NM	NM
	01/17/2008		3.66	9.16
	04/10/2008		6.34	6.48
	07/24/2008		6.85	5.97
	10/22/2008		7.05	5.77
	01/08/2009		4.39	8.43
	04/09/2009		4.17	8.65
	07/16/2009		6.23	6.59
	10/16/2009		4.14	8.66
	01/14/2010		5.66	7.16
	04/23/2010		3.81	9.01
	07/23/2010		6.20	6.62
	10/15/2010		6.80	6.01
	01/28/2011		3.68	9.14
	04/19/2011		4.00	8.82
LF-PZ18	12/15/1997	15.71	5.85	9.86
	01/13/1998		4.77	10.94
	01/30/1998		4.78	10.93
	02/24/1998		4.66	11.05
	04/06/1998		6.17	9.54
	07/02/1998		7.66	8.05
	07/13/1998		7.87	7.84
	09/28/1998		8.34	7.37
	10/16/1998		8.18	7.53
	01/08/1999		6.55	9.16
	04/16/1999		5.37	10.34
	06/21/1999		7.08	8.63
	07/12/1999		7.66	8.05
	10/08/1999		8.91	6.80

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ18	01/17/2000	15.71	8.91	6.80
	04/25/2000		5.81	9.90
	05/30/2000		5.94	9.77
	06/26/2000		NM	NM
	08/10/2000		7.20	8.51
	10/06/2000		7.95	7.76
	01/15/2001		7.23	8.48
	04/19/2001		5.69	10.02
	07/02/2001		7.09	8.62
	09/07/2001		NM	NM
	10/18/2001		8.44	7.27
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		5.15	10.56
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.49	9.22
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		7.52	8.19
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		8.22	7.49
	01/13/2003		5.77	9.94
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		7.10	8.61
	07/07/2003		8.19	7.52
	10/27/2003		NM	NM
	11/18/2003		8.45	7.26
	01/15/2004		5.81	9.90
	04/21/2004		6.20	9.51
	07/13/2004		8.14	7.57
	10/12/2004		8.39	7.32
	01/25/2005		5.54	10.17
	04/25/2005		5.70	10.01
	07/20/2005		7.30	8.41
	10/21/2005		8.75	6.96
	01/23/2006		4.71	11.00
	04/27/2006		5.51	10.20
	07/20/2006		7.32	8.39
	10/19/2006		8.38	7.33
	01/18/2007		7.58	8.13
	04/12/2007		5.89	9.82
	07/19/2007		8.33	7.38

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ18	10/12/2007	15.71	8.23	7.48
	01/17/2008		5.88	9.83
	04/10/2008		6.17	9.54
	07/24/2008		8.72	6.99
	10/22/2008		9.01	6.70
	01/08/2009		7.64	8.07
	04/09/2009		5.52	10.19
	07/16/2009		6.73	8.98
	10/16/2009		7.57	8.12
	01/14/2010		6.01	9.70
	04/23/2010		5.49	10.22
	07/23/2010		6.80	8.91
	10/15/2010		8.60	7.10
	01/28/2011		5.50	10.21
	04/19/2011		5.46	10.25
LF-PZ19	12/15/1997	16.37	5.16	12.18
	01/13/1998		4.11	13.23
	01/30/1998		4.19	13.15
	02/24/1998		5.08	12.26
	04/06/1998		6.61	10.73
	07/02/1998		8.95	8.39
	07/13/1998		9.29	7.08
	09/28/1998		9.69	6.68
	10/16/1998		8.83	7.54
	01/08/1999		7.48	8.89
	04/16/1999		6.82	9.55
	06/21/1999		9.52	6.85
	07/12/1999		9.81	6.56
	10/08/1999		10.23	6.14
	01/17/2000		8.33	8.04
	04/25/2000		6.16	10.21
	05/30/2000		7.00	9.37
	06/26/2000		NM	NM
	08/10/2000		8.65	7.72
	10/06/2000		8.84	7.53
	01/15/2001		7.39	8.98
	04/19/2001		6.43	9.94
	07/02/2001		8.94	7.43
	09/07/2001		NM	NM
	10/18/2001		9.11	7.26
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		5.84	10.53
	02/21/2002		NM	NM
	03/25/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ19	04/18/2002	16.37	7.94	8.43
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		8.03	8.34
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		8.71	7.66
	01/13/2003		6.50	9.87
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		7.30	9.07
	07/07/2003		9.19	7.18
	10/27/2003		NM	NM
	11/18/2003		8.71	7.66
	01/15/2004		7.25	9.12
	04/21/2004		8.26	8.11
	07/13/2004		9.26	7.11
	10/12/2004		9.10	7.27
	01/25/2005		6.74	9.63
	04/25/2005		7.54	8.83
	07/20/2005		9.10	7.27
	10/21/2005		9.89	6.48
	01/23/2006		5.75	10.62
	04/27/2006		7.02	9.35
	07/20/2006		9.12	7.25
	10/19/2006		9.30	7.07
	01/18/2007		7.61	8.76
	04/12/2007		7.94	8.43
	07/19/2007		9.44	6.93
	10/12/2007		7.86	8.51
	01/17/2008		6.83	9.54
	04/10/2008		9.01	7.36
	07/24/2008		9.97	6.40
	10/22/2008		10.09	6.28
	01/08/2009		7.85	8.52
	04/09/2009		7.27	9.10
	07/16/2009		9.14	7.23
	10/16/2009		7.43	8.92
	01/14/2010		8.75	7.62
	04/23/2010		7.18	9.19
	07/23/2010		9.11	7.26
	10/15/2010		9.74	6.62
	01/28/2011		7.18	9.19
	04/19/2011		7.27	9.10
LF-PZ2	12/15/1997	20.74	9.32	11.42

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ2	01/13/1998	20.74	10.11	10.63
	01/30/1998		9.43	11.31
	02/24/1998		8.76	11.98
	04/06/1998		9.79	10.95
	07/02/1998		10.55	10.19
	07/13/1998		10.66	10.08
	09/28/1998		11.12	9.62
	10/16/1998		11.22	9.52
	01/08/1999		10.90	9.84
	04/16/1999		9.82	10.92
	06/21/1999		11.02	9.72
	07/12/1999		11.30	9.44
	10/08/1999		11.59	9.15
	01/17/2000		11.60	9.14
	04/25/2000		10.69	10.05
	05/30/2000		11.15	9.59
	06/26/2000		11.35	9.39
	08/10/2000		11.78	8.96
	08/31/2000		11.63	9.11
	09/25/2000		11.44	9.30
	10/06/2000		11.46	9.28
	11/21/2000		11.89	8.85
	12/18/2000		11.85	8.89
	01/15/2001		11.41	9.33
	02/14/2001		11.20	9.54
	03/01/2001		9.95	10.79
	04/19/2001		11.03	9.71
	05/23/2001		11.68	9.06
	06/14/2001		11.76	8.98
	07/02/2001		11.61	9.13
	08/10/2001		11.59	9.15
	09/07/2001		11.62	9.12
	10/18/2001		11.80	8.94
	11/02/2001		11.88	8.86
	12/14/2001		10.42	10.32
	01/18/2002		9.72	11.02
	02/21/2002		10.29	10.45
	03/25/2002		10.30	10.44
	04/18/2002		10.61	10.13
	05/10/2002		10.99	9.75
	06/04/2002		11.87	8.87
	07/10/2002		11.14	9.60
	08/15/2002		11.13	9.61
	09/11/2002		10.92	9.82
	10/08/2002		11.21	9.53

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ2	11/07/2002	20.74	11.21	9.53
	12/12/2002		10.91	9.83
	01/13/2003		9.81	10.93
	02/26/2003		9.85	10.89
	03/19/2003		10.95	9.79
	04/14/2003		11.19	9.55
	05/13/2003		11.12	9.62
	06/13/2003		11.11	9.63
	07/07/2003		11.03	9.71
	08/13/2003		10.95	9.79
	09/17/2003		11.11	9.63
	10/27/2003		11.41	9.33
	11/18/2003		11.38	9.36
	12/19/2003		10.96	9.78
	01/15/2004		10.13	10.61
	02/17/2004		10.62	10.12
	03/18/2004		11.10	9.64
	04/21/2004		11.65	9.09
	05/18/2004		11.40	9.34
	06/10/2004		11.65	9.09
	07/13/2004		11.63	9.11
	08/12/2004		11.50	9.24
	09/16/2004		11.55	9.19
	10/12/2004		11.43	9.31
	11/17/2004		11.53	9.21
	12/15/2004		11.03	9.71
	01/25/2005		10.32	10.42
	02/15/2005		11.25	9.49
	03/15/2005		10.68	10.06
	04/25/2005		11.02	9.72
	05/20/2005		11.12	9.62
	06/21/2005		11.21	9.53
	07/20/2005		11.65	9.09
	08/22/2005		11.75	8.99
	09/16/2005		11.87	8.87
	10/21/2005		11.94	8.80
	11/18/2005		11.94	8.80
	12/16/2005		11.57	9.17
	01/20/2006		9.90	10.84
	02/22/2006		10.23	10.51
	03/30/2006		8.75	11.99
	04/27/2006		9.36	11.38
	05/18/2006		10.33	10.41
	06/22/2006		11.06	9.68
	07/20/2006		11.18	9.56

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ2	08/17/2006	20.74	11.27	9.47
	09/14/2006		11.20	9.54
	10/19/2006		11.33	9.41
	11/21/2006		11.33	9.41
	12/21/2006		10.10	10.64
	01/18/2007		10.43	10.31
	02/06/2007		10.62	10.12
	03/08/2007		9.57	11.17
	04/12/2007		10.30	10.44
	05/10/2007		10.11	10.63
	06/07/2007		10.93	9.81
	07/19/2007		11.08	9.66
	08/09/2007		11.17	9.57
	08/17/2007		10.95	9.79
	08/24/2007		10.85	9.89
	08/30/2007		10.78	9.96
	09/06/2007		10.72	10.02
	09/14/2007		10.65	10.09
	09/21/2007		10.48	10.26
	09/28/2007		10.48	10.26
	10/05/2007		10.50	10.24
	10/12/2007		10.36	10.38
	10/19/2007		10.28	10.46
	10/26/2007		10.12	10.62
	11/02/2007		10.24	10.50
	11/09/2007		10.19	10.55
	11/15/2007		10.01	10.73
	11/21/2007		10.06	10.68
	11/29/2007		10.09	10.65
	12/14/2007		9.99	10.75
	01/17/2008		9.35	11.39
	02/21/2008		9.75	10.99
	03/20/2008		10.48	10.26
	04/10/2008		11.18	9.56
	05/08/2008		11.17	9.57
	06/12/2008		11.18	9.56
	07/24/2008		11.42	9.32
	08/14/2008		11.39	9.35
	09/18/2008		11.30	9.44
	10/22/2008		11.41	9.33
	11/13/2008		11.40	9.34
	12/04/2008		11.27	9.47
	01/08/2009		10.80	9.94
	02/11/2009		10.58	10.16
	03/12/2009		8.30	12.44

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ2	04/09/2009	20.74	9.40	11.34
	05/20/2009		9.83	10.91
	06/17/2009		10.28	10.46
	07/16/2009		10.42	10.32
	08/13/2009		10.47	10.27
	09/10/2009		10.84	9.90
	10/16/2009		9.81	10.91
	11/12/2009		10.43	10.31
	12/03/2009		10.56	10.18
	01/14/2010		10.67	10.07
	02/18/2010		8.99	11.75
	03/25/2010		9.10	11.64
	04/23/2010		9.34	11.40
	05/21/2010		9.97	10.77
	06/10/2010		10.39	10.35
	07/23/2010		10.51	10.23
	08/12/2010		10.51	10.23
	09/10/2010		10.86	9.88
	10/15/2010		10.83	9.90
	11/04/2010		10.76	9.98
	12/03/2010		10.40	10.34
	01/28/2011		9.28	11.46
	02/10/2011		9.88	10.86
	03/31/2011		7.64	13.10
	04/19/2011		8.90	11.84
LF-PZ20	12/15/1997	16.15	5.78	10.37
	01/13/1998		3.81	12.34
	01/30/1998		5.28	10.87
	02/24/1998		3.21	12.94
	04/06/1998		4.97	11.18
	07/02/1998		6.61	9.54
	07/13/1998		7.83	8.32
	09/28/1998		6.85	9.30
	10/16/1998		7.12	9.03
	01/08/1999		6.53	9.62
	04/16/1999		5.39	10.76
	06/21/1999		7.24	8.91
	07/12/1999		7.45	8.70
	10/08/1999		7.60	8.55
	01/17/2000		7.00	9.15
	04/25/2000		5.36	10.79
	05/30/2000		5.93	10.22
	06/26/2000		NM	NM
	08/10/2000		7.80	8.35
	10/06/2000		6.82	9.33

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ20	01/15/2001	16.15	6.16	9.99
	04/19/2001		5.46	10.69
	07/02/2001		8.35	7.80
	09/07/2001		NM	NM
	10/18/2001		6.29	9.86
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.63	11.52
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		6.25	9.90
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		6.43	9.72
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		6.41	9.74
	01/13/2003		4.53	11.62
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		5.41	10.74
	07/07/2003		6.17	9.98
	10/27/2003		NM	NM
	11/18/2003		6.11	10.04
	01/15/2004		5.64	10.51
	04/21/2004		6.15	10.00
	07/13/2004		6.64	9.51
	10/12/2004		6.55	9.60
	01/25/2005		5.35	10.80
	04/25/2005		5.44	10.71
	07/20/2005		6.20	9.95
	10/21/2005		7.15	9.00
	01/20/2006		4.52	11.63
	04/27/2006		5.66	10.49
	07/20/2006		6.00	10.15
	10/19/2006		6.05	10.10
	01/18/2007		5.65	10.50
	04/12/2007		5.58	10.57
	07/19/2007		6.59	9.56
	10/05/2007		5.91	10.24
	10/12/2007		5.30	10.85
	10/26/2007		5.27	10.88
	11/02/2007		5.37	10.78
	01/17/2008		5.26	10.89
	04/10/2008		6.17	9.98

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ20	07/24/2008	16.15	6.98	9.17
	10/22/2008		6.68	9.47
	01/08/2009		5.46	10.69
	04/09/2009		5.58	10.57
	07/16/2009		6.12	10.03
	10/16/2009		5.18	10.95
	01/14/2010		5.41	10.74
	04/23/2010		5.07	11.08
	07/23/2010		6.25	9.90
	10/15/2010		6.65	9.49
	01/28/2011		5.16	10.99
	04/19/2011		5.28	10.87
LF-PZ21	06/21/1999	14.70	7.23	7.47
	07/12/1999		7.61	7.09
	10/08/1999		7.80	6.90
LF-PZ22	06/21/1999	14.96	5.58	9.38
	07/12/1999		5.96	9.00
	10/08/1999		6.10	8.86
LF-PZ23	06/21/1999	18.34	8.71	9.63
	07/12/1999		8.83	9.51
	10/08/1999		8.95	9.39
LF-PZ24	06/21/1999	18.97	9.74	9.23
	07/12/1999		9.91	9.06
	10/08/1999		10.00	8.97
LF-PZ25	06/21/1999	19.06	9.77	9.29
	07/12/1999		9.96	9.10
	10/08/1999		10.14	8.92
LF-PZ26	10/08/1999	21.40	12.39	9.01
	01/17/2000		11.69	9.71
	04/25/2000		10.64	10.76
	05/30/2000		11.46	9.94
	06/26/2000		NM	NM
	08/10/2000		12.02	9.38
	10/06/2000		12.92	8.48
	01/15/2001		10.97	10.43
	04/19/2001		11.05	10.35
	07/02/2001		11.87	9.53
	09/07/2001		NM	NM
	10/18/2001		11.60	9.80
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		10.40	11.00
	02/21/2002		NM	NM
	03/25/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ26	04/18/2002	21.40	11.62	9.78
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		11.46	9.94
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		11.22	10.18
	01/13/2003		10.32	11.08
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		10.36	11.04
	07/07/2003		11.70	9.70
	10/27/2003		NM	NM
	01/15/2004		11.27	10.13
	04/21/2004		11.45	9.95
	07/13/2004		11.84	9.56
	10/12/2004		11.38	10.02
	01/25/2005		10.70	10.70
	02/15/2005		9.35	12.05
	04/25/2005		10.90	10.50
	07/20/2005		11.79	9.61
	10/21/2005		12.05	9.35
	01/20/2006		9.31	12.09
	04/27/2006		10.88	10.52
	07/20/2006		11.47	9.93
	10/19/2006		11.23	10.17
	01/18/2007		11.14	10.26
	04/12/2007		11.32	10.08
	07/19/2007		11.75	9.65
	08/17/2007		11.53	9.87
	08/24/2007		11.38	10.02
	08/30/2007		11.31	10.09
	09/06/2007		11.22	10.18
	09/14/2007		11.11	10.29
	09/21/2007		10.95	10.45
	09/28/2007		10.90	10.50
	10/05/2007		11.01	10.39
	10/12/2007		10.28	11.12
	10/19/2007		10.29	11.11
	10/26/2007		10.45	10.95
	11/02/2007		10.59	10.81
	11/09/2007		10.71	10.69
	11/15/2007		10.19	11.21
	11/21/2007		10.46	10.94
	11/29/2007		10.63	10.77

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ26	01/17/2008	21.40	10.42	10.98
	04/10/2008		11.37	10.03
	07/24/2008		11.95	9.45
	10/22/2008		11.69	9.71
	01/08/2009		10.59	10.81
	04/09/2009		10.87	10.53
	07/16/2009		11.52	9.88
	10/16/2009		10.33	11.05
	01/14/2010		10.94	10.46
	04/23/2010		10.29	11.11
	07/23/2010		11.30	10.10
	10/15/2010		11.61	9.78
	01/28/2011		10.71	10.69
	04/19/2011		10.89	10.51
LF-PZ27	01/17/2000	19.08	9.91	9.17
	04/25/2000		9.26	9.82
	05/30/2000		9.82	9.26
	06/26/2000		10.24	8.84
	08/10/2000		10.48	8.60
	08/31/2000		9.76	9.32
	09/25/2000		10.05	9.03
	10/06/2000		10.17	8.91
	11/21/2000		10.31	8.77
	12/18/2000		9.87	9.21
	01/15/2001		9.76	9.32
	02/14/2001		9.04	10.04
	03/01/2001		8.52	10.56
	04/19/2001		9.85	9.23
	05/23/2001		10.41	8.67
	06/14/2001		10.41	8.67
	07/02/2001		10.15	8.93
	08/10/2001		10.25	8.83
	09/07/2001		10.24	8.84
	10/18/2001		10.27	8.81
	11/02/2001		10.10	8.98
	12/14/2001		8.91	10.17
	01/18/2002		8.61	10.47
	02/21/2002		8.85	10.23
	03/25/2002		8.11	10.97
	04/18/2002		9.60	9.48
	05/10/2002		9.95	9.13
	06/04/2002		9.43	9.65
	07/10/2002		9.80	9.28
	08/15/2002		9.62	9.46
	09/11/2002		9.41	9.67

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ27	10/08/2002	19.08	9.43	9.65
	11/07/2002		9.76	9.32
	12/12/2002		9.64	9.44
	01/13/2003		8.05	11.03
	02/26/2003		8.01	11.07
	03/19/2003		9.21	9.87
	04/14/2003		9.00	10.08
	05/13/2003		9.01	10.07
	06/13/2003		9.22	9.86
	07/07/2003		9.19	9.89
	08/13/2003		9.46	9.62
	09/17/2003		9.55	9.53
	10/27/2003		NM	NM
	11/18/2003		9.62	9.46
	12/19/2003		8.88	10.20
	01/15/2004		8.70	10.38
	02/17/2004		8.83	10.25
	03/18/2004		9.20	9.88
	04/21/2004		9.86	9.22
	05/18/2004		9.77	9.31
	06/10/2004		9.70	9.38
	07/13/2004		9.64	9.44
	08/12/2004		9.80	9.28
	09/16/2004		9.86	9.22
	10/12/2004		9.67	9.41
	11/17/2004		9.46	9.62
	12/15/2004		8.83	10.25
	01/25/2005		8.68	10.40
	02/15/2005		9.35	9.73
	03/15/2005		8.87	10.21
	04/25/2005		8.97	10.11
	05/20/2005		9.10	9.98
	06/21/2005		9.35	9.73
	07/20/2005		9.97	9.11
	08/19/2005		10.20	8.88
	09/16/2005		10.09	8.99
	10/21/2005		10.25	8.83
	11/18/2005		10.11	8.97
	12/16/2005		9.71	9.37
	01/20/2006		8.23	10.85
	02/22/2006		8.35	10.73
	03/30/2006		7.96	11.12
	04/27/2006		7.99	11.09
	05/18/2006		8.40	10.68
	06/22/2006		9.12	9.96

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ27	07/20/2006	19.08	9.13	9.95
	08/17/2006		8.99	10.09
	09/14/2006		9.08	10.00
	10/19/2006		9.12	9.96
	11/21/2006		9.23	9.85
	12/21/2006		8.35	10.73
	01/18/2007		8.83	10.25
	02/06/2007		9.24	9.84
	03/08/2007		8.53	10.55
	04/12/2007		8.91	10.17
	05/10/2007		8.89	10.19
	06/07/2007		9.45	9.63
	07/19/2007		9.23	9.85
	08/09/2007		9.06	10.02
	09/14/2007		8.77	10.31
	10/12/2007		8.63	10.45
	11/09/2007		8.49	10.59
	12/14/2007		8.38	10.70
	01/17/2008		8.38	10.70
	02/21/2008		6.19	12.89
	03/20/2008		9.25	9.83
	04/10/2008		9.75	9.33
	05/08/2008		9.58	9.50
	06/12/2008		9.35	9.73
	07/24/2008		NM	NM
	08/14/2008		9.47	9.61
	09/18/2008		9.12	9.96
	10/22/2008		9.67	9.41
	11/13/2008		9.28	9.80
	12/04/2008		9.37	9.71
	01/08/2009		8.94	10.14
	02/11/2009		8.65	10.43
	03/12/2009		7.24	11.84
	04/09/2009		8.46	10.62
	05/20/2009		8.63	10.45
	06/17/2009		8.79	10.29
	07/16/2009		8.97	10.11
	08/13/2009		8.81	10.27
	09/10/2009		9.07	10.01
	10/16/2009		8.20	10.86
	11/12/2009		8.38	10.70
	12/03/2009		8.62	10.46
	01/14/2010		8.49	10.59
	02/18/2010		8.23	10.85
	03/25/2010		8.08	11.00

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ27	04/23/2010	19.08	7.82	11.26
	05/21/2010		8.60	10.48
	06/10/2010		8.90	10.18
	07/23/2010		8.69	10.39
	08/12/2010		8.80	10.28
	09/10/2010		8.89	10.19
	10/15/2010		9.31	9.76
	11/04/2010		8.84	10.24
	12/03/2010		8.64	10.44
	01/28/2011		8.31	10.77
	02/10/2011		8.37	10.71
	03/31/2011		6.70	12.38
	04/19/2011		7.98	11.10
LF-PZ28	01/17/2000	14.83	5.72	9.11
	04/25/2000		4.81	10.02
	05/30/2000		5.33	9.50
	06/26/2000		5.55	9.28
	08/10/2000		5.88	8.95
	08/31/2000		5.90	8.93
	09/25/2000		5.72	9.11
	10/06/2000		5.67	9.16
	11/21/2000		5.99	8.84
	12/18/2000		5.89	8.94
	01/15/2001		5.37	9.46
	02/14/2001		4.83	10.00
	03/01/2001		3.86	10.97
	04/19/2001		5.05	9.78
	05/23/2001		5.85	8.98
	06/14/2001		6.00	8.83
	07/02/2001		5.99	8.84
	08/10/2001		5.85	8.98
	09/07/2001		5.87	8.96
	10/18/2001		5.96	8.87
	11/02/2001		6.00	8.83
	12/14/2001		4.18	10.65
	01/18/2002		3.93	10.90
	02/21/2002		4.20	10.63
	03/25/2002		4.22	10.61
	04/18/2002		4.81	10.02
	05/10/2002		5.27	9.56
	06/04/2002		5.02	9.81
	07/10/2002		5.34	9.49
	08/15/2002		5.44	9.39
	09/11/2002		5.12	9.71
	10/08/2002		5.01	9.82

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ28	11/07/2002	14.83	4.56	10.27
	12/12/2002		5.70	9.13
	01/13/2003		3.65	11.18
	02/26/2003		3.60	11.23
	03/19/2003		4.89	9.94
	04/14/2003		4.90	9.93
	05/13/2003		5.00	9.83
	06/13/2003		5.14	9.69
	07/07/2003		5.02	9.81
	08/13/2003		5.16	9.67
	09/17/2003		5.30	9.53
	10/27/2003		5.51	9.32
	11/18/2003		5.45	9.38
	12/19/2003		4.70	10.13
	01/15/2004		4.18	10.65
	02/17/2004		4.13	10.70
	03/18/2004		5.09	9.74
	04/21/2004		5.79	9.04
	05/18/2004		5.41	9.42
	06/10/2004		7.15	7.68
	07/13/2004		5.70	9.13
	08/12/2004		5.65	9.18
	09/16/2004		5.63	9.20
	10/12/2004		5.45	9.38
	11/17/2004		5.41	9.42
	12/15/2004		4.91	9.92
	01/25/2005		4.56	10.27
	02/15/2005		5.13	9.70
	03/15/2005		4.89	9.94
	04/25/2005		5.12	9.71
	05/20/2005		5.12	9.71
	06/21/2005		5.29	9.54
	07/20/2005		5.82	9.01
	08/22/2005		6.15	8.68
	09/16/2005		6.05	8.78
	10/21/2005		6.16	8.67
	11/18/2005		7.00	7.83
	12/16/2005		5.59	9.24
	01/20/2006		3.66	11.17
	02/22/2006		4.40	10.43
	03/30/2006		2.16	12.67
	04/27/2006		3.40	11.43
	05/18/2006		4.59	10.24
	06/22/2006		5.29	9.54
	07/20/2006		5.35	9.48

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ28	08/17/2006	14.83	5.50	9.33
	09/14/2006		5.31	9.52
	10/19/2006		5.31	9.52
	11/21/2006		5.35	9.48
	12/21/2006		3.90	10.93
	01/18/2007		4.93	9.90
	02/06/2007		4.72	10.11
	03/08/2007		3.71	11.12
	04/12/2007		4.44	10.39
	05/10/2007		4.21	10.62
	06/07/2007		5.28	9.55
	07/19/2007		5.25	9.58
	08/09/2007		5.28	9.55
	08/17/2007		5.17	9.66
	08/24/2007		4.96	9.87
	08/30/2007		4.85	9.98
	09/06/2007		4.80	10.03
	09/14/2007		4.73	10.10
	09/21/2007		4.63	10.20
	09/28/2007		4.59	10.24
	10/05/2007		4.61	10.22
	10/12/2007		4.44	10.39
	10/19/2007		4.29	10.54
	10/26/2007		4.18	10.65
	11/02/2007		4.24	10.59
	11/09/2007		4.33	10.50
	11/15/2007		4.05	10.78
	11/21/2007		4.12	10.71
	11/29/2007		4.22	10.61
	12/14/2007		3.97	10.86
	01/17/2008		3.43	11.40
	02/21/2008		3.56	11.27
	03/20/2008		4.75	10.08
	04/10/2008		5.46	9.37
	05/08/2008		5.37	9.46
	06/12/2008		6.48	8.35
	07/24/2008		5.72	9.11
	08/14/2008		5.62	9.21
	09/18/2008		5.39	9.44
	10/22/2008		5.56	9.27
	11/13/2008		5.45	9.38
	12/04/2008		5.41	9.42
	01/08/2009		4.82	10.01
	02/11/2009		4.21	10.62
	03/12/2009		2.37	12.46

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ28	04/09/2009	14.83	3.67	11.16
	05/20/2009		3.99	10.84
	06/17/2009		4.48	10.35
	07/16/2009		4.59	10.24
	08/13/2009		4.62	10.21
	09/10/2009		4.97	9.86
	10/16/2009		3.41	11.40
	11/12/2009		4.53	10.30
	12/03/2009		4.62	10.21
	01/14/2010		4.67	10.16
	02/18/2010		3.08	11.75
	03/25/2010		3.35	11.48
	04/23/2010		3.31	11.52
	05/21/2010		4.14	10.69
	06/10/2010		4.67	10.16
	07/23/2010		4.67	10.16
	08/12/2010		4.68	10.15
	09/10/2010		4.72	10.11
	10/15/2010		5.06	9.76
	11/04/2010		4.91	9.92
	12/03/2010		4.47	10.36
	01/28/2011		3.47	11.36
	02/10/2011		4.01	10.82
	03/31/2011		1.83	13.00
	04/19/2011		3.25	11.58
LF-PZ29	01/17/2000	14.45	7.48	6.97
	04/25/2000		4.13	10.32
	05/30/2000		5.41	9.04
	06/26/2000		5.95	8.50
	08/10/2000		7.36	7.09
	08/31/2000		7.01	7.44
	09/25/2000		7.24	7.21
	10/06/2000		7.56	6.89
	11/21/2000		6.35	8.10
	12/18/2000		6.04	8.41
	01/15/2001		5.75	8.70
	02/14/2001		4.91	9.54
	03/01/2001		3.85	10.60
	04/19/2001		4.25	10.20
	05/23/2001		6.26	8.19
	06/14/2001		7.11	7.34
	07/02/2001		7.72	6.73
	08/10/2001		6.64	7.81
	09/07/2001		7.19	7.26
	10/18/2001		7.21	7.24

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ29	11/02/2001	14.45	7.44	7.01
	12/14/2001		2.49	11.96
	01/18/2002		4.30	10.15
	02/21/2002		5.81	8.64
	03/25/2002		5.62	8.83
	04/18/2002		7.16	7.29
	05/10/2002		5.59	8.86
	06/04/2002		6.10	8.35
	07/10/2002		6.26	8.19
	08/15/2002		6.71	7.74
	09/11/2002		6.82	7.63
	10/08/2002		7.01	7.44
	11/07/2002		6.99	7.46
	12/12/2002		6.85	7.60
	01/13/2003		4.50	9.95
	02/26/2003		5.23	9.22
	03/19/2003		6.52	7.93
	04/14/2003		5.59	8.86
	05/13/2003		6.62	7.83
	06/13/2003		5.10	9.35
	07/07/2003		7.80	6.65
	08/13/2003		7.90	6.55
	09/17/2003		7.66	6.79
	10/27/2003		7.72	6.73
	11/18/2003		7.37	7.08
	12/19/2003		6.45	8.00
	01/15/2004		6.00	8.45
	02/17/2004		5.61	8.84
	03/18/2004		6.60	7.85
	04/21/2004		6.95	7.50
	05/18/2004		6.80	7.65
	06/10/2004		6.95	7.50
	07/13/2004		7.66	6.79
	08/12/2004		7.71	6.74
	09/16/2004		8.60	5.85
	10/12/2004		6.48	7.97
	11/17/2004		5.94	8.51
	12/15/2004		5.15	9.30
	01/25/2005		4.84	9.61
	02/15/2005		6.22	8.23
	03/15/2005		4.94	9.51
	04/25/2005		5.83	8.62
	05/20/2005		5.58	8.87
	06/21/2005		6.51	7.94
	07/20/2005		7.04	7.41

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ29	08/22/2005	14.45	8.00	6.45
	09/16/2005		8.00	6.45
	10/21/2005		8.13	6.32
	11/18/2005		7.33	7.12
	12/16/2005		6.47	7.98
	01/20/2006		3.00	11.45
	02/22/2006		6.09	8.36
	03/30/2006		2.97	11.48
	04/27/2006		5.17	9.28
	05/18/2006		7.00	7.45
	06/22/2006		7.25	7.20
	07/20/2006		7.27	7.18
	08/17/2006		7.50	6.95
	09/14/2006		7.37	7.08
	10/19/2006		7.34	7.11
	11/21/2006		6.66	7.79
	12/21/2006		5.38	9.07
	01/18/2007		5.92	8.53
	02/06/2007		6.55	7.90
	03/08/2007		5.32	9.13
	04/12/2007		6.43	8.02
	05/10/2007		6.03	8.42
	06/07/2007		7.50	6.95
	07/19/2007		8.05	6.40
	08/09/2007		8.01	6.44
	08/17/2007		7.85	6.60
	08/24/2007		7.59	6.86
	08/30/2007		7.30	7.15
	09/06/2007		7.09	7.36
	09/14/2007		6.86	7.59
	09/21/2007		6.70	7.75
	09/28/2007		6.62	7.83
	10/05/2007		6.53	7.92
	10/12/2007		5.90	8.55
	10/19/2007		5.38	9.07
	10/26/2007		5.35	9.10
	11/02/2007		5.26	9.19
	11/09/2007		5.26	9.19
	11/15/2007		4.74	9.71
	11/21/2007		4.72	9.73
	11/29/2007		4.73	9.72
	12/14/2007		4.98	9.47
	01/17/2008		5.16	9.29
	02/21/2008		5.02	9.43
	03/20/2008		6.81	7.64

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ29	04/10/2008	14.45	7.31	7.14
	05/08/2008		7.55	6.90
	06/12/2008		7.81	6.64
	07/24/2008		8.01	6.44
	08/14/2008		8.28	6.17
	09/18/2008		8.28	6.17
	10/22/2008		8.23	6.22
	11/13/2008		6.59	7.86
	12/04/2008		7.16	7.29
	01/08/2009		5.87	8.58
	02/11/2009		6.35	8.10
	03/12/2009		3.58	10.87
	04/09/2009		5.55	8.90
	05/20/2009		5.68	8.77
	06/17/2009		7.25	7.20
	07/16/2009		7.50	6.95
	08/13/2009		7.68	6.77
	09/10/2009		7.69	6.76
	10/16/2009		4.98	9.45
	11/12/2009		6.67	7.78
	12/03/2009		7.48	6.97
	01/14/2010		6.59	7.86
	02/18/2010		4.13	10.32
	03/25/2010		5.14	9.31
	04/23/2010		5.17	9.28
	05/21/2010		6.28	8.17
	06/10/2010		6.45	8.00
	07/23/2010		6.93	7.52
	08/12/2010		7.06	7.39
	09/10/2010		7.57	6.88
	10/15/2010		7.93	6.51
	11/04/2010		7.65	6.80
	12/03/2010		5.86	8.59
	01/28/2011		5.25	9.20
	02/10/2011		5.51	8.94
	03/31/2011		3.14	11.31
	04/19/2011		5.54	8.91
LF-PZ3	12/15/1997	20.70	9.45	11.25
	01/13/1998		8.31	12.39
	01/30/1998		8.46	12.24
	02/24/1998		7.81	12.89
	04/06/1998		9.95	10.75
	07/02/1998		11.29	9.41
	07/13/1998		11.33	9.37
	09/28/1998		11.72	8.98

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ3	10/16/1998	20.70	11.96	8.74
	01/08/1999		11.25	9.45
	04/16/1999		10.70	10.00
	06/21/1999		12.38	8.32
	07/12/1999		12.42	8.28
	10/08/1999		12.74	7.96
	01/17/2000		12.43	8.27
	04/25/2000		10.20	10.50
	05/30/2000		11.23	9.47
	06/26/2000		11.80	8.90
	08/10/2000		12.07	8.63
	08/31/2000		12.04	8.66
	09/25/2000		11.80	8.90
	10/06/2000		12.02	8.68
	11/21/2000		12.24	8.46
	12/18/2000		11.54	9.16
	01/15/2001		11.12	9.58
	02/14/2001		9.41	11.29
	03/01/2001		8.48	12.22
	04/19/2001		10.45	10.25
	05/23/2001		11.65	9.05
	06/14/2001		11.65	9.05
	07/02/2001		11.79	8.91
	08/10/2001		11.65	9.05
	09/07/2001		11.60	9.10
	10/18/2001		11.60	9.10
	11/02/2001		11.81	8.89
	12/14/2001		8.33	12.37
	01/18/2002		9.43	11.27
	02/21/2002		10.72	9.98
	03/25/2002		10.79	9.91
	04/18/2002		11.17	9.53
	05/10/2002		11.45	9.25
	06/04/2002		11.16	9.54
	07/10/2002		11.29	9.41
	08/15/2002		11.44	9.26
	09/11/2002		6.51	14.19
	10/08/2002		11.31	9.39
	11/07/2002		11.48	3.22
	12/12/2002		10.51	4.19
	01/13/2003		9.96	4.74
	02/26/2003		10.55	4.15
	03/19/2003		10.64	10.06
	04/14/2003		10.90	9.80
	05/13/2003		11.23	9.47

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ3	06/13/2003	20.70	11.93	8.77
	07/07/2003		12.22	8.48
	08/13/2003		12.31	8.39
	09/17/2003		12.20	8.50
	10/27/2003		12.52	8.18
	11/18/2003		12.30	8.40
	12/19/2003		11.28	9.42
	01/15/2004		10.65	10.05
	02/17/2004		11.01	9.69
	03/18/2004		11.02	9.68
	04/21/2004		11.75	8.95
	05/18/2004		11.55	9.15
	06/10/2004		11.90	8.80
	07/13/2004		12.16	8.54
	08/12/2004		12.05	8.65
	09/16/2004		12.30	8.40
	10/12/2004		11.87	8.83
	11/17/2004		10.48	10.22
	12/15/2004		9.83	10.87
	01/25/2005		9.81	10.89
	02/15/2005		10.96	9.74
	03/15/2005		8.10	12.60
	04/25/2005		10.42	10.28
	05/20/2005		11.02	9.68
	06/21/2005		11.10	9.60
	07/20/2005		11.73	8.97
	08/22/2005		11.96	8.74
	09/16/2005		12.10	8.60
	10/21/2005		12.20	8.50
	11/18/2005		11.55	9.15
	12/16/2005		10.87	9.83
	01/20/2006		8.55	12.15
	02/22/2006		10.54	10.16
	03/30/2006		8.02	12.68
	04/27/2006		10.10	10.60
	05/18/2006		11.06	9.64
	06/22/2006		11.47	9.23
	07/20/2006		11.53	9.17
	08/17/2006		11.53	9.17
	09/14/2006		11.61	9.09
	10/19/2006		11.29	9.41
	11/21/2006		11.04	9.66
	12/21/2006		10.12	10.58
	01/18/2007		10.88	9.82
	02/06/2007		11.16	9.54

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ3	03/08/2007	20.70	9.60	11.10
	04/12/2007		10.88	9.82
	05/10/2007		10.48	10.22
	06/07/2007		11.20	9.50
	07/19/2007		11.62	9.08
	08/09/2007		11.75	8.95
	08/17/2007		11.63	9.07
	08/24/2007		11.55	9.15
	08/30/2007		11.48	9.22
	09/06/2007		11.38	9.32
	09/14/2007		11.32	9.38
	09/21/2007		11.13	9.57
	09/28/2007		11.06	9.64
	10/05/2007		11.01	9.69
	10/12/2007		10.84	9.86
	10/19/2007		10.10	10.60
	10/26/2007		10.11	10.59
	11/02/2007		10.28	10.42
	11/09/2007		10.28	10.42
	11/15/2007		9.79	10.91
	11/21/2007		9.97	10.73
	11/29/2007		10.13	10.57
	12/14/2007		10.04	10.66
	01/17/2008		9.71	10.99
	02/21/2008		9.90	10.80
	03/20/2008		10.82	9.88
	04/10/2008		11.20	9.50
	05/08/2008		11.31	9.39
	06/12/2008		11.39	9.31
	07/24/2008		11.78	8.92
	08/14/2008		11.77	8.93
	09/18/2008		11.89	8.81
	10/22/2008		11.88	8.82
	11/13/2008		11.38	9.32
	12/04/2008		11.34	9.36
	01/08/2009		10.56	10.14
	02/11/2009		10.90	9.80
	03/12/2009		8.84	11.86
	04/09/2009		10.39	10.31
	05/20/2009		10.26	10.44
	06/17/2009		10.97	9.73
	07/16/2009		11.25	9.45
	08/13/2009		11.43	9.27
	09/10/2009		11.57	9.13
	10/16/2009		10.09	10.59

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ3	11/12/2009	20.70	10.96	9.74
	12/03/2009		11.34	9.36
	01/14/2010		10.92	9.78
	02/18/2010		9.60	11.10
	03/25/2010		10.18	10.52
	04/23/2010		9.83	10.87
	05/21/2010		10.72	9.98
	06/10/2010		10.94	9.76
	07/23/2010		11.20	9.50
	08/12/2010		11.29	9.41
	09/10/2010		11.84	8.86
	10/15/2010		11.82	8.87
	11/04/2010		11.52	9.18
	12/03/2010		10.55	10.15
	01/28/2011		9.97	10.73
	02/10/2011		10.42	10.28
	03/31/2011		7.85	12.85
	04/19/2011		10.27	10.43
LF-PZ30	01/17/2000	18.41	8.27	10.14
	04/25/2000		7.89	10.52
	05/30/2000		8.14	10.27
	06/26/2000		8.29	10.12
	08/10/2000		8.52	9.89
	08/31/2000		8.38	10.03
	09/25/2000		8.47	9.94
	10/06/2000		8.51	9.90
	11/21/2000		8.08	10.33
	12/18/2000		8.08	10.33
	01/15/2001		7.99	10.42
	02/14/2001		7.50	10.91
	03/01/2001		7.27	11.14
	04/19/2001		8.04	10.37
	05/23/2001		8.36	10.05
	06/14/2001		8.30	10.11
	07/02/2001		8.31	10.10
	08/10/2001		8.18	10.23
	09/07/2001		8.20	10.21
	10/18/2001		8.20	10.21
	11/02/2001		8.21	10.20
	12/14/2001		7.14	11.27
	01/18/2002		7.48	10.93
	02/21/2002		7.52	10.89
	03/25/2002		7.63	10.78
	04/18/2002		7.99	10.42
	05/10/2002		8.11	10.30

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ30	06/04/2002	18.41	7.99	10.42
	07/10/2002		8.14	10.27
	08/15/2002		8.21	10.20
	09/11/2002		8.05	10.36
	10/08/2002		8.15	10.26
	11/07/2002		8.07	10.34
	12/12/2002		8.04	10.37
	01/13/2003		7.03	11.38
	02/26/2003		7.29	11.12
	03/19/2003		7.51	10.90
	04/14/2003		7.36	11.05
	05/13/2003		7.65	10.76
	06/13/2003		8.00	10.41
	07/07/2003		7.95	10.46
	08/13/2003		8.12	10.29
	09/17/2003		8.10	10.31
	10/27/2003		8.23	10.18
	11/18/2003		8.07	10.34
	12/19/2003		7.58	10.83
	01/15/2004		7.41	11.00
	02/17/2004		7.16	11.25
	03/18/2004		7.65	10.76
	04/21/2004		7.92	10.49
	05/18/2004		8.05	10.36
	06/10/2004		8.00	10.41
	07/13/2004		8.08	10.33
	08/12/2004		8.10	10.31
	09/16/2004		8.23	10.18
	10/12/2004		8.15	10.26
	11/17/2004		7.74	10.67
	12/15/2004		7.48	10.93
	01/24/2005		7.37	11.04
	02/15/2005		7.55	10.86
	03/15/2005		7.45	10.96
	04/25/2005		7.53	10.88
	05/20/2005		7.68	10.73
	06/21/2005		7.88	10.53
	07/20/2005		8.12	10.29
	08/22/2005		8.24	10.17
	09/16/2005		8.30	10.11
	10/21/2005		8.42	9.99
	11/18/2005		8.16	10.25
	12/16/2005		8.01	10.40
	01/20/2006		NM	NM
	02/22/2006		7.30	11.11

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ30	03/30/2006	18.41	6.56	11.85
	04/27/2006		7.05	11.36
	05/18/2006		7.50	10.91
	06/22/2006		7.74	10.67
	07/20/2006		7.81	10.60
	08/17/2006		7.80	10.61
	09/14/2006		7.80	10.61
	10/19/2006		7.80	10.61
	11/21/2006		7.73	10.68
	12/21/2006		7.10	11.31
	01/18/2007		7.68	10.73
	02/06/2007		7.90	10.51
	03/08/2007		7.38	11.03
	04/12/2007		7.72	10.69
	05/10/2007		7.59	10.82
	06/07/2007		7.88	10.53
	07/19/2007		7.91	10.50
	08/09/2007		7.93	10.48
	09/14/2007		7.70	10.71
	10/12/2007		7.51	10.90
	11/09/2007		7.67	10.74
	12/14/2007		7.49	10.92
	01/17/2008		7.33	11.08
	02/21/2008		7.03	11.38
	03/20/2008		7.73	10.68
	04/10/2008		8.05	10.36
	05/08/2008		7.99	10.42
	06/12/2008		7.96	10.45
	07/24/2008		8.16	10.25
	08/14/2008		8.14	10.27
	09/18/2008		8.06	10.35
	10/22/2008		8.19	10.22
	11/13/2008		7.67	10.74
	12/04/2008		7.84	10.57
	01/08/2009		7.51	10.90
	02/11/2009		7.36	11.05
	03/12/2009		6.75	11.66
	04/09/2009		7.29	11.12
	05/20/2009		7.49	10.92
	06/17/2009		7.65	10.76
	07/16/2009		7.76	10.65
	08/13/2009		7.70	10.71
	09/10/2009		7.89	10.52
	10/16/2009		7.17	11.22
	11/12/2009		7.51	10.90

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ30	12/03/2009	18.41	7.65	10.76
	01/14/2010		7.45	10.96
	02/18/2010		6.97	11.44
	03/25/2010		7.14	11.27
	04/23/2010		7.07	11.34
	05/21/2010		7.45	10.96
	06/10/2010		7.62	10.79
	07/23/2010		7.66	10.75
	08/12/2010		7.77	10.64
	09/10/2010		7.85	10.56
	10/15/2010		8.01	10.39
	11/04/2010		7.66	10.75
	12/03/2010		7.46	10.95
	01/28/2011		7.36	11.05
	02/10/2011		7.50	10.91
	03/31/2011		6.45	11.96
	04/19/2011		7.27	11.14
LF-PZ31	01/17/2000	18.25	8.45	9.80
	04/25/2000		7.90	10.35
	05/30/2000		8.27	9.98
	06/26/2000		8.48	9.77
	08/10/2000		8.41	9.84
	08/31/2000		8.38	9.87
	09/25/2000		8.60	9.65
	10/06/2000		8.31	9.94
	11/21/2000		8.23	10.02
	12/18/2000		8.15	10.10
	01/15/2001		8.13	10.12
	02/14/2001		7.54	10.71
	03/01/2001		7.19	11.06
	04/19/2001		8.10	10.15
	05/23/2001		8.52	9.73
	06/14/2001		8.46	9.79
	07/02/2001		8.45	9.80
	08/10/2001		8.15	10.10
	09/07/2001		8.23	10.02
	10/18/2001		8.48	9.77
	11/02/2001		8.34	9.91
	12/14/2001		7.41	10.84
	01/18/2002		7.37	10.88
	02/21/2002		7.49	10.76
	03/25/2002		7.59	10.66
	04/18/2002		8.01	10.24
	05/10/2002		8.22	10.03
	06/04/2002		7.97	10.28

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ31	07/10/2002	18.25	8.23	10.02
	08/15/2002		8.24	10.01
	09/11/2002		8.07	10.18
	10/08/2002		8.21	10.04
	11/07/2002		8.13	10.12
	12/12/2002		8.04	10.21
	01/13/2003		9.01	9.24
	02/26/2003		7.01	11.24
	03/19/2003		7.49	10.76
	04/14/2003		7.44	10.81
	05/13/2003		7.69	10.56
	06/13/2003		7.98	10.27
	07/07/2003		8.02	10.23
	08/13/2003		8.15	10.10
	09/17/2003		8.15	10.10
	10/27/2003		8.28	9.97
	11/18/2003		8.09	10.16
	12/19/2003		7.50	10.75
	01/15/2004		7.33	10.92
	02/17/2004		7.19	11.06
	03/18/2004		7.68	10.57
	04/21/2004		7.98	10.27
	05/18/2004		8.05	10.20
	06/10/2004		7.98	10.27
	07/13/2004		8.09	10.16
	08/12/2004		8.15	10.10
	09/16/2004		8.30	9.95
	10/12/2004		8.19	10.06
	11/17/2004		7.71	10.54
	12/15/2004		7.49	10.76
	01/24/2005		7.41	10.84
	02/15/2005		7.47	10.78
	03/15/2005		7.40	10.85
	04/25/2005		7.44	10.81
	05/20/2005		7.58	10.67
	06/21/2005		7.86	10.39
	07/20/2005		8.15	10.10
	08/22/2005		8.31	9.94
	09/16/2005		8.35	9.90
	10/21/2005		8.48	9.77
	11/18/2005		8.25	10.00
	12/16/2005		7.99	10.26
	01/20/2006		NM	NM
	02/22/2006		7.05	11.20
	03/30/2006		6.09	12.16

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ31	04/27/2006	18.25	6.76	11.49
	05/18/2006		7.25	11.00
	06/22/2006		7.55	10.70
	07/20/2006		7.55	10.70
	08/17/2006		7.49	10.76
	09/14/2006		7.56	10.69
	10/19/2006		7.57	10.68
	11/21/2006		7.56	10.69
	12/21/2006		7.02	11.23
	01/18/2007		7.49	10.76
	02/06/2007		7.73	10.52
	03/08/2007		7.15	11.10
	04/12/2007		7.56	10.69
	05/10/2007		7.33	10.92
	06/07/2007		7.68	10.57
	07/19/2007		7.71	10.54
	08/09/2007		7.70	10.55
	09/14/2007		NM	NM
	10/12/2007		7.34	10.91
	11/09/2007		NM	NM
	12/14/2007		NM	NM
	01/17/2008		NM	NM
	02/21/2008		NM	NM
	03/20/2008		7.57	10.68
	04/10/2008		7.89	10.36
	05/08/2008		7.87	10.38
	06/12/2008		7.82	10.43
	07/24/2008		7.98	10.27
	08/14/2008		7.92	10.33
	09/18/2008		7.84	10.41
	10/22/2008		8.03	10.22
	11/13/2008		7.54	10.71
	12/04/2008		7.58	10.67
	01/08/2009		7.24	11.01
	02/11/2009		7.22	11.03
	03/12/2009		6.32	11.93
	04/09/2009		7.05	11.20
	05/20/2009		7.17	11.08
	06/17/2009		7.34	10.91
	07/16/2009		7.49	10.76
	08/13/2009		7.42	10.83
	09/10/2009		7.65	10.60
	10/16/2009		6.88	11.35
	11/12/2009		7.22	11.03
	12/03/2009		7.39	10.86

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ31	01/14/2010	18.25	7.27	10.98
	02/18/2010		6.64	11.61
	03/25/2010		6.80	11.45
	04/23/2010		6.77	11.48
	05/21/2010		7.19	11.06
	06/10/2010		7.40	10.85
	07/23/2010		7.38	10.87
	08/12/2010		7.50	10.75
	09/10/2010		7.56	10.69
	10/15/2010		7.82	10.42
	11/04/2010		7.47	10.78
	12/03/2010		7.25	11.00
	01/28/2011		7.04	11.21
	02/10/2011		7.28	10.97
	03/31/2011		6.12	12.13
	04/19/2011		7.03	11.22
LF-PZ32	01/17/2000	19.19	10.05	9.14
	04/25/2000		9.42	9.77
	05/30/2000		9.79	9.40
	06/26/2000		10.07	9.12
	08/10/2000		10.30	8.89
	08/31/2000		9.73	9.46
	09/25/2000		9.95	9.24
	10/06/2000		10.03	9.16
	11/21/2000		10.07	9.12
	12/18/2000		9.80	9.39
	01/15/2001		9.68	9.51
	02/14/2001		9.11	10.08
	03/01/2001		8.56	10.63
	04/19/2001		9.52	9.67
	05/23/2001		9.85	9.34
	06/14/2001		10.02	9.17
	07/02/2001		10.03	9.16
	08/10/2001		9.75	9.44
	09/07/2001		9.83	9.36
	10/18/2001		10.02	9.17
	11/02/2001		10.03	9.16
	12/14/2001		8.60	10.59
	01/18/2002		8.65	10.54
	02/21/2002		8.91	10.28
	03/25/2002		8.04	11.15
	04/18/2002		9.52	9.67
	05/10/2002		9.79	9.40
	06/04/2002		8.29	10.90
	07/10/2002		9.82	9.37

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ32	08/15/2002	19.19	9.74	9.45
	09/11/2002		8.49	10.70
	10/08/2002		9.61	9.58
	11/07/2002		9.75	9.44
	12/12/2002		9.54	9.65
	01/13/2003		8.02	11.17
	02/26/2003		8.05	11.14
	03/19/2003		8.94	10.25
	04/14/2003		9.26	9.93
	05/13/2003		8.95	10.24
	06/13/2003		9.25	9.94
	07/07/2003		9.30	9.89
	08/13/2003		9.44	9.75
	09/17/2003		9.17	10.02
	10/27/2003		NM	NM
	11/18/2003		9.54	9.65
	12/19/2003		8.86	10.33
	01/15/2004		8.46	10.73
	02/17/2004		8.71	10.48
	03/18/2004		8.81	10.38
	04/21/2004		9.46	9.73
	05/18/2004		9.23	9.96
	06/10/2004		9.45	9.74
	07/13/2004		9.47	9.72
	08/12/2004		9.51	9.68
	09/16/2004		9.70	9.49
	10/12/2004		9.60	9.59
	11/17/2004		9.21	9.98
	12/15/2004		8.84	10.35
	01/25/2005		8.68	10.51
	02/15/2005		8.88	10.31
	03/15/2005		8.45	10.74
	04/25/2005		8.85	10.34
	05/20/2005		8.82	10.37
	06/21/2005		9.00	10.19
	07/20/2005		9.34	9.85
	08/22/2005		9.78	9.41
	09/16/2005		9.80	9.39
	10/21/2005		9.97	9.22
	11/18/2005		9.77	9.42
	12/16/2005		9.42	9.77
	01/20/2006		8.29	10.90
	02/22/2006		8.15	11.04
	03/30/2006		7.85	11.34
	04/27/2006		7.97	11.22

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ32	05/18/2006	19.19	8.38	10.81
	06/22/2006		8.72	10.47
	07/20/2006		8.82	10.37
	08/17/2006		8.76	10.43
	09/14/2006		8.83	10.36
	10/19/2006		8.70	10.49
	11/21/2006		8.90	10.29
	12/21/2006		8.33	10.86
	01/18/2007		8.40	10.79
	02/06/2007		9.12	10.07
	03/08/2007		8.45	10.74
	04/12/2007		8.65	10.54
	05/10/2007		8.72	10.47
	06/07/2007		9.03	10.16
	07/19/2007		9.02	10.17
	08/09/2007		9.01	10.18
	09/14/2007		8.91	10.28
	10/12/2007		8.69	10.50
	11/09/2007		8.64	10.55
	12/14/2007		8.50	10.69
	01/17/2008		8.22	10.97
	02/21/2008		8.14	11.05
	03/20/2008		8.90	10.29
	04/10/2008		9.29	9.90
	05/08/2008		9.28	9.91
	06/12/2008		9.09	10.10
	07/24/2008		9.34	9.85
	08/14/2008		9.25	9.94
	09/18/2008		9.08	10.11
	10/22/2008		9.40	9.79
	11/13/2008		8.94	10.25
	12/04/2008		8.99	10.20
	01/08/2009		8.70	10.49
	02/11/2009		8.54	10.65
	03/12/2009		7.43	11.76
	04/09/2009		8.24	10.95
	05/20/2009		8.44	10.75
	06/17/2009		8.58	10.61
	07/16/2009		8.67	10.52
	08/13/2009		8.58	10.61
	09/10/2009		8.87	10.32
	10/16/2009		8.05	11.12
	11/12/2009		8.43	10.76
	12/03/2009		8.63	10.56
	01/14/2010		8.46	10.73

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ32	02/18/2010	19.19	7.79	11.40
	03/25/2010		7.83	11.36
	04/23/2010		7.90	11.29
	05/21/2010		8.40	10.79
	06/10/2010		8.64	10.55
	07/23/2010		8.54	10.65
	08/12/2010		8.69	10.50
	09/10/2010		8.78	10.41
	10/15/2010		9.03	10.15
	11/04/2010		8.74	10.45
	12/03/2010		8.51	10.68
	01/28/2011		8.11	11.08
	02/10/2011		8.30	10.89
	03/31/2011		6.94	12.25
	04/19/2011		8.00	11.19
LF-PZ33	01/17/2000	21.59	11.71	9.88
	04/25/2000		10.98	10.61
	05/30/2000		11.30	10.29
	06/26/2000		11.51	10.08
	08/10/2000		11.76	9.83
	08/31/2000		11.70	9.89
	09/25/2000		11.72	9.87
	10/06/2000		11.75	9.84
	11/21/2000		11.49	10.10
	12/18/2000		11.40	10.19
	01/15/2001		11.34	10.25
	02/14/2001		10.94	10.65
	03/01/2001		10.08	11.51
	04/19/2001		11.15	10.44
	05/23/2001		11.54	10.05
	06/14/2001		11.47	10.12
	07/02/2001		11.49	10.10
	08/10/2001		11.44	10.15
	09/07/2001		11.93	9.66
	10/18/2001		11.39	10.20
	11/02/2001		11.55	10.04
	12/14/2001		10.22	11.37
	01/18/2002		10.33	11.26
	02/21/2002		10.72	10.87
	03/25/2002		10.72	10.87
	04/18/2002		11.07	10.52
	05/10/2002		11.24	10.35
	06/04/2002		11.07	10.52
	07/10/2002		11.26	10.33
	08/15/2002		11.34	10.25

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ33	09/11/2002	21.59	11.21	10.38
	10/08/2002		11.25	10.34
	11/07/2002		11.38	10.21
	12/12/2002		11.32	10.27
	01/13/2003		10.29	11.30
	02/26/2003		10.45	11.14
	03/19/2003		10.71	10.88
	04/14/2003		10.69	10.90
	05/13/2003		10.86	10.73
	06/13/2003		11.20	10.39
	07/07/2003		11.23	10.36
	08/13/2003		11.37	10.22
	09/17/2003		11.38	10.21
	10/27/2003		11.55	10.04
	11/18/2003		11.38	10.21
	12/19/2003		10.80	10.79
	01/15/2004		10.55	11.04
	02/17/2004		10.45	11.14
	03/18/2004		10.81	10.78
	04/21/2004		11.12	10.47
	05/18/2004		11.28	10.31
	06/10/2004		11.24	10.35
	07/13/2004		11.34	10.25
	08/12/2004		11.40	10.19
	09/16/2004		11.51	10.08
	10/12/2004		11.40	10.19
	11/17/2004		10.86	10.73
	12/15/2004		10.60	10.99
	01/25/2005		10.40	11.19
	02/15/2005		10.87	10.72
	03/15/2005		10.45	11.14
	04/25/2005		10.56	11.03
	05/20/2005		10.87	10.72
	06/21/2005		11.04	10.55
	07/20/2005		11.30	10.29
	08/22/2005		11.49	10.10
	09/16/2005		11.55	10.04
	10/21/2005		11.69	9.90
	11/18/2005		11.41	10.18
	12/16/2005		11.12	10.47
	01/20/2006		10.25	11.34
	02/22/2006		10.54	11.05
	03/30/2006		9.46	12.13
	04/27/2006		10.13	11.46
	05/18/2006		10.65	10.94

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ33	06/22/2006	21.59	10.93	10.66
	07/20/2006		10.98	10.61
	08/17/2006		11.05	10.54
	09/14/2006		11.00	10.59
	10/19/2006		11.05	10.54
	11/21/2006		10.94	10.65
	12/21/2006		10.50	11.09
	01/18/2007		10.95	10.64
	02/06/2007		11.08	10.51
	03/08/2007		10.43	11.16
	04/12/2007		10.88	10.71
	05/10/2007		10.68	10.91
	06/07/2007		11.00	10.59
	07/19/2007		11.11	10.48
	08/09/2007		11.18	10.41
	08/17/2007		11.06	10.53
	08/24/2007		11.10	10.49
	08/30/2007		11.10	10.49
	09/06/2007		11.13	10.46
	09/14/2007		10.95	10.64
	09/21/2007		10.77	10.82
	09/28/2007		10.85	10.74
	10/05/2007		10.94	10.65
	10/12/2007		10.82	10.77
	10/19/2007		10.57	11.02
	10/26/2007		10.63	10.96
	11/02/2007		10.75	10.84
	11/09/2007		10.80	10.79
	11/15/2007		10.55	11.04
	11/21/2007		10.65	10.94
	11/29/2007		10.75	10.84
	12/14/2007		10.59	11.00
	01/17/2008		10.28	11.31
	02/21/2008		10.27	11.32
	03/20/2008		10.84	10.75
	04/10/2008		11.13	10.46
	05/08/2008		11.16	10.43
	06/12/2008		11.15	10.44
	07/24/2008		11.41	10.18
	08/14/2008		11.38	10.21
	09/18/2008		11.32	10.27
	10/22/2008		11.41	10.18
	11/13/2008		10.96	10.63
	12/04/2008		11.03	10.56
	01/08/2009		10.68	10.91

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ33	02/11/2009	21.59	10.68	10.91
	03/12/2009		9.70	11.89
	04/09/2009		10.43	11.16
	05/20/2009		10.56	11.03
	06/17/2009		10.82	10.77
	07/16/2009		10.94	10.65
	08/13/2009		10.92	10.67
	09/10/2009		11.10	10.49
	10/16/2009		10.63	10.94
	11/12/2009		10.67	10.92
	12/03/2009		10.90	10.69
	01/14/2010		10.74	10.85
	02/18/2010		10.05	11.54
	03/25/2010		10.28	11.31
	04/23/2010		10.20	11.39
	05/21/2010		10.56	11.03
	06/10/2010		10.74	10.85
	07/23/2010		10.84	10.75
	08/12/2010		10.94	10.65
	09/10/2010		11.24	10.35
	10/15/2010		11.17	10.41
	11/04/2010		10.87	10.72
	12/03/2010		10.57	11.02
	01/28/2011		10.44	11.15
	02/10/2011		10.61	10.98
	03/31/2011		9.27	12.32
	04/19/2011		10.31	11.28
LF-PZ34	01/17/2000	21.45	12.74	8.71
	04/25/2000		10.93	10.52
	05/30/2000		11.98	9.47
	06/26/2000		12.37	9.08
	08/10/2000		12.50	8.95
	08/31/2000		12.27	9.18
	09/25/2000		12.32	9.13
	10/06/2000		12.41	9.04
	11/21/2000		12.24	9.21
	12/18/2000		12.10	9.35
	01/15/2001		12.29	9.16
	02/14/2001		11.87	9.58
	03/01/2001		9.95	11.50
	04/19/2001		11.40	10.05
	05/23/2001		12.15	9.30
	06/14/2001		11.81	9.64
	07/02/2001		11.95	9.50
	08/10/2001		11.96	9.49

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ34	09/07/2001	21.45	11.40	10.05
	10/18/2001		11.81	9.64
	11/02/2001		11.15	10.30
	12/14/2001		9.95	11.50
	01/18/2002		9.85	11.60
	02/21/2002		11.03	10.42
	03/25/2002		11.09	10.36
	04/18/2002		11.39	10.06
	05/10/2002		11.65	9.80
	06/04/2002		11.31	10.14
	07/10/2002		11.45	10.00
	08/15/2002		11.57	9.88
	09/11/2002		11.55	9.90
	10/08/2002		11.41	10.04
	11/07/2002		11.86	9.59
	12/12/2002		11.93	9.52
	01/13/2003		10.95	10.50
	02/26/2003		11.22	10.23
	03/19/2003		11.15	10.30
	04/14/2003		11.20	10.25
	05/13/2003		11.91	9.54
	06/13/2003		12.22	9.23
	07/07/2003		12.33	9.12
	08/13/2003		12.51	8.94
	09/17/2003		12.31	9.14
	10/27/2003		12.65	8.80
	11/18/2003		12.51	8.94
	12/19/2003		11.49	9.96
	01/15/2004		11.57	9.88
	02/17/2004		11.61	9.84
	03/18/2004		11.64	9.81
	04/21/2004		11.99	9.46
	05/18/2004		12.02	9.43
	06/10/2004		12.15	9.30
	07/13/2004		12.30	9.15
	08/12/2004		12.25	9.20
	09/16/2004		12.41	9.04
	10/12/2004		12.09	9.36
	11/17/2004		11.05	10.40
	12/15/2004		11.01	10.44
	01/25/2005		10.61	10.84
	02/15/2005		11.52	9.93
	03/15/2005		10.05	11.40
	04/25/2005		11.16	10.29
	05/20/2005		11.59	9.86

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ34	06/21/2005	21.45	11.55	9.90
	07/20/2005		11.97	9.48
	08/22/2005		12.13	9.32
	09/16/2005		12.22	9.23
	10/21/2005		12.32	9.13
	11/18/2005		11.91	9.54
	12/16/2005		11.41	10.04
	01/20/2006		9.61	11.84
	02/22/2006		10.88	10.57
	03/30/2006		9.18	12.27
	04/27/2006		10.50	10.95
	05/18/2006		11.32	10.13
	06/22/2006		11.63	9.82
	07/20/2006		11.72	9.73
	08/17/2006		11.76	9.69
	09/14/2006		11.69	9.76
	10/19/2006		11.60	9.85
	11/21/2006		11.36	10.09
	12/21/2006		10.85	10.60
	01/18/2007		11.41	10.04
	02/06/2007		11.56	9.89
	03/08/2007		10.42	11.03
	04/12/2007		11.07	10.38
	05/10/2007		10.81	10.64
	06/07/2007		11.31	10.14
	07/19/2007		11.68	9.77
	08/09/2007		11.77	9.68
	08/17/2007		11.59	9.86
	08/24/2007		11.54	9.91
	08/30/2007		11.51	9.94
	09/06/2007		11.44	10.01
	09/14/2007		11.35	10.10
	09/21/2007		11.16	10.29
	09/28/2007		11.10	10.35
	10/05/2007		11.13	10.32
	10/12/2007		10.97	10.48
	10/19/2007		10.65	10.80
	10/26/2007		10.61	10.84
	11/02/2007		10.70	10.75
	11/09/2007		10.78	10.67
	11/15/2007		10.48	10.97
	11/21/2007		10.57	10.88
	11/29/2007		10.64	10.81
	12/14/2007		10.73	10.72
	01/17/2008		10.20	11.25

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ34	02/21/2008	21.45	10.20	11.25
	03/20/2008		11.12	10.33
	04/10/2008		11.44	10.01
	05/08/2008		11.51	9.94
	06/12/2008		11.55	9.90
	07/24/2008		11.96	9.49
	08/14/2008		11.93	9.52
	09/18/2008		12.03	9.42
	10/22/2008		12.00	9.45
	11/13/2008		11.60	9.85
	12/04/2008		11.53	9.92
	01/08/2009		10.94	10.51
	02/11/2009		11.13	10.32
	03/12/2009		9.31	12.14
	04/09/2009		10.69	10.76
	05/20/2009		10.71	10.74
	06/17/2009		11.16	10.29
	07/16/2009		11.39	10.06
	08/13/2009		11.48	9.97
	09/10/2009		11.66	9.79
	10/16/2009		11.32	10.11
	11/12/2009		11.14	10.31
	12/03/2009		11.48	9.97
	01/14/2010		11.24	10.21
	02/18/2010		10.05	11.40
	03/25/2010		10.50	10.95
	04/23/2010		10.36	11.09
	05/21/2010		10.97	10.48
	06/10/2010		11.13	10.32
	07/23/2010		11.33	10.12
	08/12/2010		11.32	10.13
	09/10/2010		11.83	9.62
	10/15/2010		11.79	9.65
	11/04/2010		11.57	9.88
	12/03/2010		10.94	10.51
	01/28/2011		10.40	11.05
	02/10/2011		10.80	10.65
	03/31/2011		8.59	12.86
	04/19/2011		10.45	11.00
LF-PZ4	12/15/1997	21.69	10.98	10.71
	01/13/1998		10.57	11.12
	01/30/1998		10.50	11.19
	02/24/1998		10.05	11.64
	04/06/1998		10.94	10.75
	07/02/1998		11.65	10.04

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ4	07/13/1998	21.69	11.74	9.95
	09/28/1998		12.01	9.68
	10/16/1998		12.11	9.58
	01/08/1999		11.82	9.87
	04/16/1999		11.17	10.52
	06/21/1999		12.11	9.58
	07/12/1999		12.28	9.41
	10/08/1999		12.40	9.29
LF-PZ5	12/15/1997	21.45	10.28	11.17
	01/13/1998		10.04	11.41
	01/30/1998		9.44	12.01
	02/24/1998		8.72	12.73
	04/06/1998		10.45	11.00
	07/02/1998		11.50	9.95
	07/13/1998		11.60	9.85
	09/28/1998		11.83	9.62
	10/16/1998		11.95	9.50
	01/08/1999		11.81	9.64
	04/16/1999		11.35	10.10
	06/21/1999		12.50	8.95
	07/12/1999		12.42	9.03
	10/08/1999		12.81	8.64
LF-PZ6	12/15/1997	21.14	9.81	11.33
	01/13/1998		9.13	12.01
	01/30/1998		8.97	12.17
	02/24/1998		8.32	12.82
	04/06/1998		10.08	11.06
	07/02/1998		11.51	9.63
	07/13/1998		11.67	9.47
	09/28/1998		11.78	9.36
	10/16/1998		12.00	9.14
	01/08/1999		11.50	9.64
	04/16/1999		11.19	9.95
	06/21/1999		12.35	8.79
	07/12/1999		12.31	8.83
	10/08/1999		12.70	8.44
	01/17/2000		12.04	9.10
	04/25/2000		10.49	10.65
	05/30/2000		11.54	9.60
	06/26/2000		NM	NM
	08/10/2000		12.15	8.99
	10/06/2000		12.07	9.07
	01/15/2001		11.41	9.73
	04/19/2001		11.03	10.11
	07/02/2001		11.80	9.34

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ6	09/07/2001	21.14	NM	NM
	10/18/2001		11.56	9.58
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		9.80	11.34
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		11.26	9.88
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		11.14	10.00
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		11.11	10.03
	01/13/2003		10.36	10.78
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		9.53	11.61
	07/07/2003		11.85	9.29
	10/27/2003		NM	NM
	11/18/2003		11.64	9.50
	01/15/2004		10.96	10.18
	04/21/2004		11.40	9.74
	07/13/2004		11.84	9.30
	10/12/2004		11.43	9.71
	01/25/2005		10.46	10.68
	04/25/2005		10.85	10.29
	07/20/2005		11.67	9.47
	10/21/2005		12.04	9.10
	01/20/2006		9.12	12.02
	04/27/2006		10.54	10.60
	07/20/2006		11.44	9.70
	10/19/2006		11.11	10.03
	01/18/2007		11.06	10.08
	04/12/2007		11.13	10.01
	07/19/2007		11.54	9.60
	10/05/2007		10.75	10.39
	10/12/2007		10.38	10.76
	10/26/2007		10.25	10.89
	11/02/2007		10.36	10.78
	01/17/2008		10.06	11.08
	04/10/2008		11.28	9.86
	07/24/2008		11.77	9.37
	10/22/2008		11.56	9.58
	01/08/2009		10.47	10.67

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ6	04/09/2009	21.14	10.72	10.42
	07/16/2009		11.24	9.90
	10/16/2009		10.34	10.78
	01/14/2010		10.94	10.20
	04/23/2010		10.15	10.99
	07/23/2010		11.07	10.07
	10/15/2010		11.45	9.68
	01/28/2011		10.44	10.70
	04/19/2011		NM	NM
LF-PZ7	12/15/1997	21.74	10.01	11.74
	01/13/1998		9.51	12.24
	01/30/1998		9.78	11.97
	02/24/1998		9.62	12.13
	04/06/1998		10.21	11.54
	07/02/1998		10.89	10.86
	07/13/1998		10.92	10.82
	09/28/1998		11.07	10.67
	10/16/1998		11.25	10.49
	01/08/1999		10.99	10.75
	04/16/1999		10.29	11.45
	06/21/1999		11.09	10.65
	07/12/1999		11.18	10.56
	10/08/1999		11.17	10.57
	01/17/2000		10.69	11.05
	04/25/2000		10.40	11.34
	05/30/2000		10.64	11.10
	06/26/2000		NM	NM
	08/10/2000		11.11	10.63
	10/06/2000		11.09	10.65
	01/15/2001		10.27	11.47
	04/19/2001		10.60	11.14
	07/02/2001		10.85	10.89
	09/07/2001		NM	NM
	10/18/2001		10.72	11.02
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		10.10	11.64
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		10.49	11.25
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		10.74	11.00
	08/15/2002		NM	NM
	09/11/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ7	10/08/2002	21.74	10.76	10.98
	01/13/2003		9.86	11.88
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		9.92	11.82
	07/07/2003		10.62	11.12
	10/27/2003		NM	NM
	11/18/2003		10.49	11.25
	01/15/2004		10.05	11.69
	04/21/2004		10.34	11.40
	07/13/2004		10.71	11.03
	10/12/2004		10.75	10.99
	01/25/2005		10.20	11.54
	04/25/2005		10.05	11.69
	07/20/2005		10.69	11.05
	10/21/2005		11.00	10.74
	01/20/2006		10.04	11.70
	04/27/2006		5.51	16.23
	07/20/2006		10.57	11.17
	10/19/2006		10.70	11.04
	01/18/2007		10.50	11.24
	04/12/2007		10.42	11.32
	07/19/2007		10.75	10.99
	08/17/2007		10.79	10.95
	08/24/2007		10.73	11.01
	08/30/2007		10.75	10.99
	09/06/2007		10.55	11.19
	09/14/2007		10.43	11.31
	09/21/2007		10.34	11.40
	09/28/2007		10.55	11.19
	10/05/2007		10.67	11.07
	10/12/2007		10.23	11.51
	10/19/2007		10.28	11.46
	10/26/2007		10.39	11.35
	11/02/2007		10.52	11.22
	11/09/2007		10.59	11.15
	11/15/2007		10.28	11.46
	11/21/2007		10.37	11.37
	11/29/2007		10.55	11.19
	01/17/2008		10.12	11.62
	04/10/2008		10.65	11.09
	07/24/2008		11.03	10.71
	10/22/2008		10.96	10.78
	01/08/2009		10.20	11.54
	04/09/2009		10.17	11.57

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ7	07/16/2009	21.74	10.72	11.02
	10/16/2009		9.97	11.75
	01/14/2010		10.21	11.53
	04/23/2010		9.98	11.76
	07/23/2010		10.55	11.19
	10/15/2010		10.80	10.93
	01/28/2011		10.28	11.46
	04/19/2011		10.22	11.52
LF-PZ8	12/15/1997	19.73	8.35	11.38
	01/13/1998		7.23	12.50
	01/30/1998		7.46	12.27
	02/24/1998		6.90	12.83
	04/06/1998		8.94	10.79
	07/02/1998		10.74	8.99
	07/13/1998		10.91	8.82
	09/28/1998		11.14	8.59
	10/16/1998		11.29	8.44
	01/08/1999		10.72	9.01
	04/16/1999		10.03	9.70
	06/21/1999		11.71	8.02
	07/12/1999		11.83	7.90
	10/08/1999		12.07	7.66
	01/17/2000		11.34	8.39
	04/25/2000		9.25	10.48
	05/30/2000		10.59	9.14
	06/26/2000		NM	NM
	08/10/2000		11.44	8.29
	10/06/2000		11.27	8.46
	01/15/2001		9.78	9.95
	04/19/2001		9.81	9.92
	07/02/2001		11.33	8.40
	09/07/2001		NM	NM
	10/18/2001		10.86	8.87
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		8.83	10.90
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		11.02	8.71
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		10.97	8.76
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		10.48	9.25

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ8	01/13/2003	19.73	9.03	10.70
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		8.95	10.78
	07/07/2003		11.37	8.36
	10/27/2003		NM	NM
	11/18/2003		10.53	9.20
	01/15/2004		10.00	9.73
	04/21/2004		11.01	8.72
	07/13/2004		11.42	8.31
	10/12/2004		10.62	9.11
	01/25/2005		9.21	10.52
	03/15/2005		4.89	14.84
	04/25/2005		9.80	9.93
	07/20/2005		11.20	8.53
	10/21/2005		11.55	8.18
	01/20/2006		7.62	12.11
	04/27/2006		9.78	9.95
	07/20/2006		10.91	8.82
	10/19/2006		10.25	9.48
	01/18/2007		10.03	9.70
	04/12/2007		10.59	9.14
	07/19/2007		11.15	8.58
	10/12/2007		8.91	10.82
	10/26/2007		9.04	10.69
	11/02/2007		9.19	10.54
	01/17/2008		8.96	10.77
	04/10/2008		10.71	9.02
	07/24/2008		11.36	8.37
	10/22/2008		11.16	8.57
	01/08/2009		9.41	10.32
	04/09/2009		9.69	10.04
	07/16/2009		10.85	8.88
	10/16/2009		8.93	10.78
	01/14/2010		9.89	9.84
	04/23/2010		8.89	10.84
	07/23/2010		10.50	9.23
	10/15/2010		11.03	8.69
	01/28/2011		9.28	10.45
	04/19/2011		9.65	10.08
LF-PZ9	12/15/1997	15.46	3.91	11.55
	01/13/1998		2.66	12.80
	01/30/1998		3.09	12.37
	02/24/1998		2.64	12.82
	04/06/1998		4.41	11.05

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ9	07/02/1998	15.46	6.34	9.12
	07/13/1998		6.46	9.00
	09/28/1998		6.62	8.84
	10/16/1998		6.75	8.71
	01/08/1999		6.93	8.53
	04/16/1999		6.29	9.17
	06/21/1999		7.90	7.56
	07/12/1999		8.04	7.42
	10/08/1999		7.89	7.57
	01/17/2000		6.78	8.68
	04/25/2000		4.98	10.48
	05/30/2000		6.23	9.23
	06/26/2000		NM	NM
	08/10/2000		6.88	8.58
	10/06/2000		6.54	8.92
	01/15/2001		5.00	10.46
	04/19/2001		5.75	9.71
	07/02/2001		6.61	8.85
	09/07/2001		NM	NM
	10/18/2001		6.20	9.26
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		5.31	10.15
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		7.17	8.29
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		7.14	8.32
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		6.02	9.44
	01/13/2003		4.71	10.75
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		4.75	10.71
	07/07/2003		6.55	8.91
	10/27/2003		NM	NM
	11/18/2003		6.19	9.27
	01/15/2004		5.70	9.76
	04/21/2004		6.79	8.67
	07/13/2004		7.03	8.43
	10/12/2004		7.05	8.41
	01/25/2005		5.25	10.21
	04/25/2005		5.10	10.36

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
LF-PZ9	07/20/2005	15.46	7.15	8.31
	10/21/2005		7.26	8.20
	01/20/2006		3.29	12.17
	04/27/2006		6.05	9.41
	07/20/2006		6.20	9.26
	10/19/2006		5.78	9.68
	01/18/2007		5.66	9.80
	04/12/2007		6.58	8.88
	07/19/2007		6.32	9.14
	08/17/2007		6.56	8.90
	08/24/2007		6.21	9.25
	08/30/2007		6.04	9.42
	09/06/2007		5.99	9.47
	09/14/2007		5.84	9.62
	09/21/2007		5.57	9.89
	09/28/2007		5.52	9.94
	10/05/2007		5.62	9.84
	10/12/2007		4.82	10.64
	10/19/2007		4.71	10.75
	10/26/2007		4.99	10.47
	11/02/2007		5.08	10.38
	11/09/2007		5.12	10.34
	11/15/2007		4.46	11.00
	11/21/2007		4.47	10.99
	11/29/2007		4.66	10.80
	01/17/2008		5.10	10.36
	04/10/2008		6.34	9.12
	07/24/2008		7.24	8.22
	10/22/2008		6.47	8.99
	01/08/2009		5.11	10.35
	04/09/2009		5.35	10.11
	07/16/2009		6.40	9.06
	10/16/2009		4.27	11.17
	01/14/2010		5.02	10.44
	04/23/2010		4.41	11.05
	07/23/2010		6.53	8.93
	10/15/2010		6.66	8.79
	01/28/2011		4.65	10.81
	04/19/2011		5.32	10.14
MD-1	05/05/2003 (e)	13.60	6.90	6.70
	10/14/2003 (e)		6.60	7.00
	01/20/2004 (e)		6.10	7.50
	04/27/2004 (e)		6.12	7.48
	10/22/2004 (e)		7.28	6.32
	09/30/2005 (e)		6.94	6.66

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MD-1	04/15/2006 (e)	13.60	5.62	7.98
	10/26/2006 (e)		5.99	7.61
	04/12/2007 (e)		5.34	8.26
	04/12/2007 (f)		5.34	8.26
	10/12/2007 (e)		5.41	8.19
	04/22/2008 (e)		6.21	7.39
	10/22/2008 (e)		6.30	7.30
	04/24/2009 (e)		5.89	7.71
	10/21/2009 (e)		5.56	8.04
	04/29/2010 (e)		5.70	7.90
	10/27/2010 (e)		5.30	8.30
	11/14/2011 (e)		5.13	8.47
	10/17/2012 (e)		5.41	8.19
	10/08/2013 (e)		5.79	7.81
	10/27/2014 (e)		5.80	7.80
MD-2	05/05/2003 (e)	11.32	5.01	6.31
	10/14/2003 (e)		6.26	5.06
	01/20/2004 (e)		5.68	5.64
	04/27/2004 (e)		6.14	5.18
	10/22/2004 (e)		6.43	4.89
	09/30/2005 (e)		6.28	5.04
	04/15/2006 (e)		5.68	5.64
	10/26/2006 (e)		6.22	5.10
	04/12/2007 (e)		6.36	4.96
	04/12/2007 (f)		6.36	4.96
	10/12/2007 (e)		6.16	5.16
	04/22/2008 (e)		6.40	4.92
	10/22/2008 (e)		6.78	4.54
	04/24/2009 (e)		6.42	4.90
	10/21/2009 (e)		6.27	5.05
	04/29/2010 (e)		6.02	5.30
	10/27/2010 (e)		6.20	5.12
	11/14/2011 (e)		6.54	4.78
	10/17/2012 (e)		6.85	4.47
	10/07/2013 (e)		6.68	4.64
	10/27/2014 (e)		6.80	4.52
MD-3	05/05/2003 (e)	12.68	7.14	5.54
	10/14/2003 (e)		7.54	5.14
	01/20/2004 (e)		6.80	5.88
	04/27/2004 (e)		7.34	5.34
	10/22/2004 (e)		7.90	4.78
	09/30/2005 (e)		7.85	4.83
	04/15/2006 (e)		6.58	6.10
	10/26/2006 (e)		7.40	5.28
	04/12/2007 (e)		7.36	5.32

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MD-3	04/12/2007 (f)	12.68	7.36	5.32
	10/12/2007 (e)		7.30	5.38
	04/22/2008 (e)		7.35	5.33
	10/22/2008 (e)		7.82	4.86
	04/24/2009 (e)		7.02	5.66
	10/21/2009 (e)		7.13	5.55
	04/29/2010 (e)		6.64	6.04
	10/27/2010 (e)		7.25	5.43
	11/14/2011 (e)		7.69	4.99
	10/17/2012 (e)		8.05	4.63
	10/07/2013 (e)		7.76	4.92
	10/27/2014 (e)		7.60	5.08
MD-4	05/05/2003 (e)	11.75	7.03	4.72
	10/14/2003 (e)		3.58	8.17
	01/20/2004 (e)		2.85	8.90
	04/27/2004 (e)		3.17	8.58
	10/22/2004 (e)		2.59	9.16
	09/30/2005 (e)		3.62	8.13
	04/15/2006 (e)		2.28	9.47
	10/26/2006 (e)		3.72	8.03
	04/12/2007 (e)		3.22	8.53
	04/12/2007 (f)		3.22	8.53
	10/12/2007 (e)		2.76	8.99
	04/22/2008 (e)		3.60	8.15
	10/22/2008 (e)		3.42	8.33
	04/24/2009 (e)		3.03	8.72
	10/21/2009 (e)		2.71	9.04
	04/29/2010 (e)		2.66	9.09
	10/27/2010 (e)		2.90	8.85
	11/14/2011 (e)		4.52	7.23
	10/17/2012 (e)		4.01	7.74
	10/08/2013 (e)		4.12	7.63
	10/27/2014 (e)		3.94	7.81
MD-5	05/05/2003 (f)	12.03	4.97	7.06
	10/14/2003 (f)		5.99	6.04
	01/20/2004 (f)		5.08	6.95
	04/20/2004 (f)		10.58	1.45
	10/21/2004 (f)		4.90	7.13
	03/28/2005 (f)		4.54	7.49
	09/21/2005 (f)		5.80	6.23
	09/30/2005 (e)		5.89	6.14
	04/13/2006 (f)		4.31	7.72
	04/15/2006 (e)		4.29	7.74
	10/26/2006 (e)		5.69	6.34
	10/26/2006 (f)		5.69	6.34

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MD-5	04/12/2007 (e)	12.03	5.62	6.41
	04/12/2007 (f)		5.62	6.41
	10/12/2007 (e)		5.30	6.73
	10/12/2007 (f)		5.30	6.73
	04/10/2008 (f)		5.92	6.11
	04/22/2008 (e)		6.01	6.02
	04/22/2008 (f)		6.01	6.02
	10/22/2008 (e)		6.23	5.80
	10/22/2008 (f)		6.30	5.73
	04/09/2009 (f)		5.48	6.55
	04/24/2009 (e)		5.70	6.33
	10/16/2009 (f)		4.98	7.03
	04/29/2010 (e)		5.31	6.72
	10/15/2010 (f)		6.10	5.93
	10/27/2010 (f)		5.67	6.36
	04/19/2011 (f)		5.56	6.47
	11/14/2011 (f)		6.43	5.60
	06/11/2012		6.30	5.73
	07/18/2012		6.29	5.74
	08/15/2012		6.40	5.63
	09/13/2012		6.49	5.54
	10/17/2012		6.43	5.60
	11/16/2012		5.88	6.15
	12/14/2012		5.41	6.62
	01/18/2013		5.92	6.11
	02/22/2013		5.84	6.19
	03/21/2013		6.00	6.03
	04/19/2013		6.21	5.82
	07/16/2013		6.27	5.76
	10/07/2013 (f)		6.54	5.49
	01/03/2014		5.93	6.10
	04/22/2014		5.95	6.08
	07/08/2014		6.16	5.87
	10/28/2014		6.55	5.48
MW-1	01/09/1995	16.48	5.14	11.35
	01/27/1995		4.78	11.71
	02/17/1995		6.73	9.76
	04/13/1995		6.63	9.86
	06/08/1995		6.98	9.51
	08/09/1995		7.50	8.99
	11/17/1995		8.00	8.49
	01/09/1996		7.19	9.29
	04/24/1996		6.93	9.55
	07/29/1996		7.76	8.72
	12/13/1996		5.19	11.29

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-1	04/15/1997	16.48	7.34	9.14
	09/19/1997		7.56	8.92
	12/03/1997		6.50	9.98
	12/15/1997		6.47	10.01
	01/13/1998		5.80	10.68
	01/30/1998		5.90	10.58
	02/24/1998		5.24	11.24
	04/06/1998		6.37	10.11
	07/02/1998		7.11	9.37
	07/13/1998		7.19	9.29
	09/28/1998		7.44	9.04
	10/16/1998		7.53	8.95
	01/08/1999		7.30	9.18
	04/16/1999		6.34	10.14
	06/21/1999		7.40	9.08
	07/12/1999		7.56	8.92
	10/08/1999		7.72	8.76
	01/17/2000		7.53	8.95
	04/25/2000		6.99	9.49
	05/30/2000		7.23	9.25
	06/26/2000		NM	NM
	08/10/2000		7.68	8.80
	08/31/2000		7.10	9.38
	09/25/2000		7.33	9.15
	10/06/2000		7.40	9.08
	11/21/2000		7.49	8.99
	12/18/2000		7.27	9.21
	01/15/2001		7.09	9.39
	02/14/2001		6.53	9.95
	03/01/2001		6.06	10.42
	04/19/2001		6.95	9.53
	05/23/2001		7.21	9.27
	06/14/2001		7.39	9.09
	07/02/2001		7.38	9.10
	08/10/2001		7.11	9.37
	09/07/2001		7.24	9.24
	10/18/2001		NM	NM
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		NM	NM
	02/21/2002		6.29	10.19
	03/25/2002		6.45	10.03
	04/18/2002		6.89	9.59
	05/10/2002		7.14	9.34
	06/04/2002		6.94	9.54

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-1	07/10/2002	16.48	7.22	9.26
	08/15/2002		9.50	6.98
	09/11/2002		4.02	12.46
	10/08/2002		7.01	9.47
	11/07/2002		7.16	9.32
	12/12/2002		6.93	9.55
	01/13/2003		5.52	10.96
	02/26/2003		5.62	10.86
	03/19/2003		6.31	10.17
	04/14/2003		6.11	10.37
	05/13/2003		6.34	10.14
	07/07/2003		NM	NM
	10/27/2003		NM	NM
	01/15/2004		NM	NM
	04/21/2004		NM	NM
	05/18/2004		NM	NM
	06/10/2004		NM	NM
	07/13/2004		NM	NM
	09/16/2004		NM	NM
	12/15/2004		NM	NM
	01/24/2005		7.28	9.20
	02/15/2005		6.23	10.25
	03/15/2005		6.11	10.37
	04/25/2005		5.99	10.49
	05/20/2005		6.13	10.35
	06/21/2005		6.40	10.08
	08/22/2005		6.42	10.06
	10/21/2005		NM	NM
	01/20/2006		2.30	14.18
	02/22/2006		5.42	11.06
	03/30/2006		4.74	11.74
	04/27/2006		NM	NM
	05/18/2006		5.92	10.56
	06/22/2006		6.26	10.22
	07/20/2006		6.18	10.30
	08/17/2006		6.06	10.42
	09/14/2006		6.22	10.26
	10/19/2006		6.25	10.23
	11/21/2006		NA	NM
	12/21/2006		5.63	10.85
	01/18/2007		6.34	10.14
	02/06/2007		DRY	NM
	03/08/2007		5.82	10.66
	04/12/2007		5.07	11.41
	05/10/2007		5.53	10.95

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-1	06/07/2007	16.48	DRY	NM
	07/19/2007		DRY	NM
	08/09/2007		DRY	NM
	09/14/2007		DRY	NM
	10/12/2007		3.23	13.25
	11/09/2007		6.19	10.29
	12/14/2007		5.94	10.54
	01/17/2008		3.60	12.88
	02/21/2008		0.00	16.48
	03/20/2008		5.47	11.01
	04/10/2008		6.36	10.12
	05/08/2008		DRY	NM
	06/12/2008		DRY	NM
	07/24/2008		DRY(1)	NM
	08/14/2008		DRY(1)	NM
	09/18/2008		DRY(1)	NM
	10/22/2008		DRY(1)	NM
	11/13/2008		3.82(1)	12.66
	12/04/2008		5.43(1)	11.05
	01/08/2009		5.70(1)	NM
	02/11/2009		0.63	15.85
	03/12/2009		2.10	14.38
	04/09/2009		2.83	13.65
	05/20/2009		3.71	12.77
	06/17/2009		5.70	10.78
	07/16/2009		5.90	10.49
	08/13/2009		5.92	10.56
	09/10/2009		6.20	10.28
	10/16/2009		0.50	NM
	11/12/2009		4.96	11.52
	12/03/2009		5.57	10.91
	01/14/2010		2.34	14.14
	02/18/2010		4.28	12.20
	03/25/2010		2.73	13.75
	04/23/2010		0.05	NM
	05/21/2010		3.05	13.43
	06/10/2010		4.30	12.18
	07/23/2010		5.95(1)	10.53
	08/12/2010		DRY	NM
	09/10/2010		6.07	10.41
	10/15/2010		6.25	10.22
	11/04/2010		5.65	10.83
	12/03/2010		4.76	11.72
	01/28/2011		5.50	10.98
	02/10/2011		5.42	11.06

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-1	03/31/2011	16.48	NM	NM
	04/19/2011		5.39	11.09
	03/20/2012		5.84	10.64
MW-2	01/09/1995	16.29	4.93	11.36
	01/27/1995		4.53	11.76
	02/17/1995		6.58	9.71
	04/13/1995		6.46	9.83
	06/08/1995		6.82	9.47
	08/09/1995		7.31	8.78
	11/17/1995		8.12	7.97
	01/09/1996		7.04	9.24
	04/24/1996		6.56	9.72
	07/29/1996		7.59	8.69
	12/13/1996		5.04	11.24
	04/15/1997		7.17	9.11
	09/19/1997		7.41	8.87
	12/03/1997		6.33	9.95
	12/15/1997		6.26	10.02
	01/13/1998		5.47	10.81
	01/30/1998		5.65	10.63
	02/24/1998		5.06	11.22
	04/06/1998		6.17	10.11
	07/02/1998		6.79	9.49
	07/13/1998		7.02	9.26
	09/28/1998		7.27	9.01
	10/16/1998		7.35	8.93
	01/08/1999		7.12	9.16
	04/16/1999		6.32	9.96
	06/21/1999		7.21	9.07
	07/12/1999		7.38	8.90
	10/08/1999		7.55	8.73
	01/17/2000		7.33	8.95
	04/25/2000		6.46	9.82
	05/30/2000		7.01	9.27
	06/26/2000		NM	NM
	08/10/2000		7.45	8.83
	10/06/2000		7.18	9.10
	11/21/2000		7.30	8.98
	12/18/2000		7.09	9.19
	01/15/2001		6.86	9.42
	02/14/2001		6.47	9.81
	03/01/2001		5.77	10.51
	04/19/2001		6.50	9.78
	05/23/2001		6.98	9.31
	06/14/2001		7.19	9.10

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-2	07/02/2001	16.29	7.15	9.14
	08/10/2001		6.89	9.40
	09/07/2001		7.04	9.25
	10/18/2001		7.22	9.07
	11/02/2001		7.22	9.07
	12/14/2001		5.81	10.48
	01/18/2002		6.88	9.41
	02/21/2002		6.22	10.07
	03/25/2002		6.34	9.95
	04/18/2002		6.63	9.66
	05/10/2002		6.93	9.36
	06/04/2002		6.87	9.42
	07/10/2002		7.04	9.25
	08/15/2002		6.95	9.34
	09/11/2002		6.82	9.47
	10/08/2002		6.90	9.39
	11/07/2002		7.02	9.27
	12/12/2002		6.75	9.54
	01/13/2003		5.39	10.90
	02/26/2003		5.35	10.94
	03/19/2003		6.02	10.27
	04/14/2003		6.09	10.20
	05/13/2003		6.19	10.10
	07/07/2003		6.45	9.84
	08/13/2003		6.62	9.67
	09/17/2003		6.66	9.63
	10/27/2003		6.80	9.49
	11/18/2003		6.78	9.51
	12/19/2003		6.40	9.89
	01/15/2004		6.29	10.00
	02/17/2004		5.68	10.61
	03/18/2004		6.31	9.98
	04/21/2004		6.61	9.68
	05/18/2004		6.70	9.59
	06/10/2004		6.65	9.64
	07/13/2004		6.69	9.60
	08/12/2004		6.67	9.62
	09/16/2004		6.90	9.39
	10/12/2004		6.88	9.41
	11/17/2004		6.48	9.81
	12/15/2004		6.21	10.08
	01/24/2005		6.28	10.01
	02/15/2005		6.20	10.09
	03/15/2005		5.71	10.58
	04/25/2005		5.85	10.44

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-2	05/20/2005	16.29	5.58	10.71
	06/21/2005		6.22	10.07
	07/20/2005		6.50	9.79
	08/22/2005		6.72	9.57
	09/16/2005		6.99	9.30
	10/21/2005		7.16	9.13
	11/18/2005		6.96	9.33
	12/16/2005		6.83	9.46
	01/20/2006		5.58	10.71
	02/22/2006		5.71	10.58
	03/30/2006		4.93	11.36
	04/27/2006		5.18	11.11
	05/18/2006		5.59	10.70
	06/22/2006		6.35	9.94
	07/20/2006		6.05	10.24
	08/17/2006		5.49	10.80
	09/14/2006		6.08	10.21
	10/19/2006		6.10	10.19
	11/21/2006		6.25	10.04
	12/21/2006		5.64	10.65
	01/18/2007		6.09	10.20
	02/06/2007		6.21	10.08
	03/08/2007		5.92	10.37
	04/12/2007		NM	NM
	05/10/2007		5.95	10.34
	06/07/2007		6.15	10.14
	07/19/2007		6.27	10.02
	08/09/2007		6.26	10.03
	09/14/2007		6.28	10.01
	10/12/2007		5.86	10.43
	11/09/2007		5.88	10.41
	12/14/2007		5.82	10.47
	01/17/2008		5.68	10.61
	02/21/2008		5.55	10.74
	03/20/2008		5.95	10.34
	04/10/2008		6.32	9.97
	05/08/2008		6.45	9.84
	06/12/2008		6.21	10.08
	07/24/2008		6.47	9.82
	08/14/2008		6.41	9.88
	09/18/2008		6.31	9.98
	10/22/2008		6.58	9.71
	11/13/2008		6.22	10.07
	12/04/2008		6.21	10.08
	01/08/2009		5.98	10.31

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-2	02/11/2009	16.29	5.89	10.40
	03/12/2009		5.05	11.24
	04/09/2009		5.55	10.74
	05/20/2009		5.88	10.41
	06/17/2009		5.91	10.38
	07/16/2009		5.89	10.40
	08/13/2009		5.79	10.50
	09/10/2009		6.07	10.22
	10/16/2009		5.29	10.98
	11/12/2009		5.62	10.67
	12/03/2009		5.85	10.44
	01/14/2010		5.79	10.50
	02/18/2010		5.35	10.94
	03/25/2010		5.45	10.84
	04/23/2010		5.31	10.98
	05/21/2010		5.74	10.55
	06/10/2010		5.84	10.45
	07/23/2010		5.79	10.50
	08/12/2010		6.13	10.16
	09/10/2010		6.00	10.29
	10/15/2010		6.27	10.01
	11/04/2010		6.02	10.27
	12/03/2010		5.86	10.43
	01/28/2011		5.57	10.72
	02/10/2011		5.68	10.61
	03/31/2011		4.64	11.65
	04/19/2011		2.71	13.58
	03/20/2012		NM	NM
MW-3	01/09/1995	17.30	5.38	11.96
	01/27/1995		4.66	12.68
	02/17/1995		7.01	10.33
	04/13/1995		6.93	10.41
	06/08/1995		7.39	9.95
	08/09/1995		7.89	9.45
	11/17/1995		8.40	8.94
	01/09/1996		7.48	9.82
	04/24/1996		7.19	10.11
	07/29/1996		8.08	9.22
	12/13/1996		5.33	11.97
	04/15/1997		7.70	9.60
	09/19/1997		7.93	9.37
	12/03/1997		6.77	10.53
	12/15/1997		6.81	10.49
	01/13/1998		6.19	11.11
	01/30/1998		6.29	11.01

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-3	02/24/1998	17.30	5.61	11.69
	04/06/1998		6.76	10.54
	07/02/1998		7.49	9.81
	07/13/1998		7.60	9.70
	09/28/1998		7.87	9.43
	10/16/1998		7.96	9.34
	01/08/1999		7.71	9.59
	04/16/1999		6.79	10.51
	06/21/1999		7.89	9.41
	07/12/1999		8.06	9.24
	10/08/1999		8.18	9.12
	01/17/2000		7.91	9.39
	04/25/2000		7.35	9.95
	05/30/2000		7.66	9.64
	06/26/2000		7.94	9.36
	08/10/2000		8.19	9.11
	08/31/2000		7.72	9.58
	09/25/2000		7.91	9.39
	10/06/2000		7.95	9.35
	11/21/2000		7.89	9.41
	12/18/2000		7.75	9.55
	01/15/2001		7.53	9.77
	02/14/2001		6.95	10.35
	03/01/2001		6.46	10.84
	04/19/2001		7.42	9.88
	05/23/2001		7.79	9.51
	06/14/2001		7.86	9.44
	07/02/2001		7.87	9.43
	08/10/2001		7.60	9.70
	09/07/2001		7.68	9.62
	10/18/2001		7.87	9.43
	11/02/2001		7.85	9.45
	12/14/2001		6.41	10.89
	01/18/2002		6.65	10.65
	02/21/2002		6.77	10.53
	03/25/2002		6.94	10.36
	04/18/2002		7.41	9.89
	05/10/2002		7.83	9.47
	06/04/2002		7.41	9.89
	07/10/2002		7.87	9.43
	08/15/2002		8.62	8.68
	09/11/2002		7.43	9.87
	10/08/2002		7.54	9.76
	11/07/2002		7.58	9.72
	12/12/2002		7.44	9.86

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-3	01/13/2003	17.30	5.97	11.33
	02/26/2003		6.14	11.16
	03/19/2003		6.99	10.31
	04/14/2003		6.70	10.60
	05/13/2003		6.82	10.48
	06/13/2003		7.21	10.09
	07/07/2003		7.25	10.05
	08/13/2003		7.43	9.87
	09/17/2003		7.45	9.85
	10/27/2003		7.62	9.68
	11/18/2003		7.43	9.87
	12/19/2003		6.80	10.50
	01/15/2004		6.58	10.72
	02/17/2004		6.41	10.89
	03/18/2004		6.96	10.34
	04/21/2004		7.32	9.98
	05/18/2004		7.43	9.87
	06/10/2004		7.35	9.95
	07/13/2004		7.40	9.90
	08/12/2004		7.45	9.85
	09/16/2004		7.60	9.70
	10/12/2004		7.52	9.78
	11/17/2004		7.10	10.20
	12/15/2004		6.75	10.55
	01/24/2005		6.63	10.67
	02/15/2005		6.65	10.65
	03/15/2005		6.70	10.60
	04/25/2005		6.64	10.66
	05/20/2005		6.83	10.47
	06/21/2005		7.16	10.14
	07/20/2005		7.48	9.82
	08/22/2005		7.69	9.61
	09/16/2005		7.72	9.58
	10/21/2005		7.87	9.43
	11/18/2005		7.67	9.63
	12/16/2005		7.32	9.98
	01/20/2006		6.33	10.97
	02/22/2006		5.90	11.40
	03/30/2006		5.07	12.23
	04/27/2006		5.75	11.55
	05/18/2006		6.34	10.96
	06/22/2006		6.65	10.65
	07/20/2006		6.60	10.70
	08/17/2006		6.50	10.80
	09/14/2006		6.62	10.68

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-3	10/19/2006	17.30	6.64	10.66
	11/21/2006		6.72	10.58
	12/21/2006		5.97	11.33
	01/18/2007		6.65	10.65
	02/06/2007		6.90	10.40
	03/08/2007		6.25	11.05
	04/12/2007		6.67	10.63
	05/10/2007		6.50	10.80
	06/07/2007		6.84	10.46
	07/19/2007		6.84	10.46
	08/09/2007		7.79	9.51
	09/14/2007		6.71	10.59
	10/12/2007		6.45	10.85
	11/09/2007		6.60	10.70
	12/14/2007		6.39	10.91
	01/17/2008		6.11	11.19
	02/21/2008		5.97	11.33
	03/20/2008		6.69	10.61
	04/10/2008		7.05	10.25
	05/08/2008		7.05	10.25
	06/12/2008		6.90	10.40
	07/24/2008		7.10	10.20
	08/14/2008		7.07	10.23
	09/18/2008		6.93	10.37
	10/22/2008		7.19	10.11
	11/13/2008		6.71	10.59
	12/04/2008		6.85	10.45
	01/08/2009		7.47	9.83
	02/11/2009		6.28	11.02
	03/12/2009		5.36	11.94
	04/09/2009		6.08	11.22
	05/20/2009		6.28	11.02
	06/17/2009		6.48	10.82
	07/16/2009		6.56	10.74
	08/13/2009		6.45	10.85
	09/10/2009		6.73	10.57
	10/16/2009		5.94	11.34
	11/12/2009		6.31	10.99
	12/03/2009		6.50	10.80
	01/14/2010		6.40	10.90
	02/18/2010		5.68	11.62
	03/25/2010		5.85	11.45
	04/23/2010		5.78	11.52
	05/21/2010		6.29	11.01
	06/10/2010		6.50	10.80

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-3	07/23/2010	17.30	6.43	10.87
	08/12/2010		6.60	10.70
	09/10/2010		6.64	10.66
	10/15/2010		6.93	10.36
	11/04/2010		6.62	10.68
	12/03/2010		6.38	10.92
	01/28/2011		6.16	11.14
	02/10/2011		6.35	10.95
	03/31/2011		4.99	12.31
	04/19/2011		6.02	11.28
	06/27/2011		6.52	10.78
	07/21/2011		6.69	10.61
	08/22/2011		7.92	9.38
	09/23/2011		11.10	6.20
	09/30/2011		11.17	6.13
	10/05/2011		11.08	6.22
	10/12/2011		11.35	5.95
	10/19/2011		11.40	5.90
	10/26/2011		11.33	5.97
	11/02/2011		11.48	5.82
	11/09/2011		10.14	7.16
	11/16/2011		9.76	7.54
	11/23/2011		9.43	7.87
	11/30/2011		9.28	8.02
	12/06/2011		9.18	8.12
	01/27/2012		7.89	9.41
	02/23/2012		7.52	9.78
	03/20/2012		6.49	10.81
	04/16/2012		5.31	11.99
	05/14/2012		6.60	10.70
	06/11/2012		6.86	10.44
	07/18/2012		6.95	10.35
	08/15/2012		6.89	10.41
	09/13/2012		6.85	10.45
	10/17/2012		6.97	10.33
	11/16/2012		6.62	10.68
	12/14/2012		5.76	11.54
	01/18/2013		6.28	11.02
	02/22/2013		6.61	10.69
	03/21/2013		6.57	10.73
	04/19/2013		6.31	10.99
	07/16/2013		7.11	10.19
	10/07/2013		7.52	9.78
	01/03/2014		7.32	9.98
	04/22/2014		6.76	10.54

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-3	07/08/2014	17.30	7.42	9.88
	10/28/2014		7.62	9.68
MW-4	01/09/1995	18.26	6.87	11.38
	01/27/1995		6.75	11.50
	02/17/1995		7.24	11.01
	04/13/1995		7.42	10.83
	06/08/1995		7.64	10.61
	08/09/1995		7.93	10.12
	11/17/1995		8.67	9.38
	01/09/1996		8.12	10.11
	04/24/1996		7.72	10.51
	07/29/1996		8.29	9.94
	12/13/1996		6.75	11.48
	04/15/1997		NM	NM
	09/19/1997		7.76	10.47
	12/03/1997		NM	NM
	12/15/1997		7.08	11.15
	01/13/1998		7.28	10.95
	01/30/1998		6.78	11.45
	02/24/1998		6.13	12.10
	04/06/1998		7.13	11.10
	07/02/1998		7.80	10.43
	07/13/1998		7.89	10.37
	09/28/1998		8.29	9.97
	10/16/1998		8.40	9.86
	01/08/1999		7.71	10.55
	04/16/1999		7.42	10.84
	06/21/1999		8.16	10.10
	07/12/1999		8.29	9.97
	10/08/1999		8.79	9.47
	01/17/2000		8.82	9.44
	04/25/2000		7.74	10.52
	05/30/2000		8.05	10.21
	06/26/2000		8.13	10.13
	08/10/2000		8.62	9.64
	08/31/2000		8.59	9.67
	09/25/2000		8.62	9.64
	10/06/2000		8.62	9.64
	11/21/2000		8.55	9.71
	12/18/2000		8.65	9.61
	01/15/2001		8.61	9.65
	02/14/2001		8.30	9.96
	03/01/2001		7.93	10.33
	04/19/2001		8.36	9.90
	05/23/2001		8.27	9.99

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-4	06/14/2001	18.26	8.30	9.96
	07/02/2001		8.39	9.87
	08/10/2001		8.34	9.92
	09/07/2001		8.32	9.94
	10/18/2001		8.56	9.70
	11/02/2001		8.81	9.45
	12/14/2001		7.84	10.42
	01/18/2002		7.09	11.17
	02/21/2002		7.47	10.79
	03/25/2002		7.45	10.81
	04/18/2002		8.01	10.25
	05/10/2002		8.01	10.25
	06/04/2002		7.94	10.32
	07/10/2002		8.26	10.00
	08/15/2002		8.25	10.01
	09/11/2002		8.05	10.21
	10/08/2002		8.04	10.22
	11/07/2002		8.13	10.13
	12/12/2002		8.24	10.02
	01/13/2003		7.42	10.84
	02/26/2003		7.15	11.11
	03/19/2003		7.58	10.68
	04/14/2003		7.62	10.64
	05/13/2003		7.75	10.51
	06/13/2003		8.02	10.24
	07/07/2003		7.96	10.30
	08/13/2003		8.13	10.13
	09/17/2003		8.18	10.08
	10/27/2003		8.44	9.82
	11/18/2003		8.41	9.85
	12/19/2003		8.00	10.26
	01/15/2004		7.36	10.90
	02/17/2004		7.51	10.75
	03/18/2004		7.60	10.66
	04/21/2004		7.83	10.43
	05/18/2004		8.08	10.18
	06/10/2004		8.14	10.12
	07/13/2004		8.22	10.04
	08/12/2004		8.30	9.96
	09/16/2004		8.36	9.90
	10/12/2004		8.33	9.93
	11/17/2004		8.03	10.23
	12/15/2004		7.71	10.55
	01/24/2005		7.28	10.98
	02/15/2005		7.60	10.66

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-4	03/15/2005	18.26	7.41	10.85
	04/25/2005		7.28	10.98
	05/20/2005		7.50	10.76
	06/21/2005		7.44	10.82
	07/20/2005		8.29	9.94
	08/22/2005		8.33	9.90
	09/16/2005		8.37	9.89
	10/21/2005		8.63	9.63
	11/18/2005		8.56	9.70
	12/16/2005		8.11	10.15
	01/20/2006		6.68	11.58
	02/22/2006		7.10	11.16
	03/30/2006		6.42	11.84
	04/27/2006		6.70	11.56
	05/18/2006		7.17	11.09
	06/22/2006		7.50	10.76
	07/20/2006		7.64	10.62
	08/17/2006		7.75	10.51
	09/14/2006		7.77	10.49
	10/19/2006		7.96	10.30
	11/21/2006		9.10	9.16
	12/21/2006		7.54	10.72
	01/18/2007		7.73	10.53
	02/06/2007		7.82	10.44
	03/08/2007		7.19	11.07
	04/12/2007		7.43	10.83
	05/10/2007		7.52	10.74
	06/07/2007		7.59	10.67
	07/19/2007		NM	NM
	08/09/2007		NM	NM
	09/14/2007		7.78	10.48
	10/12/2007		7.49	10.77
	11/09/2007		7.59	10.67
	12/14/2007		7.40	10.86
	01/17/2008		6.94	11.32
	02/21/2008		NM	NM
	03/20/2008		NM	NM
	04/10/2008		7.68	10.58
	05/08/2008		8.03	10.23
	06/12/2008		7.88	10.38
	07/24/2008		8.09	10.17
	08/14/2008		8.19	10.07
	09/18/2008		8.15	10.11
	10/22/2008		8.37	9.89
	11/13/2008		8.06	10.20

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-4	12/04/2008	18.26	8.07	10.19
	01/08/2009		7.83	10.43
	02/11/2009		7.67	10.59
	03/12/2009		7.02	11.24
	04/09/2009		6.79	11.47
	05/20/2009		7.27	10.99
	06/17/2009		7.38	10.88
	07/16/2009		NM	NM
	08/13/2009		7.56	10.70
	09/10/2009		7.80	10.46
	10/16/2009		7.53	10.71
	11/12/2009		7.38	10.88
	12/03/2009		7.51	10.75
	01/14/2010		7.50	10.76
	02/18/2010		6.68	11.58
	03/25/2010		6.72	11.54
	04/23/2010		6.92	11.34
	05/21/2010		7.18	11.08
	06/10/2010		7.30	10.96
	07/23/2010		7.46	10.80
	08/12/2010		7.57	10.69
	09/10/2010		7.78	10.48
	10/15/2010		7.87	10.38
	11/04/2010		7.94	10.32
	12/03/2010		7.46	10.80
	01/28/2011		6.93	11.33
	02/10/2011		7.08	11.18
	03/31/2011		5.91	12.35
	04/19/2011		6.58	11.68
MW-5	01/09/1995	17.97	6.14	11.83
	01/27/1995		5.71	12.26
	02/17/1995		6.59	11.38
	04/13/1995		6.55	11.42
	06/08/1995		7.44	10.53
	08/09/1995		7.87	10.70
	11/17/1995		8.65	9.92
	01/09/1996		7.93	10.01
	04/24/1996		7.49	10.45
	07/29/1996		8.24	9.70
	12/13/1996		6.97	10.97
	04/15/1997		NM	NM
	09/19/1997		8.11	9.83
	12/03/1997		7.68	10.26
	12/15/1997		7.61	10.33
	01/13/1998		7.48	10.46

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-5	01/30/1998	17.97	6.82	11.12
	02/24/1998		5.98	11.96
	04/06/1998		7.16	10.78
	07/02/1998		7.85	10.09
	07/13/1998		7.96	10.01
	09/28/1998		8.37	9.60
	10/16/1998		8.46	9.51
	01/08/1999		8.25	9.72
	04/16/1999		7.17	10.80
	06/21/1999		8.30	9.67
	07/12/1999		8.61	9.36
	10/08/1999		8.82	9.15
	01/17/2000		8.82	9.15
	04/25/2000		8.02	9.95
	05/30/2000		8.60	9.37
	06/26/2000		8.71	9.26
	08/10/2000		9.08	8.89
	08/31/2000		8.81	9.16
	09/25/2000		8.71	9.26
	10/06/2000		8.45	9.52
	11/21/2000		8.51	9.46
	12/18/2000		9.31	8.66
	01/15/2001		8.61	9.36
	02/14/2001		8.17	9.80
	03/01/2001		7.22	10.75
	04/19/2001		8.90	9.07
	05/23/2001		9.39	8.58
	06/14/2001		9.38	8.59
	07/02/2001		8.98	8.99
	08/10/2001		9.25	8.72
	09/07/2001		9.32	8.65
	10/18/2001		9.28	8.69
	11/02/2001		9.13	8.84
	12/14/2001		7.92	10.05
	01/18/2002		7.21	10.76
	02/21/2002		7.59	10.38
	03/25/2002		7.83	10.14
	04/18/2002		8.04	9.93
	05/10/2002		8.42	9.55
	06/04/2002		8.14	9.83
	07/10/2002		8.50	9.47
	08/15/2002		8.48	9.49
	09/11/2002		8.21	9.76
	10/08/2002		8.32	9.65
	11/07/2002		8.82	9.15

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-5	12/12/2002	17.97	9.03	8.94
	01/13/2003		7.04	10.93
	02/26/2003		7.62	10.35
	03/19/2003		9.33	8.64
	04/14/2003		9.01	8.96
	05/13/2003		8.65	9.32
	06/13/2003		8.27	9.70
	07/07/2003		8.20	9.77
	08/13/2003		8.48	9.49
	09/17/2003		8.63	9.34
	10/27/2003		8.61	9.36
	11/18/2003		9.01	8.96
	12/19/2003		8.31	9.66
	01/15/2004		8.18	9.79
	02/17/2004		8.21	9.76
	03/18/2004		9.02	8.95
	04/21/2004		9.42	8.55
	05/18/2004		9.02	8.95
	06/10/2004		9.20	8.77
	07/13/2004		9.17	8.80
	08/12/2004		9.20	8.77
	09/16/2004		9.15	8.82
	10/12/2004		9.01	8.96
	11/17/2004		9.29	8.68
	12/15/2004		8.98	8.99
	01/24/2005		8.54	9.43
	02/15/2005		9.18	8.79
	03/15/2005		8.78	9.19
	04/25/2005		8.81	9.16
	05/20/2005		8.91	9.06
	06/21/2005		8.90	9.07
	07/20/2005		9.27	8.70
	08/22/2005		9.50	8.47
	09/16/2005		9.35	8.62
	10/21/2005		9.45	8.52
	11/18/2005		9.47	8.50
	12/16/2005		9.22	8.75
	01/20/2006		NM	NM
	02/22/2006		NM	NM
	03/30/2006		5.45	12.52
	04/27/2006		6.80	11.17
	05/18/2006		8.33	9.64
	06/22/2006		8.88	9.09
	07/20/2006		8.91	9.06
	08/17/2006		8.93	9.04

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-5	09/14/2006	17.97	8.87	9.10
	10/19/2006		8.95	9.02
	11/21/2006		7.95	10.02
	12/21/2006		7.45	10.52
	01/18/2007		7.78	10.19
	02/06/2007		7.90	10.07
	03/08/2007		7.01	10.96
	04/12/2007		7.59	10.38
	05/10/2007		7.47	10.50
	06/07/2007		8.88	9.09
	07/19/2007		8.45	9.52
	08/09/2007		NM	NM
	09/14/2007		7.75	10.22
	10/12/2007		7.51	10.46
	11/09/2007		7.43	10.54
	12/14/2007		7.30	10.67
	01/17/2008		6.97	11.00
	02/21/2008		7.11	10.86
	03/20/2008		8.52	9.45
	04/10/2008		9.05	8.92
	05/08/2008		8.80	9.17
	06/12/2008		8.63	9.34
	07/24/2008		9.11	8.86
	08/14/2008		9.10	8.87
	09/18/2008		8.57	9.40
	10/22/2008		8.73	9.24
	11/13/2008		9.07	8.90
	12/04/2008		8.99	8.98
	01/08/2009		8.56	9.41
	02/11/2009		7.82	10.15
	03/12/2009		5.75	12.22
	04/09/2009		7.06	10.91
	05/20/2009		7.23	10.74
	06/17/2009		7.82	10.15
	07/16/2009		8.03	9.94
	08/13/2009		8.19	9.78
	09/10/2009		8.24	9.73
	10/16/2009		7.28	10.67
	11/12/2009		7.88	10.09
	12/03/2009		7.94	10.03
	01/14/2010		8.41	9.56
	02/18/2010		6.60	11.37
	03/25/2010		6.77	11.20
	04/23/2010		6.72	11.25
	05/21/2010		7.59	10.38

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
MW-5	06/10/2010	17.97	8.36	9.61
	07/23/2010		8.21	9.76
	08/12/2010		8.20	9.77
	09/10/2010		7.86	10.11
	10/15/2010		8.94	9.02
	11/04/2010		8.40	9.57
	12/03/2010		8.19	9.78
	01/28/2011		6.67	11.30
	02/10/2011		7.57	10.40
	03/31/2011		5.15	12.82
	04/19/2011		6.70	11.27
PZ-101	03/20/2012	19.01	9.09	9.92
	04/16/2012		8.62	10.39
	05/14/2012		9.30	9.71
	06/11/2012		9.56	9.45
	07/18/2012		9.73	9.28
	08/15/2012		9.83	9.18
	09/13/2012		9.91	9.10
	10/17/2012		9.85	9.16
	11/16/2012		9.46	9.55
	12/14/2012		8.73	10.28
	01/18/2013		9.10	9.91
	02/22/2013		9.67	9.34
	03/21/2013		9.50	9.51
	04/19/2013		9.34	9.67
	07/16/2013		9.99	9.02
	10/07/2013		10.25	8.76
	01/03/2014		10.06	8.95
	04/22/2014		9.45	9.56
	07/08/2014		10.08	8.93
	10/28/2014		10.34	8.67
PZ-102	03/20/2012	16.64	7.82	8.82
	04/16/2012		7.84	8.80
	05/14/2012		8.13	8.51
	06/11/2012		8.40	8.24
	07/18/2012		8.63	8.01
	08/15/2012		8.75	7.89
	09/13/2012		8.83	7.81
	10/17/2012		8.93	7.71
	11/16/2012		8.65	7.99
	12/14/2012		8.08	8.56
	01/18/2013		8.28	8.36
	02/22/2013		8.67	7.97
	03/21/2013		8.79	7.85
	04/19/2013		8.67	7.97

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
PZ-102	07/16/2013	16.64	9.33	7.31
	10/07/2013		9.70	6.94
	01/03/2014		9.31	7.33
	04/22/2014		8.30	8.34
	07/08/2014		9.32	7.32
	10/28/2014		9.78	6.86
RP-1	09/08/1994	17.84	8.65	9.17
	01/27/1995		5.96	11.88
	02/17/1995		7.46	10.38
	02/28/1995		7.83	10.01
	04/13/1995		7.43	10.41
	05/10/1995		7.53	10.31
	08/09/1995		8.39	9.45
	11/17/1995		8.91	8.93
	01/09/1996		7.95	9.89
	04/24/1996		7.81	10.03
	07/29/1996		8.58	9.26
	12/13/1996		6.00	11.84
	04/15/1997		8.18	9.66
	09/19/1997		8.46	9.38
	12/03/1997		7.45	10.39
	12/15/1997		7.41	10.43
	01/13/1998		7.02	10.82
	01/30/1998		6.88	10.96
	02/24/1998		6.18	11.66
	04/06/1998		7.32	10.52
	07/02/1998		8.03	9.81
	07/13/1998		8.14	9.70
	09/28/1998		8.42	9.42
	10/16/1998		8.50	9.34
	01/08/1999		8.26	9.58
	04/16/1999		7.33	10.51
	06/21/1999		8.43	9.41
	07/12/1999		8.63	9.21
	10/08/1999		8.99	8.85
	01/17/2000		8.46	9.38
	04/25/2000		7.89	9.95
	05/30/2000		8.34	9.50
	06/26/2000		8.67	9.17
	08/10/2000		8.92	8.92
	08/31/2000		8.35	9.49
	09/25/2000		8.62	9.22
	10/06/2000		8.70	9.14
	11/21/2000		8.41	9.43
	12/18/2000		8.26	9.58

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-1	01/15/2001	17.84	8.22	9.62
	02/14/2001		7.80	10.04
	03/01/2001		7.11	10.73
	04/19/2001		8.00	9.84
	05/23/2001		8.51	9.33
	06/14/2001		8.59	9.25
	07/02/2001		8.61	9.23
	08/10/2001		8.39	9.45
	09/07/2001		8.37	9.47
	10/18/2001		8.64	9.20
	11/02/2001		8.51	9.33
	12/14/2001		7.26	10.58
	01/18/2002		7.27	10.57
	02/21/2002		7.51	10.33
	03/25/2002		7.72	10.12
	04/18/2002		8.15	9.69
	05/10/2002		8.40	9.44
	06/04/2002		8.04	9.80
	07/10/2002		8.32	9.52
	08/15/2002		8.23	9.61
	09/11/2002		8.01	9.83
	10/08/2002		8.11	9.73
	11/07/2002		8.25	9.59
	12/12/2002		8.10	9.74
	01/13/2003		6.71	11.13
	02/26/2003		6.75	11.09
	03/19/2003		7.55	10.29
	04/14/2003		7.62	10.22
	05/13/2003		7.59	10.25
	06/13/2003		7.86	9.98
	07/07/2003		7.91	9.93
	08/13/2003		8.02	9.82
	09/17/2003		9.10	8.74
	10/27/2003		8.28	9.56
	11/18/2003		8.06	9.78
	12/19/2003		7.41	10.43
	01/15/2004		7.19	10.65
	02/17/2004		7.32	10.52
	03/18/2004		7.61	10.23
	04/21/2004		8.15	9.69
	05/18/2004		8.20	9.64
	06/10/2004		8.40	9.44
	07/13/2004		8.02	9.82
	08/12/2004		8.20	9.64
	09/16/2004		8.31	9.53

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-1	10/12/2004	17.84	8.14	9.70
	11/17/2004		7.75	10.09
	12/15/2004		7.41	10.43
	01/24/2005		7.25	10.59
	02/15/2005		7.65	10.19
	03/15/2005		7.32	10.52
	04/25/2005		7.33	10.51
	05/20/2005		7.52	10.32
	06/21/2005		7.80	10.04
	07/20/2005		8.32	9.52
	08/22/2005		8.50	9.34
	09/16/2005		8.52	9.32
	10/21/2005		8.67	9.17
	11/18/2005		8.44	9.40
	12/16/2005		8.05	9.79
	01/20/2006		6.95	10.89
	02/22/2006		6.93	10.91
	03/30/2006		5.96	11.88
	04/27/2006		6.51	11.33
	05/18/2006		7.21	10.63
	06/22/2006		7.54	10.30
	07/20/2006		7.51	10.33
	08/17/2006		7.39	10.45
	09/14/2006		7.50	10.34
	10/19/2006		7.54	10.30
	11/21/2006		7.60	10.24
	12/21/2006		6.86	10.98
	01/18/2007		7.49	10.35
	02/06/2007		7.85	9.99
	03/08/2007		7.16	10.68
	04/12/2007		7.57	10.27
	05/10/2007		7.48	10.36
	06/07/2007		7.80	10.04
	07/19/2007		7.77	10.07
	08/09/2007		7.62	10.22
	09/14/2007		7.46	10.38
	10/12/2007		7.28	10.56
	11/09/2007		7.29	10.55
	12/14/2007		6.16	11.68
	01/17/2008		7.01	10.83
	02/21/2008		6.75	11.09
	03/20/2008		7.62	10.22
	04/10/2008		7.82	10.02
	05/08/2008		7.98	9.86
	06/12/2008		7.81	10.03

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-1	07/24/2008	17.84	7.99	9.85
	08/14/2008		7.87	9.97
	09/18/2008		7.69	10.15
	10/22/2008		8.15	9.69
	11/13/2008		7.60	10.24
	12/04/2008		7.72	10.12
	01/08/2009		7.32	10.52
	02/11/2009		7.19	10.65
	03/12/2009		6.09	11.75
	04/09/2009		7.01	10.83
	05/20/2009		7.15	10.69
	06/17/2009		7.26	10.58
	07/16/2009		7.49	10.35
	08/13/2009		7.25	10.59
	09/10/2009		7.59	10.25
	10/16/2009		6.70	11.12
	11/12/2009		7.07	10.77
	12/03/2009		7.20	10.64
	01/14/2010		7.21	10.63
	02/18/2010		5.44	12.40
	03/25/2010		6.55	11.29
	04/23/2010		6.54	11.30
	05/21/2010		7.13	10.71
	06/10/2010		7.35	10.49
	07/23/2010		7.19	10.65
	08/12/2010		7.34	10.50
	09/10/2010		7.52	10.32
	10/15/2010		7.80	10.03
	11/04/2010		7.36	10.48
	12/03/2010		7.14	10.70
	01/28/2011		6.81	11.03
	02/10/2011		7.05	10.79
	03/31/2011		5.60	12.24
	04/19/2011		6.76	11.08
	06/27/2011		7.09	10.75
	07/21/2011		7.28	10.56
	08/22/2011		8.60	9.24
	09/23/2011		10.79	7.05
	09/30/2011		10.90	6.94
	10/05/2011		10.25	7.59
	10/12/2011		10.45	7.39
	10/19/2011		11.47	6.37
	10/26/2011		11.83	6.01
	11/02/2011		11.82	6.02
	11/09/2011		10.51	7.33

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-1	11/16/2011	17.84	10.54	7.30
	11/23/2011		10.44	7.40
	11/30/2011		10.64	7.20
	12/06/2011		10.02	7.82
	01/27/2012		8.60	9.24
	02/23/2012		8.15	9.69
	03/20/2012		7.29	10.55
	04/16/2012		6.10	11.74
	05/14/2012		7.09	10.75
	06/11/2012		7.50	10.34
	07/18/2012		7.60	10.24
	08/15/2012		7.49	10.35
	09/13/2012		7.50	10.34
	10/17/2012		7.68	10.16
	11/16/2012		7.35	10.49
	12/14/2012		6.40	11.44
	01/18/2013		6.90	10.94
	02/22/2013		7.30	10.54
	03/21/2013		7.28	10.56
	04/19/2013		7.01	10.83
	07/16/2013		7.72	10.12
	10/07/2013		8.14	9.70
	01/03/2014		7.91	9.93
	04/22/2014		7.44	10.40
	07/08/2014		7.98	9.86
	10/28/2014		8.21	9.63
RP-2	09/08/1994	17.94	8.99	8.94
	01/09/1995		6.40	11.54
	01/27/1995		5.95	11.99
	02/17/1995		7.76	10.18
	02/28/1995		8.11	9.83
	04/13/1995		7.69	10.25
	05/10/1995		7.77	10.17
	08/09/1995		8.67	9.27
	11/17/1995		9.27	8.67
	01/09/1996		8.27	9.67
	04/24/1996		8.04	9.90
	07/29/1996		8.89	9.05
	12/13/1996		6.20	11.74
	04/15/1997		8.46	9.48
	09/19/1997		8.74	9.20
	12/03/1997		7.74	10.20
	12/15/1997		7.66	10.28
	01/13/1998		7.14	10.80
	01/30/1998		7.10	10.84

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-2	02/24/1998	17.94	6.40	11.54
	04/06/1998		7.57	10.37
	07/02/1998		8.27	9.67
	07/13/1998		8.37	9.57
	09/28/1998		8.65	9.29
	10/16/1998		8.42	9.52
	01/08/1999		8.44	9.50
	04/16/1999		7.53	10.41
	06/21/1999		8.64	9.30
	07/12/1999		8.82	9.12
	10/08/1999		9.00	8.94
	01/17/2000		8.75	9.19
	04/25/2000		8.14	9.80
	05/30/2000		8.51	9.43
	06/26/2000		8.78	9.16
	08/10/2000		9.02	8.92
	08/31/2000		8.47	9.47
	09/25/2000		8.71	9.23
	10/06/2000		8.75	9.19
	11/21/2000		7.76	10.18
	12/18/2000		8.51	9.43
	01/15/2001		8.39	9.55
	02/14/2001		7.84	10.10
	03/01/2001		7.30	10.64
	04/19/2001		8.23	9.71
	05/23/2001		8.59	9.35
	06/14/2001		8.72	9.22
	07/02/2001		8.70	9.24
	08/10/2001		8.48	9.46
	09/07/2001		8.55	9.39
	10/18/2001		8.72	9.22
	11/02/2001		8.71	9.23
	12/14/2001		7.61	10.33
	01/18/2002		7.41	10.53
	02/21/2002		7.62	10.32
	03/25/2002		7.99	9.95
	04/18/2002		8.25	9.69
	05/10/2002		8.49	9.45
	06/04/2002		8.24	9.70
	07/10/2002		8.52	9.42
	08/15/2002		8.45	9.49
	09/11/2002		8.29	9.65
	10/08/2002		8.35	9.59
	11/07/2002		8.49	9.45
	12/12/2002		8.25	9.69

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-2	01/13/2003	17.94	6.81	11.13
	02/26/2003		6.83	11.11
	03/19/2003		7.66	10.28
	04/14/2003		7.58	10.36
	05/13/2003		7.73	10.21
	06/13/2003		7.98	9.96
	07/07/2003		8.01	9.93
	08/13/2003		8.18	9.76
	09/17/2003		8.24	9.70
	10/27/2003		8.43	9.51
	11/18/2003		8.25	9.69
	12/19/2003		7.61	10.33
	01/15/2004		7.38	10.56
	02/17/2004		7.31	10.63
	03/18/2004		7.73	10.21
	04/21/2004		8.21	9.73
	05/18/2004		8.27	9.67
	06/10/2004		8.16	9.78
	07/13/2004		8.20	9.74
	08/12/2004		8.25	9.69
	09/16/2004		8.42	9.52
	10/12/2004		8.33	9.61
	11/17/2004		7.96	9.98
	12/15/2004		7.57	10.37
	01/24/2005		7.40	10.54
	02/15/2005		7.74	10.20
	03/15/2005		7.46	10.48
	04/25/2005		7.45	10.49
	05/20/2005		7.65	10.29
	06/21/2005		7.95	9.99
	07/20/2005		8.31	9.63
	08/22/2005		8.50	9.44
	09/16/2005		8.55	9.39
	10/21/2005		8.70	9.24
	11/18/2005		8.52	9.42
	12/16/2005		8.16	9.78
	01/20/2006		7.10	10.84
	02/22/2006		NM	NM
	03/30/2006		5.97	11.97
	04/27/2006		6.62	11.32
	05/18/2006		7.26	10.68
	06/22/2006		7.62	10.32
	07/20/2006		7.56	10.38
	08/17/2006		7.46	10.48
	09/14/2006		7.57	10.37

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-2	10/19/2006	17.94	7.58	10.36
	11/21/2006		7.72	10.22
	12/21/2006		7.02	10.92
	01/18/2007		7.61	10.33
	02/06/2007		7.58	10.36
	03/08/2007		7.20	10.74
	04/12/2007		7.64	10.30
	05/10/2007		7.47	10.47
	06/07/2007		7.85	10.09
	07/19/2007		7.78	10.16
	08/09/2007		7.71	10.23
	09/14/2007		7.63	10.31
	10/12/2007		7.37	10.57
	11/09/2007		7.45	10.49
	12/14/2007		7.29	10.65
	01/17/2008		7.04	10.90
	02/21/2008		6.88	11.06
	03/20/2008		7.66	10.28
	04/10/2008		8.03	9.91
	05/08/2008		8.00	9.94
	06/12/2008		7.85	10.09
	07/24/2008		8.05	9.89
	08/14/2008		7.97	9.97
	09/18/2008		7.80	10.14
	10/22/2008		8.14	9.80
	11/13/2008		7.71	10.23
	12/04/2008		7.80	10.14
	01/08/2009		7.44	10.50
	02/11/2009		7.26	10.68
	03/12/2009		6.16	11.78
	04/09/2009		7.02	10.92
	05/20/2009		7.21	10.73
	06/17/2009		7.39	10.55
	07/16/2009		7.47	10.47
	08/13/2009		7.32	10.62
	09/10/2009		7.61	10.33
	10/16/2009		6.80	11.12
	11/12/2009		7.22	10.72
	12/03/2009		7.39	10.55
	01/14/2010		7.32	10.62
	02/18/2010		6.51	11.43
	03/25/2010		6.69	11.25
	04/23/2010		6.63	11.31
	05/21/2010		7.16	10.78
	06/10/2010		7.43	10.51

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-2	07/23/2010	17.94	7.30	10.64
	08/12/2010		7.48	10.46
	09/10/2010		7.53	10.41
	10/15/2010		7.80	10.13
	11/04/2010		7.47	10.47
	12/03/2010		7.23	10.71
	01/28/2011		6.93	11.01
	02/10/2011		7.18	10.76
	03/31/2011		5.70	12.24
	04/19/2011		6.81	11.13
	06/27/2011		7.25	10.69
	07/21/2011		7.30	10.64
	08/22/2011		8.43	9.51
	09/23/2011		10.95	6.99
	09/30/2011		11.28	6.66
	10/05/2011		11.40	6.54
	10/12/2011		11.59	6.35
	10/19/2011		11.77	6.17
	10/26/2011		11.83	6.11
	11/02/2011		11.91	6.03
	11/09/2011		11.13	6.81
	11/16/2011		10.80	7.14
	11/23/2011		10.47	7.47
	11/30/2011		10.30	7.64
	12/06/2011		10.17	7.77
	01/27/2012		8.83	9.11
	02/23/2012		8.46	9.48
	03/20/2012		8.39	9.55
	04/16/2012		6.17	11.77
	05/14/2012		7.34	10.60
	06/11/2012		7.65	10.29
	07/18/2012		7.78	10.16
	08/15/2012		7.70	10.24
	09/13/2012		7.69	10.25
	10/17/2012		7.82	10.12
	11/16/2012		7.46	10.48
	12/14/2012		6.54	11.40
	01/18/2013		7.07	10.87
	02/22/2013		7.45	10.49
	03/21/2013		7.42	10.52
	04/19/2013		7.16	10.78
	07/16/2013		7.84	10.10
	10/07/2013		8.28	9.66
	01/03/2014		8.09	9.85
	04/22/2014		7.55	10.39

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-2	07/08/2014	17.94	8.19	9.75
	10/28/2014		8.35	9.59
RP-3	09/08/1994	17.87	8.80	9.05
	01/09/1995		6.55	11.32
	01/27/1995		6.12	11.75
	02/17/1995		7.45	10.42
	02/28/1995		7.87	10.00
	04/13/1995		7.44	10.43
	05/10/1995		7.61	10.26
	08/09/1995		8.48	9.39
	11/17/1995		9.09	8.78
	01/09/1996		8.07	9.80
	04/24/1996		7.92	9.95
	07/29/1996		8.71	9.16
	12/13/1996		6.03	11.84
	04/15/1997		8.27	9.60
	09/19/1997		8.58	9.29
	12/03/1997		7.65	10.22
	12/15/1997		7.58	10.29
	01/13/1998		7.23	10.64
	01/30/1998		6.97	10.90
	02/24/1998		6.22	11.65
	04/06/1998		7.43	10.44
	07/02/1998		8.12	9.75
	07/13/1998		8.23	9.64
	09/28/1998		8.53	9.34
	10/16/1998		8.61	9.26
	01/08/1999		8.25	9.62
	04/16/1999		7.40	10.47
	06/21/1999		8.51	9.36
	07/12/1999		8.75	9.12
	10/08/1999		9.09	8.78
	01/17/2000		8.70	9.17
	04/25/2000		8.84	9.03
	05/30/2000		8.42	9.45
	06/26/2000		9.00	8.87
	08/10/2000		10.06	7.81
	08/31/2000		8.49	9.38
	09/25/2000		8.86	9.01
	10/06/2000		8.98	8.89
	11/21/2000		8.90	8.97
	12/18/2000		8.51	9.36
	01/15/2001		8.58	9.29
	02/14/2001		7.87	10.00
	03/01/2001		7.36	10.51

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-3	04/19/2001	17.87	9.32	8.55
	05/23/2001		8.92	8.95
	06/14/2001		8.92	8.95
	07/02/2001		8.80	9.07
	08/10/2001		8.85	9.02
	09/07/2001		8.75	9.12
	10/18/2001		8.99	8.88
	11/02/2001		8.81	9.06
	12/14/2001		7.60	10.27
	01/18/2002		7.82	10.05
	02/21/2002		7.65	10.22
	03/25/2002		7.86	10.01
	04/18/2002		8.43	9.44
	05/10/2002		8.71	9.16
	06/04/2002		8.26	9.61
	07/10/2002		8.36	9.51
	08/15/2002		8.42	9.45
	09/11/2002		8.16	9.71
	10/08/2002		8.36	9.51
	11/07/2002		8.72	9.15
	12/12/2002		8.32	9.55
	01/13/2003		6.89	10.98
	02/26/2003		6.80	11.07
	03/19/2003		7.81	10.06
	04/14/2003		7.85	10.02
	05/13/2003		7.83	10.04
	06/13/2003		8.08	9.79
	07/07/2003		8.01	9.86
	08/13/2003		8.21	9.66
	09/17/2003		8.30	9.57
	10/27/2003		8.45	9.42
	11/18/2003		8.32	9.55
	12/19/2003		7.63	10.24
	01/15/2004		7.42	10.45
	02/17/2004		7.51	10.36
	03/18/2004		7.86	10.01
	04/21/2004		8.44	9.43
	05/18/2004		8.41	9.46
	06/10/2004		8.03	9.84
	07/13/2004		8.29	9.58
	08/12/2004		8.43	9.44
	09/16/2004		8.51	9.36
	10/12/2004		8.33	9.54
	11/17/2004		8.08	9.79
	12/15/2004		7.69	10.18

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-3	01/24/2005	17.87	7.45	10.42
	02/15/2005		7.96	9.91
	03/15/2005		7.65	10.22
	04/25/2005		7.59	10.28
	05/20/2005		7.71	10.16
	06/21/2005		8.02	9.85
	07/20/2005		8.70	9.17
	08/19/2005		8.80	9.07
	09/16/2005		8.73	9.14
	10/21/2005		8.92	8.95
	01/20/2006		7.07	10.80
	02/22/2006		7.17	10.70
	03/30/2006		6.08	11.79
	04/27/2006		6.63	11.24
	05/18/2006		7.37	10.50
	06/22/2006		7.75	10.12
	07/20/2006		7.80	10.07
	08/17/2006		7.65	10.22
	09/14/2006		7.73	10.14
	10/19/2006		7.76	10.11
	11/21/2006		7.82	10.05
	12/21/2006		6.98	10.89
	01/18/2007		7.59	10.28
	02/06/2007		7.98	9.89
	03/08/2007		7.34	10.53
	04/12/2007		7.76	10.11
	05/10/2007		7.68	10.19
	06/07/2007		8.06	9.81
	07/19/2007		7.98	9.89
	08/09/2007		7.80	10.07
	09/14/2007		7.58	10.29
	10/12/2007		7.36	10.51
	11/09/2007		7.38	10.49
	12/14/2007		7.25	10.62
	01/17/2008		7.15	10.72
	02/21/2008		6.89	10.98
	03/20/2008		7.95	9.92
	04/10/2008		8.40	9.47
	05/08/2008		8.30	9.57
	06/12/2008		8.04	9.83
	07/24/2008		8.24	9.63
	08/14/2008		8.13	9.74
	09/18/2008		7.86	10.01
	10/22/2008		8.34	9.53
	11/13/2008		7.87	10.00

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-3	12/04/2008	17.87	7.99	9.88
	01/08/2009		7.60	10.27
	02/11/2009		7.38	10.49
	03/12/2009		6.07	11.80
	04/09/2009		7.23	10.64
	05/20/2009		7.40	10.47
	06/17/2009		7.45	10.42
	07/16/2009		7.70	10.17
	08/13/2009		7.46	10.41
	09/10/2009		7.81	10.06
	10/16/2009		6.84	11.01
	11/12/2009		7.27	10.60
	12/03/2009		7.41	10.46
	01/14/2010		7.48	10.39
	02/18/2010		6.48	11.39
	03/25/2010		6.67	11.20
	04/23/2010		6.61	11.26
	05/21/2010		7.33	10.54
	06/10/2010		7.61	10.26
	07/23/2010		7.38	10.49
	08/12/2010		7.49	10.38
	09/10/2010		7.70	10.17
	10/15/2010		8.02	9.84
	11/04/2010		7.56	10.31
	12/03/2010		7.33	10.54
	01/28/2011		6.86	11.01
	02/10/2011		7.21	10.66
	03/31/2011		5.55	12.32
	04/19/2011		6.78	11.09
	03/20/2012		7.65	10.22
	04/16/2012		6.28	11.59
	05/14/2012		7.29	10.58
	06/11/2012		7.63	10.24
	07/18/2012		7.74	10.13
	08/15/2012		7.74	10.13
	09/13/2012		7.71	10.16
	10/17/2012		7.85	10.02
	11/16/2012		7.52	10.35
	12/14/2012		6.52	11.35
	01/18/2013		7.00	10.87
	02/22/2013		7.52	10.35
	03/21/2013		7.46	10.41
	04/19/2013		7.16	10.71
	07/16/2013		7.94	9.93
	10/07/2013		8.35	9.52

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-3	01/03/2014	17.87	8.17	9.70
	04/22/2014		7.51	10.36
	07/08/2014		8.22	9.65
	10/28/2014		8.52	9.35
RP-4	09/08/1994	17.83	9.02	8.78
	01/09/1995		6.31	11.51
	01/27/1995		5.97	11.85
	02/17/1995		7.79	10.03
	02/28/1995		8.13	9.69
	04/13/1995		7.69	10.13
	05/10/1995		7.77	10.05
	08/09/1995		8.65	9.17
	11/17/1995		9.28	8.54
	01/09/1996		8.28	9.55
	04/24/1996		8.05	9.78
	07/29/1996		8.88	8.95
	12/13/1996		6.12	11.71
	04/15/1997		8.44	9.39
	09/19/1997		8.72	9.11
	12/03/1997		7.75	10.08
	12/15/1997		7.62	10.21
	01/13/1998		7.05	10.78
	01/30/1998		7.02	10.81
	02/24/1998		6.39	11.44
	04/06/1998		7.50	10.33
	07/02/1998		8.23	9.60
	07/13/1998		8.34	9.49
	09/28/1998		8.61	9.22
	10/16/1998		8.70	9.13
	01/08/1999		8.43	9.40
	04/16/1999		7.49	10.34
	06/21/1999		8.59	9.24
	07/12/1999		8.77	9.06
	10/08/1999		8.94	8.89
	01/17/2000		8.74	9.09
	04/25/2000		8.14	9.69
	05/30/2000		8.45	9.38
	06/26/2000		8.70	9.13
	08/10/2000		8.94	8.89
	08/31/2000		8.39	9.44
	09/25/2000		8.59	9.24
	10/06/2000		8.65	9.18
	11/21/2000		8.72	9.11
	12/18/2000		8.49	9.34
	01/15/2001		8.30	9.53

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-4	02/14/2001	17.83	7.80	10.03
	03/01/2001		7.23	10.60
	04/19/2001		8.20	9.63
	05/23/2001		8.48	9.35
	06/14/2001		8.61	9.22
	07/02/2001		8.67	9.16
	08/10/2001		8.51	9.32
	09/07/2001		8.47	9.36
	10/18/2001		8.66	9.17
	11/02/2001		8.67	9.16
	12/14/2001		7.36	10.47
	01/18/2002		7.33	10.50
	02/21/2002		7.57	10.26
	03/25/2002		7.71	10.12
	04/18/2002		8.14	9.69
	05/10/2002		8.42	9.41
	06/04/2002		8.15	9.68
	07/10/2002		8.47	9.36
	08/15/2002		8.38	9.45
	09/11/2002		8.15	9.68
	10/08/2002		8.32	9.51
	11/07/2002		8.42	9.41
	12/12/2002		8.17	9.66
	01/13/2003		6.71	11.12
	02/26/2003		6.75	11.08
	03/19/2003		7.46	10.37
	04/14/2003		7.44	10.39
	05/13/2003		7.59	10.24
	06/13/2003		7.90	9.93
	07/07/2003		7.95	9.88
	08/13/2003		8.10	9.73
	09/17/2003		8.12	9.71
	10/27/2003		8.34	9.49
	11/18/2003		8.16	9.67
	12/19/2003		7.52	10.31
	01/15/2004		7.30	10.53
	02/17/2004		7.21	10.62
	03/18/2004		7.64	10.19
	04/21/2004		8.06	9.77
	05/18/2004		8.17	9.66
	06/10/2004		8.07	9.76
	07/13/2004		8.11	9.72
	08/12/2004		8.15	9.68
	09/16/2004		8.33	9.50
	10/12/2004		8.25	9.58

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-4	11/17/2004	17.83	7.88	9.95
	12/15/2004		7.50	10.33
	01/24/2005		7.30	10.53
	02/15/2005		7.62	10.21
	03/15/2005		7.38	10.45
	04/25/2005		7.32	10.51
	05/20/2005		7.51	10.32
	06/21/2005		7.84	9.99
	07/20/2005		8.20	9.63
	08/22/2005		8.40	9.43
	09/16/2005		8.42	9.41
	10/21/2005		8.60	9.23
	11/18/2005		8.42	9.41
	12/16/2005		8.06	9.77
	01/20/2006		7.02	10.81
	02/22/2006		6.71	11.12
	03/30/2006		5.90	11.93
	04/27/2006		6.56	11.27
	05/18/2006		7.19	10.64
	06/22/2006		7.51	10.32
	07/20/2006		7.48	10.35
	08/17/2006		7.34	10.49
	09/14/2006		7.45	10.38
	10/19/2006		7.48	10.35
	11/21/2006		7.60	10.23
	12/21/2006		6.92	10.91
	01/18/2007		7.50	10.33
	02/06/2007		7.75	10.08
	03/08/2007		7.08	10.75
	04/12/2007		7.56	10.27
	05/10/2007		7.35	10.48
	06/07/2007		7.72	10.11
	07/19/2007		7.66	10.17
	08/09/2007		7.62	10.21
	09/14/2007		7.57	10.26
	10/12/2007		7.29	10.54
	11/09/2007		7.41	10.42
	12/14/2007		7.23	10.60
	01/17/2008		6.92	10.91
	02/21/2008		6.78	11.05
	03/20/2008		7.49	10.34
	04/10/2008		7.88	9.95
	05/08/2008		7.89	9.94
	06/12/2008		7.82	10.01
	07/24/2008		7.95	9.88

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-4	08/14/2008	17.83	7.87	9.96
	09/18/2008		7.74	10.09
	10/22/2008		8.01	9.82
	11/13/2008		7.61	10.22
	12/04/2008		7.71	10.12
	01/08/2009		7.35	10.48
	02/11/2009		7.17	10.66
	03/12/2009		6.10	11.73
	04/09/2009		6.91	10.92
	05/20/2009		7.08	10.75
	06/17/2009		7.31	10.52
	07/16/2009		7.35	10.48
	08/13/2009		7.23	10.60
	09/10/2009		7.52	10.31
	10/16/2009		6.70	11.11
	11/12/2009		7.15	10.68
	12/03/2009		7.32	10.51
	01/14/2010		7.21	10.62
	02/18/2010		6.42	11.41
	03/25/2010		6.61	11.22
	04/23/2010		6.55	11.28
	05/21/2010		7.66	10.17
	06/10/2010		7.30	10.53
	07/23/2010		7.20	10.63
	08/12/2010		7.36	10.47
	09/10/2010		7.41	10.42
	10/15/2010		7.68	10.14
	11/04/2010		7.38	10.45
	12/03/2010		7.16	10.67
	01/28/2011		6.88	10.95
	02/10/2011		7.09	10.74
	03/31/2011		5.61	12.22
	04/19/2011		6.71	11.12
	06/27/2011		7.17	10.66
	07/21/2011		7.20	10.63
	08/22/2011		8.25	9.58
	09/23/2011		10.41	7.42
	09/30/2011		10.78	7.05
	10/05/2011		10.90	6.93
	10/12/2011		11.05	6.78
	10/19/2011		11.27	6.56
	10/26/2011		11.34	6.49
	11/02/2011		11.43	6.40
	11/09/2011		10.90	6.93
	11/16/2011		10.61	7.22

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-4	11/23/2011	17.83	10.31	7.52
	11/30/2011		10.11	7.72
	12/06/2011		10.02	7.81
	01/27/2012		8.76	9.07
	02/23/2012		8.43	9.40
	03/20/2012		7.31	10.52
	04/16/2012		6.09	11.74
	05/14/2012		7.31	10.52
	06/11/2012		7.58	10.25
	07/18/2012		7.65	10.18
	08/15/2012		7.60	10.23
	09/13/2012		7.56	10.27
	10/17/2012		7.76	10.07
	11/16/2012		7.40	10.43
	12/14/2012		6.46	11.37
	01/18/2013		7.00	10.83
	02/22/2013		7.40	10.43
	03/21/2013		7.38	10.45
	04/19/2013		7.03	10.80
	07/16/2013		7.78	10.05
	10/07/2013		8.23	9.60
	01/03/2014		7.98	9.85
	04/22/2014		7.43	10.40
	07/08/2014		8.14	9.69
	10/28/2014		8.32	9.51
RP-5	09/08/1994	17.74	8.95	8.78
	01/09/1995		6.22	11.52
	01/27/1995		5.93	11.81
	02/17/1995		7.71	10.03
	02/28/1995		8.06	9.68
	04/13/1995		7.56	10.18
	05/10/1995		7.69	10.05
	08/09/1995		8.57	9.17
	11/17/1995		9.23	8.51
	01/09/1996		8.21	9.53
	04/24/1996		7.96	9.78
	07/29/1996		8.81	8.93
	12/13/1996		5.93	11.81
	04/15/1997		8.35	9.39
	09/19/1997		8.64	9.10
	12/03/1997		7.64	10.10
	12/15/1997		7.55	10.19
	01/13/1998		7.02	10.72
	01/30/1998		6.97	10.77
	02/24/1998		6.27	11.47

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-5	04/06/1998	17.74	7.44	10.30
	07/02/1998		8.16	9.58
	07/13/1998		8.26	9.48
	09/28/1998		8.54	9.20
	10/16/1998		8.62	9.12
	01/08/1999		8.37	9.37
	04/16/1999		7.43	10.31
	06/21/1999		8.51	9.23
	07/12/1999		8.70	9.04
	10/08/1999		8.90	8.84
	01/17/2000		8.68	9.06
	04/25/2000		8.08	9.66
	05/30/2000		8.40	9.34
	06/26/2000		8.65	9.09
	08/10/2000		8.90	8.84
	08/31/2000		NM	NM
	09/25/2000		8.52	9.22
	10/06/2000		8.62	9.12
	11/21/2000		8.67	9.07
	12/18/2000		8.49	9.25
	01/15/2001		8.27	9.47
	02/14/2001		7.71	10.03
	03/01/2001		7.14	10.60
	04/19/2001		8.13	9.61
	05/23/2001		8.45	9.29
	06/14/2001		8.59	9.15
	07/02/2001		8.61	9.13
	08/10/2001		8.36	9.38
	09/07/2001		8.45	9.29
	10/18/2001		8.62	9.12
	11/02/2001		8.62	9.12
	12/14/2001		7.19	10.55
	01/18/2002		7.28	10.46
	02/21/2002		7.52	10.22
	03/25/2002		7.64	10.10
	04/18/2002		8.11	9.63
	05/10/2002		8.38	9.36
	06/04/2002		8.10	9.64
	07/10/2002		8.43	9.31
	08/15/2002		8.33	9.41
	09/11/2002		8.11	9.63
	10/08/2002		8.25	9.49
	11/07/2002		8.38	9.36
	12/12/2002		8.13	9.61
	01/13/2003		6.72	11.02

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-5	02/26/2003	17.74	6.72	11.02
	03/19/2003		7.51	10.23
	04/14/2003		7.40	10.34
	05/13/2003		7.62	10.12
	06/13/2003		7.84	9.90
	07/07/2003		7.87	9.87
	08/13/2003		8.04	9.70
	09/17/2003		8.80	8.94
	10/27/2003		8.28	9.46
	11/18/2003		8.12	9.62
	12/19/2003		7.45	10.29
	01/15/2004		7.22	10.52
	02/17/2004		7.16	10.58
	03/18/2004		7.60	10.14
	04/21/2004		8.04	9.70
	05/18/2004		8.11	9.63
	06/10/2004		8.05	9.69
	07/13/2004		8.06	9.68
	08/12/2004		8.10	9.64
	09/16/2004		8.28	9.46
	10/12/2004		8.20	9.54
	11/17/2004		7.82	9.92
	12/15/2004		7.43	10.31
	01/24/2005		7.25	10.49
	02/15/2005		7.61	10.13
	03/15/2005		7.33	10.41
	04/25/2005		7.30	10.44
	05/20/2005		7.47	10.27
	06/21/2005		7.76	9.98
	07/20/2005		8.15	9.59
	08/22/2005		8.35	9.39
	09/16/2005		8.39	9.35
	10/21/2005		8.55	9.19
	11/18/2005		8.37	9.37
	12/16/2005		8.00	9.74
	01/20/2006		6.92	10.82
	02/22/2006		6.74	11.00
	03/30/2006		5.85	11.89
	04/27/2006		6.50	11.24
	05/18/2006		7.12	10.62
	06/22/2006		7.47	10.27
	07/20/2006		7.44	10.30
	08/17/2006		7.34	10.40
	09/14/2006		7.43	10.31
	10/19/2006		7.43	10.31

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-5	11/21/2006	17.74	7.59	10.15
	12/21/2006		6.91	10.83
	01/18/2007		7.46	10.28
	02/06/2007		7.71	10.03
	03/08/2007		7.02	10.72
	04/12/2007		7.48	10.26
	05/10/2007		7.31	10.43
	06/07/2007		7.66	10.08
	07/19/2007		7.61	10.13
	08/09/2007		7.60	10.14
	09/14/2007		7.51	10.23
	10/12/2007		7.25	10.49
	11/09/2007		7.32	10.42
	12/14/2007		7.14	10.60
	01/17/2008		6.85	10.89
	02/21/2008		6.75	10.99
	03/20/2008		7.43	10.31
	04/10/2008		7.86	9.88
	05/08/2008		7.84	9.90
	06/12/2008		7.67	10.07
	07/24/2008		7.92	9.82
	08/14/2008		7.83	9.91
	09/18/2008		7.66	10.08
	10/22/2008		7.98	9.76
	11/13/2008		7.58	10.16
	12/04/2008		7.65	10.09
	01/08/2009		7.30	10.44
	02/11/2009		7.13	10.61
	03/12/2009		6.00	11.74
	04/09/2009		6.86	10.88
	05/20/2009		7.03	10.71
	06/17/2009		7.25	10.49
	07/16/2009		7.29	10.45
	08/13/2009		7.18	10.56
	09/10/2009		7.46	10.28
	10/16/2009		6.64	11.08
	11/12/2009		7.07	10.67
	12/03/2009		7.26	10.48
	01/14/2010		7.18	10.56
	02/18/2010		6.35	11.39
	03/25/2010		6.55	11.19
	04/23/2010		6.50	11.24
	05/21/2010		6.98	10.76
	06/10/2010		7.22	10.52
	07/23/2010		7.12	10.62

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-5	08/12/2010	17.74	7.28	10.46
	09/10/2010		7.35	10.39
	10/15/2010		7.61	10.12
	11/04/2010		7.33	10.41
	12/03/2010		7.09	10.65
	01/28/2011		6.80	10.94
	02/10/2011		7.00	10.74
	03/31/2011		5.51	12.23
	04/19/2011		6.63	11.11
	06/27/2011		7.09	10.65
	07/21/2011		7.12	10.62
	08/22/2011		8.18	9.56
	09/23/2011		10.26	7.48
	09/30/2011		10.63	7.11
	10/05/2011		10.75	6.99
	10/12/2011		10.94	6.80
	10/19/2011		11.18	6.56
	10/26/2011		11.27	6.47
	11/02/2011		11.33	6.41
	11/09/2011		10.86	6.88
	11/16/2011		10.57	7.17
	11/23/2011		10.28	7.46
	11/30/2011		10.10	7.64
	12/06/2011		9.99	7.75
	01/27/2012		8.79	8.95
	02/23/2012		8.40	9.34
	03/20/2012		7.23	10.51
	04/16/2012		6.05	11.69
	05/14/2012		7.22	10.52
	06/11/2012		7.53	10.21
	07/18/2012		7.63	10.11
	08/15/2012		7.55	10.19
	09/13/2012		7.54	10.20
	10/17/2012		7.71	10.03
	11/16/2012		7.35	10.39
	12/14/2012		6.39	11.35
	01/18/2013		6.93	10.81
	02/22/2013		7.34	10.40
	03/21/2013		7.31	10.43
	04/19/2013		7.00	10.74
	07/16/2013		7.70	10.04
	10/07/2013		8.17	9.57
	01/03/2014		7.94	9.80
	04/22/2014		7.37	10.37
	07/08/2014		8.09	9.65

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-5	10/28/2014	17.74	8.27	9.47
RP-BW-02	10/08/1999	18.67	9.89	8.78
	01/17/2000		9.56	9.11
	04/25/2000		8.81	9.86
	05/30/2000		9.19	9.48
	06/26/2000		NM	NM
	08/10/2000		9.75	8.92
	10/06/2000		9.70	8.97
	01/15/2001		9.08	9.59
	04/19/2001		8.94	9.73
	07/02/2001		9.51	9.16
	09/07/2001		8.52	10.15
	10/18/2001		9.55	9.12
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		8.37	10.30
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		9.13	9.54
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		9.41	9.26
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		9.30	9.37
	01/13/2003		8.12	10.55
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		8.51	10.16
	07/07/2003		9.04	9.63
	08/13/2003		9.26	9.41
	10/27/2003		NM	NM
	11/18/2003		NM	NM
	01/15/2004		8.35	10.32
	02/17/2004		7.52	11.15
	03/18/2004		8.73	9.94
	04/21/2004		9.06	9.61
	07/13/2004		9.19	9.48
	10/12/2004		9.22	9.45
	01/24/2005		8.39	10.28
	04/25/2005		8.44	10.23
	07/20/2005		9.18	9.49
	10/21/2005		9.51	9.16
	01/20/2006		7.95	10.72
	04/27/2006		7.95	10.72

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
RP-BW-02	07/20/2006	18.67	8.70	9.97
	10/19/2006		8.71	9.96
	01/18/2007		8.56	10.11
	04/12/2007		8.71	9.96
	07/19/2007		8.85	9.82
	10/12/2007		8.37	10.30
	01/17/2008		8.02	10.65
	04/10/2008		8.94	9.73
	07/24/2008		9.08	9.59
	10/22/2008		9.07	9.60
	01/08/2009		8.39	10.28
	04/09/2009		8.16	10.51
	07/16/2009		8.63	10.04
	10/16/2009		7.98	10.67
	01/14/2010		8.42	10.25
	04/23/2010		7.78	10.89
	07/23/2010		8.53	10.14
	10/15/2010		8.94	9.72
	01/28/2011		8.07	10.60
	04/19/2011		8.03	10.64
SA-AW-01	10/08/1999	12.33	3.79	8.54
	01/17/2000		3.69	8.64
	04/25/2000		3.04	9.29
	05/30/2000		3.50	8.83
	06/26/2000		NM	NM
	08/10/2000		3.92	8.41
	10/06/2000		3.80	8.53
	01/15/2001		2.33	10.00
	04/19/2001		3.10	9.23
	07/02/2001		3.58	8.75
	09/07/2001		NM	NM
	10/18/2001		3.53	8.80
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		2.80	9.53
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		3.25	9.08
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		3.49	8.84
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		3.54	8.79
	01/13/2003		3.57	8.76

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SA-AW-01	02/26/2003	12.33	NM	NM
	03/19/2003		NM	NM
	04/14/2003		2.00	10.33
	07/07/2003		3.42	8.91
	10/27/2003		NM	NM
	11/18/2003		3.18	9.15
	01/15/2004		2.65	9.68
	04/21/2004		3.13	9.20
	07/13/2004		3.45	8.88
	10/12/2004		3.46	8.87
	01/24/2005		2.66	9.67
	04/25/2005		3.87	8.46
	07/20/2005		3.34	8.99
	10/21/2005		3.61	8.72
	01/20/2006		3.47	8.86
	04/27/2006		2.62	9.71
	07/20/2006		3.26	9.07
	10/19/2006		3.42	8.91
	01/18/2007		2.99	9.34
	04/12/2007		3.06	9.27
	07/19/2007		3.35	8.98
	10/12/2007		2.19	10.14
	01/17/2008		2.11	10.22
	04/10/2008		3.27	9.06
	07/24/2008		3.89	8.44
	10/22/2008		3.45	8.88
	01/08/2009		2.46	9.87
	04/09/2009		2.71	9.62
	07/16/2009		3.37	8.96
	10/16/2009		1.51	10.80
	01/14/2010		2.51	9.82
	04/23/2010		3.49	8.84
	07/23/2010		3.31	9.02
	10/15/2010		3.43	8.89
	01/28/2011		2.62	9.71
	04/19/2011		2.55	9.78
SA-AW-02	01/15/2001	12.10	2.24	9.86
	04/19/2001		3.04	9.06
	07/02/2001		3.04	9.06
	09/07/2001		NM	NM
	10/18/2001		3.20	8.90
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		2.51	9.59
	02/21/2002		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SA-AW-02	03/25/2002	12.10	NM	NM
	04/18/2002		2.79	9.31
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		3.14	8.96
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		3.18	8.92
	01/13/2003		2.09	10.01
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		2.28	9.82
	07/07/2003		3.03	9.07
	10/27/2003		NM	NM
	11/18/2003		2.91	9.19
	01/15/2004		2.40	9.70
	04/21/2004		2.82	9.28
	07/13/2004		3.13	8.97
	10/12/2004		3.12	8.98
	01/24/2005		2.45	9.65
	04/25/2005		2.64	9.46
	10/21/2005		2.25	9.85
	01/20/2006		1.85	10.25
	04/27/2006		2.45	9.65
	07/20/2006		2.93	9.17
	10/19/2006		3.06	9.04
	01/18/2007		2.73	9.37
	04/12/2007		2.75	9.35
	07/19/2007		3.01	9.09
	10/12/2007		1.97	10.13
	01/17/2008		2.00	10.10
SA-AW-03	10/08/1999	11.45	2.55	8.90
	01/17/2000		2.31	9.14
	04/25/2000		2.12	9.33
	05/30/2000		2.28	9.17
	06/26/2000		NM	NM
	08/10/2000		2.56	8.89
	10/06/2000		2.59	8.86
	01/15/2001		1.99	9.46
	04/19/2001		2.25	9.20
	07/02/2001		2.39	9.06
	09/07/2001		NM	NM
	10/18/2001		2.36	9.09
	11/02/2001		NM	NM
	12/14/2001		NM	NM

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SA-AW-03	01/18/2002	11.45	2.07	9.38
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		2.25	9.20
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		2.36	9.09
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		2.35	9.10
	01/13/2003		1.81	9.64
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		1.85	9.60
	07/07/2003		2.31	9.14
	10/27/2003		NM	NM
	11/18/2003		2.18	9.27
	01/15/2004		1.01	10.44
	04/21/2004		2.15	9.30
	07/13/2004		NM	NM
	01/24/2005		1.98	9.47
	04/25/2005		2.06	9.39
	07/20/2005		2.01	9.44
	10/21/2005		NM	NM
	01/20/2006		1.82	9.63
	04/27/2006		1.95	9.50
	07/20/2006		2.19	9.26
	10/19/2006		2.21	9.24
	01/18/2007		2.09	9.36
	04/12/2007		2.07	9.38
	07/19/2007		2.16	9.29
	10/12/2007		NM	NM
	01/17/2008		NM	NM
SA-AW-04	10/08/1999	12.72	2.75	9.97
	01/17/2000		2.50	10.22
	04/25/2000		2.30	10.42
	05/30/2000		2.48	10.24
	06/26/2000		NM	NM
	08/10/2000		2.70	10.02
	10/06/2000		2.98	9.74
	01/15/2001		2.18	10.54
	04/19/2001		2.44	10.28
	07/02/2001		2.50	10.22
	09/07/2001		NM	NM
	10/18/2001		2.48	10.24

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SA-AW-04	11/02/2001	12.72	NM	NM
	12/14/2001		NM	NM
	01/18/2002		2.11	10.61
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		2.34	10.38
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		2.43	10.29
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		2.41	10.31
	01/13/2003		1.80	10.92
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		1.85	10.87
	07/07/2003		2.79	9.93
	10/27/2003		NM	NM
	11/18/2003		2.24	10.48
	01/15/2004		1.98	10.74
	04/21/2004		2.21	10.51
	07/13/2004		2.37	10.35
	10/12/2004		2.39	10.33
	01/24/2005		2.00	10.72
	04/25/2005		2.10	10.62
	07/20/2005		2.30	10.42
	10/21/2005		2.49	10.23
	01/20/2006		1.78	10.94
	04/27/2006		2.00	10.72
	07/20/2006		2.31	10.41
	10/19/2006		2.32	10.40
	01/18/2007		2.21	10.51
	04/12/2007		2.19	10.53
	07/19/2007		2.33	10.39
	10/12/2007		1.89	10.83
	01/17/2008		1.86	10.86
	04/10/2008		2.35	10.37
	07/24/2008		2.66	10.06
	10/22/2008		2.57	10.15
	01/08/2009		1.95	10.77
	04/09/2009		1.87	10.85
	07/16/2009		2.40	10.32
	10/16/2009		1.58	11.12
	01/14/2010		1.93	10.79
	04/23/2010		1.78	10.94

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SA-AW-04	07/23/2010	12.72	2.33	10.39
	10/15/2010		2.50	10.21
	01/28/2011		2.02	10.70
	04/19/2011		2.06	10.66
SA-AW-05	10/08/1999	15.42	5.20	10.22
	01/17/2000		5.05	10.37
	04/25/2000		4.60	10.82
	05/30/2000		4.84	10.58
	06/26/2000		NM	NM
	08/10/2000		5.08	10.34
	10/06/2000		5.08	10.34
	01/15/2001		4.48	10.94
	04/19/2001		4.81	10.61
	07/02/2001		4.92	10.50
	09/07/2001		NM	NM
	10/18/2001		4.81	10.61
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.44	10.98
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		4.67	10.75
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		4.89	10.53
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		4.81	10.61
	01/13/2003		3.42	12.00
	02/26/2003		NM	NM
	03/19/2003		NM	NM
	04/14/2003		4.23	11.19
	07/07/2003		4.81	10.61
	10/27/2003		NM	NM
	11/18/2003		4.59	10.83
	01/15/2004		4.40	11.02
	04/21/2004		4.50	10.92
	07/13/2004		4.76	10.66
	10/12/2004		4.79	10.63
	01/24/2005		4.28	11.14
	04/25/2005		4.43	10.99
	07/20/2005		4.65	10.77
	10/21/2005		4.88	10.54
	01/20/2006		4.25	11.17
	04/27/2006		4.33	11.09

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SA-AW-05	07/20/2006	15.42	4.69	10.73
	10/19/2006		4.73	10.69
	01/18/2007		4.57	10.85
	04/12/2007		4.55	10.87
	07/19/2007		4.74	10.68
	10/12/2007		4.28	11.14
	01/17/2008		4.20	11.22
	04/10/2008		4.74	10.68
	07/24/2008		5.08	10.34
	10/22/2008		4.94	10.48
	01/08/2009		4.26	11.16
	04/09/2009		4.18	11.24
	07/16/2009		4.80	10.62
	10/16/2009		3.93	11.47
	01/14/2010		4.36	11.06
	04/23/2010		4.14	11.28
	07/23/2010		4.75	10.67
	10/15/2010		4.90	10.51
	01/28/2011		4.43	10.99
	04/19/2011		4.41	11.01
SA-BW-01	10/08/1999	12.77	4.64	8.13
	01/17/2000		5.11	7.66
	04/25/2000		3.98	8.79
	05/30/2000		4.77	8.00
	06/26/2000		NM	NM
	08/10/2000		4.85	7.92
	10/06/2000		4.71	8.06
	01/15/2001		4.10	8.67
	04/19/2001		4.65	8.12
	07/02/2001		4.65	8.12
	09/07/2001		NM	NM
	10/18/2001		4.43	8.34
	11/02/2001		NM	NM
	12/14/2001		NM	NM
	01/18/2002		4.71	8.06
	02/21/2002		NM	NM
	03/25/2002		NM	NM
	04/18/2002		4.26	8.51
	05/10/2002		NM	NM
	06/04/2002		NM	NM
	07/10/2002		4.46	8.31
	08/15/2002		NM	NM
	09/11/2002		NM	NM
	10/08/2002		4.42	8.35
	01/13/2003		2.16	10.61

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SA-BW-01	02/26/2003	12.77	NM	NM
	03/19/2003		NM	NM
	04/14/2003		3.88	8.89
	07/07/2003		4.35	8.42
	10/27/2003		NM	NM
	11/18/2003		4.34	8.43
	01/15/2004		3.71	9.06
	04/21/2004		4.14	8.63
	07/13/2004		4.39	8.38
	10/12/2004		4.42	8.35
	01/24/2005		3.80	8.97
	03/15/2005		0.00	12.77
	04/25/2005		3.87	8.90
	07/20/2005		4.16	8.61
	10/21/2005		4.58	8.19
	01/20/2006		1.83	10.94
	04/27/2006		3.56	9.21
	07/20/2006		4.14	8.63
	10/19/2006		4.28	8.49
	01/18/2007		4.03	8.74
	04/12/2007		4.05	8.72
	07/19/2007		4.27	8.50
	10/12/2007		4.03	8.74
	01/17/2008		4.08	8.69
	04/10/2008		4.24	8.53
	07/24/2008		4.46	8.31
	10/22/2008		4.53	8.24
	01/08/2009		3.76	9.01
	04/09/2009		3.79	8.98
	07/16/2009		4.19	8.58
	10/16/2009		3.65	9.10
	01/14/2010		4.40	8.37
	04/23/2010		1.81	10.96
	07/23/2010		4.12	8.65
	10/15/2010		4.31	8.45
	01/28/2011		3.79	8.98
	04/19/2011		3.78	8.99
SP-AW-06	01/15/2001	21.42	11.49	9.93
	04/19/2001		11.37	10.05
	05/23/2001		11.71	9.71
	06/14/2001		11.83	9.59
	07/02/2001		11.84	9.58
	08/10/2001		11.62	9.80
	09/07/2001		11.67	9.75
	10/18/2001		12.01	9.41

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SP-AW-06	11/02/2001	21.42	12.78	8.64
	12/14/2001		10.65	10.77
	01/18/2002		10.58	10.84
	02/21/2002		10.67	10.75
	03/25/2002		10.87	10.55
	04/18/2002		11.32	10.10
	05/10/2002		11.51	9.91
	06/04/2002		11.41	10.01
	07/10/2002		11.64	9.78
	08/15/2002		11.63	9.79
	09/11/2002		11.49	9.93
	10/08/2002		11.54	9.88
	11/07/2002		11.82	9.60
	12/12/2002		11.41	10.01
	01/13/2003		9.88	11.54
	02/26/2003		10.16	11.26
	03/19/2003		10.83	10.59
	04/14/2003		10.62	10.80
	05/13/2003		10.91	10.51
	06/13/2003		11.19	10.23
	07/07/2003		11.25	10.17
	08/13/2003		11.41	10.01
	09/17/2003		11.40	10.02
	10/27/2003		11.57	9.85
	11/18/2003		11.38	10.04
	12/19/2003		10.77	10.65
	01/15/2004		10.57	10.85
	02/17/2004		10.45	10.97
	03/18/2004		10.91	10.51
	04/21/2004		11.25	10.17
	05/18/2004		11.33	10.09
	06/10/2004		11.25	10.17
	07/13/2004		11.34	10.08
	08/12/2004		11.37	10.05
	09/16/2004		11.53	9.89
	10/12/2004		11.48	9.94
	11/17/2004		11.05	10.37
	12/15/2004		10.73	10.69
	01/25/2005		10.67	10.75
	02/15/2005		10.65	10.77
	03/15/2005		10.63	10.79
	04/25/2005		10.57	10.85
	05/20/2005		10.80	10.62
	06/21/2005		11.10	10.32
	07/20/2005		11.41	10.01

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SP-AW-06	08/22/2005	21.42	11.58	9.84
	09/16/2005		11.62	9.80
	10/21/2005		NM	NM
	01/20/2006		9.47	11.95
	02/22/2006		5.41	16.01
	03/30/2006		9.00	12.42
	04/27/2006		9.66	11.76
	05/18/2006		10.20	11.22
	06/22/2006		10.50	10.92
	07/20/2006		10.48	10.94
	08/17/2006		10.38	11.04
	09/14/2006		10.56	10.86
	10/19/2006		5.56	15.86
	11/21/2006		10.68	10.74
	12/21/2006		10.08	11.34
	01/18/2007		10.63	10.79
	02/06/2007		10.83	10.59
	03/08/2007		10.21	11.21
	04/12/2007		10.63	10.79
	05/10/2007		10.45	10.97
	06/07/2007		10.82	10.60
	07/19/2007		10.80	10.62
	08/09/2007		NM	NM
	09/14/2007		10.74	10.68
	10/12/2007		10.48	10.94
	11/09/2007		10.63	10.79
	12/14/2007		10.41	11.01
	01/17/2008		10.08	11.34
	02/21/2008		10.01	11.41
	03/20/2008		10.62	10.80
	04/10/2008		10.93	10.49
	05/08/2008		10.96	10.46
	06/12/2008		10.82	10.60
	07/24/2008		11.05	10.37
	08/14/2008		11.00	10.42
	09/18/2008		10.91	10.51
	10/22/2008		11.11	10.31
	11/13/2008		10.66	10.76
	12/04/2008		10.79	10.63
	01/08/2009		10.40	11.02
	02/11/2009		10.23	11.19
	03/12/2009		9.32	12.10
	04/09/2009		10.01	11.41
	05/20/2009		10.21	11.21
	06/17/2009		10.42	11.00

Table D-1
Historical Groundwater Elevation Data (NAVD 88 Datum)
The Sherwin-Williams Company
Emeryville, California

Well Number	Date	Well Elevation	Measured Depth to Water (ft)	Groundwater Elevation
SP-AW-06	07/16/2009	21.42	10.49	10.93
	08/13/2009		10.38	11.04
	09/10/2009		10.64	10.78
	10/16/2009		9.85	11.55
	11/12/2009		10.24	11.18
	12/03/2009		10.45	10.97
	01/14/2010		10.35	11.07
	02/18/2010		9.62	11.80
	03/25/2010		9.81	11.61
	04/23/2010		9.72	11.70
	05/21/2010		10.18	11.24
	06/10/2010		10.38	11.04
	07/23/2010		10.39	11.03
	08/12/2010		10.51	10.91
	09/10/2010		10.52	10.90
	10/15/2010		10.87	10.54
	11/04/2010		10.53	10.89
	12/03/2010		10.30	11.12
	01/28/2011		10.14	11.28
	02/10/2011		10.31	11.11
	03/31/2011		9.00	12.42
	04/19/2011		9.97	11.45

Data updated by MSM. Proofed by EW

Notes:

ft = Feet
NM = Not measured

(a) Measurement taken at higher high tide

(b) Measurement taken at lower low tide

(c) Measurement taken at lower high tide

(d) Suspect that depth to groundwater was measured in LF-B3 instead of LF-21 on August 17, and September 6, 14, 21, and 28, 2007, due to a field oversight

(e) South Bayfront Project Area (SBPA) well monitored by SLR consulting

(f) SBPA well monitored by EKI personnel

(1) Depth to water measurement determined not to be accurate due to damaged well casing.

(2) The depth to water measurement made in LF-B5 on April 9, 2009 was determined to be erroneous: well LF-B5 was remeasured on April 17, 2009.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
CDM-1	14-Feb-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	14-Feb-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-1	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-1	19-Jul-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Jul-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-1	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-1	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-1	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-1	18-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-101	17-Apr-12	<0.0005	0.0021	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-101	19-Oct-12	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-101	22-Apr-13	<0.0005	0.0015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-101	07-Oct-13	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-101	28-Apr-14	<0.0005	0.0015	<0.0005	<0.01	<0.01 U6	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.001
DUP	28-Apr-14	<0.0005	0.0015	<0.0005	<0.01	<0.01 U6	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.001
CDM-101	29-Oct-14	<0.0005	0.0008	<0.0005	<0.01	<0.01 U12	0.0002 J	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	29-Oct-14	<0.0005	0.0008	<0.0005	<0.01	<0.01 U12	0.0002 J	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-102	17-Apr-12	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	0.0066 J	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.001
CDM-102	19-Oct-12	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0004 J	<0.001
CDM-102	22-Apr-13	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.001
CDM-102	07-Oct-13	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0002 J	<0.001
CDM-102	07-Oct-13	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0002 J	<0.001
CDM-102	28-Apr-14	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0002 J	<0.001
CDM-102	29-Oct-14	<0.0005	0.0011	<0.0005	<0.01	<0.01 U5	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-103	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-103	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-103	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-104	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-104	24-Apr-13	<0.0005	0.0011	<0.0005	<0.01	<0.01	0.0001 J	<0.0005	<0.0005	0.0049	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	0.0006	<0.001
CDM-104	25-Apr-14	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	0.0002 J	<0.0005	<0.0005	<0.001
CDM-105	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0032	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-105	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	0.0019 J	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-105	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0026	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-106	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0013	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005 J
CDM-106	24-Apr-13	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	0.0012	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0004 J	<0.001
CDM-106	25-Apr-14	<0.0005	0.0009	<0.0005	<0.01	<0.01	0.0001 J	0.0009	<0.0005	0.0011	<0.0005	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005	0.0001 J	<0.001
CDM-107	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-107	19-Oct-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
CDM-1	14-Feb-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Feb-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-1	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-1	19-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Jul-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-1	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-1	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-1	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-1	18-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-101	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-101	19-Oct-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-101	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-101	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-101	28-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0001 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	28-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0001 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-101	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-102	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-102	19-Oct-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-102	22-Apr-13	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-102	07-Oct-13	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-102	07-Oct-13	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-102	28-Apr-14	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-102	29-Oct-14	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-103	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-103	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-103	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-104	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	0.0006 J	<0.001	<0.0005	<0.0005
CDM-104	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-104	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-105	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-105	24-Apr-13	<0.0005	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-105	25-Apr-14	<0.0005	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-106	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-106	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-106	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-107	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-107	19-Oct-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
CDM-1	14-Feb-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	14-Feb-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-1	20-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-1	19-Jul-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	19-Jul-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0011	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-1	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0011	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-1	17-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	0.0003 J	0.0016	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	17-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	0.0003 J	0.0016	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-1	26-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-1	18-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0009	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-101	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
CDM-101	19-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
CDM-101	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
CDM-101	07-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
CDM-101	28-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
DUP	28-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
CDM-101	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
DUP	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
CDM-102	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
CDM-102	19-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
CDM-102	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
CDM-102	07-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-102	07-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-102	28-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
CDM-102	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-103	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
CDM-103	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
CDM-103	29-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-104	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-104	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
CDM-104	25-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
CDM-105	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0012	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-105	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0008	<0.01	0.0001 J	0.0002 J	<0.0005	<0.0005
CDM-105	25-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.001	<0.01	0.0002 J	0.0002 J	<0.0005	<0.0005
CDM-106	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-106	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0001 J	<0.01	<0.0005	0.0009	<0.0005	<0.0005
CDM-106	25-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0002 J	<0.01	<0.0005	0.001	<0.0005	<0.0005
CDM-107	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-107	19-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
CDM-107	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-107	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-107	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-107	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-108	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-108	19-Oct-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-108	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	0.0002 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-108	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-108	25-Apr-14	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	25-Apr-14	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-108	29-Oct-14	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-109	19-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-109	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-109	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	0.0007 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-110	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-110	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-110	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005 U12	<0.0005	<0.0005	<0.0005	0.0001 J
CDM-111	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-111	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0002 J
CDM-111	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-112	19-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-112	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.001
CDM-112	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0001 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.001
CDM-113	19-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-113	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0001 J	0.0005 J	<0.0005	0.0001 J	<0.0005	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	0.0005 J
CDM-113	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	0.0008 J	0.0001 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005 U12	<0.0005	<0.0005	<0.0005	0.0006 JJ
CDM-114	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-114	19-Oct-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Oct-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-114	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
CDM-114	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005 U12	<0.0005	<0.0005	<0.0005	<0.001
DUP	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005 U12	<0.0005	<0.0005	<0.0005	<0.001
EX-1	18-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	0.0011	<0.005	<0.005	<0.005	0.006	<0.1	<0.005	0.0009	<0.005	<0.005	<0.01	0.02
EX-1	01-Aug-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	0.027	<0.005	<0.005	<0.01	0.019

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
CDM-107	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-107	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-107	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-107	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-108	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-108	19-Oct-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-108	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-108	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-108	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-108	29-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-109	19-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-109	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-109	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-110	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-110	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-110	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-111	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-111	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0001 J	<0.0005
CDM-111	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-112	19-Apr-12	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Apr-12	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-112	24-Apr-13	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-112	29-Apr-14	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-113	19-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-113	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0002 J	<0.0005
CDM-113	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0002 J	<0.0005
CDM-114	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-114	19-Oct-12	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Oct-12	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-114	23-Apr-13	<0.0005	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	23-Apr-13	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
CDM-114	24-Apr-14	<0.0005	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	24-Apr-14	<0.0005	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	18-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-1	01-Aug-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
CDM-107	23-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
CDM-107	07-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-107	25-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
CDM-107	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
CDM-108	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-108	19-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-108	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005
CDM-108	07-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005
DUP	07-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005
CDM-108	25-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0002 J	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
DUP	25-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0001 J	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
CDM-108	29-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0002 J	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
CDM-109	19-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-109	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-109	25-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-110	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-110	23-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-110	24-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-111	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	0.0024	0.002	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-111	23-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	0.0027	0.0022	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005
CDM-111	24-Apr-14	<0.0005	<0.0005	0.0003 J	<0.0005	0.0007	0.0015	<0.01	0.0002 J	<0.0005	<0.0005	<0.0005
CDM-112	19-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	19-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-112	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-112	29-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-113	19-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	0.0013	0.002	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-113	24-Apr-13	<0.0005	<0.0005	0.0009 J	<0.0005	0.0022	0.0029	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-113	24-Apr-14	<0.0005	<0.0005	0.0007 J	<0.0005	0.0019	0.0033	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-114	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0021	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-114	19-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0023	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	19-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	0.0003 J	0.0025	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-114	23-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	0.0002 J	0.0025	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	23-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	0.0002 J	0.0024	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
CDM-114	24-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	0.0001 J	0.0021	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	24-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	0.0001 J	0.0023	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	18-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
EX-1	01-Aug-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-1	18-Dec-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	0.031	<0.1	<0.005	0.87	<0.005	<0.005	<0.01	1.4
EX-1	15-Apr-97	<0	<0.5	<0.5	<5	<10	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	3.2	<0.5	<0.5	<1	2.2
EX-1	01-Jul-97	<0	<0.1	<0.1	<1	<2	<0.1	<0.1	<0.1	<0.1	0.1	<2	<0.1	2	<0.1	<0.1	<0.2	1.8
EX-1	22-Sep-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	0.21
EX-1	18-Dec-97	<0	<0.03	<0.03	<0.3	<0.5	<0.03	<0.03	<0.03	<0.03	0.22	<0.5	<0.03	0.2	<0.03	<0.03	<0.05	0.74
EX-1	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	0.0023	0.002	<0.001	0.0012	0.11	<0.02	<0.001	0.0039	<0.001	<0.001	<0.002	0.248
EX-1	09-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.011
EX-1	17-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0022	<0.001	<0.001	0.0017	<0.005	<0.001	0.0051	<0.001	<0.001	<0.001	0.015
EX-1	23-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0018	<0.001	<0.001	0.0026	<0.005	<0.001	0.0038	<0.001	<0.001	<0.001	0.014
EX-1	14-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0017	<0.001	<0.001	0.001 J11	<0.005	<0.001	0.0042	<0.001	<0.001	<0.001	0.0063
EX-1	23-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0008 J11	<0.001	<0.001	0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-1	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	<0.0005	0.0039	<0.01	<0.0005	0.0059	<0.0005	<0.0005	<0.0005	0.033
EX-1	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0038	<0.0005	<0.0005	<0.0005	<0.001
EX-1	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.001
EX-1	26-Apr-00	<0.0008	<0.0008	<0.0008	<0.017	0.061	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.024	<0.0008	0.0009	<0.0008	<0.0008	<0.0008	0.0025
EX-1	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0014
EX-1	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	0.0051
EX-1	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-1	16-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0013	0.0021	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-1	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002
EX-1	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-1	21-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0006	0.0009	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	21-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0006	0.0009	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-1	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018
EX-1	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0026
DUP	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0023
EX-1	12-Dec-02	<0.0005	0.01	<0.0005	<0.01	0.27	0.0032	<0.0005	0.0021	0.0023	0.046	0.067	<0.0005	0.35	0.0009	0.0034	<0.0005	0.498
EX-1	13-Jan-03	<0.005	0.0071	<0.005	<0.1	1.2	0.011	<0.005	<0.005	<0.005	0.18	0.51	<0.005	1	<0.005	<0.005	<0.005	0.642
EX-1	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0022	<0.0005	0.0008	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	0.0108
EX-1	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0009	<0.0005	0.0028	<0.01	<0.0005	0.0049	<0.0005	<0.0005	<0.0005	0.07
EX-1	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.033
EX-1	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0081
EX-1	05-May-04	<0.0005	<0.0005	<0.0005	<0.01	0.016	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-1	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0042
EX-1	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-1	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011 J
EX-1	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J
EX-1	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0021
EX-1	26-Oct-05	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0004 J	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-1	18-Dec-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-1	15-Apr-97	<0.5	<0.5	na	<0.5	<0.5	na	na	na	<5	na	<1	<1	<1	na	na	na
EX-1	01-Jul-97	<0.1	<0.1	na	<0.1	<0.1	na	na	na	<1	na	<0.2	<0.2	<0.2	na	na	na
EX-1	22-Sep-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-1	18-Dec-97	<0.03	<0.03	na	<0.03	<0.03	na	na	na	<0.3	na	<0.05	<0.05	<0.05	na	na	na
EX-1	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.039	0.016	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	0.0066	<0.001
EX-1	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0012	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-1	17-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0022	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-1	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0029	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-1	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0009 J11	<0.001	<0.005	<0.001	0.0026	<0.001	<0.001	<0.001	<0.001	<0.001
EX-1	23-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	<0.001
EX-1	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0065	0.0033	<0.01	<0.0005	0.013	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	26-Apr-00	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.017	<0.0008	0.28	<0.0017	<0.0017	<0.0017	<0.0008	<0.0008
EX-1	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0006	<0.01	<0.0005	0.0011	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	16-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	21-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0007	<0.0005
DUP	21-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	<0.0005
EX-1	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	12-Dec-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.043	0.016	0.043	<0.0005	0.0027	<0.001	<0.001	<0.001	0.0023	0.0007
EX-1	13-Jan-03	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.066	0.02	0.4	<0.005	<0.005	<0.01	<0.01	<0.01	<0.005	<0.005
EX-1	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0036	0.0017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.008	0.0029	<0.01	<0.0005	0.0044	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0027	0.0059	<0.01	<0.0005	0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0015	0.0038	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	05-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	0.0012	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0005 J	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-1	18-Dec-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
EX-1	15-Apr-97	na	na	na	<0.5	na	na	<5	na	na	na	<0.5
EX-1	01-Jul-97	na	na	na	<0.1	na	na	<1	na	na	na	<0.1
EX-1	22-Sep-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
EX-1	18-Dec-97	na	na	na	<0.03	na	na	<0.3	na	na	na	<0.03
EX-1	27-Feb-98	<0.001	0.005	0.0068	<0.001	0.0011	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
EX-1	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-1	17-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	na	<0.001	<0.002	<0.001	<0.001
EX-1	23-Oct-98	<0.001	<0.001	0.008	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-1	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0006 J11	na	<0.001	<0.002	<0.001	<0.001
EX-1	23-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-1	16-Jul-99	<0.0005	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-1	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
EX-1	25-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	26-Apr-00	<0.0008	<0.0008	<0.0017	<0.0008	<0.0008	<0.0008	<0.017	<0.0008	<0.0008	<0.0008	<0.0008
EX-1	26-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	09-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	16-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	16-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0014	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-1	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-1	16-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.001	<0.01	<0.0005	0.0017	<0.0005	<0.0005
EX-1	21-Jan-02	<0.0005	0.0006	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	21-Jan-02	<0.0005	0.0006	<0.001	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	12-Dec-02	0.0009	0.0026	0.0036	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	13-Jan-03	<0.005	<0.005	<0.02	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
EX-1	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	07-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	29-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
EX-1	23-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
EX-1	05-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-1	11-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	21-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	20-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	22-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-1	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0005	0.0006	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013
DUP	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0005	0.0006	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013
EX-1	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	0.0009	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	0.0032
EX-10	11-Sep-98	<0.01	0.028	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	0.041	<0.05	<0.01	0.15	<0.01	<0.01	<0.01	0.047
EX-10	22-Oct-98	<0.002	0.041	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	<0.002	0.049	<0.01	<0.002	0.13	<0.002	<0.002	<0.002	0.042
EX-10	14-Jan-99	<0.001	0.034	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0012	0.0015	<0.005	<0.001	0.0016	<0.001	0.0008 J11	<0.001	0.0034
EX-10	23-Apr-99	<0.001	0.0081	<0.001	<0.005	<0.005	0.0009 J11	<0.001	<0.001	0.002	0.0015	<0.005	<0.001	0.0005 J11	0.0012	<0.001	<0.001	0.012 J11
EX-10	15-Jul-99	<0.0005	0.015	<0.0005	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.001
EX-10	15-Oct-99	<0.0005	0.093	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-10	12-Jan-00	<0.0005	0.0094	<0.0005	<0.01	<0.01	0.0008	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	0.0022
EX-10	26-Apr-00	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
EX-10	26-Jul-00	<0.0005	0.0067	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	0.0017	0.0009	<0.0005	0.0015
EX-10	09-Oct-00	<0.0005	0.0068	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.001
EX-10	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0016	0.0008	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.016
EX-10	16-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0028	<0.0005	<0.0005	0.0008	0.0007	<0.01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0556
EX-10	03-Jul-01	<0.0005	0.0021	<0.0005	<0.01	0.02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-10	16-Oct-01	<0.0005	0.0088	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-10	16-Jan-02	<0.0005	0.0014	<0.0005	<0.01	<0.01	0.001	0.0006	<0.0005	0.0008	0.0011	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.0099
DUP	16-Jan-02	<0.0005	0.0011	<0.0005	<0.01	<0.01	0.0009	0.0005	<0.0005	0.0007	0.0009	<0.01	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.0082
EX-10	09-Apr-02	<0.0005	0.0039	<0.0005	<0.01	<0.01	0.0009	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.01
EX-10	09-Jul-02	<0.0005	0.0024	<0.0005	<0.01	<0.01	0.0012	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.0098
EX-10	07-Nov-02	<0.0005	0.0059	<0.0005	<0.01	<0.01	0.0009	0.0006	0.0082	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0099
EX-10	13-Jan-03	<0.0005	0.002	<0.0005	<0.01	<0.01	0.0015	0.0007	<0.0005	0.0007	0.001	<0.01	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.0055
EX-10	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.002	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	0.0338
EX-10	07-Jul-03	<0.0005	0.018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.001
DUP	07-Jul-03	<0.0005	0.018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-10	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0007	0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018
EX-10	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0014	<0.0005	<0.0005	0.0008	0.0005	<0.01	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.014
EX-10	06-May-04	<0.0005	0.0041	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0025
EX-10	14-Jul-04	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	0.0024
DUP	14-Jul-04	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0028
EX-10	21-Jan-05	<0.0005	0.0007	<0.0005	<0.01	<0.01	0.001	0.0008	<0.0005	0.0007	0.0006	<0.01	<0.0005	0.0003 J	0.0006	<0.0005	<0.0005	0.0123 J
EX-10	20-Apr-05	<0.0005	0.002	<0.0005	<0.01	<0.01	0.0007	0.0005 J	<0.0005	0.0005	0.0003 J	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	0.013
EX-10	22-Jul-05	<0.0005	0.0053	<0.0005	<0.01	<0.01	0.0007	0.0005 J	<0.0005	0.0007	0.0003 J	<0.01	<0.0005	0.0081	0.0006	<0.0005	<0.0005	0.0071 J
DUP	22-Jul-05	<0.0005	0.0052	<0.0005	<0.01	<0.01	0.0006	0.0004 J	<0.0005	0.0007	0.0003 J	<0.01	<0.0005	0.0073	0.0005	<0.0005	<0.0005	0.0064 J
EX-10	26-Oct-05	<0.0005	0.0044	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005 J	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
EX-10	27-Jan-06	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	0.0009	0.0006	<0.0005	0.0006	0.0005 J	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	0.0087 J
DUP	27-Jan-06	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	0.001	0.0005	<0.0005	0.0007	0.0004 J	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	0.0097 J
EX-10	20-Apr-06	<0.0005	0.0006	<0.0005	<0.01	<0.01	0.001	0.0006	<0.0005	0.0005 J	0.0004 J	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	0.0154 J

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mgLl)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-1	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005 J	0.0003 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-1	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0003 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	11-Sep-98	<0.01	<0.01	<0.01 UJ3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.016	<0.01
EX-10	22-Oct-98	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	0.016	0.0043
EX-10	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	0.0006 J11	<0.001	<0.001	<0.001	0.0005 J11	<0.001
EX-10	23-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0026	0.0009 J11	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0029	0.0016
EX-10	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.066	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	0.0017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.003	0.0031
EX-10	16-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0054	0.003	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0059	<0.0005
EX-10	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	16-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	0.0008	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0021	0.019
DUP	16-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0006	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0018	0.015
EX-10	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0033	0.002	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0022	<0.0005
EX-10	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0031	<0.0016	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0018	<0.0012
EX-10	07-Nov-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	0.0008	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0009	<0.0005
EX-10	13-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0054	0.0031	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0034	0.0024
EX-10	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0062	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0073	0.0056
EX-10	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-10	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019	0.001	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0015	<0.0012
EX-10	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.011	0.0054	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0026	<0.0034
EX-10	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.0009	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0011	0.001
EX-10	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	0.0007	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0007	<0.0005
DUP	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	0.0009	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	0.0006
EX-10	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0068	0.0052	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0059	0.0068
EX-10	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0043	0.0036	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0032	<0.0005
EX-10	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	0.0016	<0.01	<0.0005	0.0006	<0.001	<0.001	<0.001	0.002	<0.0005
DUP	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019	0.0014	<0.01	<0.0005	0.0005	<0.001	<0.001	<0.001	0.0018	<0.0005
EX-10	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0003 J	0.0004 J
EX-10	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0038	0.0033	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.005	<0.0005
DUP	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.004	0.0036	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0051	<0.0005
EX-10	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0059	0.0044	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0042	0.0034

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-1	27-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0009	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-1	20-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	11-Sep-98	<0.01	0.014	0.015	0.011	<0.01	<0.01	na	<0.01 UJ3	<0.02	<0.01	<0.01
EX-10	22-Oct-98	0.005	0.017	0.017	<0.002	0.007	<0.002	na	<0.002	<0.004	<0.002	<0.002
EX-10	14-Jan-99	<0.001	<0.001	0.0006 J11	<0.001	0.0007 J11	0.0009 J11	na	<0.001	0.001 J11	<0.001	<0.001
EX-10	23-Apr-99	<0.001	0.0018	0.002	<0.001	0.0032	0.0016	na	<0.001	<0.002	<0.001	<0.001
EX-10	15-Jul-99	<0.0005	<0.0005	0.0005	<0.0005	0.0007	0.0009	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-10	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0023	<0.0005	<0.0005
EX-10	12-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	0.001	0.0012	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	26-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	26-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0011	0.0016	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	09-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	0.0008	0.0014	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	16-Jan-01	<0.0005	0.0012	0.0021	<0.0005	0.0051	0.0026	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	16-Apr-01	0.0006	0.0021	0.0049	<0.0005	0.0086	0.0031	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	16-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0009	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-10	16-Jan-02	<0.0005	0.0009	0.0017	<0.0005	0.0026	0.0016	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Jan-02	<0.0005	0.0008	0.0015	<0.0005	0.0021	0.0011	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	09-Apr-02	<0.0005	0.0008	0.002	<0.0005	0.0025	0.0016	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	09-Jul-02	<0.0005	<0.0007	<0.002	<0.0005	0.0021	0.0018	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	07-Nov-02	<0.0005	<0.0005	<0.002	<0.0005	0.0009	0.001	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	13-Jan-03	<0.0008	0.0015	<0.0034	<0.0005	0.0038	0.002	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	14-Apr-03	0.001	0.0043	0.0052	<0.0005	0.0085	0.0033	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	07-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
DUP	07-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
EX-10	29-Oct-03	0.0006	0.001	0.002	<0.0005	0.0018	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	23-Jan-04	0.0013	0.0014	0.0065	<0.0005	0.0035	0.0024	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	06-May-04	<0.0005	0.0006	<0.002	<0.0005	0.0018	0.0011	<0.01	<0.0005	0.0005	<0.0005	<0.0005
EX-10	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	0.0009	0.0016	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	0.001	0.0017	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	21-Jan-05	0.0008	0.0035	0.0043	<0.0005	0.0084	0.0025	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	20-Apr-05	0.0005 J	0.0016	0.0031	<0.0005	0.004	0.0018	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	22-Jul-05	<0.0005	0.001	0.0017 J	<0.0005	0.0023	0.0012	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
DUP	22-Jul-05	<0.0005	0.0009	0.0017 J	<0.0005	0.0022	0.0012	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-10	26-Oct-05	<0.0005	<0.0005	0.001 J	<0.0005	0.0005	0.0004 J	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
EX-10	27-Jan-06	0.0007	0.0023	0.0034	<0.0005	0.0068	0.0024	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Jan-06	0.0007	0.0024	0.0039	<0.0005	0.0068	0.0025	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	20-Apr-06	0.0007	0.002	0.0056	<0.0005	0.0059	0.0027	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-10	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0006	0.0006	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	0.0025 J
EX-10	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0004 J	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
EX-10	17-Apr-09	<0.0005	0.0011	<0.0005	<0.01	<0.01	0.0003 J	0.0006	<0.0005	0.0005 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-10	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0003 J	0.0007	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
EX-11	16-Jul-99	<0.0005	0.04	<0.0005	<0.01	<0.01	0.0028	<0.0005	<0.0005	<0.0005	0.013	0.015	<0.0005	0.0046	<0.0005	<0.0005	<0.0005	0.0189
EX-12	02-Jun-99	<0.001	0.0084	<0.001	<0.005	<0.005	<0.0005	<0.001	<0.001	0.0023	<0.001	<0.005	0.0015	<0.001	<0.001	0.011	<0.0005	<0.002
DUP	02-Jun-99	<0.001	0.0085	<0.001	<0.005	<0.005	<0.0005	<0.001	<0.001	0.0024	<0.001	<0.005	0.0015	<0.001	<0.001	0.011	<0.0005	<0.002
EX-12	13-Jul-99	<0.0005	0.044	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.005	<0.0005	<0.01	0.0009	<0.0005	0.0017	0.011	<0.0005	<0.001
EX-12	25-Oct-99	<0.0005	0.0089	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	0.0016	<0.0005	<0.0005	0.01	<0.0005	<0.001
EX-13	02-Jun-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.0005	0.0033	<0.001	0.0007 J	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.002
EX-13	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0026	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-14	08-Oct-99	<0.0005	0.002	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	0.001	<0.0005	<0.0005	0.0022	<0.0005	0.0008
DUP	08-Oct-99	<0.0005	0.002	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	0.001	<0.0005	<0.0005	0.002	<0.0005	0.0008
EX-14	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.001
EX-14	26-Apr-00	<0.0005	0.0006	<0.0005	<0.01	0.012	<0.0005	<0.0005	<0.0005	<0.0005	0.0076	<0.01	<0.0005	0.053	<0.0005	<0.0005	<0.0005	0.014
EX-14	26-Jul-00	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	0.0008	<0.01	<0.0005	0.002	<0.0005	0.0011	<0.0005	0.0025
EX-14	09-Oct-00	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	0.0008
EX-14	16-Jan-01	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.001
DUP	16-Jan-01	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.001
EX-14	13-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.001
EX-14	03-Jul-01	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.001
EX-14	12-Oct-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.001
EX-14	17-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.001
EX-14	09-Apr-02	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-14	10-Jul-02	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-14	18-Dec-02	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0014	0.0006	0.0022	<0.01	<0.0005	0.0011	<0.0005	0.0016	<0.0005	0.0054
EX-14	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	0.001
EX-14	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.001
EX-14	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.0012
EX-14	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-14	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-14	06-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001
EX-14	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	0.077	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.32	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-14	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-14	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.001
EX-14	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
EX-14	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
EX-14	26-Oct-05	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	<0.0005	<0.0005	0.0005	0.0005	<0.0005	<0.001
DUP	26-Oct-05	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	<0.0005	<0.0005	0.0006	0.0006	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-10	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	0.0017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0027	0.003
EX-10	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0011	0.0019
EX-10	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0016	<0.0005
EX-10	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0017	<0.0005
EX-11	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0034	0.2	<0.0005	0.16	<0.001	<0.001	<0.001	0.0005	<0.0005
EX-12	02-Jun-99	<0.0005	<0.001	<0.0095	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	02-Jun-99	<0.0005	<0.001	<0.0095	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-12	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	<0.0005	0.016	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-12	25-Oct-99	<0.0005	0.0018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-13	02-Jun-99	<0.0005	<0.001	<0.0097	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-13	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	0.022	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	08-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.003	0.0007	<0.01	<0.0005	0.09	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	08-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.003	0.0007	<0.01	<0.0005	0.084	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	0.19	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	0.0072	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0026	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	13-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0038	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0021	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	17-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	10-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	18-Dec-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0023	0.0006	<0.01	<0.0005	0.019	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	0.048	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019	0.0005	<0.01	<0.0005	0.016	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	0.082	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	0.0026	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0029	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0028	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-10	17-Apr-07	0.0006	0.0008	0.0028	<0.0005	0.0053	0.0026	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	18-Apr-08	0.0004 J	0.0003 J	0.0017 J	<0.0005	0.0025	0.0026	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	17-Apr-09	0.0004 J	0.0004 J	<0.002	<0.0005	0.0047	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-10	30-Apr-10	0.0003 J	0.0003 J	<0.002	<0.0005	0.0059	0.0025	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-11	16-Jul-99	<0.0005	0.0008	0.0027	0.0017	<0.0005	<0.0005	<0.01	<0.0005	0.0032	<0.0005	<0.0005
EX-12	02-Jun-99	<0.001	<0.001	<0.0095	<0.001	<0.001	<0.001	na	<0.0095	0.001 J	<0.001	<0.001
DUP	02-Jun-99	<0.001	<0.001	<0.0095	<0.001	<0.001	<0.001	na	<0.0095	0.001 J	<0.001	<0.001
EX-12	13-Jul-99	<0.0005	<0.0005	0.0007	0.0006	<0.0005	<0.0005	<0.01	<0.0005	0.0028	<0.0005	<0.0005
EX-12	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
EX-13	02-Jun-99	<0.001	<0.001	<0.0097	<0.001	<0.001	<0.001	na	<0.0097	<0.002	<0.001	<0.001
EX-13	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	08-Oct-99	<0.0005	<0.0005	0.0006	0.001	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
DUP	08-Oct-99	<0.0005	<0.0005	0.0006	0.001	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
EX-14	25-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
EX-14	26-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-14	26-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
EX-14	09-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-14	16-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	13-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-14	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	17-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	10-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-14	18-Dec-02	<0.0005	<0.0005	0.011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	14-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	14-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	07-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	29-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	23-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	06-May-04	<0.0005	<0.0005	0.004	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	14-Jul-04	<0.0005	<0.0005	0.004	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	21-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	20-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	22-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-14	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
DUP	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-14	27-Jan-06	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
EX-14	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	0.0006	<0.001
EX-15	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0022	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	<0.001
EX-15	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	26-Jul-00	<0.0005	<0.5	<0.5	<10	27	<0.5	0.6	<0.5	0.7	6.6	<10	<0.5	14	<0.5	<0.5	1.0	23
EX-15	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	<0.0005	0.0018	<0.01	<0.0005	0.002	<0.0005	<0.0005	<0.0005	0.0087
EX-15	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0016
EX-15	13-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019
EX-15	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	17-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007
EX-15	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	18-Dec-02	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	0.0007	0.0009	0.0009	0.0048	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	0.0064
EX-15	13-Jan-03	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0007	0.0025	0.0009	0.0047	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.0044
EX-15	14-Apr-03	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.0009	0.0012	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0023
EX-15	07-Jul-03	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	29-Oct-03	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
EX-15	23-Jan-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	06-May-04	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	0.0009	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001
EX-15	14-Jul-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	14-Oct-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	21-Jan-05	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	0.0004 J	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	20-Apr-05	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	22-Jul-05	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	26-Oct-05	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	27-Jan-06	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-15	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-16	25-Jan-00	<0.05	<0.05	<0.05	<1	14	0.12	<0.05	<0.05	<0.05	0.79	4	<0.05	13	<0.05	<0.05	<0.05	3.13
EX-16	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	0.018	0.0072	<0.0005	<0.0005	0.0009	<0.0005	0.011	<0.0005	0.0054	<0.0005	<0.0005	<0.0005	0.151
EX-16	26-Jul-00	<0.0025	<0.0025	<0.0025	<0.05	0.61	0.0046	<0.0025	<0.0025	<0.0025	<0.0025	0.082	<0.0025	0.029	<0.0025	<0.0025	<0.0025	0.121
EX-16	09-Oct-00	<0.005	<0.005	<0.005	<0.1	1.5	<0.005	<0.005	<0.005	<0.005	<0.005	0.28	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01
EX-16	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	0.013	0.0023	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.0134
EX-16	13-Apr-01	<0.0063	<0.0063	<0.0063	<0.13	1.9	0.015	<0.0063	<0.0063	<0.0063	0.15	0.61	<0.0063	0.099	<0.0063	<0.0063	<0.0063	0.4178
EX-16	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	0.13	0.0068	0.0006	<0.0005	0.0006	0.051	0.046	<0.0005	0.014	<0.0005	0.0006	<0.0005	0.0847
EX-16	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	0.16	0.011	<0.0005	<0.0005	0.0007	0.16	0.071	<0.0005	0.13	<0.0005	<0.0005	<0.0005	0.3172
EX-16	16-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	0.028	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.018
EX-16	12-Apr-02	<0.0036	<0.0036	<0.0036	<0.071	0.83	0.045	<0.0036	<0.0036	<0.0036	0.085	0.24	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	0.066

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-14	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-14	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	25-Jan-00	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	26-Jul-00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	6.2	1.4	<10	<0.5	31	<1.0	<1.0	<1.0	<0.5	<0.5
EX-15	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0033	0.0008	<0.01	<0.0005	0.029	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	13-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	0.0011	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	0.0056	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0022	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	17-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	0.0019	<0.001	<0.0005	<0.0005
EX-15	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	18-Dec-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	0.0013	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	13-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	0.0079	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.012	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0047	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	0.0005	<0.01	<0.0005	0.02	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-15	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-16	25-Jan-00	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.34	0.096	3.2	<0.05	<0.05	<0.1	<0.1	<0.1	<0.05	<0.05
EX-16	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.017	0.013	0.027	<0.0005	0.041	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-16	26-Jul-00	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.021	0.0064	0.14	<0.0025	0.051	<0.005	<0.005	<0.005	<0.0025	<0.0025
EX-16	09-Oct-00	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.01	<0.01	<0.01	<0.005	<0.005
EX-16	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	0.011	<0.01	<0.0005	0.0058	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-16	13-Apr-01	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.14	0.035	0.17	<0.0063	<0.0063	<0.013	<0.013	<0.013	<0.0063	<0.0063
EX-16	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.041	0.0078	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0037	0.0009
EX-16	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.059	0.012	0.01	<0.0005	0.0027	<0.001	<0.001	<0.001	0.0052	0.0006
EX-16	16-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0093	0.028	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.0008
EX-16	12-Apr-02	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	0.022	0.0042	0.21	<0.0036	<0.0036	<0.0071	<0.0071	<0.0071	<0.0036	<0.0036

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-14	27-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-14	20-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
EX-15	25-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	26-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	26-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	26-Jul-00	<0.5	<0.5	<1.0	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5
EX-15	09-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	16-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	13-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
EX-15	17-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-15	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-15	18-Dec-02	<0.0005	<0.0005	0.0076	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	13-Jan-03	<0.0005	<0.0005	<0.0038	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-15	14-Apr-03	<0.0005	0.0006	<0.002	<0.0005	0.0007	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-15	07-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-15	29-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-15	23-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-15	06-May-04	<0.0005	<0.0005	0.0088	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-15	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-15	21-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
EX-15	20-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
EX-15	22-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
EX-15	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
EX-15	27-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-15	20-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-16	25-Jan-00	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<1	<0.05	<0.05	<0.05	<0.05
EX-16	26-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-16	26-Jul-00	<0.0025	<0.0025	<0.005	<0.0025	<0.0025	<0.0025	<0.05	<0.0025	<0.0025	<0.0025	<0.0025
EX-16	09-Oct-00	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
EX-16	16-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-16	13-Apr-01	<0.0063	0.0087	<0.013	<0.0063	<0.0063	<0.0063	<0.13	<0.0063	<0.0063	<0.0063	<0.0063
EX-16	03-Jul-01	<0.0005	0.0054	0.0016	<0.0005	0.001	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
EX-16	12-Oct-01	<0.0005	0.0055	0.0029	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-16	16-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-16	12-Apr-02	<0.0036	0.0043	<0.0071	<0.0036	<0.0036	<0.0036	<0.071	<0.0036	<0.0036	<0.0036	<0.0036

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	12-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	0.53	0.047	<0.0005	<0.0005	0.0017	0.067	0.18	<0.0005	0.0017	<0.0005	0.0016	<0.0005	0.036
EX-16	09-Jul-02	<0.001	<0.001	<0.001	<0.02	<0.4	0.038	<0.001	<0.001	0.0018	<0.033	<0.1	<0.001	0.0022	<0.001	0.0015	<0.001	<0.0082
EX-16	07-Nov-02	<0.005	<0.005	<0.005	<0.1	1.5	0.01	<0.005	<0.005	<0.005	0.12	0.35	<0.005	0.097	<0.005	<0.005	<0.005	0.188
DUP	07-Nov-02	<0.005	<0.005	<0.005	<0.1	1.6	0.011	<0.005	<0.005	<0.005	0.12	0.37	<0.005	0.099	<0.005	<0.005	<0.005	0.177
EX-16	14-Jan-03	<0.0013	<0.0013	<0.0013	<0.025	0.084	0.0038	<0.0013	0.0014	<0.0013	0.36	<0.025	<0.0013	0.016	<0.0013	<0.0013	<0.0013	0.293
EX-16	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	0.44	0.011	<0.0005	<0.0005	0.0006	0.1	0.11	<0.0005	0.13	<0.0005	<0.0005	<0.0005	0.106
EX-16	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0058	<0.0005	0.0005	<0.0005	0.04	<0.01	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	0.0127
EX-16	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	<0.01	<0.0005	0.0018	<0.0005	<0.0005	<0.0005	0.0017
EX-16	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	0.48	0.0091	<0.0005	<0.0005	0.0007	0.053	0.14	<0.0005	0.1	<0.0005	<0.0005	<0.0005	0.0429
EX-16	06-May-04	<0.0005	<0.0005	<0.0005	<0.01	0.014	0.0029	<0.0005	<0.0005	0.0006	0.014	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.01
DUP	06-May-04	<0.0005	<0.0005	<0.0005	<0.01	0.011	0.0026	<0.0005	<0.0005	0.0006	0.013	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.01
EX-16	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	0.018	0.0035	<0.0005	<0.0005	0.0008	0.019	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	0.0064
EX-16	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	0.017	0.0018	<0.0005	<0.0005	0.0008	0.011	<0.01	<0.0005	0.0013	<0.0005	<0.0005	<0.0005	0.004
EX-16	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	0.072	0.0037	0.0003 J	<0.0005	0.0008	0.0078	0.01	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0036 J
EX-16	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0025	0.0003 J	<0.0005	0.0008	0.008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013
EX-16	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0022	0.0003 J	<0.0005	0.001	0.0049	<0.01	<0.0005	0.0021	<0.0005	<0.0005	<0.0005	0.0007
EX-16	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0008	0.0003 J	<0.0005	0.001	0.0023	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005
EX-16	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	0.094	0.0028	<0.0005	<0.0005	0.0007	0.0068	0.015	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	0.0033
DUP	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	0.094	0.0029	<0.0005	<0.0005	0.0007	0.0069	0.016	<0.0005	0.0013	<0.0005	<0.0005	<0.0005	0.0035
EX-16	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	0.14	0.005	0.0003 J	<0.0005	0.0009	0.031	0.03	<0.0005	0.0053	<0.0005	<0.0005	<0.0005	0.0223
EX-2	18-Apr-96	<0	<3	<3	<30	<50	0.11	<3	<3	<3	8	<50	<3	24	<3	<3	<5	7.7
EX-2	01-Aug-96	<0	<0.5	<0.5	<5	<10	<0.5	<0.5	<0.5	<0.5	0.65	<10	<0.5	6.6	<0.5	<0.5	<1	3.7
EX-2	18-Dec-96	<0	<1	<1	<10	<20	<1	<1	<1	<1	2.5	<20	<1	23	<1	<1	<2	12
EX-2	15-Apr-97	<0	<3	<3	<30	<50	<3	<3	<3	<3	<3	<50	<3	26	<3	<3	<5	10
EX-2	01-Jul-97	<0	<1	<1	<10	<30	<1	<1	<1	<1	2	<30	<1	27	<1	<1	<3	10
EX-2	22-Sep-97	<0	<1	<1	<10	<30	<1	<1	<1	<1	1.8	<30	<1	21	<1	8.2	<3	8.4
EX-2	22-Dec-97	<0	<0.5	<0.5	<5	<10	<0.5	<0.5	<0.5	<0.5	1.6	<10	<0.5	8.3	<0.5	<0.5	<1	6.6
EX-2	02-Mar-98	<0	<0.1	<0.1	<2	<2	<0.1	<0.1	<0.1	<0.1	1.1	<2	<0.1	7.7	<0.1	<0.1	<0.2	4.8
EX-2	09-Apr-98	<0	<0.05	<0.05	<0.25	<0.25	<0.05	<0.05	<0.05	<0.05	0.52	<0.25	<0.05	8.1	<0.05	<0.05	<0.05	4
EX-2	17-Jul-98	<0.25	<0.25	<0.25	<1.2	<1.2	<0.25	<0.25	<0.25	<0.25	<0.25	<1.2	<0.25	4.2	<0.25	<0.25	<0.25	4.4
EX-2	23-Oct-98	<0.0025	<0.0025	<0.0025	<0.012	<0.012	0.0032	<0.0025	<0.0025	<0.0025	0.031	<0.012	<0.0025	0.13	<0.0025	<0.0025	<0.0025	0.24
EX-2	14-Jan-99	<0.1	<0.1	<0.1	<0.5	<0.5	0.059 J11	<0.1	<0.1	<0.1	1.2	<0.5	<0.1	11	<0.1	<0.1	<0.1	6.4
EX-2	23-Apr-99	<0.013	<0.013	<0.013	<0.063	<0.068 U6	0.0069 J11	<0.013	<0.013	0.0081 J11	0.17	<0.063	<0.013	1.6	<0.013	<0.013	<0.013	2.61
EX-2	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	0.0071	<0.01	<0.0005	0.0098	<0.0005	<0.0005	<0.0005	0.059
EX-2	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0009	<0.0005	<0.0005	0.0021	0.0074	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.026
EX-2	12-Jan-00	<0.0005	0.057	<0.0005	<0.01	0.018	0.0005	<0.0005	<0.0005	0.0032	<0.0005	<0.01	<0.0005	0.0058	0.002	0.0044	<0.0005	0.091
EX-2	26-Apr-00	<0.0025	<0.0025	<0.0025	<0.05	2.5	0.0041	<0.0025	<0.0025	0.004	0.55	<0.05	<0.0025	0.081	<0.0025	<0.0025	<0.0025	1.15
EX-2	26-Jul-00	<0.005	<0.005	<0.005	<0.1	0.25	<0.005	<0.005	<0.005	<0.005	0.0094	<0.1	<0.005	0.19	<0.005	<0.005	<0.005	3.33
DUP	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	0.26 J	0.0035	<0.0005	<0.0005	0.0067	0.015	<0.01	0.001	0.2	<0.0005	0.002	0.0012	3.64

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	12-Apr-02	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.016	0.003	0.16	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0027	<0.0005
EX-16	09-Jul-02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0022	<0.001	<0.091	<0.001	<0.001	<0.002	<0.002	<0.002	0.002	<0.001
EX-16	07-Nov-02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.077	0.026	0.18	<0.005	0.029	<0.01	<0.01	<0.01	0.0057	<0.005
DUP	07-Nov-02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.078	0.026	0.19	<0.005	0.031	<0.01	<0.01	<0.01	0.0058	<0.005
EX-16	14-Jan-03	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	0.64	0.19	<0.025	<0.0013	<0.0013	<0.0025	<0.0025	<0.0025	0.045	0.0094
EX-16	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.15	0.039	0.054	<0.0005	0.0021	<0.001	<0.001	<0.001	0.012	<0.0005
EX-16	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.075	0.011	<0.01	<0.0005	0.023	<0.001	<0.001	<0.001	0.0058	<0.0005
EX-16	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.34	<0.001	<0.001	<0.001	0.0009	<0.0005
EX-16	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.059	0.013	0.084	<0.0005	0.0008	<0.001	<0.001	<0.001	0.005	<0.0005
EX-16	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0026	<0.01	<0.0005	0.032	<0.001	<0.001	<0.001	0.0012	<0.0005
DUP	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0027	<0.01	<0.0005	0.03	<0.001	<0.001	<0.001	0.0013	<0.0005
EX-16	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0052	0.0008	<0.01	<0.0005	0.0023	<0.001	<0.001	<0.001	0.0012	<0.0005
EX-16	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0069	0.0013	<0.01	<0.0005	0.0014	<0.001	<0.001	<0.001	0.0009	<0.0005
EX-16	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.012	0.0029	0.0063 J	<0.0005	0.0005 J	<0.001	<0.001	<0.001	0.0009	<0.0005
EX-16	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0049	<0.0005	<0.01	<0.0005	0.0027	<0.001	<0.001	<0.001	0.001	<0.0005
EX-16	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	0.0021	<0.001	<0.001	<0.001	0.0003 J	<0.0005
EX-16	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	0.0033	<0.001	<0.001	<0.001	0.0004 J	<0.0005
EX-16	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0093	0.001	0.0073 J	<0.0005	0.0006	<0.001	<0.001	<0.001	0.0011	<0.0005
DUP	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0098	0.0011	0.0078 J	<0.0005	0.0007	<0.001	<0.001	<0.001	0.0011	<0.0005
EX-16	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0005 J	0.028	<0.0005	0.0012	<0.001	<0.001	<0.001	0.0017	0.0017
EX-2	18-Apr-96	<3	<3	<0.1	<3	<3	na	na	na	<30	na	<5	<5	<5	na	na	na
EX-2	01-Aug-96	<0.5	<0.5	na	<0.5	<0.5	na	na	na	<5	na	<1	<1	<1	na	na	na
EX-2	18-Dec-96	<1	<1	na	<1	<1	na	na	na	<10	na	<2	<2	<2	na	na	na
EX-2	15-Apr-97	<3	<3	na	<3	<3	na	na	na	<30	na	<5	<5	<5	na	na	na
EX-2	01-Jul-97	<1	<1	na	<1	<1	na	na	na	<10	na	<3	<3	<3	na	na	na
EX-2	22-Sep-97	<1	<1	na	<1	<1	na	na	na	<10	na	<3	<3	<3	na	na	na
EX-2	22-Dec-97	<0.5	<0.5	na	<0.5	<0.5	na	na	na	<5	na	<1	<1	<1	na	na	na
EX-2	02-Mar-98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.51	0.14	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1
EX-2	09-Apr-98	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.38	0.14	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
EX-2	17-Jul-98	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.39	<0.25	<1.2	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
EX-2	23-Oct-98	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.022	0.013	<0.012	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
EX-2	14-Jan-99	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.62	0.19	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EX-2	23-Apr-99	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.42	0.14	<0.063	<0.013	<0.013	<0.013	<0.013	<0.013	0.01 J11	<0.013
EX-2	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0058	0.0041	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-2	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0032	0.0025	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-2	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.012	0.0052	<0.01	<0.0005	0.0015	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-2	26-Apr-00	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.28	0.11	<0.05	<0.0025	0.0028	<0.005	<0.005	<0.005	0.048	<0.0025
EX-2	26-Jul-00	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.61	0.19	<0.1	<0.005	<0.005	<0.01	<0.01	<0.01	<0.005	<0.005
DUP	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.59	0.21	<0.01	<0.0005	0.0028	<0.001	<0.001	<0.001	0.0015	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	12-Apr-02	<0.0005	0.0037	0.002	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-16	09-Jul-02	<0.001	<0.0014	<0.004	<0.001	<0.001	<0.001	<0.02	<0.001	0.001	<0.001	<0.001
EX-16	07-Nov-02	<0.005	0.0085	<0.02	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
DUP	07-Nov-02	<0.005	0.0087	<0.02	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
EX-16	14-Jan-03	<0.0053	0.11	0.017	<0.0013	0.0044	<0.0013	<0.025	<0.0013	<0.0013	<0.0013	<0.0013
EX-16	14-Apr-03	0.0027	0.029	0.0034	<0.0005	<0.0005	0.001	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-16	07-Jul-03	0.001	0.012	0.0025	<0.0005	0.0013	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-16	29-Oct-03	<0.0005	0.0007	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-16	23-Jan-04	0.0016	0.01	<0.017	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-16	06-May-04	<0.0005	0.0021	0.0036	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	06-May-04	<0.0005	0.0021	0.004	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
EX-16	14-Jul-04	<0.0005	0.0017	<0.002	<0.0005	0.0007	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-16	14-Oct-04	<0.0005	0.0018	<0.002	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-16	21-Jan-05	0.0004 J	0.0014	0.0012 J	<0.0005	0.0004 J	0.0004 J	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
EX-16	20-Apr-05	<0.0005	0.0015	0.001 J	<0.0005	0.0005 J	0.0003 J	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
EX-16	22-Jul-05	<0.0005	0.0003 J	<0.002	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
EX-16	26-Oct-05	<0.0005	0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
EX-16	27-Jan-06	<0.0005	0.0016	<0.002	<0.0005	0.0003 J	0.0004 J	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
DUP	27-Jan-06	<0.0005	0.0016	<0.002	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-16	20-Apr-06	0.0003 J	0.0026	<0.002	<0.0005	0.0005	0.0003 J	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-2	18-Apr-96	na	na	<0.1	<3	na	na	<30	<0.1	na	na	<3
EX-2	01-Aug-96	na	na	na	<0.5	na	na	<5	na	na	na	<0.5
EX-2	18-Dec-96	na	na	na	<1	na	na	<10	na	na	na	<1
EX-2	15-Apr-97	na	na	na	<3	na	na	<30	na	na	na	<3
EX-2	01-Jul-97	na	na	na	<1	na	na	<10	na	na	na	<1
EX-2	22-Sep-97	na	na	na	<1	na	na	<10	na	na	na	<1
EX-2	22-Dec-97	na	na	na	<0.5	na	na	<5	na	na	na	<0.5
EX-2	02-Mar-98	<0.1	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.1	<0.1
EX-2	09-Apr-98	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	na	<0.05	<0.002	<0.05	<0.05
EX-2	17-Jul-98	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	na	<0.25	<0.5	<0.25	<0.25
EX-2	23-Oct-98	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.0025	na	<0.0025	<0.005	<0.0025	<0.0025
EX-2	14-Jan-99	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	na	<0.1	<0.2	<0.1	<0.1
EX-2	23-Apr-99	<0.013	0.011 J11	0.011 J11	<0.013	<0.013	<0.013	na	<0.013	<0.025	<0.013	<0.013
EX-2	15-Jul-99	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	12-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0026	<0.0005	<0.0005
EX-2	26-Apr-00	0.0026	0.05	0.015	<0.0025	<0.0025	<0.0025	<0.05	<0.0025	<0.0025	<0.0025	<0.0025
EX-2	26-Jul-00	<0.02	<0.005	<0.01	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
DUP	26-Jul-00	0.0035	<0.0005	0.011	<0.0005	<0.02	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.02

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-2	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	0.018	0.0035	<0.0005	<0.0005	0.0053	0.13	<0.01	<0.0005	0.11	<0.0005	<0.0005	0.0035	0.47
EX-2	16-Jan-01	<0.0042	<0.0042	<0.0042	<0.083	<0.01	0.0052	<0.0042	<0.0042	<0.0042	0.63	<0.083	<0.0042	0.39	<0.0042	<0.0042	<0.0042	2.1
EX-2	16-Apr-01	<0.0008	<0.0008	<0.0008	<0.017	<0.017	0.0016	<0.0008	<0.0008	<0.0008	0.16	<0.017	<0.0008	0.016	<0.0008	<0.0008	<0.0008	0.361
EX-2	03-Jul-01	<0.0025	<0.0025	<0.0025	<0.05	<0.05	0.0088	<0.0025	<0.0025	0.0051	0.24	<0.05	<0.0025	0.31	<0.0025	<0.0025	<0.0025	1.69
EX-2	12-Oct-01	<0.0008	<0.0008	<0.0008	<0.017	<0.017	0.0053	<0.0008	<0.0008	0.0038	0.14	<0.017	0.0016	0.061	<0.0008	<0.0008	0.0013	0.53
EX-2	16-Jan-02	<0.005	<0.005	<0.005	<0.1	<0.1	0.0098	<0.005	<0.005	<0.005	0.88	<0.1	<0.005	1.2	<0.005	<0.005	<0.005	3.25
EX-2	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0014	<0.0005	<0.0005	0.0011	0.014	<0.01	<0.0005	0.12	<0.0005	<0.0005	0.0006	0.45
EX-2	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0028	<0.0005	<0.0005	0.0009	<0.075	<0.01	<0.0005	0.09	<0.0005	<0.0005	<0.0005	0.334
EX-2	08-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0032	<0.0005	<0.0005	0.0031	0.021	<0.01	0.0003 J	0.051	<0.0005	<0.0005	0.0009	0.49
EX-2	13-Jan-03	<0.0013	<0.0013	<0.0013	<0.025	<0.025	0.0053	<0.0013	<0.0013	0.0019	0.38	<0.025	<0.0013	0.061	<0.0013	<0.0013	<0.0013	0.79
EX-2	14-Apr-03	<0.0036	<0.0036	<0.0036	<0.071	<0.071	0.0069	<0.0036	0.02	<0.0036	0.1	<0.071	<0.0036	0.77	<0.0036	<0.0036	<0.0036	2.54
EX-2	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0051	<0.0005	<0.0005	0.0035	0.1	<0.01	<0.0005	0.014	<0.0005	<0.0005	0.0016	0.26
EX-2	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0024	<0.0005	<0.0005	0.0036	0.022	<0.01	<0.0005	0.0015	<0.0005	<0.0005	0.0014	0.091
EX-2	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0018	<0.0005	<0.0005	0.0012	0.071	<0.01	<0.0005	0.13	<0.0005	<0.0005	0.0006	0.49
EX-2	06-May-04	<0.0005	0.0012	<0.0005	<0.01	0.095	0.0005	<0.0005	<0.0005	0.0019	0.022	0.041	<0.0005	0.045	<0.0005	0.0006	<0.0005	0.161
EX-2	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	0.0019	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0049
EX-2	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0027	<0.0005	<0.0005	0.0035	0.084	<0.01	<0.0005	0.012	<0.0005	<0.0005	0.0011	0.252
EX-2	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	0.015	0.0021	0.0003 J	<0.0005	0.0013	0.068	<0.01	0.0005 J	0.18	<0.0005	0.0004 J	<0.0005	1.61
EX-2	20-Apr-05	<0.0071	<0.0071	<0.0071	<0.14	<0.14	<0.0071	<0.0071	<0.0071	<0.0071	0.33	<0.14	<0.0071	0.84	<0.0071	<0.0071	<0.0071	2.86
EX-2	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0005 J	0.0017	<0.0005	0.0007	0.003	<0.01	<0.0005	0.0004 J	0.0003 J	<0.0005	<0.0005	0.0063 J
EX-2	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0043	0.0077	<0.01	<0.0005	0.0007	<0.0005	<0.0005	0.0016	0.0301
EX-2	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.003	0.0007	<0.0005	0.0012	0.58	<0.01	0.0005 J	0.44	<0.0005	0.0003 J	<0.0005	1.94
EX-2	20-Apr-06	<0.0083	<0.0083	<0.0083	<0.17	<0.17	0.0047 J	<0.0083	<0.0083	<0.0083	0.71	<0.17	<0.0083	0.82	<0.0083	<0.0083	<0.0083	4.76
EX-3	18-Apr-96	<0	<0.3	<0.3	<3	<5	0.0009	<0.3	<0.3	<0.3	<0.3	<5	<0.3	<0.3	<0.3	<0.3	<0.5	<0.5
EX-3	01-Aug-96	<0	0.006	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
EX-3	18-Dec-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
EX-3	15-Apr-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
EX-3	01-Jul-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
EX-3	22-Sep-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	0.009	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
EX-3	19-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	0.017	<0.1	<0.005	0.05	<0.005	<0.005	<0.01	0.073
EX-3	02-Mar-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0017	<0.001	<0.02	<0.001	<0.001	<0.001	0.0015	<0.002	<0.002
EX-3	09-Apr-98	<0	0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0015	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011
EX-3	17-Jul-98	<0.001	0.0023	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0031	0.001	<0.005	<0.001	<0.001	0.0015	0.0017	<0.001	<0.001
EX-3	22-Oct-98	<0.001	0.0042	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0048	<0.001	<0.005	<0.001	<0.001	0.0028	0.0016	<0.001	<0.001
DUP	22-Oct-98	<0.001	0.004	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0043	<0.001	<0.005	<0.001	<0.001	0.0024	0.0014	<0.001	<0.001
EX-3	14-Jan-99	<0.001	0.0086	<0.001	<0.005	<0.005	<0.001	0.001	<0.001	0.004	<0.001	<0.005	<0.001	0.002	0.0024	0.0018	<0.001	<0.001
EX-3	23-Apr-99	<0.001	0.017	<0.001	<0.005	<0.005	0.0007 J11	0.0009 J11	<0.001	0.0037	0.0009 J11	<0.005	<0.001	0.0019	0.0023	0.0014	<0.001	0.0045 J11
EX-3	16-Jul-99	<0.0005	0.039	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	0.0037	<0.0005	<0.01	<0.0005	0.008	0.0021	0.0014	<0.0005	0.0049
EX-3	13-Oct-99	<0.0005	0.011	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.0062	<0.0005	<0.01	0.0011	0.0042	0.004	0.0017	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-2	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.11	0.045	<0.01	<0.0005	0.0076	<0.001	<0.001	<0.001	0.0081	<0.0005
EX-2	16-Jan-01	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	0.6	0.18	<0.083	<0.0042	<0.0042	<0.0083	<0.0083	<0.0083	0.044	0.0052
EX-2	16-Apr-01	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.28	0.063	<0.017	<0.0008	<0.0008	<0.0017	<0.0017	<0.0017	0.042	<0.0008
EX-2	03-Jul-01	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.29	0.095	<0.05	<0.0025	<0.0025	<0.005	<0.005	<0.005	0.013	<0.0025
EX-2	12-Oct-01	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.063	0.043	<0.017	<0.0008	<0.0008	<0.0017	<0.0017	<0.0017	0.008	<0.0008
EX-2	16-Jan-02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.49	0.18	<0.1	<0.005	<0.005	<0.01	<0.01	<0.01	0.062	0.0064
EX-2	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.051	0.05	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	<0.0005
EX-2	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.07	<0.027	<0.01	<0.0005	<0.002	<0.001	<0.001	<0.001	0.0033	<0.0005
EX-2	08-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.044	0.034	<0.01	<0.0005	0.0003 J	<0.001	<0.001	<0.001	<0.0005	0.0024
EX-2	13-Jan-03	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	0.25	0.083	<0.025	<0.0013	<0.0013	<0.0025	<0.0025	<0.0025	0.028	<0.0013
EX-2	14-Apr-03	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	0.34	0.096	<0.071	<0.0036	<0.0036	<0.0071	<0.0071	<0.0071	0.0054	<0.0036
EX-2	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.13	0.024	<0.01	<0.0005	0.0095	<0.001	<0.001	<0.001	0.0036	<0.0005
EX-2	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.049	0.014	<0.01	<0.0005	0.0005	<0.001	<0.001	<0.001	0.0013	<0.0005
EX-2	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.059	0.052	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.004	<0.0005
EX-2	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.018	0.016	<0.01	<0.0005	0.0028	<0.001	<0.001	<0.001	0.0007	<0.0005
EX-2	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	0.0018	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-2	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.064	0.02	<0.01	<0.0005	0.0011	<0.001	<0.001	<0.001	0.0044	<0.0005
EX-2	21-Jan-05	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	0.26	0.1	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0044	<0.0005
EX-2	20-Apr-05	<0.0071	<0.0071	<0.0071	<0.0071	<0.0071	<0.0071	0.31	0.11	<0.14	<0.0071	<0.0071	<0.014	<0.014	<0.014	0.012	<0.0071
EX-2	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019	0.001	<0.01	<0.0005	0.0005	<0.001	<0.001	<0.001	0.0005	<0.0005
EX-2	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.015	0.0047	<0.01	<0.0005	0.0009	<0.001	<0.001	<0.001	0.0008	<0.0005
EX-2	27-Jan-06	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	0.26	0.084	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.039	<0.0005
EX-2	20-Apr-06	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	0.63	0.19	<0.17	<0.0083	<0.0083	<0.017	<0.017	<0.017	0.023	<0.0083
EX-3	18-Apr-96	<0.3	<0.3	<0.01	<0.3	<0.3	na	na	na	<3	na	<0.5	<0.5	<0.5	na	na	na
EX-3	01-Aug-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-3	18-Dec-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-3	15-Apr-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-3	01-Jul-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-3	22-Sep-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-3	19-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
EX-3	02-Mar-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
EX-3	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-3	17-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-3	22-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	22-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-3	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	0.003	<0.001	<0.001	<0.001	<0.001	<0.001
EX-3	23-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0006 J11	<0.001	<0.005	<0.001	0.0021	<0.001	<0.001	<0.001	<0.001	<0.001
EX-3	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0009	<0.0005	<0.01	<0.0005	0.0018	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-2	09-Oct-00	0.0007	0.01	0.0044	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	16-Jan-01	<0.0042	0.061	0.012	<0.0042	<0.0042	<0.0042	<0.083	<0.0042	<0.0042	<0.0042	<0.0042
EX-2	16-Apr-01	0.0016	0.047	0.016	<0.0008	<0.0008	<0.0008	<0.017	<0.0008	<0.0008	<0.0008	<0.0008
EX-2	03-Jul-01	<0.0025	0.012	0.011	<0.0025	<0.0025	<0.0025	<0.05	<0.0025	<0.0025	<0.0025	<0.0025
EX-2	12-Oct-01	<0.0008	0.0076	0.0037	<0.0008	<0.0008	<0.0008	<0.017	<0.0008	<0.0008	<0.0008	<0.0008
EX-2	16-Jan-02	<0.005	0.081	0.013	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
EX-2	09-Apr-02	0.0006	0.0008	0.0022	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	09-Jul-02	0.0007	<0.0032	<0.0027	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	08-Oct-02	0.0017	0.0005 J	0.0021	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
EX-2	13-Jan-03	<0.0017	0.035	<0.012	<0.0013	<0.0013	<0.0013	<0.025	<0.0013	<0.0013	<0.0013	<0.0013
EX-2	14-Apr-03	<0.0036	0.0042	<0.014	0.016	<0.0036	<0.0036	<0.071	<0.0036	<0.0036	<0.0036	<0.0036
EX-2	07-Jul-03	0.0006	0.0029	0.0041	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	29-Oct-03	0.0007	0.001	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	23-Jan-04	0.001	0.0034	0.0036	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	06-May-04	<0.0005	0.0007	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	11-Oct-04	<0.0005	0.0049	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	21-Jan-05	0.0022	0.0039	0.0091	<0.0005	0.0005 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	20-Apr-05	<0.0071	0.0098	0.02 J	<0.0071	<0.0071	<0.0071	<0.14	<0.0071	<0.0071	<0.0071	<0.0071
EX-2	22-Jul-05	<0.0005	0.0004 J	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-2	26-Oct-05	<0.0005	0.0008	0.0014 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-2	27-Jan-06	0.0022	0.047	0.012	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-2	20-Apr-06	0.0043 J	0.015	<0.033	<0.0083	<0.0083	<0.0083	<0.17	<0.0083	<0.0083	<0.0083	<0.0083
EX-3	18-Apr-96	na	na	<0.01	<0.3	na	na	<3	<0.01	na	na	<0.3
EX-3	01-Aug-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
EX-3	18-Dec-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
EX-3	15-Apr-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
EX-3	01-Jul-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
EX-3	22-Sep-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
EX-3	19-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
EX-3	02-Mar-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
EX-3	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-3	17-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-3	22-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	22-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-3	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-3	23-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0032	<0.001	<0.001
EX-3	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
EX-3	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-3	25-Jan-00	<0.0083	<0.0083	<0.0083	<0.17	1.7	0.047	<0.0083	<0.0083	<0.0083	0.32	1	<0.0083	0.75	<0.0083	<0.0083	<0.0083	1.29
EX-3	26-Apr-00	<0.0005	0.0018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	0.0017	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0132
EX-3	26-Jul-00	<0.0005	0.0034	<0.0005	<0.01	<0.01	0.0006	0.0019	<0.0005	0.0049	0.0034	<0.01	<0.0005	0.049	0.0029	0.0019	<0.0005	0.0228
EX-3	09-Oct-00	<0.0005	0.0029	<0.0005	<0.01	<0.01	<0.0005	0.0017	<0.0005	0.0044	0.0015	<0.01	<0.0005	0.0042	0.0024	0.0017	<0.0005	0.0074
DUP	09-Oct-00	<0.0005	0.0029	<0.0005	<0.01	<0.01	<0.0005	0.0017	<0.0005	0.0042	0.0014	<0.01	<0.0005	0.0041	0.0022	0.0016	<0.0005	0.0071
EX-3	16-Jan-01	<0.0005	0.002	<0.0005	<0.01	<0.01	<0.0005	0.0015	<0.0005	0.0045	<0.0005	<0.01	<0.0005	<0.0005	0.0023	0.0015	<0.0005	0.0016
EX-3	13-Apr-01	<0.0005	0.0013	<0.0005	<0.01	<0.01	<0.0005	0.0012	<0.0005	0.0037	0.0011	<0.01	<0.0005	0.0094	0.0017	0.0011	<0.0005	0.0048
EX-3	03-Jul-01	<0.0005	0.0021	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.0039	0.0008	<0.01	<0.0005	0.0051	0.0025	0.0013	<0.0005	0.0094
EX-3	12-Oct-01	<0.0005	0.0018	<0.0005	<0.01	<0.01	<0.0005	0.0016	<0.0005	0.0053	<0.0005	<0.01	<0.0005	<0.0005	0.0034	0.0014	<0.0005	0.0008
EX-3	16-Jan-02	<0.0005	0.0012	<0.0005	<0.01	<0.01	0.0008	0.001	<0.0005	0.0037	0.0035	<0.01	<0.0005	0.0016	0.0023	0.0013	<0.0005	0.0023
EX-3	09-Apr-02	<0.0005	0.0012	<0.0005	<0.01	<0.01	<0.0005	0.0012	<0.0005	0.0038	<0.0005	<0.01	<0.0005	<0.0005	0.0025	0.001	<0.0005	<0.001
EX-3	30-Aug-02	<0.0005	0.0015	<0.0005	<0.01	<0.017	<0.0005	0.0012	0.24	0.0035	<0.0005	<0.01	0.0007	0.0015	0.002	0.0021	<0.0005	<0.001
EX-3	08-Oct-02	<0.0005	0.0012	<0.0005	<0.01	<0.01	<0.0005	0.0007	0.06	0.0027	<0.0005	<0.01	0.0003 J	<0.0005	0.0012	0.0015	<0.0005	<0.001
EX-3	13-Jan-03	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	0.0011	0.0098	0.0037	<0.0005	<0.01	<0.0005	0.0006	0.0017	0.0013	<0.0005	<0.001
EX-3	16-Apr-03	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	0.0005	0.0058	0.0023	<0.0005	<0.01	<0.0005	0.0008	0.0012	0.0009	<0.0005	<0.001
EX-3	07-Jul-03	<0.0005	0.0013	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	0.004	<0.0005	<0.01	<0.0005	<0.0005	0.0025	0.001	<0.0005	<0.001
EX-3	29-Oct-03	<0.0005	0.0016	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	0.004	<0.0005	<0.01	<0.0005	<0.0005	0.0032	0.001	<0.0005	<0.001
EX-3	23-Jan-04	<0.0005	0.0011	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	0.0036	<0.0005	<0.01	<0.0005	<0.0005	0.0024	0.0012	<0.0005	<0.001
EX-3	06-May-04	<0.0005	0.0013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.001	0.0032	<0.0005	<0.01	<0.0005	0.0009	0.0023	0.001	<0.0005	0.0028
EX-3	14-Jul-04	<0.0005	0.0011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0041	<0.0005	<0.01	<0.0005	<0.0005	0.003	0.0013	<0.0005	<0.001
EX-3	11-Oct-04	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	0.001	<0.01	<0.0005	0.012	0.001	<0.0005	<0.0005	0.0033
EX-3	21-Jan-05	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0007	0.0023	<0.0005	<0.01	<0.0005	0.0021	0.0013	0.0007	<0.0005	0.0006
EX-3	20-Apr-05	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0009	0.0015	0.0007	<0.01	<0.0005	0.0033	0.0013	0.0007	<0.0005	0.003
EX-3	22-Jul-05	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	0.0004 J	<0.01	<0.0005	0.0014	0.0024	0.0009	<0.0005	0.0046
EX-3	26-Oct-05	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.01	<0.0005	<0.0005	0.0021	0.0011	<0.0005	<0.001
EX-3	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	0.0058 J	0.0003 J	<0.0005	0.0008	0.0004 J	0.0019	<0.01	<0.0005	0.0053	<0.0005	<0.0005	<0.0005	0.0017
EX-3	20-Apr-06	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.002	0.0016	0.0004 J	<0.01	<0.0005	0.0034	0.001	0.0006	<0.0005	0.0028
EX-4	11-Sep-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-4	22-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-4	14-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0006 J11	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	14-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0006 J11	<0.001	<0.001	<0.001	<0.005	<0.001	0.0022	<0.001	<0.001	<0.001	<0.001
EX-4	23-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0006 J11	<0.001	<0.001	<0.001	<0.005	<0.001	0.0008 J11	<0.001	<0.001	<0.001	0.0019 J11
EX-4	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0073	<0.01	<0.0005	0.033	<0.0005	<0.0005	<0.0005	0.087
EX-4	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0026	<0.01	<0.0005	0.0033	<0.0005	<0.0005	<0.0005	0.036
EX-4	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	<0.01	<0.0005	0.0021	<0.0005	<0.0005	<0.0005	0.0185
EX-4	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0033
EX-4	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.01	<0.0005	0.0026	<0.0005	<0.0005	<0.0005	0.0055
EX-4	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0055
EX-4	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-3	25-Jan-00	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	0.093	0.03	0.45	<0.0083	<0.0083	<0.017	<0.017	<0.017	0.014	<0.0083
EX-3	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	<0.0005	<0.01	<0.0005	0.036	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	0.0023	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	0.0014	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	0.0014	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	13-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	16-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	0.0007	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	30-Aug-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	08-Oct-02	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	13-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	0.014	<0.0005	0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	22-Jul-05	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	26-Oct-05	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-3	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	11-Sep-98	<0.001	<0.001	<0.01 UJ3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-4	22-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-4	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-4	23-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-4	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.01	0.0035	<0.01	<0.0005	0.032	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0091	0.0035	<0.01	<0.0005	0.041	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0032	0.0023	<0.01	<0.0005	0.0035	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.0011	<0.01	<0.0005	0.022	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	0.001	<0.01	<0.0005	0.0053	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	0.0022	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-3	25-Jan-00	<0.0083	0.016	0.012 J	<0.0083	<0.0083	<0.0083	<0.17	<0.0083	<0.0083	<0.0083	<0.0083
EX-3	26-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	26-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	09-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	09-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	16-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	13-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-3	16-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	30-Aug-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	0.0015
EX-3	08-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	0.0004 J
EX-3	13-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	07-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	29-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	23-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	06-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	11-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	21-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	20-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	22-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-3	27-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-3	20-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	11-Sep-98	<0.001	<0.001	<0.01 UJ3	<0.001	<0.001	<0.001	na	<0.01 UJ3	<0.002	<0.001	<0.001
EX-4	22-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-4	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	na	<0.001	<0.002	<0.001	<0.001
DUP	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.001 J11	na	<0.001	<0.002	<0.001	<0.001
EX-4	23-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.001 J11	na	<0.001	<0.002	<0.001	<0.001
EX-4	15-Jul-99	<0.0005	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	15-Oct-99	<0.0005	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-4	12-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	26-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	26-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	09-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	16-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-4	16-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
EX-4	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0023
EX-4	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-4	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-4	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	<0.01	<0.0005	0.0017	<0.0005	<0.0005	<0.0005	0.0101
EX-4	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0016	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0055
EX-4	12-Dec-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0025	<0.0005	0.0026	<0.01	<0.0005	0.001	<0.0005	<0.0005	<0.0005	0.0092
EX-4	13-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-4	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0006	<0.0005	0.0048	<0.01	<0.0005	0.0038	<0.0005	<0.0005	<0.0005	0.0366
EX-4	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.021	<0.01	<0.0005	0.0056	<0.0005	<0.0005	<0.0005	0.197
EX-4	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-4	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-4	06-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-4	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.0057
EX-4	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-4	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	0.0018	<0.01	<0.0005	0.001	<0.0005	<0.0005	<0.0005	0.0092
EX-4	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0033
EX-4	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	<0.0005	0.0017	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0056
EX-4	26-Oct-05	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J
EX-4	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	0.0007	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	0.0027
EX-4	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005	<0.0005	0.0084
EX-5	11-Sep-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.003	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-5	22-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0024	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-5	14-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	0.0052	0.0019	<0.001	0.0009 J11	0.0022	<0.005	<0.001	0.0007 J11	<0.001	<0.001	<0.001	0.0043
EX-5	23-Apr-99	<0.0063	<0.0063	<0.0063	<0.031	<0.031	0.033	<0.0063	<0.0063	0.0067	0.25	<0.031	<0.0063	0.99	<0.0063	<0.0063	<0.0063	1.36
EX-5	19-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0015	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0181
EX-5	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0047	0.0016	<0.0005	<0.0005	0.0017	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0129
EX-5	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.013	0.0018	<0.0005	0.0014	0.072	<0.01	<0.0005	0.085	<0.0005	<0.0005	0.0006	0.35
EX-5	26-Apr-00	<0.002	<0.002	<0.002	<0.04	<0.04	0.018	0.0022	<0.002	0.0031	0.064	<0.04	<0.002	0.037	<0.002	<0.002	<0.002	0.61
EX-5	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0022	0.0006	<0.0005	0.0007	0.009	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0426
EX-5	09-Oct-00	<0.0005	0.0016	<0.0005	0.067	5.5	0.0085	0.0022	<0.0005	0.0009	0.013	2.4	<0.0005	0.73	<0.0005	<0.0005	<0.0005	0.118
EX-5	16-Jan-01	<0.005	<0.005	<0.005	<0.1	<0.1	0.036	<0.005	<0.005	<0.005	1	<0.1	<0.005	0.29	<0.005	<0.005	<0.005	3.69
EX-5	16-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0039	0.0037	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0075
EX-5	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0031	0.0042	<0.0005	0.001	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0029
DUP	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0031	0.0042	<0.0005	0.0009	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0028
EX-5	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0007	0.0027	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012
EX-5	21-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-4	16-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0008	<0.01	<0.0005	0.0016	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0039	<0.0016	<0.01	<0.0005	<0.0011	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	12-Dec-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019	0.0033	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	13-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0039	0.0021	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	0.0006	<0.0005
EX-4	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.026	0.0076	<0.01	<0.0005	0.0023	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.0013	<0.01	<0.0005	0.0025	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0004 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	0.0005 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	0.0009	<0.01	<0.0005	0.0008	<0.001	<0.001	<0.001	0.0003 J	<0.0005
EX-4	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-4	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0004 J	<0.01	<0.0005	0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	11-Sep-98	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-5	22-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
EX-5	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0033	0.0007 J11	<0.005	<0.001	0.16	<0.001	<0.001	<0.001	<0.001	<0.001
EX-5	23-Apr-99	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.076	0.023	<0.031	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.0054 J11	<0.0063
EX-5	19-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0011	<0.01	<0.0005	0.15	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.006	0.0022	<0.01	<0.0005	0.017	<0.001	<0.001	<0.001	0.0008	<0.0005
EX-5	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.028	0.015	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.004	<0.0005
EX-5	26-Apr-00	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.044	0.014	<0.04	<0.002	0.53	<0.004	<0.004	<0.004	<0.002	<0.002
EX-5	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0038	0.0084	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	<0.0005
EX-5	09-Oct-00	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0088	0.0052	1.4	<0.0005	0.0016	<0.001	<0.001	<0.001	0.0012	<0.0005
EX-5	16-Jan-01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.13	0.044	<0.1	<0.005	<0.005	<0.01	<0.01	<0.01	0.026	<0.005
EX-5	16-Apr-01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	03-Jul-01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	21-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-4	16-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0011	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-4	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0021	<0.0005	<0.0005
EX-4	16-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0017	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-4	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	12-Dec-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	13-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	14-Apr-03	<0.0005	0.0006	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-4	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-4	29-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	29-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-4	23-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	06-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	11-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
DUP	11-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-4	21-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	20-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	22-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-4	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
EX-4	27-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-4	20-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	11-Sep-98	<0.001	<0.001	0.0013	<0.001	<0.001	<0.001	na	<0.01	<0.002	<0.001	<0.001
EX-5	22-Oct-98	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-5	14-Jan-99	<0.001	<0.001	<0.001	0.0016	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
EX-5	23-Apr-99	<0.0063	0.0046 J11	0.018	<0.0063	<0.0063	<0.0063	na	<0.0063	<0.013	<0.0063	<0.0063
EX-5	19-Jul-99	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-5	15-Oct-99	<0.0005	0.0006	0.0013	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
EX-5	12-Jan-00	<0.0005	0.0037	0.0038	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-5	26-Apr-00	<0.002	<0.002	0.013	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
EX-5	26-Jul-00	<0.0005	<0.0005	<0.0027	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	09-Oct-00	<0.0005	0.0009	0.0019	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	16-Jan-01	0.011	0.024	0.03	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
EX-5	16-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	16-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	21-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-5	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0086	0.0091	<0.0005	0.0022	0.026	<0.01	<0.0005	0.0006	<0.0005	<0.0005	0.001	0.0145
EX-5	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0019	0.0043	0.016	0.0009	<0.0052	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0026
EX-5	08-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0023	0.0065	0.0008	0.0005 J	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011
EX-5	13-Jan-03	<0.0013	<0.0013	<0.0013	<0.025	<0.025	0.024	0.0087	<0.0013	0.0051	0.26	<0.025	<0.0013	0.018	<0.0013	<0.0013	0.0026	0.77
EX-5	14-Apr-03	<0.0013	<0.0013	<0.0013	<0.025	<0.025	0.013	0.0069	<0.0013	<0.0013	0.14	<0.025	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	0.636
EX-5	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0022	0.0064	<0.0005	0.0005	0.008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.031
EX-5	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0056	<0.0005	<0.0005	0.0019	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0026
EX-5	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.012	0.011	<0.0005	0.0042	0.1	<0.01	<0.0005	0.059	<0.0005	<0.0005	0.0016	0.384
EX-5	06-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0051	0.0055	<0.0005	0.0008	0.037	<0.01	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.1922
EX-5	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0028	0.0066	<0.0005	0.0006	0.0048	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0081
EX-5	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-5	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.011	0.0076	<0.0005	0.0031	0.074	<0.01	<0.0005	0.0011	<0.0005	<0.0005	0.0009	0.3033
EX-5	20-Apr-05	<0.0013	<0.0013	<0.0013	<0.025	<0.025	0.0077	0.0082	<0.0013	0.0011 J	0.11	<0.025	<0.0013	0.0007 J	<0.0013	<0.0013	<0.0013	0.5231
EX-5	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0008	0.011	<0.0005	0.0003 J	0.0064	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0343 J
EX-5	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0003 J	0.0018	0.0012	0.0008	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0009
EX-5	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0033	0.0068	<0.0005	0.001	0.0091	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.037
EX-5	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0011	0.0034	<0.0005	0.001	0.015	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0004 J	0.0921
EX-6	11-Sep-98	<0.1	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	0.92	<0.5	<0.1	0.14	<0.1	<0.1	<0.1	4.4
DUP	11-Sep-98	<0.1	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	0.93	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	4.5
EX-6	22-Oct-98	<0.012	<0.012	<0.012	<0.062	<0.062	0.046	<0.012	<0.012	<0.012	0.54	<0.062	<0.012	<0.012	<0.012	<0.012	<0.012	2.1
EX-6	15-Jan-99	<0.02	<0.02	<0.02	<0.1	<0.1	0.091	<0.02	<0.02	<0.02	1.6	<0.1	<0.02	0.93	<0.02	<0.02	<0.02	6.08
EX-6	23-Apr-99	<0.005	<0.005	<0.005	<0.025	<0.034 U6	0.0082	<0.005	<0.005	0.0026 J11	0.16	<0.025	<0.005	0.15	<0.005	<0.005	<0.005	1.45
DUP	23-Apr-99	<0.005	<0.005	<0.005	<0.025	<0.035 U6	0.0084	<0.005	<0.005	0.0026 J11	0.18	<0.025	<0.005	0.15	<0.005	<0.005	<0.005	1.55
EX-6	19-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.0194
EX-6	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.036	0.0006	<0.0005	0.0032	0.11	<0.01	<0.0005	<0.0005	0.0011	<0.0005	0.0016	0.4044
EX-6	21-Jan-00	<0.0025	<0.0025	<0.0025	<0.05	<0.05	0.033	<0.0025	<0.0025	0.0054	0.49	<0.05	<0.0025	0.0043	<0.0025	<0.0025	<0.0025	1.8
EX-6	26-Apr-00	<0.0007	<0.0007	<0.0007	<0.014	<0.014	0.013	<0.0007	<0.0007	0.004	0.066	<0.014	<0.0007	0.03	<0.0007	<0.0007	<0.0007	0.32
EX-6	26-Jul-00	<0.01	<0.01	<0.01	<0.2	<0.2	0.052	<0.01	<0.01	<0.01	1.8	<0.2	<0.01	0.058	<0.01	<0.01	<0.01	6.35
DUP	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	0.033	0.054	0.0019	<0.0005	0.0074	1.8	<0.01	<0.0005	0.073	0.0008	<0.0005	0.0016	6.62
EX-6	09-Oct-00	<0.002	<0.002	<0.002	<0.04	<0.04	0.016	<0.002	<0.002	0.0024	0.058	<0.04	<0.002	<0.002	<0.002	<0.002	<0.002	1.126
EX-6	16-Jan-01	<0.0063	<0.0063	<0.0063	<0.13	<0.13	0.045	<0.0063	<0.0063	<0.0063	1.4	<0.13	<0.0063	0.36	<0.0063	<0.0063	<0.0063	5.09
EX-6	13-Apr-01	<0.0083	<0.0083	<0.0083	<0.17	<0.17	0.036	<0.0083	<0.0083	<0.0083	1.2	<0.17	<0.0083	0.03	<0.0083	<0.0083	<0.0083	4.49
EX-6	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0094	<0.0005	<0.0005	0.0013	0.024	<0.01	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.074
EX-6	16-Oct-01	<0.0017	<0.0017	<0.0017	<0.033	<0.033	0.023	<0.0017	<0.0017	0.0025	0.25	<0.033	<0.0017	0.0018	<0.0017	<0.0017	<0.0017	0.937
EX-6	16-Jan-02	<0.0042	<0.0042	<0.0042	<0.083	<0.083	0.019	<0.0042	<0.0042	<0.0042	0.98	<0.083	<0.0042	0.035	<0.0042	<0.0042	<0.0042	2.76
EX-6	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0023	<0.0005	<0.0005	0.0006	0.031	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.2447
EX-6	09-Jul-02	<0.0042	<0.0042	<0.0042	<0.083	<0.083	0.014	<0.0042	0.024	<0.0042	<0.058	<0.083	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	2.074
EX-6	10-Oct-02	<0.0025	<0.0025	<0.0025	<0.05	<0.05	0.02	<0.0025	0.009	0.0013 J	0.46	<0.05	<0.0025	0.0025 J	<0.0025	<0.0025	<0.0025	1.217
EX-6	13-Jan-03	<0.0063	<0.0063	<0.0063	<0.13	<0.13	0.016	<0.0063	<0.0063	<0.0063	0.67	<0.13	<0.0063	0.022	<0.0063	0.012	<0.0063	3.23

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-5	09-Apr-02	<0.0005	<0.0005	0.0013	<0.0005	<0.0005	<0.0005	0.0082	0.0046	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.003	<0.0005
EX-5	09-Jul-02	<0.0005	<0.0005	<0.0006	<0.0005	<0.0005	<0.0005	<0.0023	<0.0013	<0.01	<0.0005	<0.017	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	08-Oct-02	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	0.0015	0.0008	<0.01	<0.0005	0.0068	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	13-Jan-03	<0.0013	<0.0013	0.0014	<0.0013	<0.0013	<0.0013	0.05	0.02	<0.025	<0.0013	<0.0013	<0.0025	<0.0025	<0.0025	0.0095	<0.0013
EX-5	14-Apr-03	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	0.052	0.02	<0.025	<0.0013	<0.0013	<0.0025	<0.0025	<0.0025	0.007	0.0013
EX-5	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0059	<0.01	<0.0005	0.012	<0.001	<0.001	<0.001	0.0012	<0.0005
EX-5	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	0.0015	<0.01	<0.0005	0.0034	<0.001	<0.001	<0.001	0.0012	<0.0008
EX-5	23-Jan-04	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	0.034	0.016	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0074	<0.0006
EX-5	06-May-04	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.017	0.0078	<0.01	<0.0005	0.022	<0.001	<0.001	<0.001	0.0024	<0.0005
EX-5	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0086	0.0052	<0.01	<0.0005	0.0022	<0.001	<0.001	<0.001	0.0023	<0.0005
EX-5	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.01	<0.0005	0.0015	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	21-Jan-05	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	0.025	0.011	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	0.0066	<0.0005
EX-5	20-Apr-05	<0.0013	<0.0013	0.0009 J	<0.0013	<0.0013	<0.0013	0.045	0.02	<0.025	<0.0013	0.0011 J	<0.0025	<0.0025	<0.0025	0.0087	0.0091
EX-5	22-Jul-05	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0095	0.0048	<0.01	<0.0005	0.001	<0.001	<0.001	<0.001	0.0016	<0.0005
EX-5	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0004 J	<0.01	<0.0005	0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-5	27-Jan-06	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	<0.0005	0.0042	0.0026	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0023	<0.0005
EX-5	20-Apr-06	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.014	0.013	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0012	0.0077
EX-6	11-Sep-98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
DUP	11-Sep-98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.15	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EX-6	22-Oct-98	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	0.1	0.039	<0.062	<0.012	<0.012	<0.012	<0.012	<0.012	0.024	<0.012
EX-6	15-Jan-99	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.17	0.057	<0.1	<0.02	0.014 J11	<0.02	<0.02	<0.02	0.035	<0.02
EX-6	23-Apr-99	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.046	0.018	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	0.0031 J11	<0.005
DUP	23-Apr-99	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.046	0.019	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	0.0035 J11	<0.005
EX-6	19-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-6	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.028	0.012	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.01	0.0015
EX-6	21-Jan-00	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.07	0.026	<0.05	<0.0025	<0.0025	<0.005	<0.005	<0.005	0.015	<0.0025
EX-6	26-Apr-00	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	0.019	0.0071	<0.014	<0.0007	0.18	<0.0014	<0.0014	<0.0014	0.001	<0.0007
EX-6	26-Jul-00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.2	0.074	<0.2	<0.01	<0.01	<0.02	<0.02	<0.02	0.038	<0.013
DUP	26-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.17	0.095	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.051	<0.031
EX-6	09-Oct-00	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.043	0.029	<0.04	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002
EX-6	16-Jan-01	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.17	0.056	<0.13	<0.0063	<0.0063	<0.013	<0.013	<0.013	0.034	<0.0063
EX-6	13-Apr-01	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	0.16	0.053	<0.17	<0.0083	<0.0083	<0.017	<0.017	<0.017	0.028	<0.0083
EX-6	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.022	0.01	<0.01	<0.0005	0.012	<0.001	<0.001	<0.001	0.001	<0.0005
EX-6	16-Oct-01	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	0.029	0.013	<0.033	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	0.011	0.0021
EX-6	16-Jan-02	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	0.098	0.043	<0.083	<0.0042	<0.0042	<0.0083	<0.0083	<0.0083	0.024	<0.0042
EX-6	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.023	0.013	<0.01	<0.0005	<0.0005	<0.001	0.0012	<0.001	0.0025	<0.0005
EX-6	09-Jul-02	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.078	<0.045	<0.083	<0.0042	<0.0042	<0.0083	<0.0083	<0.0083	<0.0042	<0.0042
EX-6	10-Oct-02	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.077	0.033	<0.05	<0.0025	<0.0025	<0.005	<0.005	<0.005	0.023	0.0052
EX-6	13-Jan-03	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.15	0.063	<0.13	<0.0063	<0.0063	<0.013	<0.013	<0.013	0.015	<0.0063

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-5	09-Apr-02	<0.0005	0.0017	0.0046	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	08-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-5	13-Jan-03	<0.0013	0.0082	0.017	<0.0013	<0.0013	<0.0013	<0.025	<0.0013	<0.0013	<0.0013	<0.0013
EX-5	14-Apr-03	<0.0013	0.0063	0.0098	<0.0013	<0.0013	0.0016	<0.025	<0.0013	<0.0013	<0.0013	<0.0013
EX-5	07-Jul-03	<0.0005	0.0008	0.0031	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	29-Oct-03	<0.0005	0.0008	<0.002	<0.0005	0.0007	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	23-Jan-04	<0.0005	0.005	0.008	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	06-May-04	<0.0005	0.0015	0.0043	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	14-Jul-04	<0.0005	0.0013	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-5	21-Jan-05	<0.0005	0.0049	0.0056	<0.0005	0.0003 J	<0.0013	<0.01	<0.0013	0.0003 J	<0.0005	<0.0005
EX-5	20-Apr-05	<0.0013	0.0084	0.012	<0.0013	<0.0013	<0.0013	<0.025	<0.0013	<0.0013	<0.0013	<0.0013
EX-5	22-Jul-05	0.0003 J	0.0014	0.0022	<0.0005	<0.0005	0.0005 J	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005
EX-5	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-5	27-Jan-06	<0.0005	0.0012	0.0012 J	<0.0005	<0.0005	0.0005	<0.01	0.0003 J	<0.0005	<0.0005	<0.0005
EX-5	20-Apr-06	<0.0005	0.0007	0.0029	<0.0005	<0.0005	0.0005	<0.01	0.0005 J	<0.0005	<0.0005	<0.0005
EX-6	11-Sep-98	<0.1	<0.1	0.012 J3	<0.1	<0.1	<0.1	na	<0.1	<0.2	<0.1	<0.1
DUP	11-Sep-98	<0.1	<0.1	0.013	<0.1	<0.1	<0.1	na	<0.1	<0.2	<0.1	<0.1
EX-6	22-Oct-98	<0.012	0.026	0.014	<0.012	<0.012	<0.012	na	<0.012	<0.025	<0.012	<0.012
EX-6	15-Jan-99	<0.02	0.04	0.021	<0.02	<0.02	<0.02	na	<0.02	<0.04	<0.02	<0.02
EX-6	23-Apr-99	<0.005	<0.005	0.014	<0.005	<0.005	<0.005	na	<0.005	<0.01	<0.005	<0.005
DUP	23-Apr-99	<0.005	0.0025 J11	0.015	<0.005	<0.005	<0.005	na	<0.005	<0.01	<0.005	<0.005
EX-6	19-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	12-Oct-99	0.001	0.0075	0.012	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	21-Jan-00	<0.0025	0.011	0.0084	<0.0025	<0.0025	<0.0025	<0.05	<0.0025	<0.0025	<0.0025	<0.0025
EX-6	26-Apr-00	<0.0007	<0.0007	0.005	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	<0.0007	<0.0007	<0.0007
EX-6	26-Jul-00	<0.015	0.041	<0.026	<0.01	<0.01	<0.01	<0.2	<0.01	<0.01	<0.01	<0.01
DUP	26-Jul-00	0.015	0.057	0.049	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.031
EX-6	09-Oct-00	0.0044	<0.002	0.008	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
EX-6	16-Jan-01	0.013	0.032	0.033	<0.0063	<0.0063	<0.0063	<0.13	<0.0063	<0.0063	<0.0063	<0.0063
EX-6	13-Apr-01	<0.0083	0.027	0.025	<0.0083	<0.0083	<0.0083	<0.17	<0.0083	<0.0083	<0.0083	<0.0083
EX-6	03-Jul-01	0.0017	0.0006	0.011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	16-Oct-01	0.0072	0.0075	0.022	<0.0017	<0.0017	<0.0017	<0.033	<0.0017	<0.0017	<0.0017	<0.0017
EX-6	16-Jan-02	0.005	0.02	0.0098	<0.0042	<0.0042	<0.0042	<0.083	<0.0042	<0.0042	<0.0042	<0.0042
EX-6	09-Apr-02	0.0039	0.0017	0.0079	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	09-Jul-02	0.012	<0.0042	<0.017	<0.0042	<0.0042	<0.0042	<0.083	<0.0042	<0.0042	<0.0042	<0.0042
EX-6	10-Oct-02	0.0089	0.022	0.03	<0.0025	0.0024 J	<0.0025	<0.05	<0.0025	<0.0025	<0.0025	<0.0025
EX-6	13-Jan-03	<0.015	0.0088	<0.032	<0.0063	<0.0063	<0.0063	<0.13	<0.0063	<0.0063	<0.0063	<0.0063

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexanone	Acetone	Benzene	Chlorobenzene	Chloroform	cis-1,2-DCE	Ethylbenzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	13-Jan-03	<0.0063	<0.0063	<0.0063	<0.13	<0.13	0.018	<0.0063	<0.0063	<0.0063	0.93	<0.13	<0.0063	0.026	<0.0063	<0.0063	<0.0063	3.56
EX-6	14-Apr-03	<0.0036	<0.0036	<0.0036	<0.071	<0.071	0.01	<0.0036	0.019	<0.0036	0.15	<0.071	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	2.075
DUP	14-Apr-03	<0.0042	<0.0042	<0.0042	<0.083	<0.083	0.0095	<0.0042	<0.0042	<0.0042	0.14	<0.083	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	2.072
EX-6	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0043	<0.0005	<0.0005	0.0016	0.02	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0072
EX-6	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	0.015	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	0.0037
EX-6	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	0.0022	<0.01	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	0.048
DUP	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	0.0025	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	0.049
EX-6	06-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0045	<0.0005	<0.0005	0.001	0.067	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0866
EX-6	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0035	<0.0005	<0.0005	0.0013	0.0099	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0464
EX-6	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0028	<0.0005	<0.0005	0.0008	0.0034	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.1723
EX-6	21-Jan-05	<0.0042	<0.0042	<0.0042	<0.083	<0.083	0.0088	<0.0042	<0.0042	<0.0042	0.81	<0.083	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	2.03
EX-6	20-Apr-05	<0.002	<0.002	<0.002	<0.04	<0.04	0.0053	<0.002	<0.002	<0.002	0.36	<0.04	<0.002	<0.002	<0.002	<0.002	<0.002	1.3088
EX-6	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0013	0.0004 J	<0.0005	0.0011	0.012	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	0.0056
EX-6	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0006	0.0008	0.0009	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001
EX-6	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0029	0.0006	<0.0005	0.0008	0.32	<0.01	<0.0005	0.0007	0.0004 J	<0.0005	<0.0005	0.6718
EX-6	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0006	0.0017	<0.0005	0.0003 J	0.0094	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0393 J
EX-6	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0013	0.0004 J	<0.0005	0.0008	0.047	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0583 J
EX-6	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	0.05	0.0007	0.0003 J	<0.0005	0.0003 J	0.019	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	0.0044
EX-6	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0019	0.0005 J	<0.0005	0.0006	0.13	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005	<0.0005	0.35
EX-6	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0013	0.0004 J	<0.0005	0.0003 J	0.079	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	0.1803 J
EX-7	11-Sep-98	<0.1	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	0.54	<0.5	<0.1	3.6	<0.1	<0.1	<0.1	2.7
EX-7	22-Oct-98	<0.005	0.0072	<0.005	<0.025	<0.025	0.0083	<0.005	<0.005	<0.005	0.091	<0.025	<0.005	0.47	<0.005	<0.005	<0.005	0.32
EX-7	14-Jan-99	<0.001	0.012	<0.001	0.011	1.6	0.028	<0.001	<0.001	0.0068	0.21	0.86	<0.001	2.2	0.0008 J11	0.0006 J11	0.0015	1.43
EX-7	23-Apr-99	<0.0063	<0.0063	<0.0063	<0.031	0.95	0.0086	<0.0063	<0.0063	0.0056 J11	0.072	<0.36 U6	<0.0063	0.7	<0.0063	<0.0063	<0.0063	0.66
EX-7	15-Jul-99	<0.0005	0.018	<0.0005	<0.01	0.029	0.0025	<0.0005	<0.0005	0.0031	0.0036	<0.01	<0.0005	0.034	0.0014	<0.0005	<0.0005	0.075
EX-7	15-Oct-99	<0.0005	0.019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-7	19-Jan-00	<0.0005	0.0067	<0.0005	<0.01	<0.01	0.005	<0.0005	<0.0005	0.0049	<0.0005	<0.01	<0.0005	0.016	0.0019	<0.0005	0.0007	0.224
EX-7	26-Apr-00	<0.0005	0.0013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008
EX-7	26-Jul-00	<0.0008	0.0052	<0.0008	<0.017	0.29	0.013	<0.0008	<0.0008	0.0063	0.028	0.14	<0.0008	0.22	0.0022	<0.0008	<0.0008	0.498
EX-7	09-Oct-00	<0.001	0.0046	<0.001	<0.02	<0.02	0.02	<0.001	<0.001	0.0061	0.17	<0.02	<0.001	0.26	0.0017	<0.001	<0.001	0.502
EX-7	16-Jan-01	<0.0005	0.004	<0.0005	<0.01	0.019	0.0035	<0.0005	<0.0005	0.002	0.022	<0.01	<0.0005	0.052	0.001	<0.0005	<0.0005	0.154
EX-7	13-Apr-01	<0.0007	0.001	<0.0007	<0.014	0.021	0.0065	<0.0007	<0.0007	0.0015	0.072	<0.014	<0.0007	0.17	<0.0007	0.0012	<0.0007	0.349
EX-7	03-Jul-01	<0.0005	0.015	<0.0005	<0.01	<0.01	0.0046	<0.0005	<0.0005	0.0032	0.024	<0.01	<0.0005	0.0091	0.0016	<0.0005	<0.0005	0.09
EX-7	16-Oct-01	<0.0005	0.0056	<0.0005	<0.01	<0.01	0.015	<0.0005	<0.0005	0.002	0.09	<0.01	<0.0005	0.096	0.0006	0.0011	<0.0005	0.345
DUP	16-Oct-01	<0.0005	0.0056	<0.0005	<0.01	0.011	0.015	<0.0005	<0.0005	0.0019	0.087	<0.01	<0.0005	0.097	0.0006	0.001	<0.0005	0.335
EX-7	16-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	0.086	0.0044	<0.0005	<0.0005	0.0009	0.026	0.035	<0.0005	0.11	<0.0005	<0.0005	<0.0005	0.136
EX-7	09-Apr-02	<0.0005	0.018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	0.0013	<0.0005	<0.0005	0.0045
EX-7	09-Jul-02	0.0013	0.0056	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.026	0.0019	<0.0005	<0.01	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0009
EX-7	15-Aug-02	<0.0005	0.011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0068	0.0038	<0.0005	<0.01	<0.0005	<0.0005	0.0024	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	13-Jan-03	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.18	0.075	<0.13	<0.0063	<0.0063	<0.013	<0.013	<0.013	0.023	<0.0063
EX-6	14-Apr-03	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	0.096	0.036	<0.071	<0.0036	<0.0036	<0.0071	<0.0071	<0.0071	0.0059	<0.0036
DUP	14-Apr-03	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	0.089	0.033	<0.083	<0.0042	<0.0042	<0.0083	<0.0083	<0.0083	0.0062	<0.0042
EX-6	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0025	0.0013	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0012	<0.0005
EX-6	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0026	0.0011	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0019	<0.0009
EX-6	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.005	0.016	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.005	0.016	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-6	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.016	0.0067	<0.01	<0.0005	0.0056	<0.001	<0.001	<0.001	0.0062	0.0014
EX-6	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0032	0.0034	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0016	<0.0005
EX-6	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0087	0.0051	<0.01	<0.0005	0.003	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-6	21-Jan-05	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	0.21	0.078	<0.083	<0.0042	<0.0042	<0.0083	<0.0083	<0.0083	0.074	<0.0042
EX-6	20-Apr-05	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.11	0.041	<0.04	<0.002	<0.002	<0.004	<0.004	<0.004	0.037	0.012
EX-6	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018	0.0009	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0023	<0.0005
EX-6	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0004 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0003 J	<0.0005
EX-6	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.088	0.046	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.06	<0.0005
EX-6	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0045	0.0026	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0011	0.0025
EX-6	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0041	0.0021	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0046	<0.0005
EX-6	18-Apr-08	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	0.0022	0.0016	<0.01	<0.0005	0.024	<0.001	<0.001	<0.001	0.0022	<0.0005
EX-6	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.017	0.0092	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.014	<0.0005
EX-6	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0094	0.0063	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0081	<0.0005
EX-7	11-Sep-98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.25	<0.1	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EX-7	22-Oct-98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.031	0.0083	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
EX-7	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.21	0.073	0.23	<0.001	0.0046	<0.001	<0.001	<0.001	0.0083	0.0008 J11
EX-7	23-Apr-99	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.13	0.048	0.2	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063
EX-7	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0096	0.0072	0.011	<0.0005	0.016	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	19-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.039	0.066	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.0015
EX-7	26-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	0.013	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	26-Jul-00	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.17	0.063	0.073	<0.0008	0.0013	<0.0017	<0.0017	<0.0017	0.0009	<0.0008
EX-7	09-Oct-00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.23	0.068	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	0.014	<0.001
EX-7	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.047	0.042	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0017	<0.0005
EX-7	13-Apr-01	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	0.12	0.041	<0.014	<0.0007	<0.0007	<0.0014	<0.0014	<0.0014	0.0054	<0.0007
EX-7	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.037	0.013	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0012	<0.0005
EX-7	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.18	0.056	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0077	<0.0005
DUP	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.17	0.054	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0074	<0.0005
EX-7	16-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.028	0.016	0.018	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0018	<0.0005
EX-7	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0044	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	15-Aug-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	0.0009	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	13-Jan-03	<0.016	0.016	<0.035	<0.0063	<0.0063	<0.0063	<0.13	<0.0063	<0.0063	<0.0063	<0.0063
EX-6	14-Apr-03	0.01	0.0045	0.018	<0.0036	<0.0036	<0.0036	<0.071	<0.0036	<0.0036	<0.0036	<0.0036
DUP	14-Apr-03	0.0093	0.0049	0.017	<0.0042	<0.0042	<0.0042	<0.083	<0.0042	<0.0042	<0.0042	<0.0042
EX-6	07-Jul-03	<0.0005	0.0007	0.0028	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	29-Oct-03	0.0007	0.0012	0.0025	<0.0005	0.0009	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	23-Jan-04	0.0016	<0.0005	0.0031	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	23-Jan-04	0.0016	<0.0005	0.003	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	06-May-04	0.0022	0.005	0.0072	<0.0005	0.0009	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	14-Jul-04	0.0011	0.0007	0.0035	<0.0005	0.0005	0.0009	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	11-Oct-04	0.0007	<0.0005	0.003	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	21-Jan-05	0.011	0.075	0.027	<0.0042	0.0027 J	<0.0042	<0.083	<0.0042	<0.0042	<0.0042	<0.0042
EX-6	20-Apr-05	0.01	0.035	0.028	<0.002	0.0027	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
EX-6	22-Jul-05	0.0007	0.0015	0.0021	<0.0005	0.0009	0.0011	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	26-Oct-05	<0.0005	<0.0005	0.0014 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	27-Jan-06	0.0081	0.057	0.016	<0.0005	0.0024	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	20-Apr-06	<0.0005	0.0009	0.0021	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	17-Apr-07	0.0015	0.0034	0.0039	<0.0005	0.0015	0.0012	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	18-Apr-08	0.0006	0.0015	0.0024	0.0014	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	17-Apr-09	0.0017	0.012	0.0089	<0.0005	0.0029	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-6	27-Apr-10	0.001	0.007	0.0053	<0.0005	0.0017	0.0009	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-7	11-Sep-98	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	na	<0.1	<0.2	<0.1	<0.1
EX-7	22-Oct-98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	<0.01	<0.005	<0.005
EX-7	14-Jan-99	0.0015	0.0083	0.0092	<0.001	<0.001	<0.001	na	<0.001	0.0027	<0.001	<0.001
EX-7	23-Apr-99	<0.0063	<0.0063	0.0076	<0.0063	<0.0063	<0.0063	na	<0.0063	<0.013	<0.0063	<0.0063
EX-7	15-Jul-99	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0072	<0.0005	<0.0005
EX-7	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0075	<0.0005	<0.0005
EX-7	19-Jan-00	0.0016	<0.0005	0.0032	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0032	<0.0005	<0.0005
EX-7	26-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-7	26-Jul-00	<0.0022	<0.0008	<0.002	<0.0008	<0.0008	<0.0008	<0.017	<0.0008	<0.0008	<0.0008	<0.0008
EX-7	09-Oct-00	0.003	0.021	0.0087	<0.001	0.0011	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001
EX-7	16-Jan-01	0.0019	0.002	0.0021	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
EX-7	13-Apr-01	0.002	0.0068	0.0038	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	<0.0007	<0.0007	<0.0007
EX-7	03-Jul-01	0.0005	0.0011	0.0013	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0049	<0.0005	<0.0005
EX-7	16-Oct-01	0.0035	0.012	0.0066	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0029	<0.0005	<0.0005
DUP	16-Oct-01	0.0035	0.011	<0.0064	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.003	<0.0005	<0.0005
EX-7	16-Jan-02	<0.0005	0.0019	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-7	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0061	<0.0005	<0.0005
EX-7	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
EX-7	15-Aug-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.004	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-7	07-Nov-02	<0.0005	0.0027	<0.0005	<0.01	0.016	0.0082	<0.0005	0.012	0.0021	0.029	<0.01	<0.0005	0.029	0.0011	<0.0005	0.0007	0.095
EX-7	13-Jan-03	<0.0005	0.0023	<0.0005	<0.01	0.013	0.0069	<0.0005	0.0046	0.0028	0.083	<0.01	<0.0005	0.011	0.0014	0.0011	<0.0005	0.136
EX-7	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0043	<0.0005	0.0008	0.0016	0.055	<0.01	<0.0005	0.032	0.0007	<0.0005	<0.0005	0.165
EX-7	07-Jul-03	<0.0005	0.0038	<0.0005	<0.01	<0.01	0.0071	<0.0005	<0.0005	0.0049	0.04	<0.01	<0.0005	0.0009	0.0024	<0.0005	<0.0005	0.0103
EX-7	29-Oct-03	<0.0005	0.0034	<0.0005	<0.01	<0.01	0.0038	<0.0005	<0.0005	0.0053	0.0068	<0.01	<0.0005	<0.0005	0.003	<0.0005	<0.0005	0.0046
EX-7	23-Jan-04	<0.0005	0.0007	<0.0005	<0.01	<0.01	0.0079	<0.0005	<0.0005	0.0038	0.034	<0.01	<0.0005	0.0069	0.002	<0.0005	<0.0005	0.0583
EX-7	06-May-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	0.0025	<0.0005	<0.0005	0.0017	0.011	<0.01	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	0.0272
EX-7	14-Jul-04	<0.0005	0.0009	<0.0005	<0.01	<0.01	0.004	<0.0005	<0.0005	0.0048	0.0078	<0.01	<0.0005	<0.0005	0.0028	<0.0005	<0.0005	0.0124
EX-7	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
EX-7	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0019	<0.0005	<0.0005	0.0003 J	0.013	<0.01	<0.0005	0.0041	<0.0005	<0.0005	<0.0005	0.0303
EX-7	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0007	<0.0005	<0.0005	0.0005	0.0061	<0.01	<0.0005	0.0009	0.0005 J	<0.0005	<0.0005	0.0315
EX-7	22-Jul-05	<0.0005	0.0011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
EX-7	26-Oct-05	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.001
EX-7	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	0.0099 J	0.0032	<0.0005	<0.0005	0.0003 J	0.022	<0.01	<0.0005	0.0029	<0.0005	<0.0005	<0.0005	0.0202
DUP	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	0.011	0.0033	<0.0005	<0.0005	0.0003 J	0.023	<0.01	<0.0005	0.0035	<0.0005	<0.0005	<0.0005	0.0227
EX-7	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0047	<0.0005	<0.0005	0.0006	0.047	<0.01	<0.0005	0.017	<0.0005	<0.0005	<0.0005	0.085
DUP	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0028	<0.0005	<0.0005	0.0006	0.029	<0.01	<0.0005	0.011	<0.0005	<0.0005	<0.0005	0.063
EX-7	17-Apr-07	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	0.0012	0.0015	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	0.0024
EX-7	18-Apr-08	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	0.0005 J	0.0003 J	0.0004 J	<0.001
EX-7	17-Apr-09	<0.0005	0.0029	<0.0005	<0.01	<0.01	0.0011	<0.0005	0.0008	0.0019	0.0005	<0.01	<0.0005	<0.0005	0.0015	<0.0005	<0.0005	<0.001
EX-7	30-Apr-10	<0.0005	0.008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	0.0006	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.001
DUP	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0003 J	0.0007	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
EX-8	11-Sep-98	<5	<5	<5	<25	110	<5	<5	<5	<5	<5	62	<5	49	<5	<5	<5	<5
EX-8	22-Oct-98	<1.2	<1.2	<1.2	<6.2	62	<1.2	<1.2	<1.2	<1.2	<1.2	40	<1.2	28	<1.2	<1.2	<1.2	2.2
EX-8	14-Jan-99	<0.13	<0.13	<0.13	<0.63	42	<0.13	<0.13	<0.13	<0.13	0.067 J11	19	<0.13	6.2	<0.13	<0.13	<0.13	0.56
EX-8	23-Apr-99	<1.3	<1.3	<1.3	<6.3	190	<1.3	<1.3	<1.3	<1.3	0.91 J11	85	<1.3	66	<1.3	<1.3	<1.3	4.52 J11
EX-8	19-Jul-99	<0.42	<0.42	<0.42	<8.3	130	<0.42	<0.42	<0.42	<0.42	<0.42	58	<0.42	22	<0.42	<0.42	<0.42	1.94
EX-8	15-Oct-99	<0.25	<0.25	<0.25	<5	83	<0.25	<0.25	<0.25	<0.25	<0.25	29	<0.25	6.5	<0.25	<0.25	<0.25	<0.5
EX-8	21-Jan-00	<0.25	<0.25	<0.25	<5	44	<0.25	<0.25	<0.25	<0.25	<0.25	20	<0.25	12	<0.25	<0.25	<0.25	0.42
EX-8	26-Apr-00	<0.36	<0.36	<0.36	<7.1	100	<0.36	<0.36	<0.36	<0.36	<0.36	42	<0.36	7.7	<0.36	<0.36	<0.36	<0.72
EX-8	26-Jul-00	<0.42	<0.42	<0.42	<8.3	110	<0.42	<0.42	<0.42	<0.42	<0.42	45	<0.42	14	<0.42	<0.42	<0.42	0.57
EX-8	09-Oct-00	<0.36	<0.36	<0.36	<7.1	120	<0.36	<0.36	<0.36	<0.36	<0.36	56	<0.36	16	<0.36	<0.36	<0.36	1.1
EX-8	16-Jan-01	<0.25	<0.25	<0.25	<5	62	<0.25	<0.25	<0.25	<0.25	0.64	31	<0.25	62	<0.25	<0.25	<0.25	4.7
EX-8	16-Apr-01	<0.31	<0.31	<0.31	<6.3	75	0.33	<0.31	<0.31	<0.31	1.4	33	<0.31	98	<0.31	<0.31	<0.31	7.3
DUP	16-Apr-01	<0.31	<0.31	<0.31	<6.3	76	0.36	<0.31	<0.31	<0.31	1.4	33	<0.31	95	<0.31	<0.31	<0.31	7.4
EX-8	03-Jul-01	<0.5	<0.5	<0.5	<10	130	<0.5	<0.5	<0.5	<0.5	<0.5	51	<0.5	16	<0.5	<0.5	<0.5	1.2
EX-8	16-Oct-01	<0.31	<0.31	<0.31	<6.3	130 >LR	<0.31	<0.31	<0.31	<0.31	0.81	53	<0.31	62	<0.31	<0.31	<0.31	4.08
EX-8	09-Jan-02	<0.31	<0.31	<0.31	<6.3	60	0.32	<0.31	<0.31	<0.31	1.4	21	<0.31	95	<0.31	<0.31	<0.31	8.3
EX-8	10-Apr-02	<0.31	<0.31	<0.31	<6.3	86	<0.31	<0.31	<0.31	<0.31	<0.31	8.6	<0.31	2.5	<0.31	<0.31	<0.31	<0.62

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-7	07-Nov-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.052	0.0081	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0036	<0.0005
EX-7	13-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.094	0.02	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0063	<0.0005
EX-7	14-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.082	0.021	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.004	<0.0005
EX-7	07-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.036	0.0019	<0.01	<0.0005	0.0031	<0.001	<0.001	<0.001	0.0031	<0.0005
EX-7	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.011	0.0015	<0.01	<0.0005	0.0016	<0.001	<0.001	<0.001	0.001	<0.0005
EX-7	23-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.038	0.017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0026	<0.0005
EX-7	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.029	0.0068	<0.01	<0.0005	0.001	<0.001	<0.001	<0.001	0.0009	<0.0005
EX-7	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.027	0.0029	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0015	<0.0005
EX-7	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.03	0.0073	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0018	<0.0005
EX-7	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.014	0.0065	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	<0.0005
EX-7	22-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.038	0.011	0.011	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0048	<0.0005
DUP	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.04	0.011	0.012	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0052	<0.0005
EX-7	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.094	0.023	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0068	<0.0005
DUP	20-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.06	0.017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0038	0.0003 J
EX-7	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0005 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0003 J	<0.0005
EX-7	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-7	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0005 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.001	<0.0005
EX-7	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0004 J	<0.0005
DUP	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0015	<0.0005
EX-8	11-Sep-98	<5	<5	<5	<5	<5	<5	<5	<5	31	<5	<5	<5	<5	<5	<5	<5
EX-8	22-Oct-98	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	16	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
EX-8	14-Jan-99	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	6.9	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
EX-8	23-Apr-99	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	46	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
EX-8	19-Jul-99	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	29	<0.42	<0.42	<0.83	<0.83	<0.83	<0.42	<0.42
EX-8	15-Oct-99	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	15	<0.25	<0.25	<0.5	<0.5	<0.5	<0.25	<0.25
EX-8	21-Jan-00	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	9.5	<0.25	<0.25	<0.5	<0.5	<0.5	<0.25	<0.25
EX-8	26-Apr-00	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	21	<0.36	<0.36	<0.71	<0.71	<0.71	<0.36	<0.36
EX-8	26-Jul-00	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	28	<0.42	<0.42	<0.83	<0.83	<0.83	<0.42	<0.42
EX-8	09-Oct-00	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	35	<0.36	<0.36	<0.71	<0.71	<0.71	<0.36	<0.36
EX-8	16-Jan-01	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	20	<0.25	<0.25	<0.5	<0.5	<0.5	<0.25	<0.25
EX-8	16-Apr-01	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	0.34	<0.31	22	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31
DUP	16-Apr-01	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	0.37	<0.31	22	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31
EX-8	03-Jul-01	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	35	<0.5	<0.5	<1	<1	<1	<0.5	<0.5
EX-8	16-Oct-01	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	36	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31
EX-8	09-Jan-02	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	0.32	<0.31	21	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31
EX-8	10-Apr-02	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	14	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-7	07-Nov-02	<0.0005	0.0039	0.0022	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
EX-7	13-Jan-03	<0.0007	0.0079	<0.0043	<0.0005	0.0009	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
EX-7	14-Apr-03	0.0007	0.005	0.0023	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
EX-7	07-Jul-03	<0.0005	0.0034	0.0021	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.0005	<0.0005
EX-7	29-Oct-03	<0.0005	0.0009	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.0005	<0.0005
EX-7	23-Jan-04	0.001	0.0025	0.0045	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
EX-7	06-May-04	<0.0005	0.001	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
EX-7	14-Jul-04	<0.0005	0.0012	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
EX-7	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
EX-7	21-Jan-05	<0.0005	0.0022	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-7	20-Apr-05	0.0003 J	0.0006	0.001 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
EX-7	22-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0026	<0.0005	<0.0005
EX-7	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0038	<0.0005	<0.0005
EX-7	27-Jan-06	<0.0005	0.0061	0.0011 J	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Jan-06	<0.0005	0.0064	<0.002	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J
EX-7	20-Apr-06	0.0007	0.01	0.0019 J	<0.0005	0.0008	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
DUP	20-Apr-06	0.0006	0.0052	0.0014 J	<0.0005	0.0005 J	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
EX-7	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
EX-7	18-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-7	17-Apr-09	<0.0005	0.0007	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0031	<0.0005	<0.0005
EX-7	30-Apr-10	<0.0005	0.0004 J	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0055	<0.0005	<0.0005
DUP	30-Apr-10	0.0003 J	0.0003 J	<0.002	<0.0005	0.0059	0.0024	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
EX-8	11-Sep-98	<5	<5	<5	<5	<5	<5	na	<5	<10	<5	<5
EX-8	22-Oct-98	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	na	<1.2	<2.5	<1.2	<1.2
EX-8	14-Jan-99	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	na	<0.13	<0.25	<0.13	<0.13
EX-8	23-Apr-99	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	na	<1.3	<2.5	<1.3	<1.3
EX-8	19-Jul-99	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<8.3	<0.42	<0.42	<0.42	<0.42
EX-8	15-Oct-99	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<5	<0.25	<0.25	<0.25	<0.25
EX-8	21-Jan-00	<0.25	<0.25	<0.5	<0.25	<0.25	<0.25	<5	<0.25	<0.25	<0.25	<0.25
EX-8	26-Apr-00	<0.36	<0.36	<0.71	<0.36	<0.36	<0.36	<7.1	<0.36	<0.36	<0.36	<0.36
EX-8	26-Jul-00	<0.42	<0.42	<0.83	<0.42	<0.42	<0.42	<8.3	<0.42	<0.42	<0.42	<0.42
EX-8	09-Oct-00	<0.36	<0.36	<0.71	<0.36	<0.36	<0.36	<7.1	<0.36	<0.36	<0.36	<0.36
EX-8	16-Jan-01	<0.25	<0.25	<0.5	<0.25	<0.25	<0.25	<5	<0.25	<0.25	<0.25	<0.25
EX-8	16-Apr-01	<0.31	<0.31	<0.63	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31
DUP	16-Apr-01	<0.31	<0.31	<0.63	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31
EX-8	03-Jul-01	<0.5	<0.5	<1	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5
EX-8	16-Oct-01	<0.31	<0.31	<0.63	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31
EX-8	09-Jan-02	<0.31	<0.31	<0.63	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31
EX-8	10-Apr-02	<0.31	<0.31	<1.3	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-8	18-Dec-02	<0.0083	<0.0083	<0.0083	<0.17	4.2	0.035	<0.0083	<0.0083	<0.0083	0.61	2.2	<0.0083	3.2	<0.0083	<0.0083	<0.0083	2.5
EX-8	13-Jan-03	<0.13	<0.13	<0.13	<2.5	98	0.29	<0.13	<0.13	<0.13	0.36	38	<0.13	45	<0.13	<0.13	<0.13	1.97
EX-8	14-Apr-03	<0.1	<0.1	<0.1	<2	78	0.22	<0.1	<0.1	<0.1	0.22	34	<0.1	35	<0.1	<0.1	<0.1	1.23
EX-8	07-Jul-03	<0.31	<0.31	<0.31	<6.3	200	<0.31	<0.31	<0.31	<0.31	0.39	41	<0.31	24	<0.31	<0.31	<0.31	1.81
EX-8	29-Oct-03	<0.42	<0.42	<0.42	<8.3	150	<0.42	<0.42	<0.42	<0.42	<0.42	68	<0.42	2.6	<0.42	<0.42	<0.42	<0.84
EX-8	23-Jan-04	<0.17	<0.17	<0.17	<3.3	98	0.26	<0.17	<0.17	<0.17	0.21	35	<0.17	32	<0.17	<0.17	<0.17	1.07
EX-8	05-May-04	<0.25	<0.25	<0.25	<5	97	0.31	<0.25	<0.25	<0.25	0.81	44	<0.25	74	<0.25	<0.25	<0.25	4.23
EX-8	14-Jul-04	<0.63	<0.63	<0.63	<13	100	<0.63	<0.63	<0.63	<0.63	1.1	42	<0.63	100	<0.63	<0.63	<0.63	7.5
EX-8	14-Oct-04	<0.63	<0.63	<0.63	<13	100	<0.63	<0.63	<0.63	<0.63	<0.63	36	<0.63	4.5	<0.63	<0.63	<0.63	<1.26
EX-8	21-Jan-05	<0.31	<0.31	<0.31	<6.3	45	0.39	<0.31	<0.31	<0.31	1.5	16	<0.31	44	<0.31	<0.31	<0.31	8
EX-8	20-Apr-05	<1	<1	<1	<20	66	<1	<1	<1	<1	3	21	<1	130	<1	<1	<1	15.2
EX-8	22-Jul-05	<0.2	<0.2	<0.2	<4	86	0.14 J	<0.2	<0.2	<0.2	0.4	33	<0.2	32	<0.2	<0.2	<0.2	2.43
EX-8	26-Oct-05	<0.17	<0.17	<0.17	<3.3	150	0.13 J	<0.17	<0.17	<0.17	0.096 J	49	<0.17	11	<0.17	<0.17	<0.17	0.56
EX-8	27-Jan-06	<0.31	<0.31	<0.31	<6.3	44	<0.31	<0.31	<0.31	<0.31	0.61	13	<0.31	31	<0.31	<0.31	<0.31	4.1
EX-8	20-Apr-06	<0.25	<0.25	<0.25	<5	44	<0.25	<0.25	<0.25	<0.25	0.33	12	<0.25	16	<0.25	<0.25	<0.25	2.56
EX-8	18-Apr-07	<0.5	<0.5	<0.5	<10	100	0.25 J	<0.5	<0.5	<0.5	0.92	30	<0.5	62	<0.5	<0.5	<0.5	6
EX-8	18-Apr-08	<0.0005	0.015	<0.0005	<0.01	0.099	0.0006	<0.0005	<0.0005	0.028	0.0063	0.032	0.0008	0.076	0.011	0.013	<0.0005	0.0141
EX-8	17-Apr-09	<0.2	<0.2	<0.2	<4	90	0.17 J	<0.2	<0.2	<0.2	1	35	<0.2	53	<0.2	<0.2	<0.2	5.5
EX-8	30-Apr-10	<0.36	<0.36	<0.36	<7.1	69	<0.36	<0.36	<0.36	<0.36	0.53	14	<0.36	33	<0.36	<0.36	<0.36	3.83
EX-9	11-Sep-98	<0.2	<0.2	<0.2	<1	1.6	<0.2	<0.2	<0.2	<0.2	0.34	1.2	<0.2	7.3	<0.2	<0.2	<0.2	1.6
EX-9	22-Oct-98	<0.025	0.18	<0.025	<0.12	0.64	<0.025	<0.025	<0.025	<0.025	0.14	0.56	<0.025	2.1	<0.025	<0.025	<0.025	0.57
EX-9	14-Jan-99	<0.025	0.24	<0.025	<0.13	0.53	<0.025	<0.025	<0.025	<0.025	0.059	0.37	<0.025	3.5	<0.025	<0.025	<0.025	0.85
EX-9	23-Apr-99	<0.033	0.18	<0.033	<0.17	<1.3 U6	<0.033	<0.033	<0.033	<0.033	0.043	<0.4 U6	<0.033	5.4	<0.033	<0.033	<0.033	3.24
EX-9	15-Jul-99	<0.01	0.15	<0.01	<0.2	0.53	<0.01	<0.01	<0.01	<0.01	0.36	0.35	<0.01	2.6	<0.01	0.014	<0.01	1.4
EX-9	14-Oct-99	<0.0005	0.17	<0.0005	<0.01	0.11	0.002	<0.0005	<0.0005	0.0088	0.002	0.027	0.0007	0.032	0.0045	0.011	<0.0005	0.182
EX-9	21-Jan-00	<0.0005	0.12	<0.0005	<0.01	0.078	0.001	<0.0005	<0.0005	0.0084	<0.0005	0.036	0.0012	0.12 J	0.006	0.014	<0.0005	0.352 JJ
DUP	21-Jan-00	<0.0005	0.11	<0.0005	<0.01	0.064	<0.0005	<0.0005	<0.0005	0.0062	<0.0005	0.025	0.001	0.018 J	0.0051	0.012	<0.0005	0.233 JJ
EX-9	26-Apr-00	<0.0063	0.031	<0.0063	<0.13	1.3	0.0066	<0.0063	<0.0063	<0.0063	0.2	<0.13	<0.0063	1.4	<0.0063	<0.0063	<0.0063	0.59
EX-9	26-Jul-00	<0.017	0.12	<0.017	<0.33	2.3	<0.017	<0.017	<0.017	<0.017	0.028	0.58	<0.017	3.9	<0.017	<0.017	<0.017	1.67
EX-9	09-Oct-00	<0.0013	0.11	<0.0013	<0.025	0.054	<0.0013	<0.0013	<0.0013	0.015	0.05	<0.025	<0.0013	0.34	0.005	0.0065	<0.0013	0.229
EX-9	16-Jan-01	<0.013	0.11	<0.013	<0.25	1	<0.013	<0.013	<0.013	<0.013	0.061	0.48	<0.013	2.8	<0.013	0.017	<0.013	1.47
EX-9	13-Apr-01	<0.013	<0.013	<0.013	<0.25	3.7	<0.013	<0.013	<0.013	<0.013	0.031	1.9	<0.013	0.96	<0.013	<0.013	<0.013	0.324
EX-9	03-Jul-01	<0.025	0.06	<0.025	<0.5	6.9	<0.025	<0.025	<0.025	<0.025	0.16	2.5	<0.025	3.2	<0.025	<0.025	<0.025	1.67
EX-9	12-Oct-01	<0.002	0.024	<0.002	<0.04	0.62	<0.002	<0.002	<0.002	0.01	0.21	0.25	<0.002	0.1	0.0051	0.004	<0.002	0.377
EX-9	21-Jan-02	<0.0031	0.0053	<0.0031	<0.063	0.85	<0.0031	<0.0031	<0.0031	<0.0031	<0.0031	<0.063	<0.0031	0.0071	<0.0031	<0.0031	<0.0031	<0.0062
EX-9	09-Apr-02	<0.0005	0.008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0027
EX-9	30-Aug-02	<0.0031	0.057	<0.0031	<0.063	1.1	<0.0031	<0.0031	0.0046	0.01	0.39	0.47	<0.0031	1.7	0.0056	0.02	<0.0031	1.32
EX-9	12-Dec-02	<0.0005	0.1	<0.0005	<0.01	1.1	0.0022	<0.0005	<0.0005	0.01	0.036	0.24	0.0014	1.1	0.0051	0.012	<0.0005	1.78
EX-9	13-Jan-03	<0.017	0.054	<0.017	<0.33	3.7	<0.017	<0.017	<0.017	<0.017	0.97	1.4	<0.017	4.8	<0.017	<0.017	0.019	3.29

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-8	18-Dec-02	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	0.11	0.04	2.2	<0.0083	<0.0083	<0.017	<0.017	<0.017	0.017	<0.0083
EX-8	13-Jan-03	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	0.15	<0.13	37	<0.13	<0.13	<0.25	<0.25	<0.25	<0.13	<0.13
EX-8	14-Apr-03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	26	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1
EX-8	07-Jul-03	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	9.9	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31
EX-8	29-Oct-03	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	38	<0.42	<0.42	<0.83	<0.83	<0.83	<0.42	<0.42
EX-8	23-Jan-04	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	31	<0.17	<0.17	<0.33	<0.33	<0.33	<0.17	<0.17
EX-8	05-May-04	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	36	<0.25	<0.25	<0.5	<0.5	<0.5	<0.25	<0.25
EX-8	14-Jul-04	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	34	<0.63	<0.63	<1.3	<1.3	<1.3	<0.63	<0.63
EX-8	14-Oct-04	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	28	<0.63	<0.63	<1.3	<1.3	<1.3	<0.63	<0.63
EX-8	21-Jan-05	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	0.42	<0.31	18	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31
EX-8	20-Apr-05	<1	<1	<1	<1	<1	<1	1	<1	22	<1	0.59 J	<2	<2	<2	<1	<1
EX-8	22-Jul-05	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	29	<0.2	<0.2	<0.4	<0.4	<0.4	<0.2	<0.2
EX-8	26-Oct-05	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	51	<0.17	<0.17	<0.33	<0.33	<0.33	<0.17	<0.17
EX-8	27-Jan-06	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	0.35	<0.31	12	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31
EX-8	20-Apr-06	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.22 J	<0.25	10	<0.25	<0.25	<0.5	<0.5	<0.5	<0.25	<0.25
EX-8	18-Apr-07	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.27 J	<0.5	35	<0.5	<0.5	<1	<1	<1	<0.5	<0.5
EX-8	18-Apr-08	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	0.0039	0.0011	0.034	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0007	<0.0005
EX-8	17-Apr-09	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.32	<0.2	35	<0.2	<0.2	<0.4	<0.4	<0.4	<0.2	<0.2
EX-8	30-Apr-10	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	0.23 J	<0.36	19	<0.36	<0.36	<0.71	<0.71	<0.71	<0.36	<0.36
EX-9	11-Sep-98	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
EX-9	22-Oct-98	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	<0.025	0.13	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
EX-9	14-Jan-99	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.025	<0.025	<0.13	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
EX-9	23-Apr-99	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	0.18	0.051	0.19	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033
EX-9	15-Jul-99	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.088	0.024	<0.2	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01
EX-9	14-Oct-99	<0.0005	0.0019	<0.0005	<0.0005	<0.0005	<0.0005	0.025	0.012	0.026	<0.0005	0.0057	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-9	21-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.026	0.016	0.018	<0.0005	0.0025	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	21-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.018	0.013	0.017	<0.0005	0.0021	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-9	26-Apr-00	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.062	0.018	0.15	<0.0063	0.019	<0.013	<0.013	<0.013	<0.0063	<0.0063
EX-9	26-Jul-00	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	0.083	0.03	<0.33	<0.017	<0.017	<0.033	<0.033	<0.033	<0.017	<0.017
EX-9	09-Oct-00	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	0.027	0.0095	<0.025	<0.0013	0.0027	<0.0025	<0.0025	<0.0025	<0.0013	<0.0013
EX-9	16-Jan-01	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.093	0.031	<0.25	<0.013	<0.013	<0.025	<0.025	<0.025	<0.013	<0.013
EX-9	13-Apr-01	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.021	<0.013	0.69	<0.013	<0.013	<0.025	<0.025	<0.025	<0.013	<0.013
EX-9	03-Jul-01	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.11	0.036	0.86	<0.025	<0.025	<0.05	<0.05	<0.05	<0.025	<0.025
EX-9	12-Oct-01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.045	0.018	0.07	<0.002	<0.002	<0.004	<0.004	<0.004	0.0049	<0.002
EX-9	21-Jan-02	<0.0031	<0.0031	<0.0031	<0.0031	<0.0031	<0.0031	<0.0031	<0.0031	<0.063	<0.0031	<0.0031	<0.0063	<0.0063	<0.0063	<0.0031	<0.0031
EX-9	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0019	0.0006	<0.01	<0.0005	0.002	<0.001	0.0011	<0.001	<0.0005	<0.0005
EX-9	30-Aug-02	<0.0031	<0.0031	<0.0031	<0.0031	<0.0031	<0.0031	0.19	0.056	0.17	<0.0031	<0.0031	<0.0063	<0.0063	<0.0063	0.0084	<0.0031
EX-9	12-Dec-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.18	0.068	0.18	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0009	<0.0005
EX-9	13-Jan-03	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	0.3	0.099	0.56	<0.017	<0.017	<0.033	<0.033	<0.033	0.026	<0.017

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-8	18-Dec-02	<0.0083	0.016	<0.033	<0.0083	<0.0083	<0.0083	<0.17	<0.0083	<0.0083	<0.0083	<0.0083
EX-8	13-Jan-03	<0.13	<0.13	<0.5	<0.13	<0.13	<0.13	<2.5	<0.13	<0.13	<0.13	<0.13
EX-8	14-Apr-03	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1
EX-8	07-Jul-03	<0.31	<0.31	<1.3	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31
EX-8	29-Oct-03	<0.42	<0.42	<1.7	<0.42	<0.42	<0.42	<8.3	<0.42	<0.42	<0.42	<0.42
EX-8	23-Jan-04	<0.17	<0.17	<0.67	<0.17	<0.17	<0.17	<3.3	<0.17	<0.17	<0.17	<0.17
EX-8	05-May-04	<0.25	<0.25	<1	<0.25	<0.25	<0.25	<5	<0.25	<0.25	<0.25	<0.25
EX-8	14-Jul-04	<0.63	<0.63	<2.5	<0.63	<0.63	<0.63	<13	<0.63	<0.63	<0.63	<0.63
EX-8	14-Oct-04	<0.63	<0.63	<2.5	<0.63	<0.63	<0.63	<13	<0.63	<0.63	<0.63	<0.63
EX-8	21-Jan-05	<0.31	<0.31	<1.3	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31
EX-8	20-Apr-05	<1	<1	<4	<1	<1	<1	<20	<1	<1	<1	<1
EX-8	22-Jul-05	<0.2	<0.2	<0.8	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.2	<0.2
EX-8	26-Oct-05	<0.17	<0.17	<0.67	<0.17	<0.17	<0.17	<3.3	<0.17	<0.17	<0.17	<0.17
EX-8	27-Jan-06	<0.31	<0.31	<1.3	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31
EX-8	20-Apr-06	<0.25	<0.25	<1	<0.25	<0.25	<0.25	<5	<0.25	<0.25	<0.25	<0.25
EX-8	18-Apr-07	<0.5	<0.5	<2	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5
EX-8	18-Apr-08	<0.0005	0.0007	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0031	<0.0005	<0.0005
EX-8	17-Apr-09	<0.2	<0.2	<0.8	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.2	<0.2
EX-8	30-Apr-10	<0.36	<0.36	<1.4	<0.36	<0.36	<0.36	<7.1	<0.36	<0.36	<0.36	<0.36
EX-9	11-Sep-98	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	na	<0.2	<0.4	<0.2	<0.2
EX-9	22-Oct-98	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	na	<0.025	<0.05	<0.025	<0.025
EX-9	14-Jan-99	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	na	<0.025	<0.05	<0.025	<0.025
EX-9	23-Apr-99	<0.033	<0.033	<0.033	<0.033	<0.033	<0.033	na	<0.033	<0.067	<0.033	<0.033
EX-9	15-Jul-99	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.2	<0.01	<0.01	<0.01	<0.01
EX-9	14-Oct-99	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0053	<0.0005	<0.0005
EX-9	21-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.004	<0.0005	<0.0005
DUP	21-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0037	<0.0005	<0.0005
EX-9	26-Apr-00	<0.0063	<0.0063	<0.013	<0.0063	<0.0063	<0.0063	<0.13	<0.0063	<0.0063	<0.0063	<0.0063
EX-9	26-Jul-00	<0.017	<0.017	<0.033	<0.017	<0.017	<0.017	<0.33	<0.017	<0.017	<0.017	<0.017
EX-9	09-Oct-00	<0.0013	0.0013	<0.0025	<0.0013	<0.0013	<0.0013	<0.025	<0.0013	0.0043	<0.0013	<0.0013
EX-9	16-Jan-01	<0.013	<0.013	<0.025	<0.013	<0.013	<0.013	<0.25	<0.013	<0.013	<0.013	<0.013
EX-9	13-Apr-01	<0.013	<0.013	<0.025	<0.013	<0.013	<0.013	<0.25	<0.013	<0.013	<0.013	<0.013
EX-9	03-Jul-01	<0.025	<0.025	<0.05	<0.025	<0.025	<0.025	<0.5	<0.025	<0.025	<0.025	<0.025
EX-9	12-Oct-01	<0.002	0.0053	<0.004	<0.002	<0.002	<0.002	<0.04	<0.002	0.0033	<0.002	<0.002
EX-9	21-Jan-02	<0.0031	<0.0031	<0.0063	<0.0031	<0.0031	<0.0031	<0.063	<0.0031	<0.0031	<0.0031	<0.0031
EX-9	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0031	<0.0005	<0.0005
EX-9	30-Aug-02	<0.0031	0.012	<0.013	<0.0031	<0.0031	<0.0031	<0.063	<0.0031	0.0034	<0.0031	<0.0031
EX-9	12-Dec-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0024	<0.0005	<0.0005
EX-9	13-Jan-03	<0.017	0.019	<0.067	<0.017	<0.017	<0.017	<0.33	<0.017	<0.017	<0.017	<0.017

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
EX-9	14-Apr-03	<0.01	0.03	<0.01	<0.2	2	<0.01	<0.01	<0.01	<0.01	0.61	0.71	<0.01	2.8	<0.01	<0.01	<0.01	1.88
EX-9	07-Jul-03	<0.036	<0.036	<0.036	<0.71	8.8	<0.036	<0.036	<0.036	<0.036	0.38	2.7	<0.036	0.57	<0.036	<0.036	<0.036	1.22
EX-9	29-Oct-03	<0.01	0.034	<0.01	<0.2	2.2	<0.01	<0.01	<0.01	0.011	0.26	0.8	<0.01	0.55	<0.01	<0.01	<0.01	0.781
EX-9	23-Jan-04	<0.02	0.023	<0.02	<0.4	5.4	<0.02	<0.02	<0.02	<0.02	1	2.6	<0.02	5.7	<0.02	<0.02	<0.02	4.1
EX-9	06-May-04	<0.0083	0.028	<0.0083	<0.17	2.7	<0.0083	<0.0083	<0.0083	0.016	0.42	1.1	<0.0083	1.1	<0.0083	0.023	<0.0083	1.61
EX-9	14-Jul-04	<0.017	0.025	<0.017	<0.33	2.4	<0.017	<0.017	<0.017	<0.017	0.33	0.82	<0.017	1.1	<0.017	<0.017	<0.017	1.21
EX-9	14-Oct-04	<0.002	0.021	<0.002	<0.04	0.34	<0.002	<0.002	<0.002	0.012	0.16	0.12	<0.002	0.74	0.0058	0.0094	<0.002	1.05
EX-9	21-Jan-05	<0.05	<0.05	<0.05	<1	14	<0.05	<0.05	<0.05	<0.05	1.3	7.4	<0.05	6.7	<0.05	<0.05	<0.05	5
EX-9	20-Apr-05	<0.031	0.017 J	<0.031	<0.63	17	<0.031	<0.031	<0.031	<0.031	0.55	4.2	<0.031	3	<0.031	<0.031	<0.031	2.03
EX-9	22-Jul-05	<0.0083	0.011	<0.0083	<0.17	8.7	<0.0083	<0.0083	<0.0083	0.0091	0.025	1.9	<0.0083	1.4	<0.0083	0.0048 J	<0.0083	0.81
EX-9	26-Oct-05	<0.0005	0.03	<0.0005	<0.01	<0.01	0.0007	<0.0005	<0.0005	0.024	0.0011	<0.01	0.0005 J	0.001	0.012	0.013	<0.0005	0.0073
EX-9	27-Jan-06	<0.017	0.013 J	<0.017	<0.33	2.8	<0.017	<0.017	<0.017	0.017 J	0.11	0.94	<0.017	0.65	<0.017	<0.017	<0.017	0.68
EX-9	20-Apr-06	<0.025	0.015 J	<0.025	<0.5	10	<0.025	<0.025	<0.025	0.016 J	0.35	3	<0.025	2.3	<0.025	<0.025	<0.025	2.01
EX-9	17-Apr-07	<0.0005	0.0065	<0.0005	<0.01	<0.01	0.0007	<0.0005	<0.0005	0.025	0.11	<0.01	0.0005 J	0.011	0.0088	0.0051	<0.0005	0.138
EX-9	18-Apr-08	<0.0005	0.015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.03	0.0021	<0.01	0.0006	<0.0005	0.011	0.012	<0.0005	<0.001
EX-9	17-Apr-09	<0.0005	0.012	<0.0005	<0.01	0.013	<0.0005	<0.0005	<0.0005	0.026	0.0059	<0.01	0.0007	0.0003 J	0.009	0.01	<0.0005	0.0007
EX-9	30-Apr-10	<0.0005	0.008	<0.0005	<0.01	0.072	0.0003 J	<0.0005	<0.0005	0.017	0.036	0.02	0.0006	0.015	0.0062	0.0083	<0.0005	0.0173
LF-1	01-Jun-89	<0	<0.2	na	15	30	<0.2	<0.2	na	na	0.9	20	<0.2	6	na	<0.2	na	3.6
LF-1	07-Dec-89	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	0.002	<0.001	na	<0.001	na	0.04
LF-1	20-Jul-90	<0	<0.001	na	<0.001	0.45	0.002	<0.001	na	0.001	<0.001	0.2	0.005	0.018	na	0.004	na	0.16
LF-1	21-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	0.019	<0.02	0.002	<0.005	na	<0.005	na	0.01
LF-1	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	0.008	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-1	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-10	05-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	07-Dec-89	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-10	19-Jul-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
DUP	19-Jul-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-10	19-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
DUP	19-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-10	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	21-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-10	18-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
DUP	18-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-10	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-10	31-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
DUP	31-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-10	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-10	06-Jan-94	<0	<0.003	<0.003	<0.03	<0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.05	<0.003	<0.003	<0.003	<0.003	<0.005	<0.005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mgLl)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
EX-9	14-Apr-03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.16	0.05	0.22	<0.01	<0.01	<0.02	<0.02	<0.02	0.017	<0.01
EX-9	07-Jul-03	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	0.089	<0.036	<0.71	<0.036	<0.036	<0.071	<0.071	<0.071	<0.036	<0.036
EX-9	29-Oct-03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.023	0.014	<0.2	<0.01	<0.01	<0.02	<0.02	<0.02	<0.01	<0.01
EX-9	23-Jan-04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.42	0.12	1.6	<0.02	<0.02	<0.04	<0.04	<0.04	0.023	<0.02
EX-9	06-May-04	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	0.19	0.062	0.46	<0.0083	<0.0083	<0.017	<0.017	<0.017	0.0096	<0.0083
EX-9	14-Jul-04	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	0.15	0.046	<0.33	<0.017	<0.017	<0.033	<0.033	<0.033	<0.017	<0.017
EX-9	14-Oct-04	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.16	0.051	0.051	<0.002	<0.002	<0.004	<0.004	<0.004	0.0025	<0.002
EX-9	21-Jan-05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.56	0.16	3.6	<0.05	<0.05	<0.1	<0.1	<0.1	0.032 J	<0.05
EX-9	20-Apr-05	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	0.23	0.065	2.9	<0.031	<0.031	<0.063	<0.063	<0.063	<0.031	<0.031
EX-9	22-Jul-05	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	0.081	0.028	1	<0.0083	<0.0083	<0.017	<0.017	<0.017	<0.0083	<0.0083
EX-9	26-Oct-05	0.0003 J	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	0.0053	0.001	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
EX-9	27-Jan-06	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	0.11	0.036	0.48	<0.017	<0.017	<0.033	<0.033	<0.033	<0.017	<0.017
EX-9	20-Apr-06	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.25	0.076	1.9	<0.025	<0.025	<0.05	<0.05	<0.05	<0.025	<0.025
EX-9	17-Apr-07	<0.0005	0.0005 J	<0.0005	<0.0005	<0.0005	<0.0005	0.049	0.017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.004	<0.0005
EX-9	18-Apr-08	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0003 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0004 J	<0.0005
EX-9	17-Apr-09	<0.0005	0.0005 J	<0.0005	<0.0005	<0.0005	<0.0005	0.0042	0.002	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0005	<0.0005
EX-9	30-Apr-10	<0.0005	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	0.033	0.011	0.0075 J	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0017	<0.0005
LF-1	01-Jun-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-1	07-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-1	20-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-1	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-1	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-1	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	05-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	07-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	19-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	19-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	18-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	18-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	31-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	31-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-10	06-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
EX-9	14-Apr-03	<0.01	0.019	<0.04	<0.01	<0.01	<0.01	<0.2	<0.01	<0.01	<0.01	<0.01
EX-9	07-Jul-03	<0.036	<0.036	<0.14	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.036	<0.036
EX-9	29-Oct-03	<0.01	0.015	<0.04	<0.01	<0.01	<0.01	<0.2	<0.01	<0.01	<0.01	<0.01
EX-9	23-Jan-04	<0.02	0.033	<0.08	<0.02	<0.02	<0.02	<0.4	<0.02	<0.02	<0.02	<0.02
EX-9	06-May-04	<0.0083	0.014	<0.033	<0.0083	<0.0083	<0.0083	<0.17	<0.0083	<0.0083	<0.0083	<0.0083
EX-9	14-Jul-04	<0.017	<0.017	<0.067	<0.017	<0.017	<0.017	<0.33	<0.017	<0.017	<0.017	<0.017
EX-9	14-Oct-04	<0.002	0.0024	<0.008	<0.002	<0.002	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
EX-9	21-Jan-05	<0.05	0.042 J	<0.2	<0.05	<0.05	<0.05	<1	<0.05	<0.05	<0.05	<0.05
EX-9	20-Apr-05	<0.031	0.018 J	<0.13	<0.031	<0.031	<0.031	<0.63	<0.031	<0.031	<0.031	<0.031
EX-9	22-Jul-05	<0.0083	<0.0083	<0.033	<0.0083	<0.0083	<0.0083	<0.17	<0.0083	<0.0083	<0.0083	<0.0083
EX-9	26-Oct-05	<0.0005	<0.0005	0.0014 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0036	<0.0005	<0.0005
EX-9	27-Jan-06	<0.017	<0.017	<0.067	<0.017	<0.017	<0.017	<0.33	<0.017	<0.017	<0.017	<0.017
EX-9	20-Apr-06	<0.071	<0.025	<0.1	<0.025	<0.025	<0.025	<0.5	<0.025	<0.025	<0.025	<0.025
EX-9	17-Apr-07	0.0005 J	0.0044	0.0016 J	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	0.0033	<0.0005	0.0003 J
EX-9	18-Apr-08	<0.0005	0.0004 J	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.003	<0.0005	<0.0005
EX-9	17-Apr-09	<0.0005	0.0007	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.0005	<0.0005
EX-9	30-Apr-10	<0.0005	0.0026	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-1	01-Jun-89	na	na	0.018	na	na	na	na	na	na	na	na
LF-1	07-Dec-89	na	na	<0.004	na	na	na	na	na	na	na	na
LF-1	20-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-1	21-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
LF-1	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-1	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-10	05-Dec-89	na	na	0.14	na	na	na	na	na	na	na	na
LF-10	07-Dec-89	na	na	na	na	na	na	na	na	na	na	na
LF-10	19-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
DUP	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na
LF-10	19-Dec-90	na	na	na	na	na	na	na	na	na	na	na
DUP	19-Dec-90	na	na	na	na	na	na	na	na	na	na	na
LF-10	21-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
DUP	21-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-10	21-Jun-91	na	na	<0.01	na	na	na	na	na	na	na	na
LF-10	18-Dec-91	na	na	na	na	na	na	na	na	na	na	na
DUP	18-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-10	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-10	31-Dec-92	na	na	na	na	na	na	na	na	na	na	na
DUP	31-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-10	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-10	06-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	06-Jan-94	<0	<0.003	<0.003	<0.03	<0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.05	<0.003	<0.003	<0.003	<0.003	<0.005	<0.005
LF-10	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	0.011	<0.001	<0.001	0.0022	0.0017	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	0.0062
LF-10	15-Jan-99	<0.001	<0.001	<0.001	<0.005	0.035	<0.001	<0.001	<0.001	0.0009 J11	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	0.0006 J11	<0.001
LF-10	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	0.016	<0.0005	<0.0005	<0.0005	0.0005	0.0017	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0032
LF-10	23-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-10	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-10	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-10	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-10	14-Oct-04	<0.0005	0.003	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
LF-10	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-10	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-10	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-10	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-10	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	05-Dec-89	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.002	na	<0.001	na	<0.001
DUP	05-Dec-89	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.023	na	<0.001	na	<0.001
LF-11	19-Jul-90	<0	<0.001	na	<0.001	0.015	<0.001	<0.001	na	na	<0.001	<0.02	0.001	<0.001	na	<0.001	na	<0.001
LF-11	08-Aug-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	21-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-11	21-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
DUP	21-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-11	17-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-11	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-11	31-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-11	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-11	05-Jan-94	<0	<0.003	<0.003	<0.03	<0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.05	<0.003	<0.003	<0.003	<0.003	<0.005	<0.005
LF-11	16-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-11	31-Jul-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-11	20-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-11	18-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	18-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-11	11-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-11	19-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	19-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-11	17-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	0.024
LF-11	02-Mar-98	<0	<0.001	<0.001	<0.02	<0.02	0.0085	<0.001	<0.001	<0.001	0.14	<0.02	<0.001	0.31 J1	<0.001	0.0014	<0.002	0.513 J1
LF-11	10-Apr-98	<0	<0.01	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	0.1	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.47
DUP	10-Apr-98	<0	<0.005	<0.005	<0.025	<0.025	0.0078	<0.005	<0.005	<0.005	0.1	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	0.47

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	06-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na
LF-10	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-10	15-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-10	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	<0.0005
LF-10	23-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-10	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-10	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-10	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-10	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	0.0005	<0.001	<0.001	<0.001	0.0007	<0.0005
LF-10	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-10	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-10	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-10	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-10	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	05-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	05-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	08-Aug-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	31-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	05-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na
LF-11	16-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-11	31-Jul-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-11	20-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-11	18-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	18-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-11	11-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	0.016	<0.01	<0.01	na	na	na
LF-11	19-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	19-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-11	17-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-11	02-Mar-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0025	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	0.0028	<0.001
LF-11	10-Apr-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
DUP	10-Apr-98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	06-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003
LF-10	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-10	15-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0007 J11	na	<0.001	<0.002	<0.001	<0.001
LF-10	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0011	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	23-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.001	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0009	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0009 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	0.001	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0012	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0015	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0015	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	15-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-10	26-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	05-Dec-89	na	na	<0.002	na	na	na	na	na	na	na	na
DUP	05-Dec-89	na	na	na	na	na	na	na	na	na	na	na
LF-11	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na
LF-11	08-Aug-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-11	21-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-11	21-Jun-91	na	na	<0.01	na	na	na	na	na	na	na	na
DUP	21-Jun-91	na	na	<0.01	na	na	na	na	na	na	na	na
LF-11	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-11	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-11	31-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-11	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-11	05-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003
LF-11	16-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-11	31-Jul-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-11	20-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-11	18-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	18-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-11	11-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-11	19-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	19-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-11	17-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-11	02-Mar-98	<0.001	0.0012	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-11	10-Apr-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	na	<0.01	<0.02	<0.01	<0.01
DUP	10-Apr-98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	<0.01	<0.005	<0.005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-11	16-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-11	23-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-11	14-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-11	22-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	22-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-11	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	01-May-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	<0.001
LF-11	10-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	10-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	04-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	21-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	0.0077 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	07-Jul-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
LF-11	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-11	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-11	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-11	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-11	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-11	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	01-May-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-11	10-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	10-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	21-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	07-Jul-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-11	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-11	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-11	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005 J11	na	<0.001	<0.002	<0.001	<0.001
LF-11	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-11	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	20-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	01-May-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	22-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	06-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	16-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
LF-11	10-Apr-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	10-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	20-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	10-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	28-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	11-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	20-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	20-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	21-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	07-Jul-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-11	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-11	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-12	06-Dec-89	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.005	na	<0.001	na	<0.001
LF-12	18-Jul-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	0.001	<0.001	na	0.002	na	<0.001
LF-12	19-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	0.002	<0.001	na	0.003	na	<0.001
LF-12	19-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	0.002	na	<0.005
LF-12	16-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-12	08-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-12	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	30-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-12	08-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-12	06-Jan-94	<0	<0.003	<0.003	<0.03	<0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.05	<0.003	<0.003	<0.003	<0.003	<0.005	<0.005
LF-12	16-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-12	30-Jul-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-12	20-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-12	17-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-12	01-Jul-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	01-Jul-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-12	20-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-12	18-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-12	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	0.0018	<0.001	<0.001	0.0017	<0.002	<0.002
LF-12	08-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0022	<0.001	<0.001	0.0018	<0.001	<0.001
LF-12	14-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0014	<0.001	<0.001	0.0015	<0.001	<0.001
LF-12	21-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0013	<0.001	<0.001	0.0012	<0.001	<0.001
LF-12	12-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0015	<0.001	<0.001	0.0014	<0.001	<0.001
LF-12	20-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0017	<0.001	<0.001	0.0015	<0.001	<0.001
LF-12	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0014	<0.0005	<0.0005	0.0011	<0.0005	<0.001
LF-12	11-Oct-99	0.0008	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0024	<0.0005	<0.0005	0.0013	<0.0005	<0.001
LF-12	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.0005	0.0007	<0.0005	<0.001
LF-12	24-Jan-01	0.0007	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0017	<0.0005	<0.0005	0.0016	<0.0005	<0.001
LF-12	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.001	<0.0005	<0.0005	0.0008	<0.0005	<0.001
LF-12	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	<0.001
LF-12	16-Jan-03	0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0012	<0.0005	<0.0005	0.001	<0.0005	<0.001
LF-12	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0013	<0.0005	<0.0005	0.0009	<0.0005	<0.001
LF-12	18-Jan-05	0.0003 J	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0014	<0.0005	<0.0005	0.0008	<0.0005	<0.001
LF-12	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0013	<0.0005	<0.0005	0.0009	<0.0005	<0.001
LF-12	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.001	<0.0005	<0.0005	0.0005 J	<0.0005	<0.001
LF-12	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-12	13-Apr-09	<0.0005	<0.0005	0.0003 J	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0005 J	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-11	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-11	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	06-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	18-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	19-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	19-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	08-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	06-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na
LF-12	16-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-12	30-Jul-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-12	20-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-12	17-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-12	01-Jul-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	01-Jul-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-12	20-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-12	18-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-12	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-12	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-12	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-12	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-12	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-12	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-12	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-12	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-11	15-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-11	27-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	06-Dec-89	na	na	<0.002	na	na	na	na	na	na	na	na
LF-12	18-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-12	19-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-12	19-Jun-91	na	na	<0.012	na	na	na	na	na	na	na	na
LF-12	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-12	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na
LF-12	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-12	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-12	08-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-12	06-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003
LF-12	16-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-12	30-Jul-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-12	20-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-12	17-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-12	01-Jul-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	01-Jul-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-12	20-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-12	18-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-12	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-12	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-12	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-12	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-12	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-12	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-12	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
LF-12	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	26-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	18-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	13-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	13-Apr-09	<0.0005	<0.0005	0.0003 J	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0005 J	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
LF-12	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0007	<0.0005	<0.0005	0.0005	<0.0005	<0.001
LF-12	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0013	<0.0005	<0.0005	0.0008	<0.0005	<0.001
LF-12	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	0.0014	<0.0005	<0.0005	0.001	<0.0005	<0.001
LF-12	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005 J	<0.0005	<0.01	0.0014	<0.0005	<0.0005	0.0011	<0.0005	<0.001
LF-13	06-Dec-89	0.029	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.002	na	<0.001	na	<0.001
LF-13	18-Jul-90	0.056	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	0.001	0.002	na	<0.001	na	0.001
LF-13	19-Dec-90	0.042	0.002	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	0.002	<0.001	na	<0.001	na	<0.001
LF-13	19-Jun-91	0.032	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-13	16-Dec-91	0.018	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-13	08-Jul-92	0.01	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-13	30-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-13	08-Jun-93	0.008	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-13	05-Jan-94	0.004	<0.003	<0.003	<0.03	<0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.05	<0.003	<0.003	<0.003	<0.003	<0.005	<0.005
LF-13	16-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-13	30-Jul-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	30-Jul-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-13	20-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-13	17-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	17-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-13	12-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-13	19-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-13	18-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-13	25-Feb-98	0.0025	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	0.015	<0.002	<0.002
LF-13	07-Apr-98	0.0047	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	0.0061	<0.001	<0.001
DUP	07-Apr-98	0.0048	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	0.0085	<0.001	<0.001
LF-13	13-Jul-98	0.0047	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-13	19-Oct-98	0.0049 J2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	<0.005 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	0.001 J2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2
LF-13	11-Jan-99	0.0049	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.001 J11	<0.001	<0.001	<0.001	<0.001	<0.001
LF-13	19-Apr-99	0.0059	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0009 J11	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	19-Apr-99	0.0057	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.001 J11	<0.001	<0.001	<0.001	<0.001	<0.001
LF-13	13-Jul-99	0.0007	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	12-Oct-99	0.0055	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0019	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	14-Jan-00	0.0049	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	18-Jan-01	0.0036	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	10-Jan-02	0.0017	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	10-Jan-02	0.0019	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	16-Jan-03	0.0012	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	16-Jan-03	0.0012	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-12	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	06-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-13	18-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-13	19-Dec-90	0.002	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-13	19-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-13	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-13	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-13	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-13	08-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-13	05-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na
LF-13	16-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-13	30-Jul-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	30-Jul-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-13	20-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-13	17-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	17-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-13	12-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-13	19-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-13	18-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-13	25-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-13	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-13	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-13	19-Oct-98	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2
LF-13	11-Jan-99	0.0005 J11	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-13	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	19-Apr-99	0.0006 J11	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-13	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	18-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	13-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	23-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-12	24-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	06-Dec-89	na	na	<0.002	na	na	na	na	na	na	na	na
LF-13	18-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-13	19-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-13	19-Jun-91	na	na	<0.01	na	na	na	na	na	na	na	na
LF-13	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-13	08-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-13	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-13	08-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-13	05-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003
LF-13	16-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-13	30-Jul-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	30-Jul-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-13	20-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-13	17-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	17-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-13	12-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-13	19-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-13	18-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-13	25-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-13	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-13	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-13	19-Oct-98	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	na	<0.001 UJ2	<0.002 UJ2	<0.001 UJ2	<0.001 UJ2
LF-13	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-13	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-13	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	14-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	18-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-13	20-Jan-04	0.0009 J	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	18-Jan-05	0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	25-Jan-06	0.0004 J	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	16-Apr-07	0.0003 J	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
DUP	16-Apr-07	0.0003 J	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-13	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-14	04-Sep-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-14	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	21-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-14	20-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-14	17-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-14	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-14	31-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-14	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-15	04-Sep-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-15	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	21-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-15	20-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-15	17-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-15	08-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-15	30-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-15	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-16	04-Sep-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-16	20-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-16	20-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-16	17-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-16	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-16	30-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-16	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-17	02-Mar-98	<0	<0.001	<0.001	<0.02	<0.02	0.042	<0.001	<0.001	0.017	0.043	<0.02	<0.001	0.028	0.017	<0.001	0.012	0.054
LF-17	10-Apr-98	<0	<0.01	<0.01	<0.05	<0.05	0.052	<0.01	<0.01	0.032	0.048	<0.05	<0.01	<0.01	0.02	<0.01	0.016	0.076
LF-17	16-Jul-98	<0.01	<0.01	<0.01	<0.05	<0.05	0.048	<0.01	<0.01	0.024	0.054	<0.05	<0.01	0.12	0.015	<0.01	0.012	0.13
LF-17	23-Oct-98	<0.001	0.0014	<0.001	<0.005	<0.005	0.046	<0.001	<0.001	0.021	0.035	<0.005	<0.001	0.0042	0.016	<0.001	0.013	0.062
LF-17	15-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	0.058	<0.001	<0.001	0.015	0.042	<0.005	<0.001	0.0038	0.018	<0.001	0.011	0.0452
LF-17	22-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	0.061	<0.001	<0.001	0.013	0.045	<0.005	<0.001	0.0029	0.016	<0.001	0.0084	0.0794
LF-17	16-Jul-99	<0.001	<0.001	<0.001	<0.02	<0.02	0.049	<0.001	<0.001	0.0068	0.037	<0.02	<0.001	0.0024	0.014	<0.001	0.0023	0.0657
LF-17	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.041	<0.0005	<0.0005	0.0056	0.034	<0.01	<0.0005	0.0024	0.015	<0.0005	0.0043	0.0598
DUP	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.041	<0.0005	<0.0005	0.0057	0.034	<0.01	<0.0005	0.0024	0.015	<0.0005	0.0043	0.0598

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-13	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	25-Jan-06	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	16-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-13	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-14	04-Sep-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	31-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-14	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	04-Sep-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-15	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-16	04-Sep-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-16	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-16	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-16	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-16	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-16	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-16	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-17	02-Mar-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	0.0017	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	0.0074	0.014
LF-17	10-Apr-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.028	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.016	<0.01
LF-17	16-Jul-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.041	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.024	0.051
LF-17	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.028	0.0029	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.016	0.023
LF-17	15-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.028	0.0024	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.016	0.023
LF-17	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.036	0.0032	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.021	0.028
LF-17	16-Jul-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.024	0.0022	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	0.013	0.024
LF-17	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0014	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0089	0.014
DUP	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.013	0.0014	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0089	0.013

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-13	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	16-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-13	13-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-14	04-Sep-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-14	20-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-14	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na
LF-14	20-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
LF-14	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-14	08-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-14	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na
LF-14	31-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-14	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-15	04-Sep-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-15	20-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-15	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na
LF-15	20-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
LF-15	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-15	08-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-15	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-15	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-16	04-Sep-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-16	20-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-16	20-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
LF-16	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-16	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-16	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-16	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-17	02-Mar-98	0.0037	0.0052	0.11	<0.001	0.0052	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-17	10-Apr-98	<0.01	0.017	0.29	<0.01	<0.01	<0.01	na	<0.01	<0.02	<0.01	<0.01
LF-17	16-Jul-98	0.019	0.031	0.37	<0.01	0.016	<0.01	na	<0.01	<0.02	<0.01	<0.01
LF-17	23-Oct-98	0.011	0.021	0.38	<0.001	0.0084	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-17	15-Jan-99	0.0084	0.017	0.27	<0.001	0.0073	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-17	22-Apr-99	0.011	0.023	0.39	<0.001	0.0095	0.0006 J11	na	<0.001	<0.002	<0.001	<0.001
LF-17	16-Jul-99	0.0074	0.013	0.27	<0.001	0.0073	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001
LF-17	13-Oct-99	0.0047	0.0082	0.18	<0.0005	0.0054	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	13-Oct-99	0.0047	0.0081	0.18	<0.0005	0.0053	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-17	20-Jan-00	<0.001 UJ	<0.001 UJ	<0.001 UJ	<0.02 UJ	<0.02 UJ	0.054 J	<0.001 UJ	<0.001 UJ	0.012 J	0.037 J	<0.02 UJ	<0.001 UJ	0.0028 J	0.014 J	<0.001 UJ	0.0075 J	0.048 J
LF-17	23-Jan-01	<0.001	<0.001	<0.001	<0.02	<0.02	0.051	<0.001	<0.001	0.0055	0.035	<0.02	<0.001	0.0024	0.012	<0.001	0.0036	0.0385
LF-17	10-Jan-02	<0.0008	<0.0008	<0.0008	<0.016	<0.016	0.039	<0.0008	<0.0008	0.0032	0.025	<0.016	<0.0008	0.0014	0.0072	<0.0008	0.0026	0.033
LF-17	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.052 J	<0.0005	<0.0005	0.0029 J	0.065 J	<0.01	<0.0005	0.0015 J	0.01 J	<0.0005	0.0016 J	0.176 JJ
LF-17	22-Jan-04	<0.0017	<0.0017	<0.0017	<0.033	<0.033	0.042	<0.0017	<0.0017	0.0024	0.047	<0.033	<0.0017	0.0018	0.0083	<0.0017	<0.0017	0.2
LF-17	20-Jan-05	<0.002	<0.002	<0.002	<0.04	<0.04	0.045	<0.002	<0.002	0.0025	0.021	<0.04	<0.002	0.0016 J	0.0086	<0.002	<0.002	0.1211 J
LF-17	24-Jan-06	<0.002	<0.002	<0.002	<0.04	<0.04	0.043	<0.002	<0.002	0.0019 J	0.016	<0.04	<0.002	0.0013 J	0.0068	<0.002	<0.002	0.15
LF-17	18-Apr-07	<0.0013	<0.0013	<0.0013	<0.025	<0.025	0.048	<0.0013	<0.0013	0.0012 J	0.052	<0.025	<0.0013	0.027	0.0057	<0.0013	0.0007 J	0.3235
LF-17	15-Apr-08	<0.002	<0.002	<0.002	<0.04	<0.04	0.052	<0.002	<0.002	0.0014 J	0.092	<0.04	<0.002	0.001 J	0.0058	0.0021	<0.002	0.5598
LF-17	15-Apr-09	<0.002	<0.002	<0.002	<0.04	<0.04	0.055	<0.002	<0.002	0.0015 J	0.058	<0.04	<0.002	<0.002	0.0052	<0.002	<0.002	0.6918 J
LF-17	26-Apr-10	<0.001	<0.001	<0.001	<0.02	<0.02	0.037	<0.001	<0.001	0.0006 J	0.018	<0.02	<0.001	0.0008 J	0.0031	<0.001	0.0006 J	0.3507 J
DUP	26-Apr-10	<0.001	<0.001	<0.001	<0.02	<0.02	0.037	<0.001	<0.001	0.0007 J	0.018	<0.02	<0.001	0.0007 J	0.0031	<0.001	0.0005 J	0.3507 J
LF-18	11-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-18	30-Jul-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-18	20-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-18	19-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-18	11-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	11-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-18	19-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-18	17-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-18	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-18	08-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	15-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	15-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	21-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	13-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	21-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	21-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	19-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mgLl)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-17	20-Jan-00	<0.001 UJ	<0.001 UJ	<0.001 UJ	<0.001 UJ	<0.001 UJ	<0.001 UJ	0.014 J	0.0024 J	<0.02 UJ	<0.001 UJ	<0.001 UJ	<0.002 UJ	<0.002 UJ	<0.002 UJ	0.02 J	0.027 J
LF-17	23-Jan-01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	0.0016	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	0.01	0.017
LF-17	10-Jan-02	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.0053	0.0021	<0.016	<0.0008	<0.0008	<0.0016	<0.0016	<0.0016	0.0088	0.02
LF-17	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0039 J	0.0014 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.014 J	0.015 J
LF-17	22-Jan-04	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	0.0042	0.0017	<0.033	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	0.012	0.021
LF-17	20-Jan-05	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0024	0.0013 J	<0.04	<0.002	<0.002	<0.004	<0.004	<0.004	0.013	<0.002
LF-17	24-Jan-06	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0026	0.0015 J	<0.04	<0.002	<0.002	<0.004	<0.004	<0.004	0.014	0.039
LF-17	18-Apr-07	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	0.0041	0.002	<0.025	<0.0013	<0.0013	<0.0025	<0.0025	<0.0025	0.018	0.028
LF-17	15-Apr-08	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0024	0.001 J	<0.04	<0.002	<0.002	<0.004	<0.004	<0.004	0.01	<0.002
LF-17	15-Apr-09	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0049	0.0014 J	<0.04	<0.002	<0.002	<0.004	<0.004	<0.004	0.012	<0.002
LF-17	26-Apr-10	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0023	0.0008 J	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	0.0081	<0.001
DUP	26-Apr-10	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0022	0.0007 J	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	0.0084	<0.001
LF-18	11-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-18	30-Jul-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-18	20-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-18	19-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-18	11-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	11-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-18	19-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-18	17-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-18	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-18	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-18	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	19-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-17	20-Jan-00	0.0086 J	0.021 J	0.27 J	<0.001 UJ	0.0095 J	<0.001 UJ	<0.02 UJ	<0.001 UJ	<0.001 UJ	<0.001 UJ	<0.001 UJ
LF-17	23-Jan-01	0.0034	0.0087	0.18	<0.001	0.0056	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001
LF-17	10-Jan-02	0.0053	0.0078	0.21	<0.0008	0.006	<0.0008	<0.016	<0.0008	<0.0008	<0.0008	<0.0008
LF-17	20-Jan-03	0.0031 J	0.011 J	0.21 J	<0.0005	0.0062 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-17	22-Jan-04	0.0033	0.011	0.29	<0.0017	0.0058	<0.0017	<0.033	<0.0017	<0.0017	<0.0017	<0.0017
LF-17	20-Jan-05	0.0031	0.013	0.27	<0.002	0.0061	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
LF-17	24-Jan-06	0.0035	0.013	0.24	<0.002	0.0073	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
LF-17	18-Apr-07	0.0051	0.017	0.25	<0.0013	0.0092	0.0007 J	<0.025	<0.0013	<0.0013	<0.0013	<0.0013
LF-17	15-Apr-08	0.0016 J	0.009	0.17	<0.002	0.0046	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
LF-17	15-Apr-09	0.0023	0.01	0.18	<0.002	0.0058	<0.002	<0.04	<0.002	<0.002	<0.002	<0.002
LF-17	26-Apr-10	0.0014	0.0064	0.16	<0.001	0.0037	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001
DUP	26-Apr-10	0.0016	0.007	0.16	<0.001	0.0042	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001
LF-18	11-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-18	30-Jul-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-18	20-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-18	19-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-18	11-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	11-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-18	19-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-18	17-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-18	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-18	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-18	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-18	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-18	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-18	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-18	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	13-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-18	19-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	22-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	20-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-18	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-18	20-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-18	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	16-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	16-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-18	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-19	13-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-19	19-Aug-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0006	na	na	na	<0.002
LF-19	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	0.0023	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-19	08-Apr-98	<0	<0.001	<0.001	<0.005	0.0074	<0.001	0.0025	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	15-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0028	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	23-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0024	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	23-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0025	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	13-Jan-99	<0.001	<0.001	<0.001	<0.005	0.0066	<0.001	0.003	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	20-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.01 U5	<0.001	0.0033	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0033	<0.0005	<0.0005	0.0006	<0.01	<0.0005	0.026	<0.0005	<0.0005	<0.0005	0.0022
LF-19	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.003	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-2	02-Jun-89	<0	<0.005	na	<0.005	<0.05	0.015	<0.005	na	na	0.015	<0.1	<0.005	<0.005	na	<0.005	na	0.3
LF-2	07-Dec-89	<0	<0.02	na	<0.02	0.35	<0.02	<0.02	na	na	<0.02	<0.4	<0.02	0.029	na	<0.02	na	0.84
LF-2	20-Jul-90	<0	<0.05	na	12	<0.5	<0.05	0.05	na	na	0.066	8.8	<0.05	0.051	na	<0.05	na	0.91
LF-20	11-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-20	30-Jul-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-20	21-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-20	18-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-20	11-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-20	19-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-20	18-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-20	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	0.0041	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-20	09-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	0.0042	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	09-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	0.004	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	16-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0044	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	23-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0039	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	13-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0043	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	13-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0041	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	21-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0036	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0035	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	20-Jan-00	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.01 UJ	<0.01 UJ	<0.0005 UJ	0.0037 J	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.01 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.001 UJ
LF-20	01-May-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0033	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-18	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	16-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-18	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-19	13-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-19	19-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-19	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-19	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-19	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-19	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-2	02-Jun-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-2	07-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-2	20-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-20	11-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-20	30-Jul-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-20	21-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-20	18-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-20	11-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-20	19-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-20	18-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-20	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-20	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-20	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	20-Jan-00	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.01 UJ	<0.0005 UJ	<0.0005 UJ	<0.001 UJ	<0.001 UJ	<0.001 UJ	<0.0005 UJ	<0.0005 UJ
LF-20	01-May-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-18	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
LF-18	27-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	16-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-18	23-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005
LF-18	29-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-19	13-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-19	19-Aug-97	na	na	na	na	na	na	na	na	na	na	na
LF-19	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-19	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-19	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-19	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-19	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-19	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-19	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-19	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-2	02-Jun-89	na	na	0.65	na	na	na	na	na	na	na	na
LF-2	07-Dec-89	na	na	0.32	na	na	na	na	na	na	na	na
LF-2	20-Jul-90	na	na	0.33	na	na	na	na	na	na	na	na
LF-20	11-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-20	30-Jul-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-20	21-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-20	18-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-20	11-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-20	19-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-20	18-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-20	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-20	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-20	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-20	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-20	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-20	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005 J11	na	<0.001	<0.002	<0.001	<0.001
LF-20	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	20-Jan-00	<0.0005 UJ	<0.0005 UJ	<0.001 UJ	<0.0005 UJ	<0.0005 UJ	0.0005 J	<0.01 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ
LF-20	01-May-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-20	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0041	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0031	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0036	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0042	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0026	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0029	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0035	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0024 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0033	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0035	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0036	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0027 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	04-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0016	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0038	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0031	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0017	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0013	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	21-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0015	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0028 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0025	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	19-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0021	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0021	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0023	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0015	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-20	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	10-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-21	31-Jul-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-21	21-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-21	18-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-21	11-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-21	19-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-21	17-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-21	02-Mar-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-20	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	11-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	21-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	19-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-20	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	10-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-21	31-Jul-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-21	21-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-21	18-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-21	11-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-21	19-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-21	17-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-21	02-Mar-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-20	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	22-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	06-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	10-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	20-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	28-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	11-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	21-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	19-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	19-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	17-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-20	27-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	10-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-21	31-Jul-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-21	21-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-21	18-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-21	11-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-21	19-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-21	17-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-21	02-Mar-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	02-Mar-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-21	09-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	16-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	23-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	14-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	22-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	24-Jul-00	<0.0005	0.0083	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	23-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	23-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	18-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	28-Oct-03	<0.0005	0.0036	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	04-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	21-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	19-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-21	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	02-Mar-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-21	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-21	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	23-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	23-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	18-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	21-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	19-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-21	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	02-Mar-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-21	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-21	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-21	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-21	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-21	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-21	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	20-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	0.065	<0.0005	0.015	<0.0005	<0.0005
LF-21	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	23-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	23-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	06-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	18-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	10-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	28-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.015	<0.0005	<0.0005
LF-21	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	21-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	19-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-21	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-22	02-Mar-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0049	<0.001	<0.02	<0.001	<0.001	<0.001	0.0049	<0.002	<0.002
LF-22	10-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0071	<0.001	<0.005	<0.001	<0.001	<0.001	0.0058	<0.001	<0.001
LF-22	15-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0041	<0.001	<0.005	0.0009 J11	<0.001	0.0013	0.01	<0.001	<0.001
LF-22	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	<0.0005	<0.0005	0.0012	0.0056	<0.0005	<0.001
LF-22	02-Feb-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0031	<0.0005	<0.01	<0.0005	<0.0005	0.0022	0.002	<0.0005	<0.001
LF-22	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0033	<0.0005	<0.01	<0.0005	<0.0005	0.0036	0.0009	<0.0005	<0.001
LF-22	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026 J	<0.0005	<0.01	<0.0005	<0.0005	0.0017 J	0.0016 J	<0.0005	<0.001
LF-22	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	0.0016	0.0008	<0.0005	<0.001
LF-22	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0028	<0.0005	<0.01	<0.0005	<0.0005	0.0027	0.0008	<0.0005	<0.001
LF-22	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.01	<0.0005	<0.0005	0.0029	0.0009	<0.0005	<0.001
LF-22	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	0.001	<0.0005	0.0025	0.0044	<0.0005	<0.001
LF-22	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-22	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	0.0009	<0.0005	0.0021	0.0031	<0.0005	<0.001
LF-22	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	0.0004 J	<0.0005	0.0018	0.0017	<0.0005	<0.001
LF-23	10-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	10-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-23	02-Aug-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-23	21-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-23	18-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	0.01	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-23	11-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-23	20-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-23	18-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-23	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-23	08-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	0.002	<0.001	<0.001	<0.001	0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	15-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.0095 U5	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	21-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	12-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	21-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-23	21-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-23	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	11-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-24	02-Aug-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-24	21-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-24	18-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-24	11-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-24	20-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-24	18-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-24	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-22	02-Mar-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-22	10-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-22	15-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-22	20-Jan-00	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	02-Feb-01	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	08-Jan-02	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	20-Jan-03	0.0005 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	20-Jan-05	0.0005 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	25-Jan-06	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	18-Apr-07	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-22	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-23	10-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	10-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-23	02-Aug-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-23	21-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-23	18-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-23	11-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-23	20-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-23	18-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-23	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-23	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-23	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-23	21-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-23	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	11-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-24	02-Aug-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-24	21-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-24	18-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-24	11-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-24	20-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-24	18-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-24	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-22	02-Mar-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-22	10-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-22	15-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-22	20-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	02-Feb-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-22	20-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	15-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	17-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-22	30-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-23	10-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
DUP	10-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-23	02-Aug-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-23	21-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-23	18-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-23	11-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-23	20-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-23	18-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-23	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-23	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-23	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-23	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-23	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-23	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-23	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-23	21-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-23	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	11-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-24	02-Aug-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-24	21-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-24	18-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-24	11-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-24	20-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-24	18-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-24	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-24	08-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	15-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	21-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	12-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	21-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	21-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	21-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	16-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-24	13-May-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01 U6	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	13-May-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	11-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-25	02-Aug-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-25	21-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-25	18-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-25	11-Jun-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-25	20-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-25	18-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-25	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-25	08-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	15-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	21-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	12-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	21-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	21-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	16-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-24	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-24	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	21-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	21-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	16-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-24	13-May-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	13-May-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	11-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-25	02-Aug-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-25	21-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-25	18-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-25	11-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-25	20-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-25	18-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-25	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-25	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-25	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	21-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	16-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-24	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-24	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-24	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-24	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-24	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-24	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	21-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	21-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	15-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	16-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	19-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-24	13-May-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	13-May-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	11-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-25	02-Aug-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-25	21-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-25	18-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-25	11-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-25	20-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-25	18-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-25	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-25	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-25	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-25	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-25	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-25	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-25	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	21-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	15-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	15-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	16-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-25	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-25	13-May-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01 U5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	0.0036	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-26	09-Apr-98	<0	<0.001	<0.001	<0.005	<0.0056 U5	<0.001	0.0033	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-26	16-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0033	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-26	23-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0024	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-26	13-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0034	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-26	21-Apr-99	<0.001	<0.001	<0.001	<0.005	0.0062	<0.001	0.0031	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0025	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0028	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	20-Jan-00	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.01 UJ	<0.01 UJ	<0.0005 UJ	0.003 J	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.01 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.001 UJ
DUP	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0034	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0041	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0047 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0049	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0045	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	0.0067 J	<0.0005	0.004	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0048	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0048	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0045	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-26	18-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.005	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	18-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0048	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-27	29-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-27	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	0.0022	<0.002	<0.002
LF-27	08-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	0.0021	<0.001	<0.001
LF-27	14-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	0.0019	<0.001	<0.001
LF-27	21-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	0.0017	<0.001	<0.001
LF-27	12-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0006 J11	<0.001	<0.001	0.0018	<0.001	<0.001
LF-27	20-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0007 J11	<0.001	<0.001	0.0019	<0.001	<0.001
LF-27	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	0.0016	<0.0005	<0.001
DUP	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	0.0015	<0.0005	<0.001
LF-27	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0015	<0.0005	<0.0005	0.0018	<0.0005	<0.001
LF-27	17-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.001
DUP	17-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.001
LF-27	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.001
LF-27	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-25	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-25	13-May-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	0.0012	<0.001
LF-26	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
LF-26	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-26	23-Oct-98	<0.001	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-26	13-Jan-99	<0.001	<0.001	0.0006 J11	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0006 J11	<0.001
LF-26	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	20-Jan-00	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.01 UJ	<0.0005 UJ	<0.0005 UJ	<0.001 UJ	<0.001 UJ	<0.001 UJ	<0.0005 UJ	<0.0005 UJ
DUP	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	19-Jan-05	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-26	18-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	29-Dec-97	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-27	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-27	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-27	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-27	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-27	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-27	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-27	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	17-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	17-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-25	19-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	19-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-25	13-May-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-26	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-26	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-26	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-26	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-26	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	20-Jan-00	<0.0005 UJ	<0.0005 UJ	<0.001 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.01 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ	<0.0005 UJ
DUP	20-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	22-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	20-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
LF-26	26-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-26	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	26-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-26	18-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	18-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	29-Dec-97	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-27	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-27	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-27	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-27	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-27	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-27	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-27	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	17-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	17-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-27	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.001
DUP	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	0.0009	<0.0005	<0.001
LF-27	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	<0.001
LF-27	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.001
LF-27	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.001
LF-27	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	0.001	<0.0005	<0.001
DUP	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.001
LF-27	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0005 J	<0.0005	<0.0005	0.0008	<0.0005	<0.001
LF-27	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0005 J	<0.0005	<0.0005	0.0007	<0.0005	<0.001
LF-27	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.001
LF-27	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-27	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.001
LF-27	29-Apr-10	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	0.0003 J	<0.0005	<0.0005	0.0029	<0.0005	<0.001
LF-28	29-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	0.029	<0.005	<0.1	<0.005	<0.005	0.011	0.005	<0.01	<0.01
LF-28	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.02	<0.001	<0.02	<0.001	<0.001	0.0066	0.0034	<0.002	<0.002
LF-28	08-Apr-98	<0	0.0018	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.029	<0.001	<0.005	<0.001	<0.001	0.0088	0.0061	<0.001	<0.001
LF-28	14-Jul-98	<0.001	0.0022	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.029	<0.001	<0.005	<0.001	<0.001	0.0097	0.0071	<0.001	<0.001
LF-28	21-Oct-98	<0.002	0.0037	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	0.041	<0.002	<0.01	<0.002	<0.002	0.015	0.013	<0.002	<0.002
LF-28	12-Jan-99	<0.001	0.0026	<0.001	<0.005	<0.005	0.0006 J11	<0.001	<0.001	0.029	<0.001	<0.005	<0.001	<0.001	0.011	0.0088	<0.001	<0.001
DUP	12-Jan-99	<0.001	0.0023	<0.001	<0.005	<0.005	0.0006 J11	<0.001	<0.001	0.027	<0.001	<0.005	<0.001	<0.001	0.011	0.0074	0.0005 J11	<0.001
LF-28	20-Apr-99	<0.001	0.0021	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.026	<0.001	<0.005	<0.001	<0.001	0.01	0.0059	0.0005 J11	<0.001
LF-28	14-Jul-99	<0.0005	0.003	<0.0005	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.034	<0.0005	<0.01	<0.0005	<0.0005	0.014	0.0094	<0.0005	<0.001
LF-28	11-Oct-99	<0.0005	0.004	<0.0005	<0.01	<0.01	0.0007	<0.0005	<0.0005	0.045	<0.0005	<0.01	<0.0005	<0.0005	0.019	0.015	<0.0005	<0.001
LF-28	17-Jan-00	<0.0005	0.0029	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.032	<0.0005	<0.01	<0.0005	<0.0005	0.012	0.0088	<0.0005	<0.001
LF-28	28-Apr-00	<0.0005	0.0021	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.024	<0.0005	<0.01	<0.0005	<0.0005	0.0088	0.0055	<0.0005	<0.001
LF-28	25-Jul-00	<0.0005	0.0032	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.03	<0.0005	<0.01	<0.0005	0.0009	0.01	<0.0082	<0.0005	<0.001
LF-28	10-Oct-00	<0.0005	0.005	<0.0005	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.048	<0.0005	<0.01	<0.0005	<0.0005	0.017	0.016	<0.0005	<0.001
LF-28	24-Jan-01	<0.0005	0.0038	<0.0005	<0.01	<0.01	0.0005	<0.0005	<0.0005	0.036	<0.0005	<0.01	<0.0005	<0.0005	0.012	0.01	<0.0005	<0.001
LF-28	09-Apr-01	<0.0005	0.0015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.026	<0.0005	<0.01	<0.0005	<0.0005	0.008	0.0043	<0.0005	<0.001
LF-28	05-Jul-01	<0.0005	0.0032	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.034	<0.0005	<0.01	<0.0005	<0.0005	0.011	0.01	<0.0005	<0.001
LF-28	15-Oct-01	<0.0005	0.0033	<0.0005	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.039	<0.0005	<0.01	<0.0005	<0.0005	0.012	0.0087	<0.0005	<0.001
LF-28	09-Jan-02	<0.0005	0.0022	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.023	<0.0005	<0.01	<0.0005	<0.0005	0.0084	0.0051	<0.0005	<0.001
LF-28	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	0.00148
LF-28	09-Apr-02	<0.0005	0.0033	<0.0005	<0.01	<0.01	0.0005	<0.0005	<0.0005	0.036	<0.0005	<0.01	<0.0005	<0.0005	0.011	0.011	<0.0005	<0.001
LF-28	08-Jul-02	<0.0005	0.0016	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.026	<0.0005	<0.01	<0.0005	<0.0005	0.0083	0.0045	<0.0005	<0.001
LF-28	09-Oct-02	<0.0005	0.0034	<0.0005	<0.01	<0.01	0.0004 J	<0.0005	<0.0005	0.038	<0.0005	<0.01	<0.0005	<0.0005	0.011	0.012	<0.0005	<0.001
LF-28	16-Jan-03	<0.0005	0.0015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.021	<0.0005	<0.01	<0.0005	<0.0005	0.0068	0.0044	<0.0005	<0.001
LF-28	16-Apr-03	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.01	<0.0005	<0.0005	0.0052	0.0026	<0.0005	<0.001
LF-28	09-Jul-03	<0.0005	0.0021	<0.0005	<0.01	<0.01	0.0005	<0.0005	<0.0005	0.031	<0.0005	<0.01	<0.0005	<0.0005	0.011	0.0089	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-27	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-27	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-27	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	29-Dec-97	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-28	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-28	08-Apr-98	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-28	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-28	21-Oct-98	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
LF-28	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-28	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-28	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	17-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-28	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-27	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
LF-27	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	26-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	15-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	13-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-27	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-28	29-Dec-97	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-28	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-28	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-28	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-28	21-Oct-98	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	na	<0.002	<0.004	<0.002	<0.002
LF-28	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0014 J11	<0.001	<0.001
DUP	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0013 J11	<0.001	<0.001
LF-28	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0013 J11	<0.001	<0.001
LF-28	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0018	<0.0005	<0.0005
LF-28	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
LF-28	17-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.0005	<0.0005
LF-28	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
LF-28	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
LF-28	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0021	<0.0005	<0.0005
LF-28	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.0005	<0.0005
LF-28	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-28	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
LF-28	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
LF-28	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-28	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
LF-28	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-28	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-28	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-28	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-28	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-28	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-28	29-Oct-03	<0.0005	0.002	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.028	<0.0005	<0.01	<0.0005	<0.0005	0.0093	0.0069	<0.0005	<0.001
LF-28	20-Jan-04	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0056	0.0024	<0.0005	<0.001
LF-28	04-May-04	<0.0005	0.0021	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.026	<0.0005	<0.01	<0.0005	<0.0005	0.0089	0.0075	<0.0005	<0.001
LF-28	15-Jul-04	<0.0005	0.0024	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.036	<0.0005	<0.01	<0.0005	<0.0005	0.012	0.0099	<0.0005	<0.001
LF-28	13-Oct-04	<0.0005	0.002	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.027	<0.0005	<0.01	<0.0005	<0.0005	0.0083	0.0063	<0.0005	<0.001
LF-28	18-Jan-05	<0.0005	0.0015	<0.0005	<0.01	<0.01	0.0003 J	<0.0005	<0.0005	0.017	<0.0005	<0.01	<0.0005	<0.0005	0.0062	0.0051	<0.0005	<0.001
LF-28	20-Apr-05	<0.0005	0.0017	<0.0005	<0.01	<0.01	0.0004 J	<0.0005	<0.0005	0.026	<0.0005	<0.01	<0.0005	<0.0005	0.0097	0.0069	<0.0005	<0.001
LF-28	19-Jul-05	<0.0005	0.0024	<0.0005	<0.01	<0.01	0.0004 J	<0.0005	<0.0005	0.031	<0.0005	<0.01	<0.0005	<0.0005	0.011	0.0086	<0.0005	<0.001
DUP	19-Jul-05	<0.0005	0.0018	<0.0005	<0.01	<0.01	0.0003 J	<0.0005	<0.0005	0.025	<0.0005	<0.01	<0.0005	<0.0005	0.0082	0.0062	<0.0005	<0.001
LF-28	27-Oct-05	<0.0005	0.0023	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.034	<0.0005	<0.01	<0.0005	<0.0005	0.013	0.0095	<0.0005	<0.001
DUP	27-Oct-05	<0.0005	0.0023	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.035	<0.0005	<0.01	<0.0005	<0.0005	0.012	0.0088	<0.0005	<0.001
LF-28	27-Jan-06	<0.0005	0.0016	<0.0005	<0.01	<0.01	0.0003 J	<0.0005	<0.0005	0.022	<0.0005	<0.01	<0.0005	<0.0005	0.0081	0.0064	<0.0005	<0.001
LF-28	18-Apr-06	<0.0005	0.0014	<0.0005	<0.01	<0.01	0.0003 J	<0.0005	<0.0005	0.019	<0.0005	<0.01	<0.0005	<0.0005	0.0062	0.0054	<0.0005	<0.001
LF-28	16-Apr-07	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0037	0.0035	<0.0005	<0.001
LF-28	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0003 J	<0.0005	<0.001
LF-28	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0004 J	<0.0005	<0.001
LF-28	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0003 J	<0.0005	<0.001
LF-28	12-Oct-11	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0057	<0.0005	<0.01	<0.0005	<0.0005	0.0024	0.0016	<0.0005	<0.001
LF-28	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.001	0.0007	<0.0005	<0.001
LF-28	23-Apr-13	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	0.0007	0.0004 J	<0.0005	<0.001
LF-28	24-Apr-14	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	0.0007	0.0005 J	<0.0005	<0.001
LF-29	29-Dec-97	<0	<0.03	0.21	<0.3	<0.5	<0.03	<0.03	<0.03	<0.03	<0.03	<0.5	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05
LF-29	25-Feb-98	<0	0.013	0.17	<0.04	<0.04	0.016	<0.002	0.0039	<0.002	<0.002	<0.04	<0.002	<0.002	<0.002	0.011	<0.004	<0.004
LF-29	07-Apr-98	<0	0.015	0.19	<0.05	<0.05	0.019	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	0.013	<0.01	<0.001
LF-29	14-Jul-98	<0.01	0.013	0.22	<0.05	<0.05	0.02	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	0.012	<0.01	<0.01
LF-29	20-Oct-98	<0.005	0.012	0.19	<0.025	<0.025	0.018	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	0.0087	<0.005	<0.005
LF-29	11-Jan-99	<0.001	0.012	0.2	<0.005	<0.005	0.014	0.0009 J11	0.0029	0.0023	<0.001	<0.005	0.0006 J11	0.016	<0.001	0.012	0.0036	0.0021
LF-29	20-Apr-99	<0.001	0.01	0.16	<0.005	<0.005	0.016	0.0009 J11	0.003	0.0022	<0.001	<0.005	0.0006 J11	<0.001	<0.001	0.012	0.003	0.0015
DUP	20-Apr-99	<0.001	0.01	0.16	<0.005	<0.005	0.017	0.0009 J11	0.0031	0.0023	<0.001	<0.005	0.0006 J11	<0.001	<0.001	0.011	0.0027	0.002 J11
LF-29	13-Jul-99	<0.0005	0.012	0.17	<0.01	<0.01	0.02	0.0011	0.0029	0.0026	<0.0005	<0.01	0.0005	0.018	<0.0005	0.012	0.0037	0.0023
LF-29	11-Oct-99	<0.0005	0.011	0.17	<0.01	<0.01	0.018	0.0011	0.0024	0.0024	<0.0005	<0.01	0.0005	0.014	<0.0005	0.012	0.0039	0.0023
DUP	11-Oct-99	<0.0005	0.011	0.17	<0.01	<0.01	0.019	0.0009	0.0024	0.0024	<0.0005	<0.01	<0.0005	0.014	<0.0005	0.012	0.0034	0.0023
LF-29	17-Jan-00	<0.0005	0.011	0.19	<0.01	<0.01	0.02	0.001	0.0028	0.0026	<0.0005	0.015	0.0005	0.017	<0.0005	0.012	0.0036	0.0022
LF-29	24-Jan-01	<0.0005	0.013	0.2	<0.01	<0.01	0.017	0.0008	0.0032	0.002	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.01	0.0032	0.0012
LF-29	09-Jan-02	<0.0005	0.0099	0.16	<0.01	<0.01	0.012	0.0007	0.0024	0.0013	<0.0005	0.021	<0.0005	0.019	<0.0005	0.0071	0.0028	0.0008
LF-29	03-Apr-02	na	na	na	na	na	0.0153	na	na	na	<0.001	na	na	<0.001	na	na	na	0.00222
LF-29	17-Jan-03	<0.0007	0.011	0.18	<0.014	<0.014	0.017	0.0008	0.0021	0.0017	<0.0007	<0.014	<0.0007	<0.0007	<0.0007	0.0093	0.0027	0.0011
LF-29	20-Jan-04	<0.0008	0.012	0.2	<0.017	<0.017	0.019	0.0009	0.0021	0.0017	<0.0008	<0.017	<0.0008	<0.0008	<0.0008	0.0084	0.0032	0.001
LF-29	26-Jan-06	<0.001	0.0097	0.15	<0.02	<0.02	0.017	0.0009 J	0.0014	0.0017	<0.001	<0.02	<0.001	<0.001	<0.001	0.0076	0.0033	0.0008 J

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-28	29-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	20-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	27-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	27-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	16-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	18-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	23-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-28	24-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-29	29-Dec-97	<0.03	<0.03	<0.01	<0.03	<0.03	na	na	na	<0.3	na	<0.05	<0.05	<0.05	na	na	na
LF-29	25-Feb-98	<0.002	<0.002	<0.002	<0.002	<0.002	0.019	<0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002
LF-29	07-Apr-98	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
LF-29	14-Jul-98	<0.01	<0.01	<0.01	<0.01	<0.01	0.021	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
LF-29	20-Oct-98	<0.005	<0.005	<0.005	<0.005	<0.005	0.013	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
LF-29	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.017	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0007 J11	<0.001
LF-29	20-Apr-99	0.0005 J11	<0.001	<0.001	<0.001	<0.001	0.014	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0008 J11	<0.001
DUP	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.016	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0008 J11	<0.001
LF-29	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	<0.0005
LF-29	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0014 J10	<0.0005
DUP	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008 J10	<0.0005
LF-29	17-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0009	<0.0005
LF-29	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0007	<0.0005
LF-29	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	<0.0005
LF-29	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-29	17-Jan-03	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	0.015	<0.0007	<0.0007	<0.014	<0.0007	<0.0007	<0.0014	<0.0014	<0.0014	<0.0007	<0.0007
LF-29	20-Jan-04	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.015	<0.0008	<0.0008	<0.017	<0.0008	<0.0008	<0.0017	<0.0017	<0.0017	<0.0008	<0.0008
LF-29	26-Jan-06	<0.001	<0.001	<0.001	<0.001	<0.001	0.012	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	0.0007 J	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-28	29-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-28	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-28	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-28	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-28	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-28	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-28	20-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-28	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
DUP	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-28	27-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
DUP	27-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-28	27-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-28	18-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-28	16-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
LF-28	17-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-28	13-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-28	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-28	12-Oct-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005
LF-28	18-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-28	23-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-28	24-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-29	29-Dec-97	na	na	<0.01	<0.03	na	na	<0.3	<0.01	na	na	<0.03
LF-29	25-Feb-98	<0.002	<0.002	<0.01	<0.002	<0.002	0.008	<0.002	<0.002	<0.004	<0.002	<0.002
LF-29	07-Apr-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	na	<0.01	<0.002	<0.01	<0.01
LF-29	14-Jul-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	na	<0.01	<0.002	<0.01	<0.01
LF-29	20-Oct-98	<0.005	<0.005	<0.005	<0.005	<0.005	0.0074	na	<0.005	<0.01	<0.005	<0.005
LF-29	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0081	na	<0.001	<0.002	<0.001	<0.001
LF-29	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0089	na	<0.001	<0.002	<0.001	<0.001
DUP	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0085	na	<0.001	<0.002	<0.001	<0.001
LF-29	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0084	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-29	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0087	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0089	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-29	17-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0091	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-29	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0079	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-29	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0071	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-29	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
LF-29	17-Jan-03	<0.0007	<0.0007	<0.0029	<0.0007	<0.0007	0.0075	<0.014	<0.0007	<0.0007	<0.0007	<0.0007
LF-29	20-Jan-04	<0.0008	<0.0008	<0.0033	<0.0008	<0.0008	0.0079	<0.017	<0.0008	<0.0008	<0.0008	<0.0008
LF-29	26-Jan-06	<0.001	<0.001	<0.004	<0.001	<0.001	0.0067	<0.02	<0.001	<0.001	<0.001	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-29	16-Apr-07	<0.0005	0.0036	0.043	<0.01	<0.01	0.0076	0.0007	<0.0005	0.0009	<0.0005	<0.01	0.0006	<0.0005	<0.0005	0.0053	0.0022	0.0005
LF-29	15-Apr-08	<0.0005	0.0063	0.044	<0.01	<0.01	0.0076	0.0006	0.0006	0.001	<0.0005	<0.01	0.0005 J	<0.0005	<0.0005	0.005	0.0022	0.0003 J
LF-29	13-Apr-09	<0.0005	0.0034	0.031	<0.01	<0.01	0.0055	0.0005	0.0004 J	0.0008	<0.0005	<0.01	0.0003 J	<0.0005	<0.0005	0.0033	0.0013	<0.001
LF-29	29-Apr-10	<0.0005	0.0056	0.032	<0.01	<0.01	0.006	0.0005	0.0004 J	0.0009	<0.0005	<0.01	0.0003 J	<0.0005	<0.0005	0.0035	0.0018	<0.001
LF-3	02-Jun-89	<0	<0.1	na	<0.1	<1	<0.1	<0.1	na	na	2.5	<2	<0.1	17	na	<0.1	na	12
LF-3	07-Dec-89	<0	<0.5	na	<0.5	<5	<0.5	<0.5	na	na	6.3	<10	<0.5	77	na	<0.5	na	32
LF-3	20-Jul-90	<0	<0.05	na	1.9	10	0.11	<0.05	na	na	5	7.7	<0.05	52	na	<0.05	na	22
LF-3	21-Jun-91	<0	<1	na	<2	9.9	<1	<1	na	na	7.5	8.2	<1	62	na	<1	na	44
LF-3	09-Jul-92	<0	<2.5	na	<5	<10	<2.5	<2.5	na	na	8.9	<10	<2.5	92	na	<2.5	na	43
DUP	09-Jul-92	<0	<5	na	<10	<20	<5	<5	na	na	8.8	<20	<5	100	na	<5	na	45
LF-3	09-Jun-93	<0	<2.5	na	<5	<10	<2.5	<2.5	na	na	9.8	<10	<2.5	120	na	<2.5	na	48
DUP	09-Jun-93	<0	<2.5	na	<5	<10	<2.5	<2.5	na	na	7.6	<10	<2.5	110	na	<2.5	na	37
LF-3	16-Apr-96	<0	<3	<3	<30	<50	<3	<3	<3	<3	5.5	<50	<3	45	<3	<3	<5	27
LF-3	31-Jul-96	<0	<3	<3	<30	<50	<3	<3	<3	<3	4.5	<50	<3	44	<3	<3	<5	24
LF-3	20-Nov-96	<0	<3	<3	<30	<50	<3	<3	<3	<3	4	<50	<3	41	<3	<3	<5	12
LF-3	19-Mar-97	<0	<3	<3	<30	<50	<3	<3	<3	<3	3	<50	<3	43	<3	<3	<5	16
LF-3	12-Jun-97	<0	<3	<3	<30	<50	<3	<3	<3	<3	7	<50	<3	70	<3	<3	<5	31
LF-3	19-Aug-97	<0	<5	<5	<50	<100	<5	<5	<5	<5	6	<100	<5	91	<5	<5	<10	31
LF-3	17-Dec-97	<0	<5	<5	<50	<100	<5	<5	<5	<5	<5	<100	<5	40	<5	<5	<10	<10
DUP	17-Dec-97	<0	<5	<5	<50	<100	<5	<5	<5	<5	<5	<100	<5	38	<5	<5	<10	<10
LF-3	02-Mar-98	<0	<0.5	<0.5	<10	<10	<0.5	<0.5	<0.5	<0.5	3	<10	<0.5	67.8	<0.5	<0.5	<1	15.9
LF-3	10-Apr-98	<0	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	0.59	<2.5	<0.5	17 J4	<0.5	<0.5	<0.5	2.9
LF-3	16-Jul-98	<2.5	<2.5	<2.5	<12	<12	<2.5	<2.5	<2.5	<2.5	3.6	<12	<2.5	52	<2.5	<2.5	<2.5	17
LF-3	19-Oct-98	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<12 UJ2	<12 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	4.6 J2	<12 UJ2	<2.5 UJ2	57 J2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2
LF-3	15-Jan-99	<0.5	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	2.8	<2.5	<0.5	52	<0.5	<0.5	<0.5	13.4
DUP	15-Jan-99	<0.5	<0.5	<0.5	<2.5	<2.5	<0.5	<0.5	<0.5	<0.5	2.6	<2.5	<0.5	58	<0.5	<0.5	<0.5	13.5
LF-3	22-Apr-99	<0.13	<0.13	<0.13	<0.63	<0.63	<0.13	<0.13	<0.13	0.1 J11	1	<0.63	<0.13	23	<0.13	<0.13	<0.13	4.8
LF-3	19-Jul-99	<0.2	<0.2	<0.2	<4	<4	<0.2	<0.2	<0.2	<0.2	4.1	<4	<0.2	56	<0.2	<0.2	<0.2	20
LF-3	12-Oct-99	<0.25	<0.25	<0.25	<5	<5	<0.25	<0.25	<0.25	<0.25	4.4	<5	<0.25	66	<0.25	<0.25	<0.25	22.2
LF-3	20-Jan-00	<0.1	<0.1	<0.1	<2	<2	<0.1	<0.1	<0.1	<0.1	1.4	<2	<0.1	28	<0.1	<0.1	<0.1	7.2
LF-3	01-May-00	<0.2	<0.2	<0.2	<4	<4	<0.2	<0.2	<0.2	<0.2	1.9	<4	<0.2	47	<0.2	<0.2	<0.2	9.5
LF-3	24-Jul-00	<0.17	<0.17	<0.17	<3.3	<2	<0.17	<0.17	<0.17	<0.17	4.4	<3.3	<0.17	51	<0.17	<0.17	<0.17	22
LF-3	11-Oct-00	<0.083	<0.083	<0.083	<1.7	<1.7	0.088	<0.083	<0.083	<0.083	4.5	<1.7	<0.083	59	<0.083	<0.083	<0.083	22.4
LF-3	16-Jan-01	<0.1	<0.1	<0.1	<2	<2	<0.1	<0.1	<0.1	<0.1	2.2	<2	<0.1	26	<0.1	<0.1	<0.1	8.3
LF-3	13-Apr-01	<0.1	<0.1	<0.1	<2	<2	<0.1	<0.1	<0.1	<0.1	2.2	<2	<0.1	40	<0.1	<0.1	<0.1	8.6
LF-3	06-Jul-01	<0.1	<0.1	<0.1	<2	<2	<0.1	<0.1	<0.1	<0.1	3.8	<2	<0.1	39	<0.1	<0.1	<0.1	18.2
LF-3	15-Oct-01	<0.2	<0.2	<0.2	<4	<4	<0.2	<0.2	<0.2	<0.2	3.8	<4	<0.2	41	<0.2	<0.2	<0.2	18.5
LF-3	10-Jan-02	<0.005	<0.005	<0.005	<0.1	<0.1	0.019	<0.005	<0.005	0.0067	0.35	<0.1	<0.005	1.7	<0.005	<0.005	<0.005	1.8
LF-3	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	0.829	na	na	0.421	na	na	na	3.9343

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-29	16-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0049	<0.0005	<0.0005	<0.01	0.0003 J	<0.0005	<0.001	<0.001	<0.001	0.0006	<0.0005
LF-29	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0035	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0004 J	<0.0005
LF-29	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0033	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0003 J	<0.0005
LF-29	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.003	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0003 J	<0.0005
LF-3	02-Jun-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-3	07-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-3	20-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-3	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-3	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-3	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-3	16-Apr-96	<3	<3	<0.1	<3	<3	na	na	na	<30	na	<5	<5	<5	na	na	na
LF-3	31-Jul-96	<3	<3	na	<3	<3	na	na	na	<30	na	<5	<5	<5	na	na	na
LF-3	20-Nov-96	<3	<3	na	<3	<3	na	na	na	<30	na	<5	<5	<5	na	na	na
LF-3	19-Mar-97	<3	<3	na	<3	<3	na	na	na	<30	na	<5	<5	<5	na	na	na
LF-3	12-Jun-97	<3	<3	na	<3	<3	na	na	na	<30	na	<5	<5	<5	na	na	na
LF-3	19-Aug-97	<5	<5	na	<5	<5	na	na	na	<50	na	<10	<10	<10	na	na	na
LF-3	17-Dec-97	<5	<5	na	<5	<5	na	na	na	<50	na	<10	<10	<10	na	na	na
DUP	17-Dec-97	<5	<5	na	<5	<5	na	na	na	<50	na	<10	<10	<10	na	na	na
LF-3	02-Mar-98	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<0.5	<0.5
LF-3	10-Apr-98	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
LF-3	16-Jul-98	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<12	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
LF-3	19-Oct-98	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<12 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2
LF-3	15-Jan-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
DUP	15-Jan-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
LF-3	22-Apr-99	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.63	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13
LF-3	19-Jul-99	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.4	<0.4	<0.4	<0.2	<0.2
LF-3	12-Oct-99	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<5	<0.25	<0.25	<0.5	<0.5	<0.5	<0.25	<0.25
LF-3	20-Jan-00	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1
LF-3	01-May-00	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.4	<0.4	<0.4	<0.2	<0.2
LF-3	24-Jul-00	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<3.3	<0.17	<0.17	<0.33	<0.33	<0.33	<0.17	<0.17
LF-3	11-Oct-00	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<1.7	<0.083	<0.083	<0.17	<0.17	<0.17	<0.083	<0.083
LF-3	16-Jan-01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1
LF-3	13-Apr-01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1
LF-3	06-Jul-01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1
LF-3	15-Oct-01	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.4	<0.4	<0.4	<0.2	<0.2
LF-3	10-Jan-02	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.01	<0.01	<0.01	<0.005	<0.005
LF-3	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-29	16-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0084	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
LF-29	15-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0056	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-29	13-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0052	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-29	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0052	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-3	02-Jun-89	na	na	0.091	na	na	na	na	na	na	na	na
LF-3	07-Dec-89	na	na	0.14	na	na	na	na	na	na	na	na
LF-3	20-Jul-90	na	na	0.16	na	na	na	na	na	na	na	na
LF-3	21-Jun-91	na	na	0.11	na	na	na	na	na	na	na	na
LF-3	09-Jul-92	na	na	0.15	na	na	na	na	na	na	na	na
DUP	09-Jul-92	na	na	0.14	na	na	na	na	na	na	na	na
LF-3	09-Jun-93	na	na	0.17	na	na	na	na	na	na	na	na
DUP	09-Jun-93	na	na	0.16	na	na	na	na	na	na	na	na
LF-3	16-Apr-96	na	na	<0.1	<3	na	na	<30	<0.1	na	na	<3
LF-3	31-Jul-96	na	na	na	<3	na	na	<30	na	na	na	<3
LF-3	20-Nov-96	na	na	na	<3	na	na	<30	na	na	na	<3
LF-3	19-Mar-97	na	na	na	<3	na	na	<30	na	na	na	<3
LF-3	12-Jun-97	na	na	na	<3	na	na	<30	na	na	na	<3
LF-3	19-Aug-97	na	na	na	<5	na	na	<50	na	na	na	<5
LF-3	17-Dec-97	na	na	na	<5	na	na	<50	na	na	na	<5
DUP	17-Dec-97	na	na	na	<5	na	na	<50	na	na	na	<5
LF-3	02-Mar-98	<0.5	<0.5	<2.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<0.5	<0.5
LF-3	10-Apr-98	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	na	<0.5	<1	<0.5	<0.5
LF-3	16-Jul-98	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	na	<2.5	<5	<2.5	<2.5
LF-3	19-Oct-98	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	<2.5 UJ2	na	<2.5 UJ2	<5 UJ2	<2.5 UJ2	<2.5 UJ2
LF-3	15-Jan-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	na	<0.5	<1	<0.5	<0.5
DUP	15-Jan-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	na	<0.5	<1	<0.5	<0.5
LF-3	22-Apr-99	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	na	<0.13	<0.25	<0.13	<0.13
LF-3	19-Jul-99	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.2	<0.2
LF-3	12-Oct-99	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<5	<0.25	<0.25	<0.25	<0.25
LF-3	20-Jan-00	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1
LF-3	01-May-00	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.2	<0.2
LF-3	24-Jul-00	<0.17	<0.17	<0.33	<0.17	<0.17	<0.17	<3.3	<0.17	<0.17	<0.17	<0.17
LF-3	11-Oct-00	<0.083	<0.083	<0.17	<0.083	<0.083	<0.083	<1.7	<0.083	<0.083	<0.083	<0.083
LF-3	16-Jan-01	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1
LF-3	13-Apr-01	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1
LF-3	06-Jul-01	<0.1	<0.1	<0.2	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1
LF-3	15-Oct-01	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.2	<0.2
LF-3	10-Jan-02	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
LF-3	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-3	10-Apr-02	<0.036	<0.036	<0.036	<0.71	<0.71	0.046	<0.036	<0.036	<0.036	1.4	<0.71	<0.036	8.4	<0.036	<0.036	<0.036	6.47
LF-3	09-Jul-02	<0.1	<0.1	<0.1	<2	<2	<0.1	<0.1	<0.1	<0.1	<1.9	<2	<0.1	23	<0.1	<0.1	<0.1	1.8
LF-3	10-Oct-02	<0.083	<0.083	<0.083	<1.7	<1.7	0.053 J	<0.083	<0.083	<0.083	2.3	<1.7	<0.083	24	<0.083	<0.083	<0.083	9.3
LF-3	20-Jan-03	<0.042	<0.042	<0.042	<0.83	<0.83	<0.042	<0.042	<0.042	<0.042	0.69 J	<0.83	<0.042	9.8 J	<0.042	<0.042	<0.042	3.44 JJ
LF-3	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.001	<0.0005	<0.0005	0.0009	0.018	<0.01	<0.0005	0.066	<0.0005	<0.0005	<0.0005	0.07
LF-3	10-Jul-03	<0.036	<0.036	<0.036	<0.71	<0.71	<0.036	<0.036	<0.036	<0.036	0.78	<0.71	<0.036	11	<0.036	<0.036	<0.036	3.81
LF-3	28-Oct-03	<0.042	<0.042	<0.042	<0.83	<0.83	<0.042	<0.042	<0.042	<0.042	1.9	<0.83	<0.042	12	<0.042	<0.042	<0.042	9.5
DUP	28-Oct-03	<0.036	<0.036	<0.036	<0.71	<0.71	<0.036	<0.036	<0.036	<0.036	1.5	<0.71	<0.036	10	<0.036	<0.036	<0.036	7.7
LF-3	22-Jan-04	<0.036	<0.036	<0.036	<0.71	<0.71	0.038 J	<0.036	<0.036	<0.036	1.4 J	<0.71	<0.036	11 J	<0.036	<0.036	<0.036	6.27 JJ
LF-3	05-May-04	<0.0083	<0.0083	<0.0083	<0.17	<0.17	0.027	<0.0083	<0.0083	0.011	0.78	<0.17	<0.0083	6.5	<0.0083	<0.0083	<0.0083	3.51
LF-3	15-Jul-04	<0.02	<0.02	<0.02	<0.4	<0.4	0.035	<0.02	<0.02	<0.02	1.7	<0.4	<0.02	8.8	<0.02	<0.02	<0.02	8.6
LF-3	11-Oct-04	<0.036	<0.036	<0.036	<0.71	<0.71	0.037	<0.036	<0.036	<0.036	1.7	<0.71	<0.036	6.3	<0.036	<0.036	<0.036	9
LF-3	20-Jan-05	<0.025	<0.025	<0.025	<0.5	<0.5	0.026	<0.025	<0.025	0.018 J	0.3	<0.5	<0.025	3.9	<0.025	<0.025	<0.025	1.65
LF-3	20-Apr-05	<0.083	<0.083	<0.083	<1.7	<1.7	<0.083	<0.083	<0.083	<0.083	0.85	<1.7	<0.083	9.7	<0.083	<0.083	<0.083	4.27
LF-3	21-Jul-05	<0.031	<0.031	<0.031	<0.63	<0.63	0.029 J	<0.031	0.055	<0.031	0.68	<0.63	<0.031	4.5	<0.031	<0.031	<0.031	4.02
LF-3	26-Oct-05	<0.017	<0.017	<0.017	<0.33	<0.33	0.027	<0.017	<0.017	0.024	1.6	<0.33	<0.017	2	<0.017	<0.017	<0.017	7.6
LF-3	24-Jan-06	<0.063	<0.063	<0.063	<1.3	<1.3	0.036 J	<0.063	<0.063	<0.063	0.54	<1.3	<0.063	8.6	<0.063	<0.063	<0.063	2.88
LF-3	19-Apr-06	<0.05	<0.05	<0.05	<1	<1	0.031 J	<0.05	<0.05	<0.05	0.61	<1	<0.05	5.1	<0.05	<0.05	<0.05	3.41
LF-3	18-Apr-07	<0.02	<0.02	<0.02	<0.4	<0.4	0.045	<0.02	<0.02	<0.02	1	<0.4	<0.02	0.46	<0.02	<0.02	<0.02	6.34
LF-3	15-Apr-08	<0.02	<0.02	<0.02	<0.4	<0.4	0.039	<0.02	<0.02	0.012 J	1.2	<0.4	<0.02	0.65	<0.02	<0.02	<0.02	6.18
LF-3	15-Apr-09	<0.01	<0.01	<0.01	<0.2	<0.2	0.051	<0.01	<0.01	0.012	1.7	<0.2	<0.01	0.42	<0.01	<0.01	<0.01	8
LF-3	26-Apr-10	<0.017	<0.017	<0.017	<0.33	<0.33	0.048	<0.017	<0.017	0.014 J	1.2	<0.33	<0.017	3.5	<0.017	<0.017	<0.017	6.88
LF-30	30-Dec-97	<0	0.02	0.099	<0.05	<0.1	<0.005	<0.005	<0.005	0.01	<0.005	<0.1	<0.005	<0.005	<0.005	0.023	<0.01	<0.01
LF-30	25-Feb-98	<0	0.0016	0.019	<0.02	<0.02	<0.001	<0.001	<0.001	0.0015	<0.001	<0.02	<0.001	<0.001	<0.001	0.0092	<0.002	<0.002
DUP	25-Feb-98	<0	0.0026	0.023	<0.02	<0.02	<0.001	<0.001	<0.001	0.0017	<0.001	<0.02	<0.001	<0.001	<0.001	0.01	<0.002	<0.002
LF-30	07-Apr-98	<0	0.0076	0.037	<0.005	<0.005	<0.001	<0.001	<0.001	0.0051	<0.001	<0.005	<0.001	<0.001	<0.001	0.012	0.0021	<0.001
LF-30	14-Jul-98	<0.002	0.0055	0.034	<0.01	<0.01	<0.002	<0.002	<0.002	0.005	<0.002	<0.01	<0.002	<0.002	<0.002	0.011	<0.002	<0.002
LF-30	20-Oct-98	<0.001	0.005	0.034	<0.005	<0.005	<0.001	<0.001	<0.001	0.0035	<0.001	<0.005	<0.001	<0.001	<0.001	0.0097	0.0015	<0.001
LF-30	11-Jan-99	<0.001	0.0095	0.053	<0.005	<0.005	0.001 J11	<0.001	<0.001	0.0056	<0.001	<0.005	<0.001	0.004	<0.001	0.015	0.0034	<0.001
LF-30	20-Apr-99	<0.001	0.0033	0.021	<0.005	<0.005	<0.001	<0.001	<0.001	0.003	<0.001	<0.005	<0.001	<0.001	<0.001	0.0092	0.0011	<0.001
LF-30	13-Jul-99	<0.0005	0.0094	0.048	<0.01	<0.01	0.0011	<0.0005	<0.0005	0.006	<0.0005	<0.01	<0.0005	0.0051	<0.0005	0.018	0.0023	<0.001
LF-30	11-Oct-99	<0.0005	0.003	0.025	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.01	<0.0005	0.002	<0.0005	0.013	0.0009	<0.001
LF-30	18-Jan-00	<0.0005	0.0047	0.038	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.0044	<0.0005	<0.01	<0.0005	0.0035	<0.0005	0.015	0.0014	<0.001
LF-30	24-Jan-01	<0.0005	0.013	0.065	<0.01	<0.01	0.0014	0.0008	<0.0005	0.0082	<0.0005	<0.01	<0.0005	<0.0005	0.0005	0.023	0.0035	<0.001
LF-30	09-Jan-02	<0.0005	0.0054	0.025	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.0045	<0.0005	0.019	<0.0005	<0.0005	<0.0005	0.0093	0.0016	<0.001
LF-30	10-Apr-02	<0.0005	0.012	0.065	<0.01	<0.01	0.0019	0.0008	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0007	0.025	0.0036	<0.001
LF-30	17-Jan-03	<0.0005	0.0093 J	0.051 J	<0.01	<0.01	0.0012 J	<0.0005	<0.0005	0.0076 J	<0.0005	<0.01	<0.0005	<0.0005	0.0006 J	0.021 J	0.0024 J	<0.001
LF-30	20-Jan-04	<0.0005	0.004	0.028	<0.01	<0.01	0.0014	0.0005	<0.0005	0.0055	<0.0005	<0.01	<0.0005	<0.0005	0.0008	0.019	0.0012	<0.001
LF-30	18-Jan-05	<0.0005	0.0029	0.027	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0028	<0.0005	<0.01	<0.0005	<0.0005	0.0006	0.015	0.0004 J	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-3	10-Apr-02	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.071	<0.071	<0.071	<0.036	<0.036
LF-3	09-Jul-02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.2	<0.2	<0.2	<0.1	<0.1
LF-3	10-Oct-02	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<1.7	<0.083	<0.083	<0.17	<0.17	<0.17	<0.083	<0.083
LF-3	20-Jan-03	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.83	<0.042	<0.042	<0.083	<0.083	<0.083	<0.042	<0.042
LF-3	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	0.0018	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-3	10-Jul-03	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.071	<0.071	<0.071	<0.036	<0.036
LF-3	28-Oct-03	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	<0.83	<0.042	<0.042	<0.083	<0.083	<0.083	<0.042	<0.042
DUP	28-Oct-03	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.071	<0.071	<0.071	<0.036	<0.036
LF-3	22-Jan-04	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.071	<0.071	<0.071	<0.036	<0.036
LF-3	05-May-04	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.0083	<0.17	<0.0083	<0.0083	<0.017	<0.017	<0.017	<0.0083	<0.0083
LF-3	15-Jul-04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.4	<0.02	<0.02	<0.04	<0.04	<0.04	<0.02	<0.02
LF-3	11-Oct-04	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.071	<0.071	<0.071	<0.036	<0.036
LF-3	20-Jan-05	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.5	<0.025	<0.025	<0.05	<0.05	<0.05	<0.025	<0.025
LF-3	20-Apr-05	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<0.083	<1.7	<0.083	<0.083	<0.17	<0.17	<0.17	<0.083	<0.083
LF-3	21-Jul-05	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	<0.63	<0.031	<0.031	<0.063	<0.063	<0.063	<0.031	<0.031
LF-3	26-Oct-05	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	0.0091 J	0.0092 J	<0.33	<0.017	<0.017	<0.033	<0.033	<0.033	<0.017	<0.017
LF-3	24-Jan-06	<0.063	<0.063	<0.063	<0.063	<0.063	<0.063	<0.063	<0.063	<1.3	<0.063	<0.063	<0.13	<0.13	<0.13	<0.063	<0.063
LF-3	19-Apr-06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.05	<0.05	<0.1	<0.1	<0.1	<0.05	<0.05
LF-3	18-Apr-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.012 J	0.016 J	<0.4	<0.02	<0.02	<0.04	<0.04	<0.04	<0.02	<0.02
LF-3	15-Apr-08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.013 J	<0.4	<0.02	<0.02	<0.04	<0.04	<0.04	<0.02	<0.02
LF-3	15-Apr-09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.018	0.015	<0.2	<0.01	<0.01	<0.02	<0.02	<0.02	0.011	<0.01
LF-3	26-Apr-10	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.33	<0.017	<0.017	<0.033	<0.033	<0.033	<0.017	<0.017
LF-30	30-Dec-97	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-30	25-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
DUP	25-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-30	07-Apr-98	0.0013	<0.001	<0.001	<0.001	<0.001	0.0025	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	0.0041	<0.001	<0.001
LF-30	14-Jul-98	<0.002	<0.002	<0.002	<0.002	<0.002	0.0022	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
LF-30	20-Oct-98	0.001	<0.001	<0.001	<0.001	<0.001	0.0017	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	0.0038	<0.001	<0.001
LF-30	11-Jan-99	0.0014	<0.001	<0.001	<0.001	<0.001	0.0033	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	0.0054	<0.001	<0.001
LF-30	20-Apr-99	0.0008 J11	<0.001	<0.001	<0.001	<0.001	0.0018	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-30	13-Jul-99	0.0014	<0.0005	<0.0005	<0.0005	<0.0005	0.0033	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-30	11-Oct-99	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	0.0034	<0.0005	<0.0005
LF-30	18-Jan-00	0.0012	<0.0005	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	0.002	<0.0005	<0.0005
LF-30	24-Jan-01	0.0018	<0.0005	<0.0005	<0.0005	<0.0005	0.004	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	0.0029	<0.0005	<0.0005
LF-30	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-30	10-Apr-02	0.0017	<0.0005	<0.0005	<0.0005	<0.0005	0.0046	<0.0005	<0.0005	<0.01	0.0007	<0.0005	<0.001	<0.001	0.0034	<0.0005	<0.0005
LF-30	17-Jan-03	0.0013 J	<0.0005	<0.0005	<0.0005	<0.0005	0.005 J	<0.0005	<0.0005	<0.01	0.0009 J	<0.0005	<0.001	<0.001	0.0029 J	<0.0005	<0.0005
LF-30	20-Jan-04	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	0.0034	<0.0005	<0.0005	<0.01	0.0011	<0.0005	<0.001	<0.001	0.0023	<0.0005	<0.0005
LF-30	18-Jan-05	0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.0032	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	0.0023	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-3	10-Apr-02	<0.036	<0.036	<0.14	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.036	<0.036
LF-3	09-Jul-02	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1
LF-3	10-Oct-02	<0.083	<0.083	<0.33	<0.083	<0.083	<0.083	<1.7	<0.083	<0.083	<0.083	<0.083
LF-3	20-Jan-03	<0.042	<0.042	<0.17	<0.042	<0.042	<0.042	<0.83	<0.042	<0.042	<0.042	<0.042
LF-3	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-3	10-Jul-03	<0.036	<0.036	<0.14	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.036	<0.036
LF-3	28-Oct-03	<0.042	<0.042	<0.17	<0.042	<0.042	<0.042	<0.83	<0.042	<0.042	<0.042	<0.042
DUP	28-Oct-03	<0.036	<0.036	<0.14	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.036	<0.036
LF-3	22-Jan-04	<0.036	<0.036	<0.14	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.036	<0.036
LF-3	05-May-04	<0.0083	<0.0083	<0.033	<0.0083	<0.0083	<0.0083	<0.17	<0.0083	<0.0083	<0.0083	<0.0083
LF-3	15-Jul-04	<0.02	<0.02	<0.08	<0.02	<0.02	<0.02	<0.4	<0.02	<0.02	<0.02	<0.02
LF-3	11-Oct-04	<0.036	<0.036	<0.14	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.036	<0.036
LF-3	20-Jan-05	<0.025	<0.025	<0.1	<0.025	<0.025	<0.025	<0.5	<0.025	<0.025	<0.025	<0.025
LF-3	20-Apr-05	<0.083	<0.083	<0.33	<0.083	<0.083	<0.083	<1.7	<0.083	<0.083	<0.083	<0.083
LF-3	21-Jul-05	<0.031	<0.031	<0.13	<0.031	<0.031	<0.031	<0.63	<0.031	<0.031	<0.031	<0.031
LF-3	26-Oct-05	<0.017	<0.017	0.051 J	<0.017	<0.017	<0.017	<0.33	<0.017	<0.017	<0.017	<0.017
LF-3	24-Jan-06	<0.063	<0.063	<0.25	<0.063	<0.063	<0.063	<1.3	<0.063	<0.063	<0.063	<0.063
LF-3	19-Apr-06	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<1	<0.05	<0.05	<0.05	<0.05
LF-3	18-Apr-07	<0.02	<0.02	<0.08	<0.02	<0.02	<0.02	<0.4	<0.02	<0.02	<0.02	<0.02
LF-3	15-Apr-08	<0.02	<0.02	<0.08	<0.02	<0.02	<0.02	<0.4	<0.02	<0.02	<0.02	<0.02
LF-3	15-Apr-09	<0.01	0.0067 J	0.048	<0.01	<0.01	<0.01	<0.2	<0.01	<0.01	<0.01	<0.01
LF-3	26-Apr-10	<0.017	<0.017	<0.067	<0.017	<0.017	<0.017	<0.33	<0.017	<0.017	<0.017	<0.017
LF-30	30-Dec-97	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-30	25-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
DUP	25-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-30	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	0.0011	na	<0.001	<0.002	<0.001	<0.001
LF-30	14-Jul-98	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	na	<0.002	<0.002	<0.002	<0.002
LF-30	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-30	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0015	na	<0.001	0.0014 J11	<0.001	<0.001
LF-30	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0008 J11	na	<0.001	<0.002	<0.001	<0.001
LF-30	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	<0.01	<0.0005	0.0016	<0.0005	<0.0005
LF-30	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-30	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.001	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-30	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0026	<0.01	<0.0005	0.0014	<0.0005	<0.0005
LF-30	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0009	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-30	10-Apr-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0027	<0.01	<0.0005	0.0017	<0.0005	<0.0005
LF-30	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0024 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-30	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0016	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-30	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-30	26-Jan-06	<0.0005	0.0037	0.028	<0.01	<0.01	0.0008	0.0005 J	<0.0005	0.0049	<0.0005	<0.01	<0.0005	<0.0005	0.0009	0.019	0.001	<0.001
LF-31	02-Jun-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.0005	<0.001	<0.001	0.0058	<0.001	<0.005	<0.001	<0.001	0.0022	<0.001	0.0006	<0.002
LF-31	13-Jul-99	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0054	<0.0005	<0.01	<0.0005	<0.0005	0.0024	0.0006	0.0006	<0.001
LF-31	11-Oct-99	<0.0005	0.003	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.019	<0.0005	<0.01	<0.0005	<0.0005	0.0094	0.0034	0.0015	<0.001
LF-32	22-Jun-99	<0.0005	0.0098	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	0.0009	<0.0005	<0.0005	0.0069	<0.0005	<0.001
LF-32	16-Jul-99	<0.0005	0.0091	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	0.001	<0.0005	<0.0005	0.0067	<0.0005	<0.001
LF-32	25-Oct-99	<0.0005	0.013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	0.0012	<0.0005	<0.0005	0.0079	<0.0005	<0.001
DUP	25-Oct-99	<0.0005	0.013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	0.0012	<0.0005	<0.0005	0.0076	<0.0005	<0.001
LF-33	22-Jun-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0005	<0.0013	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	22-Jun-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0005	<0.0009	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-33	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0005	0.0006	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-33	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-34	22-Jun-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.014	<0.0005	<0.01	<0.0005	<0.0005	0.0056	0.0005	<0.0005	<0.001
LF-34	13-Jul-99	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0059	0.0008	<0.0005	<0.001
LF-34	11-Oct-99	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.018	<0.0005	<0.01	<0.0005	<0.0005	0.006	0.0008	0.0015	<0.001
LF-35	25-Oct-99	<0.0005	0.002	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	14-Jan-00	<0.0005	0.0024	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	28-Apr-00	<0.0005	0.0023	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	25-Jul-00	<0.0005	0.0089	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	25-Jul-00	<0.0005	0.0086	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	10-Oct-00	<0.0005	0.0038	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	17-Jan-01	<0.0005	0.006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	13-Apr-01	<0.0005	0.0034	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	05-Jul-01	<0.0005	0.0044	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	15-Oct-01	<0.0005	0.038	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0044	<0.0005	<0.01	<0.0005	<0.0005	0.0011	0.0009	<0.0005	<0.001
LF-35	08-Jan-02	<0.0005	0.026	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0028	<0.0005	<0.01	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.001
DUP	08-Jan-02	<0.0005	0.024	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.001
LF-35	08-Apr-02	<0.0005	0.014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	08-Apr-02	<0.0005	0.014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	08-Jul-02	<0.0005	0.0084	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	07-Oct-02	<0.0005	0.0071	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
LF-35	15-Jan-03	<0.0005	0.0057	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	15-Apr-03	<0.0005	0.0046	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	09-Jul-03	<0.0005	0.004	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	27-Oct-03	<0.0005	0.0038	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	19-Jan-04	<0.0005	0.0037	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	04-May-04	<0.0005	0.0027	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	14-Jul-04	<0.0005	0.0031	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	13-Oct-04	<0.0005	0.0034	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-30	26-Jan-06	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	0.004	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.001	<0.001	0.0022	<0.0005	<0.0005
LF-31	02-Jun-99	<0.0005	<0.001	<0.01	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-31	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-31	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-32	22-Jun-99	<0.0005	<0.0005	<0.0095	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-32	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-32	25-Oct-99	<0.0005	0.0018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	25-Oct-99	<0.0005	0.0018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-33	22-Jun-99	<0.0005	<0.0005	<0.0094	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	22-Jun-99	<0.0005	<0.0005	<0.0095	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-33	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-33	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-34	22-Jun-99	<0.0005	<0.0005	<0.0095	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-34	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-34	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	13-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	07-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-30	26-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0013	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-31	02-Jun-99	<0.001	<0.001	<0.01	<0.001	<0.001	<0.001	na	<0.01	0.0076	<0.001	<0.001
LF-31	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0081	<0.0005	<0.0005
LF-31	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0064	<0.0005	<0.0005
LF-32	22-Jun-99	<0.0005	<0.0005	<0.0095	<0.0005	<0.0005	<0.0005	<0.01	<0.0095	0.0019	<0.0005	<0.0005
LF-32	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
LF-32	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
DUP	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005
LF-33	22-Jun-99	<0.0005	<0.0005	<0.0094	<0.0005	<0.0005	<0.0005	<0.01	<0.0094	0.0006	<0.0005	<0.0005
DUP	22-Jun-99	<0.0005	<0.0005	<0.0095	<0.0005	<0.0005	<0.0005	<0.01	<0.0095	0.0006	<0.0005	<0.0005
LF-33	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-33	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-34	22-Jun-99	<0.0005	<0.0005	<0.0095	<0.0005	<0.0005	<0.0005	<0.01	<0.0095	0.0026	<0.0005	<0.0005
LF-34	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0023	<0.0005	<0.0005
LF-34	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.0005	<0.0005
LF-35	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.003	<0.0005	<0.0005
LF-35	14-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.0005	<0.0005
LF-35	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0026	<0.0005	<0.0005
LF-35	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.009	<0.0005	<0.0005
DUP	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.01	<0.0005	<0.0005
LF-35	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0033	<0.0005	<0.0005
LF-35	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	0.035	<0.0005	0.0058	<0.0005	<0.0005
LF-35	13-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0034	<0.0005	<0.0005
LF-35	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0045	<0.0005	<0.0005
LF-35	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.012	<0.0005	<0.0005
LF-35	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0089	<0.0005	<0.0005
DUP	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.009	<0.0005	<0.0005
LF-35	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.006	<0.0005	<0.0005
DUP	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0059	<0.0005	<0.0005
LF-35	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.004	<0.0005	<0.0005
LF-35	07-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0017	<0.0005	<0.0005
LF-35	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0028	<0.0005	<0.0005
LF-35	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0022	<0.0005	<0.0005
LF-35	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
LF-35	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005
LF-35	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
LF-35	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005
LF-35	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.002	<0.0005	<0.0005
LF-35	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-35	17-Jan-05	<0.0005	0.0034	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	18-Apr-05	<0.0005	0.0032	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	18-Apr-05	<0.0005	0.0032	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	18-Jul-05	<0.0005	0.0031	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	24-Oct-05	<0.0005	0.0021	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	23-Jan-06	<0.0005	0.0032	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	17-Apr-06	<0.0005	0.0039	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-35	18-Apr-07	<0.0005	0.0033	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
LF-35	17-Apr-08	<0.0005	0.0044	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
LF-35	14-Apr-09	<0.0005	0.0046	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
LF-35	30-Apr-10	<0.0005	0.0049	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
LF-35	17-Apr-12	<0.0005	0.0023	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
LF-35	22-Apr-13	<0.0005	0.0037	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
LF-35	28-Apr-14	<0.0005	0.0034	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
LF-36	13-Jan-00	<0.001	<0.001	<0.001	<0.02	0.29	<0.001	<0.001	<0.001	0.014	<0.001	<0.02	<0.001	<0.001 UJ	0.0047	<0.001 UJ	0.001	<0.002
LF-36	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0045	<0.0005	0.001	<0.001
LF-36	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.018	<0.0005	<0.01	<0.0005	<0.0005	0.0055	<0.0005	0.001	<0.001
LF-36	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.019	<0.0005	<0.01	<0.0005	<0.0005	0.0059	<0.0005	0.0017	<0.001
LF-36	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0041	<0.0005	0.001	<0.001
LF-36	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.014	<0.0005	<0.01	<0.0005	<0.0005	0.0038	<0.0005	0.0013	<0.001
LF-36	02-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0033	<0.0005	<0.0005	<0.001
LF-36	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0042	<0.0005	0.0013	<0.001
LF-36	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0033	<0.0005	0.0009	<0.001
LF-36	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0028	<0.0005	0.0008	<0.001
LF-36	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0037	<0.0005	0.001	<0.001
LF-36	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0034	0.0005	0.0007	<0.001
LF-36	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0095	<0.0005	<0.01	<0.0005	<0.0005	0.0028	<0.0005	0.0006	<0.001
LF-36	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0029	<0.0005	0.0006	<0.001
LF-36	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0034	<0.0005	0.0009	<0.001
LF-36	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0099	<0.0005	<0.01	<0.0005	<0.0005	0.003	<0.0005	0.0007	<0.001
LF-36	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0089	<0.0005	<0.01	<0.0005	<0.0005	0.0024	<0.0005	0.0007	<0.001
LF-36	03-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0078	<0.0005	<0.01	<0.0005	<0.0005	0.0022	<0.0005	<0.0005	<0.001
LF-36	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0076	<0.0005	<0.01	<0.0005	<0.0005	0.0019	<0.0005	<0.0005	<0.001
DUP	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0082	<0.0005	<0.01	<0.0005	<0.0005	0.0022	<0.0005	<0.0005	<0.001
LF-36	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.009	<0.0005	<0.01	<0.0005	<0.0005	0.0022	0.0005	0.0006	<0.001
LF-36	17-Jan-05	<0.0005	0.0041	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0062	<0.0005	<0.01	<0.0005	<0.0005	0.001	0.0026	<0.0005	<0.001
LF-36	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0071	<0.0005	<0.01	<0.0005	<0.0005	0.0021	0.0003 J	<0.0005	<0.001
LF-36	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0071	<0.0005	<0.01	<0.0005	<0.0005	0.0021	0.0004 J	0.0004 J	<0.001
LF-36	27-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0099	<0.0005	<0.01	<0.0005	<0.0005	0.0029	0.0005 J	0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-35	17-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-35	28-Apr-14	0.0001 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	13-Jan-00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-36	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0023	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	02-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0038	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	17-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	27-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-35	17-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
LF-35	18-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
DUP	18-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
LF-35	18-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.002	<0.0005	<0.0005
LF-35	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.002	<0.0005	<0.0005
LF-35	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0018	<0.0005	<0.0005
LF-35	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.002	<0.0005	<0.0005
LF-35	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
LF-35	17-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005
LF-35	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.0005	<0.0005
LF-35	30-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
LF-35	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
LF-35	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-35	28-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-36	13-Jan-00	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.02	<0.001	0.0017	<0.001	<0.001
LF-36	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-36	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-36	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-36	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-36	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	02-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-36	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-36	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-36	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
LF-36	14-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-36	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	17-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-36	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-36	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-36	27-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-36	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0086	<0.0005	<0.01	<0.0005	<0.0005	0.0027	0.0003 J	<0.0005	<0.001
LF-36	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0044	<0.0005	<0.01	<0.0005	<0.0005	0.0016	0.0004 J	<0.0005	<0.001
LF-36	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	0.0007	0.0003 J	<0.0005	<0.001
LF-36	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
DUP	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
LF-36	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
LF-36	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-36	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-36	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-36	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
DUP	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
LF-36	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
LF-36	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-36	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0001 J	<0.0005	<0.001
LF-36	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	0.0002 J	0.0001 J	<0.0005	<0.001
LF-37	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	25-Jul-00	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	10-Oct-00	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	17-Jan-01	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	05-Jul-01	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	08-Apr-02	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	08-Jul-02	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	10-Oct-02	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	10-Oct-02	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	27-Oct-03	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	27-Oct-03	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	19-Jan-04	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	03-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-36	27-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-36	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-36	27-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-36	18-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	17-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	17-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	15-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	21-Jul-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	12-Oct-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	12-Oct-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-36	29-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-37	14-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
DUP	14-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
LF-37	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-37	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-37	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-37	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-37	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-37	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-37	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-37	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-37	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-37	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
DUP	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-37	10-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
DUP	10-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-37	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-37	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-37	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
DUP	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-37	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
DUP	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-37	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-37	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-37	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	24-Oct-05	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0025	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	23-Jan-06	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	18-Apr-06	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
LF-37	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	17-Apr-12	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	22-Apr-13	<0.0005	0.0001 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	22-Apr-13	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-37	23-Apr-14	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	14-Jan-00	<0.0005	0.0015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	28-Apr-00	<0.0005	0.0011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	25-Jul-00	<0.0005	0.0017	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	10-Oct-00	<0.0005	0.0017	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	10-Oct-00	<0.0005	0.0018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	17-Jan-01	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	17-Jan-01	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	10-Apr-01	<0.0005	0.0012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	05-Jul-01	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	12-Oct-01	<0.0005	0.0018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	08-Jan-02	<0.0005	0.0024	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	08-Apr-02	<0.0005	0.002	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	08-Jul-02	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	10-Oct-02	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	15-Jan-03	<0.0005	0.0023	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	15-Jan-03	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	15-Apr-03	<0.0005	0.0025	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	08-Jul-03	<0.0005	0.0022	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	27-Oct-03	<0.0005	0.0024	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	19-Jan-04	<0.0005	0.0027	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	03-May-04	<0.0005	0.0027	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	12-Jul-04	<0.0005	0.0033	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	13-Oct-04	<0.0005	0.0028	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-37	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-37	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-37	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-37	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-37	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-37	18-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
LF-37	18-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
LF-37	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-37	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
LF-37	18-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-37	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-37	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-37	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-37	30-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-37	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-37	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-37	23-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-38	14-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-38	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-38	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-38	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-38	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-38	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-38	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-38	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-38	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-38	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-38	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-38	10-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
DUP	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-38	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-38	19-Jan-05	<0.0005	0.0039	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	18-Apr-05	<0.0005	0.0043	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	18-Jul-05	<0.0005	0.0045	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	24-Oct-05	<0.0005	0.0046	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	23-Jan-06	<0.0005	0.0051	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	18-Apr-06	<0.0005	0.005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	19-Apr-07	<0.0005	0.0051	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	16-Apr-08	<0.0005	0.0054	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	14-Apr-09	<0.0005	0.0061	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	28-Apr-10	<0.0005	0.0062	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-38	17-Apr-12	<0.0005	0.0057	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
DUP	17-Apr-12	<0.0005	0.0059	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
LF-38	22-Apr-13	<0.0005	0.0051	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
LF-38	23-Apr-14	<0.0005	0.004	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
LF-39	14-Jan-00	<0.0005	0.013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	0.001	<0.0005	0.0007	0.0083	<0.0005	<0.001
LF-39	28-Apr-00	<0.0005	0.017	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.006	<0.0005	<0.01	0.001	<0.0005	0.0026	0.0095	<0.0005	<0.001
LF-39	25-Jul-00	<0.0005	0.03	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	0.0009	<0.0005	0.0066	0.014	<0.0005	<0.001
LF-39	10-Oct-00	<0.0005	0.015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0027	<0.0005	<0.01	0.0013	<0.0005	0.0008	0.0085	<0.0005	<0.001
LF-39	24-Jan-01	<0.0005	0.045	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.024	<0.0005	<0.01	0.0006	<0.0005	0.012	0.018	<0.0005	<0.001
LF-39	09-Apr-01	<0.0005	0.016	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.01	<0.0005	<0.01	0.0009	<0.0005	0.0039	0.0094	<0.0005	<0.001
LF-39	05-Jul-01	<0.0005	0.032	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	0.0008	<0.0005	0.0077	0.013	<0.0005	<0.001
LF-39	15-Oct-01	<0.0005	0.063	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.022	<0.0005	<0.01	<0.0005	<0.0005	0.0086	0.013	<0.0005	<0.001
LF-39	08-Jan-02	<0.0005	0.024	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0057	<0.0005	<0.01	0.0012	<0.0005	0.0026	0.0085	<0.0005	<0.001
LF-39	08-Apr-02	<0.0005	0.018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.004	<0.0005	<0.01	0.0013	<0.0005	0.0014	0.0092	<0.0005	<0.001
LF-39	08-Jul-02	<0.0005	0.018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0058	<0.0005	<0.01	0.0014	<0.0005	0.0025	0.01	<0.0005	<0.001
LF-39	09-Oct-02	<0.0005	0.014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	0.0012	<0.0005	0.0009	0.0087	<0.0005	<0.001
LF-39	14-Jan-03	<0.0005	0.014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.01	0.0014	<0.0005	0.0009	0.0095	<0.0005	<0.001
DUP	14-Jan-03	<0.0005	0.014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.01	0.0014	<0.0005	0.001	0.0099	<0.0005	<0.001
LF-39	15-Apr-03	<0.0005	0.015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	0.001	<0.0005	0.0009	0.0079	<0.0005	<0.001
LF-39	08-Jul-03	<0.0005	0.012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0028	<0.0005	<0.01	0.0012	<0.0005	0.0008	0.0063	<0.0005	<0.001
LF-39	28-Oct-03	<0.0005	0.011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	0.0012	<0.0005	0.0006	0.0072	<0.0005	<0.001
LF-39	19-Jan-04	<0.0005	0.013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0025	<0.0005	<0.01	0.0013	<0.0005	0.0007	0.0076	<0.0005	<0.001
LF-39	03-May-04	<0.0005	0.011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022	<0.0005	<0.01	0.0013	<0.0005	0.0007	0.0073	<0.0005	<0.001
LF-39	12-Jul-04	<0.0005	0.011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	0.001	<0.0005	0.0006	0.0065	<0.0005	<0.001
LF-39	13-Oct-04	<0.0005	0.0082	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	0.0012	<0.0005	0.0005	0.0056	<0.0005	<0.001
LF-39	17-Jan-05	<0.0005	0.01	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0025	<0.0005	<0.01	0.001	<0.0005	0.0008	0.0071	<0.0005	<0.001
LF-39	18-Apr-05	<0.0005	0.013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	0.0011	<0.0005	0.0006	0.0072	<0.0005	<0.001
LF-39	18-Jul-05	<0.0005	0.012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	0.0011	<0.0005	0.0008	0.007	<0.0005	<0.001
LF-39	27-Oct-05	<0.0005	0.02	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0051	<0.0005	<0.01	0.0011	<0.0005	0.0031	0.0078	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-38	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	28-Apr-10	<0.0005	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	22-Apr-13	0.0001 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-38	23-Apr-14	0.0001 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	09-Oct-02	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	17-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	27-Oct-05	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-38	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-38	18-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-38	18-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-38	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-38	18-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-38	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-38	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-38	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-38	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-38	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
DUP	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-38	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-38	23-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-39	14-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-39	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	0.0054 J	<0.0005	0.0018	<0.0005	<0.0005
LF-39	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0029	<0.0005	<0.0005
LF-39	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
LF-39	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0042	<0.0005	<0.0005
LF-39	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
LF-39	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0033	<0.0005	<0.0005
LF-39	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0053	<0.0005	<0.0005
LF-39	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
LF-39	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-39	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-39	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-39	14-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
DUP	14-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-39	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-39	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-39	28-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-39	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-39	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-39	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-39	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-39	17-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-39	18-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-39	18-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-39	27-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-39	23-Jan-06	<0.0005	0.011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	0.0012	<0.0005	0.0009	0.007	<0.0005	<0.001
LF-39	17-Apr-06	<0.0005	0.014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	0.0014	<0.0005	0.0006	0.0074	<0.0005	<0.001
LF-39	18-Apr-07	<0.0005	0.0099	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	0.0014	<0.0005	0.0007	0.0071	<0.0005	<0.001
LF-39	17-Apr-08	<0.0005	0.015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.004	<0.0005	<0.01	0.001	<0.0005	0.0015	0.0066	<0.0005	<0.001
LF-39	15-Apr-09	<0.0005	0.0079	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0032	<0.0005	<0.01	0.0012	<0.0005	0.001	0.0063	<0.0005	<0.001
LF-39	28-Apr-10	<0.0005	0.006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0039	<0.0005	<0.01	0.001	<0.0005	0.0011	0.0061	<0.0005	<0.001
LF-39	17-Apr-12	<0.0005	0.0032	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.004	<0.0005	<0.01	0.0006	<0.0005	0.0014	0.0039	<0.0005	<0.001
LF-39	22-Apr-13	<0.0005	0.0027	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.01	0.0007	<0.0005	0.0011	0.0039	<0.0005	<0.001
LF-39	22-Apr-14	<0.0005	0.0026	<0.0005	<0.01	<0.01 U5	<0.0005	<0.0005	<0.0005	0.0038	<0.0005	<0.01	0.0007	0.0005 J	0.0011	0.0038	<0.0005	<0.001
DUP	22-Apr-14	<0.0005	0.0025	<0.0005	<0.01	<0.01 U5	<0.0005	<0.0005	<0.0005	0.0039	<0.0005	<0.01	0.0007	0.0005 J	0.0011	0.0038	<0.0005	<0.001
LF-4	02-Jun-89	<0	<0.02	na	0.26	1.3	<0.2	<0.02	na	na	1.3	4.7	<0.02	<0.2	na	<0.02	na	3.8
DUP	02-Jun-89	<0	<0.02	na	0.28	1.3	<0.2	<0.02	na	na	1.7	4.7	<0.02	<0.02	na	<0.02	na	4.1
LF-4	06-Dec-89	<0	<0.002	na	<0.002	<0.02	<0.02	<0.002	na	na	0.2	<0.04	<0.002	<0.004	na	<0.002	na	0.65
DUP	06-Dec-89	<0	<0.005	na	<0.005	<0.05	<0.005	<0.005	na	na	0.25	<0.1	<0.005	<0.005	na	<0.005	na	0.75
LF-4	20-Jul-90	<0	<0.1	na	<0.1	<1	<1	<0.1	na	na	<0.1	<2	<0.1	<0.1	na	<0.1	na	0.38
LF-4	21-Jun-91	<0	<0.01	na	<0.02	0.079	0.039	0.005	na	na	0.058	<0.04	<0.01	0.007	na	<0.01	na	0.35
DUP	21-Jun-91	<0	<0.01	na	<0.02	<0.04	0.04	0.006	na	0.02	0.14	<0.04	<0.01	0.008	na	<0.01	na	0.38
LF-4	09-Jul-92	<0	<0.005	na	<0.01	<0.02	0.016	0.008	na	na	0.015	<0.02	<0.005	<0.005	na	<0.005	na	0.069
LF-4	09-Jun-93	<0	<0.05	na	<0.1	<0.2	0.051	<0.05	na	na	0.21	<0.2	<0.05	<0.05	na	<0.05	na	1.5
LF-4	02-Mar-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	0.0013	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-4	09-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	0.0039 J3	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-4	16-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0038	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-4	19-Oct-98	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	<0.005 UJ2	<0.001 UJ2	0.0037 J2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2
LF-4	14-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	0.0007 J11	0.0045	<0.001	0.0007 J11	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-4	22-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	0.0007 J11	0.0051	<0.001	0.0009 J11	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005 J11
LF-4	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0043	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0042	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0042	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0008	0.0033	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	0.018	0.0007	0.0032	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0028	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0022 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0028	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-39	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-39	22-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	22-Apr-14	<0.0005	0.0002 J	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	02-Jun-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	02-Jun-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-4	06-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	06-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-4	20-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-4	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-4	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-4	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-4	02-Mar-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0018	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	0.001	<0.001
LF-4	09-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0014 J3	<0.001
LF-4	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-4	19-Oct-98	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2
LF-4	14-Jan-99	<0.001	<0.001	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-4	22-Apr-99	<0.001	<0.001	0.0015	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-4	16-Jul-99	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Jul-99	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	15-Oct-99	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	25-Jan-00	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	25-Jan-00	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	20-Jan-03	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	25-Jan-06	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-39	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-39	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-39	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-39	17-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005
LF-39	15-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-39	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-39	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
LF-39	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-39	22-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
DUP	22-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
LF-4	02-Jun-89	na	na	0.14	na	na	na	na	na	na	na	na
DUP	02-Jun-89	na	na	0.095	na	na	na	na	na	na	na	na
LF-4	06-Dec-89	na	na	0.015	na	na	na	na	na	na	na	na
DUP	06-Dec-89	na	na	0.007	na	na	na	na	na	na	na	na
LF-4	20-Jul-90	na	na	0.01	na	na	na	na	na	na	na	na
LF-4	21-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
DUP	21-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
LF-4	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-4	09-Jun-93	na	na	0.01	na	na	na	na	na	na	na	na
LF-4	02-Mar-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-4	09-Apr-98	<0.001	<0.001	0.0014 J3	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-4	16-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-4	19-Oct-98	<0.001 UJ2	<0.001 UJ2	<0.0021 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	na	<0.001 UJ2	<0.002 UJ2	<0.001 UJ2	<0.001 UJ2
LF-4	14-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-4	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-4	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
DUP	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-4	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-4	25-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	25-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	20-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-4	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.001
LF-4	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-4	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-40	14-Jan-00	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0005 R	<0.0005	<0.001
LF-40	28-Apr-00	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-40	25-Jul-00	<0.0005	0.0017	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0007	<0.0005	<0.001
LF-40	10-Oct-00	<0.0005	0.0016	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.001
LF-40	24-Jan-01	<0.0005	0.0018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008	0.0006	<0.001
LF-40	09-Apr-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	<0.001
DUP	09-Apr-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.001
LF-40	05-Jul-01	<0.0005	0.0014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0007	0.0011	<0.001
LF-40	15-Oct-01	<0.0005	0.0023	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	0.0009	<0.001
LF-40	08-Jan-02	<0.0005	0.0013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.001
LF-40	08-Apr-02	<0.0005	0.0023	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	<0.0005	<0.0005	0.0005	0.0012	0.0009	<0.001
LF-40	08-Jul-02	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0029	<0.0005	<0.01	<0.0005	<0.0005	0.0006	0.0009	0.0009	<0.001
LF-40	09-Oct-02	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	0.0009	<0.001
LF-40	14-Jan-03	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.001
LF-40	15-Apr-03	<0.0005	0.0026	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.001
LF-40	08-Jul-03	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.001
LF-40	28-Oct-03	<0.0005	0.012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	0.0011	<0.0005	0.0006	0.0068	<0.0005	<0.001
LF-40	19-Jan-04	<0.0005	0.0009 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0011 J	<0.001
LF-40	03-May-04	<0.0005	0.0012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	0.0008	<0.001
DUP	03-May-04	<0.0005	0.0012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0025	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	0.0008	<0.001
LF-40	12-Jul-04	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0027	<0.0005	<0.01	<0.0005	<0.0005	0.0005	<0.0005	0.0009	<0.001
LF-40	13-Oct-04	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.0005	<0.0005	0.0007	<0.001
LF-40	17-Jan-05	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0004 J	0.0004 J	<0.001
LF-40	18-Apr-05	<0.0005	0.0017	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0027	<0.0005	<0.01	<0.0005	<0.0005	0.0005	0.0009	0.0009	<0.001
LF-40	18-Jul-05	<0.0005	0.0011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0028	<0.0005	<0.01	<0.0005	<0.0005	0.0006	0.0007	<0.0005	<0.001
LF-40	27-Oct-05	<0.0005	0.0014 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0049 J	<0.0005	<0.01	<0.0005	<0.0005	0.0016 J	0.0008 J	0.0007 J	<0.001
LF-40	23-Jan-06	<0.0005	0.0014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0049	<0.0005	<0.01	<0.0005	<0.0005	0.0014	0.0007	0.0008	<0.001
LF-40	17-Apr-06	<0.0005	0.0017	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0041	<0.0005	<0.01	<0.0005	<0.0005	0.0011	0.0012	0.0006	<0.001
DUP	17-Apr-06	<0.0005	0.0021	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0038	<0.0005	<0.01	<0.0005	<0.0005	0.0011	0.0011	0.0007	<0.001
LF-40	18-Apr-07	<0.0005	0.0017	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.005	<0.0005	<0.01	<0.0005	<0.0005	0.0016	0.001	0.0007	<0.001
LF-40	17-Apr-08	<0.0005	0.002	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0035	<0.0005	<0.01	<0.0005	<0.0005	0.0012	0.0013	0.0005	<0.001
LF-40	15-Apr-09	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	<0.0005	<0.0005	0.0006	0.0007	<0.0005	<0.001
LF-40	28-Apr-10	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0004 J	<0.0005	<0.001
LF-40	17-Apr-12	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	0.0003 J	<0.0005	<0.001
LF-40	22-Apr-13	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0002 J	0.0003 J	<0.0005	<0.001
LF-40	22-Apr-14	<0.0005	0.0005 J	<0.0005	<0.01	0.0011 J	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0002 J	0.0004 J	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-4	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-4	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0026	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	17-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	27-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-40	22-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-4	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-4	26-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-40	14-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
LF-40	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-40	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
LF-40	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
LF-40	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-40	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
DUP	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-40	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
LF-40	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0018	<0.0005	<0.0005
LF-40	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
LF-40	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005
LF-40	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-40	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-40	14-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-40	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-40	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-40	28-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-40	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011 J	<0.0005	<0.0005
LF-40	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
DUP	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-40	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-40	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-40	17-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-40	18-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-40	18-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-40	27-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008 J	<0.0005	<0.0005
LF-40	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-40	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
DUP	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-40	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-40	17-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-40	15-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-40	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-40	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-40	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-40	22-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0001 J	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-41	13-Jan-00	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0069	<0.0005	<0.01	<0.0005	<0.0005	0.0025	<0.0005	0.0018	<0.001
DUP	13-Jan-00	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0066	<0.0005	<0.01	<0.0005	<0.0005	0.0025	<0.0005	0.0016	<0.001
LF-41	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.007	<0.0005	<0.01	<0.0005	<0.0005	0.0029	<0.0005	0.0025	<0.001
LF-41	25-Jul-00	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0088	<0.0005	<0.01	<0.0005	<0.0005	0.0032	<0.0005	0.002	<0.001
LF-41	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0078	<0.0005	<0.01	<0.0005	<0.0005	0.0027	<0.0005	0.0037	<0.001
DUP	10-Oct-00	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0078	<0.0005	<0.01	<0.0005	<0.0005	0.0026	<0.0005	0.0035	<0.001
LF-41	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.009	<0.0005	<0.01	<0.0005	<0.0005	0.0032	<0.0005	0.0029	<0.001
LF-41	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0097	<0.0005	<0.01	<0.0005	<0.0005	0.0033	<0.0005	0.0036	<0.001
LF-41	05-Jul-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0088	<0.0005	<0.01	<0.0005	<0.0005	0.0034	<0.0005	0.0038	<0.001
LF-41	12-Oct-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0039	<0.0005	0.0031	<0.001
LF-41	08-Jan-02	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.005	<0.0005	0.0039	<0.001
LF-41	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	<0.001
DUP	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	<0.001
LF-41	08-Apr-02	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0043	<0.0005	0.0021	<0.001
LF-41	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0099	<0.0005	<0.01	<0.0005	<0.0005	0.004	<0.0005	0.0024	<0.001
LF-41	09-Oct-02	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0085	<0.0005	<0.01	<0.0005	<0.0005	0.0029	<0.0005	0.0016	<0.001
LF-41	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0041	<0.0005	0.0024	<0.001
LF-41	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0042	<0.0005	0.0019	<0.001
LF-41	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0092	<0.0005	<0.01	<0.0005	<0.0005	0.0032	<0.0005	0.0028	<0.001
LF-41	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.009	<0.0005	<0.01	<0.0005	<0.0005	0.0028	<0.0005	0.0021	<0.001
LF-41	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0035	<0.0005	0.0024	<0.001
LF-41	03-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0042	<0.0005	0.0012	<0.001
LF-41	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0041	<0.0005	0.0015	<0.001
LF-41	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0087	<0.0005	<0.01	<0.0005	<0.0005	0.0029	<0.0005	0.0013	<0.001
LF-41	17-Jan-05	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0051	0.0003 J	0.0027	<0.001
LF-41	19-Apr-05	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0064	0.0003 J	0.0022	<0.001
DUP	19-Apr-05	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.014	<0.0005	<0.01	<0.0005	<0.0005	0.0063	<0.0005	0.0021	<0.001
LF-41	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0052	<0.0005	0.0013	<0.001
LF-41	24-Oct-05	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.017	<0.0005	<0.01	<0.0005	<0.0005	0.0071	<0.0005	0.0017	<0.001
LF-41	23-Jan-06	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.01	<0.0005	<0.0005	0.0071	<0.0005	0.0022	<0.001
DUP	23-Jan-06	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.01	<0.0005	<0.0005	0.0073	<0.0005	0.0022	<0.001
LF-41	17-Apr-06	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.014	<0.0005	<0.01	<0.0005	<0.0005	0.0078	0.0004 J	0.0025	<0.001
LF-41	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-41	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-41	19-Oct-11	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	0.0002 J	<0.0005	<0.0005	<0.001
LF-41	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
LF-41	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	0.0003 J	<0.001
LF-41	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	0.0002 J	<0.0005	0.0002 J	<0.001
LF-41	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	0.0013 J	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-41	13-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	13-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-41	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	17-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	19-Oct-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-41	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-41	13-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0073	<0.0005	<0.0005
DUP	13-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0072	<0.0005	<0.0005
LF-41	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0059	<0.0005	<0.0005
LF-41	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0061	<0.0005	<0.0005
LF-41	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0046	<0.0005	<0.0005
DUP	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0049	<0.0005	<0.0005
LF-41	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0038	<0.0005	<0.0005
LF-41	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0027	<0.0005	<0.0005
LF-41	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0027	<0.0005	<0.0005
LF-41	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0033	<0.0005	<0.0005
LF-41	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0024	<0.0005	<0.0005
LF-41	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
DUP	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
LF-41	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0024	<0.0005	<0.0005
LF-41	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
LF-41	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
LF-41	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
LF-41	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
LF-41	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
LF-41	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-41	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
LF-41	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-41	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
LF-41	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-41	17-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
LF-41	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
DUP	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-41	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-41	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
LF-41	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
DUP	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
LF-41	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-41	15-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-41	21-Jul-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-41	19-Oct-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-41	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-41	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-41	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-41	23-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0023	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0023	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	01-May-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0019	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	01-May-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0026	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0018	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0016	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0016	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0015	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0015	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0015	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0013	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0016	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0013	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	04-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0014	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0013	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	19-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-42	24-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	0.0002 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	12-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	01-May-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	01-May-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	09-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	19-Jul-05	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	26-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	19-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-42	24-Apr-13	<0.0005	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	23-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	12-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	12-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	01-May-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	01-May-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-42	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	06-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	06-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-42	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	09-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	09-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-42	10-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-42	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	28-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-42	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-42	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
LF-42	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
DUP	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
LF-42	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
LF-42	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
LF-42	26-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
LF-42	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-42	19-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0007	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-42	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-42	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	26-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-42	24-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0002 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexanone	Acetone	Benzene	Chlorobenzene	Chloroform	cis-1,2-DCE	Ethylbenzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-42	25-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.0001 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-5	01-Jun-89	<0	<1	na	<2	220	<2	<1	na	na	2	390	<1	300	na	<2	na	8
LF-5	06-Dec-89	<0	<1	na	<1	51	<1	<1	na	na	<1	320	<1	310	na	<1	na	<1
LF-5	20-Jul-90	<0	<1	na	6.7	<10	<1	<1	na	na	1.1	170	<1	170	na	<1	na	2.6
LF-5	21-Jun-91	<0	<5	na	<10	<20	<5	<5	na	na	<5	<20	<5	200 GT	na	<5	na	5.4
LF-5	06-Aug-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-5	09-Jul-92	<0	<5	na	<10	<20	<5	<5	na	na	<5	<20	<5	150	na	<5	na	<5
LF-5	09-Jun-93	<0	<2.5	na	<5	<10	<2.5	<2.5	na	na	<2.5	<10	<2.5	83	na	<2.5	na	4.5
LF-6	01-Jun-89	<0	<0.2	na	<1	280	<1	<0.2	na	na	6	470	<0.2	22	na	<1	na	210
LF-6	05-Dec-89	<0	<1	na	<1	64	<1	<1	na	na	5	320	<1	59	na	<1	na	17
LF-6	20-Jul-90	<0	<1	na	24	200	<1	<1	na	na	4	720	45	45	na	<1	na	13
LF-7	01-Jun-89	<0	<0.001	na	<0.005	<0.005	0.05	<0.001	na	na	<0.005	<0.005	<0.001	0.27	na	<0.005	na	0.58
LF-7	06-Dec-89	<0	<0.001	na	<0.001	<0.01	0.031	0.007	na	na	0.052	<0.02	<0.001	0.003	na	<0.001	na	0.15
LF-7	19-Jul-90	<0	<0.001	na	<0.001	<0.01	<0.001	0.001	na	na	0.007	<0.02	<0.001	<0.001	na	<0.001	na	0.044
LF-7	08-Aug-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	20-Jun-91	<0	<0.005	na	<0.01	<0.02	0.061	0.007	na	na	0.045	<0.02	<0.005	<0.005	na	<0.005	na	0.12
LF-7	06-Aug-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	17-Dec-91	<0.005	<0.005	na	<0.010	<0.020	0.006	0.005	na	na	0.006	<0.020	<0.005	<0.005	na	<0.005	na	0.009
LF-7	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
DUP	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-7	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
DUP	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-7	06-Jan-94	<0	<0.003	<0.003	<0.03	<0.05	0.031	0.009	<0.003	<0.003	0.003	<0.05	<0.003	0.12	<0.003	<0.003	<0.005	0.014
LF-7	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	0.004	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
DUP	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	0.0037	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-7	13-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0038	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-7	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0067	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0069	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0063	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0076	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0079	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0068	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0073	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0097	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0099	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.01	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-7	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.01	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-42	25-Apr-14	<0.0005	<0.0005	0.0001 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-5	01-Jun-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-5	06-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-5	20-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-5	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-5	06-Aug-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-5	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-5	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-6	01-Jun-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-6	05-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-6	20-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	01-Jun-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	06-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	08-Aug-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	06-Aug-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-7	06-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na
LF-7	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
DUP	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-7	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-7	20-Jan-00	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	25-Jan-01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	17-Jan-03	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	19-Jan-05	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	24-Jan-06	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	19-Apr-07	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Apr-07	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	14-Apr-08	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Apr-08	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	16-Apr-09	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-7	27-Apr-10	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-42	25-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0002 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-5	01-Jun-89	na	na	0.02	na	na	na	na	na	na	na	na
LF-5	06-Dec-89	na	na	0.025	na	na	na	na	na	na	na	na
LF-5	20-Jul-90	na	na	<0.02	na	na	na	na	na	na	na	na
LF-5	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na
LF-5	06-Aug-91	na	na	<0.05	na	na	na	na	na	na	na	na
LF-5	09-Jul-92	na	na	<0.02	na	na	na	na	na	na	na	na
LF-5	09-Jun-93	na	na	0.01	na	na	na	na	na	na	na	na
LF-6	01-Jun-89	na	na	na	na	na	na	na	na	na	na	na
LF-6	05-Dec-89	na	na	0.06	na	na	na	na	na	na	na	na
LF-6	20-Jul-90	na	na	<0.02	na	na	na	na	na	na	na	na
LF-7	01-Jun-89	na	na	0.008	na	na	na	na	na	na	na	na
LF-7	06-Dec-89	na	na	<0.002	na	na	na	na	na	na	na	na
LF-7	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na
LF-7	08-Aug-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-7	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na
LF-7	06-Aug-91	na	na	0.005	na	na	na	na	na	na	na	na
LF-7	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-7	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
DUP	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-7	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
DUP	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-7	06-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003
LF-7	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
DUP	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-7	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-7	20-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-7	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-7	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-7	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-7	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-7	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
LF-7	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-7	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005
DUP	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005 J	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005
LF-7	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005
DUP	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005
LF-7	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005
LF-7	27-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	0.0005 J	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-8	05-Dec-89	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.003	na	<0.001	na	<0.001
LF-8	19-Jul-90	<0	<0.001	na	<0.001	<0.01	<0.001	0.001	na	na	0.007	<0.02	<0.001	<0.001	na	<0.001	na	0.002
LF-8	08-Aug-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	21-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-8	20-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-8	17-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-8	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-8	30-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-8	09-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-8	06-Jan-94	<0	<0.003	<0.003	<0.03	<0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.05	<0.003	<0.003	<0.003	<0.003	<0.005	<0.005
LF-8	27-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-8	08-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	15-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	21-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	13-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	21-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0012	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	19-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0018	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0028	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0025 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0025	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0028	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0004 J	0.0028	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0003 J	0.0031	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0003 J	0.0037	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J
LF-8	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0004 J	0.0035	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0004 J	0.0033	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-8	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.003	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-9	05-Dec-89	<0	<0.001	na	<0.001	<0.01	<0.001	0.005	na	na	0.022	<0.02	<0.001	0.003	na	<0.001	na	<0.001
LF-9	19-Jul-90	<0	<0.001	na	<0.001	<0.01	<0.001	0.004	na	na	0.011	<0.02	<0.001	<0.001	na	<0.001	na	0.002
LF-9	21-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-9	21-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	0.006	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-9	16-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	0.009	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-9	09-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-9	30-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	0.005	na	na	0.007	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-9	09-Jun-93	<0	<0.005	na	<0.01	<0.02	0.005	0.005	na	na	<0.005	<0.02	<0.005	0.005	na	<0.005	na	<0.005
LF-B1 (a)	07-Dec-89	<0	0.051	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-8	05-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	08-Aug-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-8	06-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na
LF-8	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-8	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-8	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	19-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	20-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-8	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-9	05-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-9	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-9	21-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-9	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-9	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-9	09-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-9	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-9	09-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	07-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-8	05-Dec-89	na	na	0.06	na	na	na	na	na	na	na	na
LF-8	19-Jul-90	na	na	na	na	na	na	na	na	na	na	na
LF-8	08-Aug-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-8	21-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-8	20-Jun-91	na	na	<0.013	na	na	na	na	na	na	na	na
LF-8	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-8	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-8	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-8	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-8	06-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003
LF-8	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-8	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-8	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-8	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-8	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-8	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-8	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	19-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	22-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	20-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	20-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	20-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0011	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0019	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-8	26-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.001	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-9	05-Dec-89	na	na	<0.002	na	na	na	na	na	na	na	na
LF-9	19-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-9	21-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-9	21-Jun-91	na	na	<0.01	na	na	na	na	na	na	na	na
LF-9	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-9	09-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-9	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-9	09-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B1 (a)	07-Dec-89	na	na	<0.002	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-B1 (a)	18-Jul-90	<0	0.17	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	0.001	<0.002	na	<0.001	na	<0.001
LF-B1 (a)	20-Dec-90	<0	0.13	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-B1 (a)	20-Jun-91	<0	0.18	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B1 (a)	16-Dec-91	<0.005	0.160	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-B1 (a)	08-Jul-92	<0	0.15	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B1 (a)	30-Dec-92	<0	0.14	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B1 (a)	08-Jun-93	<0	0.16	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B2	06-Dec-89	<0	0.007	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	0.013
LF-B2	18-Jul-90	<0	0.007	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.002	na	<0.001	na	<0.001
DUP	18-Jul-90	<0	0.007	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.002	na	<0.001	na	<0.001
LF-B2	19-Dec-90	<0	0.004	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	0.002	<0.001	na	<0.001	na	<0.001
LF-B2	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	20-Jun-91	<0	0.15	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B2	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	16-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-B2	08-Jul-92	<0	0.006	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B2	08-Jun-93	<0	0.006	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B3	07-Dec-89	<0	0.1	na	0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
DUP	07-Dec-89	<0	0.073	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-B3	18-Jul-90	<0	0.086	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.002	na	<0.001	na	<0.001
LF-B3	20-Dec-90	<0	0.084	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	<0.001	na	<0.001	na	<0.001
LF-B3	19-Jun-91	<0	0.11	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B3	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	16-Dec-91	<0.005	0.087	na	<0.010	0.026	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.005	na	<0.005	na	<0.005
LF-B3	08-Jul-92	<0	0.11	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B3	30-Dec-92	<0	0.11	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B3	08-Jun-93	<0	0.11	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B3	05-Jan-94	<0	0.099	<0.003	<0.03	<0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.05	<0.003	<0.003	<0.003	<0.003	<0.005	<0.005
LF-B3	16-Apr-96	<0	0.013	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B3	01-Aug-96	<0	0.022	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B3	21-Nov-96	<0	0.036	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	21-Nov-96	<0	0.021	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B3	17-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B3	12-Jun-97	<0	0.034	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B3	20-Aug-97	<0	0.032	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B3	17-Dec-97	<0	0.018	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B3	27-Feb-98	<0	0.022	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-B3	08-Apr-98	<0	0.0059	<0.001	<0.005	0.014	<0.001	<0.001	<0.001	<0.001	<0.001	0.0057	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B3	15-Jul-98	<0.001	0.019	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-B1 (a)	18-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	08-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	06-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	18-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	18-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	19-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B2	08-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	07-Dec-89	na	na	na	na	na	na	na	na	0.001	na	na	na	na	na	na	na
DUP	07-Dec-89	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	18-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	20-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	19-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	21-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	08-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B3	05-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na
LF-B3	16-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B3	01-Aug-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B3	21-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	21-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B3	17-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B3	12-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B3	20-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B3	17-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B3	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B3	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B3	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-B1 (a)	18-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B1 (a)	20-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B1 (a)	20-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
LF-B1 (a)	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	08-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B1 (a)	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-B1 (a)	08-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B2	06-Dec-89	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B2	18-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
DUP	18-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B2	19-Dec-90	na	na	na	na	na	na	na	na	na	na	na
LF-B2	20-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B2	20-Jun-91	na	na	na	na	na	na	na	na	na	na	na
LF-B2	21-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
LF-B2	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-B2	08-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B2	08-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B3	07-Dec-89	na	na	<0.002	0.001	na	na	0.001	na	na	na	na
DUP	07-Dec-89	na	na	na	na	na	na	na	na	na	na	na
LF-B3	18-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B3	20-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B3	19-Jun-91	na	na	na	na	na	na	na	na	na	na	na
LF-B3	21-Jun-91	na	na	<0.011	na	na	na	na	na	na	na	na
LF-B3	16-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-B3	08-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B3	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-B3	08-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B3	05-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003
LF-B3	16-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-B3	01-Aug-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B3	21-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	21-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B3	17-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B3	12-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B3	20-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B3	17-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B3	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.011	<0.001	<0.001
LF-B3	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-B3	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.012	<0.001	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-B3	21-Oct-98	<0.001	0.017	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B3	13-Jan-99	<0.001	0.018	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B3	22-Apr-99	<0.001	0.014	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B3	15-Jul-99	<0.0005	0.014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	14-Oct-99	<0.0005	0.012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	25-Jan-00	<0.0005	0.0029	<0.0005	<0.01	0.016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	25-Jan-01	<0.0005	0.0014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	15-Oct-01	<0.0005	0.0063	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	15-Oct-01	<0.0005	0.0061	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	10-Jan-02	<0.0005	0.0051	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	16-Jan-03	<0.0005	0.0059	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	21-Jan-04	<0.0005	0.0034	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	21-Jan-04	<0.0005	0.0035 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	20-Jan-05	<0.0005	0.0037	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	24-Jan-06	<0.0005	0.0028	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	19-Apr-07	<0.0005	0.003	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	16-Apr-08	<0.0005	0.0029	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	15-Apr-09	<0.0005	0.0029	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B3	30-Apr-10	<0.0005	0.0026	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	18-Jul-90	<0	0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.002	na	<0.001	na	<0.001
LF-B4	19-Dec-90	<0	<0.001	na	<0.001	<0.01	<0.001	<0.001	na	na	<0.001	<0.02	<0.001	0.002	na	<0.001	na	<0.001
LF-B4	19-Jun-91	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B4	17-Dec-91	<0.005	<0.005	na	<0.010	<0.020	<0.005	<0.005	na	na	<0.005	<0.020	<0.005	<0.050	na	<0.005	na	<0.005
LF-B4	08-Jul-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B4	30-Dec-92	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B4	08-Jun-93	<0	<0.005	na	<0.01	<0.02	<0.005	<0.005	na	na	<0.005	<0.02	<0.005	<0.005	na	<0.005	na	<0.005
LF-B4	05-Jan-94	<0	<0.003	<0.003	<0.03	<0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.05	<0.003	<0.003	<0.003	0.012	<0.005	<0.005
LF-B4	16-Apr-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B4	30-Jul-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B4	22-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	0.01	<0.005	<0.005	<0.01	<0.01
DUP	22-Nov-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B4	17-Mar-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B4	01-Jul-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B4	20-Aug-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B4	18-Dec-97	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B4	25-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-B4	07-Apr-98	<0	0.0012	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B4	15-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B4	19-Oct-98	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	<0.005 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-B3	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B3	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B3	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B3	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0026	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0023	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B3	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	18-Jul-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B4	19-Dec-90	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B4	19-Jun-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B4	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B4	08-Jul-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B4	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B4	08-Jun-93	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
LF-B4	05-Jan-94	<0.003	<0.003	na	<0.003	<0.003	na	na	na	<0.03	na	<0.005	<0.005	<0.005	na	na	na
LF-B4	16-Apr-96	<0.005	<0.005	<0.01	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B4	30-Jul-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B4	22-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	22-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B4	17-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B4	01-Jul-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B4	20-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B4	18-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B4	25-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B4	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B4	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B4	19-Oct-98	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.005 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-B3	21-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.019	<0.001	<0.001
LF-B3	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.014	<0.001	<0.001
LF-B3	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.012	<0.001	<0.001
LF-B3	15-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.014	<0.0005	<0.0005
LF-B3	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.015	<0.0005	<0.0005
LF-B3	25-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.0005	<0.0005
LF-B3	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.003	<0.0005	<0.0005
LF-B3	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.013	<0.0005	<0.0005
DUP	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.013	<0.0005	<0.0005
LF-B3	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0084	<0.0005	<0.0005
LF-B3	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.017	<0.0005	<0.0005
LF-B3	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.012	<0.0005	<0.0005
DUP	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.012 J	<0.0005	<0.0005
LF-B3	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.014	<0.0005	<0.0005
LF-B3	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.012	<0.0005	<0.0005
LF-B3	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.012	<0.0005	<0.0005
LF-B3	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.014	<0.0005	<0.0005
LF-B3	15-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.013	<0.0005	<0.0005
LF-B3	30-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.01	<0.0005	<0.0005
LF-B4	18-Jul-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B4	19-Dec-90	na	na	<0.002	na	na	na	na	na	na	na	na
LF-B4	19-Jun-91	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B4	17-Dec-91	na	na	na	na	na	na	na	na	na	na	na
LF-B4	08-Jul-92	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B4	30-Dec-92	na	na	na	na	na	na	na	na	na	na	na
LF-B4	08-Jun-93	na	na	<0.01	na	na	na	na	na	na	na	na
LF-B4	05-Jan-94	na	na	na	<0.003	na	na	<0.03	na	na	na	<0.003
LF-B4	16-Apr-96	na	na	<0.01	<0.005	na	na	<0.05	<0.01	na	na	<0.005
LF-B4	30-Jul-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B4	22-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	22-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B4	17-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B4	01-Jul-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B4	20-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B4	18-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B4	25-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
LF-B4	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-B4	15-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-B4	19-Oct-98	<0.001 UJ2	<0.001 UJ2	0.002 J2	<0.001 UJ2	<0.001 UJ2	<0.001 UJ2	na	<0.001 UJ2	<0.002 UJ2	<0.001 UJ2	<0.001 UJ2

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-B4	11-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B4	20-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B4	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0031	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	16-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B4	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B5 (b)	09-Apr-96	<0	0.28	<0.05	<0.5	<1	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1
LF-B5 (b)	01-Aug-96	<0	0.38	<0.03	<0.3	<0.5	<0.03	<0.03	<0.03	<0.03	<0.03	<0.5	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05
LF-B5 (b)	22-Nov-96	<0	0.32	<0.03	<0.3	<0.5	<0.03	<0.03	<0.03	<0.03	<0.03	<0.5	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05
LF-B5 (b)	17-Mar-97	<0	0.29	<0.03	<0.3	<0.5	<0.03	<0.03	<0.03	<0.03	<0.03	<0.5	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05
LF-B5 (b)	12-Jun-97	<0	0.31	<0.03	<0.3	<0.5	<0.03	<0.03	<0.03	<0.03	<0.03	<0.5	<0.03	<0.03	<0.03	<0.03	<0.05	<0.05
LF-B5 (b)	20-Aug-97	<0	0.38	<0.05	<0.5	<1	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1
LF-B5 (b)	17-Dec-97	<0	0.34	<0.05	<0.5	<1	<0.05	<0.05	<0.05	<0.05	<0.05	<1	<0.05	<0.05	<0.05	<0.05	<0.1	<0.1
LF-B5 (b)	27-Feb-98	<0	0.24	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0048	<0.001	<0.02	<0.001	<0.001	0.0023	0.009	<0.002	<0.002
LF-B5 (b)	09-Apr-98	<0	0.34	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.001
LF-B5 (b)	16-Jul-98	<0.012	0.28	<0.012	<0.062	<0.062	<0.012	<0.012	<0.012	<0.012	<0.012	<0.062	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
LF-B5 (b)	23-Oct-98	<0.0025	0.24	<0.0025	<0.012	0.03	<0.0025	<0.0025	<0.0025	0.003	<0.0025	<0.012	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
LF-B5 (b)	13-Jan-99	<0.002	0.3	<0.002	<0.01	<0.01	<0.002	<0.002	<0.002	0.003	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
LF-B5 (b)	21-Apr-99	<0.001	0.31	0.0009 J11	<0.005	<0.005	<0.001	<0.001	<0.001	0.003	<0.001	<0.005	<0.001	<0.001	<0.001	0.0009 J11	<0.001	<0.001
LF-B5 (b)	15-Jul-99	<0.001	0.26	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0025	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002
LF-B5 (b)	15-Oct-99	<0.001	0.27	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0044	<0.001	<0.02	<0.001	<0.001	<0.001	0.003	<0.001	<0.002
DUP	15-Oct-99	<0.001	0.26	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0029	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002
LF-B5 (b)	21-Jan-00	<0.001	0.26	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0035	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002
LF-B5 (b)	02-Feb-01	<0.0005	0.2	0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008	0.0008	<0.001
LF-B5 (b)	10-Jan-02	<0.0005	0.21	0.0007	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0027	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.001
LF-B5 (b)	20-Jan-03	<0.0007	0.24	0.0008	<0.014	<0.014	<0.0007	<0.0007	<0.0007	0.0039	<0.0007	<0.014	<0.0007	<0.0007	<0.0007	0.0014	<0.0007	<0.0014
LF-B5 (b)	22-Jan-04	<0.0005	0.22	0.0007	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0032	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.001
DUP	22-Jan-04	<0.0005	0.22	0.0008	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0032	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.001
LF-B5 (b)	20-Jan-05	<0.002	0.21	<0.002	<0.04	<0.04	<0.002	<0.002	<0.002	0.0032	<0.002	<0.04	<0.002	<0.002	<0.002	0.0012 J	<0.002	<0.004
LF-B5 (b)	25-Jan-06	<0.002	0.21	<0.002	<0.04	<0.04	<0.002	<0.002	<0.002	0.0028	<0.002	<0.04	<0.002	<0.002	<0.002	0.0011 J	<0.002	<0.004

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-B4	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B4	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B4	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	16-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B4	13-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B5 (b)	09-Apr-96	<0.05	<0.05	<0.01	<0.05	<0.05	na	na	na	<0.5	na	<0.1	<0.1	<0.1	na	na	na
LF-B5 (b)	01-Aug-96	<0.03	<0.03	na	<0.03	<0.03	na	na	na	<0.3	na	<0.05	<0.05	<0.05	na	na	na
LF-B5 (b)	22-Nov-96	<0.03	<0.03	na	<0.03	<0.03	na	na	na	<0.3	na	<0.05	<0.05	<0.05	na	na	na
LF-B5 (b)	17-Mar-97	<0.03	<0.03	na	<0.03	<0.03	na	na	na	<0.3	na	<0.05	<0.05	<0.05	na	na	na
LF-B5 (b)	12-Jun-97	<0.03	<0.03	na	<0.03	<0.03	na	na	na	<0.3	na	<0.05	<0.05	<0.05	na	na	na
LF-B5 (b)	20-Aug-97	<0.05	<0.05	na	<0.05	<0.05	na	na	na	<0.5	na	<0.1	<0.1	<0.1	na	na	na
LF-B5 (b)	17-Dec-97	<0.05	<0.05	na	<0.05	<0.05	na	na	na	<0.5	na	<0.1	<0.1	<0.1	na	na	na
LF-B5 (b)	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	0.0018	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B5 (b)	09-Apr-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
LF-B5 (b)	16-Jul-98	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.062	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012
LF-B5 (b)	23-Oct-98	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.012	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
LF-B5 (b)	13-Jan-99	<0.002	<0.002	<0.002	<0.002	<0.002	0.0032	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
LF-B5 (b)	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0036	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B5 (b)	15-Jul-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0039	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B5 (b)	15-Oct-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0024	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
DUP	15-Oct-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0023	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B5 (b)	21-Jan-00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B5 (b)	02-Feb-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B5 (b)	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B5 (b)	20-Jan-03	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	<0.0007	<0.0014	<0.0014	<0.0014	<0.0007	<0.0007
LF-B5 (b)	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0044	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0044	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B5 (b)	20-Jan-05	<0.002	<0.002	<0.002	<0.002	<0.002	0.0034	<0.002	<0.002	<0.04	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002
LF-B5 (b)	25-Jan-06	<0.002	<0.002	<0.002	<0.002	<0.002	0.0027	<0.002	<0.002	<0.04	<0.002	<0.002	<0.004	<0.004	<0.004	<0.002	<0.002

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-B4	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-B4	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
LF-B4	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
LF-B4	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	26-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	16-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B4	13-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
LF-B5 (b)	09-Apr-96	na	na	<0.01	<0.05	na	na	<0.5	<0.01	na	na	<0.05
LF-B5 (b)	01-Aug-96	na	na	na	<0.03	na	na	<0.3	na	na	na	<0.03
LF-B5 (b)	22-Nov-96	na	na	na	<0.03	na	na	<0.3	na	na	na	<0.03
LF-B5 (b)	17-Mar-97	na	na	na	<0.03	na	na	<0.3	na	na	na	<0.03
LF-B5 (b)	12-Jun-97	na	na	na	<0.03	na	na	<0.3	na	na	na	<0.03
LF-B5 (b)	20-Aug-97	na	na	na	<0.05	na	na	<0.5	na	na	na	<0.05
LF-B5 (b)	17-Dec-97	na	na	na	<0.05	na	na	<0.5	na	na	na	<0.05
LF-B5 (b)	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0038	<0.001	<0.001
LF-B5 (b)	09-Apr-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	na	<0.01	<0.002	<0.01	<0.01
LF-B5 (b)	16-Jul-98	<0.012	<0.012	<0.012	<0.012	<0.012	<0.012	na	<0.012	<0.025	<0.012	<0.012
LF-B5 (b)	23-Oct-98	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	na	<0.0025	0.0064	<0.0025	<0.0025
LF-B5 (b)	13-Jan-99	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	na	<0.002	0.0069	<0.002	<0.002
LF-B5 (b)	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0063	<0.001	<0.001
LF-B5 (b)	15-Jul-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	0.0066	<0.001	<0.001
LF-B5 (b)	15-Oct-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	0.0061	<0.001	<0.001
DUP	15-Oct-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	0.0058	<0.001	<0.001
LF-B5 (b)	21-Jan-00	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.02	<0.001	0.0059	<0.001	<0.001
LF-B5 (b)	02-Feb-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0039	<0.0005	<0.0005
LF-B5 (b)	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0049	<0.0005	<0.0005
LF-B5 (b)	20-Jan-03	<0.0007	<0.0007	<0.0029	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	0.0067	<0.0007	<0.0007
LF-B5 (b)	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0062	<0.0005	<0.0005
DUP	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0063	<0.0005	<0.0005
LF-B5 (b)	20-Jan-05	<0.002	<0.002	<0.008	<0.002	<0.002	<0.002	<0.04	<0.002	0.0055	<0.002	<0.002
LF-B5 (b)	25-Jan-06	<0.002	<0.002	<0.008	<0.002	<0.002	<0.002	<0.04	<0.002	0.0041	<0.002	<0.002

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
LF-B5 (b)	18-Apr-07	<0.0013	0.18	0.0008 J	<0.025	<0.025	<0.0013	<0.0013	<0.0013	0.003	<0.0013	<0.025	<0.0013	<0.0013	<0.0013	0.0015	<0.0013	<0.0026
LF-B5 (b)	15-Apr-08	<0.001	0.22	0.0006 J	<0.02	<0.02	<0.001	<0.001	<0.001	0.0024	<0.001	<0.02	<0.001	<0.001	<0.001	0.002	<0.001	<0.002
LF-B5 (b)	17-Apr-09	<0.001	0.14	0.0005 J	<0.02	<0.02	<0.001	<0.001	<0.001	0.0019	<0.001	<0.02	<0.001	<0.001	<0.001	0.0007 J	<0.001	<0.002
LF-B5 (b)	30-Apr-10	<0.001	0.18	0.0006 J	<0.02	<0.02	<0.001	<0.001	<0.001	0.0027	<0.001	<0.02	<0.001	<0.001	<0.001	0.0006 J	<0.001	<0.002
LF-B6	09-Apr-96	<0	<0.1	<0.1	<1	<2	<0.1	<0.1	<0.1	<0.1	0.29	<2	<0.1	0.29	<0.1	<0.1	<0.2	0.97
LF-B6	01-Aug-96	<0	0.03	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	0.11	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B6	25-Nov-96	<0	0.046	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	25-Nov-96	<0	0.047	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B6	17-Mar-97	<0	0.025	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B6	12-Jun-97	<0	0.041	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B6	19-Aug-97	<0	0.07	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B6	18-Dec-97	<0	0.067	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
LF-B6	27-Feb-98	<0	0.059	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
LF-B6	08-Apr-98	<0	0.072	<0.005	<0.025	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001
LF-B6	15-Jul-98	<0.0025	0.064	<0.0025	<0.012	<0.012	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.012	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
LF-B6	19-Oct-98	<0.05 UJ2	<0.083 UJ2	<0.05 UJ2	<0.25 UJ2	<0.35 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.25 UJ2	<0.05 UJ2	<0.09 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2
LF-B6	13-Jan-99	<0.001	0.085	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B6	21-Apr-99	<0.001	0.084	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B6	14-Jul-99	<0.0005	0.079	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	15-Oct-99	<0.0005	0.09	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	21-Jan-00	<0.0005	0.097	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	25-Jan-01	<0.0005	0.08	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	25-Jan-01	<0.0005	0.091	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	10-Apr-01	<0.0005	0.094	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	10-Jan-02	<0.0005	0.067	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	17-Jan-03	<0.0005	0.098 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	22-Jan-04	<0.0005	0.11	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	19-Jan-05	<0.0005	0.1	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
LF-B6	25-Jan-06	<0.0005	0.1	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	25-Jan-06	<0.0005	0.1	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
LF-B6	17-Apr-07	<0.0005	0.08	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
LF-B6	14-Apr-08	<0.0005	0.076	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
LF-B6	16-Apr-09	<0.0005	0.072	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0051	<0.0005	<0.01	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.001
LF-B6	26-Apr-10	<0.0005	0.068	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0031	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.001
MD-1 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	0.78	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	33	0.74	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	39	0.85	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	45	0.94	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	31	0.82	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
LF-B5 (b)	18-Apr-07	<0.0013	<0.0013	<0.0013	<0.0013	<0.0013	0.0026	<0.0013	<0.0013	<0.025	<0.0013	<0.0013	<0.0025	<0.0025	<0.0025	<0.0013	<0.0013
LF-B5 (b)	15-Apr-08	<0.001	<0.001	<0.001	<0.001	<0.001	0.0023	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B5 (b)	17-Apr-09	<0.001	<0.001	<0.001	<0.001	<0.001	0.0024	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B5 (b)	30-Apr-10	<0.001	<0.001	<0.001	<0.001	<0.001	0.0021	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B6	09-Apr-96	<0.1	<0.1	<0.01	<0.1	<0.1	na	na	na	<1	na	<0.2	<0.2	<0.2	na	na	na
LF-B6	01-Aug-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B6	25-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	25-Nov-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B6	17-Mar-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B6	12-Jun-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B6	19-Aug-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B6	18-Dec-97	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
LF-B6	27-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
LF-B6	08-Apr-98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
LF-B6	15-Jul-98	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.012	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
LF-B6	19-Oct-98	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.25 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2
LF-B6	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B6	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
LF-B6	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	21-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	14-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	16-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
LF-B6	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-1 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
LF-B5 (b)	18-Apr-07	<0.0013	<0.0013	<0.005	<0.0013	<0.0013	<0.0013	<0.025	<0.0013	0.004	<0.0013	<0.0013
LF-B5 (b)	15-Apr-08	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.02	<0.001	0.0039	<0.001	<0.001
LF-B5 (b)	17-Apr-09	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.02	<0.001	0.0038	<0.001	<0.001
LF-B5 (b)	30-Apr-10	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.02	<0.001	0.0043	<0.001	<0.001
LF-B6	09-Apr-96	na	na	0.01	<0.1	na	na	<1	<0.01	na	na	<0.1
LF-B6	01-Aug-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B6	25-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	25-Nov-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B6	17-Mar-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B6	12-Jun-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B6	19-Aug-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B6	18-Dec-97	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
LF-B6	27-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.011	<0.001	<0.001
LF-B6	08-Apr-98	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	na	<0.005	<0.002	<0.005	<0.005
LF-B6	15-Jul-98	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	na	<0.0025	0.0087	<0.0025	<0.0025
LF-B6	19-Oct-98	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	<0.05 UJ2	na	<0.05 UJ2	<0.1 UJ2	<0.05 UJ2	<0.05 UJ2
LF-B6	13-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0089	<0.001	<0.001
LF-B6	21-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.01	<0.001	<0.001
LF-B6	14-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.01	<0.0005	<0.0005
LF-B6	15-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0098	<0.0005	<0.0005
LF-B6	21-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.01	<0.0005	<0.0005
LF-B6	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0077	<0.0005	<0.0005
DUP	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.008	<0.0005	<0.0005
LF-B6	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0072	<0.0005	<0.0005
LF-B6	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0056	<0.0005	<0.0005
LF-B6	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0075 J	<0.0005	<0.0005
LF-B6	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0085	<0.0005	<0.0005
LF-B6	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0072	<0.0005	<0.0005
LF-B6	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0061	<0.0005	<0.0005
DUP	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0061	<0.0005	<0.0005
LF-B6	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0059	<0.0005	<0.0005
LF-B6	14-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0051	<0.0005	<0.0005
LF-B6	16-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0052	<0.0005	<0.0005
LF-B6	26-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.004	<0.0005	<0.0005
MD-1 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
MD-1 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	34	0.91	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	6.7	0.28	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	14	0.57	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	16	0.97	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	11	0.86	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	8.2	0.85	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	2.5	0.670	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	1.9	0.470	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	21-Oct-09	<0.017	<0.017	<0.017	<0.33	<0.330	2.3	0.54	<0.017	<0.017	<0.017	<0.330	<0.017	<0.017	<0.017	<0.017	<0.017	<0.017
MD-1 (c)	29-Apr-10	<0.0063	<0.0063	<0.0063	<0.13	<0.130	0.95	0.39	<0.0063	<0.0063	<0.0063	<0.130	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063
MD-1 (c)	27-Oct-10	<0.0025	<0.0025	<0.0025	<0.050	<0.050	0.45	0.27	<0.0025	<0.0025	<0.0025	<0.050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MD-1 (c)	14-Nov-11	<0.0025	<0.0025	<0.0025	<0.050	<0.050	1.2	0.28	<0.0025	<0.0025	<0.0025	<0.050	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
MD-1 (c)	17-Oct-12	<0.005	<0.005	<0.005	<0.0010	<0.100	0.57	0.18	<0.005	<0.005	<0.005	<0.100	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MD-1 (c)	08-Oct-13	<0.0036	<0.0036	<0.0036	<0.071	<0.071	0.79	0.26	<0.0036	<0.0036	<0.0036	<0.071	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036
MD-1 (c)	27-Oct-14	<0.0017	<0.0017	<0.0017	<0.033	<0.033	0.2	0.27	<0.0017	<0.0017	<0.0017	<0.033	<0.0017	0.002	<0.0017	<0.0017	<0.0017	<0.0017
MD-2 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	0.011	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	0.0022	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	21-Oct-09	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
DUP	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	27-Oct-10	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	14-Nov-11	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	17-Oct-12	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	08-Oct-13	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
DUP	08-Oct-13	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	27-Oct-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Oct-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	0.0024	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgLl)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
MD-1 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.020	<0.020	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	0.044	na/ND
MD-1 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.020	<0.017	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	0.028	na/ND
MD-1 (c)	21-Oct-09	<0.017	<0.017	<0.0017	<0.017	<0.017	<0.017	<0.017	<0.017	<0.330	<0.017	<0.017	<0.033	<0.033	<0.033	0.034	<0.017
MD-1 (c)	29-Apr-10	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.130	<0.0063	<0.0063	<0.013	<0.013	<0.013	0.026	<0.0063
MD-1 (c)	27-Oct-10	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.050	<0.0025	<0.0025	<0.005	<0.005	<0.005	0.02	<0.0025
MD-1 (c)	14-Nov-11	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.050	<0.0025	<0.0025	<0.005	<0.005	<0.005	0.018	<0.0025
MD-1 (c)	17-Oct-12	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.100	<0.005	<0.005	<0.010	<0.010	<0.010	0.011	<0.005
MD-1 (c)	08-Oct-13	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.071	<0.0036	<0.0036	<0.0071	<0.0071	<0.0071	0.016	<0.0036
MD-1 (c)	27-Oct-14	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.033	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	0.017	<0.0017
MD-2 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	21-Oct-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-2 (c)	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-2 (c)	27-Oct-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-2 (c)	14-Nov-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-2 (c)	17-Oct-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-2 (c)	08-Oct-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	08-Oct-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-2 (c)	27-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	27-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-3 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
MD-1 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	22-Oct-08	na/ND	0.049	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	24-Apr-09	na/ND	0.030	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-1 (c)	21-Oct-09	<0.017	0.036	<0.067	<0.017	<0.017	<0.017	<0.330	<0.017	<0.017	<0.017	<0.017
MD-1 (c)	29-Apr-10	<0.0063	0.024	<0.0025	<0.0063	<0.0063	<0.0063	<0.130	<0.0063	<0.0063	<0.0063	<0.0063
MD-1 (c)	27-Oct-10	<0.0025	0.021	<0.001	<0.0025	<0.0025	<0.0025	<0.050	<0.0025	<0.0025	<0.0025	<0.0025
MD-1 (c)	14-Nov-11	<0.0025	0.019	<0.001	<0.0025	<0.0025	<0.0025	<0.050	<0.0025	<0.0025	<0.0025	<0.0025
MD-1 (c)	17-Oct-12	<0.005	0.012	<0.0020	<0.005	<0.005	<0.005	<0.100	<0.005	<0.005	<0.005	<0.005
MD-1 (c)	08-Oct-13	<0.0036	0.018	<0.014	<0.0036	<0.0036	<0.0036	<0.071	<0.0036	<0.0036	<0.0036	<0.0036
MD-1 (c)	27-Oct-14	<0.0017	0.017	<0.0067	<0.0017	0.0019	<0.0017	<0.033	<0.0017	0.0018	<0.0017	<0.0017
MD-2 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-2 (c)	21-Oct-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
DUP	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	27-Oct-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	14-Nov-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	17-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	08-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	08-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MD-2 (c)	27-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
MD-3 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	0.0009	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	0.0012	na/ND	na/ND	na/ND	0.002
MD-3 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	0.0012	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	21-Oct-09	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	27-Oct-10	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	14-Nov-11	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	17-Oct-12	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	27-Oct-14	<0.0005	<0.0005	<0.0005	<0.01	0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	05-May-03	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MD-4 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	21-Oct-09	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	27-Oct-10	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Oct-10	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	14-Nov-11	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	17-Oct-12	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	08-Oct-13	<0.0005	<0.0005	<0.0005	<0.01	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgLl)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
MD-3 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	0.0005	0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	21-Oct-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-3 (c)	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-3 (c)	27-Oct-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	0.0092	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-3 (c)	14-Nov-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-3 (c)	17-Oct-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-3 (c)	07-Oct-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-3 (c)	27-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-4 (c)	05-May-03	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MD-4 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	21-Oct-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-4 (c)	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-4 (c)	27-Oct-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	27-Oct-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-4 (c)	14-Nov-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-4 (c)	17-Oct-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-4 (c)	08-Oct-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
MD-3 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-3 (c)	21-Oct-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	27-Oct-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	14-Nov-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	17-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	07-Oct-13	na	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MD-3 (c)	27-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	05-May-03	na	na	na	na	na	na	na	na	na	na	na
MD-4 (c)	14-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	27-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	15-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	12-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	12-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	22-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-4 (c)	21-Oct-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	27-Oct-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Oct-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	14-Nov-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	17-Oct-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005
MD-4 (c)	08-Oct-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
MD-4 (c)	27-Oct-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	05-May-03	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	13-Oct-03	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
DUP	20-Jan-04	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	21-Apr-04	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	21-Oct-04	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	29-Mar-05	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	21-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-5 (d)	13-Apr-06	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	26-Oct-06	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	16-Apr-07	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	11-Oct-07	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	23-Apr-08	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	23-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
DUP	23-Oct-08	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	24-Apr-09	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na/ND	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na
MD-5 (d)	21-Oct-09	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MD-5 (d)	29-Apr-10	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MD-5 (d)	27-Oct-10	na	na	na	na	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	19-Apr-11	na	na	na	na	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
DUP	19-Apr-11	na	na	na	na	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	14-Nov-11	na	na	na	na	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	17-Oct-12	na	na	na	na	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	08-Oct-13	na	na	na	na	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	27-Oct-14	na	na	na	na	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Oct-14	na	na	na	na	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	na	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
MW-1	16-Dec-94	na	<0.0009	0.032	0.0028	<0.0042	0.016	na	0.001	na	<0.0005	<0.0011	na	0.0027	<0.0011	0.0028	0.0022	0.0031
MW-1	29-Mar-95	<0	0.017	0.068	<0.002	<0.005	0.028	0.0017	0.002	na	0.0093	0.013	<0	0.0013	0.0013	0.0065	0.005	0.0025
MW-1	08-Jun-95	<0	0.024	0.089	<0	<0	0.037	0.0022	0.0026	na	0.003	0.025	0.0013	0.0016	<0	0.01	0.009	0.0023
MW-1	09-Jan-96	<0	0.052	0.13	<0.05	<0.1	0.065	<0.005	<0.005	0.012	0.002	<0.1	<0.005	0.003	<0.005	<0.005	0.015	0.006
MW-1	17-Apr-96	na	na	na	na	na	0.065	na	na	na	0.0055	na	na	0.0035	na	na	na	0.007
MW-1	31-Jul-96	na	na	na	na	na	0.053	na	na	na	0.012	na	na	0.0098	na	na	na	0.014
MW-1	19-Nov-96	na	na	na	na	na	0.032	na	na	na	0.0017	na	na	0.0017	na	na	na	0.005
MW-1	25-Mar-97	na	na	na	na	na	0.049	na	na	na	0.0024	na	na	0.0022	na	na	na	0.005
MW-1	10-Jun-97	na	na	na	na	na	0.032	na	na	na	0.0007	na	na	0.0009	na	na	na	0.003
MW-1	18-Aug-97	na	na	na	na	na	0.033	na	na	na	0.0014	na	na	0.0015	na	na	na	0.004
MW-1	19-Dec-97	na	na	na	na	na	0.083	na	na	na	0.0038	na	na	0.0078	na	na	na	0.011

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgLl)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
MD-4 (c)	27-Oct-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MD-5 (d)	05-May-03	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	na	na/ND	<0.0005	na/ND
MD-5 (d)	13-Oct-03	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	na	na/ND	<0.0005	na/ND
MD-5 (d)	20-Jan-04	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
DUP	20-Jan-04	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	21-Apr-04	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	21-Oct-04	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	29-Mar-05	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	21-Sep-05	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-5 (d)	13-Apr-06	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	26-Oct-06	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	16-Apr-07	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	11-Oct-07	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	23-Apr-08	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	23-Oct-08	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
DUP	23-Oct-08	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	24-Apr-09	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	<0.0005	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005	na/ND
MD-5 (d)	21-Oct-09	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MD-5 (d)	29-Apr-10	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MD-5 (d)	27-Oct-10	<0.0005	na	na	na	na	na	<0.0005	<0.0005	na	na	na	na	<0.0005	na	<0.0005	na
MD-5 (d)	19-Apr-11	<0.0005	na	na	na	na	na	<0.0005	<0.0005	na	na	na	na	<0.0005	na	<0.0005	na
DUP	19-Apr-11	<0.0005	na	na	na	na	na	<0.0005	<0.0005	na	na	na	na	<0.0005	na	<0.0005	na
MD-5 (d)	14-Nov-11	<0.0005	na	na	na	na	na	<0.0005	<0.0005	na	na	na	na	<0.0005	na	<0.0005	na
MD-5 (d)	17-Oct-12	<0.0005	na	na	na	na	na	<0.0005	<0.0005	na	na	na	na	<0.0005	na	<0.0005	na
MD-5 (d)	08-Oct-13	na	na	na	na	na	na	<0.0005	<0.0005	<0.01	na	na	na	<0.0005	na	<0.0005	na
MD-5 (d)	27-Oct-14	na	na	na	na	na	na	<0.0005	<0.0005	na	na	na	na	<0.0005	na	<0.0005	na
DUP	27-Oct-14	na	na	na	na	na	na	<0.0005	<0.0005	na	na	na	na	<0.0005	na	<0.0005	na
MW-1	16-Dec-94	na	na	na	na	<0.0008	na	na	na	<0.0014	na	<0.0012	na	na	na	na	na
MW-1	29-Mar-95	<0	<0	na	<0	<0	na	na	na	<0.002	na	0.0053	na	na	na	na	na
MW-1	08-Jun-95	0.0006	<0	na	0.0028	<0	na	na	na	<0	na	<0	na	na	na	na	na
MW-1	09-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
MW-1	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-1	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-1	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-1	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-1	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-1	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-1	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
MD-4 (c)	27-Oct-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MD-5 (d)	05-May-03	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na	na/ND	na
MD-5 (d)	13-Oct-03	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	na
MD-5 (d)	20-Jan-04	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.001	na/ND	<0.0005
DUP	20-Jan-04	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.001	na/ND	<0.0005
MD-5 (d)	21-Apr-04	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.001	na/ND	na
MD-5 (d)	21-Oct-04	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.001	na/ND	na
MD-5 (d)	29-Mar-05	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005
MD-5 (d)	21-Sep-05	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na	na/ND	<0.0005
MD-5 (d)	30-Sep-05	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND
MD-5 (d)	13-Apr-06	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005
MD-5 (d)	26-Oct-06	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005
MD-5 (d)	16-Apr-07	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005
MD-5 (d)	11-Oct-07	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	na	na/ND	<0.0005
MD-5 (d)	23-Apr-08	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005
MD-5 (d)	23-Oct-08	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005
DUP	23-Oct-08	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005
MD-5 (d)	24-Apr-09	na/ND	<0.0005	na/ND	na/ND	na/ND	na/ND	na/ND	na/ND	<0.0005	na/ND	<0.0005
MD-5 (d)	21-Oct-09	na	na	na	na	na	na	na	na	na	na	na
MD-5 (d)	29-Apr-10	na	na	na	na	na	na	na	na	na	na	na
MD-5 (d)	27-Oct-10	<0.0005	<0.0005	na	na	na	na	na	na	<0.0005	na	na
MD-5 (d)	19-Apr-11	<0.0005	<0.0005	na	na	na	na	na	na	<0.0005	na	na
DUP	19-Apr-11	<0.0005	<0.0005	na	na	na	na	na	na	<0.0005	na	na
MD-5 (d)	14-Nov-11	<0.0005	<0.0005	na	na	na	na	na	na	<0.0005	na	na
MD-5 (d)	17-Oct-12	<0.0005	<0.0005	na	na	na	na	na	na	<0.0005	na	na
MD-5 (d)	08-Oct-13	<0.0005	<0.0005	na	na	na	na	na	na	<0.0005	na	na
MD-5 (d)	27-Oct-14	<0.0005	<0.0005	na	na	na	na	na	na	<0.0005	na	<0.0005
DUP	27-Oct-14	<0.0005	<0.0005	na	na	na	na	na	na	<0.0005	na	<0.0005
MW-1	16-Dec-94	na	na	na	na	na	na	na	na	na	na	na
MW-1	29-Mar-95	na	na	na	na	na	na	na	na	na	na	na
MW-1	08-Jun-95	na	na	na	na	na	na	na	na	na	na	na
MW-1	09-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
MW-1	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
MW-1	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
MW-1	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
MW-1	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na
MW-1	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na
MW-1	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
MW-1	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
MW-1	26-Feb-98	<0	0.041	0.17	<0.02	<0.02	0.056	0.0036	0.0033	0.0087	0.0024	<0.02	<0.001	0.0032	0.0014	0.013	0.0077	0.0053
MW-1	08-Apr-98	<0	0.046	0.15	<0.025	<0.025	0.053	<0.005	<0.005	0.011	<0.005	<0.025	<0.005	<0.005	<0.005	0.014	0.013	<0.001
DUP	08-Apr-98	<0	0.043	0.13	<0.025	<0.025	0.049	<0.005	<0.005	0.0099	<0.005	<0.025	<0.005	<0.005	<0.005	0.013	0.011	<0.001
MW-1	14-Jul-98	<0.005	0.045	0.14	<0.025	<0.025	0.06	<0.005	<0.005	0.0095	<0.005	<0.025	<0.005	<0.005	<0.005	0.012	0.014	<0.005
MW-1	21-Oct-98	<0.01	0.052	0.15	<0.05	<0.05	0.062	<0.01	<0.01	0.01	<0.01	<0.05	<0.01	<0.01	<0.01	0.014	0.015	<0.01
MW-1	12-Jan-99	<0.001	0.055	0.17	<0.005	<0.005	0.073	0.0046	0.0033	0.011	0.0019	<0.005	0.0006 J11	0.011	0.0015	0.017	0.017	0.0053
MW-1	20-Apr-99	<0.001	0.051	0.14	<0.005	<0.005	0.067	0.0042	0.0031	0.0092	0.002	<0.005	0.0006 J11	<0.001	0.0012	0.015	0.013	0.005
MW-1	13-Jul-99	<0.0005	0.044	0.093	<0.01	<0.01	0.055	0.0036	0.0024	0.0072	0.0014	<0.01	<0.0005	0.0077	0.0009	0.013	0.016	0.004
MW-1	11-Oct-99	<0.0005	0.04	0.11	<0.01	<0.01	0.053	0.0035	0.0025	0.0073	0.0013	<0.01	0.0013	0.0074	0.0009	0.013	0.013	0.0037
MW-1	18-Jan-00	<0.0005	0.025	0.061	<0.01	<0.01	0.043	0.0028	0.0015	0.0065	0.0013	<0.01	<0.0005	0.0046	0.0008	0.0095	0.01	0.0034
DUP	24-Jan-01	<0.0005	0.033	0.1	<0.01	<0.01	0.051	0.0038	0.0019	0.0066	0.0015	<0.01	0.0005	<0.0005	0.0006	0.012	0.0098	0.0045
MW-1	16-Jan-03	<0.0005	0.032	0.12	<0.01	<0.01	0.032	0.0022	0.0017	0.0033	0.0008	0.038	<0.0005	0.008	<0.0005	0.0087	0.0067	0.0027
MW-1	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
MW-2	16-Dec-94	na	<0.0009	0.0047	<0.0018	<0.0042	0.017	na	<0.0008	na	<0.0005	<0.0011	na	0.0019	<0.0011	0.0018	<0.0014	0.0012
MW-2	29-Mar-95	<0	<0.0009	0.0022	<0.002	<0.005	0.016	<0.0006	<0.0008	na	<0.0004	<0.002	<0	0.0011	<0.002	0.0009	<0.002	0.0009
MW-2	08-Jun-95	<0	0.0025	<0	<0	<0	0.022	<0	<0	na	0.0005	<0	<0	0.0009	<0	0.0049	0.0022	0.0009
MW-2	09-Jan-96	<0	0.007	0.02	<0.05	<0.1	0.051	<0.005	<0.005	0.023	0.0009	<0.1	<0.005	0.001	0.008	<0.005	<0.01	0.002
MW-2	17-Apr-96	na	na	na	na	na	0.032	na	na	na	0.0008	na	na	0.0013	na	na	na	<0.002
MW-2	31-Jul-96	na	na	na	na	na	0.042	na	na	na	0.0009	na	na	0.0016	na	na	na	<0.002
MW-2	19-Nov-96	na	na	na	na	na	0.018	na	na	na	0.0007	na	na	0.0017	na	na	na	0.004
MW-2	25-Mar-97	na	na	na	na	na	0.024	na	na	na	0.001	na	na	0.0007	na	na	na	<0.002
MW-2	10-Jun-97	na	na	na	na	na	0.027	na	na	na	<0.0005	na	na	0.0005	na	na	na	0.002
MW-2	18-Aug-97	na	na	na	na	na	0.033	na	na	na	<0.0005	na	na	0.0008	na	na	na	<0.002
MW-2	19-Dec-97	na	na	na	na	na	0.019	na	na	na	0.0021	na	na	0.0019	na	na	na	0.006
MW-2	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	0.014	<0.001	<0.001	0.0064	<0.001	<0.02	<0.001	<0.001	0.0037	0.0027	<0.002	<0.002
MW-2	08-Apr-98	<0	0.0012	0.0018	<0.005	<0.005	0.016	0.001	<0.001	0.0069	<0.001	<0.005	<0.001	<0.001	0.0022	0.0025	0.0017	<0.001
MW-2	14-Jul-98	<0.001	0.0043	0.0095	<0.005	<0.005	0.036	0.0025	<0.001	0.024	<0.001	<0.005	<0.001	<0.001	0.0083	0.0095	0.005	<0.001
MW-2	21-Oct-98	<0.002	0.0039	0.0067	<0.01	<0.01	0.037	0.0032	<0.002	0.026	<0.002	<0.01	<0.002	<0.002	0.01	0.012	0.0055	<0.002
DUP	21-Oct-98	<0.002	0.004	0.0074	<0.01	<0.01	0.037	0.0031	<0.002	0.027	<0.002	<0.01	<0.002	<0.002	0.01	0.012	0.0056	<0.002
MW-2	12-Jan-99	<0.001	0.0015	0.0033	<0.005	<0.005	0.032	0.0025	<0.001	0.019	<0.001	<0.005	<0.001	<0.001	0.0077	0.0083	0.0047	<0.001
MW-2	24-Jan-01	<0.0005	0.0016	0.0041	<0.01	<0.01	0.028	0.0026	<0.0005	0.014	<0.0005	<0.01	<0.0005	0.0008	0.0054	0.0072	0.0038	<0.001
MW-2	08-Jan-02	<0.0005	0.002	0.0047	<0.01	<0.01	0.019	0.0017	<0.0005	0.0069	<0.0005	0.026	<0.0005	0.0007	0.0028	0.0046	0.0026	<0.001
MW-2	16-Jan-03	<0.0005	0.0017	0.0019	<0.01	<0.01	0.027	0.0022	<0.0005	0.012	<0.0005	0.041	<0.0005	<0.0005	0.0042	0.0089	0.0032	<0.001
MW-2	20-Jan-04	<0.0005	0.0032	0.0038	<0.01	<0.01	0.03	0.0031	<0.0005	0.012	<0.0005	<0.01	<0.0005	0.0006	0.0038	0.01	0.0041	<0.001
MW-2	18-Jan-05	<0.001	0.01	0.12	<0.02	<0.02	0.014	0.0007 J	0.0012	0.001	<0.001	<0.02	0.0006 J	<0.001	<0.001	0.007	0.0027	0.0006 J
MW-2	25-Jan-06	<0.0005	0.0021	0.0008	<0.01	<0.01	0.026	0.0029	<0.0005	0.012	0.0003 J	<0.01	<0.0005	0.0004 J	0.0034	0.009	0.0027	0.0004 J
MW-2	16-Apr-07	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	0.021	0.0025	<0.0005	0.0068	<0.0005	<0.01	<0.0005	0.0005 J	0.0023	0.0036	0.0015	0.0004 J
MW-2	17-Apr-08	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	0.016	0.0022	<0.0005	0.0065	<0.0005	<0.01	<0.0005	0.0004 J	0.0023	0.0029	0.0016	<0.001
MW-2	17-Apr-09	<0.0005	0.0004 J	0.0005 J	<0.01	<0.01	0.015	0.0027	<0.0005	0.0083	<0.0005	<0.01	<0.0005	0.0004 J	0.0025	0.0042	0.0013	0.0003 J

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
MW-1	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	<0.001	0.0034	<0.001	<0.002	0.0021	<0.002	0.0044	<0.001
MW-1	08-Apr-98	<0.005	<0.005	<0.005	<0.005	<0.005	0.0086	<0.005	<0.005	<0.025	0.005	<0.005	<0.005	<0.005	<0.005	0.0058	<0.005
DUP	08-Apr-98	<0.005	<0.005	<0.005	<0.005	<0.005	0.0099	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-1	14-Jul-98	<0.005	<0.005	<0.005	<0.005	<0.005	0.0092	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
MW-1	21-Oct-98	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
MW-1	12-Jan-99	0.0011	<0.001	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	<0.005	0.0059	<0.001	0.001	<0.001	<0.001	0.0029	0.0005 J11
MW-1	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.009	<0.001	<0.001	<0.005	0.0053	<0.001	<0.001	<0.001	<0.001	0.0033	0.0006 J11
MW-1	13-Jul-99	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	0.0066	<0.0005	<0.0005	<0.01	0.0044	<0.0005	<0.001	<0.001	<0.001	0.0028	0.0006
MW-1	11-Oct-99	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	0.0073	<0.0005	<0.0005	<0.01	0.0041	<0.0005	<0.001	<0.001	<0.001	0.0023	<0.0012
MW-1	18-Jan-00	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	0.0031	<0.0005	<0.0005	<0.01	0.0035	<0.0005	<0.001	<0.001	<0.001	0.0061	0.0007
DUP	24-Jan-01	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0047	<0.0005	<0.001	<0.001	<0.001	0.0042	<0.0005
MW-1	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0069	<0.0005	<0.0005	<0.01	0.0021	<0.0005	<0.001	<0.001	<0.001	0.0037	0.0008
MW-1	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-2	16-Dec-94	na	na	na	na	<0.0008	na	na	na	<0.0014	na	<0.0012	na	na	na	na	na
MW-2	29-Mar-95	<0	<0	na	<0	<0	na	na	na	<0.002	na	<0.002	na	na	na	na	na
MW-2	08-Jun-95	<0	<0	na	<0	<0	na	na	na	<0	na	<0	na	na	na	na	na
MW-2	09-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
MW-2	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-2	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-2	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-2	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-2	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-2	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-2	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-2	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	0.003	<0.001
MW-2	08-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0036	<0.001
MW-2	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0011	<0.001	<0.001	<0.001	<0.001	0.0027	<0.001
MW-2	21-Oct-98	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	0.0022	<0.002
DUP	21-Oct-98	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.01	<0.002	<0.002	<0.002	<0.002	<0.002	0.0021	<0.002
MW-2	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	0.0009 J11	<0.001	<0.001	<0.001	<0.001	0.0026	<0.001
MW-2	24-Jan-01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.001	<0.0005	<0.001	<0.001	<0.001	0.0024	<0.0005
MW-2	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.001	<0.001	<0.001	0.0022	<0.0005
MW-2	16-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0012	<0.0005	<0.001	<0.001	<0.001	0.0018	<0.0005
MW-2	20-Jan-04	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0018	<0.0005	<0.001	<0.001	<0.001	0.0019	<0.0005
MW-2	18-Jan-05	<0.001	<0.001	<0.001	<0.001	<0.001	0.012	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
MW-2	25-Jan-06	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0016	<0.0005	<0.001	<0.001	<0.001	0.0016	0.0005
MW-2	16-Apr-07	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0011	<0.0005	<0.001	<0.001	<0.001	0.0027	0.0004 J
MW-2	17-Apr-08	0.0005 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0009	<0.0005	<0.001	<0.001	<0.001	0.0021	0.0006
MW-2	17-Apr-09	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0015	<0.0005	<0.001	<0.001	<0.001	0.0023	0.0008

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
MW-1	26-Feb-98	0.021	0.0049	<0.005	<0.001	<0.001	0.021	<0.001	<0.001	<0.002	<0.001	<0.001
MW-1	08-Apr-98	<0.005	0.0087	<0.005	<0.005	<0.005	0.02	na	<0.005	<0.002	<0.005	<0.005
DUP	08-Apr-98	<0.005	0.0065	<0.005	<0.005	<0.005	0.018	na	<0.005	<0.002	<0.005	<0.005
MW-1	14-Jul-98	<0.005	<0.005	<0.005	<0.005	<0.005	0.019	na	<0.005	<0.01	<0.005	<0.005
MW-1	21-Oct-98	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	na	<0.01	<0.02	<0.01	<0.01
MW-1	12-Jan-99	<0.001	0.0006 J11	<0.001	<0.001	<0.001	0.025	na	<0.001	<0.002	<0.001	<0.001
MW-1	20-Apr-99	<0.001	0.0014	<0.001	<0.001	<0.001	0.024	na	<0.001	<0.002	<0.001	<0.001
MW-1	13-Jul-99	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	0.02	<0.01	<0.0005	0.0019	<0.0005	<0.0005
MW-1	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	0.021	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-1	18-Jan-00	<0.0005	0.0077	<0.001	<0.0005	0.0005	0.021	<0.01	<0.0005	0.0015	<0.0005	<0.0005
DUP	24-Jan-01	<0.0005	0.0028	<0.001	<0.0005	<0.0005	0.023	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-1	16-Jan-03	<0.0005	0.0061	<0.002	<0.0005	0.0007	0.014	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-1	26-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-2	16-Dec-94	na	na	na	na	na	na	na	na	na	na	na
MW-2	29-Mar-95	na	na	na	na	na	na	na	na	na	na	na
MW-2	08-Jun-95	na	na	na	na	na	na	na	na	na	na	na
MW-2	09-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
MW-2	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
MW-2	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
MW-2	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
MW-2	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na
MW-2	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na
MW-2	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
MW-2	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
MW-2	26-Feb-98	0.002	0.0014	<0.005	<0.001	0.0012	0.002	<0.001	<0.001	<0.002	<0.001	<0.001
MW-2	08-Apr-98	<0.001	0.0012	<0.001	<0.001	0.0013	0.0018	na	<0.001	<0.002	<0.001	<0.001
MW-2	14-Jul-98	<0.001	<0.001	<0.001	<0.001	0.0011	0.004	na	<0.001	0.0053	<0.001	<0.001
MW-2	21-Oct-98	<0.002	<0.002	<0.002	<0.002	<0.002	0.0046	na	<0.002	<0.004	<0.002	<0.002
DUP	21-Oct-98	<0.002	<0.002	<0.002	<0.002	<0.002	0.0044	na	<0.002	<0.004	<0.002	<0.002
MW-2	12-Jan-99	<0.001	<0.001	<0.001	<0.001	0.0008 J11	0.0038	na	<0.001	0.0042	<0.001	<0.001
MW-2	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	0.0006	0.0043	<0.01	<0.0005	0.0028	<0.0005	<0.0005
MW-2	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	0.0006	0.0032	<0.01	<0.0005	0.0018	<0.0005	<0.0005
MW-2	16-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	0.0005	0.0047	<0.01	<0.0005	0.0027	<0.0005	<0.0005
MW-2	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0061	<0.01	<0.0005	0.003	<0.0005	<0.0005
MW-2	18-Jan-05	<0.001	<0.001	<0.004	<0.001	<0.001	0.0058	<0.02	<0.001	<0.001	<0.001	<0.001
MW-2	25-Jan-06	<0.0005	0.0003 J	<0.002	<0.0005	0.0004 J	0.0051	<0.01	<0.0005	0.0029	<0.0005	<0.0005
MW-2	16-Apr-07	<0.0005	0.0003 J	<0.002	<0.0005	0.001	0.0045	<0.01	<0.0005	0.0031	<0.0005	<0.0005
MW-2	17-Apr-08	<0.0005	0.0003 J	<0.002	<0.0005	0.0009	0.0039	<0.01	<0.0005	0.0028	0.0006	<0.0005
MW-2	17-Apr-09	<0.0005	0.0003 J	<0.002	<0.0005	0.0009	0.0054	<0.01	<0.0005	0.0029	0.0007	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
MW-2	29-Apr-10	<0.0005	0.0004 J	0.0004 J	<0.01	<0.01	0.011	0.0029	<0.0005	0.011	<0.0005	<0.01	<0.0005	0.0003 J	0.0028	0.0051	0.0014	0.0003 J
MW-3	16-Dec-94	na	<0.0009	<0.0022	<0.0018	<0.0042	<0.0008	na	<0.0008	na	<0.0005	<0.0011	na	<0.0005	0.0028	<0.0008	<0.0014	<0.0005
MW-3	29-Mar-95	<0	<0.0009	<0.003	<0.002	<0.005	<0.0008	<0.0006	<0.0008	na	<0.0004	<0.002	<0	<0.0004	<0.002	<0.0008	<0.002	<0.0004
MW-3	08-Jun-95	<0	0.0019	<0	<0	<0	<0	<0	<0	na	<0	0.0052	<0	<0	0.011	0.0011	0.0007	<0
MW-3	09-Jan-96	<0	0.01	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	0.037	<0.005	<0.1	<0.005	<0.005	0.029	0.006	<0.01	<0.01
MW-3	17-Apr-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
MW-3	31-Jul-96	na	na	na	na	na	<0.005	na	na	na	<0.005	na	na	<0.005	na	na	na	<0.02
MW-3	19-Nov-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0006	na	na	na	0.004
MW-3	25-Mar-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
MW-3	10-Jun-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
MW-3	18-Aug-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
MW-3	19-Dec-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
MW-3	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0099	<0.001	<0.02	<0.001	<0.001	0.0084	<0.001	<0.002	<0.002
MW-3	07-Apr-98	<0	0.0037	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.018	<0.001	<0.005	<0.001	<0.001	0.013	0.0014	<0.001	<0.001
MW-3	14-Jul-98	<0.001	0.0046	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.022	<0.001	<0.005	<0.001	<0.001	0.016	0.0016	<0.001	<0.001
DUP	14-Jul-98	<0.001	0.0041	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.022	<0.001	<0.005	<0.001	<0.001	0.015	0.0013	0.0014	<0.001
MW-3	20-Oct-98	<0.001	0.0044	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.024	<0.001	<0.005	<0.001	<0.001	0.017	0.0014	0.002	<0.001
MW-3	11-Jan-99	<0.001	0.0042	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.025	<0.001	<0.005	<0.001	<0.001	0.019	0.0023	0.0012	<0.001
DUP	11-Jan-99	<0.001	0.0042	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.025	<0.001	<0.005	<0.001	<0.001	0.019	0.0022	0.0013	<0.001
MW-3	19-Apr-99	<0.001	0.0009 J11	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.01	<0.001	<0.005	<0.001	<0.001	0.0078	0.0005 J11	<0.001	<0.001
MW-3	13-Jul-99	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0078	<0.0005	<0.01	<0.0005	<0.0005	0.0063	<0.0005	<0.0005	<0.001
MW-3	11-Oct-99	<0.0005	0.0026	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.024	<0.0005	<0.01	<0.0005	<0.0005	0.019	0.0019	0.0019	<0.001
MW-3	17-Jan-00	<0.0005	0.0039	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.028	<0.0005	<0.01	<0.0005	<0.0005	0.02	0.0031	0.0011	<0.001
MW-3	28-Apr-00	<0.0005	0.0025	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.021	<0.0005	<0.01	<0.0005	<0.0005	0.015	0.002	0.0011	<0.001
MW-3	25-Jul-00	<0.0005	0.0052	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.038	<0.0005	<0.01	<0.0005	<0.0005	0.025	<0.0047	0.0007	<0.001
MW-3	10-Oct-00	<0.0005	0.003	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.031	<0.0005	<0.01	<0.0005	<0.0005	0.02	0.0022	0.0018	<0.001
MW-3	24-Jan-01	<0.0005	0.0046	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.035	<0.0005	<0.01	<0.0005	<0.0005	0.021	0.0044	0.0007	<0.001
MW-3	09-Apr-01	<0.0005	0.0021	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.026	<0.0005	<0.01	<0.0005	<0.0005	0.015	0.0024	0.0009	<0.001
MW-3	05-Jul-01	<0.0005	0.0039	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.042	<0.0005	<0.01	<0.0005	<0.0005	0.026	0.0041	<0.0005	<0.001
MW-3	15-Oct-01	<0.0005	0.0025	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.028	<0.0005	<0.01	<0.0005	<0.0005	0.015	0.0025	0.0021	<0.001
MW-3	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.001
MW-3	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	0.00119
MW-3	08-Apr-02	<0.0005	0.0019	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.041	<0.0005	<0.01	<0.0005	<0.0005	0.023	0.0017	<0.0005	<0.001
MW-3	08-Jul-02	<0.0005	0.0017	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.026	<0.0005	<0.01	<0.0005	<0.0005	0.014	0.0024	0.0013	<0.001
DUP	08-Jul-02	<0.0005	0.0018	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.024	<0.0005	<0.01	<0.0005	<0.0005	0.013	0.0025	0.0014	<0.001
MW-3	09-Oct-02	<0.0005	0.004	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.048	<0.0005	<0.01	<0.0005	<0.0005	0.023	0.0043	0.0007	<0.001
MW-3	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	<0.001
MW-3	16-Apr-03	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.022	<0.0005	<0.01	<0.0005	<0.0005	0.011	<0.0005	0.0007	<0.001
MW-3	09-Jul-03	<0.0005	0.0014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.035	<0.0005	<0.01	<0.0005	<0.0005	0.018	0.0013	0.0006	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
MW-2	29-Apr-10	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0018	<0.0005	<0.001	<0.001	<0.001	0.0017	0.0004 J
MW-3	16-Dec-94	na	na	na	na	0.018	na	na	na	<0.0014	na	0.0034	na	na	na	na	na
MW-3	29-Mar-95	<0	<0	na	<0	<0	na	na	na	<0.002	na	0.014	na	na	na	na	na
MW-3	08-Jun-95	<0	<0	na	<0	<0	na	na	na	<0	na	0.0016	na	na	na	na	na
MW-3	09-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
MW-3	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-3	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-3	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-3	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-3	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-3	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-3	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-3	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
MW-3	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-3	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-3	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-3	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-3	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-3	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	17-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	24-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-3	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
MW-2	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	0.0005 J	0.0058	<0.01	<0.0005	0.0027	<0.0005	<0.0005
MW-3	16-Dec-94	na	na	na	na	na	na	na	na	na	na	na
MW-3	29-Mar-95	na	na	na	na	na	na	na	na	na	na	na
MW-3	08-Jun-95	na	na	na	na	na	na	na	na	na	na	na
MW-3	09-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
MW-3	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
MW-3	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
MW-3	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
MW-3	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na
MW-3	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na
MW-3	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
MW-3	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
MW-3	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
MW-3	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0036	<0.001	<0.001
MW-3	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0064	<0.001	<0.001
DUP	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0075	<0.001	<0.001
MW-3	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0059	<0.001	<0.001
MW-3	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0036	<0.001	<0.001
DUP	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0032	<0.001	<0.001
MW-3	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	0.0005 J11	na	<0.001	<0.002	<0.001	<0.001
MW-3	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.01	<0.0005	0.0021	<0.0005	<0.0005
MW-3	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.0005	<0.0005
MW-3	17-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
MW-3	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
MW-3	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
MW-3	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.0005	<0.0005
MW-3	24-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.0005	<0.0005
MW-3	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
MW-3	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0018	<0.0005	<0.0005
MW-3	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
MW-3	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
MW-3	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.003	<0.0005	<0.0005
MW-3	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
DUP	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
MW-3	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
MW-3	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	16-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0026	<0.0005	<0.0005
MW-3	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
MW-3	28-Oct-03	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.021	<0.0005	<0.01	<0.0005	<0.0005	0.01	0.001	0.0014	<0.001
MW-3	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0076	<0.0005	0.0006	<0.001
DUP	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0074	<0.0005	0.0006	<0.001
MW-3	04-May-04	<0.0005	0.0015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.029	<0.0005	<0.01	<0.0005	<0.0005	0.016	0.0016	<0.0005	<0.001
MW-3	15-Jul-04	<0.0005	0.0014	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.03	<0.0005	<0.01	<0.0005	<0.0005	0.014	0.0015	0.0014	<0.001
MW-3	13-Oct-04	<0.0005	0.0011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.021	<0.0005	<0.01	<0.0005	<0.0005	0.0091	0.0012	0.0016	<0.001
MW-3	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022	<0.0005	<0.01	<0.0005	<0.0005	0.001	<0.0005	0.0003 J	<0.001
MW-3	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0055	<0.0005	<0.0005	<0.001
MW-3	19-Jul-05	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.006	0.0004 J	0.001	<0.001
DUP	19-Jul-05	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0057	0.0004 J	0.0009	<0.001
MW-3	27-Oct-05	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.023	<0.0005	<0.01	<0.0005	<0.0005	0.011	0.0012	0.0016	<0.001
MW-3	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0054	<0.0005	0.0004 J	<0.001
MW-3	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0044	<0.0005	<0.01	<0.0005	<0.0005	0.0021	<0.0005	<0.0005	<0.001
MW-3	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0031	<0.0005	<0.01	<0.0005	<0.0005	0.0018	<0.0005	<0.0005	<0.001
MW-3	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	<0.001
MW-3	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	<0.001
MW-3	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
MW-3	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
MW-3	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
MW-3	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.001
MW-3	23-Feb-12	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.001
DUP	23-Feb-12	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.001
MW-3	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
MW-3	22-Apr-13	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.001
MW-3	29-Apr-14	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0049	<0.0005	<0.01	<0.0005	<0.0005	0.0023	0.0004 J	<0.0005	<0.001
MW-4	16-Dec-94	na	<0.0009	<0.0022	<0.0018	<0.0042	0.0014	na	<0.0008	na	0.0006	<0.0011	na	0.0021	<0.0011	0.013	<0.0014	0.0023
MW-4	29-Mar-95	<0	<0.0009	<0.003	<0.002	<0.005	0.0015	<0.0006	<0.0008	na	0.0007	<0.002	<0	0.001	<0.002	0.0069	<0.002	0.0037
MW-4	08-Jun-95	<0	<0	<0	<0	<0	0.0018	<0	<0	na	0.0011	<0	<0	0.0022	<0	0.0016	<0	0.0079
MW-4	10-Jan-96	<0	<0.005	<0.005	<0.05	<0.1	0.002	<0.005	<0.005	<0.005	0.002	<0.1	<0.005	0.027	<0.005	<0.005	<0.01	0.012
MW-4	19-Nov-96	na	na	na	na	na	0.0024	na	na	na	0.0017	na	na	0.0021	na	na	na	0.01
MW-4	18-Aug-97	na	na	na	na	na	0.0017	na	na	na	0.0017	na	na	0.0016	na	na	na	0.014
MW-4	19-Dec-97	na	na	na	na	na	0.0008	na	na	na	0.0011	na	na	0.001	na	na	na	0.006
MW-4	02-Mar-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	0.002
MW-4	10-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0033
MW-4	17-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0058
MW-4	23-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.005
MW-4	15-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	0.0014	<0.001	<0.001	0.0006 J11	0.0011	<0.005	<0.001	0.0018	<0.001	0.0017	<0.001	0.0054
MW-4	22-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.0058 U6	0.0012	<0.001	<0.001	<0.001	0.0012	<0.005	<0.001	0.0009 J11	<0.001	0.0016	<0.001	0.0059
MW-4	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0014	<0.0005	<0.0005	0.0008	0.0011	<0.01	<0.0005	0.0011	<0.0005	0.0027	<0.0005	0.0061

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
MW-3	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	27-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-3	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-4	16-Dec-94	na	na	na	na	<0.0008	na	na	na	<0.0014	na	<0.0012	na	na	na	na	na
MW-4	29-Mar-95	<0	<0	na	<0	<0	na	na	na	<0.002	na	<0.002	na	na	na	na	na
MW-4	08-Jun-95	<0	<0	na	<0	<0	na	na	na	<0	na	<0	na	na	na	na	na
MW-4	10-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
MW-4	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-4	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-4	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-4	02-Mar-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0037	0.0037	0.004	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
MW-4	10-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0024	0.0026	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-4	17-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0039	0.0045	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-4	23-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0029	0.0033	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
MW-4	15-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0028	0.0032	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0007 J11	0.0008 J11
MW-4	22-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0038	0.0043	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0008 J11	0.0011
MW-4	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0038	0.0042	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	0.0009

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
MW-3	28-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
MW-3	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0023	<0.0005	<0.0005
DUP	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0022	<0.0005	<0.0005
MW-3	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
MW-3	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005
MW-3	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
MW-3	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0014	<0.0005	<0.0005
MW-3	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	0.001	<0.0005	<0.0005
DUP	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.001	<0.0005	<0.0005
MW-3	27-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0013	<0.0005	<0.0005
MW-3	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	0.0011	<0.0005	<0.0005
MW-3	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005 J	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
MW-3	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
MW-3	15-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0005 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0003 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	15-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	21-Jul-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	12-Oct-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0008	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-3	29-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0002 J	<0.01	<0.0005	0.0002 J	<0.0005	<0.0005
MW-4	16-Dec-94	na	na	na	na	na	na	na	na	na	na	na
MW-4	29-Mar-95	na	na	na	na	na	na	na	na	na	na	na
MW-4	08-Jun-95	na	na	na	na	na	na	na	na	na	na	na
MW-4	10-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
MW-4	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
MW-4	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
MW-4	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
MW-4	02-Mar-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
MW-4	10-Apr-98	<0.001	<0.001	0.0047	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
MW-4	17-Jul-98	<0.001	<0.001	0.011	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
MW-4	23-Oct-98	0.001	<0.001	0.0082	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
MW-4	15-Jan-99	0.0006 J11	0.0007 J11	0.0064	<0.001	0.0005 J11	<0.001	na	<0.001	<0.002	<0.001	<0.001
MW-4	22-Apr-99	0.0008 J11	0.0007 J11	0.01	<0.001	0.0006 J11	<0.001	na	<0.001	<0.002	<0.001	<0.001
MW-4	16-Jul-99	0.0007	0.0006	0.0093	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
MW-4	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0016	<0.0005	<0.0005	0.0007	0.0012	<0.01	<0.0005	0.0013	<0.0005	0.0018	<0.0005	0.006
MW-4	25-Jan-00	<0.0005	0.0012	<0.0005	<0.01	<0.01	0.0012	<0.0005	<0.0005	0.0016	0.0009	<0.01	<0.0005	0.0006	<0.0005	0.0045	<0.0005	0.0041
MW-4	01-May-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0008	<0.0005	<0.0005	<0.0005	0.0007	<0.01	<0.0005	0.001	<0.0005	0.0015	<0.0005	0.0038
MW-4	25-Jul-00	<0.0005	0.0005	<0.0005	<0.01	<0.01	0.0014	<0.0005	<0.0005	0.0007	0.0008	<0.01	<0.0005	0.0008	<0.0005	<0.0019	<0.0005	0.0034
MW-4	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0013	<0.0005	<0.0005	0.0006	0.0009	<0.01	<0.0005	0.0006	<0.0005	0.0015	<0.0005	0.0042
MW-4	16-Jan-01	<0.0005	0.0018	<0.0005	<0.01	<0.01	0.0015	<0.0005	<0.0005	0.0016	0.0012	<0.01	<0.0005	0.0067	0.0005	0.0046	<0.0005	0.0058
MW-4	13-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0009	<0.0005	<0.0005	0.0006	0.0006	<0.01	<0.0005	0.0008	<0.0005	0.0014	<0.0005	0.0031
MW-4	02-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0028	0.0007	<0.0005	<0.001
MW-4	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0012	<0.0005	<0.0005	<0.0005	0.0008	<0.01	<0.0005	0.0006	<0.0005	0.001	<0.0005	0.0037
MW-4	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0015	<0.0005	<0.0005	0.0006	0.0021	<0.01	<0.0005	0.029	<0.0005	0.0014	<0.0005	0.0123
MW-4	09-Jan-02	<0.0005	0.0014	<0.0005	<0.01	<0.01	0.0014	<0.0005	<0.0005	0.001	0.001	<0.01	<0.0005	0.0011	<0.0005	0.0021	<0.0005	0.0046
MW-4	10-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0007	<0.0005	<0.0005	<0.0005	0.0008	<0.01	<0.0005	0.0013	<0.0005	0.0007	<0.0005	0.0053
DUP	10-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0009	<0.0005	<0.0005	<0.0005	0.0008	<0.01	<0.0005	0.0011	<0.0005	0.0007	<0.0005	0.0052
MW-4	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0005	<0.0005	<0.0005	<0.0005	<0.0006	<0.01	<0.0005	0.0006	<0.0005	0.0006	<0.0005	0.0021
MW-4	10-Oct-02	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	0.0013	<0.0005	<0.0005	0.0005 J	0.0008	<0.01	<0.0005	0.0013	<0.0005	0.0012	<0.0005	0.0033
MW-4	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	0.0028
MW-4	16-Apr-03	<0.0005	0.0014	<0.0005	<0.01	<0.01	0.0014	<0.0005	<0.0005	0.0012	0.0006	<0.01	<0.0005	<0.0005	<0.0005	0.0028	<0.0005	0.0024
MW-4	10-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	0.0024
MW-4	20-Jan-04	<0.0005	0.0018	<0.0005	<0.01	<0.01	0.0016	<0.0005	<0.0005	0.0014	0.0008	<0.01	<0.0005	<0.0005	<0.0005	0.003	<0.0005	0.0036
MW-4	06-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	0.0013
MW-4	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0019	<0.0005	<0.0005	0.0006	0.001	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	0.0039
MW-4	13-Oct-04	<0.0005	0.0008	<0.0005	<0.01	<0.01	0.0012	<0.0005	<0.0005	0.0007	0.0007	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	0.0033
MW-4	19-Jan-05	<0.0005	0.0021	<0.0005	<0.01	<0.01	0.0018	<0.0005	<0.0005	0.0016	0.0008	<0.01	<0.0005	0.0003 J	0.0004 J	0.0031	<0.0005	0.0032
MW-4	18-Apr-05	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	0.001	<0.0005	<0.0005	0.0003 J	0.0007	<0.01	<0.0005	0.0003 J	<0.0005	0.0008	<0.0005	0.0031
MW-4	19-Jul-05	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	0.0012	<0.0005	<0.0005	0.0003 J	0.0008	<0.01	<0.0005	0.0003 J	<0.0005	0.0009	<0.0005	0.0035
MW-4	27-Oct-05	<0.0005	0.0031	<0.0005	<0.01	<0.01	0.0012	<0.0005	<0.0005	0.0028	0.0007	<0.01	<0.0005	0.0004 J	0.0006	0.0056	<0.0005	0.0028
MW-4	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.0003 J	0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	0.0026
MW-4	17-Apr-06	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	0.0007	<0.0005	<0.0005	0.0004 J	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	0.0015 J
MW-4	20-Apr-07	<0.0005	0.0009	<0.0005	<0.01	<0.01	0.0011	<0.0005	<0.0005	0.0008	0.0005 J	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	0.002
MW-4	18-Apr-08	<0.0005	0.0037	<0.0005	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.0021	0.0004 J	<0.01	<0.0005	<0.0005	0.0007	0.0049	<0.0005	0.0015
MW-4	15-Apr-09	<0.0005	0.0006	<0.0005	<0.01	<0.01	0.0006	<0.0005	<0.0005	0.0004 J	0.0004 J	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	0.0019 J
MW-4	28-Apr-10	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	0.0004 J	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	0.001
MW-5	16-Dec-94	na	<0.018	<0.0022	<0.0018	1300	0.57	na	<0.0008	na	1.8	1700	na	73	<0.0011	<0.0008	<0.0014	7.8
MW-5	29-Mar-95	<0	<0.0009	<0.003	<0.002	290	0.47	<0.0006	<0.0008	na	1.3	42	<0	92	<0.002	<0.0008	<0.002	6.8
MW-5	08-Jun-95	0.0041	<0	<0	<0	82	0.4	<0	0.0009	na	1.9	95	0.0019	91	<0	0.011	<0	9.7
MW-5	10-Jan-96	<0	<5	<5	<50	130	0.95	<5	<5	<5	3	<100	<5	81	<5	<5	<10	15
MW-5	19-Nov-96	na	na	na	na	na	0.7	na	na	na	2.1	na	na	120	na	na	na	10
MW-5	18-Aug-97	na	na	na	na	na	0.4	na	na	na	1.6	na	na	84	na	na	na	8.1
MW-5	19-Dec-97	na	na	na	na	na	<0.5	na	na	na	2.5	na	na	120	na	na	na	11

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
MW-4	25-Oct-99	<0.0005	0.0016	<0.0005	<0.0005	<0.0005	<0.0005	0.0035	0.0038	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.001	0.001
MW-4	25-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0024	0.0029	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	0.0008
MW-4	01-May-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0023	0.0027	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	0.0007
MW-4	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002	0.0023	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	<0.001
MW-4	09-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0022	0.0027	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	<0.0005
MW-4	16-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0023	0.0025	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	0.0008
MW-4	13-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0017	0.002	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.0006
MW-4	02-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-4	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002	0.0025	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	0.0008
MW-4	16-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0033	0.003	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	0.001
MW-4	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	0.0022	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0007	0.0006
MW-4	10-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0044	0.0055	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0005	0.0006
DUP	10-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0039	0.0048	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	0.0007
MW-4	09-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0024	<0.0027	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-4	10-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	0.0017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0005	0.0008
MW-4	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002	0.0025	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-4	16-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0011	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0005	0.0006
MW-4	10-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0016	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-4	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0014	0.0017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	<0.0008
MW-4	06-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0015	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-4	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0016	0.0021	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0011	0.0011
MW-4	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.001	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
MW-4	19-Jan-05	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	0.001	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	<0.0005
MW-4	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	0.0014	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	0.0005 J
MW-4	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0013	0.0017	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0008	<0.0005
MW-4	27-Oct-05	<0.0005	0.0003 J	<0.0005	<0.0005	<0.0005	<0.0005	0.001	0.0012	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0007	0.0007
MW-4	26-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	0.0014	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	0.0005 J
MW-4	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	0.0006	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0004 J	0.0004 J
MW-4	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	0.0004 J	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0006	<0.0005
MW-4	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0007	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0005 J	0.0012
MW-4	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	0.0007	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	0.0005 J	<0.0005
MW-4	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	0.0003 J
MW-5	16-Dec-94	na	na	na	na	<0.0008	na	na	na	0.13	na	<0.0012	na	na	na	na	na
MW-5	29-Mar-95	<0	<0	na	<0	<0	na	na	na	39	na	<0.002	na	na	na	na	na
MW-5	08-Jun-95	<0	0.0015	na	<0	<0	na	na	na	27	na	0.0023	na	na	na	na	na
MW-5	10-Jan-96	<5	<5	na	<5	<5	na	na	na	<50	na	<10	<10	<10	na	na	na
MW-5	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-5	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
MW-5	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
MW-4	25-Oct-99	0.0007	0.0008	0.0091	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	25-Jan-00	0.0006	0.0006	0.0053	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	01-May-00	0.0006	0.0005	0.0041	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	25-Jul-00	0.0008	0.0006	<0.0038	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	09-Oct-00	0.0007	0.0007	0.0058	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	16-Jan-01	0.0006	0.0006	0.0055	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	13-Apr-01	<0.0005	<0.0005	0.0064	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	02-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
MW-4	06-Jul-01	<0.0005	0.0005	0.0047	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	16-Oct-01	0.0005	0.0006	0.0069	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	09-Jan-02	<0.0005	0.0005	0.004	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	10-Apr-02	0.0008	<0.0005	0.006	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	10-Apr-02	0.0007	0.0005	0.0064	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	09-Jul-02	0.0005	<0.0005	<0.0032	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	10-Oct-02	0.0005 J	0.0004 J	0.0044	<0.0005	0.0005 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	15-Jan-03	0.0005	<0.0005	<0.0029	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	16-Apr-03	<0.0005	<0.0005	<0.0032	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	10-Jul-03	<0.0005	<0.0005	0.0034	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	20-Jan-04	0.0006	0.0006	0.0046	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	06-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	14-Jul-04	0.0006	0.0007	0.0053	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	13-Oct-04	<0.0005	<0.0005	0.0036	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	19-Jan-05	0.0004 J	0.0005 J	0.0043	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
MW-4	18-Apr-05	0.0004 J	0.0005 J	0.0044	<0.0005	0.0005 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	19-Jul-05	0.0006	0.0006	0.0047	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	27-Oct-05	0.0005	0.0006	0.0042	<0.0005	0.0007	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
MW-4	26-Jan-06	0.0005 J	0.0005 J	0.0029	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	17-Apr-06	0.0003 J	0.0003 J	0.0021	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	20-Apr-07	0.0003 J	0.0004 J	0.0038	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	18-Apr-08	0.0003 J	0.0004 J	0.0034	<0.0005	0.0004 J	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
MW-4	15-Apr-09	0.0003 J	0.0004 J	0.0026	<0.0005	0.0003 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-4	28-Apr-10	<0.0005	<0.0005	0.0018 J	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
MW-5	16-Dec-94	na	na	na	na	na	na	na	na	na	na	na
MW-5	29-Mar-95	na	na	na	na	na	na	na	na	na	na	na
MW-5	08-Jun-95	na	na	na	na	na	na	na	na	na	na	na
MW-5	10-Jan-96	na	na	na	<5	na	na	<50	na	na	na	<5
MW-5	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
MW-5	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
MW-5	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
MW-5	02-Mar-98	<0	<5	<5	<100	374	<5	<5	<5	<5	<5	<100	<5	59.4	<5	<5	<10	<10
MW-5	10-Apr-98	<0	<10	<10	<50	260	<10	<10	<10	<10	<10	68	<10	94 J4	<10	<10	<10	<10
MW-5	17-Jul-98	<5	<5	<5	<25	94	<5	<5	<5	<5	<5	46	<5	96	<5	<5	<5	6.3
MW-5	19-Oct-98	<5 UJ2	<5 UJ2	<5 UJ2	<25 UJ2	99 J2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	48 J2	<5 UJ2	67 J2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2
MW-5	15-Jan-99	<1	<1	<1	<5	130	<1	<1	<1	<1	1.6	52	<1	93	<1	<1	<1	7.1
MW-5	22-Apr-99	<1.3	<1.3	<1.3	<6.3	<230 U6	0.64 J11	<1.3	<1.3	<1.3	2.1	<65 U6	<1.3	93	<1.3	<1.3	<1.3	9.1
MW-5	19-Jul-99	<0.63	<0.63	<0.63	<13	130	<0.63	<0.63	<0.63	<0.63	1.4	65	<0.63	72	<0.63	<0.63	<0.63	6.6
DUP	19-Jul-99	<0.5	<0.5	<0.5	<10	130	<0.5	<0.5	<0.5	<0.5	1.4	65	<0.5	74	<0.5	<0.5	<0.5	6.7
MW-5	25-Oct-99	<0.5	<0.5	<0.5	<10	150	<0.5	<0.5	<0.5	<0.5	1.2	73	<0.5	65	<0.5	<0.5	<0.5	5.6
MW-5	25-Jan-00	<0.42	<0.42	<0.42	<8.3	130	<0.42	<0.42	<0.42	<0.42	1.5	64	<0.42	77	<0.42	<0.42	<0.42	7.2
MW-5	01-May-00	<0.25	<0.25	<0.25	<5	93	0.37	<0.25	<0.25	<0.25	1.6	47	<0.25	68	<0.25	<0.25	<0.25	7.2
MW-5	25-Jul-00	<0.17	<0.17	<0.17	<3.3	71	0.35	<0.17	<0.17	<0.17	1.4	46	<0.17	50	<0.17	<0.17	<0.17	6.4
MW-5	09-Oct-00	<0.36	<0.36	<0.36	<7.1	110	<0.36	<0.36	<0.36	<0.36	1.3	51	<0.36	44	<0.36	<0.36	<0.36	6.1
MW-5	16-Jan-01	<0.31	<0.31	<0.31	<6.3	90	0.42	<0.31	<0.31	<0.31	2	38	<0.31	36	<0.31	<0.31	<0.31	8.3
MW-5	13-Apr-01	<0.2	<0.2	<0.2	<4	58	0.34	<0.2	<0.2	<0.2	1.7	25	<0.2	21	<0.2	<0.2	<0.2	6.81
DUP	13-Apr-01	<0.2	<0.2	<0.2	<4	60	0.35	<0.2	<0.2	<0.2	1.7	26	<0.2	21	<0.2	<0.2	<0.2	6.68
MW-5	06-Jul-01	<0.2	<0.2	<0.2	<4	43	0.24	<0.2	<0.2	<0.2	1.2	16	<0.2	16	<0.2	<0.2	<0.2	4.79
MW-5	16-Oct-01	<0.13	<0.13	<0.13	<2.5	46	0.31	<0.13	<0.13	<0.13	1.5	23	<0.13	16	<0.13	<0.13	<0.13	5.49
DUP	16-Oct-01	<0.13	<0.13	<0.13	<2.5	45	0.29	<0.13	<0.13	<0.13	1.5	21	<0.13	17	<0.13	<0.13	<0.13	5.41
MW-5	09-Jan-02	<0.031	<0.031	<0.031	<0.63	10	0.15	<0.031	<0.031	<0.031	1.1	6.4	<0.031	9.1	<0.031	<0.031	<0.031	3.73
MW-5	10-Apr-02	<0.042	<0.042	<0.042	<0.83	31	0.31	<0.042	<0.042	<0.042	1.8	16	<0.042	16	<0.042	<0.042	<0.042	6.14
MW-5	09-Jul-02	<0.1	<0.1	<0.1	<2	<34	0.42	<0.1	<0.1	<0.1	<1.7	<12	<0.1	24	<0.1	<0.1	<0.1	0.86
MW-5	10-Oct-02	<0.063	<0.063	<0.063	<1.3	36	0.25	<0.063	<0.063	<0.063	1.2	17	<0.063	13	<0.063	<0.063	<0.063	4.48
MW-5	15-Jan-03	<0.042	<0.042	<0.042	<0.83	15	0.21	<0.042	<0.042	<0.042	1.7	6.2	<0.042	10	<0.042	<0.042	<0.042	5.01
MW-5	15-Apr-03	<0.031	<0.031	<0.031	<0.63	18	0.13	<0.031	<0.031	<0.031	0.73	12	<0.031	6.5	<0.031	<0.031	<0.031	1.62
MW-5	10-Jul-03	<0.05	<0.05	<0.05	<1	18	0.15	<0.05	<0.05	<0.05	0.76	6.9	<0.05	3.3	<0.05	<0.05	<0.05	1.883
MW-5	28-Oct-03	<0.063	<0.063	<0.063	<1.3	18	0.15	<0.063	<0.063	<0.063	0.88	9.6	<0.063	2.7	<0.063	<0.063	<0.063	1.791
MW-5	20-Jan-04	<0.031	<0.031	<0.031	<0.63	31	0.17	<0.031	<0.031	<0.031	0.99	11	<0.031	7.8	<0.031	<0.031	<0.031	2.09
MW-5	04-May-04	<0.042	<0.042	<0.042	<0.83	5.9	0.065	<0.042	<0.042	<0.042	0.42	1.6	<0.042	4.5	<0.042	<0.042	<0.042	1.18
MW-5	14-Jul-04	<0.036	<0.036	<0.036	<0.71	5.1	0.039	<0.036	<0.036	<0.036	0.23	3.5	<0.036	1.2	<0.036	<0.036	<0.036	0.37
MW-5	13-Oct-04	<0.071	<0.071	<0.071	<1.4	9.5	0.12	<0.071	<0.071	<0.071	0.92	4.1	<0.071	3.3	<0.071	<0.071	<0.071	2
MW-5	19-Jan-05	<0.02	<0.02	<0.02	<0.4	6.9	0.095	<0.02	<0.02	<0.02	0.8	2.3	<0.02	2.1	<0.02	<0.02	<0.02	1.43
MW-5	18-Apr-05	<0.0063	<0.0063	<0.0063	<0.13	3.2	0.049	<0.0063	<0.0063	<0.0063	0.22	1.2	<0.0063	0.96	<0.0063	<0.0063	<0.0063	0.295
MW-5	19-Jul-05	<0.005	<0.005	<0.005	<0.1	1.8	0.034	<0.005	<0.005	<0.005	0.26	0.58	<0.005	2.1	<0.005	<0.005	<0.005	0.82
MW-5	27-Oct-05	<0.013	<0.013	<0.013	<0.25	1.8	0.087	<0.013	<0.013	<0.013	0.59	<0.25	<0.013	1.4	<0.013	0.01 J	<0.013	0.87
MW-5	17-Apr-06	<0.036	<0.036	<0.036	<0.71	7.1	0.077	<0.036	<0.036	<0.036	0.73	1.4	<0.036	3.5	<0.036	<0.036	<0.036	2.11
MW-5	17-Apr-07	<0.0017	<0.0017	<0.0017	0.029 J	2.3	0.081	<0.0017	<0.0017	0.0013 J	0.99	0.77	0.0015 J	0.56	<0.0017	0.0039	<0.0017	1.029
MW-5	17-Apr-08	<0.0025	<0.0025	<0.0025	<0.05	1.1	0.035	<0.0025	<0.0025	<0.0025	0.22	0.34	<0.0025	0.3	<0.0025	0.0017 J	<0.0025	0.1277
MW-5	15-Apr-09	<0.0063	<0.0063	<0.0063	<0.13	0.99	0.063	<0.0063	<0.0063	<0.0063	0.73	0.67	<0.0063	0.33	<0.0063	0.0048 J	<0.0063	0.547

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloroethane	1,2,3-Trichloropropane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-pentanone	Bromobenzene	Carbon Disulfide	Chloroethane	Chloromethane	Dichlorodifluoromethane	Isopropylbenzene	n-Butylbenzene
MW-5	02-Mar-98	<5	<5	<5	<5	<5	<5	<5	<5	36.1	<5	<5	<10	<10	<10	<5	<5
MW-5	10-Apr-98	<10	<10	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	<10	<10	<10	<10
MW-5	17-Jul-98	<5	<5	<5	<5	<5	<5	<5	<5	<25	<5	<5	<5	<5	<5	<5	<5
MW-5	19-Oct-98	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	140 J2	<5 UJ2	<5 UJ2	<25 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2
MW-5	15-Jan-99	<1	<1	<1	<1	<1	<1	<1	<1	21	<1	<1	<1	<1	<1	<1	<1
MW-5	22-Apr-99	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	32	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3
MW-5	19-Jul-99	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	26	<0.63	<0.63	<1.3	<1.3	<1.3	<0.63	<0.63
DUP	19-Jul-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	27	<0.5	<0.5	<1	<1	<1	<0.5	<0.5
MW-5	25-Oct-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	29	<0.5	<0.5	<1	<1	<1	<0.5	<0.5
MW-5	25-Jan-00	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	<0.42	27	<0.42	<0.42	<0.83	<0.83	<0.83	<0.42	<0.42
MW-5	01-May-00	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0.35	<0.25	20	<0.25	<0.25	<0.5	<0.5	<0.5	<0.25	<0.25
MW-5	25-Jul-00	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	0.25	<0.17	20	<0.17	<0.17	<0.33	<0.33	<0.33	<0.17	<0.17
MW-5	09-Oct-00	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	<0.36	21	<0.36	<0.36	<0.71	<0.71	<0.71	<0.36	<0.36
MW-5	16-Jan-01	<0.31	<0.31	<0.31	<0.31	<0.31	<0.31	0.53	<0.31	15	<0.31	<0.31	<0.63	<0.63	<0.63	<0.31	<0.31
MW-5	13-Apr-01	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.48	<0.2	9.4	<0.2	<0.2	<0.4	<0.4	<0.4	<0.2	<0.2
DUP	13-Apr-01	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.44	<0.2	9.1	<0.2	<0.2	<0.4	<0.4	<0.4	<0.2	<0.2
MW-5	06-Jul-01	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	4.5	<0.2	<0.2	<0.4	<0.4	<0.4	<0.2	<0.2
MW-5	16-Oct-01	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	0.32	<0.13	5.4	<0.13	<0.13	<0.25	<0.25	<0.25	<0.13	<0.13
DUP	16-Oct-01	<0.13	<0.13	<0.13	<0.13	<0.13	<0.13	0.31	<0.13	5.1	<0.13	<0.13	<0.25	<0.25	<0.25	<0.13	<0.13
MW-5	09-Jan-02	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	0.27	0.077	1.6	<0.031	<0.031	<0.063	<0.063	<0.063	<0.031	<0.031
MW-5	10-Apr-02	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	0.46	0.13	10	<0.042	<0.042	<0.083	<0.083	<0.083	<0.042	<0.042
MW-5	09-Jul-02	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.63	<0.17	<8.2	<0.1	<0.21	<0.2	<0.2	<0.2	<0.1	<0.1
MW-5	10-Oct-02	<0.063	<0.063	<0.063	<0.063	<0.063	<0.063	0.34	0.1	8.1	<0.063	<0.063	<0.13	<0.13	<0.13	<0.063	<0.063
MW-5	15-Jan-03	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	0.63	0.18	2.8	<0.042	<0.042	<0.083	<0.083	<0.083	<0.042	<0.042
MW-5	15-Apr-03	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	0.1	0.032	3.6	<0.031	<0.031	<0.063	<0.063	<0.063	<0.031	<0.031
MW-5	10-Jul-03	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	<0.05	1.7	<0.05	<0.05	<0.1	<0.1	<0.1	<0.05	<0.05
MW-5	28-Oct-03	<0.063	<0.063	<0.063	<0.063	<0.063	<0.063	0.17	<0.063	2.8	<0.063	<0.063	<0.13	<0.13	<0.13	<0.063	<0.063
MW-5	20-Jan-04	<0.031	<0.031	<0.031	<0.031	<0.031	<0.031	0.21	0.057	5.7	<0.031	<0.031	<0.063	<0.063	<0.063	<0.031	<0.031
MW-5	04-May-04	<0.042	<0.042	<0.042	<0.042	<0.042	<0.042	0.15	0.046	<0.83	<0.042	<0.042	<0.083	<0.083	<0.083	<0.042	<0.042
MW-5	14-Jul-04	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	0.042	<0.036	0.87	<0.036	<0.036	<0.071	<0.071	<0.071	<0.036	<0.036
MW-5	13-Oct-04	<0.071	<0.071	<0.071	<0.071	<0.071	<0.071	0.2	<0.071	1.6	<0.071	<0.071	<0.14	<0.14	<0.14	<0.071	<0.071
MW-5	19-Jan-05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.24	0.071	1.1	<0.02	<0.02	<0.04	<0.04	<0.04	0.013 J	<0.02
MW-5	18-Apr-05	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.025	0.012	0.75	<0.0063	<0.0063	<0.013	<0.013	<0.013	<0.0063	<0.0063
MW-5	19-Jul-05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.12	0.047	0.39	<0.005	<0.005	<0.01	<0.01	<0.01	0.0064	<0.005
MW-5	27-Oct-05	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.14	0.051	0.5	<0.013	<0.013	<0.025	<0.025	<0.025	0.0088 J	<0.013
MW-5	17-Apr-06	<0.036	<0.036	<0.036	<0.036	<0.036	<0.036	0.44	0.13	1.8	<0.036	<0.036	<0.071	<0.071	<0.071	0.019 J	<0.063
MW-5	17-Apr-07	0.001 J	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	0.15	0.06	0.47	<0.0017	<0.0017	<0.0033	<0.0033	<0.0033	0.016	<0.0017
MW-5	17-Apr-08	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	0.011	0.0077	0.31	<0.0025	<0.0025	<0.005	<0.005	<0.005	0.0025	<0.0025
MW-5	15-Apr-09	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.15	0.05	0.32	<0.0063	<0.0063	<0.013	<0.013	<0.013	0.015	<0.0063

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
MW-5	02-Mar-98	<5	<5	<25	<5	<5	<5	<5	<5	<10	<5	<5
MW-5	10-Apr-98	<10	<10	<10	<10	<10	<10	na	<10	<20	<10	<10
MW-5	17-Jul-98	<5	<5	<5	<5	<5	<5	na	<5	<10	<5	<5
MW-5	19-Oct-98	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	<5 UJ2	na	<5 UJ2	<10 UJ2	<5 UJ2	<5 UJ2
MW-5	15-Jan-99	<1	<1	<1	<1	<1	<1	na	<1	<2	<1	<1
MW-5	22-Apr-99	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	na	<1.3	<2.5	<1.3	<1.3
MW-5	19-Jul-99	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<13	<0.63	<0.63	<0.63	<0.63
DUP	19-Jul-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5
MW-5	25-Oct-99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<0.5
MW-5	25-Jan-00	<0.42	<0.42	<0.83	<0.42	<0.42	<0.42	<8.3	<0.42	<0.42	<0.42	<0.42
MW-5	01-May-00	<0.25	<0.25	<0.5	<0.25	<0.25	<0.25	<5	<0.25	<0.25	<0.25	<0.25
MW-5	25-Jul-00	<0.17	<0.17	<0.33	<0.17	<0.17	<0.17	<3.3	<0.17	<0.17	<0.17	<0.17
MW-5	09-Oct-00	<0.36	<0.36	<0.71	<0.36	<0.36	<0.36	<7.1	<0.36	<0.36	<0.36	<0.36
MW-5	16-Jan-01	<0.31	<0.31	<0.63	<0.31	<0.31	<0.31	<6.3	<0.31	<0.31	<0.31	<0.31
MW-5	13-Apr-01	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.2	<0.2
DUP	13-Apr-01	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.2	<0.2
MW-5	06-Jul-01	<0.2	<0.2	<0.4	<0.2	<0.2	<0.2	<4	<0.2	<0.2	<0.2	<0.2
MW-5	16-Oct-01	<0.13	<0.13	<0.25	<0.13	<0.13	<0.13	<2.5	<0.13	<0.13	<0.13	<0.13
DUP	16-Oct-01	<0.13	<0.13	<0.25	<0.13	<0.13	<0.13	<2.5	<0.13	<0.13	<0.13	<0.13
MW-5	09-Jan-02	<0.031	<0.031	<0.063	<0.031	<0.031	<0.031	<0.63	<0.031	<0.031	<0.031	<0.031
MW-5	10-Apr-02	<0.042	<0.042	<0.17	<0.042	<0.042	<0.042	<0.83	<0.042	<0.042	<0.042	<0.042
MW-5	09-Jul-02	<0.1	<0.1	<0.4	<0.1	<0.1	<0.1	<2	<0.1	<0.1	<0.1	<0.1
MW-5	10-Oct-02	<0.063	<0.063	<0.25	<0.063	<0.063	<0.063	<1.3	<0.063	<0.063	<0.063	<0.063
MW-5	15-Jan-03	<0.042	0.054	<0.17	<0.042	<0.042	<0.042	<0.83	<0.042	<0.042	<0.042	<0.042
MW-5	15-Apr-03	<0.031	<0.031	<0.13	<0.031	<0.031	<0.031	<0.63	<0.031	<0.031	<0.031	<0.031
MW-5	10-Jul-03	<0.05	<0.05	<0.2	<0.05	<0.05	<0.05	<1	<0.05	<0.05	<0.05	<0.05
MW-5	28-Oct-03	<0.063	<0.063	<0.25	<0.063	<0.063	<0.063	<1.3	<0.063	<0.063	<0.063	<0.063
MW-5	20-Jan-04	<0.031	<0.031	<0.13	<0.031	<0.031	<0.031	<0.63	<0.031	<0.031	<0.031	<0.031
MW-5	04-May-04	<0.042	<0.042	<0.17	<0.042	<0.042	<0.042	<0.83	<0.042	<0.042	<0.042	<0.042
MW-5	14-Jul-04	<0.036	<0.036	<0.14	<0.036	<0.036	<0.036	<0.71	<0.036	<0.036	<0.036	<0.036
MW-5	13-Oct-04	<0.071	<0.071	<0.29	<0.071	<0.071	<0.071	<1.4	<0.071	<0.071	<0.071	<0.071
MW-5	19-Jan-05	<0.02	0.023	<0.08	<0.02	<0.02	<0.02	<0.4	<0.02	<0.02	<0.02	<0.02
MW-5	18-Apr-05	<0.0063	0.0048 J	<0.025	<0.0063	<0.0063	<0.0063	<0.13	<0.0063	<0.0063	<0.0063	<0.0063
MW-5	19-Jul-05	<0.005	0.012	<0.02	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005
MW-5	27-Oct-05	<0.013	0.014	0.028 J	<0.013	<0.013	<0.013	<0.25	<0.013	<0.013	<0.013	<0.013
MW-5	17-Apr-06	<0.063	0.04	<0.14	<0.036	<0.063	<0.036	<0.71	<0.036	<0.036	<0.036	<0.036
MW-5	17-Apr-07	<0.0017	0.021	0.011	<0.0017	0.0014 J	<0.0017	<0.033	<0.0017	<0.0017	<0.0017	<0.0017
MW-5	17-Apr-08	<0.0025	0.003	<0.01	<0.0025	<0.0025	<0.0025	<0.05	<0.0025	<0.0025	<0.0025	<0.0025
MW-5	15-Apr-09	<0.0063	0.024	<0.025	<0.0063	<0.0063	<0.0063	<0.13	<0.0063	<0.0063	<0.0063	<0.0063

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	15-Apr-09	<0.0063	<0.0063	<0.0063	<0.13	0.87	0.07	<0.0063	<0.0063	<0.0063	0.8	0.53	<0.0063	0.42	<0.0063	0.0042 J	<0.0063	0.673
MW-5	28-Apr-10	<0.0042	<0.0042	<0.0042	<0.083	0.48	0.052	<0.0042	<0.0042	<0.0042	0.56	0.27	<0.0042	0.29	<0.0042	0.0037 J	<0.0042	0.446
RP-1	08-Sep-94	<0	0.002	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	0.003	<0.005	<0.1	<0.005	<0.005	0.001	<0.005	<0.01	<0.01
RP-1	28-Feb-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	29-Mar-95	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-1	10-May-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	09-Aug-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	17-Nov-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0008	na	na	na	<0.002
RP-1	10-Jan-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	0.001	<0.005	<0.005	<0.01	<0.01
RP-1	17-Apr-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
DUP	17-Apr-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	31-Jul-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	19-Nov-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	25-Mar-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	10-Jun-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	18-Aug-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-1	19-Dec-97	na	na	na	na	na	<0.0005	na	na	na	0.0006	na	na	0.0006	na	na	na	0.002
DUP	19-Dec-97	na	na	na	na	na	<0.0005	na	na	na	0.0011	na	na	0.001	na	na	na	0.003
RP-1	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0013	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
DUP	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0013	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
RP-1	07-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0018	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	14-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.002	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	20-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0022	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	12-Jan-99	<0.001	0.0008 J11	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0022	<0.001	<0.005	<0.001	<0.001	0.0008 J11	<0.001	<0.001	<0.001
RP-1	19-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0009 J11	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	16-Jul-99	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.001
RP-1	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	27-Apr-00	<0.0005	0.0013	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	25-Jul-00	<0.0005	0.0015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.001
RP-1	10-Oct-00	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	25-Jan-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	09-Apr-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	05-Jul-01	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	05-Jul-01	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	12-Oct-01	<0.0005	0.001	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.001
RP-1	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	<0.001
RP-1	08-Apr-02	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	15-Apr-09	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	<0.0063	0.22	0.069	0.34	<0.0063	<0.0063	<0.013	<0.013	<0.013	0.024	<0.0063
MW-5	28-Apr-10	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	<0.0042	0.095	0.029	0.22	<0.0042	<0.0042	<0.0083	<0.0083	<0.0083	0.011	<0.0042
RP-1	08-Sep-94	<0.005	<0.005	<0.0005	<0.005	<0.005	na	na	na	<0.05	na	0.01	<0.01	<0.01	<0.0005	na	na
RP-1	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	29-Mar-95	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-1	10-May-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	10-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-1	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
DUP	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	0.0029	<0.002	<0.001	<0.001
RP-1	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-1	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-1	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	15-Apr-09	<0.0063	0.045	0.025	<0.0063	0.0035 J	<0.0063	<0.13	<0.0063	<0.0063	<0.0063	<0.0063
MW-5	28-Apr-10	<0.0042	0.017	0.0084 J	<0.0042	<0.0042	<0.0042	<0.083	<0.0042	<0.0042	<0.0042	<0.0042
RP-1	08-Sep-94	na	na	na	<0.005	na	na	<0.05	<0.0005	na	na	<0.005
RP-1	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na
RP-1	29-Mar-95	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-1	10-May-95	na	na	na	na	na	na	na	na	na	na	na
RP-1	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na
RP-1	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na
RP-1	10-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-1	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
DUP	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
RP-1	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
RP-1	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
RP-1	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na
RP-1	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na
RP-1	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
RP-1	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
DUP	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
RP-1	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
DUP	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
RP-1	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-1	14-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.002	<0.001	<0.001
RP-1	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-1	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0011 J11	<0.001	<0.001
RP-1	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-1	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
RP-1	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-1	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-1	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-1	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-1	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
RP-1	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
RP-1	08-Jul-02	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.001
RP-1	09-Oct-02	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	15-Apr-03	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	09-Jul-03	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	28-Oct-03	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	03-May-04	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	15-Jul-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	19-Jan-05	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
RP-1	19-Apr-05	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
RP-1	19-Jul-05	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
RP-1	24-Oct-05	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0025	<0.0005	<0.01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.001
RP-1	23-Jan-06	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	<0.0005	<0.001
RP-1	17-Apr-06	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.001
RP-1	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.001
RP-1	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
RP-1	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-1	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-2	08-Sep-94	<0	0.001	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	0.001	<0.005	<0.1	<0.005	0.0005	<0.005	0.0006	<0.01	<0.01
DUP	08-Sep-94	<0	0.001	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	0.001	<0.005	<0.1	<0.005	<0.005	<0.005	0.0005	<0.01	<0.01
RP-2	28-Feb-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	29-Mar-95	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-2	10-May-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	09-Aug-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	17-Nov-95	na	na	na	na	na	0.002	na	na	na	0.0009	na	na	0.003	na	na	na	0.004
RP-2	10-Jan-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-2	17-Apr-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	31-Jul-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	19-Nov-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	25-Mar-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	10-Jun-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
RP-1	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	28-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	15-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	22-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-1	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	08-Sep-94	<0.005	<0.005	<0.0005	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	<0.0005	na	na
DUP	08-Sep-94	<0.005	<0.005	<0.0005	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	<0.0005	na	na
RP-2	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	29-Mar-95	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	0.015	<0.01	<0.01	na	na	na
RP-2	10-May-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	10-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-2	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
RP-1	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
RP-1	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	28-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-1	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-1	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
RP-1	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	15-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	15-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	21-Jul-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	22-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-1	23-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	08-Sep-94	na	na	na	<0.005	na	na	<0.05	<0.0005	na	na	<0.005
DUP	08-Sep-94	na	na	na	<0.005	na	na	<0.05	<0.0005	na	na	<0.005
RP-2	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na
RP-2	29-Mar-95	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-2	10-May-95	na	na	na	na	na	na	na	na	na	na	na
RP-2	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na
RP-2	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na
RP-2	10-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-2	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
RP-2	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
RP-2	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
RP-2	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na
RP-2	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
RP-2	18-Aug-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
DUP	18-Aug-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	19-Dec-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-2	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
RP-2	07-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0014	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	13-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0012	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	20-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	11-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0011	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	19-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0016	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	0.0006 J11	<0.001
RP-2	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-2	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0023	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	0.0012	<0.001
RP-2	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	0.0007	<0.001
DUP	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0028	<0.0005	<0.01	<0.0005	<0.0005	0.0007	<0.0005	0.0008	<0.001
RP-2	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0039	<0.0005	<0.01	<0.0005	<0.0005	0.0013	<0.0005	0.0015	<0.001
RP-2	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.007	<0.0005	<0.01	<0.0005	<0.0005	0.0024	<0.0005	0.0022	<0.001
RP-2	10-Oct-00	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0045	<0.0005	0.0029	<0.001
RP-2	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0044	<0.0005	0.0017	<0.001
RP-2	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0089	<0.0005	<0.01	<0.0005	<0.0005	0.0037	<0.0005	0.0023	<0.001
RP-2	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0058	<0.0005	0.0027	<0.001
RP-2	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0054	<0.0005	0.0023	<0.001
RP-2	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.014	<0.0005	<0.01	<0.0005	<0.0005	0.0055	<0.0005	0.0023	<0.001
RP-2	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.01	<0.0005	<0.0005	0.0065	<0.0005	0.0018	<0.001
RP-2	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0065	<0.0005	0.0019	<0.001
RP-2	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0049	<0.0005	0.0014	<0.001
DUP	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0049	<0.0005	0.0014	<0.001
RP-2	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0043	<0.0005	0.0013	<0.001
RP-2	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0038	<0.0005	0.0009	<0.001
RP-2	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0087	<0.0005	<0.01	<0.0005	<0.0005	0.0042	<0.0005	0.0015	<0.001
DUP	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0093	<0.0005	<0.01	<0.0005	<0.0005	0.0041	<0.0005	0.0015	<0.001
RP-2	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0099	<0.0005	<0.01	<0.0005	<0.0005	0.0043	<0.0005	0.0016	<0.001
RP-2	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.008 J	<0.0005	<0.01	<0.0005	<0.0005	0.0034 J	<0.0005	0.0012 J	<0.001
RP-2	03-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0069	<0.0005	<0.01	<0.0005	<0.0005	0.0028	<0.0005	<0.0005	<0.001
RP-2	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0065	<0.0005	<0.01	<0.0005	<0.0005	0.0024	<0.0005	0.0006	<0.001
RP-2	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0063	<0.0005	<0.01	<0.0005	<0.0005	0.0024	<0.0005	0.0007	<0.001
RP-2	17-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0053	<0.0005	<0.01	<0.0005	<0.0005	0.0022	<0.0005	0.0006	<0.001
RP-2	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0042	<0.0005	<0.01	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	<0.001
RP-2	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0035	<0.0005	<0.01	<0.0005	<0.0005	0.0012	<0.0005	0.0004 J	<0.001
RP-2	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0037	<0.0005	<0.01	<0.0005	<0.0005	0.0014	<0.0005	0.0004 J	<0.001
RP-2	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0044	<0.0005	<0.01	<0.0005	<0.0005	0.0016	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
RP-2	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-2	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
RP-2	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-2	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	05-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	09-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	17-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	19-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
RP-2	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
DUP	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
RP-2	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
RP-2	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
RP-2	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-2	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-2	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-2	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0015 J11	<0.001	<0.001
RP-2	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0015 J11	<0.001	<0.001
RP-2	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0016	<0.0005	<0.0005
RP-2	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0039	<0.0005	<0.0005
RP-2	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0022	<0.0005	<0.0005
DUP	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0023	<0.0005	<0.0005
RP-2	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0043	<0.0005	<0.0005
RP-2	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0039	<0.0005	<0.0005
RP-2	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0043	<0.0005	<0.0005
RP-2	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.003	<0.0005	<0.0005
RP-2	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0024	<0.0005	<0.0005
RP-2	05-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0019	<0.0005	<0.0005
RP-2	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0021	<0.0005	<0.0005
RP-2	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0017	<0.0005	<0.0005
RP-2	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.0005	<0.0005
RP-2	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0011	<0.0005	<0.0005
RP-2	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
DUP	09-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.0005	<0.0005
RP-2	14-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
RP-2	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-2	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-2	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-2	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006 J	<0.0005	<0.0005
RP-2	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	17-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-2	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	19-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
RP-2	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0041	<0.0005	<0.01	<0.0005	<0.0005	0.0015	<0.0005	0.0003 J	<0.001
RP-2	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.001
DUP	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.001
RP-2	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.001
RP-2	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	0.0007	<0.001
RP-2	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	0.0003 J	<0.001
RP-2	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	0.0005 J	<0.0005	0.0004 J	<0.001
RP-2	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
RP-2	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
RP-2	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
RP-2	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
RP-2	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	0.0003 J	<0.001
RP-2	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	08-Sep-94	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-3	28-Feb-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0007	na	na	na	<0.002
RP-3	29-Mar-95	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-3	10-May-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-3	09-Aug-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0009	na	na	na	0.0094
RP-3	17-Nov-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.001	na	na	na	0.005
RP-3	10-Jan-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	0.0006	<0.005	<0.005	<0.01	0.003
RP-3	17-Apr-96	na	na	na	na	na	<0.0005	na	na	na	0.0006	na	na	<0.0005	na	na	na	0.008
RP-3	31-Jul-96	na	na	na	na	na	<0.0005	na	na	na	0.0005	na	na	0.0005	na	na	na	0.007
RP-3	19-Nov-96	na	na	na	na	na	<0.0005	na	na	na	0.0005	na	na	0.0005	na	na	na	0.003
RP-3	25-Mar-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	0.004
RP-3	10-Jun-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-3	18-Aug-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	0.0041
RP-3	19-Dec-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0006	na	na	na	0.003
RP-3	25-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
RP-3	07-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	13-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	20-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	20-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	11-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	19-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
RP-2	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	17-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0001 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-2	23-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	08-Sep-94	<0.005	<0.005	<0.0005	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	<0.0005	na	na
RP-3	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	29-Mar-95	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-3	10-May-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	10-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-3	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-3	25-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
RP-3	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DUP	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	0.0007 J11	<0.001	<0.001	<0.001	<0.001	<0.001
RP-3	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	14-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
RP-2	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	20-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	20-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	17-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	15-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	21-Jul-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	21-Jul-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	12-Oct-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	19-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-2	23-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-3	08-Sep-94	na	na	na	<0.005	na	na	<0.05	<0.0005	na	na	<0.005
RP-3	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na
RP-3	29-Mar-95	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-3	10-May-95	na	na	na	na	na	na	na	na	na	na	na
RP-3	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na
RP-3	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na
RP-3	10-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-3	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
RP-3	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
RP-3	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
RP-3	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na
RP-3	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na
RP-3	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
RP-3	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
RP-3	25-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
RP-3	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-3	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-3	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
DUP	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-3	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-3	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-3	16-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-3	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-3	14-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-3	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
RP-3	25-Jul-00	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	10-Oct-00	<0.0005	0.0015	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	17-Jan-01	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	10-Apr-01	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	03-Jul-01	<0.0005	0.0012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	15-Oct-01	<0.0005	0.0012	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	08-Jan-02	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	08-Apr-02	<0.0005	0.0011	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	08-Jul-02	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	07-Oct-02	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	15-Apr-03	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.001
RP-3	27-Oct-03	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	19-Jan-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	19-Jan-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0013	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	03-May-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0018	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-3	17-Jan-05	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	0.0005 J	<0.001
RP-3	18-Apr-05	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0016	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0005 J	<0.001
RP-3	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0021	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
RP-3	24-Oct-05	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0028	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	0.0004 J	<0.001
RP-3	23-Jan-06	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0026	<0.0005	<0.01	<0.0005	<0.0005	0.0006	<0.0005	0.0007	<0.001
RP-3	17-Apr-06	<0.0005	0.0009	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0003 J	0.0006	<0.001
RP-3	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0022	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	0.0004 J	<0.001
RP-3	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	0.0008	<0.001
DUP	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0017	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	0.0008	<0.001
RP-3	14-Apr-09	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	0.0003 J	<0.001
RP-3	28-Apr-10	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.001
DUP	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	0.0003 J	<0.001
RP-3	17-Apr-12	<0.0005	0.008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
RP-3	19-Apr-13	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.001
RP-3	28-Apr-14	<0.0005	0.0006	<0.0005	<0.01	<0.01 U5	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-4	08-Sep-94	<0	0.001	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	0.009	<0.005	<0.1	<0.005	<0.005	0.004	0.002	<0.01	<0.01
RP-4	28-Feb-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
DUP	28-Feb-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	29-Mar-95	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-4	10-May-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
RP-3	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	03-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	07-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	09-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	14-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	17-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	18-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	17-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	18-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-3	28-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	08-Sep-94	<0.005	<0.005	<0.0005	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	<0.0005	na	na
RP-4	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	29-Mar-95	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-4	10-May-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
RP-3	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-3	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
RP-3	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
RP-3	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-3	03-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
RP-3	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0013	<0.0005	<0.0005
RP-3	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
RP-3	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
RP-3	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0012	<0.0005	<0.0005
RP-3	07-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0008	<0.0005	<0.0005
RP-3	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
RP-3	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
RP-3	09-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-3	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
RP-3	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.0005	<0.0005
DUP	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0009	<0.0005	<0.0005
RP-3	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
RP-3	14-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-3	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-3	17-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-3	18-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-3	18-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
RP-3	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-3	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005 J	<0.0005	<0.0005
RP-3	17-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-3	18-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-3	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-3	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-3	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-3	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-3	19-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
RP-3	28-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
RP-4	08-Sep-94	na	na	na	<0.005	na	na	<0.05	<0.0005	na	na	<0.005
RP-4	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na
DUP	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na
RP-4	29-Mar-95	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-4	10-May-95	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	10-May-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	09-Aug-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
DUP	09-Aug-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	17-Nov-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
DUP	17-Nov-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	09-Jan-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	0.006	0.0005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-4	17-Apr-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	31-Jul-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
DUP	31-Jul-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	19-Nov-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	25-Mar-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	10-Jun-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
DUP	10-Jun-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	18-Aug-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-4	19-Dec-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0006	na	na	na	<0.002
RP-4	25-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0055	<0.001	<0.02	<0.001	<0.001	0.0016	0.0011	<0.002	<0.002
RP-4	07-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0061	<0.001	<0.005	<0.001	<0.001	0.0015	0.0013	<0.001	<0.001
RP-4	13-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0067	<0.001	<0.005	<0.001	<0.001	0.0019	0.0014	<0.001	<0.001
RP-4	20-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0076	<0.001	<0.005	<0.001	<0.001	0.0023	0.0011	<0.001	<0.001
RP-4	11-Jan-99	<0.001	0.0007 J11	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0098	<0.001	<0.005	<0.001	<0.001	0.0033	0.0015	0.0006 J11	<0.001
RP-4	19-Apr-99	<0.001	0.0008 J11	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	0.0094	<0.001	<0.005	<0.001	<0.001	0.003	0.0014	<0.001	<0.001
RP-4	13-Jul-99	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0095	<0.0005	<0.01	<0.0005	<0.0005	0.0032	0.0013	<0.0005	<0.001
DUP	13-Jul-99	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0095	<0.0005	<0.01	<0.0005	<0.0005	0.0032	0.0013	<0.0005	<0.001
RP-4	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0039	0.0011	<0.0005	<0.001
RP-4	18-Jan-00	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0045	0.001	0.0005	<0.001
RP-4	27-Apr-00	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0043	0.0012	<0.0005	<0.001
RP-4	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.01	<0.0005	<0.0005	0.0051	<0.001	0.0008	<0.001
RP-4	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0043	0.0009	0.0006	<0.001
RP-4	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.01	<0.0005	<0.0005	0.0044	0.0008	0.0006	<0.001
RP-4	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0039	0.0007	<0.0005	<0.001
RP-4	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.01	<0.0005	<0.0005	0.0037	0.0007	<0.0005	<0.001
RP-4	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0028	<0.0005	<0.0005	<0.001
RP-4	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0034	0.0007	<0.0005	<0.001
RP-4	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.016	<0.0005	<0.01	<0.0005	<0.0005	0.0046	0.0009	0.0006	<0.001
RP-4	07-Oct-02	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.003	0.0008	<0.0005	<0.001
RP-4	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0089	<0.0005	<0.01	<0.0005	<0.0005	0.0026	0.0006	0.0006	<0.001
RP-4	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0029	0.0007	<0.0005	<0.001
RP-4	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0093	<0.0005	<0.01	<0.0005	<0.0005	0.0026	0.0006	0.0005	<0.001
RP-4	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0029	0.0008	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	10-May-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	09-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-4	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-4	25-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
RP-4	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-4	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-4	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-4	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-4	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-4	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	25-Oct-99	<0.0005	0.0016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	07-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	10-May-95	na	na	na	na	na	na	na	na	na	na	na
RP-4	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na
DUP	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na
RP-4	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na
DUP	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na
RP-4	09-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-4	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
RP-4	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
DUP	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
RP-4	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
RP-4	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na
RP-4	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na
DUP	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na
RP-4	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
RP-4	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
RP-4	25-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.0027	<0.001	<0.001
RP-4	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0025	<0.001	<0.001
RP-4	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-4	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0047	<0.001	<0.001
RP-4	11-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0034	<0.001	<0.001
RP-4	19-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	0.0025	<0.001	<0.001
RP-4	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.003	<0.0005	<0.0005
DUP	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.003	<0.0005	<0.0005
RP-4	25-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0025	<0.0005	<0.0005
RP-4	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0021	<0.0005	<0.0005
RP-4	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0015	<0.0005	<0.0005
RP-4	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-4	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
RP-4	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-4	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-4	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	07-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	14-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
RP-4	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
RP-4	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0082	<0.0005	<0.01	<0.0005	<0.0005	0.0022	0.0006	<0.0005	<0.001
RP-4	03-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0079	<0.0005	<0.01	<0.0005	<0.0005	0.002	0.0007	<0.0005	<0.001
RP-4	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0095	<0.0005	<0.01	<0.0005	<0.0005	0.0026	0.0009	<0.0005	<0.001
RP-4	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.008	<0.0005	<0.01	<0.0005	<0.0005	0.0019	0.0007	<0.0005	<0.001
RP-4	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0079	<0.0005	<0.01	<0.0005	<0.0005	0.0021	0.0006	<0.0005	<0.001
RP-4	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0073	<0.0005	<0.01	<0.0005	<0.0005	0.0019	0.0006	<0.0005	<0.001
RP-4	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0062	<0.0005	<0.01	<0.0005	<0.0005	0.0019	0.0005 J	<0.0005	<0.001
RP-4	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0091	<0.0005	<0.01	<0.0005	<0.0005	0.0027	0.0006	0.0003 J	<0.001
DUP	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0089	<0.0005	<0.01	<0.0005	<0.0005	0.0024	0.0007	0.0003 J	<0.001
RP-4	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0079	<0.0005	<0.01	<0.0005	<0.0005	0.0023	0.0007	<0.0005	<0.001
RP-4	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.006	<0.0005	<0.01	<0.0005	<0.0005	0.0019	0.0005	<0.0005	<0.001
DUP	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0061	<0.0005	<0.01	<0.0005	<0.0005	0.0018	0.0005	<0.0005	<0.001
RP-4	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.002	<0.0005	<0.01	<0.0005	<0.0005	0.0007	0.0004 J	<0.0005	<0.001
RP-4	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	0.0006	0.0005 J	<0.0005	<0.001
RP-4	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0003 J	<0.0005	<0.001
DUP	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0004 J	<0.0005	<0.001
RP-4	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005 J	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
RP-4	15-Apr-11	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	0.0003 J	<0.0005	<0.001
DUP	15-Apr-11	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	0.0003 J	<0.0005	<0.001
RP-4	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0003 J	<0.0005	<0.001
RP-4	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	0.0002 J	<0.0005	<0.001
RP-4	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
RP-4	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
RP-4	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0005 J	<0.0005	<0.01	<0.0005	<0.0005	0.0001 J	0.0002 J	<0.0005	<0.001
RP-4	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	0.0002 J	0.0001 J	<0.0005	<0.001
DUP	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0002 J	<0.0005	<0.001
RP-5	08-Sep-94	<0	0.0008	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	0.0005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-5	28-Feb-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0009	na	na	na	<0.002
RP-5	29-Mar-95	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-5	10-May-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-5	09-Aug-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-5	17-Nov-95	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-5	09-Jan-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
DUP	09-Jan-96	<0	<0.005	<0.005	<0.05	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.1	<0.005	<0.005	<0.005	<0.005	<0.01	<0.01
RP-5	17-Apr-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-5	31-Jul-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-5	19-Nov-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
DUP	19-Nov-96	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-5	25-Mar-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
RP-4	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0001 J	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-4	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	08-Sep-94	<0.005	<0.005	<0.0005	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	<0.0005	na	na
RP-5	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	29-Mar-95	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-5	10-May-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	09-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
DUP	09-Jan-96	<0.005	<0.005	na	<0.005	<0.005	na	na	na	<0.05	na	<0.01	<0.01	<0.01	na	na	na
RP-5	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
DUP	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
RP-4	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-4	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-4	18-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
DUP	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-4	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-4	18-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	18-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	15-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	15-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	21-Jul-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	12-Oct-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	19-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-4	29-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	29-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	08-Sep-94	na	na	na	<0.005	na	na	<0.05	<0.0005	na	na	<0.005
RP-5	28-Feb-95	na	na	na	na	na	na	na	na	na	na	na
RP-5	29-Mar-95	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-5	10-May-95	na	na	na	na	na	na	na	na	na	na	na
RP-5	09-Aug-95	na	na	na	na	na	na	na	na	na	na	na
RP-5	17-Nov-95	na	na	na	na	na	na	na	na	na	na	na
RP-5	09-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
DUP	09-Jan-96	na	na	na	<0.005	na	na	<0.05	na	na	na	<0.005
RP-5	17-Apr-96	na	na	na	na	na	na	na	na	na	na	na
RP-5	31-Jul-96	na	na	na	na	na	na	na	na	na	na	na
RP-5	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
DUP	19-Nov-96	na	na	na	na	na	na	na	na	na	na	na
RP-5	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
DUP	25-Mar-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-5	10-Jun-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	<0.0005	na	na	na	<0.002
RP-5	18-Aug-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0006	na	na	na	<0.002
RP-5	19-Dec-97	na	na	na	na	na	<0.0005	na	na	na	<0.0005	na	na	0.0025	na	na	na	<0.002
RP-5	26-Feb-98	<0	<0.001	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002
RP-5	07-Apr-98	<0	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	13-Jul-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	20-Oct-98	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	12-Jan-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0007 J11	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	20-Apr-99	<0.001	<0.001	<0.001	<0.005	<0.005	<0.001	0.0007 J11	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-5	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-5	18-Jan-00	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	0.001	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-5	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-5	25-Jul-00	<0.0005	0.0013	<0.0005	<0.01	<0.01	<0.0005	0.0011	<0.0005	0.0041	<0.0005	<0.01	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.001
RP-5	10-Oct-00	<0.0005	0.0012	<0.0005	<0.01	<0.01	<0.0005	0.0014	<0.0005	0.006	<0.0005	<0.01	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	<0.001
RP-5	17-Jan-01	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	0.001	<0.0005	0.0084	<0.0005	<0.01	<0.0005	<0.0005	0.0018	<0.0005	<0.0005	<0.001
RP-5	09-Apr-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.0096	<0.0005	<0.01	<0.0005	<0.0005	0.0021	<0.0005	<0.0005	<0.001
RP-5	02-Jul-01	<0.0005	0.0008	<0.0005	<0.01	<0.01	<0.0005	0.001	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0024	0.0005	<0.0005	<0.001
RP-5	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0026	<0.0005	<0.0005	<0.001
DUP	12-Oct-01	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	0.001	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0027	0.0006	<0.0005	<0.001
RP-5	09-Jan-02	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0028	0.0005	<0.0005	<0.001
DUP	09-Jan-02	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.01	<0.0005	<0.01	<0.0005	<0.0005	0.0026	0.0005	0.0005	<0.001
RP-5	08-Apr-02	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0009	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0033	0.0007	<0.0005	<0.001
RP-5	08-Jul-02	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0032	0.0007	<0.0005	<0.001
RP-5	07-Oct-02	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0008	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0026	0.0006	0.0003 J	<0.001
RP-5	14-Jan-03	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0029	0.0007	<0.0005	<0.001
RP-5	15-Apr-03	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0031	0.0008	<0.0005	<0.001
RP-5	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.003	0.0006	<0.0005	<0.001
RP-5	27-Oct-03	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0007	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0029	0.0007	<0.0005	<0.001
RP-5	19-Jan-04	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0028	0.0006	<0.0005	<0.001
RP-5	03-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0097	<0.0005	<0.01	<0.0005	<0.0005	0.0027	0.0007	<0.0005	<0.001
RP-5	12-Jul-04	<0.0005	0.0007	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0027	0.0008	<0.0005	<0.001
RP-5	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.009	<0.0005	<0.01	<0.0005	<0.0005	0.0024	<0.0005	<0.0005	<0.001
DUP	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0082	<0.0005	<0.01	<0.0005	<0.0005	0.0021	<0.0005	<0.0005	<0.001
RP-5	19-Jan-05	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	0.0005 J	<0.0005	0.008	<0.0005	<0.01	<0.0005	<0.0005	0.002	0.0004 J	<0.0005	<0.001
RP-5	19-Apr-05	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	0.0005 J	<0.0005	0.0071	<0.0005	<0.01	<0.0005	<0.0005	0.0019	0.0004 J	<0.0005	<0.001
RP-5	18-Jul-05	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	0.0005	<0.0005	0.0078	<0.0005	<0.01	<0.0005	<0.0005	0.0022	0.0006	<0.0005	<0.001
RP-5	24-Oct-05	<0.0005	0.0005 J	<0.0005	<0.01	<0.01	<0.0005	0.0006	<0.0005	0.0085	<0.0005	<0.01	<0.0005	<0.0005	0.0021	0.0006	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
DUP	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
RP-5	26-Feb-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
RP-5	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
RP-5	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	18-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	17-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	02-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	12-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	08-Apr-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	08-Jul-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	07-Oct-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	14-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	15-Apr-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	08-Jul-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0014	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	27-Oct-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	19-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	03-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	12-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	13-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	19-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	18-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	24-Oct-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
DUP	25-Mar-97	na	na	na	na	na	na	na	na	na	na	na
RP-5	10-Jun-97	na	na	na	na	na	na	na	na	na	na	na
RP-5	18-Aug-97	na	na	na	na	na	na	na	na	na	na	na
RP-5	19-Dec-97	na	na	na	na	na	na	na	na	na	na	na
RP-5	26-Feb-98	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	<0.001
RP-5	07-Apr-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-5	13-Jul-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-5	20-Oct-98	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-5	12-Jan-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-5	20-Apr-99	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	na	<0.001	<0.002	<0.001	<0.001
RP-5	13-Jul-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	18-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
RP-5	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.001	<0.0005	<0.0005
RP-5	17-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-5	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
RP-5	02-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0007	<0.0005	<0.0005
RP-5	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	12-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-5	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
DUP	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	08-Apr-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0006	<0.0005	<0.0005
RP-5	08-Jul-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	07-Oct-02	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	14-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	15-Apr-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.0005	<0.0005
RP-5	08-Jul-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	27-Oct-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	19-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	03-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	12-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	13-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	19-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0004 J	<0.0005	<0.0005
RP-5	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	18-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-5	24-Oct-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
RP-5	23-Jan-06	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	0.0005 J	<0.0005	0.0071	<0.0005	<0.01	<0.0005	<0.0005	0.0018	0.0004 J	<0.0005	<0.001
RP-5	18-Apr-06	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	0.0004 J	<0.0005	0.0066	<0.0005	<0.01	<0.0005	<0.0005	0.0017	0.0005	<0.0005	<0.001
RP-5	20-Apr-07	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	0.0004 J	<0.0005	0.0044	<0.0005	<0.01	<0.0005	<0.0005	0.0014	0.0006	<0.0005	<0.001
RP-5	16-Apr-08	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	0.0035	<0.0005	<0.01	<0.0005	<0.0005	0.001	0.0003 J	<0.0005	<0.001
RP-5	14-Apr-09	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	0.0008	0.0004 J	<0.0005	<0.001
RP-5	28-Apr-10	<0.0005	0.0004 J	<0.0005	<0.01	<0.01	<0.0005	0.0003 J	<0.0005	0.0015	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.001
RP-5	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
RP-5	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-5	12-Oct-11	<0.0005	0.0001 J	<0.0005	<0.01	<0.01	<0.0005	0.0002 J	<0.0005	0.002	<0.0005	<0.01	<0.0005	<0.0005	0.0002 J	<0.0005	<0.0005	<0.001
RP-5	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0014	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0003 J	<0.0005	<0.001
RP-5	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	<0.0005	<0.0005	<0.001
RP-5	19-Apr-13	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0011	<0.0005	<0.01	<0.0005	<0.0005	0.0003 J	0.0002 J	<0.0005	<0.001
RP-5	29-Apr-14	<0.0005	0.0002 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	0.0001 J	0.0002 J	0.0003 J	<0.0005	0.0001 J
RP-BW-02	11-Oct-99	<0.0005	0.16	<0.0005	<0.01	0.052	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-BW-02	20-Jan-00	<0.0005	0.15	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-BW-02	28-Apr-00	<0.0005	0.16	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-BW-02	25-Jul-00	<0.0005	0.17	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-BW-02	10-Oct-00	<0.0005	0.18	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-BW-02	18-Jan-01	<0.0007	0.17	<0.0007	<0.014	<0.014	<0.0007	<0.0007	<0.0007	0.0011	<0.0007	<0.014	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0014
DUP	18-Jan-01	<0.0007	0.18	<0.0007	<0.014	<0.014	<0.0007	<0.0007	<0.0007	0.0012	<0.0007	<0.014	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0014
RP-BW-02	10-Jan-02	<0.0005	0.15	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	10-Jan-02	<0.0005	0.14	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
RP-BW-02	15-Jan-03	<0.0005	0.16	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0024	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.001
RP-BW-02	20-Jan-04	<0.0005	0.15	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0035	<0.0005	<0.01	<0.0005	<0.0005	0.0006	0.0008	<0.0005	<0.001
RP-BW-02	15-Jul-04	<0.0005	0.16	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0044	<0.0005	<0.01	<0.0005	<0.0005	0.0006	0.0008	<0.0005	<0.001
RP-BW-02	19-Jan-05	<0.001	0.15	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0047	<0.001	<0.02	<0.001	<0.001	0.0009 J	0.0008 J	<0.001	<0.002
RP-BW-02	25-Jan-06	<0.001	0.15	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	0.0056	<0.001	<0.02	<0.001	<0.001	0.0009 J	0.001 J	<0.001	<0.002
RP-BW-02	17-Apr-07	<0.0005	0.096	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0078	<0.0005	<0.01	<0.0005	<0.0005	0.0014	0.0015	<0.0005	<0.001
RP-BW-02	17-Apr-08	<0.0007	0.1	<0.0007	<0.014	<0.014	<0.0007	<0.0007	<0.0007	0.0091	<0.0007	<0.014	<0.0007	<0.0007	0.0015	0.0026	<0.0007	<0.0014
RP-BW-02	15-Apr-09	<0.0005	0.079	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0021	0.0018	<0.0005	<0.001
RP-BW-02	30-Apr-10	<0.0005	0.061	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0018	0.0016	<0.0005	<0.001
SA-AW-01	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	13-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
RP-5	23-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	18-Apr-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	28-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	15-Apr-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	21-Jul-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	12-Oct-11	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	23-Feb-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	17-Apr-12	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	19-Apr-13	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-5	29-Apr-14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0001 J	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0046	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	20-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	28-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	25-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0008	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	10-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	18-Jan-01	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	<0.0007	<0.0014	<0.0014	<0.0014	<0.0007	<0.0007
DUP	18-Jan-01	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	<0.0007	<0.0014	<0.0014	<0.0014	<0.0007	<0.0007
RP-BW-02	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	15-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	19-Jan-05	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
RP-BW-02	25-Jan-06	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.02	<0.001	<0.001	<0.002	<0.002	<0.002	<0.001	<0.001
RP-BW-02	17-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	17-Apr-08	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	<0.0007	<0.0014	<0.0014	<0.0014	<0.0007	<0.0007
RP-BW-02	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
RP-BW-02	30-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	13-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
RP-5	23-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
RP-5	18-Apr-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	20-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	28-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	15-Apr-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	21-Jul-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	12-Oct-11	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	23-Feb-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	17-Apr-12	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	19-Apr-13	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-5	29-Apr-14	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
RP-BW-02	11-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0098	<0.0005	<0.0005
RP-BW-02	20-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0097	<0.0005	<0.0005
RP-BW-02	28-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0089	<0.0005	<0.0005
RP-BW-02	25-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0087	<0.0005	<0.0005
RP-BW-02	10-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0093	<0.0005	<0.0005
RP-BW-02	18-Jan-01	<0.0007	<0.0007	<0.0014	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	0.0072	<0.0007	<0.0007
DUP	18-Jan-01	<0.0007	<0.0007	<0.0014	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	0.007	<0.0007	<0.0007
RP-BW-02	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0074	<0.0005	<0.0005
DUP	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0081	<0.0005	<0.0005
RP-BW-02	15-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0076	<0.0005	<0.0005
RP-BW-02	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0061	<0.0005	<0.0005
RP-BW-02	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0066	<0.0005	<0.0005
RP-BW-02	19-Jan-05	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.02	<0.001	0.006	<0.001	<0.001
RP-BW-02	25-Jan-06	<0.001	<0.001	<0.004	<0.001	<0.001	<0.001	<0.02	<0.001	0.0048	<0.001	<0.001
RP-BW-02	17-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0039	<0.0005	<0.0005
RP-BW-02	17-Apr-08	<0.0007	<0.0007	<0.0029	<0.0007	<0.0007	<0.0007	<0.014	<0.0007	0.0033	<0.0007	<0.0007
RP-BW-02	15-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0038	<0.0005	<0.0005
RP-BW-02	30-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0026	<0.0005	<0.0005
SA-AW-01	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	13-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
SA-AW-01	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-01	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-02	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	19-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	18-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0011	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	21-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-03	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-04	14-Oct-99	0.001	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.0005	0.0007	<0.0005	<0.001
SA-AW-04	19-Jan-00	0.0011	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0009	<0.0005	<0.0005	0.0008	<0.0005	<0.001
DUP	19-Jan-00	0.0012	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.001	<0.0005	<0.0005	0.0008	<0.0005	<0.001
SA-AW-04	27-Apr-00	0.0007	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	0.0006	<0.0005	<0.001
DUP	27-Apr-00	0.0007	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0007	<0.0005	<0.0005	0.0006	<0.0005	<0.001
SA-AW-04	24-Jul-00	0.001	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.0005	0.0006	<0.0005	<0.001
DUP	24-Jul-00	0.0007	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-04	11-Oct-00	0.0007	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-04	25-Jan-01	0.0008	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-04	09-Jan-02	0.0011	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.001	<0.0005	<0.0005	0.0007	<0.0005	<0.001
SA-AW-04	17-Jan-03	0.0006	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.002	<0.0005	<0.0005	0.0006	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
SA-AW-01	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-01	27-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	25-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	10-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	22-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-02	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	19-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	24-Jul-00	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	18-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	21-Jan-04	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	21-Jan-05	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-03	25-Jan-06	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	14-Oct-99	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	19-Jan-00	0.0011	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	19-Jan-00	0.0012	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	27-Apr-00	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	27-Apr-00	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	24-Jul-00	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	24-Jul-00	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	11-Oct-00	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	25-Jan-01	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	09-Jan-02	0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	17-Jan-03	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
SA-AW-01	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	0.0013	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	15-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-01	27-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	10-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	06-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	22-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-02	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	12-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	19-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	18-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	21-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-03	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	19-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	19-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	25-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
SA-AW-04	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-AW-04	18-Jan-05	0.001	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.01	0.0037	<0.0005	<0.0005	0.0017	<0.0005	<0.001
DUP	18-Jan-05	0.0003 J	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0009	<0.0005	<0.0005	0.0005 J	<0.0005	<0.001
SA-AW-04	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0007	<0.0005	<0.0005	0.0004 J	<0.0005	<0.001
SA-AW-04	20-Apr-07	0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0004 J	<0.0005	<0.0005	<0.01	0.0035	<0.0005	<0.0005	0.0013	<0.0005	<0.001
SA-AW-05	14-Oct-99	0.0024	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.004	<0.0005	<0.0005	0.0024	<0.0005	<0.001
DUP	14-Oct-99	0.0023	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0039	<0.0005	<0.0005	0.0025	<0.0005	<0.001
SA-AW-05	19-Jan-00	0.0025	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0013	<0.0005	<0.0005	<0.01	0.0034	<0.0005	<0.0005	0.0021	<0.0005	<0.001
SA-AW-05	27-Apr-00	0.0027	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	<0.01	0.0039	<0.0005	<0.0005	0.0021	<0.0005	<0.001
SA-AW-05	24-Jul-00	0.0029	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0043	<0.0005	<0.0005	<0.01	0.0037	<0.0005	<0.0005	0.0019	<0.0005	<0.001
SA-AW-05	11-Oct-00	0.0025	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0045	<0.0005	<0.0005	0.0022	<0.0005	<0.001
DUP	11-Oct-00	0.0025	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0043	<0.0005	<0.0005	0.0023	<0.0005	<0.001
SA-AW-05	18-Jan-01	0.0025	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.01	0.0042	<0.0005	<0.0005	0.0023	<0.0005	<0.001
SA-AW-05	09-Jan-02	0.0023	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.01	0.004	<0.0005	<0.0005	0.0016	<0.0005	<0.001
SA-AW-05	17-Jan-03	0.0015	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0013	<0.0005	<0.0005	<0.01	0.005	<0.0005	<0.0005	0.0021	<0.0005	<0.001
DUP	17-Jan-03	0.0016	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0011	<0.0005	<0.0005	<0.01	0.0051	<0.0005	<0.0005	0.0022	<0.0005	<0.001
SA-AW-05	21-Jan-04	0.0012	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.01	0.0039	<0.0005	<0.0005	0.0021	<0.0005	<0.001
SA-AW-05	18-Jan-05	<0.0005	0.0017	0.0009	<0.01	<0.01	0.026	0.0029	<0.0005	0.01	0.0003 J	<0.01	<0.0005	0.0004 J	0.0033	0.0094	0.0035	0.0003 J
SA-AW-05	25-Jan-06	0.0009	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0038	<0.0005	<0.0005	0.0018	<0.0005	<0.001
SA-AW-05	17-Apr-09	0.0004 J	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0015	<0.0005	<0.0005	<0.01	0.0035	<0.0005	<0.0005	0.001	<0.0005	<0.001
SA-BW-01	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.01	0.14	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	13-Jan-00	<0.0005	<0.0005	<0.0005	<0.01	0.017	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SA-BW-01	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SP-AH-21	03-Nov-00	<0.005	<0.005	<0.005	<0.01	<0.02	<0.005	<0.005	<0.005	0.021	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005
SP-AH-21	16-Nov-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.02	<0.0005	<0.01	<0.0005	<0.0005	0.0019	0.0015	0.0006 J	<0.0005
DUP	16-Nov-00	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.019	<0.0005	<0.01	<0.0005	<0.0005	0.0015	0.0016	<0.001	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgL)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
SA-AW-04	21-Jan-04	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	18-Jan-05	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Jan-05	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	25-Jan-06	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-04	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	14-Oct-99	<0.0005	0.0016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	14-Oct-99	<0.0005	0.0016	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	19-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	18-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	09-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	18-Jan-05	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	0.0018	<0.0005	<0.001	<0.001	<0.001	0.0019	0.0003 J
SA-AW-05	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-AW-05	17-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	13-Jan-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	27-Apr-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	24-Jul-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	11-Oct-00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	22-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	10-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	21-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	20-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	24-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	19-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	16-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	15-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SA-BW-01	26-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AH-21	03-Nov-00	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	<0.01	<0.01	<0.01	<0.005	<0.005
SP-AH-21	16-Nov-00	<0.0005	<0.0005	<0.0094	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	16-Nov-00	<0.0005	<0.0005	<0.0094	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
SA-AW-04	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-04	20-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	19-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	18-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	09-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	0.0004 J	0.0061	<0.01	<0.0005	0.0031	<0.0005	<0.0005
SA-AW-05	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-AW-05	17-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	14-Oct-99	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	13-Jan-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	27-Apr-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	24-Jul-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	11-Oct-00	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	22-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	10-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	21-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	20-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	0.0003 J	<0.0005	<0.0005
SA-BW-01	24-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	19-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	16-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	15-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SA-BW-01	26-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AH-21	03-Nov-00	<0.005	<0.005	<0.01	<0.005	<0.005	<0.005	<0.05	<0.01	<0.005	<0.005	<0.005
SP-AH-21	16-Nov-00	<0.0005	<0.0005	<0.0094	<0.0005	<0.0005	<0.0005	<0.01	<0.0094	na	<0.0005	<0.0005
DUP	16-Nov-00	<0.0005	<0.0005	<0.0094	<0.0005	<0.0005	<0.0005	<0.01	<0.0094	na	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total
SP-AW-06	18-Jan-01	<0.0005	0.0006	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.018	<0.0005	<0.01	<0.0005	<0.0005	0.0017	0.0024	<0.0005	<0.001
SP-AW-06	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.015	<0.0005	<0.01	<0.0005	<0.0005	0.0014	0.0028	<0.0005	<0.001
SP-AW-06	06-Jul-01	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.011	<0.0005	<0.01	<0.0005	<0.0005	0.0011	0.0037	<0.0005	<0.001
SP-AW-06	15-Oct-01	<0.0005	0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0011	0.0038	<0.0005	<0.001
SP-AW-06	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	<0.0005	<0.0005	0.0013	0.002	<0.0005	<0.001
DUP	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.013	<0.0005	<0.01	<0.0005	<0.0005	0.0016	0.0016	<0.0005	<0.001
SP-AW-06	03-Apr-02	na	na	na	na	na	<0.001	na	na	na	<0.001	na	na	<0.001	na	na	na	<0.001
SP-AW-06	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.012	<0.0005	<0.01	0.0011	<0.0005	0.0011	0.0008	<0.0005	<0.001
SP-AW-06	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0095	<0.0005	<0.01	<0.0005	<0.0005	0.0009	0.0013	<0.0005	<0.001
SP-AW-06	04-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0053	<0.0005	<0.01	<0.0005	<0.0005	0.0005	0.001	<0.0005	<0.001
DUP	04-May-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0079	<0.0005	<0.01	<0.0005	<0.0005	0.0009	0.0015	<0.0005	<0.001
SP-AW-06	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0084	<0.0005	<0.01	<0.0005	<0.0005	0.0008	0.0013	<0.0005	<0.001
SP-AW-06	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0079	<0.0005	<0.01	<0.0005	<0.0005	0.0008	0.0012	<0.0005	<0.001
SP-AW-06	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0037	<0.0005	<0.01	<0.0005	<0.0005	0.0004 J	0.0015	<0.0005	<0.001
SP-AW-06	19-Apr-05	<0.0005	0.0003 J	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0082	<0.0005	<0.01	<0.0005	<0.0005	0.0011	0.001	<0.0005	<0.001
SP-AW-06	21-Jul-05	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	0.0071	<0.0005	<0.01	<0.0005	<0.0005	0.0008	0.0009	<0.0005	<0.001
SP-AW-06	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.003	0.0045	<0.0005	<0.01	<0.0005	<0.0005	0.0012	0.0021	<0.0005	<0.001
SP-AW-06	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0084	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SP-AW-06	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0066	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.0084	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SP-AW-06	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.03	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
SP-AW-06	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.022	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001
DUP	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	0.024	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mgLl)

Well Number	Date Sampled	1,1-DCA	1,1-DCE	1,2-DCB	1,1,2-TCA	1,1,2,2-Tetrachloro-ethane	1,2,3-Trichloro-propane	1,2,4-TMB	1,3,5-TMB	4-Methyl-2-penta-none	Bromo-benzene	Carbon Disulfide	Chloro-ethane	Chloro-methane	Dichloro-difluoro-methane	Iso-propyl-benzene	n-Butyl-benzene
SP-AW-06	18-Jan-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	09-Apr-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	06-Jul-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	15-Oct-01	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	08-Jan-02	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
SP-AW-06	17-Jan-03	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	20-Jan-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	04-May-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	15-Jul-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	14-Oct-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	18-Jan-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	19-Apr-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	21-Jul-05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	25-Jan-06	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	20-Apr-07	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	18-Apr-08	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	14-Apr-09	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
SP-AW-06	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005
DUP	29-Apr-10	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	p-Iso-propyl-toluene	n-Propyl-benzene	Naph-thalene	Styrene	sec-Butyl-benzene	tert-Butyl-benzene	Vinyl Acetate	1,4-Dichloro-benzene	MTBE	2,2-Dichloro-propane	Bromodi-chlormethane
SP-AW-06	18-Jan-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	09-Apr-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	06-Jul-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	15-Oct-01	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	08-Jan-02	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	03-Apr-02	na	na	na	na	na	na	na	na	na	na	na
SP-AW-06	17-Jan-03	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	20-Jan-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	04-May-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	15-Jul-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	14-Oct-04	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	18-Jan-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	19-Apr-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	21-Jul-05	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	25-Jan-06	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
SP-AW-06	20-Apr-07	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0007
SP-AW-06	18-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0005 J
DUP	18-Apr-08	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0006
SP-AW-06	14-Apr-09	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	0.0008
SP-AW-06	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
DUP	29-Apr-10	<0.0005	<0.0005	<0.002	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005

All notes are listed at the end of this table; see last page.

Table D-2
Summary of Historical Volatile Organic Compounds (EPA Methods 8240 and 8260*) in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California

Concentrations reported in milligrams per liter (mg/L)

Well Number	Date Sampled	1,1,1-TCA	1,2-DCA	1,2-DCP	2-Hexa-none	Acetone	Benzene	Chloro-benzene	Chloro-form	cis-1,2-DCE	Ethyl-benzene	Methyl Ethyl Ketone	PCE	Toluene	trans-1,2-DCE	TCE	Vinyl Chloride	Xylenes, Total

Data QA/QC performed by EW.

Notes:

* = Analysis changed from EPA Method 8240 to EPA Method 8260 beginning in February-March 1998 (First Quarter 1998).

< = Analyte was not detected at or greater than the detection limit reported.

ND = Not detected (no associated detection limit was reported)

na = Not analyzed

DUP = Duplicate sample (field duplicate)

(a) Concentrations for LF-B1 may not represent B-zone water quality because LF-B1 is screened in the aquitard between the A- and B-zones.

(b) Concentrations for LF-B5 may not represent B-zone water quality because LF-B5 is screened in the aquitard between the A- and B- zones.

(c) SBPA well monitored by SLR consulting.

(d) SBPA well monitored by EKI personnel.

RPD = Relative percent difference.

Abbreviations for analytes:

1,1,1-TCA = 1,1,1-Trichloroethane
1,1,2-TCA = 1,1,2-Trichloroethane
1,1-DCA = 1,1-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
1,2,4-TMB = 1,2,4-Trimethylbenzene
1,2-DCA = 1,2-Dichloroethane
1,2-DCB = 1,2-Dichlorobenzene
1,2-DCP = 1,2-Dichloropropane
1,3,5-TMB = 1,3,5-Trimethylbenzene
cis-1,2-DCE = cis-1,2-Dichloroethene
PCE = Tetrachloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
TCE = Trichloroethene
MTBE = Methl teritary-butyl ether

Data qualifiers:

J= Concentration is estimated.

J1= Concentration is estimated because the concentration exceeded the calibration range of the analytical instrument.

J2 = Concentration is estimated because the sample was analyzed outside of holding time.

J3 = Concentration is estimated because surrogate recoveries were outside of control limits.

J4 = Concentration is estimated because RPD was outside of control limit for laboratory control sample.

J10 = Concentration is estimated due to field duplicate RPD outside of control limit.

J11 = Concentration is estimated because it was reported at a concentration less than the detection limit.

R = Quantified as rejected.

U = Quantified as nondetect (U).

U5 = Quantified as nondetect (U) based on field blank contamination evaluation.

U6 = Quantified as nondetect (U) based on trip blank contamination evaluation.

U12 = Quantified as nondetect (U) based on source water contamination evaluation.

(1) = High responses were observed for sec-butylbenzene and p-isopropyltoluene in continuing calibration verification.

All notes are listed at the end of this table; see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
CDM-1		08-Dec-06	na	na	na
CDM-1		14-Feb-07	na	na	na
DUP		14-Feb-07	na	na	na
CDM-1		20-Apr-07	na	na	na
CDM-1		19-Jul-07	na	na	na
DUP		19-Jul-07	na	na	na
CDM-1		16-Apr-08	na	na	na
CDM-1		17-Apr-09	na	na	na
DUP		17-Apr-09	na	na	na
CDM-1		26-Apr-10	na	na	na
CDM-1		18-Apr-11	na	na	na
CDM-101		17-Apr-12	na	na	na
CDM-101		07-Oct-13	na	na	na
CDM-101		29-Oct-14	na	na	na
DUP		29-Oct-14	na	na	na
CDM-102		17-Apr-12	na	na	na
CDM-102		07-Oct-13	na	na	na
CDM-102		29-Oct-14	na	na	na
CDM-103		18-Apr-12	na	na	na
CDM-104		18-Apr-12	na	na	na
CDM-105		18-Apr-12	na	na	na
CDM-106		18-Apr-12	na	na	na
CDM-107		18-Apr-12	na	na	na
CDM-107		29-Oct-14	na	na	na
CDM-108		18-Apr-12	na	na	na
CDM-108		07-Oct-13	na	na	na
DUP		07-Oct-13	na	na	na
CDM-108		29-Oct-14	na	na	na
CDM-109		19-Apr-12	na	na	na
CDM-110		18-Apr-12	0.18	0.33	<0.30
DUP		18-Apr-12	0.15	0.35	<0.30
CDM-110		23-Apr-13	0.13 Y	0.34	<0.3
CDM-110		24-Apr-14	0.13 Y	0.26	<0.29
CDM-111		18-Apr-12	2.0	1.6	<0.30
CDM-111		23-Apr-13	2.5 Y	1.9	<0.3
CDM-111		24-Apr-14	0.59	0.99	<0.29

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
CDM-112		19-Apr-12	na	na	na
DUP		19-Apr-12	na	na	na
CDM-113		19-Apr-12	na	na	na
CDM-114		18-Apr-12	2.0	1.6	<0.30
CDM-114		23-Apr-13	1.7 Y	1.2	<0.3
DUP		23-Apr-13	1.6 Y	1.1	<0.3
CDM-114		24-Apr-14	0.39	0.69	<0.29
DUP		24-Apr-14	0.3	0.72	<0.3
EX-1		18-Apr-96	4.3	0.42	na
EX-1		01-Aug-96	4.1	0.22	na
EX-1		18-Dec-96	2.4	3.1	na
EX-1		15-Apr-97	0.99	7.1	na
EX-1		01-Jul-97	0.94	4.7	na
EX-1		22-Sep-97	1.4	0.32	na
EX-1		18-Dec-97	1.7	1.6	na
EX-1		27-Feb-98	0.8	1.8	na
EX-1		09-Apr-98	<0.25	<0.05	na
EX-1		23-Oct-98	<0.5	<0.05	na
EX-1		14-Jan-99	1.6	0.28	na
EX-1		23-Apr-99	1.1	0.15	na
EX-1		16-Jul-99	1 c,e	0.14	na
EX-1		13-Oct-99	0.41 e	0.08 d	na
EX-1		25-Jan-00	2.9 J	0.21	na
EX-1		26-Apr-00	na	na	na
EX-1		26-Jul-00	na	na	na
EX-1		09-Oct-00	na	na	na
EX-1		16-Jan-01	na	na	na
EX-1		16-Apr-01	na	na	na
EX-1		03-Jul-01	na	na	na
EX-1		16-Oct-01	na	na	na
EX-1		21-Jan-02	na	na	na
DUP		21-Jan-02	na	na	na
EX-1		09-Apr-02	na	na	na
EX-1		09-Jul-02	na	na	na
DUP		09-Jul-02	na	na	na
EX-1		12-Dec-02	na	na	na
EX-1		13-Jan-03	na	na	na
EX-1		16-Apr-03	na	na	na
EX-1		07-Jul-03	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-1		29-Oct-03	na	na	na
EX-1		23-Jan-04	na	na	na
EX-1		05-May-04	na	na	na
EX-1		14-Jul-04	na	na	na
EX-1		11-Oct-04	na	na	na
EX-1		21-Jan-05	na	na	na
EX-1		20-Apr-05	na	na	na
EX-1		22-Jul-05	na	na	na
EX-1		26-Oct-05	na	na	na
EX-1		27-Jan-06	na	na	na
DUP		27-Jan-06	na	na	na
EX-1		20-Apr-06	na	na	na
EX-10		11-Sep-98	< 0.25	< 0.05	na
EX-10		22-Oct-98	< 0.05	2 J3	na
EX-10		14-Jan-99	1.4	1.1	na
EX-10		23-Apr-99	1.3	0.9	na
EX-10		15-Jul-99	0.5 c,f	0.47	na
EX-10		15-Oct-99	1.4 i	0.1 d	na
EX-10		12-Jan-00	0.98	0.63 J,d	na
EX-10		26-Apr-00	na	na	na
EX-10		26-Jul-00	na	na	na
EX-10		09-Oct-00	na	na	na
EX-10		16-Jan-01	na	na	na
EX-10		16-Apr-01	na	na	na
EX-10		03-Jul-01	na	na	na
EX-10		16-Oct-01	na	na	na
EX-10		16-Jan-02	na	na	na
DUP		16-Jan-02	na	na	na
EX-10		09-Apr-02	na	na	na
EX-10		09-Jul-02	na	na	na
EX-10		07-Nov-02	na	na	na
EX-10		13-Jan-03	na	na	na
EX-10		14-Apr-03	na	na	na
EX-10		07-Jul-03	na	na	na
DUP		07-Jul-03	na	na	na
EX-10		29-Oct-03	na	na	na
EX-10		23-Jan-04	na	na	na
EX-10		06-May-04	na	na	na
EX-10		14-Jul-04	na	na	na
DUP		14-Jul-04	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-10		14-Oct-04	na	na	na
EX-10		21-Jan-05	na	na	na
EX-10		20-Apr-05	na	na	na
EX-10		22-Jul-05	na	na	na
DUP		22-Jul-05	na	na	na
EX-10		26-Oct-05	na	na	na
EX-10		27-Jan-06	na	na	na
DUP		27-Jan-06	na	na	na
EX-10		20-Apr-06	na	na	na
EX-10		17-Apr-07	na	na	na
EX-10		18-Apr-08	na	na	na
EX-10		17-Apr-09	na	na	na
EX-10		30-Apr-10	na	na	na
EX-11		16-Jul-99	4.2	0.25	na
EX-12		02-Jun-99	0.19	0.059	na
DUP		02-Jun-99	0.17	0.065	na
EX-12		13-Jul-99	0.24 c	< 0.05	na
EX-12		25-Oct-99	0.11 e	< 0.05	na
EX-13		02-Jun-99	1.3	0.25	na
EX-13		16-Jul-99	1.8 c,f	0.19	na
EX-14		08-Oct-99	0.71 c,e	0.099	na
DUP		08-Oct-99	0.79 c,e	0.095	na
EX-14		25-Jan-00	0.59 J	0.062 J,d	na
EX-14		26-Apr-00	na	na	na
EX-14		26-Jul-00	na	na	na
EX-14		09-Oct-00	na	na	na
EX-14		16-Jan-01	na	na	na
DUP		16-Jan-01	na	na	na
EX-14		13-Apr-01	na	na	na
EX-14		03-Jul-01	na	na	na
EX-14		12-Oct-01	na	na	na
EX-14		17-Jan-02	na	na	na
EX-14		09-Apr-02	na	na	na
EX-14		10-Jul-02	na	na	na
EX-14		18-Dec-02	na	na	na
EX-14		14-Jan-03	na	na	na
EX-14		14-Apr-03	na	na	na
EX-14		07-Jul-03	na	na	na
EX-14		29-Oct-03	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-14		23-Jan-04	na	na	na
EX-14		06-May-04	na	na	na
EX-14		14-Jul-04	na	na	na
EX-14		14-Oct-04	na	na	na
EX-14		21-Jan-05	na	na	na
EX-14		20-Apr-05	na	na	na
EX-14		22-Jul-05	na	na	na
EX-14		26-Oct-05	na	na	na
DUP		26-Oct-05	na	na	na
EX-14		27-Jan-06	na	na	na
EX-14		20-Apr-06	na	na	na
EX-15		25-Jan-00	1.1 J	0.22 J,d	na
EX-15		26-Apr-00	na	na	na
DUP		26-Apr-00	na	na	na
EX-15		26-Jul-00	na	na	na
EX-15		09-Oct-00	na	na	na
EX-15		16-Jan-01	na	na	na
EX-15		13-Apr-01	na	na	na
EX-15		03-Jul-01	na	na	na
EX-15		12-Oct-01	na	na	na
EX-15		17-Jan-02	na	na	na
EX-15		09-Apr-02	na	na	na
EX-15		09-Jul-02	na	na	na
EX-15		18-Dec-02	na	na	na
EX-15		13-Jan-03	na	na	na
EX-15		14-Apr-03	na	na	na
EX-15		07-Jul-03	na	na	na
EX-15		29-Oct-03	na	na	na
EX-15		23-Jan-04	na	na	na
EX-15		06-May-04	na	na	na
EX-15		14-Jul-04	na	na	na
EX-15		14-Oct-04	na	na	na
EX-15		21-Jan-05	na	na	na
EX-15		20-Apr-05	na	na	na
EX-15		22-Jul-05	na	na	na
EX-15		26-Oct-05	na	na	na
EX-15		27-Jan-06	na	na	na
EX-15		20-Apr-06	na	na	na
EX-16		25-Jan-00	14 J	43	na
EX-16		26-Apr-00	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-16		26-Jul-00	na	na	na
EX-16		09-Oct-00	na	na	na
EX-16		16-Jan-01	na	na	na
EX-16		13-Apr-01	na	na	na
EX-16		03-Jul-01	na	na	na
EX-16		12-Oct-01	na	na	na
EX-16		16-Jan-02	na	na	na
EX-16		12-Apr-02	na	na	na
DUP		12-Apr-02	na	na	na
EX-16		09-Jul-02	na	na	na
EX-16		07-Nov-02	na	na	na
DUP		07-Nov-02	na	na	na
EX-16		14-Jan-03	na	na	na
EX-16		14-Apr-03	na	na	na
EX-16		07-Jul-03	na	na	na
EX-16		29-Oct-03	na	na	na
EX-16		23-Jan-04	na	na	na
EX-16		06-May-04	na	na	na
DUP		06-May-04	na	na	na
EX-16		14-Jul-04	na	na	na
EX-16		14-Oct-04	na	na	na
EX-16		21-Jan-05	na	na	na
EX-16		20-Apr-05	na	na	na
EX-16		22-Jul-05	na	na	na
EX-16		26-Oct-05	na	na	na
EX-16		27-Jan-06	na	na	na
DUP		27-Jan-06	na	na	na
EX-16		20-Apr-06	na	na	na
EX-2		12-Jan-96	2	na	na
EX-2		18-Apr-96	1.3	41	na
EX-2		01-Aug-96	3.7	34	na
EX-2		18-Dec-96	0.69	45	na
EX-2		15-Apr-97	0.72	47	na
EX-2		01-Jul-97	0.64	70	na
EX-2		22-Sep-97	0.64	39	na
EX-2		22-Dec-97	0.55	10	na
EX-2		02-Mar-98	0.97	29.6	na
EX-2		09-Apr-98	< 0.5	31 J2	na
EX-2		23-Oct-98	< 0.5	< 0.05	na
EX-2		14-Jan-99	2.7	51	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-2		23-Apr-99	1.6	10 J3	na
EX-2		15-Jul-99	0.51 c,e	0.35 J3	na
EX-2		14-Oct-99	0.35 i	0.29	na
EX-2		12-Jan-00	0.38	0.13 J,d	na
EX-2		26-Apr-00	na	na	na
EX-2		26-Jul-00	na	na	na
DUP		26-Jul-00	na	na	na
EX-2		09-Oct-00	na	na	na
EX-2		16-Jan-01	na	na	na
EX-2		16-Apr-01	na	na	na
EX-2		03-Jul-01	na	na	na
EX-2		12-Oct-01	na	na	na
EX-2		16-Jan-02	na	na	na
EX-2		09-Apr-02	na	na	na
EX-2		09-Jul-02	na	na	na
EX-2		08-Oct-02	na	na	na
EX-2		13-Jan-03	na	na	na
EX-2		14-Apr-03	na	na	na
EX-2		07-Jul-03	na	na	na
EX-2		29-Oct-03	na	na	na
EX-2		23-Jan-04	na	na	na
EX-2		06-May-04	na	na	na
EX-2		14-Jul-04	na	na	na
EX-2		11-Oct-04	na	na	na
EX-2		21-Jan-05	na	na	na
EX-2		20-Apr-05	na	na	na
EX-2		22-Jul-05	na	na	na
EX-2		26-Oct-05	na	na	na
EX-2		27-Jan-06	na	na	na
EX-2		20-Apr-06	na	na	na
EX-3		12-Jan-96	< 0.05	na	na
EX-3		18-Apr-96	0.43	< 0.05	na
EX-3		01-Aug-96	0.82	< 0.05	na
EX-3		18-Dec-96	0.21	< 0.05	na
EX-3		15-Apr-97	0.09	< 0.05	na
EX-3		01-Jul-97	0.13	< 0.05	na
EX-3		22-Sep-97	0.08	< 0.05	na
EX-3		19-Dec-97	0.18	0.22	na
EX-3		02-Mar-98	0.19	< 0.05	na
EX-3		09-Apr-98	< 5	< 0.05 UJ2	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-3		22-Oct-98	< 0.25	< 0.05	na
DUP		22-Oct-98	< 0.25	< 0.05	na
EX-3		14-Jan-99	0.24	0.082	na
EX-3		23-Apr-99	0.1	0.14	na
EX-3		16-Jul-99	0.048 c,e	< 0.05	na
EX-3		13-Oct-99	0.12 c	< 0.05	na
EX-3		25-Jan-00	0.69 J	7	na
EX-3		26-Apr-00	na	na	na
EX-3		26-Jul-00	na	na	na
EX-3		09-Oct-00	na	na	na
DUP		09-Oct-00	na	na	na
EX-3		16-Jan-01	na	na	na
EX-3		13-Apr-01	na	na	na
EX-3		03-Jul-01	na	na	na
EX-3		12-Oct-01	na	na	na
EX-3		16-Jan-02	na	na	na
EX-3		09-Apr-02	na	na	na
EX-3		30-Aug-02	na	na	na
EX-3		08-Oct-02	na	na	na
EX-3		13-Jan-03	na	na	na
EX-3		16-Apr-03	na	na	na
EX-3		07-Jul-03	na	na	na
EX-3		29-Oct-03	na	na	na
EX-3		23-Jan-04	na	na	na
EX-3		06-May-04	na	na	na
EX-3		14-Jul-04	na	na	na
EX-3		11-Oct-04	na	na	na
EX-3		21-Jan-05	na	na	na
EX-3		20-Apr-05	na	na	na
EX-3		22-Jul-05	na	na	na
EX-3		26-Oct-05	na	na	na
EX-3		27-Jan-06	na	na	na
EX-3		20-Apr-06	na	na	na
EX-4		11-Sep-98	< 0.05	< 0.05	na
EX-4		22-Oct-98	< 0.1	< 0.05	na
EX-4		14-Jan-99	1.4	0.24	na
DUP		14-Jan-99	1.7	0.25	na
EX-4		23-Apr-99	0.94	0.46 J3	na
EX-4		15-Jul-99	0.83 c,e	0.38	na
EX-4		15-Oct-99	0.6 i	0.22	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-4		12-Jan-00	0.57	0.15	na
EX-4		26-Apr-00	na	na	na
EX-4		26-Jul-00	na	na	na
EX-4		09-Oct-00	na	na	na
EX-4		16-Jan-01	na	na	na
EX-4		16-Apr-01	na	na	na
EX-4		03-Jul-01	na	na	na
EX-4		16-Oct-01	na	na	na
EX-4		09-Jan-02	na	na	na
EX-4		09-Apr-02	na	na	na
EX-4		09-Jul-02	na	na	na
EX-4		12-Dec-02	na	na	na
EX-4		13-Jan-03	na	na	na
EX-4		14-Apr-03	na	na	na
EX-4		08-Jul-03	na	na	na
EX-4		29-Oct-03	na	na	na
DUP		29-Oct-03	na	na	na
EX-4		23-Jan-04	na	na	na
EX-4		06-May-04	na	na	na
EX-4		14-Jul-04	na	na	na
EX-4		11-Oct-04	na	na	na
DUP		11-Oct-04	na	na	na
EX-4		21-Jan-05	na	na	na
EX-4		20-Apr-05	na	na	na
EX-4		22-Jul-05	na	na	na
EX-4		26-Oct-05	na	na	na
EX-4		27-Jan-06	na	na	na
EX-4		20-Apr-06	na	na	na
EX-5		11-Sep-98	< 0.05	< 0.05	na
EX-5		22-Oct-98	< 0.05	0.38	na
EX-5		14-Jan-99	2.6	0.41	na
EX-5		23-Apr-99	2.8	5.4 J3	na
EX-5		19-Jul-99	3.8 c,i	0.18 d	na
EX-5		15-Oct-99	1.5	0.39	na
EX-5		12-Jan-00	1.3	1.9 J	na
EX-5		26-Apr-00	na	na	na
EX-5		26-Jul-00	na	na	na
EX-5		09-Oct-00	na	na	na
EX-5		16-Jan-01	na	na	na
EX-5		16-Apr-01	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-5		03-Jul-01	na	na	na
DUP		03-Jul-01	na	na	na
EX-5		16-Oct-01	na	na	na
EX-5		21-Jan-02	na	na	na
EX-5		09-Apr-02	na	na	na
EX-5		09-Jul-02	na	na	na
EX-5		08-Oct-02	na	na	na
EX-5		13-Jan-03	na	na	na
EX-5		14-Apr-03	na	na	na
EX-5		07-Jul-03	na	na	na
EX-5		29-Oct-03	na	na	na
EX-5		23-Jan-04	na	na	na
EX-5		06-May-04	na	na	na
EX-5		14-Jul-04	na	na	na
EX-5		14-Oct-04	na	na	na
EX-5		21-Jan-05	na	na	na
EX-5		20-Apr-05	na	na	na
EX-5		22-Jul-05	na	na	na
EX-5		26-Oct-05	na	na	na
EX-5		27-Jan-06	na	na	na
EX-5		20-Apr-06	na	na	na
EX-6		11-Sep-98	< 0.05	11	na
DUP		11-Sep-98	< 0.05	< 0.5	na
EX-6		22-Oct-98	< 0.5	7.8	na
EX-6		15-Jan-99	1.9	24	na
EX-6		23-Apr-99	1.5	4.1 J3	na
DUP		23-Apr-99	1.4	4.1 J3	na
EX-6		19-Jul-99	1.2 c,f	0.34 d	na
EX-6		12-Oct-99	2.4 e,f	2.5	na
EX-6		21-Jan-00	1.4 J	8.9 J,d	na
EX-6		26-Apr-00	na	na	na
EX-6		26-Jul-00	na	na	na
DUP		26-Jul-00	na	na	na
EX-6		09-Oct-00	na	na	na
EX-6		16-Jan-01	na	na	na
EX-6		13-Apr-01	na	na	na
EX-6		03-Jul-01	na	na	na
EX-6		16-Oct-01	na	na	na
EX-6		16-Jan-02	na	na	na
EX-6		09-Apr-02	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-6		09-Jul-02	na	na	na
EX-6		10-Oct-02	na	na	na
EX-6		13-Jan-03	na	na	na
DUP		13-Jan-03	na	na	na
EX-6		14-Apr-03	na	na	na
DUP		14-Apr-03	na	na	na
EX-6		07-Jul-03	na	na	na
EX-6		29-Oct-03	na	na	na
EX-6		23-Jan-04	na	na	na
DUP		23-Jan-04	na	na	na
EX-6		06-May-04	na	na	na
EX-6		14-Jul-04	na	na	na
EX-6		11-Oct-04	na	na	na
EX-6		21-Jan-05	na	na	na
EX-6		20-Apr-05	na	na	na
EX-6		22-Jul-05	na	na	na
EX-6		26-Oct-05	na	na	na
EX-6		27-Jan-06	na	na	na
EX-6		20-Apr-06	na	na	na
EX-6		17-Apr-07	na	na	na
EX-6		18-Apr-08	na	na	na
EX-6		17-Apr-09	na	na	na
EX-6		27-Apr-10	na	na	na
EX-7		11-Sep-98	< 0.25	< 0.5	na
EX-7		22-Oct-98	< 0.25	1.3	na
EX-7		14-Jan-99	1.1	5.3	na
EX-7		23-Apr-99	0.94	3.9 J3	na
EX-7		15-Jul-99	0.32 c,f	0.48 J3	na
EX-7		15-Oct-99	< 0.048	< 0.05	na
EX-7		19-Jan-00	0.61	1.4 J	na
EX-7		26-Apr-00	na	na	na
EX-7		26-Jul-00	na	na	na
EX-7		09-Oct-00	na	na	na
EX-7		16-Jan-01	na	na	na
EX-7		13-Apr-01	na	na	na
EX-7		03-Jul-01	na	na	na
EX-7		16-Oct-01	na	na	na
DUP		16-Oct-01	na	na	na
EX-7		16-Jan-02	na	na	na
EX-7		09-Apr-02	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-7		15-Aug-02	na	na	na
EX-7		07-Nov-02	na	na	na
EX-7		13-Jan-03	na	na	na
EX-7		14-Apr-03	na	na	na
EX-7		07-Jul-03	na	na	na
EX-7		29-Oct-03	na	na	na
EX-7		23-Jan-04	na	na	na
EX-7		06-May-04	na	na	na
EX-7		14-Jul-04	na	na	na
EX-7		14-Oct-04	na	na	na
EX-7		21-Jan-05	na	na	na
EX-7		20-Apr-05	na	na	na
EX-7		22-Jul-05	na	na	na
EX-7		26-Oct-05	na	na	na
EX-7		27-Jan-06	na	na	na
DUP		27-Jan-06	na	na	na
EX-7		20-Apr-06	na	na	na
DUP		20-Apr-06	na	na	na
EX-7		17-Apr-07	na	na	na
EX-7		18-Apr-08	na	na	na
EX-7		17-Apr-09	na	na	na
EX-7		30-Apr-10	na	na	na
DUP		30-Apr-10	na	na	na
EX-8		11-Sep-98	< 0.25	< 25	na
EX-8		22-Oct-98	< 0.5	< 5	na
EX-8		14-Jan-99	2.7	26	na
EX-8		23-Apr-99	6.8	120	na
EX-8		19-Jul-99	6.5 cfi	69 d	na
EX-8		15-Oct-99	4.2 f,i	25	na
EX-8		21-Jan-00	3.1 J	31 J,d	na
EX-8		26-Apr-00	na	na	na
EX-8		26-Jul-00	na	na	na
EX-8		09-Oct-00	na	na	na
EX-8		16-Jan-01	na	na	na
EX-8		16-Apr-01	na	na	na
DUP		16-Apr-01	na	na	na
EX-8		03-Jul-01	na	na	na
EX-8		16-Oct-01	na	na	na
EX-8		09-Jan-02	na	na	na
EX-8		10-Apr-02	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-8		18-Dec-02	na	na	na
EX-8		13-Jan-03	na	na	na
EX-8		14-Apr-03	na	na	na
EX-8		07-Jul-03	na	na	na
EX-8		29-Oct-03	na	na	na
EX-8		23-Jan-04	na	na	na
EX-8		05-May-04	na	na	na
EX-8		14-Jul-04	na	na	na
EX-8		14-Oct-04	na	na	na
EX-8		21-Jan-05	na	na	na
EX-8		20-Apr-05	na	na	na
EX-8		22-Jul-05	na	na	na
EX-8		26-Oct-05	na	na	na
EX-8		27-Jan-06	na	na	na
EX-8		20-Apr-06	na	na	na
EX-8		18-Apr-07	na	na	na
EX-8		18-Apr-08	na	na	na
EX-8		17-Apr-09	na	na	na
EX-8		30-Apr-10	na	na	na
EX-9		11-Sep-98	< 0.05	< 1	na
EX-9		22-Oct-98	< 0.05	< 0.5 UJ2	na
EX-9		14-Jan-99	0.73	6.9	na
EX-9		23-Apr-99	0.64	19 J3	na
EX-9		15-Jul-99	0.22 c,f	5.5 J3	na
EX-9		14-Oct-99	0.19 c,f	1.2	na
EX-9		21-Jan-00	0.36 J	0.76 J,d	na
DUP		21-Jan-00	0.41 J	1.7 J,d	na
EX-9		26-Apr-00	na	na	na
EX-9		26-Jul-00	na	na	na
EX-9		09-Oct-00	na	na	na
EX-9		16-Jan-01	na	na	na
EX-9		13-Apr-01	na	na	na
EX-9		03-Jul-01	na	na	na
EX-9		12-Oct-01	na	na	na
EX-9		21-Jan-02	na	na	na
EX-9		09-Apr-02	na	na	na
EX-9		30-Aug-02	na	na	na
EX-9		12-Dec-02	na	na	na
EX-9		13-Jan-03	na	na	na
EX-9		14-Apr-03	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
EX-9		07-Jul-03	na	na	na
EX-9		29-Oct-03	na	na	na
EX-9		23-Jan-04	na	na	na
EX-9		06-May-04	na	na	na
EX-9		14-Jul-04	na	na	na
EX-9		14-Oct-04	na	na	na
EX-9		21-Jan-05	na	na	na
EX-9		20-Apr-05	na	na	na
EX-9		22-Jul-05	na	na	na
EX-9		26-Oct-05	na	na	na
EX-9		27-Jan-06	na	na	na
EX-9		20-Apr-06	na	na	na
EX-9		17-Apr-07	na	na	na
EX-9		18-Apr-08	na	na	na
EX-9		17-Apr-09	na	na	na
EX-9		30-Apr-10	na	na	na
LF-1		21-Jun-91	< 0.05	na	na
LF-1		09-Jul-92	0.11	< 0.05	na
LF-1		09-Jun-93	0.083	< 0.05	na
LF-10		21-Jun-91	0.27	na	na
LF-10		18-Dec-91	0.990	na	na
DUP		18-Dec-91	0.570	na	na
LF-10		09-Jul-92	0.42	0.7	na
LF-10		31-Dec-92	0.33	0.19	na
DUP		31-Dec-92	0.37	0.18	na
LF-10		09-Jun-93	0.47	0.18	na
LF-10		06-Jan-94	1.5	0.2	na
DUP		06-Jan-94	1.2	0.2	na
LF-10		27-Feb-98	0.86	0.56	na
LF-10		15-Jan-99	2.4	0.45	na
LF-10		18-Jan-00	1.1 J	0.95 J,d	na
LF-10		23-Jan-01	na	na	na
LF-10		08-Jan-02	na	na	na
LF-10		16-Jan-03	na	na	na
LF-10		22-Jan-04	na	na	na
LF-10		20-Jan-05	na	na	na
LF-10		24-Jan-06	na	na	na
LF-10		17-Apr-07	na	na	na
DUP		17-Apr-07	na	na	na
LF-10		16-Apr-08	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-10		15-Apr-09	na	na	na
LF-10		26-Apr-10	na	na	na
LF-11		21-Jun-91	0.13	na	na
DUP		21-Jun-91	0.12	na	na
LF-11		17-Dec-91	0.410	na	na
LF-11		09-Jul-92	0.26	< 0.05	na
LF-11		31-Dec-92	0.31	0.058	na
LF-11		09-Jun-93	0.27	< 0.05	na
LF-11		05-Jan-94	0.8	0.06	na
LF-11		16-Apr-96	0.93	< 0.05	na
LF-11		31-Jul-96	0.58	< 0.05	na
LF-11		20-Nov-96	1.5	< 0.05	na
LF-11		18-Mar-97	1.9	0.19	na
DUP		18-Mar-97	1.8	< 0.05	na
LF-11		11-Jun-97	0.41	0.17	na
LF-11		19-Aug-97	0.47	0.16	na
DUP		19-Aug-97	0.41	0.15	na
LF-11		17-Dec-97	< 0.05	0.22	na
LF-11		02-Mar-98	0.64	2.2	na
LF-11		10-Apr-98	< 0.25	2	na
DUP		10-Apr-98	< 0.25	2.6	na
LF-11		16-Jul-98	< 0.05	< 0.05	na
LF-11		23-Oct-98	< 0.05	< 0.05	na
LF-11		14-Jan-99	0.66	0.15	na
LF-11		22-Apr-99	0.76	< 0.05	na
DUP		22-Apr-99	0.71	< 0.05	na
LF-11		16-Jul-99	1.1 e	0.12	na
LF-11		12-Oct-99	0.74 e	0.095 d	na
DUP		12-Oct-99	0.67 e	0.11 d	na
LF-11		20-Jan-00	0.51 J	< 0.05	na
LF-11		01-May-00	na	na	na
LF-11		24-Jul-00	na	na	na
LF-11		11-Oct-00	na	na	na
LF-11		22-Jan-01	na	na	na
LF-11		10-Apr-01	na	na	na
DUP		10-Apr-01	na	na	na
LF-11		06-Jul-01	na	na	na
LF-11		16-Oct-01	na	na	na
LF-11		09-Jan-02	na	na	na
LF-11		10-Apr-02	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-11		09-Jul-02	na	na	na
LF-11		10-Oct-02	na	na	na
LF-11		20-Jan-03	na	na	na
LF-11		16-Apr-03	na	na	na
LF-11		10-Jul-03	na	na	na
LF-11		28-Oct-03	na	na	na
LF-11		21-Jan-04	na	na	na
LF-11		04-May-04	na	na	na
LF-11		15-Jul-04	na	na	na
LF-11		11-Oct-04	na	na	na
LF-11		20-Jan-05	na	na	na
LF-11		20-Apr-05	na	na	na
DUP		20-Apr-05	na	na	na
LF-11		21-Jul-05	na	na	na
LF-11		26-Oct-05	na	na	na
LF-11		24-Jan-06	na	na	na
LF-11		07-Jul-06	na	na	na
LF-11		19-Apr-07	na	na	na
LF-11		16-Apr-08	na	na	na
LF-11		15-Apr-09	na	na	na
LF-11		27-Apr-10	na	na	na
LF-12		19-Jun-91	< 0.05	na	na
LF-12		16-Dec-91	< 0.050	na	na
LF-12		08-Jul-92	< 0.05	< 0.05	na
LF-12		30-Dec-92	< 0.05	< 0.05	na
LF-12		08-Jun-93	0.099	< 0.05	na
LF-12		06-Jan-94	< 0.05	< 0.05	na
LF-12		16-Apr-96	< 0.05	< 0.05	na
LF-12		30-Jul-96	< 0.05	< 0.05	na
LF-12		20-Nov-96	< 0.05	< 0.05	na
LF-12		17-Mar-97	< 0.05	< 0.05	na
LF-12		01-Jul-97	< 0.05	< 0.05	na
DUP		01-Jul-97	< 0.05	< 0.05	na
LF-12		20-Aug-97	< 0.05	< 0.05	na
LF-12		18-Dec-97	< 0.05	< 0.05	na
LF-12		26-Feb-98	0.15	< 0.05	na
LF-12		08-Apr-98	< 0.05	< 0.05	na
LF-12		14-Jul-98	< 0.05	< 0.05	na
LF-12		21-Oct-98	< 0.05	< 0.05	na
LF-12		12-Jan-99	< 0.048	< 0.05	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-12		20-Apr-99	< 0.048	< 0.05	na
LF-12		14-Jul-99	< 0.05	< 0.05	na
LF-12		11-Oct-99	< 0.049	< 0.05	na
LF-12		18-Jan-00	< 0.05	< 0.05	na
LF-12		24-Jan-01	na	na	na
LF-12		09-Jan-02	na	na	na
LF-12		16-Jan-03	na	na	na
LF-12		20-Jan-04	na	na	na
LF-12		18-Jan-05	na	na	na
LF-12		26-Jan-06	na	na	na
LF-12		17-Apr-07	na	na	na
LF-12		18-Apr-08	na	na	na
LF-12		13-Apr-09	na	na	na
DUP		13-Apr-09	na	na	na
LF-12		29-Apr-10	na	na	na
LF-12		18-Apr-12	0.064 Y	< 0.05	0.97
LF-12		23-Apr-13	< 0.05	< 0.05	0.7
LF-12		24-Apr-14	< 0.052	< 0.05	0.7
LF-13		19-Jun-91	< 0.05	na	na
LF-13		16-Dec-91	< 0.050	na	na
LF-13		08-Jul-92	< 0.05	< 0.05	na
LF-13		30-Dec-92	< 0.05	< 0.05	na
LF-13		08-Jun-93	0.052	< 0.05	na
LF-13		05-Jan-94	< 0.05	< 0.05	na
LF-13		16-Apr-96	< 0.05	< 0.05	na
LF-13		30-Jul-96	< 0.05	< 0.05	na
DUP		30-Jul-96	< 0.05	< 0.05	na
LF-13		20-Nov-96	< 0.05	< 0.05	na
LF-13		17-Mar-97	< 0.05	< 0.05	na
DUP		17-Mar-97	< 0.05	< 0.05	na
LF-13		12-Jun-97	< 0.05	< 0.05	na
LF-13		19-Aug-97	< 0.05	< 0.05	na
LF-13		18-Dec-97	< 0.05	< 0.05	na
LF-13		25-Feb-98	< 0.05	< 0.05	na
LF-13		07-Apr-98	< 0.05	< 0.05	na
DUP		07-Apr-98	< 0.05	< 0.05	na
LF-13		13-Jul-98	< 0.05	< 0.05	na
LF-13		19-Oct-98	< 0.05	< 0.05	na
LF-13		11-Jan-99	< 0.048	< 0.05	na
LF-13		19-Apr-99	< 0.047	< 0.05	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
DUP		19-Apr-99	< 0.047	< 0.05	na
LF-13		13-Jul-99	< 0.048	< 0.05	na
LF-13		12-Oct-99	< 0.051	< 0.05	na
LF-13		14-Jan-00	< 0.05	< 0.05	na
LF-13		18-Jan-01	na	na	na
LF-13		10-Jan-02	na	na	na
DUP		10-Jan-02	na	na	na
LF-13		16-Jan-03	na	na	na
DUP		16-Jan-03	na	na	na
LF-13		20-Jan-04	na	na	na
LF-13		18-Jan-05	na	na	na
LF-13		25-Jan-06	na	na	na
LF-13		16-Apr-07	na	na	na
DUP		16-Apr-07	na	na	na
LF-13		13-Apr-09	na	na	na
LF-14		20-Jun-91	< 0.05	na	na
LF-14		17-Dec-91	0.086	na	na
LF-14		09-Jul-92	0.18	< 0.05	na
LF-14		31-Dec-92	0.19	0.068	na
LF-14		09-Jun-93	0.24	< 0.05	na
LF-15		20-Jun-91	< 0.05	na	na
LF-15		17-Dec-91	< 0.050	na	na
LF-15		08-Jul-92	< 0.05	< 0.05	na
LF-15		30-Dec-92	< 0.05	< 0.05	na
LF-15		09-Jun-93	0.098	< 0.05	na
LF-16		20-Jun-91	< 0.05	na	na
LF-16		17-Dec-91	0.094	na	na
LF-16		09-Jul-92	0.075	< 0.05	na
LF-16		30-Dec-92	< 0.05	0.05	na
LF-16		09-Jun-93	0.083	< 0.05	na
LF-17		02-Mar-98	11	3.2	na
LF-17		10-Apr-98	< 0.5	< 0.5	na
LF-17		16-Jul-98	< 1	< 1	na
LF-17		23-Oct-98	< 0.5	< 0.5	na
LF-17		15-Jan-99	19	4.7	na
LF-17		22-Apr-99	18	8.1	na
LF-17		16-Jul-99	23 f	3.9 h	na
LF-17		13-Oct-99	15 e,f	3.9 h	na
DUP		13-Oct-99	15 e,f	4.2 h	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-17		20-Jan-00	21 J	9.2 Jdh	na
LF-17		23-Jan-01	na	na	na
LF-17		10-Jan-02	na	na	na
LF-17		20-Jan-03	na	na	na
LF-17		22-Jan-04	na	na	na
LF-17		20-Jan-05	na	na	na
LF-17		24-Jan-06	na	na	na
LF-17		18-Apr-07	na	na	na
LF-17		15-Apr-08	na	na	na
LF-17		15-Apr-09	na	na	na
LF-17		26-Apr-10	na	na	na
DUP		26-Apr-10	na	na	na
LF-18		11-Apr-96	0.32	< 0.05	na
LF-18		30-Jul-96	0.32	< 0.05	na
LF-18		20-Nov-96	0.5	< 0.05	na
LF-18		19-Mar-97	0.26	< 0.05	na
LF-18		11-Jun-97	0.18	< 0.05	na
DUP		11-Jun-97	0.18	< 0.05	na
LF-18		19-Aug-97	0.31	< 0.05	na
LF-18		17-Dec-97	0.21	< 0.05	na
LF-18		27-Feb-98	0.1	< 0.05	na
LF-18		08-Apr-98	< 0.05	< 0.05	na
LF-18		15-Jul-98	< 0.05	< 0.05	na
DUP		15-Jul-98	< 0.05	< 0.05	na
LF-18		21-Oct-98	< 0.05	< 0.05	na
LF-18		13-Jan-99	0.29	< 0.05	na
LF-18		21-Apr-99	0.31	< 0.05	na
DUP		21-Apr-99	0.26	< 0.05	na
LF-18		14-Jul-99	0.28 c,e	< 0.05	na
LF-18		13-Oct-99	0.64 e	0.057 d	na
LF-18		19-Jan-00	0.17	< 0.05	na
LF-18		22-Jan-01	na	na	na
LF-18		10-Jan-02	na	na	na
LF-18		20-Jan-03	na	na	na
LF-18		21-Jan-04	na	na	na
LF-18		19-Jan-05	na	na	na
LF-18		24-Jan-06	na	na	na
LF-18		20-Apr-07	na	na	na
LF-18		14-Apr-08	na	na	na
LF-18		16-Apr-09	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-18		27-Apr-10	na	na	na
LF-18		16-Apr-12	na	na	na
DUP		16-Apr-12	na	na	na
LF-19		13-Jun-97	0.6	0.07	na
LF-19		19-Aug-97	0.78	0.15	na
LF-19		27-Feb-98	0.69	0.19	na
LF-19		08-Apr-98	< 0.05	< 0.05	na
LF-19		15-Jul-98	< 0.05	< 0.05	na
LF-19		23-Oct-98	< 0.05	< 0.05	na
DUP		23-Oct-98	< 0.05	< 0.05	na
LF-19		13-Jan-99	2.2	0.17	na
LF-19		20-Apr-99	3.3	0.16	na
LF-19		14-Jul-99	2.7 cei	0.2	na
LF-19		15-Oct-99	2.1 c,e	0.17 d	na
LF-20		11-Apr-96	0.96	0.23	na
LF-20		30-Jul-96	0.56	0.2	na
LF-20		21-Nov-96	3.2	0.25	na
LF-20		18-Mar-97	0.61	0.2	na
LF-20		11-Jun-97	0.54	0.2	na
LF-20		19-Aug-97	0.67	0.22	na
LF-20		18-Dec-97	0.79	< 0.05	na
LF-20		27-Feb-98	0.74	0.43	na
LF-20		09-Apr-98	< 0.05	< 0.05	na
DUP		09-Apr-98	< 0.05	< 0.05	na
LF-20		16-Jul-98	< 0.05	0.51	na
LF-20		23-Oct-98	< 0.05	< 0.05	na
LF-20		13-Jan-99	1.7	0.51	na
DUP		13-Jan-99	1.7	0.53	na
LF-20		21-Apr-99	1.8	0.5	na
LF-20		15-Jul-99	1.5	0.45	na
LF-20		14-Oct-99	1.2	0.44 d	na
LF-20		20-Jan-00	0.98 J	0.53 Jd	na
LF-20		01-May-00	na	na	na
LF-20		24-Jul-00	na	na	na
LF-20		11-Oct-00	na	na	na
LF-20		22-Jan-01	na	na	na
LF-20		10-Apr-01	na	na	na
LF-20		06-Jul-01	na	na	na
LF-20		15-Oct-01	na	na	na
LF-20		09-Jan-02	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-20		09-Apr-02	na	na	na
LF-20		09-Jul-02	na	na	na
LF-20		10-Oct-02	na	na	na
LF-20		20-Jan-03	na	na	na
LF-20		16-Apr-03	na	na	na
LF-20		09-Jul-03	na	na	na
LF-20		28-Oct-03	na	na	na
LF-20		21-Jan-04	na	na	na
LF-20		04-May-04	na	na	na
LF-20		15-Jul-04	na	na	na
LF-20		11-Oct-04	na	na	na
LF-20		19-Jan-05	na	na	na
LF-20		19-Apr-05	na	na	na
DUP		19-Apr-05	na	na	na
LF-20		21-Jul-05	na	na	na
LF-20		26-Oct-05	na	na	na
LF-20		24-Jan-06	na	na	na
LF-20		19-Apr-06	na	na	na
DUP		19-Apr-06	na	na	na
LF-20		17-Apr-07	na	na	na
LF-20		14-Apr-08	na	na	na
LF-20		17-Apr-09	na	na	na
LF-20		27-Apr-10	na	na	na
DUP		27-Apr-10	v	na	na
LF-21		10-Apr-96	2.8	< 0.05	na
LF-21		31-Jul-96	1.4	0.06	na
LF-21		21-Nov-96	2.4	0.06	na
LF-21		18-Mar-97	1.7	< 0.05	na
LF-21		11-Jun-97	0.83	< 0.05	na
LF-21		19-Aug-97	0.78	< 0.05	na
LF-21		17-Dec-97	1	< 0.05	na
LF-21		02-Mar-98	3	< 0.05	na
DUP		02-Mar-98	3.2	< 0.05	na
LF-21		09-Apr-98	< 0.05	< 0.05	na
LF-21		16-Jul-98	< 0.05	< 0.05 UJ3	na
LF-21		23-Oct-98	< 0.05	< 0.05	na
LF-21		14-Jan-99	1.4	< 0.05	na
LF-21		22-Apr-99	11	< 0.05	na
LF-21		15-Jul-99	6.1 c,e	< 0.05	na
DUP		15-Jul-99	5 c,e	< 0.05	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-21		12-Oct-99	1.9 c,e	< 0.05	na
LF-21		20-Jan-00	0.47 J	< 0.05	na
LF-21		27-Apr-00	na	na	na
LF-21		24-Jul-00	na	na	na
LF-21		11-Oct-00	na	na	na
LF-21		23-Jan-01	na	na	na
DUP		23-Jan-01	na	na	na
LF-21		10-Apr-01	na	na	na
LF-21		06-Jul-01	na	na	na
LF-21		18-Oct-01	na	na	na
LF-21		09-Jan-02	na	na	na
LF-21		08-Apr-02	na	na	na
LF-21		09-Jul-02	na	na	na
LF-21		10-Oct-02	na	na	na
LF-21		16-Jan-03	na	na	na
LF-21		16-Apr-03	na	na	na
DUP		16-Apr-03	na	na	na
LF-21		09-Jul-03	na	na	na
LF-21		28-Oct-03	na	na	na
LF-21		21-Jan-04	na	na	na
LF-21		04-May-04	na	na	na
LF-21		15-Jul-04	na	na	na
LF-21		14-Oct-04	na	na	na
DUP		14-Oct-04	na	na	na
LF-21		20-Jan-05	na	na	na
LF-21		19-Apr-05	na	na	na
LF-21		21-Jul-05	na	na	na
LF-21		26-Oct-05	na	na	na
LF-21		23-Jan-06	na	na	na
LF-21		19-Apr-06	na	na	na
LF-21		19-Apr-07	na	na	na
LF-22		02-Mar-98	0.06	< 0.05	na
LF-22		10-Apr-98	< 0.05	< 0.05	na
LF-22		15-Jan-99	< 0.048	< 0.05	na
LF-22		20-Jan-00	< 0.05	< 0.05	na
LF-22		02-Feb-01	na	na	na
LF-22		08-Jan-02	na	na	na
LF-22		20-Jan-03	na	na	na
LF-22		22-Jan-04	na	na	na
LF-22		20-Jan-05	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-22		25-Jan-06	na	na	na
LF-22		18-Apr-07	na	na	na
LF-22		15-Apr-08	na	na	na
LF-22		17-Apr-09	na	na	na
LF-22		30-Apr-10	na	na	na
LF-23		10-Apr-96	1.7	< 0.05	na
DUP		10-Apr-96	1.3	< 0.05	na
LF-23		02-Aug-96	5.6	< 0.05	na
LF-23		21-Nov-96	1.3	< 0.05	na
LF-23		18-Mar-97	1.5	< 0.05	na
LF-23		11-Jun-97	0.41	< 0.05	na
LF-23		20-Aug-97	0.29	< 0.05	na
LF-23		18-Dec-97	0.3	< 0.05	na
LF-23		26-Feb-98	0.56	< 0.05	na
LF-23		08-Apr-98	< 0.05	< 0.05	na
LF-23		15-Jul-98	< 0.05	< 0.05	na
LF-23		21-Oct-98	< 0.05	< 0.05	na
LF-23		12-Jan-99	0.26	< 0.05	na
LF-23		21-Apr-99	0.42	< 0.05	na
LF-23		14-Jul-99	0.39 c,e	< 0.05	na
LF-23		21-Jul-00	na	na	na
LF-23		11-Oct-00	na	na	na
LF-24		11-Apr-96	0.09	< 0.05	na
LF-24		02-Aug-96	0.16	< 0.05	na
LF-24		21-Nov-96	0.14	< 0.05	na
LF-24		18-Mar-97	< 0.05	< 0.05	na
LF-24		11-Jun-97	0.06	< 0.05	na
LF-24		20-Aug-97	0.06	< 0.05	na
LF-24		18-Dec-97	0.06	< 0.05	na
LF-24		26-Feb-98	0.05	< 0.05	na
LF-24		08-Apr-98	< 0.05	< 0.05	na
LF-24		15-Jul-98	< 0.05	< 0.05	na
LF-24		21-Oct-98	< 0.05	< 0.05	na
LF-24		12-Jan-99	< 0.047	< 0.05	na
LF-24		21-Apr-99	0.09	< 0.05	na
LF-24		14-Jul-99	< 0.048	< 0.05	na
LF-24		21-Jul-00	na	na	na
DUP		21-Jul-00	na	na	na
LF-24		11-Oct-00	na	na	na
LF-24		19-Apr-07	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-24		15-Apr-08	na	na	na
LF-24		16-Apr-09	na	na	na
LF-24		23-Feb-12	na	na	na
LF-24		16-Apr-12	na	na	na
LF-25		11-Apr-96	0.18	< 0.05	na
LF-25		02-Aug-96	0.3	< 0.05	na
LF-25		21-Nov-96	0.31	< 0.05	na
LF-25		18-Mar-97	0.11	< 0.05	na
LF-25		11-Jun-97	0.11	< 0.05	na
LF-25		20-Aug-97	0.13	< 0.05	na
LF-25		18-Dec-97	0.15	< 0.05	na
LF-25		26-Feb-98	0.31	< 0.05	na
LF-25		08-Apr-98	< 0.05	< 0.05	na
LF-25		15-Jul-98	< 0.05	< 0.05	na
LF-25		21-Oct-98	< 0.05	< 0.05	na
LF-25		12-Jan-99	0.14	0.054	na
LF-25		21-Apr-99	0.2	0.071	na
LF-25		14-Jul-99	0.11 c,e	0.091	na
LF-25		21-Jul-00	na	na	na
LF-25		11-Oct-00	na	na	na
LF-25		19-Apr-07	na	na	na
LF-25		15-Apr-08	na	na	na
DUP		15-Apr-08	na	na	na
LF-25		16-Apr-09	na	na	na
LF-25		23-Feb-12	na	na	na
LF-25		16-Apr-12	na	na	na
LF-26		27-Feb-98	0.51	0.39	na
LF-26		09-Apr-98	< 0.05	< 0.05	na
LF-26		16-Jul-98	< 0.05	0.29 J3	na
LF-26		23-Oct-98	< 0.05	< 0.05	na
LF-26		13-Jan-99	1.5	0.36	na
LF-26		21-Apr-99	1.2	0.23	na
DUP		15-Jul-99	1.2	0.22	na
LF-26		14-Oct-99	1	0.26 d	na
LF-26		20-Jan-00	1.1 J	0.3 Jd	na
DUP		20-Jan-00	1.2 J	0.28 Jd	na
LF-26		22-Jan-01	na	na	na
LF-26		09-Jan-02	na	na	na
LF-26		20-Jan-03	na	na	na
LF-26		21-Jan-04	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-26		19-Jan-05	na	na	na
LF-26		26-Jan-06	na	na	na
LF-26		17-Apr-07	na	na	na
LF-26		14-Apr-08	na	na	na
LF-26		16-Apr-09	na	na	na
LF-26		26-Apr-10	na	na	na
LF-26		18-Apr-11	na	na	na
DUP		18-Apr-11	na	na	na
LF-27		29-Dec-97	< 0.05	< 0.05	na
LF-27		26-Feb-98	< 0.05	< 0.05	na
LF-27		08-Apr-98	< 0.05	< 0.05	na
LF-27		14-Jul-98	< 0.05	< 0.05	na
LF-27		21-Oct-98	< 0.05	< 0.05	na
LF-27		12-Jan-99	< 0.047	< 0.05	na
LF-27		20-Apr-99	< 0.048	< 0.05	na
LF-27		14-Jul-99	< 0.048	< 0.05	na
DUP		14-Jul-99	< 0.048	< 0.05	na
LF-27		11-Oct-99	< 0.048	< 0.05	na
LF-27		17-Jan-00	< 0.05	< 0.05	na
DUP		17-Jan-00	< 0.05	< 0.05	na
LF-27		24-Jan-01	na	na	na
LF-27		09-Apr-01	na	na	na
LF-27		09-Jan-02	na	na	na
LF-27		16-Jan-03	na	na	na
LF-27		20-Jan-04	na	na	na
LF-27		14-Jul-04	na	na	na
DUP		14-Jul-04	na	na	na
LF-27		18-Jan-05	na	na	na
LF-27		26-Jan-06	na	na	na
LF-27		17-Apr-07	na	na	na
LF-27		15-Apr-08	na	na	na
LF-27		13-Apr-09	na	na	na
LF-27		29-Apr-10	na	na	na
LF-28		29-Dec-97	0.13	0.08	na
LF-28		26-Feb-98	< 0.05	0.065	na
LF-28		08-Apr-98	< 0.25	< 0.05	na
LF-28		14-Jul-98	< 0.25	< 0.05	na
LF-28		21-Oct-98	< 0.25	< 0.05	na
LF-28		12-Jan-99	0.25	0.11	na
DUP		12-Jan-99	0.27 ci	0.11	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-28		20-Apr-99	0.33	0.079	na
LF-28		14-Jul-99	0.33 i	0.088	na
LF-28		11-Oct-99	0.33 i	0.09 d	na
LF-28		17-Jan-00	0.44 J	0.1 J,d	na
LF-28		28-Apr-00	na	na	na
LF-28		25-Jul-00	na	na	na
LF-28		10-Oct-00	na	na	na
LF-28		24-Jan-01	na	na	na
LF-28		09-Apr-01	na	na	na
LF-28		05-Jul-01	na	na	na
LF-28		15-Oct-01	na	na	na
LF-28		09-Jan-02	na	na	na
LF-28		09-Apr-02	na	na	na
LF-28		08-Jul-02	na	na	na
LF-28		09-Oct-02	na	na	na
LF-28		16-Jan-03	na	na	na
LF-28		16-Apr-03	na	na	na
LF-28		09-Jul-03	na	na	na
LF-28		29-Oct-03	na	na	na
LF-28		20-Jan-04	na	na	na
LF-28		04-May-04	na	na	na
LF-28		15-Jul-04	na	na	na
LF-28		13-Oct-04	na	na	na
LF-28		18-Jan-05	na	na	na
LF-28		20-Apr-05	na	na	na
LF-28		19-Jul-05	na	na	na
DUP		19-Jul-05	na	na	na
LF-28		27-Oct-05	na	na	na
DUP		27-Oct-05	na	na	na
LF-28		27-Jan-06	na	na	na
LF-28		18-Apr-06	na	na	na
LF-28		16-Apr-07	na	na	na
LF-28		17-Apr-08	na	na	na
LF-28		13-Apr-09	na	na	na
LF-28		29-Apr-10	na	na	na
LF-28		12-Oct-11	na	na	na
LF-28		18-Apr-12	0.14 Y	< 0.05	< 0.30
LF-28		23-Apr-13	0.1 Y	0.021 J	< 0.3
LF-28		24-Apr-14	0.097 Y	0.017 J	< 0.31
LF-29		29-Dec-97	1.1	0.8	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-29		25-Feb-98	0.57	1.2	na
LF-29		07-Apr-98	< 0.25	< 0.05	na
LF-29		14-Jul-98	< 0.25	< 0.05	na
LF-29		20-Oct-98	< 0.25	< 0.05	na
LF-29		11-Jan-99	0.95	0.9	na
LF-29		20-Apr-99	1	1.1	na
DUP		20-Apr-99	0.77	1.1	na
LF-29		13-Jul-99	0.99 c	0.95	na
LF-29		11-Oct-99	1.1 c,f	1.3 d	na
DUP		11-Oct-99	0.94 c,f	1.2 d	na
LF-29		17-Jan-00	0.85 J	1.4 J,d	na
LF-29		24-Jan-01	na	na	na
LF-29		09-Jan-02	na	na	na
LF-29		17-Jan-03	na	na	na
LF-29		20-Jan-04	na	na	na
LF-29		18-Jan-05	na	na	na
LF-29		26-Jan-06	na	na	na
LF-29		16-Apr-07	na	na	na
LF-29		15-Apr-08	na	na	na
LF-29		13-Apr-09	na	na	na
LF-29		29-Apr-10	na	na	na
LF-3		21-Jun-91	2	na	na
LF-3		09-Jul-92	3	190	na
DUP		09-Jul-92	3.3	180	na
LF-3		09-Jun-93	100	150	na
DUP		09-Jun-93	110	150	na
LF-3		16-Apr-96	2.6	87	na
LF-3		31-Jul-96	0.64	90	na
LF-3		20-Nov-96	9.3	75	na
LF-3		19-Mar-97	0.65	61	na
LF-3		12-Jun-97	1.1	130	na
LF-3		19-Aug-97	0.97	200	na
LF-3		17-Dec-97	1.1	30	na
DUP		17-Dec-97	1.6	43	na
LF-3		02-Mar-98	1.3	167	na
LF-3		10-Apr-98	< 0.5	47 J1	na
LF-3		16-Jul-98	< 1	< 12	na
LF-3		19-Oct-98	< 2.5	150	na
LF-3		15-Jan-99	10	110	na
DUP		15-Jan-99	10	110	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-3		22-Apr-99	6.3	58	na
LF-3		19-Jul-99	14 cef	100 d	na
LF-3		12-Oct-99	13 e,f	210	na
LF-3		20-Jan-00	3.1 J	49 Jg	na
LF-3		01-May-00	na	na	na
LF-3		24-Jul-00	na	na	na
LF-3		11-Oct-00	na	na	na
LF-3		16-Jan-01	na	na	na
LF-3		13-Apr-01	na	na	na
LF-3		06-Jul-01	na	na	na
LF-3		15-Oct-01	na	na	na
LF-3		10-Jan-02	na	na	na
LF-3		10-Apr-02	na	na	na
LF-3		09-Jul-02	na	na	na
LF-3		10-Oct-02	na	na	na
LF-3		20-Jan-03	na	na	na
LF-3		16-Apr-03	na	na	na
LF-3		10-Jul-03	na	na	na
LF-3		28-Oct-03	na	na	na
DUP		28-Oct-03	na	na	na
LF-3		22-Jan-04	na	na	na
LF-3		05-May-04	na	na	na
LF-3		15-Jul-04	na	na	na
LF-3		11-Oct-04	na	na	na
LF-3		20-Jan-05	na	na	na
LF-3		20-Apr-05	na	na	na
LF-3		21-Jul-05	na	na	na
LF-3		26-Oct-05	na	na	na
LF-3		24-Jan-06	na	na	na
LF-3		19-Apr-06	na	na	na
LF-3		18-Apr-07	na	na	na
LF-3		15-Apr-08	na	na	na
LF-3		15-Apr-09	na	na	na
LF-3		26-Apr-10	na	na	na
LF-30		30-Dec-97	0.24	< 0.05	na
LF-30		25-Feb-98	0.11	0.14	na
DUP		25-Feb-98	0.14	0.18	na
LF-30		07-Apr-98	< 0.05	< 0.05	na
LF-30		14-Jul-98	< 0.05	< 0.05	na
LF-30		20-Oct-98	< 0.05	< 0.05	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-30		11-Jan-99	0.2	0.34	na
LF-30		20-Apr-99	0.12	0.18	na
LF-30		13-Jul-99	0.29 c	0.28	na
LF-30		11-Oct-99	0.11 c,e	0.19 d	na
LF-30		18-Jan-00	0.23 J	0.24 J,d	na
LF-30		24-Jan-01	na	na	na
LF-30		09-Jan-02	na	na	na
LF-30		10-Apr-02	na	na	na
LF-30		17-Jan-03	na	na	na
LF-30		20-Jan-04	na	na	na
LF-30		18-Jan-05	na	na	na
LF-30		26-Jan-06	na	na	na
LF-31		02-Jun-99	0.14	< 0.05	na
LF-31		13-Jul-99	0.27 c,i	< 0.05	na
LF-31		11-Oct-99	0.21 i	< 0.05	na
LF-32		22-Jun-99	< 0.047	< 0.05	na
LF-32		16-Jul-99	0.13 c,e	< 0.05	na
LF-32		25-Oct-99	< 0.05	< 0.05	na
DUP		25-Oct-99	< 0.05	< 0.05	na
LF-33		22-Jun-99	1.5 cfi	0.16	na
DUP		22-Jun-99	1.5 cfi	0.16	na
LF-33		13-Jul-99	1.5 c,i	0.1	na
LF-33		11-Oct-99	0.63 i	0.2 d	na
LF-34		22-Jun-99	0.18 c,i	< 0.05	na
LF-34		13-Jul-99	0.25 c,i	0.051	na
LF-34		11-Oct-99	0.16 i	< 0.05	na
LF-35		25-Oct-99	< 0.05	< 0.05	na
LF-35		14-Jan-00	< 0.05	< 0.05	na
LF-35		28-Apr-00	na	na	na
LF-35		25-Jul-00	na	na	na
DUP		25-Jul-00	na	na	na
LF-35		10-Oct-00	na	na	na
LF-35		17-Jan-01	na	na	na
LF-35		13-Apr-01	na	na	na
LF-35		05-Jul-01	na	na	na
LF-35		15-Oct-01	na	na	na
LF-35		08-Jan-02	na	na	na
DUP		08-Jan-02	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-35		08-Apr-02	na	na	na
DUP		08-Apr-02	na	na	na
LF-35		08-Jul-02	na	na	na
LF-35		07-Oct-02	na	na	na
LF-35		15-Jan-03	na	na	na
LF-35		15-Apr-03	na	na	na
LF-35		09-Jul-03	na	na	na
LF-35		27-Oct-03	na	na	na
LF-35		19-Jan-04	na	na	na
LF-35		04-May-04	na	na	na
LF-35		14-Jul-04	na	na	na
LF-35		13-Oct-04	na	na	na
LF-35		17-Jan-05	na	na	na
LF-35		18-Apr-05	na	na	na
DUP		18-Apr-05	na	na	na
LF-35		18-Jul-05	na	na	na
LF-35		24-Oct-05	na	na	na
LF-35		23-Jan-06	na	na	na
LF-35		17-Apr-06	na	na	na
LF-35		18-Apr-07	na	na	na
LF-35		17-Apr-08	na	na	na
LF-35		14-Apr-09	na	na	na
LF-35		30-Apr-10	na	na	na
LF-35		17-Apr-12	na	na	na
LF-36		13-Jan-00	0.18 J	< 0.05	na
LF-36		28-Apr-00	na	na	na
LF-36		25-Jul-00	na	na	na
LF-36		10-Oct-00	na	na	na
LF-36		17-Jan-01	na	na	na
LF-36		09-Apr-01	na	na	na
LF-36		02-Jul-01	na	na	na
LF-36		12-Oct-01	na	na	na
LF-36		08-Jan-02	na	na	na
LF-36		09-Apr-02	na	na	na
LF-36		08-Jul-02	na	na	na
LF-36		09-Oct-02	na	na	na
LF-36		14-Jan-03	na	na	na
LF-36		15-Apr-03	na	na	na
LF-36		08-Jul-03	na	na	na
LF-36		27-Oct-03	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-36		19-Jan-04	na	na	na
LF-36		03-May-04	na	na	na
LF-36		12-Jul-04	na	na	na
DUP		12-Jul-04	na	na	na
LF-36		14-Oct-04	na	na	na
LF-36		17-Jan-05	na	na	na
LF-36		19-Apr-05	na	na	na
LF-36		19-Jul-05	na	na	na
LF-36		27-Oct-05	na	na	na
LF-36		27-Jan-06	na	na	na
LF-36		18-Apr-06	na	na	na
LF-36		19-Apr-07	na	na	na
LF-36		17-Apr-08	na	na	na
DUP		17-Apr-08	na	na	na
LF-36		14-Apr-09	na	na	na
LF-36		28-Apr-10	na	na	na
LF-36		15-Apr-11	na	na	na
LF-36		21-Jul-11	na	na	na
LF-36		12-Oct-11	na	na	na
DUP		12-Oct-11	na	na	na
LF-36		23-Feb-12	na	na	na
LF-36		17-Apr-12	na	na	na
LF-37		14-Jan-00	0.38 J	0.29 J,d	na
DUP		14-Jan-00	0.63 J	0.28 J,d	na
LF-37		28-Apr-00	na	na	na
DUP		28-Apr-00	na	na	na
LF-37		25-Jul-00	na	na	na
LF-37		10-Oct-00	na	na	na
LF-37		17-Jan-01	na	na	na
LF-37		10-Apr-01	na	na	na
LF-37		05-Jul-01	na	na	na
LF-37		12-Oct-01	na	na	na
LF-37		08-Jan-02	na	na	na
LF-37		08-Apr-02	na	na	na
LF-37		08-Jul-02	na	na	na
DUP		08-Jul-02	na	na	na
LF-37		10-Oct-02	na	na	na
DUP		10-Oct-02	na	na	na
LF-37		15-Jan-03	na	na	na
LF-37		15-Apr-03	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-37		08-Jul-03	na	na	na
DUP		08-Jul-03	na	na	na
LF-37		27-Oct-03	na	na	na
DUP		27-Oct-03	na	na	na
LF-37		19-Jan-04	na	na	na
LF-37		03-May-04	na	na	na
LF-37		12-Jul-04	na	na	na
LF-37		13-Oct-04	na	na	na
LF-37		19-Jan-05	na	na	na
LF-37		18-Apr-05	na	na	na
LF-37		18-Jul-05	na	na	na
LF-37		24-Oct-05	na	na	na
LF-37		23-Jan-06	na	na	na
LF-37		18-Apr-06	na	na	na
LF-37		19-Apr-07	na	na	na
LF-37		16-Apr-08	na	na	na
LF-37		14-Apr-09	na	na	na
LF-37		30-Apr-10	na	na	na
LF-37		17-Apr-12	na	na	na
LF-38		14-Jan-00	0.079 J	0.18 J,d	na
LF-38		28-Apr-00	na	na	na
LF-38		25-Jul-00	na	na	na
LF-38		10-Oct-00	na	na	na
DUP		10-Oct-00	na	na	na
LF-38		17-Jan-01	na	na	na
DUP		17-Jan-01	na	na	na
LF-38		10-Apr-01	na	na	na
LF-38		05-Jul-01	na	na	na
LF-38		12-Oct-01	na	na	na
LF-38		08-Jan-02	na	na	na
LF-38		08-Apr-02	na	na	na
LF-38		08-Jul-02	na	na	na
LF-38		10-Oct-02	na	na	na
LF-38		15-Jan-03	na	na	na
DUP		15-Jan-03	na	na	na
LF-38		15-Apr-03	na	na	na
LF-38		08-Jul-03	na	na	na
LF-38		27-Oct-03	na	na	na
LF-38		19-Jan-04	na	na	na
LF-38		03-May-04	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-38		12-Jul-04	na	na	na
LF-38		13-Oct-04	na	na	na
LF-38		19-Jan-05	na	na	na
LF-38		18-Apr-05	na	na	na
LF-38		18-Jul-05	na	na	na
LF-38		24-Oct-05	na	na	na
LF-38		23-Jan-06	na	na	na
LF-38		18-Apr-06	na	na	na
LF-38		19-Apr-07	na	na	na
LF-38		16-Apr-08	na	na	na
LF-38		14-Apr-09	na	na	na
LF-38		28-Apr-10	na	na	na
LF-38		17-Apr-12	na	na	na
DUP		17-Apr-12	na	na	na
LF-39		14-Jan-00	< 0.05	< 0.05	na
LF-39		28-Apr-00	na	na	na
LF-39		25-Jul-00	na	na	na
LF-39		10-Oct-00	na	na	na
LF-39		24-Jan-01	na	na	na
LF-39		09-Apr-01	na	na	na
LF-39		05-Jul-01	na	na	na
LF-39		15-Oct-01	na	na	na
LF-39		08-Jan-02	na	na	na
LF-39		08-Apr-02	na	na	na
LF-39		08-Jul-02	na	na	na
LF-39		09-Oct-02	na	na	na
LF-39		14-Jan-03	na	na	na
DUP		14-Jan-03	na	na	na
LF-39		15-Apr-03	na	na	na
LF-39		08-Jul-03	na	na	na
LF-39		28-Oct-03	na	na	na
LF-39		19-Jan-04	na	na	na
LF-39		03-May-04	na	na	na
LF-39		12-Jul-04	na	na	na
LF-39		13-Oct-04	na	na	na
LF-39		17-Jan-05	na	na	na
LF-39		18-Apr-05	na	na	na
LF-39		18-Jul-05	na	na	na
LF-39		27-Oct-05	na	na	na
LF-39		23-Jan-06	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-39		17-Apr-06	na	na	na
LF-39		18-Apr-07	na	na	na
LF-39		17-Apr-08	na	na	na
LF-39		15-Apr-09	na	na	na
LF-39		28-Apr-10	na	na	na
LF-39		17-Apr-12	na	na	na
LF-4		21-Jun-91	0.78	na	na
DUP		21-Jun-91	0.51	na	na
LF-4		09-Jul-92	1.2	14	na
LF-4		09-Jun-93	1.2	2.2	na
LF-4		02-Mar-98	2.8	2.6	na
LF-4		09-Apr-98	< 0.5	< 0.05	na
LF-4		16-Jul-98	< 0.05	< 0.05	na
LF-4		19-Oct-98	< 0.05	< 0.05	na
LF-4		14-Jan-99	13	1.9	na
LF-4		22-Apr-99	6.3	0.74 J3	na
LF-4		16-Jul-99	2.2 e	0.49	na
DUP		16-Jul-99	2.2 e	0.5	na
LF-4		15-Oct-99	1.2 f	0.37 d	na
LF-4		25-Jan-00	2.8 J	0.75 J,d	na
DUP		25-Jan-00	3.7 J	0.74 J,d	na
LF-4		25-Jan-01	na	na	na
LF-4		08-Jan-02	na	na	na
LF-4		20-Jan-03	na	na	na
LF-4		22-Jan-04	na	na	na
LF-4		20-Jan-05	na	na	na
LF-4		25-Jan-06	na	na	na
LF-4		18-Apr-07	na	na	na
DUP		18-Apr-07	na	na	na
LF-4		14-Apr-08	na	na	na
LF-4		16-Apr-09	na	na	na
LF-4		26-Apr-10	na	na	na
LF-40		14-Jan-00	0.39	< 0.05	na
LF-40		28-Apr-00	na	na	na
LF-40		25-Jul-00	na	na	na
LF-40		10-Oct-00	na	na	na
LF-40		24-Jan-01	na	na	na
LF-40		09-Apr-01	na	na	na
DUP		09-Apr-01	na	na	na
LF-40		05-Jul-01	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-40		15-Oct-01	na	na	na
LF-40		08-Jan-02	na	na	na
LF-40		08-Apr-02	na	na	na
LF-40		08-Jul-02	na	na	na
LF-40		09-Oct-02	na	na	na
LF-40		14-Jan-03	na	na	na
LF-40		15-Apr-03	na	na	na
LF-40		08-Jul-03	na	na	na
LF-40		28-Oct-03	na	na	na
LF-40		19-Jan-04	na	na	na
LF-40		03-May-04	na	na	na
DUP		03-May-04	na	na	na
LF-40		12-Jul-04	na	na	na
LF-40		13-Oct-04	na	na	na
LF-40		17-Jan-05	na	na	na
LF-40		18-Apr-05	na	na	na
LF-40		18-Jul-05	na	na	na
LF-40		27-Oct-05	na	na	na
LF-40		23-Jan-06	na	na	na
LF-40		17-Apr-06	na	na	na
DUP		17-Apr-06	na	na	na
LF-40		18-Apr-07	na	na	na
LF-40		17-Apr-08	na	na	na
LF-40		15-Apr-09	na	na	na
LF-40		28-Apr-10	na	na	na
LF-40		17-Apr-12	na	na	na
LF-41		13-Jan-00	0.059 J	<0.05	na
DUP		13-Jan-00	0.053 J	<0.05	na
LF-41		28-Apr-00	na	na	na
LF-41		25-Jul-00	na	na	na
LF-41		10-Oct-00	na	na	na
DUP		10-Oct-00	na	na	na
LF-41		17-Jan-01	na	na	na
LF-41		09-Apr-01	na	na	na
LF-41		05-Jul-01	na	na	na
LF-41		12-Oct-01	na	na	na
LF-41		08-Jan-02	na	na	na
LF-41		08-Apr-02	na	na	na
LF-41		08-Jul-02	na	na	na
LF-41		09-Oct-02	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-41		15-Jan-03	na	na	na
LF-41		15-Apr-03	na	na	na
LF-41		09-Jul-03	na	na	na
LF-41		27-Oct-03	na	na	na
LF-41		19-Jan-04	na	na	na
LF-41		03-May-04	na	na	na
LF-41		12-Jul-04	na	na	na
LF-41		13-Oct-04	na	na	na
LF-41		17-Jan-05	na	na	na
LF-41		19-Apr-05	na	na	na
DUP		19-Apr-05	na	na	na
LF-41		19-Jul-05	na	na	na
LF-41		24-Oct-05	na	na	na
LF-41		23-Jan-06	na	na	na
DUP		23-Jan-06	na	na	na
LF-41		17-Apr-06	na	na	na
LF-41		15-Apr-11	na	na	na
LF-41		21-Jul-11	na	na	na
LF-41		19-Oct-11	na	na	na
LF-41		23-Feb-12	na	na	na
LF-41		17-Apr-12	na	na	na
LF-42		12-Jan-00	1.1	0.19 J,d	na
DUP		12-Jan-00	1.4	0.18 J,d	na
LF-42		01-May-00	na	na	na
DUP		01-May-00	na	na	na
LF-42		24-Jul-00	na	na	na
LF-42		11-Oct-00	na	na	na
LF-42		25-Jan-01	na	na	na
LF-42		10-Apr-01	na	na	na
LF-42		06-Jul-01	na	na	na
DUP		06-Jul-01	na	na	na
LF-42		15-Oct-01	na	na	na
LF-42		09-Jan-02	na	na	na
LF-42		09-Apr-02	na	na	na
DUP		09-Apr-02	na	na	na
LF-42		09-Jul-02	na	na	na
LF-42		10-Oct-02	na	na	na
LF-42		17-Jan-03	na	na	na
LF-42		16-Apr-03	na	na	na
LF-42		09-Jul-03	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-42		28-Oct-03	na	na	na
LF-42		22-Jan-04	na	na	na
LF-42		04-May-04	na	na	na
LF-42		15-Jul-04	na	na	na
LF-42		14-Oct-04	na	na	na
LF-42		19-Jan-05	na	na	na
DUP		19-Jan-05	na	na	na
LF-42		19-Apr-05	na	na	na
LF-42		19-Jul-05	na	na	na
LF-42		26-Oct-05	na	na	na
LF-42		24-Jan-06	na	na	na
LF-42		19-Apr-06	na	na	na
LF-42		19-Apr-07	na	na	na
LF-42		14-Apr-08	na	na	na
LF-42		16-Apr-09	na	na	na
DUP		16-Apr-09	na	na	na
LF-42		26-Apr-10	na	na	na
LF-42		17-Apr-12	na	na	na
LF-5		06-Aug-91	4.7	na	na
LF-5		09-Jul-92	0.83	69	na
LF-5		09-Jun-93	2	95	na
LF-7		20-Jun-91	< 0.05	na	na
LF-7		17-Dec-91	0.540	na	na
LF-7		09-Jul-92	0.3	0.14	na
DUP		09-Jul-92	0.48	0.13	na
LF-7		09-Jun-93	0.34	0.11	na
DUP		09-Jun-93	0.32	0.1	na
LF-7		06-Jan-94	0.54	0.5	na
LF-7		27-Feb-98	0.79	0.14	na
DUP		27-Feb-98	0.88	0.14	na
LF-7		13-Jan-99	0.53	0.16	na
LF-7		20-Jan-00	0.89	0.24 Jd	na
LF-7		25-Jan-01	na	na	na
LF-7		09-Jan-02	na	na	na
LF-7		17-Jan-03	na	na	na
LF-7		22-Jan-04	na	na	na
LF-7		19-Jan-05	na	na	na
LF-7		24-Jan-06	na	na	na
LF-7		19-Apr-07	na	na	na
LF-7		14-Apr-08	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
DUP		14-Apr-08	na	na	na
LF-7		16-Apr-09	na	na	na
LF-7		27-Apr-10	na	na	na
LF-8		20-Jun-91	< 0.05	na	na
LF-8		17-Dec-91	0.220	na	na
LF-8		09-Jul-92	0.25	< 0.05	na
LF-8		30-Dec-92	0.15	0.12	na
LF-8		09-Jun-93	0.33	< 0.05	na
LF-8		06-Jan-94	1.7	< 0.05	na
LF-8		27-Feb-98	0.2	< 0.05	na
LF-8		08-Apr-98	< 0.05	< 0.05	na
LF-8		15-Jul-98	< 0.05	< 0.05	na
LF-8		21-Oct-98	< 0.05	< 0.05	na
LF-8		13-Jan-99	0.44	0.053	na
LF-8		21-Apr-99	0.43	< 0.05	na
LF-8		14-Jul-99	0.39 c,e	0.053	na
LF-8		15-Oct-99	0.2	< 0.05	na
LF-8		19-Jan-00	0.29	< 0.05	na
LF-8		22-Jan-01	na	na	na
LF-8		09-Jan-02	na	na	na
LF-8		20-Jan-03	na	na	na
DUP		20-Jan-03	na	na	na
LF-8		21-Jan-04	na	na	na
LF-8		19-Jan-05	na	na	na
LF-8		24-Jan-06	na	na	na
LF-8		20-Apr-07	na	na	na
LF-8		14-Apr-08	na	na	na
LF-8		16-Apr-09	na	na	na
LF-8		26-Apr-10	na	na	na
LF-9		21-Jun-91	0.2	na	na
LF-9		16-Dec-91	0.600	na	na
LF-9		09-Jul-92	0.3	0.62	na
LF-9		30-Dec-92	0.3	0.51	na
LF-9		09-Jun-93	0.56	0.43	na
LF-B1	(a)	20-Jun-91	< 0.05	na	na
LF-B1	(a)	16-Dec-91	< 0.050	na	na
LF-B1	(a)	08-Jul-92	< 0.05	0.18	na
LF-B1	(a)	30-Dec-92	< 0.05	0.2	na
LF-B1	(a)	08-Jun-93	0.061	0.18	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-B2		21-Jun-91	< 0.05	na	na
LF-B2		16-Dec-91	< 0.050	na	na
LF-B2		08-Jul-92	< 0.05	< 0.05	na
LF-B2		08-Jun-93	< 0.05	< 0.05	na
LF-B3		19-Jun-91	< 0.05	na	na
LF-B3		16-Dec-91	< 0.050	na	na
LF-B3		08-Jul-92	< 0.05	0.14	na
LF-B3		30-Dec-92	< 0.05	0.15	na
LF-B3		08-Jun-93	0.06	0.09	na
LF-B3		05-Jan-94	< 0.05	< 0.05	na
LF-B3		16-Apr-96	2.7	< 0.05	na
LF-B3		01-Aug-96	0.6	< 0.05	na
LF-B3		21-Nov-96	0.44	< 0.05	na
DUP		21-Nov-96	0.53	< 0.05	na
LF-B3		17-Mar-97	0.85	< 0.05	na
LF-B3		12-Jun-97	0.93	0.06	na
LF-B3		20-Aug-97	0.2	0.06	na
LF-B3		17-Dec-97	0.7	< 0.05	na
LF-B3		27-Feb-98	0.42	< 0.05	na
LF-B3		08-Apr-98	< 0.05	< 0.05	na
LF-B3		15-Jul-98	< 0.05	< 0.05	na
LF-B3		21-Oct-98	< 0.05 UJ3	< 0.05	na
LF-B3		13-Jan-99	0.39	< 0.05	na
LF-B3		22-Apr-99	1.3	< 0.05	na
LF-B3		15-Jul-99	0.11 c,e	< 0.05	na
LF-B3		14-Oct-99	0.18 c,e	< 0.05	na
LF-B3		25-Jan-00	2.6 J	< 0.05	na
LF-B3		25-Jan-01	na	na	na
LF-B3		15-Oct-01	na	na	na
DUP		15-Oct-01	na	na	na
LF-B3		10-Jan-02	na	na	na
LF-B3		16-Jan-03	na	na	na
LF-B3		21-Jan-04	na	na	na
DUP		21-Jan-04	na	na	na
LF-B3		20-Jan-05	na	na	na
LF-B3		24-Jan-06	na	na	na
LF-B3		19-Apr-07	na	na	na
LF-B3		16-Apr-08	na	na	na
LF-B3		15-Apr-09	na	na	na
LF-B3		30-Apr-10	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-B4		19-Jun-91	< 0.05	na	na
LF-B4		17-Dec-91	< 0.050	na	na
LF-B4		08-Jul-92	< 0.05	< 0.05	na
LF-B4		30-Dec-92	< 0.05	0.16	na
LF-B4		08-Jun-93	0.066	< 0.05	na
LF-B4		05-Jan-94	< 0.05	< 0.05	na
LF-B4		16-Apr-96	< 0.05	< 0.05	na
LF-B4		30-Jul-96	< 0.05	< 0.05	na
LF-B4		22-Nov-96	0.16	< 0.05	na
DUP		22-Nov-96	< 0.05	< 0.05	na
LF-B4		17-Mar-97	< 0.05	< 0.05	na
LF-B4		01-Jul-97	< 0.05	< 0.05	na
LF-B4		20-Aug-97	< 0.05	< 0.05	na
LF-B4		18-Dec-97	< 0.05	< 0.05	na
LF-B4		25-Feb-98	< 0.05	< 0.05	na
LF-B4		07-Apr-98	< 0.05	< 0.05	na
LF-B4		15-Jul-98	< 0.05	< 0.05	na
LF-B4		19-Oct-98	< 0.05	< 0.05	na
LF-B4		11-Jan-99	0.055	< 0.05	na
LF-B4		20-Apr-99	0.05	< 0.05	na
LF-B4		14-Jul-99	< 0.048	< 0.05	na
LF-B4		14-Oct-99	0.12 i	< 0.05	na
LF-B4		18-Jan-00	< 0.05	< 0.05	na
LF-B4		24-Jan-01	na	na	na
DUP		24-Jan-01	na	na	na
LF-B4		09-Jan-02	na	na	na
LF-B4		16-Jan-03	na	na	na
LF-B4		21-Jan-04	na	na	na
LF-B4		18-Jan-05	na	na	na
DUP		18-Jan-05	na	na	na
LF-B4		26-Jan-06	na	na	na
LF-B4		16-Apr-07	na	na	na
LF-B4		13-Apr-09	na	na	na
LF-B5	(b)	09-Apr-96	0.1	< 0.05	na
LF-B5	(b)	01-Aug-96	< 0.05	0.15	na
LF-B5	(b)	22-Nov-96	< 0.05	0.06	na
LF-B5	(b)	17-Mar-97	< 0.05	0.12	na
LF-B5	(b)	12-Jun-97	< 0.05	0.09	na
LF-B5	(b)	20-Aug-97	< 0.05	0.12	na
LF-B5	(b)	17-Dec-97	0.64	0.12	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-B5	(b)	27-Feb-98	< 0.05	0.1	na
LF-B5	(b)	09-Apr-98	< 0.05	< 0.05	na
LF-B5	(b)	16-Jul-98	< 0.05	< 0.05	na
LF-B5	(b)	23-Oct-98	< 0.05	< 0.05	na
LF-B5	(b)	13-Jan-99	0.053	0.057	na
LF-B5	(b)	21-Apr-99	< 0.047	0.16	na
LF-B5	(b)	15-Jul-99	< 0.048	0.14 g	na
LF-B5	(b)	15-Oct-99	< 0.047	0.15 g	na
DUP	(b)	15-Oct-99	< 0.048	0.16 g	na
LF-B5	(b)	21-Jan-00	< 0.05	0.17 J,g	na
LF-B5	(b)	02-Feb-01	na	na	na
LF-B5	(b)	10-Jan-02	na	na	na
LF-B5	(b)	20-Jan-03	na	na	na
LF-B5	(b)	22-Jan-04	na	na	na
DUP	(b)	22-Jan-04	na	na	na
LF-B5	(b)	20-Jan-05	na	na	na
LF-B5	(b)	25-Jan-06	na	na	na
LF-B5	(b)	18-Apr-07	na	na	na
LF-B5	(b)	15-Apr-08	na	na	na
LF-B5	(b)	17-Apr-09	na	na	na
LF-B5	(b)	30-Apr-10	na	na	na
LF-B6		09-Apr-96	1	2.7	na
LF-B6		01-Aug-96	0.08	0.38	na
LF-B6		25-Nov-96	0.34	0.21	na
DUP		25-Nov-96	0.34	0.18	na
LF-B6		17-Mar-97	0.14	0.1	na
LF-B6		12-Jun-97	0.21	0.2	na
LF-B6		19-Aug-97	0.19	0.16	na
LF-B6		18-Dec-97	< 0.05	0.14	na
LF-B6		27-Feb-98	< 0.05	0.082	na
LF-B6		08-Apr-98	< 0.05	< 0.05	na
LF-B6		15-Jul-98	< 0.05	< 0.05	na
LF-B6		19-Oct-98	< 0.05	< 0.05	na
LF-B6		13-Jan-99	< 0.047	0.063	na
LF-B6		21-Apr-99	< 0.048	0.056	na
LF-B6		14-Jul-99	< 0.048	< 0.05	na
LF-B6		15-Oct-99	< 0.047	0.061 g	na
LF-B6		21-Jan-00	< 0.05	0.059 J,g	na
LF-B6		25-Jan-01	na	na	na
DUP		25-Jan-01	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
LF-B6		10-Apr-01	na	na	na
LF-B6		10-Jan-02	na	na	na
LF-B6		17-Jan-03	na	na	na
LF-B6		22-Jan-04	na	na	na
LF-B6		19-Jan-05	na	na	na
LF-B6		25-Jan-06	na	na	na
DUP		25-Jan-06	na	na	na
LF-B6		17-Apr-07	na	na	na
LF-B6		14-Apr-08	na	na	na
LF-B6		16-Apr-09	na	na	na
LF-B6		26-Apr-10	na	na	na
MD-1	(j)	05-May-03	na	na	na
MD-1	(j)	14-Oct-03	25	na	na
MD-1	(j)	20-Jan-04	24	na	na
MD-1	(j)	27-Apr-04	18	na	na
MD-1	(j)	22-Oct-04	19	na	na
MD-1	(j)	30-Sep-05	29	na	na
MD-1	(j)	15-Apr-06	3.1	na	na
MD-1	(j)	26-Oct-06	14	na	na
MD-1	(j)	12-Apr-07	4.4	na	na
MD-1	(j),(l)	12-Oct-07	8.6	na	na
MD-1	(j),(l)	22-Apr-08	8.3	na	na
MD-1	(j),(l)	22-Oct-08	5.4	na	na
MD-1	(j),(l)	24-Apr-09	5.9 Y	na	na
MD-1	(j),(l)	21-Oct-09	4.0Y	na	na
MD-1	(j),(l)	21-Oct-09	4.2 Y	na	na
MD-1	(j),(l)	29-Apr-10	5.4	na	na
MD-1	(j),(l)	27-Oct-10	3.1 Y	na	na
MD-1	(j)	14-Nov-11	1.3	na	na
MD-1	(j),(l)	17-Oct-12	1.9 Y	na	na
MD-1	(j)	08-Oct-13	1.8	na	na
MD-1	(j)	27-Oct-14	2.5	na	na
MD-2	(j)	05-May-03	3.4	na	na
MD-2	(j)	14-Oct-03	3.5	na	na
MD-2	(j)	20-Jan-04	3.2	na	na
MD-2	(j)	27-Apr-04	2.4	na	na
MD-2	(j)	22-Oct-04	2.8	na	na
MD-2	(j)	30-Sep-05	2.6	na	na
MD-2	(j)	15-Apr-06	2.3	na	na
MD-2	(j)	26-Oct-06	2.2	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
MD-2	(j)	12-Apr-07	2.0	na	na
MD-2	(j),(l)	12-Oct-07	2.1	na	na
MD-2	(j),(l)	22-Apr-08	2.0	na	na
MD-2	(j),(l)	22-Oct-08	2.5	na	na
MD-2	(j),(l)	24-Apr-09	2.0 Y	na	na
MD-2	(j),(l)	21-Oct-09	2.1 Y	na	na
MD-2	(j),(l)	21-Oct-09	2.1Y	na	na
MD-2	(j),(l)	29-Apr-10	2.9 Y	na	na
DUP	(j),(l)	29-Apr-10	2.4 Y	na	na
MD-2	(j),(l)	27-Oct-10	2.7 Y	na	na
MD-2	(j),(l)	14-Nov-11	1.3 Y	na	na
MD-2	(j),(l)	17-Oct-12	2.0 Y	na	na
MD-2	(j)	07-Oct-13	2.3 Y	na	na
DUP	(j)	08-Oct-13	2 Y	na	na
MD-2	(j)	27-Oct-14	2.7 Y	na	na
DUP	(j)	27-Oct-14	2.9 Y	na	na
MD-3	(j)	05-May-03	1.7	na	na
MD-3	(j)	14-Oct-03	2.0	na	na
MD-3	(j)	20-Jan-04	1.3	na	na
MD-3	(j)	27-Apr-04	1.1	na	na
MD-3	(j)	22-Oct-04	2.1	na	na
MD-3	(j)	30-Sep-05	0.800	na	na
MD-3	(j)	15-Apr-06	0.590	na	na
MD-3	(j)	26-Oct-06	0.760	na	na
MD-3	(j)	12-Apr-07	0.850	na	na
MD-3	(j),(l)	12-Oct-07	1.2	na	na
MD-3	(j),(l)	22-Apr-08	1.9	na	na
MD-3	(j),(l)	22-Oct-08	1.3	na	na
MD-3	(j),(l)	24-Apr-09	0.810 Y	na	na
MD-3	(j),(l)	21-Oct-09	0.79 Y	na	na
MD-3	(j),(l)	29-Apr-10	2.9Y	na	na
MD-3	(j),(l)	29-Apr-10	1.0 Y	na	na
MD-3	(j),(l)	27-Oct-10	1.2 Y	na	na
MD-3	(j),(l)	14-Nov-11	0.95 Y	na	na
MD-3	(j),(l)	17-Oct-12	1.7 Y	na	na
MD-3	(j)	07-Oct-13	1.1 Y	na	na
MD-3	(j)	07-Oct-13	1.6 Y	na	na
MD-3	(j)	27-Oct-14	1.6 Y	na	na
MD-4	(j)	05-May-03	na	na	na
MD-4	(j)	14-Oct-03	0.110	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
MD-4	(j)	20-Jan-04	0.150	na	na
MD-4	(j)	27-Apr-04	0.084	na	na
MD-4	(j)	22-Oct-04	0.130	na	na
MD-4	(j)	30-Sep-05	0.100	na	na
MD-4	(j)	15-Apr-06	0.093	na	na
MD-4	(j)	26-Oct-06	0.140	na	na
MD-4	(j)	12-Apr-07	0.067	na	na
MD-4	(j),(l)	12-Oct-07	0.052	na	na
MD-4	(j)	22-Apr-08	<0.050	na	na
MD-4	(j),(l)	22-Oct-08	0.098	na	na
MD-4	(j),(l)	24-Apr-09	0.110 Y	na	na
MD-4	(j),(l)	21-Oct-09	0.17 Y	na	na
MD-4	(j),(l)	29-Apr-10	0.16 Y	na	na
MD-4	(j),(l)	27-Oct-10	0.19 Y	na	na
DUP	(j),(l)	27-Oct-10	0.23 Y	na	na
MD-4	(j),(l)	14-Nov-11	0.12 Y	na	na
MD-4	(j),(l)	17-Oct-12	0.091 Y	na	na
MD-4	(j)	08-Oct-13	0.22 Y	na	na
MD-4	(j)	27-Oct-14	0.14 Y	na	na
MD-5	(k)	05-May-03	na	na	na
MD-5	(k)	13-Oct-03	na	na	na
MD-5	(k)	20-Jan-04	na	na	na
DUP	(k)	20-Jan-04	na	na	na
MD-5	(k)	21-Apr-04	na	na	na
MD-5	(k)	21-Oct-04	na	na	na
MD-5	(k)	29-Mar-05	na	na	na
MD-5	(k)	21-Sep-05	na	na	na
MD-5	(j)	30-Sep-05	0.140	na	na
MD-5	(k)	13-Apr-06	na	na	na
MD-5	(k)	26-Oct-06	na	na	na
MD-5	(k)	16-Apr-07	na	na	na
MD-5	(k)	11-Oct-07	na	na	na
MD-5	(k)	23-Apr-08	na	na	na
MD-5	(k)	23-Oct-08	na	na	na
DUP	(k)	23-Oct-08	na	na	na
MD-5	(k)	24-Apr-09	na	na	na
MD-5	(k)	21-Oct-09	na	na	na
MD-5	(k)	21-Oct-09	na	na	na
MD-5	(k)	29-Apr-10	na	na	na
MD-5	(k)	29-Apr-10	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
MD-5	(k)	27-Oct-10	na	na	na
MD-5	(k)	14-Nov-11	na	na	na
MD-5	(k)	17-Oct-12	na	na	na
MW-1		29-Mar-95	3.6	7.41	na
MW-1		08-Jun-95	2.6	2.1	na
MW-1		09-Jan-96	4	1.3	na
MW-1		17-Apr-96	1.1	1.7	na
MW-1		31-Jul-96	12	2.4	na
MW-1		19-Nov-96	1.5	0.85	na
MW-1		25-Mar-97	1.8	0.99	na
MW-1		10-Jun-97	1.3	0.94	na
MW-1		18-Aug-97	1.6	0.88	na
MW-1		19-Dec-97	1.2	1.1	na
MW-1		26-Feb-98	1.1	1.8	na
MW-1		08-Apr-98	< 0.5	< 0.05	na
DUP		08-Apr-98	< 0.5	< 0.05	na
MW-1		14-Jul-98	< 0.25	< 0.05	na
MW-1		21-Oct-98	< 0.25	< 0.05	na
MW-1		12-Jan-99	1.6	1.3	na
MW-1		20-Apr-99	1.3	1.5	na
MW-1		13-Jul-99	1.3 c	1	na
MW-1		11-Oct-99	0.92 c	1.2 d	na
MW-1		18-Jan-00	1.1 J	1.3 J,d	na
MW-1		24-Jan-01	na	na	na
MW-1		16-Jan-03	na	na	na
MW-1		26-Jan-06	na	na	na
MW-2		29-Mar-95	4.4	3	na
MW-2		08-Jun-95	3.8	1.3	na
MW-2		09-Jan-96	2.5	0.9	na
MW-2		17-Apr-96	4.6	0.62	na
MW-2		31-Jul-96	3.2	0.71	na
MW-2		19-Nov-96	3.2	0.37	na
MW-2		25-Mar-97	3.3	0.52	na
MW-2		10-Jun-97	1.5	0.5	na
MW-2		18-Aug-97	1.8	0.73	na
MW-2		19-Dec-97	1.5	0.4	na
MW-2		26-Feb-98	2.4	0.45	na
MW-2		08-Apr-98	< 0.5	< 0.05	na
MW-2		14-Jul-98	< 0.25 UJ3	< 0.05	na
MW-2		21-Oct-98	< 0.1	< 0.05	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
DUP		21-Oct-98	< 0.05	< 0.05	na
MW-2		12-Jan-99	1.1	0.33	na
MW-2		24-Jan-01	na	na	na
MW-2		08-Jan-02	na	na	na
MW-2		16-Jan-03	na	na	na
MW-2		20-Jan-04	na	na	na
MW-2		18-Jan-05	na	na	na
MW-2		25-Jan-06	na	na	na
MW-2		16-Apr-07	na	na	na
MW-2		17-Apr-08	na	na	na
MW-2		17-Apr-09	na	na	na
MW-2		29-Apr-10	na	na	na
MW-3		29-Mar-95	1.5	2	na
MW-3		08-Jun-95	0.55	0.43	na
MW-3		09-Jan-96	0.3	0.2	na
MW-3		17-Apr-96	0.18	0.16	na
MW-3		31-Jul-96	0.42	9.4	na
MW-3		19-Nov-96	0.46	0.47	na
MW-3		25-Mar-97	< 0.05	0.31	na
MW-3		10-Jun-97	< 0.05	0.07	na
MW-3		18-Aug-97	< 0.05	0.1	na
MW-3		19-Dec-97	0.06	0.07	na
MW-3		26-Feb-98	< 0.05	0.11	na
MW-3		07-Apr-98	< 0.05	< 0.05	na
MW-3		14-Jul-98	< 0.05	< 0.05	na
DUP		14-Jul-98	< 0.05	< 0.05	na
MW-3		20-Oct-98	< 0.05	< 0.05	na
MW-3		11-Jan-99	0.073	0.069	na
DUP		11-Jan-99	0.049	0.065	na
MW-3		19-Apr-99	0.091	0.1	na
MW-3		13-Jul-99	0.14 c	0.12	na
MW-3		11-Oct-99	0.047 i	< 0.05	na
MW-3		17-Jan-00	0.078 J	0.053	na
MW-3		28-Apr-00	na	na	na
MW-3		25-Jul-00	na	na	na
MW-3		10-Oct-00	na	na	na
MW-3		24-Jan-01	na	na	na
MW-3		09-Apr-01	na	na	na
MW-3		05-Jul-01	na	na	na
MW-3		15-Oct-01	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
MW-3		08-Jan-02	na	na	na
MW-3		08-Apr-02	na	na	na
MW-3		08-Jul-02	na	na	na
DUP		08-Jul-02	na	na	na
MW-3		09-Oct-02	na	na	na
MW-3		15-Jan-03	na	na	na
MW-3		16-Apr-03	na	na	na
MW-3		09-Jul-03	na	na	na
MW-3		28-Oct-03	na	na	na
MW-3		20-Jan-04	na	na	na
DUP		20-Jan-04	na	na	na
MW-3		04-May-04	na	na	na
MW-3		15-Jul-04	na	na	na
MW-3		13-Oct-04	na	na	na
MW-3		18-Jan-05	na	na	na
MW-3		19-Apr-05	na	na	na
MW-3		19-Jul-05	na	na	na
DUP		19-Jul-05	na	na	na
MW-3		27-Oct-05	na	na	na
MW-3		23-Jan-06	na	na	na
MW-3		17-Apr-06	na	na	na
MW-3		18-Apr-07	na	na	na
MW-3		15-Apr-08	na	na	na
MW-3		14-Apr-09	na	na	na
MW-3		28-Apr-10	na	na	na
MW-3		15-Apr-11	na	na	na
MW-3		21-Jul-11	na	na	na
MW-3		12-Oct-11	na	na	na
MW-3		23-Feb-12	na	na	na
DUP		23-Feb-12	na	na	na
MW-3		17-Apr-12	na	na	na
MW-4		29-Mar-95	2.5	1.9	na
MW-4		08-Jun-95	4.5	1.1	na
MW-4		10-Jan-96	6.3	0.7	na
MW-4		19-Nov-96	6.9	0.7	na
MW-4		18-Aug-97	9.9	1.1	na
MW-4		19-Dec-97	12	0.18	na
MW-4		02-Mar-98	3.7	0.22	na
MW-4		10-Apr-98	< 0.25	< 0.05	na
MW-4		17-Jul-98	< 0.25	< 0.05	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
MW-4		23-Oct-98	< 1	< 0.05	na
MW-4		15-Jan-99	6.6	0.27	na
MW-4		22-Apr-99	9.2	0.52	na
MW-4		16-Jul-99	9.1 c,e	0.25	na
MW-4		25-Oct-99	10 e	0.23 d,h	na
MW-4		25-Jan-00	4.2 J	0.22	na
MW-4		01-May-00	na	na	na
MW-4		25-Jul-00	na	na	na
MW-4		09-Oct-00	na	na	na
MW-4		16-Jan-01	na	na	na
MW-4		13-Apr-01	na	na	na
MW-4		06-Jul-01	na	na	na
MW-4		16-Oct-01	na	na	na
MW-4		09-Jan-02	na	na	na
MW-4		10-Apr-02	na	na	na
DUP		10-Apr-02	na	na	na
MW-4		09-Jul-02	na	na	na
MW-4		10-Oct-02	na	na	na
MW-4		15-Jan-03	na	na	na
MW-4		16-Apr-03	na	na	na
MW-4		10-Jul-03	na	na	na
MW-4		20-Jan-04	na	na	na
MW-4		06-May-04	na	na	na
MW-4		14-Jul-04	na	na	na
MW-4		13-Oct-04	na	na	na
MW-4		19-Jan-05	na	na	na
MW-4		18-Apr-05	na	na	na
MW-4		19-Jul-05	na	na	na
MW-4		27-Oct-05	na	na	na
MW-4		26-Jan-06	na	na	na
MW-4		17-Apr-06	na	na	na
MW-4		20-Apr-07	na	na	na
MW-4		18-Apr-08	na	na	na
MW-4		15-Apr-09	na	na	na
MW-4		28-Apr-10	na	na	na
MW-5		29-Mar-95	1.1	660	na
MW-5		08-Jun-95	13	38	na
MW-5		10-Jan-96	5.4	160	na
MW-5		19-Nov-96	3.7	180	na
MW-5		18-Aug-97	15	120	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
MW-5		19-Dec-97	6	160	na
MW-5		02-Mar-98	3.8	198	na
MW-5		10-Apr-98	< 0.5	250 J2	na
MW-5		17-Jul-98	< 0.5	< 10 UJ3	na
MW-5		19-Oct-98	< 5	130	na
MW-5		15-Jan-99	19	230	na
MW-5		22-Apr-99	20 cfi	190	na
MW-5		19-Jul-99	20 cfi	130 d	na
DUP		19-Jul-99	18 cfi	130 d	na
MW-5		25-Oct-99	22 i	190	na
MW-5		25-Jan-00	14 J	140 J,g	na
MW-5		01-May-00	na	na	na
MW-5		25-Jul-00	na	na	na
MW-5		09-Oct-00	na	na	na
MW-5		16-Jan-01	na	na	na
MW-5		13-Apr-01	na	na	na
DUP		13-Apr-01	na	na	na
MW-5		06-Jul-01	na	na	na
MW-5		16-Oct-01	na	na	na
DUP		16-Oct-01	na	na	na
MW-5		09-Jan-02	na	na	na
MW-5		10-Apr-02	na	na	na
MW-5		09-Jul-02	na	na	na
MW-5		10-Oct-02	na	na	na
MW-5		15-Jan-03	na	na	na
MW-5		15-Apr-03	na	na	na
MW-5		10-Jul-03	na	na	na
MW-5		28-Oct-03	na	na	na
MW-5		20-Jan-04	na	na	na
MW-5		04-May-04	na	na	na
MW-5		14-Jul-04	na	na	na
MW-5		13-Oct-04	na	na	na
MW-5		19-Jan-05	na	na	na
MW-5		18-Apr-05	na	na	na
MW-5		19-Jul-05	na	na	na
MW-5		27-Oct-05	na	na	na
MW-5		17-Apr-06	na	na	na
MW-5		17-Apr-07	na	na	na
MW-5		17-Apr-08	na	na	na
MW-5		15-Apr-09	na	na	na
DUP		15-Apr-09	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
MW-5		28-Apr-10	na	na	na
RP-1		08-Sep-94	4.4	1.9	na
RP-1		28-Feb-95	1.8	0.3	na
RP-1		29-Mar-95	0.78	< 0.05	na
RP-1		10-May-95	1.4	2.6	na
RP-1		09-Aug-95	1.4	1.4	na
RP-1		17-Nov-95	0.96	1.2	na
RP-1		10-Jan-96	0.55	0.8	na
RP-1		17-Apr-96	0.59	0.12	na
DUP		17-Apr-96	0.72	0.15	na
RP-1		31-Jul-96	1.1	1.4	na
RP-1		19-Nov-96	2.3	0.6	na
RP-1		25-Mar-97	1.2	0.68	na
RP-1		10-Jun-97	0.9	0.55	na
RP-1		18-Aug-97	1.4	1.2	na
RP-1		19-Dec-97	0.86	0.7	na
DUP		19-Dec-97	0.79	0.46	na
RP-1		26-Feb-98	0.42	< 0.05	na
DUP		26-Feb-98	0.5	< 0.05	na
RP-1		07-Apr-98	< 0.05	< 0.05	na
RP-1		14-Jul-98	< 0.05	< 0.05	na
RP-1		20-Oct-98	< 0.1	< 0.05	na
RP-1		12-Jan-99	1.1	0.063	na
RP-1		19-Apr-99	2.4	< 0.05	na
RP-1		16-Jul-99	1.2 c,e	0.14 d,h	na
RP-1		25-Oct-99	2 e	< 0.05	na
RP-1		18-Jan-00	1.5 J	< 0.05	na
RP-1		27-Apr-00	na	na	na
RP-1		25-Jul-00	na	na	na
RP-1		10-Oct-00	na	na	na
RP-1		25-Jan-01	na	na	na
RP-1		09-Apr-01	na	na	na
RP-1		05-Jul-01	na	na	na
DUP		05-Jul-01	na	na	na
RP-1		12-Oct-01	na	na	na
RP-1		08-Jan-02	na	na	na
RP-1		08-Apr-02	na	na	na
RP-1		08-Jul-02	na	na	na
RP-1		09-Oct-02	na	na	na
RP-1		15-Jan-03	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
RP-1		15-Apr-03	na	na	na
RP-1		09-Jul-03	na	na	na
RP-1		28-Oct-03	na	na	na
RP-1		19-Jan-04	na	na	na
RP-1		03-May-04	na	na	na
RP-1		15-Jul-04	na	na	na
RP-1		13-Oct-04	na	na	na
RP-1		19-Jan-05	na	na	na
RP-1		19-Apr-05	na	na	na
RP-1		19-Jul-05	na	na	na
RP-1		24-Oct-05	na	na	na
RP-1		23-Jan-06	na	na	na
RP-1		17-Apr-06	na	na	na
RP-1		18-Apr-07	na	na	na
RP-1		15-Apr-08	na	na	na
RP-1		14-Apr-09	na	na	na
RP-1		28-Apr-10	na	na	na
RP-1		15-Apr-11	na	na	na
RP-1		21-Jul-11	na	na	na
RP-1		23-Feb-12	na	na	na
RP-1		17-Apr-12	na	na	na
RP-2		08-Sep-94	0.4	0.09	na
DUP		08-Sep-94	0.3	0.09	na
RP-2		28-Feb-95	< 0.05	0.09	na
RP-2		29-Mar-95	0.4	0.07	na
RP-2		10-May-95	0.3	< 0.05	na
RP-2		09-Aug-95	0.2	< 0.05	na
RP-2		17-Nov-95	0.2	0.1	na
RP-2		10-Jan-96	0.1	0.05	na
RP-2		17-Apr-96	0.17	< 0.05	na
RP-2		31-Jul-96	< 0.05	< 0.05	na
RP-2		19-Nov-96	0.18	< 0.05	na
RP-2		25-Mar-97	0.2	< 0.05	na
RP-2		10-Jun-97	0.13	< 0.05	na
RP-2		18-Aug-97	0.17	< 0.05	na
DUP		18-Aug-97	0.16	< 0.05	na
RP-2		19-Dec-97	0.16	< 0.05	na
RP-2		26-Feb-98	0.14	< 0.05	na
RP-2		07-Apr-98	< 0.05	< 0.05	na
RP-2		13-Jul-98	< 0.05	< 0.05	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
RP-2		20-Oct-98	< 0.05	< 0.05	na
RP-2		11-Jan-99	0.22	0.053	na
RP-2		19-Apr-99	0.3	< 0.05	na
RP-2		13-Jul-99	0.21 c	< 0.05	na
RP-2		25-Oct-99	0.15 e	< 0.05	na
RP-2		18-Jan-00	0.15 J	< 0.05	na
DUP		18-Jan-00	0.13 J	< 0.05	na
RP-2		27-Apr-00	na	na	na
RP-2		25-Jul-00	na	na	na
RP-2		10-Oct-00	na	na	na
RP-2		17-Jan-01	na	na	na
RP-2		09-Apr-01	na	na	na
RP-2		05-Jul-01	na	na	na
RP-2		12-Oct-01	na	na	na
RP-2		09-Jan-02	na	na	na
RP-2		08-Apr-02	na	na	na
RP-2		08-Jul-02	na	na	na
RP-2		09-Oct-02	na	na	na
DUP		09-Oct-02	na	na	na
RP-2		14-Jan-03	na	na	na
RP-2		15-Apr-03	na	na	na
RP-2		09-Jul-03	na	na	na
DUP		09-Jul-03	na	na	na
RP-2		27-Oct-03	na	na	na
RP-2		19-Jan-04	na	na	na
RP-2		03-May-04	na	na	na
RP-2		12-Jul-04	na	na	na
RP-2		13-Oct-04	na	na	na
RP-2		17-Jan-05	na	na	na
RP-2		19-Apr-05	na	na	na
RP-2		19-Jul-05	na	na	na
RP-2		24-Oct-05	na	na	na
RP-2		23-Jan-06	na	na	na
RP-2		17-Apr-06	na	na	na
RP-2		20-Apr-07	na	na	na
DUP		20-Apr-07	na	na	na
RP-2		17-Apr-08	na	na	na
RP-2		14-Apr-09	na	na	na
RP-2		28-Apr-10	na	na	na
RP-2		15-Apr-11	na	na	na
RP-2		21-Jul-11	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
DUP		21-Jul-11	na	na	na
RP-2		12-Oct-11	na	na	na
RP-2		23-Feb-12	na	na	na
RP-2		17-Apr-12	na	na	na
RP-3		08-Sep-94	0.7	0.1	na
RP-3		28-Feb-95	1.2	0.2	na
RP-3		29-Mar-95	1.9	0.3	na
RP-3		10-May-95	1.7	0.1	na
RP-3		09-Aug-95	1.2	0.2	na
RP-3		17-Nov-95	1.1	0.1	na
RP-3		10-Jan-96	0.56	0.1	na
RP-3		17-Apr-96	0.42	0.13	na
RP-3		31-Jul-96	0.39	0.1	na
RP-3		19-Nov-96	1.2	0.07	na
RP-3		25-Mar-97	0.47	0.09	na
RP-3		10-Jun-97	0.53	0.1	na
RP-3		18-Aug-97	0.5	0.09	na
RP-3		19-Dec-97	0.48	0.08	na
RP-3		25-Feb-98	0.49	0.15	na
RP-3		07-Apr-98	< 0.05	< 0.05	na
RP-3		13-Jul-98	< 0.05	< 0.05	na
RP-3		20-Oct-98	< 0.05	< 0.05	na
DUP		20-Oct-98	< 0.05	< 0.05	na
RP-3		11-Jan-99	0.75	0.13	na
RP-3		19-Apr-99	2.5	0.32	na
RP-3		16-Jul-99	1.5 cei	0.22	na
RP-3		25-Oct-99	1.8 i	0.29 d	na
RP-3		14-Jan-00	0.33	0.18 J,d	na
RP-3		27-Apr-00	na	na	na
RP-3		25-Jul-00	na	na	na
RP-3		10-Oct-00	na	na	na
RP-3		17-Jan-01	na	na	na
RP-3		10-Apr-01	na	na	na
RP-3		03-Jul-01	na	na	na
RP-3		15-Oct-01	na	na	na
RP-3		08-Jan-02	na	na	na
RP-3		08-Apr-02	na	na	na
RP-3		08-Jul-02	na	na	na
RP-3		07-Oct-02	na	na	na
RP-3		15-Jan-03	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
RP-3		15-Apr-03	na	na	na
RP-3		09-Jul-03	na	na	na
RP-3		27-Oct-03	na	na	na
RP-3		19-Jan-04	na	na	na
DUP		19-Jan-04	na	na	na
RP-3		03-May-04	na	na	na
RP-3		14-Jul-04	na	na	na
RP-3		13-Oct-04	na	na	na
RP-3		17-Jan-05	na	na	na
RP-3		18-Apr-05	na	na	na
RP-3		18-Jul-05	na	na	na
RP-3		24-Oct-05	na	na	na
RP-3		23-Jan-06	na	na	na
RP-3		17-Apr-06	na	na	na
RP-3		18-Apr-07	na	na	na
RP-3		16-Apr-08	na	na	na
DUP		16-Apr-08	na	na	na
RP-3		14-Apr-09	na	na	na
RP-3		28-Apr-10	na	na	na
DUP		28-Apr-10	na	na	na
RP-3		17-Apr-12	na	na	na
RP-4		08-Sep-94	0.2	0.1	na
RP-4		28-Feb-95	0.07	0.08	na
DUP		28-Feb-95	0.07	0.07	na
RP-4		29-Mar-95	0.3	0.07	na
RP-4		10-May-95	0.2	< 0.05	na
DUP		10-May-95	0.2	< 0.05	na
RP-4		09-Aug-95	0.2	< 0.05	na
DUP		09-Aug-95	0.2	< 0.05	na
RP-4		17-Nov-95	0.1	< 0.05	na
DUP		17-Nov-95	0.3	< 0.05	na
RP-4		09-Jan-96	0.1	0.05	na
RP-4		17-Apr-96	0.14	< 0.05	na
RP-4		31-Jul-96	0.24	< 0.05	na
DUP		31-Jul-96	0.21	< 0.05	na
RP-4		19-Nov-96	0.12	< 0.05	na
RP-4		25-Mar-97	0.19	< 0.05	na
RP-4		10-Jun-97	0.19	< 0.05	na
DUP		10-Jun-97	0.12	< 0.05	na
RP-4		18-Aug-97	0.07	< 0.05	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
RP-4		19-Dec-97	0.07	< 0.05	na
RP-4		25-Feb-98	0.07	0.062	na
RP-4		07-Apr-98	< 0.05	< 0.05	na
RP-4		13-Jul-98	< 0.05	< 0.05	na
RP-4		20-Oct-98	< 0.05	< 0.05	na
RP-4		11-Jan-99	0.077	0.075	na
RP-4		19-Apr-99	0.11	0.068	na
RP-4		13-Jul-99	0.062 c	0.077	na
DUP		13-Jul-99	0.073 c	0.061	na
RP-4		25-Oct-99	0.099 e	< 0.05	na
RP-4		18-Jan-00	0.093 J	< 0.05	na
RP-4		27-Apr-00	na	na	na
RP-4		25-Jul-00	na	na	na
RP-4		10-Oct-00	na	na	na
RP-4		17-Jan-01	na	na	na
RP-4		09-Apr-01	na	na	na
RP-4		02-Jul-01	na	na	na
RP-4		12-Oct-01	na	na	na
RP-4		08-Jan-02	na	na	na
RP-4		08-Apr-02	na	na	na
RP-4		08-Jul-02	na	na	na
RP-4		07-Oct-02	na	na	na
RP-4		14-Jan-03	na	na	na
RP-4		15-Apr-03	na	na	na
RP-4		08-Jul-03	na	na	na
RP-4		27-Oct-03	na	na	na
RP-4		19-Jan-04	na	na	na
RP-4		03-May-04	na	na	na
RP-4		12-Jul-04	na	na	na
RP-4		13-Oct-04	na	na	na
RP-4		19-Jan-05	na	na	na
RP-4		19-Apr-05	na	na	na
RP-4		18-Jul-05	na	na	na
RP-4		24-Oct-05	na	na	na
DUP		24-Oct-05	na	na	na
RP-4		23-Jan-06	na	na	na
RP-4		18-Apr-06	na	na	na
DUP		18-Apr-06	na	na	na
RP-4		19-Apr-07	na	na	na
RP-4		16-Apr-08	na	na	na
RP-4		14-Apr-09	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
DUP		14-Apr-09	na	na	na
RP-4		28-Apr-10	na	na	na
RP-4		15-Apr-11	na	na	na
DUP		15-Apr-11	na	na	na
RP-4		21-Jul-11	na	na	na
RP-4		12-Oct-11	na	na	na
RP-4		23-Feb-12	na	na	na
RP-4		17-Apr-12	na	na	na
RP-5		08-Sep-94	0.6	0.09	na
RP-5		28-Feb-95	0.2	0.06	na
RP-5		29-Mar-95	0.8	< 0.05	na
RP-5		10-May-95	1.1	< 0.05	na
RP-5		09-Aug-95	0.69	< 0.05	na
RP-5		17-Nov-95	0.5	< 0.05	na
RP-5		09-Jan-96	0.2	< 0.05	na
DUP		09-Jan-96	0.2	< 0.05	na
RP-5		17-Apr-96	0.64	< 0.05	na
RP-5		31-Jul-96	0.79	< 0.05	na
RP-5		19-Nov-96	0.41	< 0.05	na
DUP		19-Nov-96	0.53	< 0.05	na
RP-5		25-Mar-97	0.54	< 0.05	na
DUP		25-Mar-97	0.59	< 0.05	na
RP-5		10-Jun-97	0.59	< 0.05	na
RP-5		18-Aug-97	0.67	< 0.05	na
RP-5		19-Dec-97	0.65	< 0.05	na
RP-5		26-Feb-98	0.34	0.055	na
RP-5		07-Apr-98	< 0.05	< 0.05	na
RP-5		13-Jul-98	< 0.05	< 0.05	na
RP-5		20-Oct-98	< 0.05	< 0.05	na
RP-5		12-Jan-99	0.43	0.07	na
RP-5		20-Apr-99	1	0.061	na
RP-5		13-Jul-99	0.48 c,e	0.07	na
RP-5		11-Oct-99	0.69 c,e	0.084 d	na
RP-5		18-Jan-00	0.44 J	0.087 J,d	na
RP-5		27-Apr-00	na	na	na
RP-5		25-Jul-00	na	na	na
RP-5		10-Oct-00	na	na	na
RP-5		17-Jan-01	na	na	na
RP-5		09-Apr-01	na	na	na
RP-5		02-Jul-01	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
RP-5		12-Oct-01	na	na	na
DUP		12-Oct-01	na	na	na
RP-5		09-Jan-02	na	na	na
DUP		09-Jan-02	na	na	na
RP-5		08-Apr-02	na	na	na
RP-5		08-Jul-02	na	na	na
RP-5		07-Oct-02	na	na	na
RP-5		14-Jan-03	na	na	na
RP-5		15-Apr-03	na	na	na
RP-5		08-Jul-03	na	na	na
RP-5		27-Oct-03	na	na	na
RP-5		19-Jan-04	na	na	na
RP-5		03-May-04	na	na	na
RP-5		12-Jul-04	na	na	na
RP-5		13-Oct-04	na	na	na
DUP		13-Oct-04	na	na	na
RP-5		19-Jan-05	na	na	na
RP-5		19-Apr-05	na	na	na
RP-5		18-Jul-05	na	na	na
RP-5		24-Oct-05	na	na	na
RP-5		23-Jan-06	na	na	na
RP-5		18-Apr-06	na	na	na
RP-5		20-Apr-07	na	na	na
RP-5		16-Apr-08	na	na	na
RP-5		14-Apr-09	na	na	na
RP-5		28-Apr-10	na	na	na
RP-5		15-Apr-11	na	na	na
RP-5		21-Jul-11	na	na	na
RP-5		12-Oct-11	na	na	na
RP-5		23-Feb-12	na	na	na
RP-5		17-Apr-12	na	na	na
RP-BW-02		11-Oct-99	< 0.048	0.11 g	na
RP-BW-02		20-Jan-00	< 0.05	0.1 Jg	na
RP-BW-02		28-Apr-00	na	na	na
RP-BW-02		25-Jul-00	na	na	na
RP-BW-02		10-Oct-00	na	na	na
RP-BW-02		18-Jan-01	na	na	na
DUP		18-Jan-01	na	na	na
RP-BW-02		10-Jan-02	na	na	na
DUP		10-Jan-02	na	na	na

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Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
RP-BW-02		15-Jan-03	na	na	na
RP-BW-02		20-Jan-04	na	na	na
RP-BW-02		15-Jul-04	na	na	na
RP-BW-02		19-Jan-05	na	na	na
RP-BW-02		25-Jan-06	na	na	na
RP-BW-02		17-Apr-07	na	na	na
RP-BW-02		17-Apr-08	na	na	na
RP-BW-02		15-Apr-09	na	na	na
RP-BW-02		30-Apr-10	na	na	na
SA-AW-01		14-Oct-99	0.098 c,e	< 0.05	na
SA-AW-01		13-Jan-00	0.15 J	< 0.05	na
SA-AW-01		27-Apr-00	na	na	na
SA-AW-01		24-Jul-00	na	na	na
SA-AW-01		11-Oct-00	na	na	na
SA-AW-01		25-Jan-01	na	na	na
SA-AW-01		09-Jan-02	na	na	na
SA-AW-01		17-Jan-03	na	na	na
SA-AW-01		21-Jan-04	na	na	na
SA-AW-01		20-Jan-05	na	na	na
SA-AW-01		24-Jan-06	na	na	na
SA-AW-01		19-Apr-07	na	na	na
SA-AW-01		16-Apr-08	na	na	na
DUP		16-Apr-08	na	na	na
SA-AW-01		15-Apr-09	na	na	na
SA-AW-01		27-Apr-10	na	na	na
SA-AW-02		25-Jan-01	na	na	na
SA-AW-02		10-Apr-01	na	na	na
SA-AW-02		06-Jul-01	na	na	na
SA-AW-02		15-Oct-01	na	na	na
SA-AW-02		09-Jan-02	na	na	na
SA-AW-02		17-Jan-03	na	na	na
SA-AW-02		22-Jan-04	na	na	na
SA-AW-02		20-Jan-05	na	na	na
SA-AW-02		25-Jan-06	na	na	na
SA-AW-03		12-Oct-99	< 0.05	< 0.05	na
SA-AW-03		19-Jan-00	< 0.05	< 0.05	na
SA-AW-03		27-Apr-00	na	na	na
SA-AW-03		24-Jul-00	na	na	na
SA-AW-03		11-Oct-00	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
SA-AW-03		18-Jan-01	na	na	na
SA-AW-03		09-Jan-02	na	na	na
SA-AW-03		17-Jan-03	na	na	na
SA-AW-03		21-Jan-04	na	na	na
SA-AW-03		21-Jan-05	na	na	na
SA-AW-03		25-Jan-06	na	na	na
SA-AW-04		14-Oct-99	< 0.051	< 0.05	na
SA-AW-04		19-Jan-00	< 0.05	< 0.05	na
DUP		19-Jan-00	< 0.05	< 0.05	na
SA-AW-04		27-Apr-00	na	na	na
DUP		27-Apr-00	na	na	na
SA-AW-04		24-Jul-00	na	na	na
DUP		24-Jul-00	na	na	na
SA-AW-04		11-Oct-00	na	na	na
SA-AW-04		25-Jan-01	na	na	na
SA-AW-04		09-Jan-02	na	na	na
SA-AW-04		17-Jan-03	na	na	na
SA-AW-04		21-Jan-04	na	na	na
SA-AW-04		18-Jan-05	na	na	na
DUP		18-Jan-05	na	na	na
SA-AW-04		25-Jan-06	na	na	na
SA-AW-05		14-Oct-99	< 0.051	< 0.05	na
DUP		14-Oct-99	< 0.051	< 0.05	na
SA-AW-05		19-Jan-00	< 0.05	< 0.05	na
SA-AW-05		27-Apr-00	na	na	na
SA-AW-05		24-Jul-00	na	na	na
SA-AW-05		11-Oct-00	na	na	na
DUP		11-Oct-00	na	na	na
SA-AW-05		18-Jan-01	na	na	na
SA-AW-05		09-Jan-02	na	na	na
SA-AW-05		17-Jan-03	na	na	na
DUP		17-Jan-03	na	na	na
SA-AW-05		21-Jan-04	na	na	na
SA-AW-05		18-Jan-05	na	na	na
SA-AW-05		25-Jan-06	na	na	na
SA-AW-05		20-Apr-07	na	na	na
SA-AW-05		17-Apr-09	na	na	na
SA-BW-01		14-Oct-99	1.4 i	< 0.05	na
SA-BW-01		13-Jan-00	< 0.05	< 0.05	na

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Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mglL)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil
SA-BW-01		27-Apr-00	na	na	na
SA-BW-01		24-Jul-00	na	na	na
SA-BW-01		11-Oct-00	na	na	na
DUP		11-Oct-00	na	na	na
SA-BW-01		22-Jan-01	na	na	na
SA-BW-01		10-Jan-02	na	na	na
SA-BW-01		17-Jan-03	na	na	na
SA-BW-01		21-Jan-04	na	na	na
SA-BW-01		20-Jan-05	na	na	na
SA-BW-01		24-Jan-06	na	na	na
SA-BW-01		19-Apr-07	na	na	na
SA-BW-01		16-Apr-08	na	na	na
SA-BW-01		15-Apr-09	na	na	na
SA-BW-01		26-Apr-10	na	na	na
SP-AW-06		18-Jan-01	na	na	na
SP-AW-06		09-Apr-01	na	na	na
SP-AW-06		06-Jul-01	na	na	na
SP-AW-06		15-Oct-01	na	na	na
SP-AW-06		08-Jan-02	na	na	na
DUP		08-Jan-02	na	na	na
SP-AW-06		17-Jan-03	na	na	na
SP-AW-06		20-Jan-04	na	na	na
SP-AW-06		04-May-04	na	na	na
DUP		04-May-04	na	na	na
SP-AW-06		15-Jul-04	na	na	na
SP-AW-06		14-Oct-04	na	na	na
SP-AW-06		18-Jan-05	na	na	na
SP-AW-06		19-Apr-05	na	na	na
SP-AW-06		21-Jul-05	na	na	na
SP-AW-06		25-Jan-06	na	na	na
SP-AW-06		20-Apr-07	na	na	na
SP-AW-06		18-Apr-08	na	na	na
DUP		18-Apr-08	na	na	na
SP-AW-06		14-Apr-09	na	na	na
SP-AW-06		29-Apr-10	na	na	na
DUP		29-Apr-10	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-3
Summary of Historical Total Petroleum Hydrocarbons as Diesel and Gasoline and Motor Oil in Groundwater Monitoring Wells
The Sherwin-Williams Company, Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Total Petroleum Hydrocarbons as Diesel	Total Petroleum Hydrocarbons as Gasoline	Total Petroleum Hydrocarbons as Motor Oil

Data QA/QC performed by EW.

Notes:

< = Analyte was not detected at or greater than the detection limit reported.

DUP = Duplicate sample (field duplicate).
Y = Sample exhibits chromatographic pattern that does not resemble standard.
na/ND = Data from table provided by EKI and/or SES consultants. Volatile Organic Compounds (VOCs) were not detected above reporting limits; however, individual analyte reporting limits were not provided.

a = Concentrations for LF-B1 may not represent B-zone water quality because LF-B1 is screened in the aquitard between the A- and B-zones.

b = Concentrations for LF-B5 may not represent B-zone water quality because LF-B5 is screened in the aquitard between the A- and B-zones.

c = Unknown hydrocarbon mixture with peak patterns atypical of diesel is quantified as diesel for a range of n-C10 to n-C24.

d = Unknown hydrocarbon mixture with peak patterns atypical of gasoline is quantified as gasoline for a range of n-C07 to n-C12.
e = The concentration reported for diesel is due primarily to the presence of a heavier petroleum product, possibly motor oil.
f = The concentration reported for diesel is due primarily to the presence of a lighter petroleum product (range C06-C12), possibly gasoline.
g = The concentration reported for gasoline is due to the presence of a discrete hydrocarbon peak not indicative of gasoline.
h = The concentration reported for gasoline is due primarily to the presence of a heavier hydrocarbon peak not indicative of gasoline.
i = The concentration reported for diesel is due to the presence of a discrete hydrocarbon peak not indicative of diesel.

j = SBPA well monitored by SLR consulting.

k = SBPA well monitored by EKI personnel.

l = Sample exhibits chromatographic pattern that does not resemble standard for diesel.

Data qualifiers and notes for Total Petroleum Hydrocarbon data:

J= Concentration is estimated.
J1= Concentration is estimated because the concentration exceeded the calibration range of the analytical instrument.
J2 = Concentration is estimated because the sample was analyzed outside of holding time.
J3 = Concentration is estimated because surrogate recoveries were outside of control limits.
U = Quantified as nondetect.

J11 = Concentration is estimated because it was reported at a concentration less than the detection limit.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
CDM-1		14-Feb-07	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Feb-07	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		20-Apr-07	4.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		19-Jul-07	8.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Jul-07	8.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		15-Oct-07	5.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		16-Apr-08	9.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		08-Oct-08	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		17-Apr-09	9.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Apr-09	8.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		27-Oct-09	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		26-Apr-10	9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		19-Oct-10	11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-1		18-Apr-11	7.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-101		17-Apr-12	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-101		19-Oct-12	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-101		22-Apr-13	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-101		07-Oct-13	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-101		28-Apr-14	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Apr-14	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-101		29-Oct-14	0.049	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		29-Oct-14	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-102		17-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-102		19-Oct-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-102		22-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-102		07-Oct-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-102		28-Apr-14	0.0064	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-102		29-Oct-14	0.0076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-103		18-Apr-12	0.0053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-103		22-Oct-12	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
CDM-103		24-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-103		09-Oct-13	0.0053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-103		29-Apr-14	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-103		27-Oct-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Oct-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-104		18-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-104		22-Oct-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-104		24-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-104		09-Oct-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-104		25-Apr-14	< 0.005 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-104		13-May-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-104		30-Oct-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		18-Apr-12	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		22-Oct-12	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		24-Apr-13	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		07-Oct-13	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		25-Apr-14	0.076 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		25-Apr-14	0.0053 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		13-May-14	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		13-May-14	0.059 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-105		28-Oct-14	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-106		18-Apr-12	0.85	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-106		22-Oct-12	0.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-106		24-Apr-13	0.68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-106		09-Oct-13	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Oct-13	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-106		25-Apr-14	1.3 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-106		25-Apr-14	0.11 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-106		13-May-14	1.4 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-106		13-May-14	0.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
CDM-106		28-Oct-14	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		18-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		19-Oct-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		23-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		07-Oct-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		25-Apr-14	0.029 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		25-Apr-14	0.0084 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		13-May-14	0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		13-May-14	0.022 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-107		29-Oct-14	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		18-Apr-12	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		19-Oct-12	0.053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		24-Apr-13	0.062	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		07-Oct-13	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		07-Oct-13	0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		02-Dec-13	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		02-Dec-13	0.089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		03-Jan-14	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		12-Feb-14	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		12-Feb-14	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		12-Feb-14	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		25-Apr-14	0.25 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		25-Apr-14	0.11 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Apr-14	0.24 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Apr-14	0.092 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		13-May-14	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		13-May-14	0.24 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		08-Jul-14	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Jul-14	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-108		29-Oct-14	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
CDM-109		19-Apr-12	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-109		22-Oct-12	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-109		24-Apr-13	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		24-Apr-13	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-109		09-Oct-13	0.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-109		25-Apr-14	0.24 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-109		25-Apr-14	0.26 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-109		13-May-14	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-109		13-May-14	0.24 F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-109		30-Oct-14	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-110		18-Apr-12	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Apr-12	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-110		22-Oct-12	0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-110		23-Apr-13	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-110		08-Oct-13	0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-110		24-Apr-14	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-111		18-Apr-12	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-111		22-Oct-12	3.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-111		23-Apr-13	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-111		08-Oct-13	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-111		24-Apr-14	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-112		19-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-112		24-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-112		29-Apr-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-113		19-Apr-12	5.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-113		24-Apr-13	8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-113		24-Apr-14	3.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-114		18-Apr-12	0.097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-114		19-Oct-12	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		19-Oct-12	0.087	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-114		23-Apr-13	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		23-Apr-13	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CDM-114		24-Apr-14	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		24-Apr-14	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		15-Sep-95	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		18-Oct-95	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		18-Apr-96	0.002	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
EX-1		01-Aug-96	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		18-Dec-96	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		15-Apr-97	0.072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		01-Jul-97	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		22-Sep-97	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		02-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04
EX-1		18-Dec-97	0.31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		27-Feb-98	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		09-Apr-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		17-Jul-98	< 0.01 U5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		23-Oct-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		14-Jan-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		23-Apr-99	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		16-Jul-99	0.045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		13-Oct-99	0.047	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.091
EX-1		25-Jan-00	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		26-Apr-00	0.46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		26-Jul-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		09-Oct-00	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		16-Jan-01	0.0086	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		23-Jan-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1
EX-1		16-Apr-01	0.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-1		03-Jul-01	0.03 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		16-Oct-01	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		21-Jan-02	0.055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		21-Jan-02	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		09-Apr-02	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		09-Jul-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Jul-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		12-Dec-02	260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		13-Jan-03	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		16-Apr-03	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		07-Jul-03	0.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		29-Oct-03	0.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		23-Jan-04	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		05-May-04	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		05-May-04	0.92	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		05-May-04	1.488	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		14-Jul-04	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		11-Oct-04	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		21-Jan-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		20-Apr-05	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		22-Jul-05	0.0094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		26-Oct-05	0.17 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		27-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-1		20-Apr-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		11-Sep-98	0.70	<0.20	<0.0050	<0.0050	<0.0050	<0.010	<0.00020	<0.0050	<0.010	<0.050	<0.020
EX-10		22-Oct-98	0.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		14-Jan-99	0.88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		23-Apr-99	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		15-Jul-99	2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-10		15-Oct-99	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		12-Jan-00	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		26-Apr-00	7.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		26-Jul-00	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		09-Oct-00	0.78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		16-Jan-01	2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		16-Apr-01	5.1 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		03-Jul-01	9.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		16-Oct-01	0.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		16-Jan-02	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Jan-02	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		09-Apr-02	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		09-Jul-02	5.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		07-Nov-02	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		13-Jan-03	4.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		14-Apr-03	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		07-Jul-03	4.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		07-Jul-03	7.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		29-Oct-03	6.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		23-Jan-04	8.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		06-May-04	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		14-Jul-04	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Jul-04	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		21-Jan-05	5.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		20-Apr-05	7.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		22-Jul-05	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Jul-05	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		26-Oct-05	3.3 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		27-Jan-06	7.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Jan-06	7.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-10		20-Apr-06	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		17-Apr-07	7.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		18-Apr-08	9.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		17-Apr-09	4.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-10		30-Apr-10	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-11		16-Jul-99	0.056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-12		02-Jun-99	0.0085	0.028	<0.002	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.005	<0.01	13
DUP		02-Jun-99	<0.005	0.026	<0.002	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.005	<0.01	13
EX-12		13-Jul-99	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-12		25-Oct-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-13		02-Jun-99	0.077	0.073	<0.002	<0.005	<0.003	<0.01	<0.0002	0.0085	<0.005	<0.01	0.03
EX-13		16-Jul-99	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		08-Oct-99	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Oct-99	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		25-Jan-00	0.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		26-Apr-00	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		26-Jul-00	0.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		09-Oct-00	0.093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		16-Jan-01	0.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Jan-01	0.27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		13-Apr-01	<0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		03-Jul-01	0.077 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		12-Oct-01	0.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		17-Jan-02	0.31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		09-Apr-02	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		10-Jul-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		18-Dec-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		14-Jan-03	0.35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		14-Apr-03	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		07-Jul-03	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-14		29-Oct-03	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		23-Jan-04	0.046	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		06-May-04	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		14-Jul-04	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		14-Oct-04	0.0065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		21-Jan-05	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		20-Apr-05	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		22-Jul-05	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		26-Oct-05	0.076 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		26-Oct-05	0.087 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		27-Jan-06	0.067	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-14		20-Apr-06	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		25-Jan-00	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		26-Apr-00	0.0071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		26-Apr-00	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		26-Jul-00	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		09-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		16-Jan-01	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		13-Apr-01	0.0073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		03-Jul-01	0.0083 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		12-Oct-01	0.078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		17-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		09-Apr-02	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		09-Jul-02	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		18-Dec-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		13-Jan-03	0.0089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		14-Apr-03	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		07-Jul-03	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		29-Oct-03	0.052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		23-Jan-04	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-15		06-May-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		14-Jul-04	0.0097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		14-Oct-04	0.0088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		21-Jan-05	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		20-Apr-05	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		22-Jul-05	0.0065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		26-Oct-05	0.038 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		27-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-15		20-Apr-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		25-Jan-00	5.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		26-Apr-00	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		26-Jul-00	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		09-Oct-00	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		16-Jan-01	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		13-Apr-01	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		03-Jul-01	1.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		12-Oct-01	3.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		16-Jan-02	0.047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		12-Apr-02	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		12-Apr-02	4.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		09-Jul-02	3.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		07-Nov-02	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		07-Nov-02	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		14-Jan-03	3.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		14-Apr-03	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		07-Jul-03	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		29-Oct-03	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		23-Jan-04	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		06-May-04	5.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		14-Jul-04	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-16		14-Oct-04	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		21-Jan-05	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		20-Apr-05	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		22-Jul-05	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		26-Oct-05	2.5 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		27-Jan-06	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Jan-06	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-16		20-Apr-06	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		15-Sep-95	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		18-Oct-95	< 0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		18-Apr-96	9.3	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
EX-2		01-Aug-96	57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		18-Dec-96	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		04-Feb-97	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		15-Apr-97	44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		01-Jul-97	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		22-Sep-97	42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		02-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.01
EX-2		22-Dec-97	36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		02-Mar-98	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		09-Apr-98	51.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		17-Jul-98	6.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		23-Oct-98	0.0070	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		14-Jan-99	8.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		23-Apr-99	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		15-Jul-99	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		14-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		12-Jan-00	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		26-Apr-00	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		26-Jul-00	6.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		26-Jul-00	4.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		09-Oct-00	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		16-Jan-01	5.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		16-Apr-01	7.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		03-Jul-01	0.0065 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		12-Oct-01	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		16-Jan-02	4.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		09-Apr-02	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		09-Jul-02	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		08-Oct-02	0.049	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		13-Jan-03	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		14-Apr-03	3.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		07-Jul-03	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		29-Oct-03	0.57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		23-Jan-04	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		06-May-04	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		14-Jul-04	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		11-Oct-04	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		21-Jan-05	0.43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		20-Apr-05	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		22-Jul-05	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		26-Oct-05	0.031 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		27-Jan-06	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-2		20-Apr-06	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		15-Sep-95	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		18-Oct-95	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		18-Apr-96	200	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
EX-3		01-Aug-96	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		18-Dec-96	270	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		15-Apr-97	220	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-3		01-Jul-97	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		22-Sep-97	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		02-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02
EX-3		19-Dec-97	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		02-Mar-98	240	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		09-Apr-98	141	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		17-Jul-98	< 125 U5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		22-Oct-98	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Oct-98	122	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		14-Jan-99	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		23-Apr-99	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		16-Jul-99	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		13-Oct-99	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
EX-3		25-Jan-00	72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		26-Apr-00	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		26-Jul-00	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		09-Oct-00	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Oct-00	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		16-Jan-01	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		23-Jan-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
EX-3		13-Apr-01	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		03-Jul-01	120 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		12-Oct-01	87	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		16-Jan-02	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		09-Apr-02	97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		30-Aug-02	44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		08-Oct-02	74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		13-Jan-03	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		16-Apr-03	95	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		07-Jul-03	98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-3		29-Oct-03	78	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		23-Jan-04	86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		06-May-04	72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		14-Jul-04	77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		11-Oct-04	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		21-Jan-05	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		20-Apr-05	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		22-Jul-05	72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		26-Oct-05	75 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		27-Jan-06	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-3		20-Apr-06	94	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		11-Sep-98	0.0062	< 0.20	< 0.0050	< 0.0050	< 0.0050	< 0.010	< 0.00020	< 0.0050	< 0.010	< 0.050	< 0.020
EX-4		22-Oct-98	< 0.0094 U5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		14-Jan-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Jan-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		23-Apr-99	0.065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		15-Jul-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		15-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		12-Jan-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		26-Apr-00	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		26-Jul-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		09-Oct-00	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		16-Jan-01	0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		16-Apr-01	0.01 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		03-Jul-01	0.053 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		16-Oct-01	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		09-Jan-02	0.064	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		09-Apr-02	0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		09-Jul-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		12-Dec-02	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-4		13-Jan-03	0.053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		14-Apr-03	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		08-Jul-03	0.045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		29-Oct-03	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		29-Oct-03	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		23-Jan-04	0.0099	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		06-May-04	0.00943	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		06-May-04	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		14-Jul-04	0.095	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		11-Oct-04	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		11-Oct-04	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		21-Jan-05	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		20-Apr-05	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		22-Jul-05	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		26-Oct-05	0.6 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		27-Jan-06	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-4		20-Apr-06	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		11-Sep-98	0.072	< 0.20	< 0.0050	< 0.0050	< 0.0050	< 0.010	< 0.00020	< 0.0050	< 0.010	< 0.050	< 0.020
EX-5		22-Oct-98	0.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		14-Jan-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		23-Apr-99	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		19-Jul-99	0.0086	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		15-Oct-99	0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		12-Jan-00	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		26-Apr-00	6.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		26-Jul-00	0.049	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		09-Oct-00	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		16-Jan-01	4.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		16-Apr-01	0.72 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		03-Jul-01	0.056 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		03-Jul-01	0.11 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		16-Oct-01	0.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		21-Jan-02	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		09-Apr-02	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		09-Jul-02	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		08-Oct-02	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		13-Jan-03	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		14-Apr-03	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		07-Jul-03	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		29-Oct-03	0.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		23-Jan-04	0.0081	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		06-May-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		14-Jul-04	0.91	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		14-Oct-04	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		21-Jan-05	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		20-Apr-05	2.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		22-Jul-05	0.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		26-Oct-05	0.0071 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		27-Jan-06	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-5		20-Apr-06	0.0062	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		11-Sep-98	4.3	<0.20	<0.0050	<0.0050	<0.0050	<0.010	<0.00020	<0.0050	<0.010	<0.050	<0.020
DUP		11-Sep-98	4.2	<0.20	<0.0050	<0.0050	<0.0050	<0.010	<0.00020	<0.0050	<0.010	<0.050	<0.020
EX-6		22-Oct-98	7.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		15-Jan-99	5.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		23-Apr-99	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		23-Apr-99	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		19-Jul-99	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		12-Oct-99	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
EX-6		21-Jan-00	6.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		26-Apr-00	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-6		26-Jul-00	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		26-Jul-00	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		09-Oct-00	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		16-Jan-01	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		23-Jan-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
EX-6		13-Apr-01	8.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		03-Jul-01	0.14 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		16-Oct-01	8.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		16-Jan-02	5.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		09-Apr-02	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		09-Jul-02	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		10-Oct-02	7.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		13-Jan-03	9.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		13-Jan-03	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		14-Apr-03	7.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Apr-03	9.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		07-Jul-03	5.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		29-Oct-03	3.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		23-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		23-Jan-04	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		06-May-04	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		06-May-04	18.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		14-Jul-04	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		11-Oct-04	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		21-Jan-05	6.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		20-Apr-05	9.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		22-Jul-05	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		26-Oct-05	0.28 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		27-Jan-06	3.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		20-Apr-06	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-6		30-Aug-06	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6	(d)	17-Apr-07	0.024	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		17-Apr-07	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		16-Oct-07	5.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		18-Apr-08	0.58	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		08-Oct-08	4.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		17-Apr-09	5.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		26-Oct-09	8.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		26-Oct-09	6.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		27-Apr-10	4.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-6		19-Oct-10	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		11-Sep-98	138	< 0.40	< 0.010	< 0.010	< 0.0050	< 0.020	< 0.00020	< 0.0050	< 0.020	< 0.10	< 0.040
EX-7		22-Oct-98	12.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		14-Jan-99	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		23-Apr-99	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		15-Jul-99	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		15-Oct-99	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		19-Jan-00	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		26-Apr-00	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		26-Jul-00	57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		09-Oct-00	74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		16-Jan-01	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		13-Apr-01	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		03-Jul-01	17 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		16-Oct-01	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Oct-01	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		16-Jan-02	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		09-Apr-02	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		09-Jul-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		15-Aug-02	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-7		07-Nov-02	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		13-Jan-03	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		14-Apr-03	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		07-Jul-03	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		29-Oct-03	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		23-Jan-04	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		06-May-04	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		14-Jul-04	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		14-Oct-04	8.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		21-Jan-05	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		20-Apr-05	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		22-Jul-05	8.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		26-Oct-05	4.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		27-Jan-06	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Jan-06	14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		20-Apr-06	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Apr-06	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		17-Apr-07	9.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		18-Apr-08	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		17-Apr-09	13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-7		30-Apr-10	8.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		30-Apr-10	3.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		11-Sep-98	364	< 0.80	< 0.020	< 0.020	< 0.0050	< 0.040	< 0.00020	< 0.0050	< 0.040	< 0.20	0.44
EX-8		22-Oct-98	133	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		14-Jan-99	57	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		23-Apr-99	450	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		19-Jul-99	430	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		15-Oct-99	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		21-Jan-00	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		26-Apr-00	410	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-8		26-Jul-00	340	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		09-Oct-00	390	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		16-Jan-01	720	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		16-Apr-01	570 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Apr-01	590 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		03-Jul-01	260 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		16-Oct-01	570	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		09-Jan-02	690	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		10-Apr-02	550	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		18-Dec-02	99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		13-Jan-03	320	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		14-Apr-03	690	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		07-Jul-03	740	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		29-Oct-03	740	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		23-Jan-04	710	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		05-May-04	964	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		05-May-04	900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		14-Jul-04	710	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		14-Oct-04	840	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		21-Jan-05	640	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		20-Apr-05	730	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		22-Jul-05	320	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		26-Oct-05	710 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		27-Jan-06	630	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		20-Apr-06	410	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		30-Aug-06	160	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8	(d)	18-Apr-07	470	0.065	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		18-Apr-07	450	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		17-Oct-07	460	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		18-Apr-08	53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-8		08-Oct-08	430	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		17-Apr-09	540	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		28-Oct-09	790	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		30-Apr-10	550	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-8		19-Oct-10	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		11-Sep-98	109	< 0.20	< 0.0050	< 0.0050	< 0.0050	< 0.010	< 0.00020	< 0.0050	< 0.010	< 0.050	0.44
EX-9		22-Oct-98	28.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		14-Jan-99	140	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		23-Apr-99	240	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		15-Jul-99	140	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		14-Oct-99	95	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		21-Jan-00	94	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		21-Jan-00	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		26-Apr-00	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		26-Jul-00	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		09-Oct-00	66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		16-Jan-01	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		13-Apr-01	220	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		03-Jul-01	190 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		12-Oct-01	99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		21-Jan-02	270	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		09-Apr-02	240	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		30-Aug-02	200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		12-Dec-02	81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		13-Jan-03	280	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		14-Apr-03	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		07-Jul-03	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		29-Oct-03	160	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		23-Jan-04	310	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		06-May-04	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
EX-9		14-Jul-04	160	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		14-Oct-04	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		21-Jan-05	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		20-Apr-05	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		22-Jul-05	99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		26-Oct-05	37 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		27-Jan-06	140	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		20-Apr-06	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9	(d)	17-Apr-07	31	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		17-Apr-07	88	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		18-Apr-08	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		17-Apr-09	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
EX-9		30-Apr-10	59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-1		01-Jun-89	200	NA	NA	< 0.04	< 0.3	NA	NA	NA	NA	NA	0.59
LF-1		07-Dec-89	190	NA	NA	< 0.04	< 0.3	NA	NA	NA	NA	NA	0.02
LF-1		20-Jul-90	120	0.06	NA	< 0.05	< 0.2	NA	NA	NA	NA	NA	0.26
LF-1		20-Jun-91	58	NA	NA	< 0.005	< 0.004	NA	NA	NA	NA	NA	0.236
LF-1		09-Jul-92	53.2	< 0.1	NA	0.058	< 0.04	< 0.01	< 0.00027	< 0.005	< 0.01	NA	NA
LF-1		09-Jun-93	39.8	< 0.1	NA	< 0.03	0.0039	< 0.01	< 0.0002	< 0.05	< 0.01	NA	NA
LF-10		07-Dec-89	0.65	NA	NA	< 0.04	< 0.3	NA	NA	NA	NA	NA	< 0.01
LF-10		19-Jul-90	0.012	0.11	NA	< 0.05	< 0.2	NA	NA	NA	NA	NA	< 0.05
DUP		19-Jul-90	0.008	0.14	NA	< 0.05	< 0.3	NA	NA	NA	NA	NA	0.07
LF-10		21-Dec-90	1	0.33	NA	0.0009	< 0.2	NA	NA	NA	NA	NA	< 0.05
DUP		21-Dec-90	1.1	0.35	NA	0.0007	< 0.3	NA	NA	NA	NA	NA	0.07
LF-10		20-Jun-91	0.657	NA	NA	< 0.005	0.013	NA	NA	NA	NA	NA	0.064
LF-10		06-Aug-91	1.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		18-Dec-91	0.704	NA	NA	< 0.005	< 0.003	< 0.010	NA	NA	NA	NA	0.028
DUP		18-Dec-91	0.549	NA	NA	< 0.005	< 0.003	< 0.010	NA	NA	NA	NA	< 0.020
LF-10		09-Jul-92	0.328	< 0.1	NA	< 0.005	< 0.04	< 0.01	< 0.00027	< 0.025	< 0.01	NA	NA
LF-10		31-Dec-92	0.55	< 0.1	NA	< 0.005	< 0.04	< 0.01	< 0.0002	< 0.005	< 0.01	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		31-Dec-92	0.552	<0.1	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-10		09-Jun-93	0.958	0.249	NA	<0.005	<0.003	<0.01	<0.0002	<0.05	<0.01	NA	NA
LF-10		06-Jan-94	0.94	0.19	NA	<0.001	<0.001	<0.002	<0.0002	<0.004	0.002	NA	NA
DUP		06-Jan-94	0.82	0.18	NA	<0.001	0.001	<0.002	<0.0002	<0.004	0.002	NA	NA
LF-10		01-Aug-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.3
LF-10		20-Nov-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.13
LF-10		02-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02
LF-10		27-Feb-98	0.77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		15-Jan-99	0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		13-Oct-99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
LF-10		18-Jan-00	0.72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		23-Jan-01	0.63	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
LF-10		08-Jan-02	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		16-Jan-03	0.99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		22-Jan-04	0.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		05-May-04	1.597	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		14-Oct-04	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		20-Jan-05	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		24-Jan-06	0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		28-Aug-06	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		17-Apr-07	0.64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10	(d)	17-Apr-07	0.16	0.56	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Apr-07	0.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		16-Oct-07	0.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		08-Oct-08	0.89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		15-Apr-09	0.82	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		26-Oct-09	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		26-Apr-10	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-10		19-Oct-10	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		05-Dec-89	<0.07 U5	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	0.02

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-11		19-Jul-90	0.007	0.12	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-11		21-Dec-90	0.011	0.18	NA	0.0006	<0.2	NA	NA	NA	NA	NA	<0.05
LF-11		21-Jun-91	0.023	NA	NA	<0.005	0.007	NA	NA	NA	NA	NA	<0.02
LF-11		21-Jun-91	0.024	NA	NA	<0.005	0.006	NA	NA	NA	NA	NA	<0.02
LF-11		06-Aug-91	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		17-Dec-91	0.011	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	<0.020
LF-11		09-Jul-92	<0.01	0.169	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-11		31-Dec-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-11		09-Jun-93	0.0116	0.152	NA	<0.005	<0.003	<0.01	<0.0002	<0.05	<0.01	NA	NA
LF-11		05-Jan-94	0.019	0.13	NA	<0.001	<0.001	<0.002	<0.0002	<0.004	0.001	NA	NA
LF-11		16-Apr-96	0.048	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-11		31-Jul-96	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		20-Nov-96	0.45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		18-Mar-97	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Mar-97	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		11-Jun-97	0.62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		19-Aug-97	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Aug-97	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		17-Dec-97	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		02-Mar-98	2.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		10-Apr-98	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-Apr-98	2.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		16-Jul-98	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		23-Oct-98	2.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		14-Jan-99	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		22-Apr-99	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Apr-99	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		16-Jul-99	2.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		12-Oct-99	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
DUP		12-Oct-99	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-11		20-Jan-00	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		01-May-00	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		24-Jul-00	2.4 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		11-Oct-00	2.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		22-Jan-01	0.65	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.067
LF-11		10-Apr-01	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-Apr-01	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		06-Jul-01	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		16-Oct-01	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		09-Jan-02	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		04-Apr-02	1.483	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		10-Apr-02	1.7 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		09-Jul-02	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		10-Oct-02	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		20-Jan-03	1.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		16-Apr-03	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		10-Jul-03	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		28-Oct-03	2.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		21-Jan-04	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		04-May-04	1.331	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		04-May-04	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		15-Jul-04	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		11-Oct-04	2.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		20-Jan-05	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		20-Apr-05	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Apr-05	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		21-Jul-05	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		26-Oct-05	1.9 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		24-Jan-06	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		07-Jul-06	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-11		29-Aug-06	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		19-Apr-07	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		17-Oct-07	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		16-Apr-08	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		08-Oct-08	2.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		15-Apr-09	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		26-Oct-09	1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		27-Apr-10	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-11		19-Oct-10	1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		06-Dec-89	< 0.07 U5	NA	NA	< 0.04	< 0.3	NA	NA	NA	NA	NA	0.02
LF-12		18-Jul-90	0.004	0.06	NA	< 0.05	< 0.3	NA	NA	NA	NA	NA	< 0.2
LF-12		19-Jun-91	< 0.01	NA	NA	< 0.005	< 0.004	NA	NA	NA	NA	NA	< 0.02
LF-12		16-Dec-91	< 0.010	NA	NA	< 0.005	< 0.003	< 0.010	NA	NA	NA	NA	0.024
LF-12		08-Jul-92	< 0.01	< 0.1	NA	< 0.005	< 0.04	< 0.01	< 0.00027	< 0.005	< 0.01	NA	NA
LF-12		30-Dec-92	0.014	< 0.1	NA	< 0.005	< 0.04	< 0.01	< 0.0002	< 0.005	< 0.01	NA	NA
LF-12		08-Jun-93	0.0152	< 0.1	NA	< 0.005	< 0.003	< 0.01	< 0.0002	< 0.05	< 0.01	NA	NA
LF-12		06-Jan-94	0.013	0.06	NA	< 0.001	< 0.001	0.006	< 0.0002	0.005	< 0.001	NA	NA
LF-12		16-Apr-96	0.043	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
LF-12		30-Jul-96	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		30-Jul-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.81
LF-12		20-Nov-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.1
LF-12		20-Nov-96	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		17-Mar-97	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		01-Jul-97	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		01-Jul-97	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		20-Aug-97	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		02-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.03
LF-12		18-Dec-97	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		26-Feb-98	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		08-Apr-98	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-12		14-Jul-98	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		21-Oct-98	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		12-Jan-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		20-Apr-99	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		14-Jul-99	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		11-Oct-99	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		18-Jan-00	0.0096	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		24-Jan-01	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		09-Jan-02	0.0087	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		03-Apr-02	0.00942	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		16-Jan-03	0.0089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		20-Jan-04	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		18-Jan-05	0.0063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		26-Jan-06	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		29-Aug-06	0.0094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		17-Apr-07	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12	(d)	17-Apr-07	0.063	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		15-Oct-07	0.0059	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Oct-07	0.0051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		18-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		07-Oct-08	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		13-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		13-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		28-Oct-09	0.0055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		29-Apr-10	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		19-Oct-10	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		18-Apr-12	0.0077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		23-Apr-13	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-12		24-Apr-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		06-Dec-89	<0.07 U5	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	0.02

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-13		18-Jul-90	<0.002	<0.05	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-13		19-Dec-90	<0.002	0.1	NA	<0.0005	<0.2	NA	NA	NA	NA	NA	<0.05
LF-13		19-Jun-91	<0.01	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	<0.02
LF-13		16-Dec-91	<0.010	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	<0.020
LF-13		09-Jul-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-13		30-Dec-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-13		08-Jun-93	<0.01	<0.1	NA	<0.005	<0.003	<0.01	<0.0002	<0.05	<0.01	NA	NA
LF-13		05-Jan-94	0.003	0.04	NA	<0.005	<0.001	<0.002	<0.0002	<0.004	<0.001	NA	NA
LF-13		16-Apr-96	<0.002	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-13		30-Jul-96	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		30-Jul-96	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		20-Nov-96	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		17-Mar-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Mar-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		12-Jun-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		19-Aug-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		18-Dec-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		25-Feb-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		07-Apr-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		07-Apr-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		13-Jul-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		19-Oct-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		11-Jan-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		19-Apr-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Apr-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		13-Jul-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		12-Oct-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
LF-13		14-Jan-00	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		18-Jan-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
DUP		18-Jan-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-13		10-Jan-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-Jan-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		16-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		20-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		18-Jan-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		25-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		16-Apr-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Apr-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-13		13-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-14		04-Sep-90	0.092	0.06	NA	<0.0005	0.007	NA	NA	NA	NA	NA	<0.05
LF-14		02-Oct-90	0.077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-14		20-Dec-90	0.15	0.47	NA	0.0036	<0.2	NA	NA	NA	NA	NA	0.41
LF-14		20-Jun-91	0.095	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	<0.02
LF-14		17-Dec-91	0.104	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	<0.020
LF-14		31-Dec-92	0.121	<0.1	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-14		09-Jun-93	0.102	<0.1	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-15		04-Sep-90	0.002	0.06	NA	<0.0005	0.043	NA	NA	NA	NA	NA	<0.05
LF-15		20-Dec-90	0.007	0.23	NA	0.0007	<0.2	NA	NA	NA	NA	NA	0.1
LF-15		20-Jun-91	<0.01	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	<0.02
LF-15		17-Dec-91	<0.010	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	0.026
LF-15		08-Jul-92	<0.01	0.105	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-15		30-Dec-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-15		09-Jun-93	<0.01	<0.1	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-16		04-Sep-90	0.003	0.06	NA	<0.0005	<0.002	NA	NA	NA	NA	NA	<0.05
LF-16		20-Dec-90	0.003	0.17	NA	0.0007	<0.2	NA	NA	NA	NA	NA	0.07
LF-16		20-Jun-91	0.01	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	<0.02
LF-16		17-Dec-91	<0.010	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	0.025
LF-16		09-Jul-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-16		30-Dec-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-16		09-Jun-93	< 0.01	< 0.1	NA	< 0.005	< 0.003	< 0.01	< 0.0002	< 0.005	< 0.01	NA	NA
LF-17		24-Nov-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.01
LF-17		02-Mar-98	65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		10-Apr-98	80.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		16-Jul-98	58.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		23-Oct-98	76.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		15-Jan-99	46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		22-Apr-99	45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		16-Jul-99	59	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		13-Oct-99	66	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
DUP		13-Oct-99	67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		20-Jan-00	51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		23-Jan-01	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
LF-17		10-Jan-02	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		20-Jan-03	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		22-Jan-04	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		20-Jan-05	37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		24-Jan-06	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		30-Aug-06	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		18-Apr-07	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		17-Oct-07	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Oct-07	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		15-Apr-08	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		09-Oct-08	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Oct-08	42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		15-Apr-09	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		27-Oct-09	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		26-Apr-10	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		26-Apr-10	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-17		19-Oct-10	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-18		11-Apr-96	0.012	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-18		30-Jul-96	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		20-Nov-96	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		19-Mar-97	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		11-Jun-97	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		11-Jun-97	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		19-Aug-97	0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		25-Nov-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.01
LF-18		17-Dec-97	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		27-Feb-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		08-Apr-98	0.0066	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		15-Jul-98	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Jul-98	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		21-Oct-98	0.0091	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		13-Jan-99	0.0068	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		21-Apr-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		21-Apr-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		14-Jul-99	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		13-Oct-99	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
LF-18		19-Jan-00	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		22-Jan-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
LF-18		10-Jan-02	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		20-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		21-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		05-May-04	0.00306	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		19-Jan-05	0.0077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		24-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		20-Apr-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		16-Oct-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		14-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-18		16-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		27-Apr-10	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		16-Apr-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Apr-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		23-Apr-13	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-18		29-Apr-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		13-Jun-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		19-Aug-97	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		01-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.19
LF-19		27-Feb-98	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		08-Apr-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		15-Jul-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		23-Oct-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		23-Oct-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		13-Jan-99	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		20-Apr-99	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		14-Jul-99	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-19		15-Oct-99	0.0094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-2		02-Jun-89	2.6	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	0.01
LF-2		07-Dec-89	17	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	<0.01
LF-2		20-Jul-90	110	0.45	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-20		11-Apr-96	<0.002	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-20		30-Jul-96	0.085	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		21-Nov-96	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		18-Mar-97	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		11-Jun-97	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		19-Aug-97	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		01-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01
LF-20		18-Dec-97	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		27-Feb-98	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-20		09-Apr-98	0.075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Apr-98	0.093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		16-Jul-98	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		23-Oct-98	0.056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		13-Jan-99	0.096	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		13-Jan-99	0.079	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		21-Apr-99	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		15-Jul-99	0.094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		14-Oct-99	0.081	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		20-Jan-00	0.092	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		01-May-00	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		24-Jul-00	0.15 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		11-Oct-00	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		22-Jan-01	0.079	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
LF-20		10-Apr-01	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		06-Jul-01	< 0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		15-Oct-01	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		09-Jan-02	0.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		09-Apr-02	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		09-Jul-02	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		10-Oct-02	0.086	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		20-Jan-03	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		16-Apr-03	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		09-Jul-03	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		28-Oct-03	0.073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		21-Jan-04	0.096	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		04-May-04	1.097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		04-May-04	0.067	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		15-Jul-04	0.083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		11-Oct-04	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-20		19-Jan-05	0.33	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		19-Apr-05	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Apr-05	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		21-Jul-05	0.047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		26-Oct-05	0.11 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		24-Jan-06	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		19-Apr-06	0.054	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Apr-06	0.053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		28-Aug-06	0.075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		17-Apr-07	0.065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		16-Oct-07	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		14-Apr-08	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		08-Oct-08	0.072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		17-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		27-Oct-09	0.055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		27-Apr-10	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Apr-10	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-20		18-Oct-10	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		10-Apr-96	<0.002	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-21		31-Jul-96	0.43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		21-Nov-96	0.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		18-Mar-97	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		11-Jun-97	0.43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		19-Aug-97	0.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		02-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02
LF-21		17-Dec-97	0.48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		02-Mar-98	0.35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		02-Mar-98	0.41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		09-Apr-98	0.36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		16-Jul-98	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-21		23-Oct-98	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		14-Jan-99	0.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		22-Apr-99	<0.093 U5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		15-Jul-99	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Jul-99	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		12-Oct-99	0.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
LF-21		20-Jan-00	0.059	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		27-Apr-00	0.077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		24-Jul-00	0.012 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		11-Oct-00	0.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		23-Jan-01	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
DUP		23-Jan-01	0.2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		10-Apr-01	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		06-Jul-01	<0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		18-Oct-01	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		09-Jan-02	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		08-Apr-02	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		09-Jul-02	0.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		10-Oct-02	0.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		16-Jan-03	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		16-Apr-03	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Apr-03	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		09-Jul-03	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		28-Oct-03	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		21-Jan-04	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		04-May-04	0.393	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		04-May-04	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		15-Jul-04	0.093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		14-Oct-04	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Oct-04	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-21		20-Jan-05	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		19-Apr-05	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		21-Jul-05	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		26-Oct-05	0.12 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		23-Jan-06	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		19-Apr-06	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		28-Aug-06	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		19-Apr-07	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-21		17-Oct-07	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		01-Aug-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.1
LF-22		20-Nov-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.19
LF-22		24-Nov-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.01
LF-22		02-Mar-98	160	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		10-Apr-98	147	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		15-Jan-99	84	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		20-Jan-00	41	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		02-Feb-01	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		08-Jan-02	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		20-Jan-03	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		22-Jan-04	8.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		20-Jan-05	6.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		25-Jan-06	6.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		30-Aug-06	4.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		18-Apr-07	4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		15-Oct-07	4.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		15-Apr-08	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		09-Oct-08	4.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		09-Oct-08	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		17-Apr-09	3.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		27-Oct-09	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		27-Oct-09	3.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		30-Apr-10	2.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-22		19-Oct-10	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		10-Apr-96	< 0.002	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
DUP		10-Apr-96	0.004	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
LF-23		02-Aug-96	< 0.009 U5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		21-Nov-96	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		18-Mar-97	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		11-Jun-97	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		20-Aug-97	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		18-Dec-97	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		26-Feb-98	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		08-Apr-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		15-Jul-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		21-Oct-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		12-Jan-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		21-Apr-99	0.0085	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		14-Jul-99	0.0068	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		21-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-23		11-Oct-00	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		11-Apr-96	0.005	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
LF-24		02-Aug-96	< 0.01 U5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		21-Nov-96	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		18-Mar-97	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		11-Jun-97	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		20-Aug-97	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		18-Dec-97	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		26-Feb-98	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		08-Apr-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		15-Jul-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-24		21-Oct-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		12-Jan-99	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		21-Apr-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		14-Jul-99	0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		21-Jul-00	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		21-Jul-00	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		11-Oct-00	0.0065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		01-Nov-04	0.0086	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		29-Aug-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		19-Apr-07	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		15-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		16-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		23-Feb-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		16-Apr-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		19-Apr-13	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-24		13-May-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		13-May-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		11-Apr-96	<0.002	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-25		02-Aug-96	0.07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		21-Nov-96	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		18-Mar-97	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		11-Jun-97	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		20-Aug-97	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		18-Dec-97	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		26-Feb-98	0.094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		08-Apr-98	0.055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		15-Jul-98	0.063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		21-Oct-98	0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		12-Jan-99	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		21-Apr-99	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-25		14-Jul-99	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		21-Jul-00	0.12 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		11-Oct-00	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		01-Nov-04	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		29-Aug-06	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		19-Apr-07	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		15-Oct-07	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		15-Apr-08	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Apr-08	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		22-Oct-08	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Oct-08	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		16-Apr-09	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		23-Feb-12	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		16-Apr-12	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		19-Apr-13	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Apr-13	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-25		13-May-14	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		01-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.01
LF-26		27-Feb-98	0.07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		09-Apr-98	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		16-Jul-98	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		23-Oct-98	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		13-Jan-99	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		21-Apr-99	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Jul-99	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		14-Oct-99	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		20-Jan-00	0.073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Jan-00	0.06	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		22-Jan-01	0.078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		09-Jan-02	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-26		20-Jan-03	0.088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		21-Jan-04	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		19-Jan-05	0.091	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		26-Jan-06	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		28-Aug-06	0.087	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26	(d)	17-Apr-07	0.045	0.68	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		17-Apr-07	0.047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		16-Oct-07	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		14-Apr-08	0.095	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		08-Oct-08	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		16-Apr-09	0.097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		27-Oct-09	0.073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		26-Apr-10	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		18-Oct-10	0.063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Oct-10	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-26		18-Apr-11	0.082	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Apr-11	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		29-Dec-97	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		26-Feb-98	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		08-Apr-98	0.0097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		14-Jul-98	0.0080	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		21-Oct-98	0.0086	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		12-Jan-99	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		20-Apr-99	0.0068	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		14-Jul-99	0.0057	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Jul-99	0.0064	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		11-Oct-99	0.0094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		17-Jan-00	0.0092	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Jan-00	0.0093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		24-Jan-01	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-27		09-Apr-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		09-Jan-02	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Jan-02	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		03-Apr-02	0.00776	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		16-Jan-03	0.0076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27	(c)	20-Jan-04	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		14-Jul-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Jul-04	0.0074	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		18-Jan-05	0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		26-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		17-Apr-07	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		15-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		13-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-27		29-Apr-10	0.0051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		29-Dec-97	0.66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		26-Feb-98	0.51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		08-Apr-98	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		14-Jul-98	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		21-Oct-98	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		12-Jan-99	0.35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		12-Jan-99	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		20-Apr-99	0.42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		14-Jul-99	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		11-Oct-99	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		17-Jan-00	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		28-Apr-00	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		25-Jul-00	0.33 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		10-Oct-00	0.31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		24-Jan-01	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		09-Apr-01	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-28		05-Jul-01	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		15-Oct-01	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		09-Jan-02	0.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		03-Apr-02	0.294	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		09-Apr-02	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		08-Jul-02	0.25 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		09-Oct-02	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		16-Jan-03	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		16-Apr-03	0.27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		09-Jul-03	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		29-Oct-03	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28	(c)	20-Jan-04	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		04-May-04	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		15-Jul-04	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		13-Oct-04	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		18-Jan-05	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		20-Apr-05	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		19-Jul-05	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Jul-05	0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		27-Oct-05	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Oct-05	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		27-Jan-06	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		18-Apr-06	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		29-Aug-06	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		16-Apr-07	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		15-Oct-07	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		17-Apr-08	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		07-Oct-08	0.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		13-Apr-09	0.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		28-Oct-09	0.28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-28		29-Apr-10	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		19-Oct-10	0.25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		12-Oct-11	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		18-Apr-12	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		23-Apr-13	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-28		24-Apr-14	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		29-Dec-97	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		25-Feb-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		07-Apr-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		14-Jul-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		20-Oct-98	< 0.0050 UJ8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		11-Jan-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		20-Apr-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Apr-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		13-Jul-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		11-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		11-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		17-Jan-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		24-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		09-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		03-Apr-02	0.00191	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		17-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		20-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		26-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		16-Apr-07	0.0074	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		15-Apr-08	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		13-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-29		29-Apr-10	0.0039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		02-Jun-89	27	NA	NA	< 0.04	< 0.3	NA	NA	NA	NA	NA	< 0.01
LF-3		07-Dec-89	30	NA	NA	< 0.04	< 0.3	NA	NA	NA	NA	NA	< 0.01

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-3		20-Jul-90	21	0.42	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-3		20-Jun-91	60.4	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	0.028
LF-3		09-Jul-92	70.8	0.473	NA	0.0205	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
DUP		09-Jul-92	66.6	0.452	NA	0.0361	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-3		09-Jun-93	142	0.625	NA	<0.1	<0.003	<0.01	<0.0002	<0.05	<0.01	NA	NA
DUP		09-Jun-93	141	0.635	NA	<0.1	<0.003	<0.01	<0.0002	<0.05	<0.01	NA	NA
LF-3		16-Apr-96	58	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-3		31-Jul-96	72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		20-Nov-96	72	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		19-Mar-97	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		12-Jun-97	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		19-Aug-97	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		02-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04
LF-3		17-Dec-97	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Dec-97	67	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		02-Mar-98	65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		10-Apr-98	25.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		16-Jul-98	117	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		19-Oct-98	142	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		15-Jan-99	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Jan-99	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		22-Apr-99	28	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		19-Jul-99	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		12-Oct-99	61	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.022
LF-3		20-Jan-00	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		01-May-00	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		24-Jul-00	43 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		11-Oct-00	55	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		16-Jan-01	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		18-Jan-01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.12

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-3		13-Apr-01	38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		06-Jul-01	47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		15-Oct-01	44	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		10-Jan-02	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		04-Apr-02	43.553	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		10-Apr-02	40 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		09-Jul-02	39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		10-Oct-02	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		20-Jan-03	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		16-Apr-03	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		10-Jul-03	29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		28-Oct-03	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Oct-03	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		22-Jan-04	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		05-May-04	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		05-May-04	45.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		15-Jul-04	32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		11-Oct-04	34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		20-Jan-05	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		20-Apr-05	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		21-Jul-05	26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		26-Oct-05	27 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		24-Jan-06	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		19-Apr-06	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		29-Aug-06	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		18-Apr-07	25	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		17-Oct-07	24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		15-Apr-08	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		15-Apr-09	23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		27-Oct-09	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-3		26-Apr-10	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-3		19-Oct-10	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		30-Dec-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		25-Feb-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Feb-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		07-Apr-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		14-Jul-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		20-Oct-98	<0.0050 UJ8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		11-Jan-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		20-Apr-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		13-Jul-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		11-Oct-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		18-Jan-00	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		24-Jan-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		09-Jan-02	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		10-Apr-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		17-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		20-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		18-Jan-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-30		26-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-31		02-Jun-99	0.019	0.078	<0.002	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.005	<0.01	0.041
LF-31		13-Jul-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-31		11-Oct-99	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-32		22-Jun-99	<0.005	0.024	<0.002	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.005	<0.01	0.27
LF-32		16-Jul-99	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-32		25-Oct-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Oct-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-33		22-Jun-99	0.0083	0.065	<0.002	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.005	<0.01	<0.02
DUP		22-Jun-99	<0.005	0.06	<0.002	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.005	<0.01	<0.02
LF-33		13-Jul-99	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-33		11-Oct-99	0.0073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-34		22-Jun-99	0.057	0.035	< 0.002	< 0.005	< 0.003	< 0.01	< 0.0002	< 0.005	< 0.005	< 0.01	< 0.02
LF-34		13-Jul-99	0.056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-34		11-Oct-99	0.058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		25-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		14-Jan-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		28-Apr-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		25-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		10-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		17-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		13-Apr-01	0.0077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		05-Jul-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		15-Oct-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		08-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		08-Apr-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Apr-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		08-Jul-02	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		07-Oct-02	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		15-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		15-Apr-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		09-Jul-03	0.0062	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		27-Oct-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		19-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		04-May-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		14-Jul-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		13-Oct-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		17-Jan-05	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		18-Apr-05	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		18-Apr-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		18-Jul-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		24-Oct-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		23-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		17-Apr-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		18-Apr-07	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		17-Apr-08	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		14-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		30-Apr-10	0.0074	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		17-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		17-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		23-Oct-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		22-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-35		28-Apr-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		13-Jan-00	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		28-Apr-00	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		25-Jul-00	0.05 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		10-Oct-00	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		17-Jan-01	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		09-Apr-01	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		02-Jul-01	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		12-Oct-01	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		08-Jan-02	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		09-Apr-02	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		08-Jul-02	0.04 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		09-Oct-02	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		14-Jan-03	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		15-Apr-03	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		08-Jul-03	0.042	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		27-Oct-03	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-36		19-Jan-04	0.046	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		03-May-04	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		12-Jul-04	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		12-Jul-04	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		14-Oct-04	0.047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		17-Jan-05	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		19-Apr-05	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		19-Jul-05	0.065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		27-Oct-05	0.046	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		27-Jan-06	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		18-Apr-06	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		29-Aug-06	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		29-Aug-06	0.042	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		19-Apr-07	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		16-Oct-07	0.042	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Oct-07	0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		17-Apr-08	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Apr-08	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		07-Oct-08	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		07-Oct-08	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		14-Apr-09	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		28-Oct-09	0.062	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Oct-09	0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		28-Apr-10	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		19-Oct-10	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		15-Apr-11	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		21-Jul-11	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		12-Oct-11	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		12-Oct-11	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		23-Feb-12	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-36		17-Apr-12	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		23-Oct-12	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		22-Apr-13	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		08-Oct-13	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		29-Apr-14	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-36		31-Oct-14	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		31-Oct-14	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		14-Jan-00	0.0074	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Jan-00	0.0062	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		28-Apr-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Apr-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		25-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		10-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		17-Jan-01	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		10-Apr-01	0.0057	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		05-Jul-01	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		12-Oct-01	0.0062	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		08-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		08-Apr-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		08-Jul-02	0.0059 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Jul-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		10-Oct-02	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-Oct-02	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		15-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		15-Apr-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		15-Apr-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		08-Jul-03	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Jul-03	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		27-Oct-03	0.0091	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Oct-03	0.0064	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-37		19-Jan-04	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		03-May-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		12-Jul-04	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		13-Oct-04	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		19-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		18-Apr-05	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		18-Jul-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		24-Oct-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		23-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		18-Apr-06	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		19-Apr-07	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		16-Apr-08	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		14-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		30-Apr-10	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		17-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		23-Oct-12	0.0077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		22-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		07-Oct-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		23-Apr-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-37		28-Oct-14	0.0069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		14-Jan-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		28-Apr-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		25-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		10-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		17-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		10-Apr-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		05-Jul-01	0.0058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-38		12-Oct-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		08-Jan-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		08-Apr-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		08-Jul-02	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		10-Oct-02	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		15-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		15-Apr-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		08-Jul-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		27-Oct-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		19-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		03-May-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		12-Jul-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		13-Oct-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		19-Jan-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		18-Apr-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		18-Jul-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		24-Oct-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		23-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		18-Apr-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		19-Apr-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		16-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		14-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		28-Apr-10	0.0014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		17-Apr-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Apr-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		22-Apr-13	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-38		23-Apr-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		14-Jan-00	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		28-Apr-00	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-39		25-Jul-00	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		10-Oct-00	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		24-Jan-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		09-Apr-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		05-Jul-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		15-Oct-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		08-Jan-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		08-Apr-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		08-Jul-02	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		09-Oct-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		14-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		15-Apr-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		08-Jul-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		28-Oct-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		19-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		03-May-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		12-Jul-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		13-Oct-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		17-Jan-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		18-Apr-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		18-Jul-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		27-Oct-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		23-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		17-Apr-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		18-Apr-07	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		17-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		15-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		28-Apr-10	0.0013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		17-Apr-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-39		22-Apr-13	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-39		22-Apr-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Apr-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		02-Jun-89	0.53	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	<0.01
DUP		02-Jun-89	0.58	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	7
LF-4		06-Dec-89	0.42	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	<0.01
DUP		06-Dec-89	0.55	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	0.01
LF-4		20-Jul-90	0.19	0.16	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-4		20-Jun-91	0.51	NA	NA	<0.005	0.015	NA	NA	NA	NA	NA	0.071
DUP		20-Jun-91	0.493	NA	NA	<0.005	0.01	NA	NA	NA	NA	NA	0.109
LF-4		09-Jul-92	0.367	0.119	NA	<0.005	<0.04	<0.01	<0.00027	<0.025	<0.01	NA	NA
LF-4		09-Jun-93	1.52	0.25	NA	<0.015	<0.003	<0.01	<0.0002	<0.025	<0.01	NA	NA
LF-4		02-Dec-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05
LF-4		02-Mar-98	0.34	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		09-Apr-98	0.73	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		16-Jul-98	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		19-Oct-98	0.47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		14-Jan-99	0.39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		22-Apr-99	0.98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		16-Jul-99	0.83	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Jul-99	0.86	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		15-Oct-99	0.75	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		25-Jan-00	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Jan-00	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		25-Jan-01	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		08-Jan-02	0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		20-Jan-03	0.29	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		22-Jan-04	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		05-May-04	0.228	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		20-Jan-05	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		20-Jan-05	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		25-Jan-06	0.082	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		28-Aug-06	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		18-Apr-07	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Apr-07	0.0095	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		17-Oct-07	0.065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		14-Apr-08	0.076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		08-Oct-08	0.081	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		16-Apr-09	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		26-Oct-09	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		26-Apr-10	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-4		18-Oct-10	0.092	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		14-Jan-00	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		28-Apr-00	<220	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		25-Jul-00	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		10-Oct-00	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		24-Jan-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		09-Apr-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Apr-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		05-Jul-01	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		15-Oct-01	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		08-Jan-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		08-Apr-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		08-Jul-02	0.011 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		09-Oct-02	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		14-Jan-03	0.089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		15-Apr-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		08-Jul-03	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		28-Oct-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		19-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-40		03-May-04	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		03-May-04	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		12-Jul-04	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		13-Oct-04	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		17-Jan-05	0.0073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		18-Apr-05	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		18-Jul-05	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		27-Oct-05	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		23-Jan-06	0.0055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		17-Apr-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Apr-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		18-Apr-07	0.0069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		17-Apr-08	0.0085	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		15-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		28-Apr-10	0.0044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		17-Apr-12	0.0055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		23-Oct-12	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		22-Apr-13	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		07-Oct-13	0.0071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		22-Apr-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-40		28-Oct-14	0.0093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		13-Jan-00	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		13-Jan-00	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		28-Apr-00	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		25-Jul-00	0.032 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		10-Oct-00	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-Oct-00	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		17-Jan-01	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		09-Apr-01	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		05-Jul-01	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-41		12-Oct-01	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		08-Jan-02	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		04-Apr-02	0.0348	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		04-Apr-02	0.0365	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		08-Apr-02	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		08-Jul-02	0.036 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		09-Oct-02	0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		15-Jan-03	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		15-Apr-03	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		09-Jul-03	0.047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		27-Oct-03	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		19-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		03-May-04	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		12-Jul-04	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		13-Oct-04	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		17-Jan-05	0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		19-Apr-05	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Apr-05	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		19-Jul-05	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		24-Oct-05	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		23-Jan-06	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		23-Jan-06	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		17-Apr-06	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		15-Apr-11	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		21-Jul-11	0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		19-Oct-11	< 0.0071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		23-Feb-12	0.042	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		17-Apr-12	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		23-Oct-12	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		23-Oct-12	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-41		22-Apr-13	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		08-Oct-13	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		23-Apr-14	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		23-Apr-14	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-41		28-Oct-14	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Oct-14	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		12-Jan-00	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		12-Jan-00	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		01-May-00	0.0091	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		01-May-00	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		24-Jul-00	0.0082 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		11-Oct-00	0.0058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		25-Jan-01	0.0074	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		10-Apr-01	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		06-Jul-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		06-Jul-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		15-Oct-01	0.0093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		09-Jan-02	0.0056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		09-Apr-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Apr-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		09-Jul-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		10-Oct-02	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		17-Jan-03	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		16-Apr-03	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		09-Jul-03	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		28-Oct-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		22-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		04-May-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		15-Jul-04	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		14-Oct-04	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-42		19-Jan-05	0.0097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		19-Apr-05	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		19-Jul-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		26-Oct-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		24-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		19-Apr-06	0.0068	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		19-Apr-07	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		14-Apr-08	< 0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		16-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		26-Apr-10	0.0031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		17-Apr-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		22-Oct-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Oct-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		24-Apr-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		09-Oct-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		25-Apr-14	< 0.005 R	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		13-May-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-42		30-Oct-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		30-Oct-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-5		01-Jun-89	0.017	NA	NA	< 0.04	< 0.3	NA	NA	NA	NA	NA	0.04
LF-5		06-Dec-89	< 0.07 U5	NA	NA	< 0.04	< 0.3	NA	NA	NA	NA	NA	< 0.01
LF-5		20-Jul-90	0.02	0.17	NA	< 0.05	< 0.2	NA	NA	NA	NA	NA	0.05
LF-5		20-Jun-91	0.038	NA	NA	< 0.005	0.003	NA	NA	NA	NA	NA	< 0.02
LF-5		09-Jul-92	< 0.01	0.111	NA	< 0.005	< 0.04	< 0.01	< 0.00027	< 0.005	< 0.01	NA	NA
LF-5		09-Jun-93	0.0283	0.257	NA	< 0.005	< 0.003	< 0.01	< 0.00027	< 0.005	< 0.01	NA	NA
LF-6		01-Jun-89	13	NA	NA	0.09	< 0.3	NA	NA	NA	NA	NA	0.12
LF-6		05-Dec-89	16	NA	NA	0.06	< 0.3	NA	NA	NA	NA	NA	< 0.01
LF-6		20-Jul-90	14	0.21	NA	< 0.05	< 0.2	NA	NA	NA	NA	NA	0.06

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-7		01-Jun-89	0.008	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	<0.01
LF-7		06-Dec-89	<0.07 U5	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	0.02
LF-7		19-Jul-90	<0.002	0.06	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-7		20-Jun-91	0.012	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	<0.02
LF-7		17-Dec-91	<0.010	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	<0.020
LF-7		09-Jul-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
DUP		09-Jul-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-7		09-Jun-93	<0.01	0.191	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
DUP		09-Jun-93	<0.01	0.201	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-7		06-Jan-94	<0.002	0.07	NA	<0.001	0.001	<0.002	<0.0002	<0.004	<0.001	NA	NA
LF-7		01-Aug-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	26
LF-7		22-Nov-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.12
LF-7		25-Nov-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.49
LF-7		27-Feb-98	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Feb-98	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		13-Jan-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		20-Jan-00	0.0088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		25-Jan-01	0.0093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		09-Jan-02	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		17-Jan-03	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		22-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		19-Jan-05	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		24-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		19-Apr-07	0.0057	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Apr-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		14-Apr-08	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Apr-08	<0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		16-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-7		27-Apr-10	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		05-Dec-89	<0.07 U5	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	<0.01

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-8		19-Jul-90	<0.002	0.12	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-8		21-Dec-90	0.02	0.59	NA	0.0015	<0.2	NA	NA	NA	NA	NA	0.25
LF-8		20-Jun-91	0.021	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	<0.02
LF-8		17-Dec-91	0.016	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	<0.020
LF-8		09-Jul-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-8		30-Dec-92	0.029	0.177	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-8		09-Jun-93	0.0384	0.121	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-8		06-Jan-94	0.055	0.1	NA	<0.001	<0.001	<0.002	<0.0002	0.005	<0.001	NA	NA
LF-8		25-Nov-97	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.01
LF-8		27-Feb-98	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		08-Apr-98	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		15-Jul-98	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		21-Oct-98	0.030	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		13-Jan-99	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		21-Apr-99	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		14-Jul-99	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		15-Oct-99	0.049	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		19-Jan-00	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		22-Jan-01	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		09-Jan-02	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		20-Jan-03	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Jan-03	0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		21-Jan-04	0.054	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		19-Jan-05	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		24-Jan-06	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		28-Aug-06	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Aug-06	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		20-Apr-07	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		16-Oct-07	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		14-Apr-08	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-8		08-Oct-08	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Oct-08	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		16-Apr-09	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		26-Oct-09	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		26-Apr-10	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-8		18-Oct-10	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-9		05-Dec-89	0.067	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	0.02
LF-9		19-Jul-90	0.008	0.11	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-9		21-Dec-90	0.12	0.27	NA	0.0029	<0.2	NA	NA	NA	NA	NA	0.73
LF-9		20-Jun-91	0.075	NA	NA	<0.005	0.012	NA	NA	NA	NA	NA	0.1
LF-9		06-Aug-91	0.131	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-9		16-Dec-91	0.046	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	0.039
LF-9		09-Jul-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-9		30-Dec-92	0.106	<0.1	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-9		09-Jun-93	0.158	0.169	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-B1	(a)	07-Dec-89	<0.07 U5	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	<0.01
LF-B1		18-Jul-90	0.007	0.08	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-B1		20-Dec-90	0.005	0.1	NA	0.001	<0.2	NA	NA	NA	NA	NA	<0.05
LF-B1		20-Jun-91	<0.01	NA	NA	<0.005	0.004	NA	NA	NA	NA	NA	<0.02
LF-B1		16-Dec-91	<0.010	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	<0.020
LF-B1		09-Jul-92	<0.01	0.122	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-B1		30-Dec-92	<0.01	<0.1	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-B1		08-Jun-93	<0.01	<0.1	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-B2		06-Dec-89	<0.07 U5	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	0.02
LF-B2		18-Jul-90	0.005	0.14	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
DUP		18-Jul-90	0.004	0.15	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-B2		19-Dec-90	0.008	0.32	NA	0.0026	<0.2	NA	NA	NA	NA	NA	0.17
LF-B2		20-Jun-91	<0.01	NA	NA	<0.005	0.005	NA	NA	NA	NA	NA	0.075
LF-B2		16-Dec-91	<0.010	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	<0.020
LF-B2		08-Jul-92	<0.01	0.245	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-B2		08-Jun-93	<0.01	0.233	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-B3		07-Dec-89	<0.07 U5	NA	NA	<0.04	<0.3	NA	NA	NA	NA	NA	0.01
LF-B3		18-Jul-90	0.003	0.1	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-B3		20-Dec-90	0.002	0.16	NA	<0.0005	<0.2	NA	NA	NA	NA	NA	<0.05
LF-B3		19-Jun-91	<0.01	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	<0.02
LF-B3		16-Dec-91	<0.010	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	<0.020
LF-B3		08-Jul-92	<0.01	0.133	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-B3		30-Dec-92	<0.01	0.112	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-B3		08-Jun-93	<0.01	<0.1	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-B3		05-Jan-94	0.004	0.11	NA	0.006	<0.001	<0.002	<0.0002	<0.004	<0.001	NA	NA
LF-B3		16-Apr-96	0.036	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-B3		01-Aug-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.2
LF-B3		01-Aug-96	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		21-Nov-96	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		21-Nov-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.05
DUP		21-Nov-96	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		17-Mar-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		12-Jun-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		20-Aug-97	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		17-Dec-97	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		27-Feb-98	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		08-Apr-98	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		15-Jul-98	0.0058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		21-Oct-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		13-Jan-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		22-Apr-99	<0.015 U5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		15-Jul-99	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		14-Oct-99	0.0086	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		25-Jan-00	0.0073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		25-Jan-01	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-B3		15-Oct-01	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Oct-01	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		10-Jan-02	0.0088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		16-Jan-03	0.0097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		21-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		21-Jan-04	0.0095	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		20-Jan-05	0.0093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		24-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		19-Apr-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		16-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		15-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B3		30-Apr-10	0.0075	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		17-Jul-90	0.003	0.08	NA	<0.05	<0.2	NA	NA	NA	NA	NA	<0.05
LF-B4		19-Dec-90	<0.002	0.08	NA	0.0014	<0.2	NA	NA	NA	NA	NA	0.08
LF-B4		19-Jun-91	<0.01	NA	NA	<0.005	<0.004	NA	NA	NA	NA	NA	<0.02
LF-B4		17-Dec-91	<0.010	NA	NA	<0.005	<0.003	<0.010	NA	NA	NA	NA	0.029
LF-B4		08-Jul-92	<0.01	0.14	NA	<0.005	<0.04	<0.01	<0.00027	<0.005	<0.01	NA	NA
LF-B4		30-Dec-92	<0.01	0.11	NA	<0.005	<0.04	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-B4		08-Jun-93	<0.01	<0.1	NA	<0.005	<0.003	<0.01	<0.0002	<0.005	<0.01	NA	NA
LF-B4		05-Jan-94	0.003	0.07	NA	<0.001	0.001	<0.002	<0.0002	<0.004	<0.001	NA	NA
LF-B4		16-Apr-96	<0.002	NA	NA	NA	<0.002	NA	NA	NA	NA	NA	NA
LF-B4		30-Jul-96	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		30-Jul-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.08
LF-B4		22-Nov-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04
LF-B4		22-Nov-96	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Nov-96	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		17-Mar-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		01-Jul-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		20-Aug-97	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		18-Dec-97	<0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-B4		25-Feb-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		07-Apr-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		15-Jul-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		19-Oct-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		11-Jan-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		20-Apr-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		14-Jul-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		14-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		18-Jan-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		24-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		24-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		09-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		16-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		21-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		18-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		26-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		16-Apr-07	0.0054	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B4		13-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5	(b)	09-Apr-96	0.32	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
LF-B5		01-Aug-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.15
LF-B5		01-Aug-96	0.097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		22-Nov-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.03
LF-B5		22-Nov-96	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		17-Mar-97	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		12-Jun-97	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		20-Aug-97	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		17-Dec-97	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		27-Feb-98	0.22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		09-Apr-98	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-B5	(b)	16-Jul-98	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		16-Jul-98	0.053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		23-Oct-98	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		13-Jan-99	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		21-Apr-99	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		15-Jul-99	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		15-Oct-99	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Oct-99	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		21-Jan-00	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		02-Feb-01	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		10-Jan-02	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		20-Jan-03	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		22-Jan-04	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		22-Jan-04	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		20-Jan-05	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		25-Jan-06	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		30-Aug-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		30-Aug-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		18-Apr-07	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		15-Oct-07	0.0064	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		15-Apr-08	0.0056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		09-Oct-08	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		09-Oct-08	0.0088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		17-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		27-Oct-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		30-Apr-10	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B5		18-Oct-10	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		09-Apr-96	0.08	NA	NA	NA	< 0.002	NA	NA	NA	NA	NA	NA
LF-B6		01-Aug-96	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		01-Aug-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.06

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
LF-B6		25-Nov-96	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		25-Nov-96	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.04
DUP		25-Nov-96	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		17-Mar-97	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		12-Jun-97	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		19-Aug-97	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		18-Dec-97	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		27-Feb-98	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		08-Apr-98	0.0067	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		15-Jul-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		19-Oct-98	0.0080	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		13-Jan-99	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		21-Apr-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		14-Jul-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		15-Oct-99	0.0059	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		21-Jan-00	0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		25-Jan-01	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Jan-01	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		10-Apr-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		10-Jan-02	0.0097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		17-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		22-Jan-04	0.0096	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		19-Jan-05	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		25-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		17-Apr-07	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		14-Apr-08	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		16-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-B6		26-Apr-10	0.0044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-1		05-May-03	0.035	na	na	na	na	na	na	na	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MD-1		14-Oct-03	<0.005	na	na	na	<0.003	na	na	na	na	na	na
MD-1		20-Jan-04	0.029	na	na	na	<0.003	na	na	na	na	na	na
MD-1		27-Apr-04	0.017	na	na	na	<0.003	na	na	na	na	na	na
MD-1		22-Oct-04	0.042	na	na	na	<0.003	na	na	na	na	na	na
MD-1		30-Sep-05	0.060	na	na	na	<0.003	na	na	na	na	na	na
MD-1		15-Apr-06	0.012	na	na	na	na	na	na	na	na	na	na
MD-1		26-Oct-06	0.044	na	na	na	na	na	na	na	na	na	na
MD-1		12-Apr-07	0.023	na	na	na	na	na	na	na	na	na	na
MD-1		12-Oct-07	<0.0061	na	na	na	na	na	na	na	na	na	na
MD-1		22-Apr-08	0.015	na	na	na	na	na	na	na	na	na	na
MD-1		22-Oct-08	0.014	na	na	na	na	na	na	na	na	na	na
MD-1		24-Apr-09	0.025	na	na	na	na	na	na	na	na	na	na
MD-1		21-Oct-09	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-1		29-Apr-10	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-1		27-Oct-10	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-1		14-Nov-11	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-1		17-Oct-12	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-1		08-Oct-13	0.0085	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-1		27-Oct-14	0.049	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-2		05-May-03	na	na	na	na	<0.003	na	na	na	na	na	na
MD-2		14-Oct-03	0.013	na	na	na	<0.003	na	na	na	na	na	na
MD-2		20-Jan-04	0.011	na	na	na	<0.003	na	na	na	na	na	na
MD-2		27-Apr-04	0.030	na	na	na	<0.003	na	na	na	na	na	na
MD-2		22-Oct-04	0.023	na	na	na	<0.003	na	na	na	na	na	na
MD-2		30-Sep-05	0.025	na	na	na	<0.003	na	na	na	na	na	na
MD-2		15-Apr-06	0.015	na	na	na	na	na	na	na	na	na	na
MD-2		26-Oct-06	0.031	na	na	na	na	na	na	na	na	na	na
MD-2		12-Apr-07	0.024	na	na	na	na	na	na	na	na	na	na
MD-2		12-Oct-07	0.011	na	na	na	na	na	na	na	na	na	na
MD-2		22-Apr-08	0.019	na	na	na	na	na	na	na	na	na	na

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MD-2		22-Oct-08	0.0093	na	na	na	na	na	na	na	na	na	na
MD-2		24-Apr-09	0.0240	na	na	na	na	na	na	na	na	na	na
MD-2		21-Oct-09	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-2		29-Apr-10	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		29-Apr-10	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-2		27-Oct-10	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-2		14-Nov-11	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		07-Oct-12	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-2		17-Oct-12	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-2		07-Oct-13	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Oct-13	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-2		27-Oct-14	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Oct-14	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-3		05-May-03	0.180	na	na	na	< 0.003	na	na	na	na	na	na
MD-3		14-Oct-03	< 0.005	na	na	na	< 0.003	na	na	na	na	na	na
MD-3		20-Jan-04	0.180	na	na	na	< 0.003	na	na	na	na	na	na
MD-3		27-Apr-04	0.120	na	na	na	< 0.003	na	na	na	na	na	na
MD-3		22-Oct-04	0.210	na	na	na	< 0.003	na	na	na	na	na	na
MD-3		30-Sep-05	0.310	na	na	na	< 0.003	na	na	na	na	na	na
MD-3		15-Apr-06	0.330	na	na	na	na	na	na	na	na	na	na
MD-3		26-Oct-06	0.350	na	na	na	na	na	na	na	na	na	na
MD-3		12-Apr-07	0.400	na	na	na	na	na	na	na	na	na	na
MD-3		12-Oct-07	0.410	na	na	na	na	na	na	na	na	na	na
MD-3		22-Apr-08	0.330	na	na	na	na	na	na	na	na	na	na
MD-3		22-Oct-08	0.340	na	na	na	na	na	na	na	na	na	na
MD-3		24-Apr-09	0.260	na	na	na	na	na	na	na	na	na	na
MD-3		21-Oct-09	0.43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-3		29-Apr-10	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-3		27-Oct-10	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-3		14-Nov-11	0.39	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MD-3		17-Oct-12	0.38	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-3		07-Oct-13	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-3		27-Oct-14	0.26	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-4		05-May-03	< 0.005	na	na	na	< 0.003	na	na	na	na	na	na
MD-4		14-Oct-03	0.0084	na	na	na	< 0.003	na	na	na	na	na	na
MD-4		20-Jan-04	< 0.005	na	na	na	< 0.003	na	na	na	na	na	na
MD-4		27-Apr-04	0.0072	na	na	na	< 0.003	na	na	na	na	na	na
MD-4		22-Oct-04	< 0.005	na	na	na	< 0.003	na	na	na	na	na	na
MD-4		30-Sep-05	< 0.005	na	na	na	< 0.003	na	na	na	na	na	na
MD-4		15-Apr-06	< 0.005	na	na	na	na	na	na	na	na	na	na
MD-4		26-Oct-06	0.0076	na	na	na	na	na	na	na	na	na	na
MD-4		12-Apr-07	ND	na	na	na	na	na	na	na	na	na	na
MD-4		12-Oct-07	< 0.0061	na	na	na	na	na	na	na	na	na	na
MD-4		22-Apr-08	< 0.0061	na	na	na	na	na	na	na	na	na	na
MD-4		22-Oct-08	< 0.005	na	na	na	na	na	na	na	na	na	na
MD-4		24-Apr-09	< 0.005	na	na	na	na	na	na	na	na	na	na
MD-4		21-Oct-09	0.0056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-4		29-Apr-10	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-4		27-Oct-10	0.0066	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Oct-10	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-4		14-Nov-11	< 0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-4		08-Oct-12	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-4		17-Oct-13	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-4		27-Oct-14	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-5		05-May-03	0.00421	na	na	na	na	na	na	na	na	na	na
MD-5		13-Oct-03	0.0125	na	na	na	na	na	na	na	na	na	na
MD-5		20-Jan-04	0.00492	na	na	na	na	na	na	na	na	na	na
DUP		20-Jan-04	0.0042	na	na	na	na	na	na	na	na	na	na
MD-5		21-Apr-04	0.00979	na	na	na	na	na	na	na	na	na	na
MD-5		21-Oct-04	0.00562	na	na	na	na	na	na	na	na	na	na

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MD-5		29-Mar-05	0.0229	na	na	na	na	na	na	na	na	na	na
MD-5		21-Sep-05	0.0112	na	na	na	na	na	na	na	na	na	na
MD-5		30-Sep-05	0.0097	na	na	na	< 0.003	na	na	na	na	na	na
MD-5		13-Apr-06	0.00395	na	na	na	na	na	na	na	na	na	na
MD-5		26-Oct-06	0.0097	na	na	na	na	na	na	na	na	na	na
MD-5		16-Apr-07	0.00631	na	na	na	na	na	na	na	na	na	na
MD-5		11-Oct-07	0.0149	na	na	na	na	na	na	na	na	na	na
MD-5		23-Apr-08	0.0115	na	na	na	na	na	na	na	na	na	na
MD-5		23-Oct-08	0.0125	na	na	na	na	na	na	na	na	na	na
DUP		23-Oct-08	0.0130	na	na	na	na	na	na	na	na	na	na
MD-5		24-Apr-09	0.0068	na	na	na	na	na	na	na	na	na	na
MD-5		21-Oct-09	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-5		29-Apr-10	0.00492	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-5		27-Oct-10	0.00649	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-5		19-Apr-11	0.00953	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Apr-11	0.00841	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-5		14-Nov-11	0.00479	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-5		17-Oct-12	0.0107	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-5		08-Oct-13	0.00899	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MD-5		27-Oct-14	0.00977	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Oct-14	0.00971	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		29-Mar-95	0.0786	0.548	< 0	0.0068	0.0308	0.091	< 0	< 0	< 0	NA	0.462
MW-1		08-Jun-95	0.04	0.35	< 0	< 0	0.02	< 0	< 0	< 0	< 0	NA	0.16
MW-1		09-Jan-96	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		17-Apr-96	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		31-Jul-96	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		19-Nov-96	0.071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		25-Mar-97	0.042	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		10-Jun-97	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		18-Aug-97	0.077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MW-1		19-Dec-97	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		26-Feb-98	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		08-Apr-98	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Apr-98	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		14-Jul-98	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		21-Oct-98	0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		12-Jan-99	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		20-Apr-99	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		13-Jul-99	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		11-Oct-99	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		18-Jan-00	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		24-Jan-01	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		16-Jan-03	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-1		26-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		29-Mar-95	0.0452	0.772	<0	<0	0.0557	0.188	<0	<0	<0	NA	0.449
MW-2		08-Jun-95	<0	0.59	<0	0.01	0.03	<0	<0	<0	<0	NA	0.24
MW-2		09-Jan-96	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		17-Apr-96	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		31-Jul-96	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		19-Nov-96	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		25-Mar-97	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		10-Jun-97	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		18-Aug-97	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		19-Dec-97	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		26-Feb-98	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		08-Apr-98	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		14-Jul-98	0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		21-Oct-98	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		21-Oct-98	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		12-Jan-99	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MW-2		24-Jan-01	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		08-Jan-02	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		16-Jan-03	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		20-Jan-04	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		18-Jan-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		25-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		16-Apr-07	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		17-Apr-08	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		17-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2		29-Apr-10	0.0097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		29-Mar-95	0.0276	0.102	<0	<0	0.007	0.0105	<0	<0	<0	NA	0.19
MW-3		08-Jun-95	0.03	0.21	<0	<0	0.01	<0	<0	<0	<0	NA	0.38
MW-3		09-Jan-96	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		17-Apr-96	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		31-Jul-96	0.059	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		19-Nov-96	0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		25-Mar-97	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		10-Jun-97	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		18-Aug-97	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		19-Dec-97	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		26-Feb-98	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		07-Apr-98	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		14-Jul-98	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Jul-98	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		20-Oct-98	0.018 J8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		11-Jan-99	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		11-Jan-99	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		19-Apr-99	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		13-Jul-99	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		11-Oct-99	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MW-3		17-Jan-00	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		28-Apr-00	0.0096	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		25-Jul-00	0.015 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		10-Oct-00	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		24-Jan-01	0.0093	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		09-Apr-01	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		05-Jul-01	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		15-Oct-01	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		08-Jan-02	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		03-Apr-02	0.00435	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		08-Apr-02	0.0053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		08-Jul-02	0.017 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Jul-02	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		09-Oct-02	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		15-Jan-03	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		16-Apr-03	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		09-Jul-03	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		28-Oct-03	0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		20-Jan-04	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Jan-04	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		04-May-04	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		15-Jul-04	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		13-Oct-04	0.053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		18-Jan-05	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		19-Apr-05	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		19-Jul-05	0.053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Jul-05	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		27-Oct-05	0.094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		23-Jan-06	0.047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		17-Apr-06	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MW-3		18-Apr-07	0.091	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		15-Apr-08	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		14-Apr-09	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		28-Apr-10	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		15-Apr-11	0.083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		21-Jul-11	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		12-Oct-11	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		23-Feb-12	0.059	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		23-Feb-12	0.045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		17-Apr-12	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		18-Jul-12	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		23-Oct-12	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		18-Jan-13	0.058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		22-Apr-13	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		16-Jul-13	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		08-Oct-13	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		03-Jan-14	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		29-Apr-14	0.053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3		30-Oct-14	0.074	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		16-Dec-94	8.87	0.163	< 0	0.141	0.0304	0.0359	< 0.0002	0.0275	0.0134	NA	71
MW-4		29-Mar-95	22	0.333	< 0	0.286	0.0636	0.031	< 0	< 0	< 0	NA	171
MW-4		08-Jun-95	46	0.56	0.01	0.42	0.06	< 0	< 0	< 0	< 0	NA	97
MW-4		10-Jan-96	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		19-Nov-96	NA	NA	NA	NA	< 0.04	NA	NA	NA	NA	NA	230
MW-4		19-Nov-96	3.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		18-Aug-97	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		19-Dec-97	42	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		02-Mar-98	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		10-Apr-98	19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		17-Jul-98	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MW-4		23-Oct-98	8.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		15-Jan-99	0.81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		22-Apr-99	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		16-Jul-99	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		25-Oct-99	0.74	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		25-Jan-00	0.17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		01-May-00	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		25-Jul-00	0.08 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		09-Oct-00	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		16-Jan-01	0.081	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		13-Apr-01	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		02-Jul-01	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		06-Jul-01	<0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		16-Oct-01	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		09-Jan-02	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		10-Apr-02	0.28 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-Apr-02	0.11 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		09-Jul-02	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		10-Oct-02	0.31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		15-Jan-03	16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		16-Apr-03	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		10-Jul-03	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		20-Jan-04	0.37	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		06-May-04	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		14-Jul-04	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		13-Oct-04	0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		19-Jan-05	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		18-Apr-05	0.56	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		19-Jul-05	0.21	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		27-Oct-05	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MW-4		26-Jan-06	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		17-Apr-06	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		29-Aug-06	0.13	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		20-Apr-07	0.11	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		15-Oct-07	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		18-Apr-08	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		09-Oct-08	0.23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		15-Apr-09	0.15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		28-Oct-09	4.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		28-Apr-10	4.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4		19-Oct-10	0.19	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		16-Dec-94	41.5	0.236	<0	0.156	0.0317	0.056	0.00023	0.009	<0.01	NA	11
MW-5		29-Mar-95	35.3	0.137	<0	<0	0.0317	0.0103	<0	<0	<0	NA	4.67
MW-5		08-Jun-95	99	0.45	<0	0.03	0.05	<0	<0	<0	<0	NA	13.8
MW-5		10-Jan-96	79	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		19-Nov-96	192	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		19-Nov-96	NA	NA	NA	NA	0.07	NA	NA	NA	NA	NA	21
MW-5		18-Aug-97	310	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		19-Dec-97	380	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		02-Mar-98	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		10-Apr-98	208	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		17-Jul-98	340	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		17-Jul-98	368	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		19-Oct-98	231	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		15-Jan-99	290	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		22-Apr-99	260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		19-Jul-99	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Jul-99	250	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		25-Oct-99	260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		25-Jan-00	240	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MW-5		01-May-00	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		25-Jul-00	180 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		09-Oct-00	220	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		16-Jan-01	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		13-Apr-01	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		13-Apr-01	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		06-Jul-01	220	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		16-Oct-01	290	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Oct-01	280	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		09-Jan-02	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		10-Apr-02	250 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		09-Jul-02	180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		10-Oct-02	190	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		15-Jan-03	120	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		15-Apr-03	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		10-Jul-03	110	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		28-Oct-03	210	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		20-Jan-04	160	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		04-May-04	49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		04-May-04	62	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		14-Jul-04	27	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		13-Oct-04	170	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		19-Jan-05	81	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		18-Apr-05	40	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		19-Jul-05	35	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		27-Oct-05	160	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		17-Apr-06	45	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		30-Aug-06	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		17-Apr-07	71	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5	(d)	17-Apr-07	31	0.16	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
MW-5		15-Oct-07	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		17-Apr-08	77	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		07-Oct-08	46	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		15-Apr-09	68	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Apr-09	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		27-Oct-09	48	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		28-Apr-10	65	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5		19-Oct-10	4.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		28-Jul-94	0.07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		08-Sep-94	0.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		28-Feb-95	0.046	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		29-Mar-95	0.035	0.04	< 0.002	< 0.005	< 0.04	< 0.01	< 0.0002	< 0.004	< 0.005	< 0.005	0.01
RP-1		10-May-95	0.095	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		09-Aug-95	0.059	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		17-Nov-95	0.086	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		10-Jan-96	0.061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		17-Apr-96	0.058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Apr-96	0.069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		31-Jul-96	0.068	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		19-Nov-96	0.041	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		25-Mar-97	0.054	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		10-Jun-97	0.077	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		18-Aug-97	0.047	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		19-Dec-97	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Dec-97	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		26-Feb-98	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		26-Feb-98	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		07-Apr-98	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		14-Jul-98	0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		20-Oct-98	< 0.0050 UJ	8 NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-1		12-Jan-99	0.063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		19-Apr-99	0.046	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		16-Jul-99	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		25-Oct-99	0.073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		18-Jan-00	0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		27-Apr-00	0.046	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		25-Jul-00	0.035 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		10-Oct-00	0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		25-Jan-01	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		09-Apr-01	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		05-Jul-01	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		05-Jul-01	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		12-Oct-01	0.055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		08-Jan-02	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		04-Apr-02	0.0435	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		08-Apr-02	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		08-Jul-02	0.052 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		09-Oct-02	0.07	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		15-Jan-03	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		15-Apr-03	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		09-Jul-03	0.049	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		28-Oct-03	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		19-Jan-04	0.04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		03-May-04	0.045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		15-Jul-04	0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		13-Oct-04	0.055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		19-Jan-05	0.043	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		19-Apr-05	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		19-Jul-05	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		24-Oct-05	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-1		23-Jan-06	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		17-Apr-06	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		18-Apr-07	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		15-Apr-08	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		14-Apr-09	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		28-Apr-10	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		15-Apr-11	0.049	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		21-Jul-11	0.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		23-Feb-12	0.14	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		17-Apr-12	0.051	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		18-Jul-12	0.054	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		23-Oct-12	0.065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		18-Jan-13	0.048	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		22-Apr-13	0.076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		16-Jul-13	0.076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Jul-13	0.072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		07-Oct-13	0.055	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		03-Jan-14	0.053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		03-Jan-14	0.063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		23-Apr-14	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-1		31-Oct-14	0.08	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		28-Jul-94	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		08-Sep-94	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Sep-94	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		28-Feb-95	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		29-Mar-95	0.01	0.08	< 0.002	< 0.005	< 0.04	< 0.01	< 0.0002	< 0.004	< 0.005	< 0.005	0.03
RP-2		10-May-95	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		09-Aug-95	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		17-Nov-95	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		10-Jan-96	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-2		17-Apr-96	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		31-Jul-96	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		19-Nov-96	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		25-Mar-97	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		10-Jun-97	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		18-Aug-97	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Aug-97	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		19-Dec-97	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		26-Feb-98	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		07-Apr-98	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		13-Jul-98	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		20-Oct-98	0.010 J8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		11-Jan-99	0.0053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		19-Apr-99	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		13-Jul-99	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		25-Oct-99	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		18-Jan-00	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Jan-00	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		27-Apr-00	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		25-Jul-00	0.014 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		10-Oct-00	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		17-Jan-01	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		09-Apr-01	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		05-Jul-01	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		12-Oct-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		09-Jan-02	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		08-Apr-02	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		08-Jul-02	0.023 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		09-Oct-02	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Oct-02	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-2		14-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		15-Apr-03	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		09-Jul-03	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Jul-03	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		27-Oct-03	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		19-Jan-04	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		03-May-04	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		12-Jul-04	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		13-Oct-04	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		17-Jan-05	0.037	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		19-Apr-05	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		19-Jul-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		24-Oct-05	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		23-Jan-06	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		17-Apr-06	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		29-Aug-06	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		20-Apr-07	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Apr-07	0.021	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		16-Oct-07	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		17-Apr-08	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		07-Oct-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		14-Apr-09	0.0097	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		28-Oct-09	0.042	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		28-Apr-10	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		18-Oct-10	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		15-Apr-11	0.022	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		21-Jul-11	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		21-Jul-11	0.023	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		12-Oct-11	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		23-Feb-12	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-2		17-Apr-12	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		23-Oct-12	0.032	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		19-Apr-13	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		08-Oct-13	0.031	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		23-Apr-14	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-2		30-Oct-14	0.045	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		28-Jul-94	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		08-Sep-94	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		28-Feb-95	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		29-Mar-95	0.004	0.18	< 0.002	< 0.005	< 0.04	< 0.01	< 0.0002	< 0.004	< 0.005	0.015	0.01
RP-3		10-May-95	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		09-Aug-95	0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		17-Nov-95	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		10-Jan-96	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		17-Apr-96	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		31-Jul-96	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		19-Nov-96	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		25-Mar-97	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		10-Jun-97	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		18-Aug-97	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		19-Dec-97	0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		25-Feb-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		07-Apr-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		13-Jul-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		20-Oct-98	0.023 J8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Oct-98	0.013 J8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		11-Jan-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		19-Apr-99	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		16-Jul-99	0.0065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		25-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
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Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-3		14-Jan-00	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		27-Apr-00	0.0064	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		25-Jul-00	0.011 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		10-Oct-00	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		17-Jan-01	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.021
RP-3		10-Apr-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		03-Jul-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		15-Oct-01	0.0058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		08-Jan-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		08-Apr-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		08-Jul-02	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		07-Oct-02	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		15-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		15-Apr-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		09-Jul-03	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		27-Oct-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		19-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		03-May-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		14-Jul-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		13-Oct-04	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		17-Jan-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		18-Apr-05	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		18-Jul-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		24-Oct-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		23-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		17-Apr-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		18-Apr-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		16-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-3		14-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		28-Apr-10	0.0024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Apr-10	0.0025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		17-Apr-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		17-Apr-12	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		20-Dec-12	0.0081	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		20-Dec-12	0.0056	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		19-Apr-13	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		08-Oct-13	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Oct-13	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		28-Apr-14	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-3		28-Oct-14	0.0057	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		28-Jul-94	<0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		08-Sep-94	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		28-Feb-95	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Feb-95	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		29-Mar-95	0.008	0.06	<0.002	<0.005	0.15	<0.01	<0.0002	<0.004	<0.005	<0.005	0.16
RP-4		10-May-95	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-May-95	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		09-Aug-95	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Aug-95	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		17-Nov-95	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Nov-95	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		09-Jan-96	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		17-Apr-96	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		31-Jul-96	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		31-Jul-96	0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		19-Nov-96	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		25-Mar-97	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		10-Jun-97	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		10-Jun-97	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		18-Aug-97	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		19-Dec-97	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		25-Feb-98	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		07-Apr-98	0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		13-Jul-98	<0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		13-Jul-98	0.0052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		20-Oct-98	0.0084 J8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		11-Jan-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		19-Apr-99	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		13-Jul-99	0.0059	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		13-Jul-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		25-Oct-99	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		18-Jan-00	0.0089	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		27-Apr-00	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		25-Jul-00	0.0081 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		10-Oct-00	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		17-Jan-01	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.039
RP-4		09-Apr-01	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		12-Oct-01	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		08-Jan-02	0.0091	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		08-Apr-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		08-Jul-02	0.0082 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		07-Oct-02	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		14-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		15-Apr-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		08-Jul-03	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		27-Oct-03	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		19-Jan-04	0.0067	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		03-May-04	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-4		12-Jul-04	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		13-Oct-04	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		19-Jan-05	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		19-Apr-05	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		18-Jul-05	0.0068	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		24-Oct-05	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		24-Oct-05	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		23-Jan-06	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		18-Apr-06	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Apr-06	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		29-Aug-06	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		19-Apr-07	0.0074	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		16-Oct-07	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		16-Apr-08	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		07-Oct-08	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		14-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		28-Oct-09	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		28-Apr-10	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		18-Oct-10	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		15-Apr-11	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		15-Apr-11	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		21-Jul-11	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		12-Oct-11	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		23-Feb-12	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		17-Apr-12	0.02	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		18-Jul-12	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Jul-12	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		23-Oct-12	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		18-Jan-13	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
DUP		18-Jan-13	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		19-Apr-13	0.013	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		16-Jul-13	0.017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		08-Oct-13	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		03-Jan-14	0.019	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		29-Apr-14	0.0099	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		29-Apr-14	0.010	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-4		30-Oct-14	0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		28-Jul-94	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		28-Jul-94	< 0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		08-Sep-94	0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		28-Feb-95	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		29-Mar-95	0.006	0.04	< 0.002	< 0.005	< 0.04	< 0.01	< 0.0002	< 0.004	< 0.005	< 0.005	0.03
RP-5		10-May-95	0.018	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		09-Aug-95	0.003	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		17-Nov-95	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		09-Jan-96	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Jan-96	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		17-Apr-96	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		31-Jul-96	< 0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		19-Nov-96	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Nov-96	0.008	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		25-Mar-97	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		25-Mar-97	0.004	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		10-Jun-97	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		18-Aug-97	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		19-Dec-97	0.038	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		26-Feb-98	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		07-Apr-98	0.0058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		13-Jul-98	< 0.0050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-5		20-Oct-98	0.053 J8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		12-Jan-99	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		20-Apr-99	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		13-Jul-99	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		11-Oct-99	0.0096	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		18-Jan-00	0.0066	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		27-Apr-00	0.0053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		25-Jul-00	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		10-Oct-00	0.0094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		17-Jan-01	0.0087	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		09-Apr-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		02-Jul-01	0.0073	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		12-Oct-01	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		12-Oct-01	0.0078	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		09-Jan-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		09-Jan-02	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		08-Apr-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		08-Jul-02	0.0089 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		07-Oct-02	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		14-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		15-Apr-03	0.0068	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		08-Jul-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		27-Oct-03	0.0085	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		19-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		03-May-04	0.0069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		12-Jul-04	0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		13-Oct-04	0.009	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		13-Oct-04	0.0069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		19-Jan-05	0.0082	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		19-Apr-05	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-5		18-Jul-05	0.0083	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		24-Oct-05	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		23-Jan-06	0.0079	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		18-Apr-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		20-Apr-07	0.0053	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		16-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		14-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		28-Apr-10	0.0063	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		15-Apr-11	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		21-Jul-11	<0.0071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		12-Oct-11	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		23-Feb-12	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		17-Apr-12	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		23-Oct-12	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		19-Apr-13	0.0069	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		08-Oct-13	0.0065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		29-Apr-14	0.0067	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-5		30-Oct-14	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		11-Oct-99	0.0099	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		20-Jan-00	0.0067	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		28-Apr-00	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		25-Jul-00	0.018 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		10-Oct-00	0.0088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		16-Nov-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.12
RP-BW-02		18-Jan-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.02
DUP		18-Jan-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		10-Jan-02	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		10-Jan-02	0.0065	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		15-Jan-03	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		20-Jan-04	0.12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
RP-BW-02		15-Jul-04	0.0057	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		19-Jan-05	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		25-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		17-Apr-07	0.054	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		17-Apr-08	0.0096	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		15-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RP-BW-02		30-Apr-10	0.0087	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		14-Oct-99	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		13-Jan-00	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		27-Apr-00	0.0088	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		24-Jul-00	<0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		11-Oct-00	0.0062	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		25-Jan-01	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		09-Jan-02	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		17-Jan-03	0.0058	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		21-Jan-04	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		20-Jan-05	0.011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		24-Jan-06	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		19-Apr-07	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		16-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		16-Apr-08	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		16-Apr-08	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		15-Apr-09	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-01		27-Apr-10	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-02		25-Jan-01	0.0076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-02		10-Apr-01	0.0061	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-02		06-Jul-01	<0.014	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-02		15-Oct-01	0.0099	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-02		09-Jan-02	<0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-02		17-Jan-03	0.0076	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
SA-AW-02		22-Jan-04	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-02		20-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-02		25-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		12-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
SA-AW-03		19-Jan-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		27-Apr-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		24-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		11-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		18-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.071
SA-AW-03		09-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		17-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		21-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		21-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-03		25-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		14-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		19-Jan-00	0.017 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Jan-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		27-Apr-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		27-Apr-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		24-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		24-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		11-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		25-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		09-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		17-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		21-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		18-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		18-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-04		25-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
SA-AW-04		20-Apr-07	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		14-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		14-Oct-99	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		19-Jan-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		27-Apr-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		24-Jul-00	< 0.005 UJ	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		11-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		11-Oct-00	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		18-Jan-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
SA-AW-05		09-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		17-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		17-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		21-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		18-Jan-05	0.012	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		25-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-AW-05		17-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		14-Oct-99	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		13-Jan-00	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		27-Apr-00	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		24-Jul-00	0.032 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		11-Oct-00	0.039	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		11-Oct-00	0.044	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		16-Nov-00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.036
SA-BW-01		22-Jan-01	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
SA-BW-01		10-Jan-02	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		17-Jan-03	0.034	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		21-Jan-04	0.033	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		20-Jan-05	0.03	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		24-Jan-06	0.026	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		29-Aug-06	0.028	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
SA-BW-01		19-Apr-07	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		17-Oct-07	0.036	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		16-Apr-08	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		08-Oct-08	0.035	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		08-Oct-08	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		15-Apr-09	0.016	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		26-Oct-09	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		26-Apr-10	0.025	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SA-BW-01		19-Oct-10	0.027	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		19-Oct-10	0.024	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AH-21		03-Nov-00	< 0.005	0.059	< 0.002	< 0.005	< 0.003	< 0.01	NA	< 0.005	< 0.005	< 0.01	< 0.02
SP-AH-21		03-Nov-00	NA	NA	NA	NA	NA	NA	< 0.0002	NA	NA	NA	NA
SP-AH-21		16-Nov-00	< 0.005	0.062	< 0.002	< 0.005	< 0.003	< 0.01	NA	< 0.005	< 0.005	< 0.01	< 0.02
SP-AH-21		16-Nov-00	NA	NA	NA	NA	NA	NA	< 0.0002	NA	NA	NA	NA
DUP		16-Nov-00	< 0.005	0.058	< 0.002	< 0.005	< 0.003	< 0.01	NA	< 0.005	< 0.005	< 0.01	< 0.02
DUP		16-Nov-00	NA	NA	NA	NA	NA	NA	< 0.0002	NA	NA	NA	NA
SP-AW-06		18-Jan-01	0.0052	NA	NA	NA	NA	NA	NA	NA	NA	NA	< 0.02
SP-AW-06		09-Apr-01	0.007	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		06-Jul-01	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		15-Oct-01	0.0072	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		08-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		08-Jan-02	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		03-Apr-02	0.0052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		17-Jan-03	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		20-Jan-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		04-May-04	0.0052	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		04-May-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		15-Jul-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		14-Oct-04	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		18-Jan-05	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc
SP-AW-06		19-Apr-05	0.0071	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		21-Jul-05	0.0098	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		25-Jan-06	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		20-Apr-07	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		18-Apr-08	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		18-Apr-08	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		14-Apr-09	< 0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SP-AW-06		29-Apr-10	0.0017	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
DUP		29-Apr-10	0.0011	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: All notes are listed at the end of this table - see last page.

Table D-4
Summary of Historical Inorganic Compounds in Groundwater Monitoring Wells
The Sherwin-Williams Company
Emeryville, California
Concentrations reported in milligrams per liter (mg/L)

Well Number	Notes	Date Sampled	Arsenic	Barium	Beryllium	Cadmium	Lead	Total Chromium	Mercury	Selenium	Silver	Vanadium	Zinc

Data QA/QC performed by EW.

Notes:

Samples were analyzed using EPA Method 200/6000/7000 series for selected metals.

< = Analyte was not detected at or greater than the detection limit reported. For some historical samples, detection limit was not available.

na = Not analyzed

DUP = Duplicate sample (field duplicate)

(a) Concentrations for LF-B1 may not represent B-zone water quality because LF-B1 is screened in the aquitard between the A- and B-zones.

(b) Concentrations for LF-B5 may not represent B-zone water quality because LF-B5 is screened in the aquitard between the A- and B-zones.

(c) The samples collected from wells LF-27 and LF-28 may have inadvertently been switched during field or laboratory procedures, as indicated by the concentrations of arsenic in these samples during the first quarter 2004 monitoring event.
(d) Results of split samples taken on behalf of CDM.

* Three groundwater samples were collected from well CDM-1 on 12/8/06 by Camp Dresser McKee, Inc. (CDM). According to CDM, two groundwater samples were collected from approximately 9.8 feet below top of casing (TOC); the samples were analyzed by two different laboratories by different analytical methods; reported dissolved arsenic concentrations were 9.8 and 11.8 mg/l, as analyzed by EPA Methods 6010B and 1637, respectively. The third groundwater sample (*) was collected from approximately 12.2 feet below TOC, was analyzed by EPA Method 1632, and the reported dissolved arsenic concentration was 12.08 mg/l.

MD-1 through MD-4 are wells monitored by SLR consulting, and MD-5 is monitored by EKI personnel.

Data Qualifiers:

J = Concentration or detection limit is estimated.

U = Quantified as nondetect.
U5 = Qualified as nondetect (U) based on field blank contamination evaluation.

J8 = Concentration is estimated because laboratory control spike and/or laboratory control duplicate spike percent recoveries were outside of control limits.

UJ8 = Nondetected value is estimated because laboratory control spike and/or laboratory control duplicate spike percent recoveries were outside of control limits.

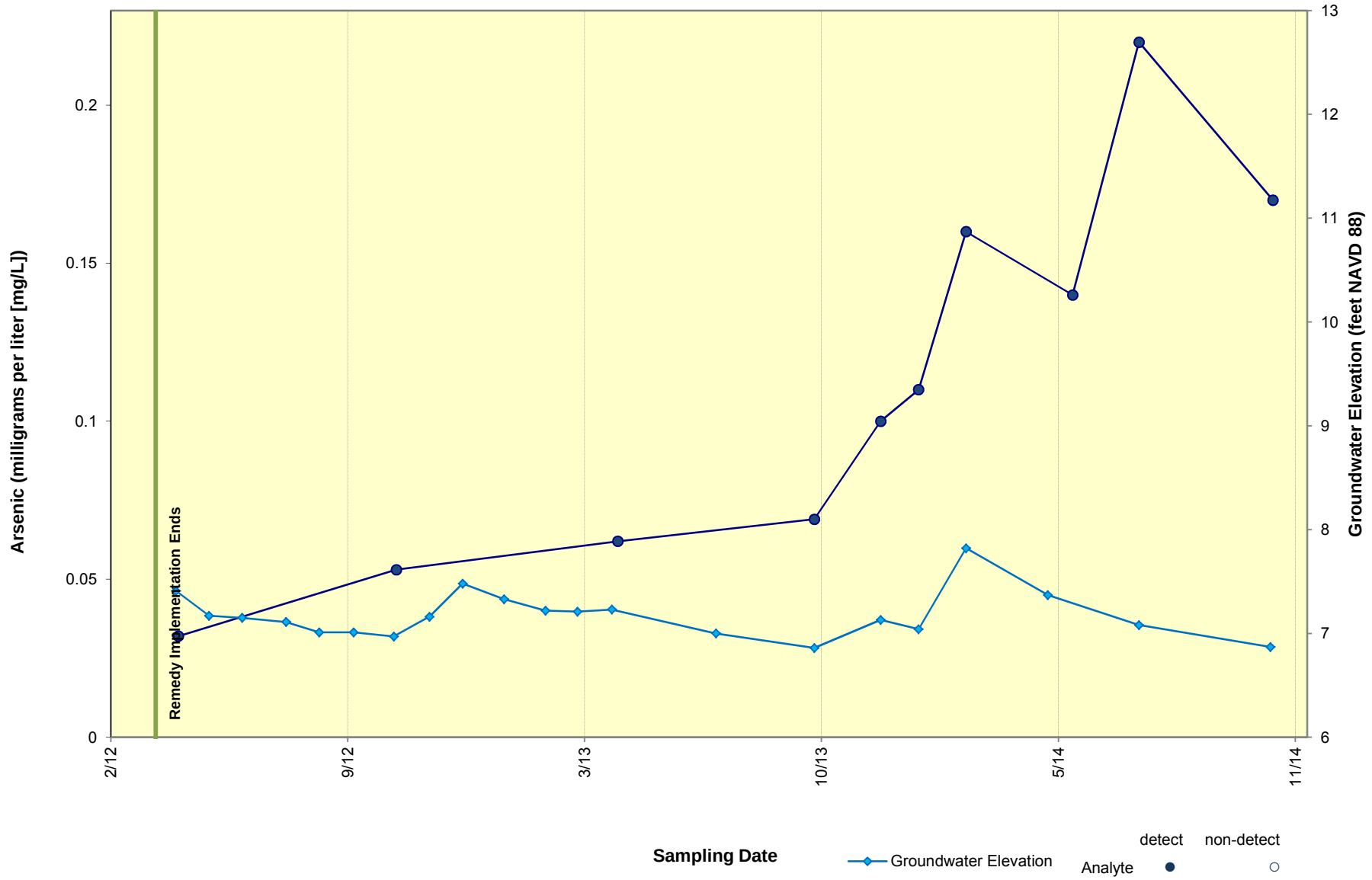
R = Rejected

F = Field Filtered

ARCADIS

Appendix E

Arsenic Concentration Trend Plots for CDM-108

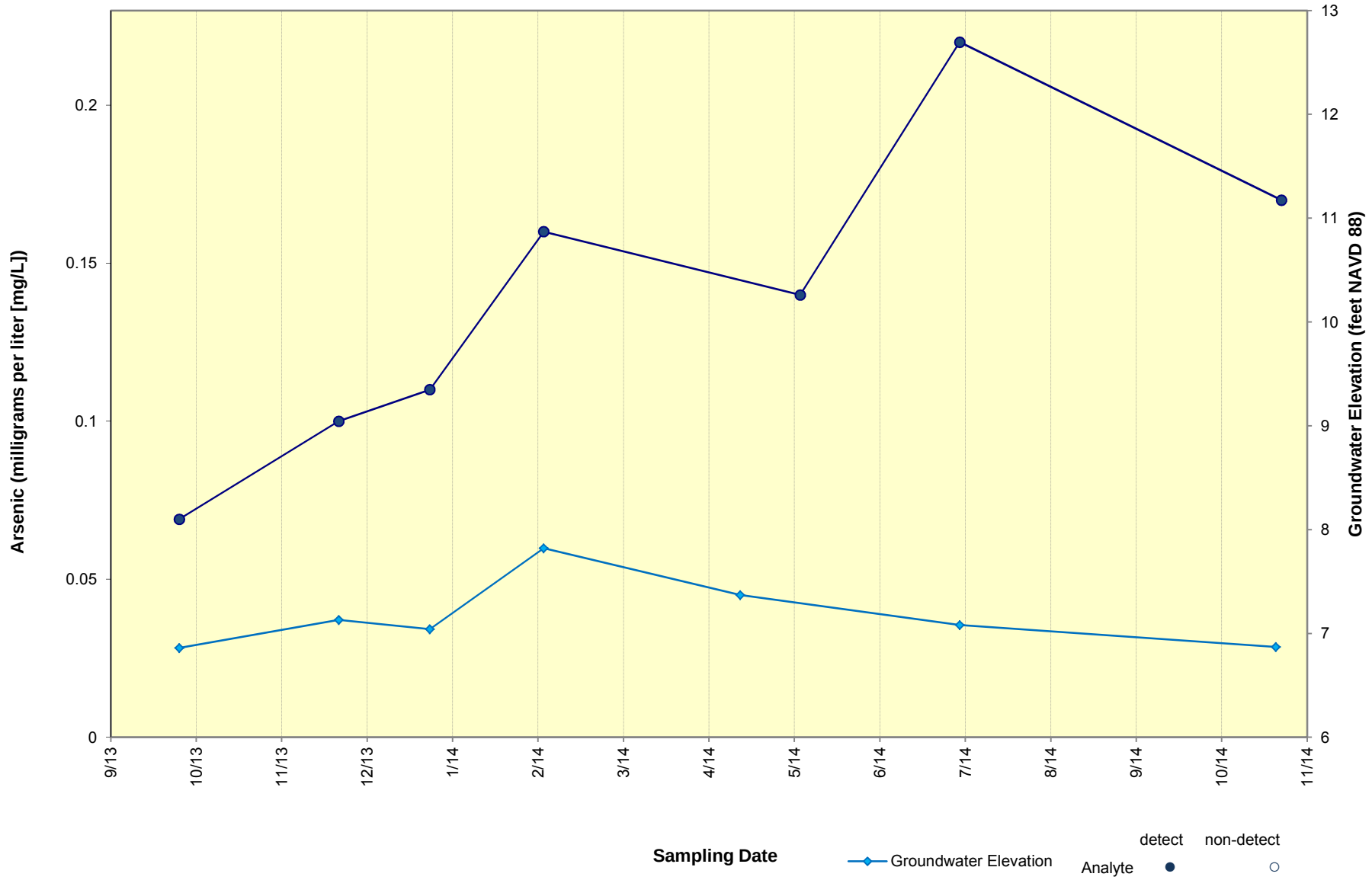


ARCADIS

Concentration and Groundwater Elevation vs. Time Plot – Arsenic in CDM-108

The Sherwin-Williams Company, Emeryville, California

Figure E-1a



ARCADIS

Concentration and Groundwater Elevation vs. Time Plot – Arsenic in CDM-108

The Sherwin-Williams Company, Emeryville, California

Figure E-1b

ARCADIS

Appendix F

Electronic Copies of Groundwater Chain-of-Custody Forms and Analytical Laboratory Reports

Well IDs associated with sampling IDs in analytical laboratory reports are provided in Appendix C.


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 258777
ANALYTICAL REPORT

Arcadis	Project : EM002616.0014.00401
2000 Powell St.	Location : Sherwin Williams-Emeryville
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
971-070814	258777-001
991A-070814	258777-002
991B-070814	258777-003
30-36-108-070814	258777-004
30-36-108-070814-D	258777-005

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 07/21/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**258777**
Client:	**Arcadis**
Project:	**EM002616.0014.00401**
Location:	**Sherwin Williams-Emeryville**
Request Date:	**07/08/14**
Samples Received:	**07/08/14**

This data package contains sample and QC results for five water samples, requested for the above referenced project on 07/08/14. The samples were received cold and intact. All data were e-mailed to Erica Whiting on 07/21/14.

Metals (EPA 6010B):
No analytical problems were encountered.

CHAIN OF CUSTODY

Curtis & Tompkins Laboratories
ENVIRONMENTAL ANALYTICAL TESTING LABORATORY
In Business Since 1878

2323 Fifth Street
Berkeley, CA 94710

Phone (510) 486-0900
Fax (510) 486-0532

Chain of Custody # _____

C&T LOGIN # 258777

Project No: EM002616.0014.00401
Project Name: Sherwin Williams
Project P. O. No:
EDD Format: Report Level ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH _____ ☒ Standard

Sampler: Miljan Draganic
Report To: Erica Whiting
Company: ARCADIS
Telephone:
Email: on file

Lab No.	Sample ID.	SAMPLING		MATRIX				# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST
		Date Collected	Time Collected	Water	Solid				HCl	H2SO4	HNO3	NaOH	None	Dissolved Arsenic (6010) ⊛
1	971-070814	7-8-14	1200	X				1					X	X
2	991A-070814	↓	1210	X				1					X	X
3	991B-070814		1240	X				1					X	X
4	30-36-108-070814		1250	X				1					X	X
5	30-36-108-070814-D	↓	1255	X				1					X	X

Notes:
⊛ Please filter As sample in Lab, UPON ARRIVAL.

QAPP Project

SAMPLE RECEIPT
☒ Intact
☒ Cold
☒ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 7/8/14 TIME: 1345
DATE: TIME:
DATE: TIME:

RECEIVED BY:
DATE: 7/8/14 TIME: 13:47
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 258777 Date Received 07/08/14 Number of coolers 1
Client ARCADIS Project EM002616.0014.00404

Date Opened 7/8/14 By (print) MC (sign)
Date Logged in " By (print) " (sign) "

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)
Shipping info

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
How many Name Date
2B. Were custody seals intact upon arrival? YES NO (N/A)
3. Were custody papers dry and intact when received? (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe)

☒ Bubble Wrap ☐ Foam blocks ☐ Bags ☒ None MC 7/8
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 3.1

☐ Samples received on ice & cold without a temperature blank; temp taken with IR gun

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)
If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? (YES) NO
10. Are there any missing / extra samples? YES (NO)
11. Are samples in the appropriate containers for indicated tests? (YES) NO
12. Are sample labels present, in good condition and complete? (YES) NO
13. Do the sample labels agree with custody papers? (YES) NO
14. Was sufficient amount of sample sent for tests requested? (YES) NO
15. Are the samples appropriately preserved? YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? YES NO (N/A)
17. Did you document your preservative check? YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? YES NO (N/A)
21. Was the client contacted concerning this sample delivery? YES (NO)
If YES, Who was called? By Date:

COMMENTS

Rev 10, 10/11

Curtis & Tompkins, Ltd.

Detections Summary for 258777

Client : Arcadis
Project : EM002616.0014.00401
Location : Sherwin Williams-Emeryville

Client Sample ID : 971-070814 Laboratory Sample ID : 258777-001

No Detections

Client Sample ID : 991A-070814 Laboratory Sample ID : 258777-002

No Detections

Client Sample ID : 991B-070814 Laboratory Sample ID : 258777-003

No Detections

Client Sample ID : 30-36-108-070814 Laboratory Sample ID : 258777-004

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Arsenic	220		5.0	1.3	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 30-36-108-070814-D Laboratory Sample ID : 258777-005

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Arsenic	230		5.0	1.3	ug/L	DISS.	1.000	EPA 6010B	METHOD

Curtis & Tompkins, Ltd.

Dissolved Arsenic

Lab #:	258777	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Sampled:	07/08/14
Matrix:	Filtrate	Received:	07/08/14
Units:	ug/L	Prepared:	07/11/14
Diln Fac:	1.000	Analyzed:	07/18/14
Batch#:	213189		

Field ID	Type	Lab ID	Result	RL
971-070814	SAMPLE	258777-001	ND	5.0
991A-070814	SAMPLE	258777-002	ND	5.0
991B-070814	SAMPLE	258777-003	ND	5.0
30-36-108-070814	SAMPLE	258777-004	220	5.0
30-36-108-070814-D	SAMPLE	258777-005	230	5.0
	BLANK	QC748782	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Arsenic

Lab #:	258777	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Batch#:	213189
Field ID:	ZZZZZZZZZZ	Sampled:	07/08/14
MSS Lab ID:	258799-001	Received:	07/08/14
Matrix:	Filtrate	Prepared:	07/11/14
Units:	ug/L	Analyzed:	07/18/14
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC748783		100.0	98.98	99	80-120		
BSD	QC748784		100.0	97.86	98	80-120	1	20
MS	QC748785	<1.293	100.0	114.9	115	79-126		
MSD	QC748786		100.0	109.7	110	79-126	5	20

RPD= Relative Percent Difference


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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 262026
ANALYTICAL REPORT

Arcadis	Project : EM002616.0014.00401
2000 Powell St.	Location : Sherwin Williams-Emeryville
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
991A-102714	262026-001
991B-102714	262026-002
50-36-103-102714	262026-003
50-36-103-102714-D	262026-004

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 11/03/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**262026**
Client:	**Arcadis**
Project:	**EM002616.0014.00401**
Location:	**Sherwin Williams-Emeryville**
Request Date:	**10/27/14**
Samples Received:	**10/27/14**

This data package contains sample and QC results for four water samples, requested for the above referenced project on 10/27/14. The samples were received cold and intact. All data were e-mailed to Erica Whiting on 11/03/14.

Metals (EPA 6010B):
No analytical problems were encountered.

CHAIN OF CUSTODY

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Fax (510) 486-0532

Chain of Custody # _____

C&T LOGIN # 262026

Project No: EM002616.0014.00401
Project Name: Sherwin Williams
Project P. O. No:
EDD Format: Report Level ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH ☒ Standard

Sampler: Miljan D. & Miguel G.
Report To: Erica Whiting
Company: ARCADIS
Telephone:
Email: on file

Lab No.	Sample ID.	SAMPLING		MATRIX				# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST
		Date Collected	Time Collected	Water	Solid				HCl	H2SO4	HNO3	NaOH	None	Dissolved Arsenic (6010)
	991A-102714	10/27/14	1345	X				1					X	X
	991B-102714	↓	1350	X				1					X	X
	50-36-103-102714		1650	X				1					X	X
	50-36-103-102714-D	↓	1655	X				1					X	X

Notes:
⊛ Lab to Filter upon arrival.
- QAPP Project

SAMPLE RECEIPT
☒ Intact
☒ Cold
☒ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 10/27/14 TIME: 1720
DATE: TIME:
DATE: TIME:

RECEIVED BY:
DATE: 10/27/14 TIME: 17:20
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST Curtis & Tompkins, Ltd.

Login # 262026 Date Received 10/27/14 Number of coolers 1
Client Arcadis Project EM002616.0014.00401

Date Opened 10/27 By (print) ME (sign)
Date Logged in 1 By (print) 1 (sign)

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)
Shipping info

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
How many Name Date
2B. Were custody seals intact upon arrival? YES NO (N/A)
3. Were custody papers dry and intact when received? (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe)

☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☐ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 1.3

☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)
If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? (YES) NO
10. Are there any missing / extra samples? YES (NO)
11. Are samples in the appropriate containers for indicated tests? (YES) NO
12. Are sample labels present, in good condition and complete? (YES) NO
13. Do the sample labels agree with custody papers? (YES) NO
14. Was sufficient amount of sample sent for tests requested? (YES) NO
15. Are the samples appropriately preserved? YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? YES NO (N/A)
17. Did you document your preservative check? YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? YES NO (N/A)
21. Was the client contacted concerning this sample delivery? YES (NO)
If YES, Who was called? By Date:

COMMENTS

Rev 10, 9/12

Curtis & Tompkins, Ltd.

Detections Summary for 262026

Results for any subcontracted analyses are not included in this summary.

Client : Arcadis
Project : EM002616.0014.00401
Location : Sherwin Williams-Emeryville

Client Sample ID : 991A-102714 Laboratory Sample ID : 262026-001

No Detections

Client Sample ID : 991B-102714 Laboratory Sample ID : 262026-002

No Detections

Client Sample ID : 50-36-103-102714 Laboratory Sample ID : 262026-003

No Detections

Client Sample ID : 50-36-103-102714-D Laboratory Sample ID : 262026-004

No Detections

Curtis & Tompkins, Ltd.

Dissolved Arsenic

Lab #:	262026	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Sampled:	10/27/14
Matrix:	Filtrate	Received:	10/27/14
Units:	ug/L	Prepared:	10/29/14
Diln Fac:	1.000	Analyzed:	10/30/14
Batch#:	216916		

Field ID	Type	Lab ID	Result	RL
991A-102714	SAMPLE	262026-001	ND	5.0
991B-102714	SAMPLE	262026-002	ND	5.0
50-36-103-102714	SAMPLE	262026-003	ND	5.0
50-36-103-102714-D	SAMPLE	262026-004	ND	5.0
	BLANK	QC763599	ND	5.0
	BLANK	QC763600	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Arsenic

Lab #:	262026	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Batch#:	216916
Field ID:	ZZZZZZZZZZ	Sampled:	10/27/14
MSS Lab ID:	262037-001	Received:	10/28/14
Matrix:	Filtrate	Prepared:	10/29/14
Units:	ug/L	Analyzed:	10/30/14
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC763601		100.0	94.79	95	80-120		
BSD	QC763602		100.0	101.5	101	80-120	7	20
MS	QC763603	1.385	100.0	109.6	108	79-126		
MSD	QC763604		100.0	106.8	105	79-126	3	20

RPD= Relative Percent Difference


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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 262055
ANALYTICAL REPORT

Arcadis	Project : EM002616.0014.00401
2000 Powell St.	Location : Sherwin Williams-Emeryville
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
991A-102814	262055-001
991B-102814	262055-002
40-36-040-102814	262055-003
40-36-041-102814	262055-004
40-36-003-102814	262055-005
40-36-037-102814	262055-006
50-36-106-102814	262055-007
50-36-105-102814	262055-008
40-36-041-102814-D	262055-009

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 11/05/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**262055**
Client:	**Arcadis**
Project:	**EM002616.0014.00401**
Location:	**Sherwin Williams-Emeryville**
Request Date:	**10/28/14**
Samples Received:	**10/28/14**

This data package contains sample and QC results for nine water samples, requested for the above referenced project on 10/28/14. The samples were received cold and intact. All data were e-mailed to Erica Whiting on 11/05/14.

Metals (EPA 6010B):
No analytical problems were encountered.

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Chain of Custody # _____

C&T LOGIN # 202055

Project No: EM002616.0014.00401
Project Name: Sherwin Williams
Project P. O. No:
EDD Format: Report Level ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH _____ ☒ Standard

Sampler: Miljan D. & Miguel G.
Report To: Erica Whiting
Company: ARCADIS
Telephone:
Email: on file

Lab No.	Sample ID.	SAMPLING		MATRIX				# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST
		Date Collected	Time Collected	Water	Solid				HCl	H2SO4	HNO3	NaOH	None	Dissolved Arsenic (6010) ⊛
1	991A-102814	10-28-14	0900	X				1					X	X
2	991B-102814		0905	X				1					X	X
3	40-36-040-102814		0950	X				1					X	X
4	40-36-041-102814		1040	X				1					X	X
5	40-36-003-102814		1310	X				1					X	X
6	40-36-037-102814		1405	X				1					X	X
7	50-36-106-102814		1505	X				1					X	X
8	50-36-105-102814		1600	X				1					X	X
9	40-36-041-102814-D	↓	1045	X				1					X	X

Notes:
⊛ Lab to filter upon arrival.

QAPP Project

SAMPLE RECEIPT
☑ Intact
☑ Cold
☑ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 10/28/14 TIME: 1700
DATE: TIME:
DATE: TIME:

RECEIVED BY:
DATE: 10/28/14 TIME: 1705
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST Curtis & Tompkins, Ltd.

Login # 462055 Date Received 10/28/14 Number of coolers 1
Client ARCADIS Project EM002616.0014.00401

Date Opened 10/28 By (print) A (sign)
Date Logged in " " By (print) " " (sign) "

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)
Shipping info

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
How many Name Date
2B. Were custody seals intact upon arrival? YES NO (N/A)
3. Were custody papers dry and intact when received? (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe)

☐ Bubble Wrap ☐ Foam blocks ☒ Bags ☐ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C
Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 1.0°
☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun
☒ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)
If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? (YES) NO
10. Are there any missing / extra samples? YES (NO)
11. Are samples in the appropriate containers for indicated tests? (YES) NO
12. Are sample labels present, in good condition and complete? (YES) NO
13. Do the sample labels agree with custody papers? (YES) NO
14. Was sufficient amount of sample sent for tests requested? (YES) NO
15. Are the samples appropriately preserved? YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? YES NO (N/A)
17. Did you document your preservative check? YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? YES NO (N/A)
21. Was the client contacted concerning this sample delivery? YES (NO)
If YES, Who was called? By Date:

COMMENTS

Rev 10, 9/12

Curtis & Tompkins, Ltd.

Detections Summary for 262055

Results for any subcontracted analyses are not included in this summary.

Client : Arcadis
Project : EM002616.0014.00401
Location : Sherwin Williams-Emeryville

Client Sample ID : 991A-102814 Laboratory Sample ID : 262055-001

No Detections

Client Sample ID : 991B-102814 Laboratory Sample ID : 262055-002

No Detections

Client Sample ID : 40-36-040-102814 Laboratory Sample ID : 262055-003

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	9.3		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-041-102814 Laboratory Sample ID : 262055-004

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	69		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-003-102814 Laboratory Sample ID : 262055-005

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	5.7		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-037-102814 Laboratory Sample ID : 262055-006

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	6.9		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 50-36-106-102814 Laboratory Sample ID : 262055-007

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	1,800		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 50-36-105-102814 Laboratory Sample ID : 262055-008

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	60		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Curtis & Tompkins, Ltd.

Client Sample ID : 40-36-041-102814-D Laboratory Sample ID : 262055-009

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	69		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Curtis & Tompkins, Ltd.

Dissolved Arsenic

Lab #:	262055	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Batch#:	216960
Matrix:	Filtrate	Sampled:	10/28/14
Units:	ug/L	Received:	10/28/14
Diln Fac:	1.000	Prepared:	10/30/14

Field ID	Type	Lab ID	Result	RL	Analyzed
991A-102814	SAMPLE	262055-001	ND	5.0	11/03/14
991B-102814	SAMPLE	262055-002	ND	5.0	11/03/14
40-36-040-102814	SAMPLE	262055-003	9.3	5.0	11/03/14
40-36-041-102814	SAMPLE	262055-004	69	5.0	11/03/14
40-36-003-102814	SAMPLE	262055-005	5.7	5.0	11/03/14
40-36-037-102814	SAMPLE	262055-006	6.9	5.0	11/03/14
50-36-106-102814	SAMPLE	262055-007	1,800	5.0	11/03/14
50-36-105-102814	SAMPLE	262055-008	60	5.0	11/03/14
40-36-041-102814-D	SAMPLE	262055-009	69	5.0	11/03/14
	BLANK	QC763768	ND	5.0	11/02/14

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Arsenic

Lab #:	262055	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Diln Fac:	1.000
Field ID:	991A-102814	Batch#:	216960
MSS Lab ID:	262055-001	Sampled:	10/28/14
Matrix:	Filtrate	Received:	10/28/14
Units:	ug/L	Prepared:	10/30/14

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Analyzed
BS	QC763769		100.0	89.40	89	80-120			11/02/14
BSD	QC763770		100.0	91.85	92	80-120	3	20	11/02/14
MS	QC763771	<1.028	100.0	103.7	104	79-126			11/03/14
MSD	QC763772		100.0	109.4	109	79-126	5	20	11/03/14

RPD= Relative Percent Difference


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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

Laboratory Job Number 262086
ANALYTICAL REPORT

Arcadis	Project : EM002616.0014.00401
2000 Powell St.	Location : Sherwin Williams-Emeryville
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
971-102914	262086-001
981-102914	262086-002
991A-102914	262086-003
991B-102914	262086-004
40-36-102-102914	262086-005
40-36-101-102914	262086-006
40-36-101-102914-D	262086-007
30-36-108-102914	262086-008
30-36-107-102914	262086-009

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 11/14/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**262086**
Client:	**Arcadis**
Project:	**EM002616.0014.00401**
Location:	**Sherwin Williams-Emeryville**
Request Date:	**10/29/14**
Samples Received:	**10/29/14**

This data package contains sample and QC results for nine water samples, requested for the above referenced project on 10/29/14. The samples were received cold and intact. All data were e-mailed to Erica Whiting on 11/14/14.

Volatile Organics by GC/MS (EPA 8260B):
Many analytes were detected between the MDL and the RL in the method blank for batch 217173; these analytes were not detected in samples at or above the RL. No other analytical problems were encountered.

Metals (EPA 6010B):
No analytical problems were encountered.

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2323 Fifth Street
Berkeley, CA 94710

Phone (510) 486-0900
Fax (510) 486-0532

Chain of Custody # _____

C&T LOGIN # 267086

Project No: EM002616.0014.00401
Project Name: Sherwin Williams
Project P. O. No:
EDD Format: Report Level ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH _____ ☒ Standard

Sampler: Miljan D. & Miguel G.
Report To: Erica Whiting
Company: ARCADIS
Telephone: file
Email: on

Lab No.	Sample ID.	SAMPLING		MATRIX				# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST	
		Date Collected	Time Collected	Water	Solid				HCl	H2SO4	HNO3	NaOH	None	Dissolved Arsenic (6010) ⊛	VOCs (8260B)
1	971-102914	10-29-14	0820	X				4	X				X	X	X
2	981-102914		0800	X				3	X						X
3	991A-102914		0830	X				4	X				X	X	X
4	991B-102914		0845	X				4	X				X	X	X
5	40-36-102-102914		1030	X				4	X				X	X	X
6	40-36-101-102914		1120	X				4	X				X	X	X
7	40-36-101-102914-D		1125	X				4	X				X	X	X
8	30-36-108-102914		1410	X				4	X				X	X	X
9	30-36-107-102914	↓	1605	X				4	X				X	X	X

Notes:
⊛Lab to Filter Arsenic samples upon arrival

@APP Project

SAMPLE RECEIPT
☒ Intact
☒ Cold
☒ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 10/29/14 TIME: 1700
DATE: TIME:
DATE: TIME:

RECEIVED BY:
DATE: 10/29/14 TIME: 1700
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 262086 Date Received 10/29/14 Number of coolers 1
Client ARCADIS Project EM002616.0004.00401

Date Opened 10/29 By (print) MC (sign)
Date Logged in 1 By (print) 1 (sign) 1

1. Did cooler come with a shipping slip (airbill, etc) YES (NO)
   Shipping info
2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
   How many Name Date
2B. Were custody seals intact upon arrival? YES NO (N/A)
3. Were custody papers dry and intact when received? (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe)

☒ Bubble Wrap ☒ Foam blocks ☐ Bags ☐ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 2 1

☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES (NO)
   If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? (YES) NO
10. Are there any missing / extra samples? YES (NO)
11. Are samples in the appropriate containers for indicated tests? (YES) NO
12. Are sample labels present, in good condition and complete? (YES) NO
13. Do the sample labels agree with custody papers? (YES) NO
14. Was sufficient amount of sample sent for tests requested? (YES) NO
15. Are the samples appropriately preserved? (YES) NO N/A
16. Did you check preservatives for all bottles for each sample? YES NO (N/A)
17. Did you document your preservative check? YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? (YES) NO N/A
21. Was the client contacted concerning this sample delivery? YES (NO)
   If YES, Who was called? By Date:

COMMENTS

Rev 10, 9/12

Curtis & Tompkins, Ltd.

Detections Summary for 262086

Results for any subcontracted analyses are not included in this summary.

Client : Arcadis
Project : EM002616.0014.00401
Location : Sherwin Williams-Emeryville

Client Sample ID : 971-102914 Laboratory Sample ID : 262086-001

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Acetone	15		10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Toluene	0.3	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
2-Hexanone	0.4	J	10	0.2	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B

Client Sample ID : 981-102914 Laboratory Sample ID : 262086-002

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Acetone	1.1	J	10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B

Client Sample ID : 991A-102914 Laboratory Sample ID : 262086-003

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Acetone	21		10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Benzene	0.1	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Toluene	0.3	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
2-Hexanone	0.7	J	10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B

Client Sample ID : 991B-102914 Laboratory Sample ID : 262086-004

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Acetone	20		10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Benzene	0.1	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Toluene	0.3	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
2-Hexanone	0.6	J	10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B

Client Sample ID : 40-36-102-102914 Laboratory Sample ID : 262086-005

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Acetone	0.6	J	10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
MTBE	0.5	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
1,1-Dichloroethane	0.2	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
cis-1,2-Dichloroethene	1.6		0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
1,2-Dichloroethane	1.1		0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Arsenic	7.6		5.0		ug/L	DISS.	1.000	EPA 6010B	METHOD

Curtis & Tompkins, Ltd.

Client Sample ID : 40-36-101-102914 Laboratory Sample ID : 262086-006

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Acetone	0.8	J	10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
MTBE	0.8		0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
cis-1,2-Dichloroethene	0.7		0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
1,2-Dichloroethane	0.8		0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Benzene	0.2	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Arsenic	49		5.0		ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-101-102914-D Laboratory Sample ID : 262086-007

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
Acetone	0.9	J	10	0.5	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
MTBE	0.8		0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
cis-1,2-Dichloroethene	0.7		0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
1,2-Dichloroethane	0.8		0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Benzene	0.2	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Arsenic	50		5.0		ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 30-36-108-102914 Laboratory Sample ID : 262086-008

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
MTBE	0.3	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
cis-1,2-Dichloroethene	0.3	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
1,2-Dichloroethane	0.2	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Chlorobenzene	0.2	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
tert-Butylbenzene	0.2	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Arsenic	170		5.0		ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 30-36-107-102914 Laboratory Sample ID : 262086-009

Analyte	Result	Flags	RL	MDL	Units	Basis	IDF	Method	Prep Method
MTBE	0.5	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Chlorobenzene	0.1	J	0.5	0.1	ug/L	As Recd	1.000	EPA 8260B	EPA 5030B
Arsenic	9.8		5.0		ug/L	DISS.	1.000	EPA 6010B	METHOD

J = Estimated value

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	971-102914	Batch#:	217371
Lab ID:	262086-001	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/12/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.1
Trichlorofluoromethane	ND	1.0	0.1
Acetone	15	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.1
Carbon Disulfide	ND	0.5	0.1
MTBE	ND	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.1
Vinyl Acetate	ND	10	0.2
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.2
cis-1,2-Dichloroethene	ND	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	ND	0.5	0.1
Benzene	ND	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.2
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	0.3 J	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	0.4 J	10	0.2
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.2
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	971-102914	Batch#:	217371
Lab ID:	262086-001	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/12/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.2
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.2
Naphthalene	ND	2.0	0.2
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	96	77-136
1,2-Dichloroethane-d4	94	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	97	80-120

J= Estimated value
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MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	981-102914	Batch#:	217371
Lab ID:	262086-002	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/12/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.1
Trichlorofluoromethane	ND	1.0	0.1
Acetone	1.1 J	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.1
Carbon Disulfide	ND	0.5	0.1
MTBE	ND	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.1
Vinyl Acetate	ND	10	0.2
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.2
cis-1,2-Dichloroethene	ND	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	ND	0.5	0.1
Benzene	ND	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.2
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	ND	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	ND	10	0.2
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.2
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	981-102914	Batch#:	217371
Lab ID:	262086-002	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/12/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.2
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.2
Naphthalene	ND	2.0	0.2
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	95	77-136
1,2-Dichloroethane-d4	95	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	96	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	991A-102914	Batch#:	217173
Lab ID:	262086-003	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.3
Trichlorofluoromethane	ND	1.0	0.2
Acetone	21	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.4
Carbon Disulfide	ND	0.5	0.1
MTBE	ND	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.2
Vinyl Acetate	ND	10	1.0
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.5
cis-1,2-Dichloroethene	ND	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	ND	0.5	0.1
Benzene	0.1 J	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.5
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	0.3 J	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	0.7 J	10	0.5
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.1
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	991A-102914	Batch#:	217173
Lab ID:	262086-003	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.5
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.4
Naphthalene	ND	2.0	0.1
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	102	77-136
1,2-Dichloroethane-d4	102	75-139
Toluene-d8	102	80-120
Bromofluorobenzene	104	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	991B-102914	Batch#:	217173
Lab ID:	262086-004	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.3
Trichlorofluoromethane	ND	1.0	0.2
Acetone	20	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.4
Carbon Disulfide	ND	0.5	0.1
MTBE	ND	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.2
Vinyl Acetate	ND	10	1.0
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.5
cis-1,2-Dichloroethene	ND	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	ND	0.5	0.1
Benzene	0.1 J	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.5
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	0.3 J	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	0.6 J	10	0.5
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.1
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	991B-102914	Batch#:	217173
Lab ID:	262086-004	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.5
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.4
Naphthalene	ND	2.0	0.1
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	103	77-136
1,2-Dichloroethane-d4	102	75-139
Toluene-d8	102	80-120
Bromofluorobenzene	105	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	40-36-102-102914	Batch#:	217173
Lab ID:	262086-005	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.3
Trichlorofluoromethane	ND	1.0	0.2
Acetone	0.6 J	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.4
Carbon Disulfide	ND	0.5	0.1
MTBE	0.5 J	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.2
Vinyl Acetate	ND	10	1.0
1,1-Dichloroethane	0.2 J	0.5	0.1
2-Butanone	ND	10	0.5
cis-1,2-Dichloroethene	1.6	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	1.1	0.5	0.1
Benzene	ND	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.5
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	ND	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	ND	10	0.5
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.1
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	40-36-102-102914	Batch#:	217173
Lab ID:	262086-005	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.5
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.4
Naphthalene	ND	2.0	0.1
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	103	77-136
1,2-Dichloroethane-d4	104	75-139
Toluene-d8	101	80-120
Bromofluorobenzene	105	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	40-36-101-102914	Batch#:	217173
Lab ID:	262086-006	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.3
Trichlorofluoromethane	ND	1.0	0.2
Acetone	0.8 J	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.4
Carbon Disulfide	ND	0.5	0.1
MTBE	0.8	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.2
Vinyl Acetate	ND	10	1.0
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.5
cis-1,2-Dichloroethene	0.7	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	0.8	0.5	0.1
Benzene	0.2 J	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.5
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	ND	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	ND	10	0.5
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.1
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	40-36-101-102914	Batch#:	217173
Lab ID:	262086-006	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.5
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.4
Naphthalene	ND	2.0	0.1
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	106	77-136
1,2-Dichloroethane-d4	106	75-139
Toluene-d8	101	80-120
Bromofluorobenzene	105	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	40-36-101-102914-D	Batch#:	217173
Lab ID:	262086-007	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.3
Trichlorofluoromethane	ND	1.0	0.2
Acetone	0.9 J	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.4
Carbon Disulfide	ND	0.5	0.1
MTBE	0.8	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.2
Vinyl Acetate	ND	10	1.0
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.5
cis-1,2-Dichloroethene	0.7	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	0.8	0.5	0.1
Benzene	0.2 J	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.5
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	ND	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	ND	10	0.5
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.1
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	40-36-101-102914-D	Batch#:	217173
Lab ID:	262086-007	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.5
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.4
Naphthalene	ND	2.0	0.1
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	105	77-136
1,2-Dichloroethane-d4	107	75-139
Toluene-d8	102	80-120
Bromofluorobenzene	104	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	30-36-108-102914	Batch#:	217173
Lab ID:	262086-008	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.3
Trichlorofluoromethane	ND	1.0	0.2
Acetone	ND	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.4
Carbon Disulfide	ND	0.5	0.1
MTBE	0.3 J	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.2
Vinyl Acetate	ND	10	1.0
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.5
cis-1,2-Dichloroethene	0.3 J	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	0.2 J	0.5	0.1
Benzene	ND	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.5
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	ND	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	ND	10	0.5
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	0.2 J	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.1
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	30-36-108-102914	Batch#:	217173
Lab ID:	262086-008	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	0.2 J	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.5
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.4
Naphthalene	ND	2.0	0.1
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	104	77-136
1,2-Dichloroethane-d4	105	75-139
Toluene-d8	102	80-120
Bromofluorobenzene	105	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	30-36-107-102914	Batch#:	217173
Lab ID:	262086-009	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/07/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.3
Trichlorofluoromethane	ND	1.0	0.2
Acetone	ND	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.4
Carbon Disulfide	ND	0.5	0.1
MTBE	0.5 J	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.2
Vinyl Acetate	ND	10	1.0
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.5
cis-1,2-Dichloroethene	ND	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	ND	0.5	0.1
Benzene	ND	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.5
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	ND	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	ND	10	0.5
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	0.1 J	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.1
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	30-36-107-102914	Batch#:	217173
Lab ID:	262086-009	Sampled:	10/29/14
Matrix:	Water	Received:	10/29/14
Units:	ug/L	Analyzed:	11/07/14
Diln Fac:	1.000		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.5
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.4
Naphthalene	ND	2.0	0.1
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	105	77-136
1,2-Dichloroethane-d4	106	75-139
Toluene-d8	101	80-120
Bromofluorobenzene	107	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	217173
Units:	ug/L	Analyzed:	11/06/14
Diln Fac:	1.000		

Type: BS Lab ID: QC764602

Analyte	Spiked	Result	%REC	Limits
1,1-Dichloroethene	12.50	13.45	108	65-134
Benzene	12.50	13.20	106	80-124
Trichloroethene	12.50	12.75	102	80-120
Toluene	12.50	13.07	105	80-122
Chlorobenzene	12.50	13.25	106	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	97	77-136
1,2-Dichloroethane-d4	86	75-139
Toluene-d8	102	80-120
Bromofluorobenzene	101	80-120

Type: BSD Lab ID: QC764603

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	12.50	12.24	98	65-134	9	20
Benzene	12.50	12.91	103	80-124	2	20
Trichloroethene	12.50	12.38	99	80-120	3	20
Toluene	12.50	12.74	102	80-122	3	20
Chlorobenzene	12.50	12.82	103	80-120	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	96	77-136
1,2-Dichloroethane-d4	86	75-139
Toluene-d8	102	80-120
Bromofluorobenzene	100	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Type:	BLANK	Dil'n Fac:	1.000
Lab ID:	QC764680	Batch#:	217173
Matrix:	Water	Analyzed:	11/06/14
Units:	ug/L		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.3
Trichlorofluoromethane	ND	1.0	0.2
Acetone	ND	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.4
Carbon Disulfide	ND	0.5	0.1
MTBE	ND	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.2
Vinyl Acetate	ND	10	1.0
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.5
cis-1,2-Dichloroethene	ND	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	ND	0.5	0.1
Benzene	ND	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.5
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	ND	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	ND	10	0.5
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.1
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	0.1 J	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC764680	Batch#:	217173
Matrix:	Water	Analyzed:	11/06/14
Units:	ug/L		

Analyte	Result	RL	MDL
2-Chlorotoluene	ND	0.5	0.1
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	0.1 J	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	0.1 J	0.5	0.1
n-Butylbenzene	0.2 J	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.5
1,2,4-Trichlorobenzene	0.2 J	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.4
Naphthalene	ND	2.0	0.1
1,2,3-Trichlorobenzene	0.1 J	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	100	77-136
1,2-Dichloroethane-d4	91	75-139
Toluene-d8	103	80-120
Bromofluorobenzene	103	80-120

J= Estimated value
ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	217371
Units:	ug/L	Analyzed:	11/12/14
Diln Fac:	1.000		

Type: BS Lab ID: QC765399

Analyte	Spiked	Result	%REC	Limits
1,1-Dichloroethene	12.50	11.82	95	65-134
Benzene	12.50	11.59	93	80-124
Trichloroethene	12.50	12.26	98	80-120
Toluene	12.50	12.05	96	80-122
Chlorobenzene	12.50	12.52	100	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	94	77-136
1,2-Dichloroethane-d4	92	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	94	80-120

Type: BSD Lab ID: QC765400

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	12.50	12.90	103	65-134	9	20
Benzene	12.50	12.09	97	80-124	4	20
Trichloroethene	12.50	13.08	105	80-120	6	20
Toluene	12.50	12.43	99	80-122	3	20
Chlorobenzene	12.50	12.92	103	80-120	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	94	77-136
1,2-Dichloroethane-d4	94	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	94	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Type:	BLANK	Dil'n Fac:	1.000
Lab ID:	QC765401	Batch#:	217371
Matrix:	Water	Analyzed:	11/12/14
Units:	ug/L		

Analyte	Result	RL	MDL
Freon 12	ND	1.0	0.1
Chloromethane	ND	1.0	0.1
Vinyl Chloride	ND	0.5	0.1
Bromomethane	ND	1.0	0.2
Chloroethane	ND	1.0	0.1
Trichlorofluoromethane	ND	1.0	0.1
Acetone	ND	10	0.5
Freon 113	ND	2.0	0.1
1,1-Dichloroethene	ND	0.5	0.1
Methylene Chloride	ND	10	0.1
Carbon Disulfide	ND	0.5	0.1
MTBE	ND	0.5	0.1
trans-1,2-Dichloroethene	ND	0.5	0.1
Vinyl Acetate	ND	10	0.2
1,1-Dichloroethane	ND	0.5	0.1
2-Butanone	ND	10	0.2
cis-1,2-Dichloroethene	ND	0.5	0.1
2,2-Dichloropropane	ND	0.5	0.1
Chloroform	ND	0.5	0.1
Bromochloromethane	ND	0.5	0.2
1,1,1-Trichloroethane	ND	0.5	0.1
1,1-Dichloropropene	ND	0.5	0.1
Carbon Tetrachloride	ND	0.5	0.1
1,2-Dichloroethane	ND	0.5	0.1
Benzene	ND	0.5	0.1
Trichloroethene	ND	0.5	0.1
1,2-Dichloropropane	ND	0.5	0.1
Bromodichloromethane	ND	0.5	0.1
Dibromomethane	ND	0.5	0.1
4-Methyl-2-Pentanone	ND	10	0.2
cis-1,3-Dichloropropene	ND	0.5	0.1
Toluene	ND	0.5	0.1
trans-1,3-Dichloropropene	ND	0.5	0.1
1,1,2-Trichloroethane	ND	0.5	0.1
2-Hexanone	ND	10	0.2
1,3-Dichloropropane	ND	0.5	0.1
Tetrachloroethene	ND	0.5	0.1
Dibromochloromethane	ND	0.5	0.1
1,2-Dibromoethane	ND	0.5	0.1
Chlorobenzene	ND	0.5	0.1
1,1,1,2-Tetrachloroethane	ND	0.5	0.1
Ethylbenzene	ND	0.5	0.1
m,p-Xylenes	ND	0.5	0.1
o-Xylene	ND	0.5	0.1
Styrene	ND	0.5	0.2
Bromoform	ND	1.0	0.1
Isopropylbenzene	ND	0.5	0.1
1,1,2,2-Tetrachloroethane	ND	0.5	0.1
1,2,3-Trichloropropane	ND	0.5	0.1
Propylbenzene	ND	0.5	0.1
Bromobenzene	ND	0.5	0.1
1,3,5-Trimethylbenzene	ND	0.5	0.1
2-Chlorotoluene	ND	0.5	0.1

ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC765401	Batch#:	217371
Matrix:	Water	Analyzed:	11/12/14
Units:	ug/L		

Analyte	Result	RL	MDL
4-Chlorotoluene	ND	0.5	0.1
tert-Butylbenzene	ND	0.5	0.1
1,2,4-Trimethylbenzene	ND	0.5	0.1
sec-Butylbenzene	ND	0.5	0.1
para-Isopropyl Toluene	ND	0.5	0.1
1,3-Dichlorobenzene	ND	0.5	0.1
1,4-Dichlorobenzene	ND	0.5	0.1
n-Butylbenzene	ND	0.5	0.1
1,2-Dichlorobenzene	ND	0.5	0.1
1,2-Dibromo-3-Chloropropane	ND	2.0	0.2
1,2,4-Trichlorobenzene	ND	0.5	0.1
Hexachlorobutadiene	ND	2.0	0.2
Naphthalene	ND	2.0	0.2
1,2,3-Trichlorobenzene	ND	0.5	0.1

Surrogate	%REC	Limits
Dibromofluoromethane	96	77-136
1,2-Dichloroethane-d4	96	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	95	80-120

ND= Not Detected
RL= Reporting Limit
MDL= Method Detection Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Organics by GC/MS

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	EPA 5030B
Project#:	EM002616.0014.00401	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	217371
MSS Lab ID:	262294-009	Sampled:	11/03/14
Matrix:	Water	Received:	11/05/14
Units:	ug/L	Analyzed:	11/12/14
Diln Fac:	1.000		

Type: MS Lab ID: QC765547

Analyte	MSS Result	Spiked	Result	%REC	Limits
1,1-Dichloroethene	<0.1268	25.00	23.56	94	69-129
Benzene	<0.1000	25.00	22.92	92	80-127
Trichloroethene	<0.1000	25.00	24.33	97	70-127
Toluene	<0.1000	25.00	23.65	95	80-123
Chlorobenzene	<0.1000	25.00	24.58	98	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	94	77-136
1,2-Dichloroethane-d4	95	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	93	80-120

Type: MSD Lab ID: QC765548

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
1,1-Dichloroethene	25.00	24.91	100	69-129	6	26
Benzene	25.00	23.62	94	80-127	3	23
Trichloroethene	25.00	25.29	101	70-127	4	21
Toluene	25.00	24.38	98	80-123	3	22
Chlorobenzene	25.00	25.28	101	80-120	3	22

Surrogate	%REC	Limits
Dibromofluoromethane	95	77-136
1,2-Dichloroethane-d4	95	75-139
Toluene-d8	96	80-120
Bromofluorobenzene	93	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Arsenic

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Sampled:	10/29/14
Matrix:	Filtrate	Received:	10/29/14
Units:	ug/L	Prepared:	11/03/14
Diln Fac:	1.000	Analyzed:	11/04/14
Batch#:	217070		

Field ID	Type	Lab ID	Result	RL
971-102914	SAMPLE	262086-001	ND	5.0
991A-102914	SAMPLE	262086-003	ND	5.0
991B-102914	SAMPLE	262086-004	ND	5.0
40-36-102-102914	SAMPLE	262086-005	7.6	5.0
40-36-101-102914	SAMPLE	262086-006	49	5.0
40-36-101-102914-D	SAMPLE	262086-007	50	5.0
30-36-108-102914	SAMPLE	262086-008	170	5.0
30-36-107-102914	SAMPLE	262086-009	9.8	5.0
	BLANK	QC764189	ND	5.0

ND= Not Detected
RL= Reporting Limit

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Batch QC Report

Dissolved Arsenic

Lab #:	262086	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Batch#:	217070
Field ID:	40-36-102-102914	Sampled:	10/29/14
MSS Lab ID:	262086-005	Received:	10/29/14
Matrix:	Filtrate	Prepared:	11/03/14
Units:	ug/L	Analyzed:	11/04/14
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC764190		100.0	95.16	95	80-120		
BSD	QC764191		100.0	97.16	97	80-120	2	20
MS	QC764192	7.608	100.0	112.2	105	79-126		
MSD	QC764193		100.0	111.1	104	79-126	1	20

RPD= Relative Percent Difference


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Laboratory Job Number 262116
ANALYTICAL REPORT

Arcadis	Project : EM002616.0014.00401
2000 Powell St.	Location : Sherwin Williams
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
991A-103014	262116-001
991B-103014	262116-002
50-36-104-103014	262116-003
40-36-042-103014	262116-004
40-36-042-103014-D	262116-005
30-36-109-103014	262116-006
40-36-005R-103014	262116-007
10-36-003-103014	262116-008
40-36-002-103014	262116-009
40-36-004R-103014	262116-010

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 11/06/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**262116**
Client:	**Arcadis**
Project:	**EM002616.0014.00401**
Location:	**Sherwin Williams**
Request Date:	**10/30/14**
Samples Received:	**10/30/14**

This data package contains sample and QC results for ten water samples, requested for the above referenced project on 10/30/14. The samples were received cold and intact. All data were e-mailed to Erica Whiting on 11/06/14.

Metals (EPA 6010B):
No analytical problems were encountered.

CHAIN OF CUSTODY

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Berkeley, CA 94710

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Fax (510) 486-0532

C&T LOGIN # 202116

Chain of Custody # _____

Project No: EM002616.0014.00401
Project Name: Sherwin Williams
Project P. O. No:
EDD Format: Report Level ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH ☒ Standard

Sampler: Miljan D. & Miguel G.
Report To: Erica Whiting
Company: ARCADIS
Telephone:
Email: on file

Lab No.	Sample ID.	SAMPLING		MATRIX				# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST
		Date Collected	Time Collected	Water	Solid				HCl	H2SO4	HNO3	NaOH	None	Dissolved Arsenic (6010) ⊛
1	991A-103014	10-30-14	0825	X				1					X	X
2	991B-103014		0830	X				1					X	X
3	50-36-104-103014		0935	X				1					X	X
4	40-36-042-103014		1025	X				1					X	X
5	40-36-042-103014-D		1030	X				1					X	X
6	30-36-109-103014		1130	X				1					X	X
7	40-36-005R-103014		1305	X				1					X	X
8	10-36-003-103014		1345	X				1					X	X
9	40-36-002-103014		1440	X				1					X	X
10	40-36-004R-103014		1525	X				1					X	X

Notes:
⊛ Lab to filter arsenic samples upon arrival.

@APP Project

SAMPLE RECEIPT
☒ Intact
☒ Cold
☒ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 10/30/14 TIME: 1635
DATE: TIME:
DATE: TIME:

RECEIVED BY:
DATE: 10/30/14 TIME: 1635
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 262116 Date Received 10/30/14 Number of coolers 1
Client CRCAPIS Project EM002616.0014.00401

Date Opened 10/30 By (print) FJ (sign) FJ
Date Logged in 10/30 By (print) FJ (sign) FJ

1. Did cooler come with a shipping slip (airbill, etc) _____ YES (NO)
Shipping info _____

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
How many _____ Name _____ Date _____
2B. Were custody seals intact upon arrival? _____ YES NO (N/A)
3. Were custody papers dry and intact when received? _____ (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? _____ (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe) _____

☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☒ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 1.0°

☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun

☒ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? _____ YES (NO)
If YES, what time were they transferred to freezer? _____
9. Did all bottles arrive unbroken/unopened? _____ (YES) NO
10. Are there any missing / extra samples? _____ YES (NO)
11. Are samples in the appropriate containers for indicated tests? _____ (YES) NO
12. Are sample labels present, in good condition and complete? _____ (YES) NO
13. Do the sample labels agree with custody papers? _____ (YES) NO
14. Was sufficient amount of sample sent for tests requested? _____ (YES) NO
15. Are the samples appropriately preserved? _____ YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? _____ YES NO (N/A)
17. Did you document your preservative check? _____ YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? _____ YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? _____ YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? _____ YES NO (N/A)
21. Was the client contacted concerning this sample delivery? _____ YES (NO)
If YES, Who was called? _____ By _____ Date: _____

COMMENTS

_____
_____
_____
_____
_____
_____

Rev 10, 9/12

Curtis & Tompkins, Ltd.

Detections Summary for 262116

Results for any subcontracted analyses are not included in this summary.

Client : Arcadis
Project : EM002616.0014.00401
Location : Sherwin Williams

Client Sample ID : 991A-103014 Laboratory Sample ID : 262116-001

No Detections

Client Sample ID : 991B-103014 Laboratory Sample ID : 262116-002

No Detections

Client Sample ID : 50-36-104-103014 Laboratory Sample ID : 262116-003

No Detections

Client Sample ID : 40-36-042-103014 Laboratory Sample ID : 262116-004

No Detections

Client Sample ID : 40-36-042-103014-D Laboratory Sample ID : 262116-005

No Detections

Client Sample ID : 30-36-109-103014 Laboratory Sample ID : 262116-006

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	250		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-005R-103014 Laboratory Sample ID : 262116-007

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	12		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 10-36-003-103014 Laboratory Sample ID : 262116-008

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	74		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-002-103014 Laboratory Sample ID : 262116-009

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	45		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-004R-103014 Laboratory Sample ID : 262116-010

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	6.1		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Curtis & Tompkins, Ltd.

Dissolved Arsenic

Lab #:	262116	Location:	Sherwin Williams
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Sampled:	10/30/14
Matrix:	Filtrate	Received:	10/30/14
Units:	ug/L	Prepared:	11/03/14
Diln Fac:	1.000	Analyzed:	11/04/14
Batch#:	217070		

Field ID	Type	Lab ID	Result	RL
991A-103014	SAMPLE	262116-001	ND	5.0
991B-103014	SAMPLE	262116-002	ND	5.0
50-36-104-103014	SAMPLE	262116-003	ND	5.0
40-36-042-103014	SAMPLE	262116-004	ND	5.0
40-36-042-103014-D	SAMPLE	262116-005	ND	5.0
30-36-109-103014	SAMPLE	262116-006	250	5.0
40-36-005R-103014	SAMPLE	262116-007	12	5.0
10-36-003-103014	SAMPLE	262116-008	74	5.0
40-36-002-103014	SAMPLE	262116-009	45	5.0
40-36-004R-103014	SAMPLE	262116-010	6.1	5.0
	BLANK	QC764189	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Arsenic

Lab #:	262116	Location:	Sherwin Williams
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Batch#:	217070
Field ID:	40-36-102-102914	Sampled:	10/29/14
MSS Lab ID:	262086-005	Received:	10/29/14
Matrix:	Filtrate	Prepared:	11/03/14
Units:	ug/L	Analyzed:	11/04/14
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC764190		100.0	95.16	95	80-120		
BSD	QC764191		100.0	97.16	97	80-120	2	20
MS	QC764192	7.608	100.0	112.2	105	79-126		
MSD	QC764193		100.0	111.1	104	79-126	1	20

RPD= Relative Percent Difference


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Laboratory Job Number 262133
ANALYTICAL REPORT

Arcadis	Project : EM002616.0014.00401
2000 Powell St.	Location : Sherwin Williams-Emeryville
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
991A-103114	262133-001
991B-103114	262133-002
40-36-036-103114	262133-003
40-36-036-103114-D	262133-004
40-36-001-103114	262133-005

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 11/07/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**262133**
Client:	**Arcadis**
Project:	**EM002616.0014.00401**
Location:	**Sherwin Williams-Emeryville**
Request Date:	**10/31/14**
Samples Received:	**10/31/14**

This data package contains sample and QC results for five water samples, requested for the above referenced project on 10/31/14. The samples were received cold and intact. All data were e-mailed to Erica Whiting on 11/07/14.

Metals (EPA 6010B):
No analytical problems were encountered.

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Berkeley, CA 94710

Phone (510) 486-0900
Fax (510) 486-0532

C&T LOGIN # 262133

Chain of Custody # _____

Project No: EM002616.0014.00401
Project Name: Sherwin Williams
Project P. O. No:
EDD Format: Report Level ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH ☒ Standard

Sampler: Miljan D. & Miguel G.
Report To: Erica Whiting
Company: ARCADIS
Telephone:
Email: on file

Lab No.	Sample ID.	SAMPLING		MATRIX				# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST
		Date Collected	Time Collected	Water	Solid				HCl	H2SO4	HNO3	NaOH	None	Dissolved Arsenic (6010) ⊛
	991A-103114	10-31-14	0820	X				1					X	X
	991B-103114		0825	X				1					X	X
	40-36-036-103114		0845	X				1					X	X
	40-36-036-103114-D		0845	X				1					X	X
	40-36-001-103114	↓	1010	X				1					X	X

Notes:
⊛ Lab to filter arsenic samples upon arrival.
QAPP Project

SAMPLE RECEIPT
☒ Intact
☒ Cold
☒ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 10/31/14 TIME: 1135
DATE: TIME:
DATE: TIME:

RECEIVED BY:
DATE: 10/31/14 TIME: 1135
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST Curtis & Tompkins, Ltd.

Login # 262133 Date Received 10/31/14 Number of coolers 1
Client Arcadis Project EM002616.0014.00401

Date Opened 10/31 By (print) MC (sign) [signature]
Date Logged in 1 By (print) 1 (sign) 1

1. Did cooler come with a shipping slip (airbill, etc) ____ YES (NO)
Shipping info ____

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
How many ____ Name ____ Date ____
2B. Were custody seals intact upon arrival? ____ YES NO (N/A)
3. Were custody papers dry and intact when received? ____ (YES) NO
4. Were custody papers filled out properly (ink, signed, etc)? ____ (YES) NO
5. Is the project identifiable from custody papers? (If so fill out top of form) (YES) NO
6. Indicate the packing in cooler: (if other, describe) ____

☐ Bubble Wrap ☐ Foam blocks ☐ Bags ☒ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 1.7

☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? ____ YES (NO)
If YES, what time were they transferred to freezer? ____
9. Did all bottles arrive unbroken/unopened? ____ (YES) NO
10. Are there any missing / extra samples? ____ YES (NO)
11. Are samples in the appropriate containers for indicated tests? ____ (YES) NO
12. Are sample labels present, in good condition and complete? ____ (YES) NO
13. Do the sample labels agree with custody papers? ____ (YES) NO
14. Was sufficient amount of sample sent for tests requested? ____ (YES) NO
15. Are the samples appropriately preserved? ____ YES NO (N/A)
16. Did you check preservatives for all bottles for each sample? ____ YES NO (N/A)
17. Did you document your preservative check? ____ YES NO (N/A)
18. Did you change the hold time in LIMS for unpreserved VOAs? ____ YES NO (N/A)
19. Did you change the hold time in LIMS for preserved terracores? ____ YES NO (N/A)
20. Are bubbles > 6mm absent in VOA samples? ____ YES NO (N/A)
21. Was the client contacted concerning this sample delivery? ____ YES (NO)
If YES, Who was called? ____ By ____ Date: ____

COMMENTS

Rev 10, 9/12

Curtis & Tompkins, Ltd.

Detections Summary for 262133

Results for any subcontracted analyses are not included in this summary.

Client : Arcadis
Project : EM002616.0014.00401
Location : Sherwin Williams-Emeryville

Client Sample ID : 991A-103114 Laboratory Sample ID : 262133-001

No Detections

Client Sample ID : 991B-103114 Laboratory Sample ID : 262133-002

No Detections

Client Sample ID : 40-36-036-103114 Laboratory Sample ID : 262133-003

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	39		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-036-103114-D Laboratory Sample ID : 262133-004

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	35		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Client Sample ID : 40-36-001-103114 Laboratory Sample ID : 262133-005

Analyte	Result	Flags	RL	Units	Basis	IDF	Method	Prep Method
Arsenic	80		5.0	ug/L	DISS.	1.000	EPA 6010B	METHOD

Curtis & Tompkins, Ltd.

Dissolved Arsenic

Lab #:	262133	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Batch#:	217153
Matrix:	Filtrate	Sampled:	10/31/14
Units:	ug/L	Received:	10/31/14
Diln Fac:	1.000	Prepared:	11/05/14

Field ID	Type	Lab ID	Result	RL	Analyzed
991A-103114	SAMPLE	262133-001	ND	5.0	11/05/14
991B-103114	SAMPLE	262133-002	ND	5.0	11/06/14
40-36-036-103114	SAMPLE	262133-003	39	5.0	11/06/14
40-36-036-103114-D	SAMPLE	262133-004	35	5.0	11/06/14
40-36-001-103114	SAMPLE	262133-005	80	5.0	11/06/14
	BLANK	QC764524	ND	5.0	11/05/14

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Arsenic

Lab #:	262133	Location:	Sherwin Williams-Emeryville
Client:	Arcadis	Prep:	METHOD
Project#:	EM002616.0014.00401	Analysis:	EPA 6010B
Analyte:	Arsenic	Batch#:	217153
Field ID:	ZZZZZZZZZZ	Sampled:	10/29/14
MSS Lab ID:	262122-002	Received:	10/30/14
Matrix:	Filtrate	Prepared:	11/05/14
Units:	ug/L	Analyzed:	11/05/14
Diln Fac:	1.000		

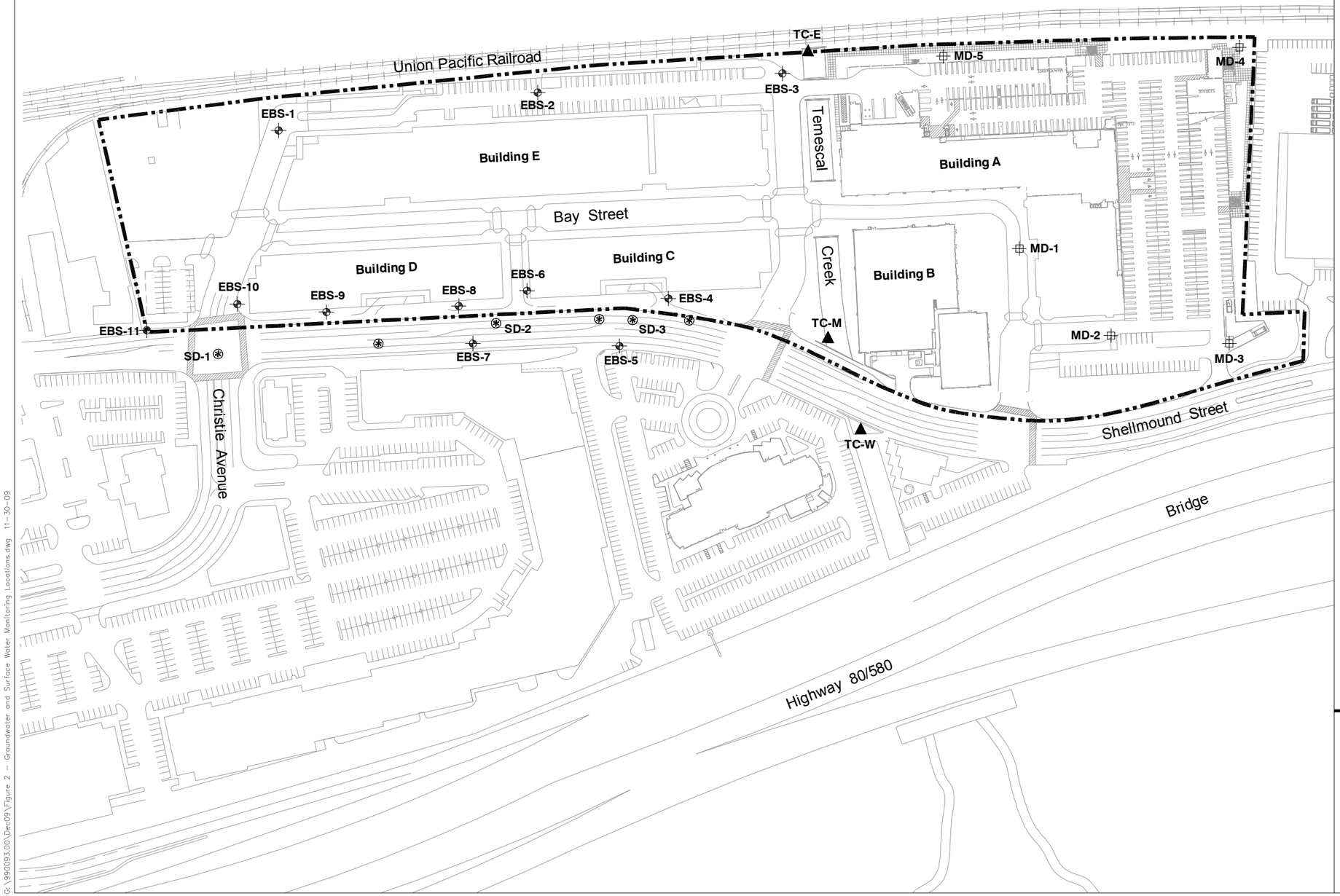
Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC764525		100.0	99.09	99	80-120		
BSD	QC764526		100.0	100.3	100	80-120	1	20
MS	QC764527	46.90	100.0	127.5	81	79-126		
MSD	QC764528		100.0	134.1	87	79-126	5	20

RPD= Relative Percent Difference

ARCADIS

Appendix G

Figure of SBPA Property



N

180 0 180

(Approximate Scale in Feet)

Legend

- Bay Street Project Area
- Groundwater Monitoring Well Shellmound Properties
- Groundwater Monitoring Well Myers Drum Site *(See Note 3)*
- Temescal Creek Surface Water Sampling Point
- Storm Drain Manhole

Notes:

1. All locations are approximate.
2. David L. Hoffman, FAIA "Bay Street Emeryville Block 1 - Building A", dated 6 July 2001.
3. Well nos. MD-1 through MD-4 are monitored by Strategic Engineering and Science on behalf of Industrial Molding and Container Corporation.

Erler & Kalinowski, Inc.

Groundwater and Surface Water Monitoring Locations

Bay Street Project
Emeryville, CA
December 2013
EKI 990093.00

Figure 2

G:\990093.00\Dec09\Figure 2 - Groundwater and Surface Water Monitoring Locations.dwg 11-30-09

Bay-Friendly
RATING MANUAL
For *New* Civic, Commercial & Multifamily Landscapes

Version 1.1, July 2011



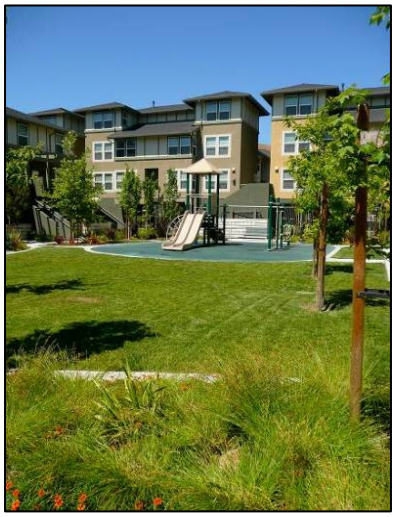






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GLOSSARY **11722**

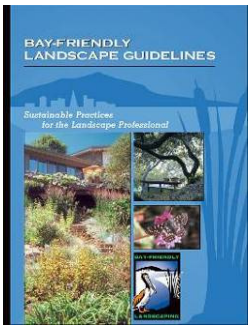
INTRODUCTION

The Bay-Friendly Rating Manual is an essential tool to successfully implement the Bay-Friendly Scorecard for new Civic and Commercial Landscapes. It is written for landscape design and construction professionals and Bay-Friendly Raters, as a guide in describing and verifying the practices in the Scorecard. The manual is geared to assist a Project Team in achieving a Bay-Friendly Rated Landscape.

Bay-Friendly Landscaping & Gardening is a whole systems approach to the design, construction and maintenance of landscapes that contributes to the health of the San Francisco Bay Watershed.

There are 7 Principles of Bay-Friendly Landscaping that provide the environmental lens that built landscapes intersect, these are:

1. Landscape Locally
2. Landscape for Less to the Landfill
3. Nurture the Soil
4. Conserve Water
5. Conserve Energy
6. Protect Water & Air Quality
7. Create Wildlife Habitat



The 7 Principles and practices of Bay-Friendly are fully defined in the companion publication, the Bay-Friendly Landscape Guidelines which can be downloaded at www.BayFriendly.org.

StopWaste.Org in Alameda County developed this manual and the Bay-Friendly Landscape Scorecard, and Guidelines as a method to create a common understanding, a standard for sustainable landscaping among landscape professional, home and property owners and public agencies.

Most cities in Alameda County require that new or renovated public landscapes be built to this standard using the Bay-Friendly Civic and Commercial Landscape Scorecard.

BENEFIT OF A BAY-FRIENDLY RATED LANDSCAPE

What if our built landscapes actually contributed to the health of our watershed and reduced green house gasses? What if they helped recharge the ground water, filter and break down pollutants through the action of healthy soil biota? What if they provided habitat for migrating birds and beneficial insects and reptiles? And what if they do all of this consuming a fraction of the water, energy, fertilizers and materials of a conventional landscape? That is what a Bay-Friendly Landscape sets out to do – to raise the bar, to provide guideposts and green our standard landscape practices.

Environment -- First and foremost, a Bay-Friendly Landscape is a benefit to the environment. Bay-Friendly Rated Landscapes consume significantly less water by creating drought resistant soils, choosing low water using plants and using efficient irrigation systems. They reduce green house gasses by reducing the need for mowing, blowing and shearing and by reducing the amount of plant debris landfilled and the amount of synthetic chemicals consumed and through the used of recycled, local materials. They reduce stormwater runoff and pollution and use materials more efficiently. Most Bay-Friendly practices have multiple environmental benefits.

Supports Compliance – Bay-Friendly Rated landscapes can support compliance with other environmental rating systems or local, state or federal requirements. For example, Bay-Friendly Rated Landscape has been recognized as an innovation credit in LEED (Leadership in Energy and Environmental Design) projects, they have earned additional points for multi-family projects that are Green Point Rated, they have some of the same practices mandated by some water agencies for

new hook-ups or in the State of California's Model Water Efficiency Landscape Ordinance. In addition, other Bay-Friendly practices assist with the federally required stormwater measures and others with local requirement on construction and demolition debris recycling goals. Bay-Friendly's holistic approach means that your Project Team is often one step ahead with complying with a whole spectrum of environmental mandates.

Recognition – A Bay-Friendly Rated Landscape brings recognition to your project and Project Team that this landscape has met an established environmental standard.

Consumer Assurance -- A Bay-Friendly Rated landscape provides the consumer an assurance that a standard has been met because it has be verified by a third party. The Bay-Friendly Rated label is an important method to achieve consumer recognition.

Currently, StopWaste.Org is the certifying body in Alameda County for public projects however the Bay-Friendly Landscaping & Gardening Coalition is seeking funding and support to provide this service regionally.

Competitive Edge – A Bay-Friendly Rated Landscape can provide a competitive edge in the market place because it achieves a higher environmental standard, saving more resources and money over most conventional landscapes. You can market to your clients the benefits of a Bay-Friendly Rated Landscape such as reducing water bills, requiring less labor to mow or shear, and a healthier landscape through the use of less or non-toxic pest control and natural fertilizers.

WHAT IS A BAY-FRIENDLY RATED LANDSCAPE?

A Bay-Friendly Rated Landscape is one where the Project Team, including the developer, landscape design professional, general contractor and landscape contractor are all working together to achieve clearly understood Bay-Friendly goals, that were set early in the design process and that are verified by a third party, a "Bay-Friendly Rater".

The Bay-Friendly Scorecard for Civic and Commercial Landscapes has 9 required practices and has a total of 215 points. The 9 required practices do not contribute to earning points but all 9 must be met in order for the project to be Bay-Friendly. In addition, a minimum of 60 points must be earned to be considered a Bay-Friendly Rated Landscape. It is not possible to earn all 215 points in any given project as some points are conflicting such as points earned for no lawn and points earned for grasscycling.

Low Score	Medium Score	High Score
60-74	**75-89**	**90+**

In general, achieving a low score and all of the 9 required practices is quite readily done, especially if Bay-Friendly goals are set early in the project. It is recommended that if a low score is your goal, then set out to achieve at least 65 or 67 points to insure that even if several points are lost in the process, the landscape still qualifies as Bay-Friendly. Achieving a medium and especially a high score can be increasingly difficult depending upon the site constraints and opportunities, budget constraints, or functions of the landscape and the knowledge/experience of the Project Team in implementing Bay-Friendly practices.

WHEN TO USE THE BAY-FRIENDLY RATING SYSTEM

Bay-Friendly Rated Landscapes have been successfully built in Alameda County on projects such as parks and street medians as well as landscapes around fire stations, senior centers, a college campus, a shopping center, libraries and other civic buildings. The Bay-Friendly Scorecard for Civic and Commercial Landscapes has also been used to rate multifamily projects. For a brief description of some of the landscapes that have been successfully designed and built to Bay-Friendly standards, visit www.BayFriendly.org .

Bay-Friendly practices have been successfully included in smaller projects such as in planters or projects under 2,500 square feet but achieving a Bay-Friendly Rated Landscape is often more difficult as a significant number of Bay-Friendly practices/points would not be applicable or cost-effective. However, for the vast majority of civic, commercial and multifamily residential projects of 2,500 square feet or greater, a Bay-Friendly Rated Landscape makes sense.

The adoption of as many Bay-Friendly practices as practical is encouraged in every new or renovated landscape project.

COST OF THE BAY-FRIENDLY RATING SYSTEM

Initially, one of the greatest costs of the Bay-Friendly Rated Landscape can be the learning curve of the Project Team. This Rating Manual is designed to make this process transparent to the entire Project Team and to streamline communication both internally, within the team, and with the Bay-Friendly Rater and reduce the cost of the learning curve. Once landscape professionals have experience and/or training in Bay-Friendly that cost is greatly reduced as Bay-Friendly practices become the new standard for creating a landscape.

There are Bay-Friendly Training and Qualification opportunities for Design, Construction and Maintenance Landscape Professionals. A developer can cut costs by selecting professionals with Bay-Friendly Qualification and experience and by giving a priority for these attributes in a bid document.

As for costs of practices, the scorecard provides flexibility to meet any budget. The minimum requirements can be met with little or no additional costs. Selecting low-water using plants, for example, is no more expensive than water loving plants; compost can be specified at comparable prices of other types of soil amendments, etc. As a project tries to achieve a higher score, costs can go up as more expensive practices are implemented. Pervious concrete is more expensive than impervious but that expense can sometimes be off-set if it replaces other more expensive stormwater drain or filter systems. A Bay-Friendly Rated Landscape is cost competitive –especially when the long term savings of lower resources consumption over the life of the landscape is considered.

WHAT YOU WILL FIND IN THE BFL RATING MANUAL

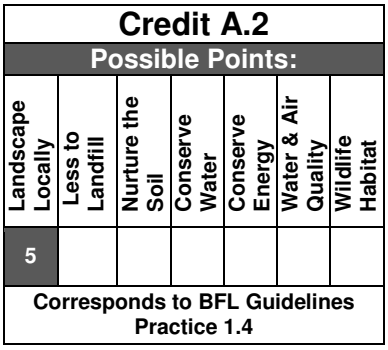
The Rating Manual follows the same organization and numbering as the Bay-Friendly Scorecard for Civic and Commercial Landscapes with practices grouped to mimic the design and construction process:

Section A: Site Planning
Section B: Stormwater and Site Drainage
Section C: Earthwork and Soil Health
Section D: Materials
Section E: Planting
Section F: Irrigation
Section G Maintenance
Section H: Innovation

Points are awarded according to the 7 Principles of Bay-Friendly Landscaping and are indicated in both the Scorecard and the Rater Verification Manual.

This graphic indicates 3 pieces of information:

- Which credit (practice) on the scorecard is being defined,
- What Bay-Friendly Principle the points are being earned under and the amount of points
- Where this practice can be found in the Bay-Friendly Landscape Guidelines



In addition each practice usually contains the following segments: Practice description, Project Team. Recommendations, Verification, Synergies and Tradeoffs, Resources and Bay-Friendly Tools. Project Team Recommendations are best practices gleaned from implementing this practice in numerous landscape projects in Alameda County. Verification is described thoroughly, later in this section. Synergies and Trade-offs indicates how implementing this practice can contribute towards or compete with earning other Bay-Friendly credits. Resources and Bay-Friendly Tools refer to support information that is not in this manual but is available on our website www.BayFriendly.org or in the website indicated. This information includes:

- A Bay-Friendly plant template to track Bay-Friendly information such as water requirements of each plant, and plant spacing as well as mature size of plant.
- Or sample Bay-Friendly plant list for lawn alternatives, natural hedges or plants for swales.
- Sample specification language for many Bay-Friendly practices as well as a model maintenance specification,
- Case studies and more.

HOW TO USE THIS MANUAL

The manual should be used by both the Project Team and the Bay-Friendly Rater. In the early stages of a landscape project, the Project Team should review the scorecard, select the likely Bay-Friendly practices to be met, insure that all required practices will be met. The team should think holistically, if a practice is not on the scorecard but would make sense to do, then implement it anyway. It could potentially earn credits under the Innovation Section. Conversely, if a practice is on the scorecard but does not make sense to do then, avoid it. For example, if the project does not need outdoor lighting, then don't install some just to earn Bay-Friendly points for efficient lighting.

As you select different practices, use this manual to fully understand the Bay-Friendly practice as the Scorecard does not have the space to fully define each practice. In order to earn the points for any given practice it must match the description and verification requirements that are defined in the Rating Manual. Once the Bay-Friendly practice is understood, evaluate whether or not it makes sense for your project.

PROJECT TEAM –There are notes to the Project Team in each Bay-Friendly credit. The information is focused on best practices on implementation of that measure and what you will need to supply the Bay-Friendly Rater in order to verify that it has been implemented. Be sure to bring your Bay-Friendly Rater on board early in the process and set up clear points in the project timeline when communication is essential.

BAY-FRIENDLY RATER – Both you and the Project Team should rely on the Rating Manual's definitions of each Bay-Friendly practice. Each practice earning points for this project will need to be verified according to this Rating Manual. Your role is to verify Bay-Friendly practice implementation. Depending on the experience of the Project Team you can also be source of support for implementation. Be sure to clear about goals, communication and documentation needs.

VERFICATION BASICS

The Bay-Friendly Rated program is designed to rely on the submittal and review of project plans, planting notes and specifications or worksheets required by the local cities such as those that conform to water efficient landscape ordinances. These documents should all be a part of the standard design process. For many of the credits, an appropriate signature on the "Accountability Form" is required and intended to be an easy to implement approach to ensure the practices have been implemented as per the Practice Description. For some of the credits, verification also requires a site visit and visual verification by the Bay-Friendly Rater. Additional documentation is required only on those measures where project plans or on-site observations are not sufficient to verify compliance with a measure.

The three verification procedures are:

1. Submittal Review
2. Inspection
3. Documentation

Many combinations of inspection, documentation and plan check are required for compliance. Some BFL practices will require physical inspection or on-site observance to verify compliance. Others require documentation in the form of product data sheets, invoices, receipts, calculation worksheets, a signed Accountability Form from a key member of the Project Team, photographs or other paperwork. Some areas of BFL such as site and structural elements can be verified during plan check. Recycled content of materials, requires a product sheet, where achieving water budget will need submittals of a worksheet. Finally, some areas such as application and depth of mulch will be typically verified by a site inspection. Every effort has been made to streamline the process, while at the same time safeguarding the integrity of the Bay-Friendly Rating. Each verification method is described next.

SUBMITTAL REVIEW

Reviewing a set of project plans can sometimes provide proof of compliance for a BFL practice. The term "plans" in this case is taken to represent plans (blueprints) along with other supporting documentation like specifications and planting notes. For measures that call for Plan Review, sets of drawings must be must be the final construction documents or Bid Set construction documents. Earlier sets of plans or specifications, such as Design Documents or 50% CDs are NOT eligible as proof of verifications, since plans in these earlier phases tend to change, unless it is specifically stated in the Verification section for a practice that such plans are acceptable. "Plans" can also include worksheets that must be completed and submitted to the local agency to demonstrate that the project meets the adopted Water Efficient Landscape Ordinance.

However, even though earlier plans won't meet the compliance for verification, it can be prudent to share some of these early plans with the Bay-Friendly Rater. This insures that if changes need to occur in the plans in order to meet compliance, then it can happen before the bid process and can avoid costly "change orders". It is recommended that you designate your Bay-Friendly Rater early in the design process not at the end of CDs, and determine how to streamline this key communication. It is recommended that at least one meeting occurs with the Bay-Friendly Rater and the Project Team during the design phase.

INSPECTION

Usually one site inspection, at post construction, is necessary to prove compliance with numerous practices. However there may be times where an earlier visit during the "rough" phase may be valuable. An example of this was for an innovation credit where forms were being used under sidewalks instead of structural soil to allow for tree root growth. Examples of post-construction verification practices are: confirming that the weather based irrigation controller specified is installed, verifying that recycled content materials such as fencing or site furnishings were used, verifying that turf was installed as planned with no sprinkler heads in sections less than 8 feet wide, etc. For all site visits, take photographs of each practice being verified, they provide backup if the practice is audited.

DOCUMENTATION

In some cases the information needed to verify compliance cannot be found on project plans or through observation in the field. In such instances, documentation is necessary to claim compliance with the measure. Documentation can take numerous forms, from copies of product literature, information sheets, (cut-sheets), to copies of Owners Manuals or other written procedural plans, to a signed "Accountability Form". An Accountability Form is intended to reduce the paperwork burden by allowing some responsible for the particular Bay-Friendly measure to sign-off that the measure has been followed or implemented. The individual signing the Accountability Form must be the person specified for each practice, such as the owner, landscape architect, developer, landscape construction contractor, or other designated professional. While an Accountability Form may streamline the verification process, the person signing the forms must be prepared to show proof of compliance if the measure is audited.

AUDITS

In case of a quality assurance audit, Raters must retain backup documentation or other means adequate to defend a position on any specific measure. In the case of Plan Review measures, this is likely to be selected sheets from a set of 100% CDs (or later) and specifications. For inspection measures (Rough and Final), the Rater must provide photographs of each measure. For Documentation keep a copy of any backup calculations, signed forms or other means of documentation that helps defend a measure.

A NOTE ON CHANGES

Bay-Friendly Landscaping program at StopWaste.Org welcomes feedback and corrections in order to improve future editions of the document. Submit comments to Chavstad@stopwaste.org and or teade@stopwaste.org.

DISCLAIMER

The Bay-Friendly practices and compliance protocols contained in this document are provided for consideration by landscape professionals in the course of designing, constructing and maintaining new civic, commercial and multi-family residential landscapes. The information is presented as a public service by StopWaste.Org, otherwise known as the Alameda County Waste Management Authority and Source Reduction and Recycling Board, to support environmental benefits and reduce costs. The practices and compliance protocols are strictly for use on a voluntary basis. They represent best practices for sustainable landscaping and are not a substitute for sound judgment. StopWaste.Org assumes no legal liability for the effects of proper or improper implementation of these measures.

THE BAY-FRIENDLY LANDCAPING & GARDENING COALITION

The Bay-Friendly Landscaping & Gardening Coalition is an alliance of stakeholders representing public agencies, utilities, non-profits, landscape professionals and associations and businesses from around the San Francisco Bay Area. The Coalition allows for a consistent application of a regional Bay-Friendly standard in sustainable landscaping and gardening and provides a complete package of educational and outreach tools for home gardeners, landscape design and maintenance professionals, as well as local governments. Memberships and sponsorships in the Coalition are encouraged in order to leverage local resources and to receive recognition and discounts to Bay-Friendly trainings and events. Visit www.BayFriendlycoalition.org for more information.

A. SITE PLANNING

1. SELECT AND EVALUATE THE SITE CAREFULLY

Credit A.1						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
11						
Corresponds to BFL Guidelines Practice 1.1						

a. Submit the completed Bay-Friendly Site Analysis Form before completion of 100% design development documents.

POINTS: 5

PRACTICE DESCRIPTION

Complete the Bay-Friendly Landscape Site Analysis to assess climate, vegetation, topography, hydrology and previous use. The site analysis form prompts fifteen key indicators to be included on a site map such as solar exposures, prevailing winds, micro climates, areas of seasonal flooding and how storm water moves across the site and more. Both the form and site map need to be submitted. This measure is meant to insure a thorough analysis is conducted early in the design process to document the natural site features that should inform the project design.

PROJECT TEAM RECOMMENDATIONS

- Maximum benefit to the planning process is gained by completing the site analysis before 100% design documents and using the site analysis to inform the building and landscape design such as building orientation and placement, storm water measures, plant choice, tree and habitat protection, firescaping and more.
- Ideally, the entire project team would have a copy of the site analysis to inform project decisions throughout the development of the project and during the maintenance once constructed. Construction and maintenance costs can be reduced if the site works in harmony with natural features instead of against them.

VERIFICATION

PROJECT TEAM

- Submit written Bay-Friendly site analysis form and site map before 100% design documents are completed.

RATER

- Verify Bay-Friendly site analysis form and site map (that indicates key natural features as indicated on the site analysis form) is completed.

SYNERGIES AND TRADE-OFFS

- Sampling the soil for analysis and testing infiltration as part of

The site *is the area within the legal boundaries of a property and encompasses all areas of the property including constructed areas and non-constructed areas. It is the same as the property area. (*USGBC LEED, *New Construction & Major Renovation v2.2,* September 2006*)*

Urban growth boundar*y is an officially adopted and mapped line dividing land to be developed from land to be protected for natural or rural uses. Urban growth boundaries (also called urban limit lines) are regulatory tools often designated for long periods of time (20 or more years) to provide greater certainty for both development and conservation goals. (*Governor's Office of Planning and Research, *State of California General Plan Guidelines,* 2003)

the site analysis can contribute to earning points for Credit C.1 (Assess the soil and determine infiltration).

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines, Practice 1.1
- The Bay-Friendly Site Analysis is available for download from: **http://www.stopwaste.org/home/index.asp?page=777**

b. The site is located within an urban growth boundary and avoids environmentally sensitive sites

POINTS: 3

PRACTICE DESCRIPTION

Project is located within an urban growth boundary defined by a city or county General Plan AND project improvements are not located on wetlands or steep slopes, prime farmland or parkland (as defined by the U.S. Department of Agriculture), or within setback distances from wetlands prescribed in regional or local regulations, or in an area identified as habitat for any species on Federal or State threatened or endangered lists.

VERIFICATION

PROJECT TEAM

- Submit an Accountability Form signed by the Owner, Developer, Landscape Architect or Designer identifying the source of the urban growth boundary and confirming that the site avoids environmentally sensitive sites.

RATER

- Verify the Accountability Form has been signed by the Owner, Developer, Landscape Architect or Designer.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines, Practice 1.1

REFERENCES

- Governor's Office of Planning and Research, *State of California General Plan Guidelines,* 2003, p. 272, www.opr.ca.gov
- Green Point Rated, *Multi Family Green Point Rater Verification Manual,* July 2007.
- USGBC, LEED, *New Construction & Major Renovation, Reference Guide, v2.2,* September 2006, p. 29.

c. The site development results in the clean up of a contaminated site (i.e. Brownfield) or is in a designated redevelopment area

POINTS: 3

PRACTICE DESCRIPTION

Part or all of the site has been labeled a Brownfield by the California Department of Toxic Substance Control Hazardous Waste and Substances Site List – Site Cleanup (Cortese List) OR is designated a redevelopment area by the local jurisdiction, with the goal of reducing pressure on undeveloped land. The redevelopment of the site does not apply to this credit unless the redevelopment was part of a deliberate city or county redevelopment area plan.

*A **Brownfield site** means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Partial definition excerpted from Public Law 107-118 (H.R. 2869) - "Small Business Liability Relief and Brownfields Revitalization Act" signed into law January 11, 2002. http://www.epa.gov/brownfields/glossary.htm*

VERIFICATION

PROJECT TEAM

- Submit an Accountability Form signed by the Owner, Developer, Landscape Architect or Designer indicating that the site is located in a designated redevelopment site or on a Brownfield, in which case the report and author of the strategy for clean up is referenced in the design documents

RATER

- Verify the Accountability Form has been signed by the Owner, Developer, Landscape Architect or Designer.

RESOURCES AND BAY-FRIENDLY TOOLS

Cortese List: www.dtsc.ca.gov/SiteCleanup/Cortese_List.cfm

REFERENCES

- Governor's Office of Planning and Research, *State of California General Plan Guidelines,* 2003, p. 272, www.opr.ca.gov
- Green Point Rated, *Multi Family Green Point Rater Verification Manual,* July 2007.
- USGBC, LEED, *New Construction & Major Renovation, Reference Guide, v2.2,* September 2006, p. 29.
- www.epa/gov/brownfields
- www.brownfields.org

2. CONSIDER THE POTENTIAL FOR FIRE

Credit A.2						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
5						
Corresponds to BFL Guidelines Practice 1.4						

Open space *is often defined by local zoning requirements. If local zoning requirements do not clearly define open space, open space means land areas that are not build upon or substantially altered from their natural state. They provide important ecological functions, natural resources, or cultural resources that are worthy of conservation and protection. Such areas may contain, but are not limited to, forests, farmland, old fields, floodplains, wetlands, and shore lands. Open Space can also encompass scenic vistas, recreational areas, and historic sites.*

a. For sites adjacent to fire sensitive open space or wildlands only: Submit a Fire Mitigation Plan

POINTS: 5

PRACTICE DESCRIPTION

Determine if the site is in or adjacent to a fire sensitive open space or wildland and prepare a fire mitigation plan.

A typical fire mitigation plan may include: adjacent fire sensitive wildland or open space or developments; exposure to prevailing winds during the dry season; steep slopes, especially south and west facing that can increase wind speed and convey heat; vegetation type, particularly species that burn readily. It may also specify mitigations to the above identified fire vectors including the establishment of a defensible zone immediately surrounding the structure that uses one or more strategies for firescaping, such as:

- Emphasize plants with low fuel volume and/or high moisture content in planting plan. Avoid plants with high oil content or that tend to accumulate excessive dead wood or debris (pyrophites).
- Trees are well spaced and pruned to 6 feet minimum above ground; dense shrub plantings are separate from trees to minimize fuel ladders.
- Trees and tall shrubs planted where limbs and branches will not reach the building or grow under overhangs as they mature.
- Fine shredded bark mulch is avoided. (e.g. gorilla hair or shredded redwood mulch)
- Decks are faced and constructed out of fire resistant materials.

PROJECT TEAM RECOMMENDATIONS

- Identify all local fire safe development requirements

VERIFICATION

PROJECT TEAM

- Submit an Accountability Form signed by the Landscape Architect or Designer indicating that the design features and practices in the fire mitigation plan have been included in the constructed landscape.

RATER

- Verify Accountability Form has been signed by the Landscape Architect or Designer.

SYNERGIES AND TRADE-OFFS

- Specifying recycled content decking materials can contribute to earning points for Credit D.1.a (Non-plant landscape materials are salvaged or made from recycled content materials or FSC certified wood).
- Specifying locally produced green waste mulch instead of shredded bark mulch can contribute to earning points for Credit D.1.d (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste).

BAY-FRIENDLY TOOLS AND RESOURCES

- Bay-Friendly Landscape Guidelines Practice 1.4
- http://frap.cdf.ca.gov/data/frapgisdata/select.asp

3. KEEP PLANT DEBRIS ON SITE:

Credit A.3						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
	5					
Corresponds to BFL Guidelines Practice 2.2						

a. Produce mulch from plants debris

i. Design documents specify areas under tree & shrub canopies and at least 10 feet away from storm drains, to be used as a leaf repository for mulch AND/OR

ii. Construction documents specify that of the trees identified for removal, some are chipped for use as mulch onsite

POINTS: 2

Mulch *is any material spread evenly over the surface of the soil to enhance the growth of plants and the appearance of the landscape. (*StopWaste.Org, *A Bay-Friendly Landscape Guide to Mulch)*

PRACTICE DESCRIPTION

i. To conserve nutrients on-site and protect the soil surface, natural leaf drop shall be retained under one or more trees and/or in one or more shrub beds, except those trees or shrub beds that are within 10 feet of storm drains (in order to keep leaf litter or mulch out of the storm water system).

ii. Construction documents shall specify that of the trees identified for removal, at least 10% are chipped and used as mulch onsite. Trees and logs that are left on site as shelter for wildlife will also be counted.

PROJECT TEAM RECOMMENDATIONS

- Identify sites for leaf repositories in design documents.
- Note on clearing and grading plans and specifications if on-site trees are to be chipped for mulch.

VERIFICATION

PROJECT TEAM

i.

- Submit planting plans with natural leaf repositories clearly identified.

ii.

- Submit total number of trees to be removed and number of trees to be chipped on site for mulch or left as logs on site for wildlife habitat
- Submit specifications in construction documents for chipping removed trees, as well as instructions as to where the chipped material is to be used as mulch OR
- Submit photo documentation (in digital form) of chipping process.

RATER

i.

- Verify that planting plans indicate natural leaf repositories and that they are not within 10 feet of hard surfaces and/or storm drains.

ii.

- Verify that the number of trees to be chipped on site for mulch or left as logs for wildlife habitat is at least 10% of the total number of trees identified for removal.
- Verify that specifications include chipping removed trees, as well as instructions as to where the chipped material is to be used as mulch are submitted OR
- Verify photos have been submitted
- (Optional) Visually verify chipping of removed trees on site.

SYNERGIES AND TRADE-OFFS

- Using mulch made from removed trees can contribute to meeting the requirement of applying 3 inches of mulch for Credit C.6.a (Required planting specifications and plans indicate that after construction, all soil on site is protected with a minimum of 3 inches of mulch)
- If all mulch is supplied by chipping on-site trees identified for removal then points can not also be earned for Credit D.1.d (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste).

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines, Practice 2.2
- Bay-Friendly Landscaping Guide to Mulch

b. Produce compost from plant debris

i. A site for composting is included in landscape plans. Systems for composting up to and including 3 cubic yards at one time (1 point) OR

ii. Systems for composting more than 3 and up to 10 yards at one time (total 2 points) OR

iii. Systems 10 cubic yards or larger (total 3 points)

Composting *is the controlled biological decomposition of organic materials*

POINTS: 3

PRACTICE DESCRIPTION

A site for composting plant debris and/or food waste shall be included in landscape plans and it is recommended that compost systems are sized to compost the amount of feedstock that is generated on site, and as per local and state composting regulations.

PROJECT TEAM RECOMMENDATIONS

- Evaluate any CA Integrated Waste Management Board's regulations that may apply to an on-site composting system, depending on the size of the system and the type of feedstock.
- Compost site should be close to level and not exceed a 2% grade. Consideration should be given to providing access to water and allowing enough space not only for compost bins and systems but for easy access. Larger systems could benefit from allowing enough space and site access for a front end loader and providing a push wall and attention should be paid to stormwater flows. See materials listed under Resources for more comprehensive site considerations.

VERIFICATION

PROJECT TEAM

- Submit construction documents showing location, design and capacity of composting system

RATER

- Verify construction documents include composting system
- Visually verify constructed system and confirm size.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines, Practice 2.2c
- *Compost: A Bay-Friendly Garden Starts with Healthy Soil* https://www.stopwaste.org/AlamedaCommerce/ProductList.aspx
- California Integrated Waste Management Board Composting Regulations: www.ciwmb.ca.gov
- StopWaste.Org, *Compost at Work*, download from www.StopWaste.Org

4. REDUCE AND RECYCLE WASTE

Credit A.4						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
	2					
Corresponds to Bay-Friendly Landscape Guidelines Practice 2.7						

a. An easily accessible area(s) is dedicated to the collection and storage of materials for recycling.

POINTS: 2

PRACTICE DESCRIPTION

To reduce waste that is generated both by building occupants and/or landscape/park visitors, receptacles for recycling are co-located with every outdoor trash receptacle. It is recommended that receptacles be made from recycled materials and that they are well marked.

AND, if there is a building on site, a centrally located area(s) that serves the building and site is dedicated to the collection and storage of non-hazardous materials for recycling, including, at a minimum, plant debris, glass, paper, metal, plastic and corrugated cardboard. Plant debris collection may be omitted if all landfill bins are labeled NO GREENWASTE The site should provide easy access to maintenance staff and hauler vehicles.

The number of recycling bins necessary in the storage area will vary based on the waste and recycling haulers in the area. Green waste should be kept separate from all other trash and recyclables. Single-stream recycling vendors allow most other recyclable items to be included in one mixed bin. Other haulers may require separate bins for each type of recyclable material.

PROJECT TEAM RECOMMENDATIONS

- Identify the location of trash/recycling receptacles and central collection/storage area in the design documents.

VERIFICATION

PROJECT TEAM

- Submit construction documents showing size and location of central collection/storage area and specifications for outdoor recycling receptacles.

RATER

- Visually verify central collection/storage area includes plant debris, glass, paper, metal, plastic and corrugated cardboard and outdoor recycling receptacles are collocated with every trash receptacle.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines Practice 2.7,
- Recycled Content Park and Recreation Products in Alameda County Fact Sheet, download from www.StopWaste.Org/buyrecycled.html
- Recycling Guidelines for Multifamily Housing, download from: http://www.stopwaste.org/home/index.asp?page=533

5. MINIMIZE SITE DISTURBANCE

Credit A.5						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
2					2	2

a. On greenfield sites, limit site disturbance to protect topography, vegetation and hydrology.

POINTS: 3

PRACTICE DESCRIPTION

Clearing and grading is limited to the minimum area required for roads, utilities, building pads, other hardscapes and maneuvering equipment or to a maximum of:

- 40 feet beyond the building perimeter;
- 10 feet beyond the surface walkways, patios and parking;
- 10 feet beyond utilities less than 12 inches in diameter;
- 15 feet beyond primary roadway curbs and main utility branch trenches;
- 25 feet beyond constructed areas with permeable paving that require additional staging areas in order to limit compaction in constructed areas AND

The property is walked with equipment operators prior to clearing and grading to clarify these boundaries

Greenfield site: *Sites that are not previously developed or graded and remain in a natural state. (* USGBC, LEED, *New Construction & Major Renovation,v2,2 Reference Guide,* September 2006*)*

Previously developed sites *are those that contained buildings, roadways, parking lots or were graded or altered directly by human activities. (* USGBC, LEED, *New Construction & Major Renovation,v2,2 Reference Guide,* September 2006*)*

PROJECT TEAM RECOMMENDATIONS

- Meet and walk the property with the owner, engineers and others before project design to define goals for limiting clearing and grading.

VERIFICATION

PROJECT TEAM

- Submit grading/construction documents highlighting the disturbance boundaries and access road.
- Accountability Form signed by participants to confirm that the boundaries were walked and identified

RATER

- Verify grading/construction documents have highlighted the disturbance boundaries and access road.
- Verify that Accountability Form has been signed by participants.
- (Optional) Visually verify.

SYNERGIES AND TRADE-OFFS

- Limiting site disturbance to meet above requirements in such a way as to also provide water, and shelter for wildlife, can contribute to earning points for Credit A.6 (Provide water and/or shelter for wildlife).
- Limiting site disturbance to also protect trees can contribute to earning points from Credit A.7.a (The landscape is designed to preserve 80% of existing mature healthy trees and penalties for their destruction are included in the construction contract).
- Limiting site disturbance to meet above requirements in such a way as to also keep the open space on the site connected to open space on adjacent sites, can contribute to earning points for Credit A.7.b (The landscape is designed to increase open space compared to its previous use and/or to connect it to other open space or wildlife corridors).
- Protecting diverse plant buffers by limiting site disturbance to meet above requirements can also contribute to earning points for Credit A.7.c (Create or protect a diverse buffer of low maintenance vegetation along creeks, shorelines or monocultured landscaped areas).

BAY-FRIENDLY TOOLS AND RESOURCES

- USGBC LEED, *New Construction & Major Renovation, v.2.2 Reference Guide,* September 2006, p. 67
- Puget Sound Action Team, Low *Impact Design: Technical Guidance Manual for Puget Sound,* 2005, p 28, 62

b. On previously developed sites, restore vegetation and hydrology.

POINTS: 3

PRACTICE DESCRIPTION

On previously developed or graded sites, a minimum of 20% of the site is restored to its native vegetation and/or hydrology.

Although restoring individual areas on the site is acceptable, designing and constructing the following are highly recommended:

- Large tracts of riparian areas that connect and create contiguous riparian areas or
- Large tracts of critical and wildlife habitat area that connect and create contiguous areas or
- Tracts that create common open space areas among and/or within developed sites or
- Areas on individual lots that connect to areas on adjacent lots or common protection areas.

PROJECT TEAM RECOMMENDATIONS

- Meet and walk the property with the owner, engineers and others before project design to define goals for restoring vegetation and hydrology.

VERIFICATION

PROJECT TEAM

- Submit design documents with restoration sites identified. Include total site square feet and the total square feet of restored areas.
- Accountability Form confirming restoration of vegetation and/or hydrology is signed by the Landscape Architect or Designer.

RATER

- Verify design documents identify restoration sites and that percentage of total site to be restored is equal to or greater than 20%.
- Verify that Accountability Form has been signed by the Landscape Architect or Designer.

SYNERGIES AND TRADE-OFFS

- Restoring vegetation and hydrology in such a way as to also provide water, and shelter for wildlife can contribute to earning points for A.6 (Provide water or shelter for wildlife).
- Restoring vegetation and hydrology in such a way as to also preserve 80% of existing mature, healthy trees can contribute to earning points for Credit A.7.a (The landscape is designed to preserve 80% of existing mature healthy trees and penalties for their destruction are included in the construction contract).
- .Restoring areas that connect to open space on adjacent properties can contribute to earning points for Credit A.7.b (The landscape is designed to increase open space compared to its previous use and/or to connect it to other open space or wildlife corridors).
- Restoring vegetation in riparian areas can also contribute to earning points for Credit A.7.c (Create or protect a diverse buffer of low maintenance vegetation along creeks, shorelines or monocultured landscaped areas).

REFERENCES

- LEED, *New Construction & Major Renovation*, V2.2 Reference Guide p. 67
- Sustainable Sites Initiative, *Preliminary report on the Standards & Guidelines*, p.35
- Puget Sound Action Team, *Low Impact Design: Technical Guidance Manual for Puget Sound*, 2005, p. 55

6. PROVIDE WATER AND/OR SHELTER FOR WILDLIFE

Credit A.6						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
						1
Corresponds to BFL Guidelines Practice 7.3						

POINTS: 1

PRACTICE DESCRIPTION

Water and/or shelter for beneficial and desirable wildlife shall be provided in order to increase the diversity and numbers of natural enemies of landscape pests.

Examples of shelter include birdhouses, bat houses, boulders, logs, wood piles and multi storied plant canopies. Water must also be provided by bird bathes, ponds, creeks, wetlands.

Wildlife *refers to undomesticated birds, mammals, reptiles, and amphibians.*

Natural enemies *are organisms that kill, decrease the reproductive potential or otherwise reduce the numbers of another organism. Natural enemies that limit pests are key components of integrated pest management programs. Important natural enemies of insect and mite pests include predators, parasites, and pathogens.*

PROJECT TEAM RECOMMENDATIONS

- Providing shelter or habitat value can be integrated into a variety of landscapes, Logs and boulders create visual interest in the landscape and habitat for soil organisms and reptiles. Rock walls without mortar provide beauty and habitat for lizards. Even small water features benefit birds and insects -- be sure that water features have shallow ends of 1 to 2 inches preferred by birds, and consider the need for maintenance against mosquitoes by circulating water.
- Providing habitat for wildlife can be done in relatively small landscapes and helps to encourage beneficial birds, insects and reptiles to common landscape pests as well as enliven the landscape for the user. Thought should also be given to avoiding attracting unwanted creatures. Large open expanses of turf for example are preferred by Canadian Geese which in large numbers can be a pest problem in urban areas.

VERIFICATION

PROJECT TEAM

- Submit construction plan(s) showing water source and/or where shelter is provided and including specifications for birdhouse, bird bath, bat house etc. if applicable.
- (Optional) Submit photo documentation (in digital form) of constructed or installed water source and/or shelter.

RATER

- Verify construction plans include water source and/or shelter.
- (Optional) Verify photo documentation has been submitted.
- Visually verify after construction.

SYNERGIES AND TRADE-OFFS

- Leaving logs from trees that are identified for removal as shelter for wildlife can contribute to earning points for Credit A.3.a (Produce mulch from plant debris).
- Providing water and protecting native trees with developed understories as shelter for wildlife can also contribute to earning points for Credit A.7.b (The landscape is designed to preserve 80% of existing mature healthy trees)
- Providing water and selecting sites for wildlife shelter that connect to open space on adjacent areas can contribute to earning points for Credit A.7.b (The landscape is designed to increase open space and/or to connect it to other open space or wildlife corridors)
- Providing wildlife habitat and water by incorporating stormwater measures can contribute to earning points for Credit B.2.b (Incorporate landscape measures that are designed to capture and filter 85% of average annual stormwater runoff).
- A project receiving points for Credit A.7.c can not receive credit for A.6 and vice a versa.
- Creating a water feature can contribute to earning points for Credit D.5.a (Specify solar powered pump(s) for water features) and Credit F.1.a (Irrigation and/or all ornamental use of water are plumbed for recycled water).
- Using boulders on the site can contribute to earning points in D.6.a. 100% of any stone and non-concrete hardscapes materials are produced within 500 miles of the project site.

RESOURCES AND BAY-FRIENDLY TOOLS

- *California Native Birds, Butterflies, Dragonflies*
- *Introduction to California Birdlife*, by Jules Evens
- *Raptors of California* by Hans Peeters and Pam Peeters
- *Field Guide to Owls of California and West* by Hans Peeters
- *Field Guide to Butterflies of the San Francisco Bay and Sacramento Valley Regions* by Arthur M. Shapiro and Tim Manolis or California Butterflies by John S. Garth and J.W. Tilden
- *Dragonflies and Damselflies of California* by Timothy D. Manolis

- Other **beneficial or desirable** creatures - bats, frogs, toads, salamanders, lizards, turtles, fish etc.
  - California Reptiles and Amphibians: http://www.californiaherps.com/
  - California Fish: http://calfish.ucdavis.edu/calfish/default.htm
  - California Bats: http://www.californiabats.com/

7. CONSERVE OR RESTORE NATURAL AREAS & WILDLIFE CORRIDORS

Credit A.7						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
						6
Corresponds to BFL Guidelines Practice 7.5						

Wildlife *refers to undomesticated birds, mammals, reptiles, and amphibians.*

a. The landscape is designed to protect 80% of existing mature healthy trees and penalties for destruction of protected trees are included in construction contract.

POINTS: 2

PRACTICE DESCRIPTION

As per a certified arborist, healthy, non-invasive trees, and their critical root zone, are identified and at least 80% are selected for protection. The trees to be conserved are prepared to withstand the stresses of construction by watering, fertilizing, pruning and mulching well in advance. Fencing is installed at or exceeding the critical root zone and provides a strong physical and visual barrier.

AND Penalties for destruction of protected trees are included in construction contract. The language should include:

Limit to an absolute minimum any excavation within the critical root zone. If excavation in this zone is unavoidable, recommendations from a certified arborist on how to excavate should also be included in the specifications.

Restrict trenching in the critical tree root zone areas, with specifications to bore under or dig a shallow trench through the roots with an air spade if trenching is unavoidable.

Prohibit stockpiling or disposal of excavated or construction materials in the critical root zone.

The following provides a prioritized list of native vegetation protection areas:

- Large tracts of riparian areas that connect and create contiguous riparian protection areas.
- Large tracts of critical and wildlife habitat area that connect and create contiguous protection areas.
- Tracts that create common open space areas among and/or within developed sites
- Protection areas on individual lots that connect to areas on adjacent lots or common protection areas.
- Protection areas on individual lots

PROJECT TEAM RECOMMENDATIONS

Meet and walk the property with owner, engineer, architects and designers to identify priority trees to be protected.

VERIFICATION

PROJECT TEAM

- Submit specifications for preparing trees for construction and delineating their critical root zones.
- Submit contract language with penalties for damage to protected trees
- Submit construction plans with fencing details
- Submit construction plans showing trees to be protected/ total trees= 80% minimum

RATER

- Verify specifications for preparing trees for construction and delineating their critical root zones have been submitted
- Verify construction contract includes penalties for damage to protected trees
- Verify construction plans include fencing details
- Verify construction plans show trees to be protected/ total trees= 80% minimum
- (Optional) Visually verify fencing in installed as per plan details.

SYNERGIES AND TRADE-OFFS

- Selecting and protecting trees in areas that connect to open space on adjacent properties can contribute to earning points for Credit A.7.b (The landscape is designed to increase open space compared to its previous use and/or to connect it to other open space or wildlife corridors).
- Selecting and protecting trees in a buffer along creeks, shorelines or other monocultured landscaped areas can contribute to earning points for Credit A.7.c (Create or protect a diverse plant buffer of low maintenance vegetation along creeks, shorelines, or monocultured landscaped areas).

RESOURCES AND BAY-FRIENDLY TOOLS

- Matheny, Nelda and Jim Clark, *Trees and Development: A Technical Guide to Preservation of Trees During Land Development,* 1998.

REFERENCES

- *Low Impact Design*, Vegetations Protection, Reforestation and Maintenance, p. 55

b. The landscape is designed to increase open space compared to its previous use and/or to connect it to other open space or wildlife corridors.

POINTS: 2

PRACTICE DESCRIPTION

Open space is increased or is connected to open space on other properties because clearing and grading and the building footprint are minimized or located in order to protect and keep open space and wildlife corridors on the project site connected to open space or wildlife corridors on adjacent properties.

OR, on previously developed sites with no open space, native vegetation and streams are brought back to the surface, degraded stream banks or wetlands are restored and the restored open space is connected to open space or wildlife corridors in adjacent properties.

The credit is not applicable to project sites that are not adjacent to sites with open space and/or wildlife corridors.

Open space is often defined by local zoning requirements. If local zoning requirements do not clearly define open space, open space means land areas that are not build upon or substantially altered from their natural state. They provide important ecological functions, natural resources, or cultural resources that are worthy of conservation and protection. Such areas may contain, but are not limited to, forests, farmland, old fields, floodplains, wetlands, and shore lands. Open Space can also encompass scenic vistas, recreational areas, and historic sites.

PROJECT TEAM RECOMMENDATIONS

- Meet and walk the property with the owner, engineers and others before project design to identify large un-fragmented areas of open space that are important as natural, scenic or cultural resources and a priority for protection and to identify linkages between open space areas that are possible for protection or can be restored to maintain an interconnected network of wildlife corridors
- Create a strategy for limiting disturbance, as early in design process as possible, that includes efficient road design and lot layout, and orientation of the long axis of the buildings along contours or staggering floor levels to adjust to gradient changes.
- Map protected areas on all plans

VERIFICATION

PROJECT TEAM

- Submit a parcel map with the following clearly identified: pre and post development open space and/or wildlife corridors on the project site and open space and/or wildlife corridors on adjacent properties AND/OR
- Submit calculations of open space as a percentage of total site area pre and post project development.

RATER

- Verify the parcel map has been submitted with the following clearly identified: pre and post development open space and/or wildlife corridors on the project site and open space and/or wildlife corridors on adjacent properties.
- Verify the calculations of open space as a percentage of total site area pre and post project development are accurate and show an increase in open space AND/OR
- Visually verify that open space on the project site is connected to open space on adjacent properties.

SYNERGIES AND TRADE-OFFS

- Restoring open space along creeks or shorelines (riparian) can contribute to earning points for Credit A.7.c (Create or protect a diverse plant buffer of low maintenance vegetation along creeks, shorelines or monocultured landscaped areas).

RESOURCES AND BAY-FRIENDLY TOOLS

- Washington State University, *Low Impact Technical Guidance Manual for Puget Sound,* January 2005

c. Create or protect a diverse plant buffer of dense vegetation next to monocultures or along creeks, shorelines or monocultured landscaped areas.

POINTS: 2

PRACTICE DESCRIPTION

Create a diverse plant buffer at least 24 inches wide next to monocultured areas

AND/OR along creeks, streams and shorelines to trap and filter sediments, nutrients and chemicals from surface runoff. Diversity is defined as a minimum of 20 distinct plant species, as per Credit E.8.

VERIFICATION

PROJECT TEAM

- Submit construction plans with plant buffers or riparian corridors identified.
- Submit plant palette with buffer plant species identified.
- Submit Accountability Form signed by Landscape Architect, Designer or Contractor confirming the requirements for the credit have been met.

RATER

- Verify that the construction plans identify the plant buffers or riparian corridors and that the minimum width is 24 inches.
- Verify plant palette for buffer meets the diversity requirement (see Credit E.8)
- Submit Accountability Form has been signed by Landscape Architect, Designer or Contractor confirming the requirements for the credit have been met.

SYNERGIES AND TRADE-OFFS

- A project receiving points for Credit A.7.c can not receive credit for A.6 and vice a versa.
- Creating this plant buffer along creeks or shorelines and/or connecting it to open space and wildlife corridors in adjacent properties can contribute to earning credits for Credit A.5.b (On previously developed sites, restore vegetation and hydrology) or Credit A.7.b (The landscape is designed to increase open space compared to its previous use and/or to connect it to other open space or wildlife corridors).
- A diverse plant pallet of 20 or more distinct plant species can contribute to earning points in Credit E.8.a-c (Diversify) providing a minimum of 20 or more distinct plant species.

RESOURCES AND BAY-FRIENDLY TOOLS

- Washington State University, *Low Impact Technical Guidance Manual for Puget Sound*, January 2005

B. STORMWATER AND SITE DRAINAGE

1. MINIMIZE IMPERVIOUS SURFACES

Credit B.1						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
					7	
Corresponds to BFL Guidelines Practice 6.6						

a. Permeable paving, gravel or other porous surfaces are installed for :

- **i. 25% OR**
- **ii. 33% (total 3 points) OR**
- **iii. 50% of the paved area (total 5 points)**

POINTS: 5

PRACTICE DESCRIPTION

Permeable paving such as gravel or other porous surfaces are installed for 25%, 33% or 50% of the paved area. Permeable paving materials shall have a runoff coefficient of .65 or less as calculated for stormwater treatment designs based on small, frequent storms. The following chart provides runoff coefficients for commonly used paving materials.

Estimated Runoff Coefficients for Various Paving Surfaces During Small Storms	
Type of surface	Runoff Coefficients
Concrete	.80
Asphalt	.70
Pervious concrete	.65
Pervious asphalt	.55
Natural stone (without grout)	.25
Turf block	.15
Brick (without grout)	.13
Unit pavers on sand	.10
Crushed aggregate	.10
Adapted from the Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance	

Paved Area *is the surface that accommodates pedestrian, bicycle or vehicular traffic. It includes sidewalks, patios, walkways, driveways, parking lots and other non-roof hardscapes, regardless of permeability*

Permeable Paving *is hardscape or a paved surface that accommodates pedestrian, bicycle vehicular traffic while also allowing surface runoff to infiltrate into surface soil and/or permeable subbase. Examples include asphalt or concrete rendered porous by the aggregate structure.*

Runoff Coefficient *is the ratio of the runoff rate to rainfall. For example, a runoff coefficient of 0.65 means that sixty five percent of the rainfall that falls on this type of surface will flow off as runoff. (Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0)*

PROJECT TEAM RECOMMENDATIONS

- Utilize LID strategies during the project planning and design phase to identify opportunities to minimize impervious surfaces and reduce stormwater runoff from the site. Specific recommendations include:
  - Consider reducing the size of parking lots, roadways and other impervious surfaces with more effective layout and reduced parking demand ratios
  - Slow runoff and encourage infiltration with bioretention planters and swales along the road and permeable paving with subbase storage capacity
  - Maximize open space connectivity and design roadways and paving areas to minimize disturbing the site and disrupting existing drainage patterns
- Consider permeable paving materials suitable for ADA accessibility including pervious concrete, pervious asphalt and aggregate fines such as decomposed granite that meet compaction test for accessibility.
- For additional stormwater retention consider permeable base material, such as Caltrans class 2 permeable subbase.
- When designing paving for vehicular traffic, work with the project engineer to establish the proper cross-section based upon underlying soil type and expected loading.
- Use deepened curbs to prevent migration of water from underneath the porous paving subbase to adjacent non-porous paving.

Impervious Surface *is the total area of surfaces on a developed site that inhibit infiltration of stormwater. The surfaces include, but are not limited to, conventional asphalt or concrete roads, driveways, parking lots, sidewalks or alleys, and rooftops (Low impact development technical guidance manual for Puget sound January 2005)*

Low impact development (LID) *is a stormwater management strategy that emphasizes conservation and use of existing natural site features integrated with distributed, small-scale stormwater controls to more closely mimic natural hydrologic patterns in residential, commercial and industrial settings. (Low impact development technical guidance manual for Puget Sound January 2005)*

VERIFICATION

PROJECT TEAM

- Submit scaled plan identifying all paved areas and surface materials.
- Submit:
  - Total square feet of impervious paving
  - Total square feet of permeable paving, gravel or other porous paving surfaces
  - Calculations of the percent of permeable paving, gravel or other porous paving surfaces

RATER

- Verify that the scaled plan identifies all paved surface materials and that the surface materials are permeable.
- Verify that square feet and calculations have been submitted and that percentage is correct and meets the criteria for the credit.

SYNERGIES AND TRADE-OFFS

- Preventing runoff from directly entering the storm drain by using permeable paving, gravel or other porous surfaces can contribute to earning points for Credit B.1.b (No impervious surfaces directly connect to the storm drain)
- Capturing and filtering 85% or 100% of average annual runoff by using permeable paving, gravel or other porous surfaces can contribute to earning points for Credit B.2.b.c (Incorporate landscape measures, including vegetated swales, infiltration planters, detention basins and /or stormwater wetlands, that are designed to capture and filter 85% or 100% of average annual runoff)
- Installing recycled aggregate base under permeable paving, gravel or other porous surfaces can contribute to earning points for Credit D.1.b (A minimum 25% of recycled aggregate (crushed concrete) is specified for walkway, driveway, roadway base and other uses)
- Substituting flyash or slag for a percent of the Portland cement in permeable concrete can contribute to earning points for credit D.1.c (Replace Portland cement in concrete with flyash or slag)
- Installing light colored permeable paving, gravel or other porous surfaces can contribute to earning points for Credit D.3.a (at least 50% of the paved site area includes cool site techniques)
- Purchasing permeable materials that are produced within 500 miles of the project site can contribute to earning points for Credit D.6.a.(100% of any stone and non-concrete hardscapes materials are produced within 500 miles of the project site

RESOURCES AND BAY-FRIENDLY TOOLS

- Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance http://www.cleanwaterprogram.org/uploads/ACCWP_C3_Technical_Guidance_090506-300dpi.pdf
- Asphalt Paving Alliance http://www.pavegreen.com/energy.asp
- Bay-Friendly Landscape Guidelines Practice 6.6 https://www.stopwaste.org/docs/bay-friendly_landscape_guidelines_-_all_chapters.pdf
- California Asphalt Pavement Association http://www.californiapavements.org/stormwater.html
- Concrete Promotion Council of Northern California http://www.cpcnc.org/
- EPA Stormwater Technology Fact Sheet Porous Pavement http://www.epa.gov/npdes/pubs/porouspa.pdf
- Ferguson, Bruce K., *Porous Pavements,* Boca Raton, FLA: CRC Press
- Interlocking Concrete Pavement Institute *http://www.icpi.org/*
- Low Impact Development Technical Guidance Manual for Puget Sound January 2005 pg 97-122 http://www.psp.wa.gov/downloads/LID/LID_manual2005.pdf

b. No impervious surfaces directly connect to the storm drain

POINTS: 2

PRACTICE DESCRIPTION

Impervious surfaces shall not directly connect to the storm drain system. All water that falls on the impervious surfaces on the site, including any roof areas, must first be directed into a landscape area or permeable paving or other porous surface before flowing into the storm drain. Driveway flares within the public right of way are excluded from this requirement.

PROJECT TEAM RECOMMENDATIONS

Work with architect/ civil engineer and/or developer of any buildings to ensure all downspouts are directed to landscape areas and not directly connected to the storm drain system.

VERIFICATION

PROJECT TEAM

- Submit Accountability Form signed by the Engineer, Designer or Landscape Architect that as installed the project meets this requirement.

RATER

- Verify that Accountability Form has been signed by Engineer, Designer or Landscape Architect.
- (Optional) Visually verify that as installed the project meets this requirement.

SYNERGIES AND TRADE-OFFS

- Installing permeable paving, gravel or other porous surfaces to prevent runoff from directly running off into the storm drain can contribute to earning points for Credit B.1.a (Permeable paving gravel or other porous surfaces are installed for 25%, 33% or 50% of paved area)
- Directing runoff from parking lots into landscape beds vegetated swales or other landscape stormwater bmps can contribute to earning points for Credit B.2.a (Capture and filter runoff from parking lots into landscape beds, vegetated swales or other landscape stormwater bmps)
- Incorporating landscape measures including vegetated swales, infiltration planters, detention basins and/ or stormwater wetlands, that are designated to capture and filter 85% or 100% of average annual runoff can contribute to earning points for Credit B.2.b,c (Incorporate landscape measures, including vegetated swales, infiltration planters, detention basins and /or stormwater wetlands, that are designed to capture and filter 85% or 100% of average annual runoff)
- Constructing swales or bioswales with flat bottoms can contribute to earning points for Credit B.2.d (Swales or bioswales specify flat bottoms of at least 18 inches across and/or rock cobble at points of concentrated flow.)
- Installing bioswales without turf can contribute to earning points for Credit B.2.e (Turf is not specified in bioswales)
- Using planters or landscape areas to capture rainwater from downspouts can contribute to earning points for Credit B.2.f (Direct rain water from all down spouts to planters, swales or landscaped areas

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines Practice 6.6
- Low Impact Development Technical Guidance Manual for Puget Sound January 2005 http://www.psp.wa.gov/downloads/LID/LID_manual2005.pdf

2. DESIGN A SYSTEM TO CAPTURE AND FILTER STORM WATER

Credit B.2						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
					9	
Corresponds to BFL Guidelines Practice 6.9						

a. Capture and filter runoff from parking lots into landscape beds, vegetated swales or other landscape stormwater BMP's

POINTS: 2

PRACTICE DESCRIPTION

Runoff from a minimum of 95% of all parking lot surfaces shall be captured and directed to landscape based BMP's. Treatments shall meet the post-construction stormwater requirements of the local jurisdiction and all required documents shall be submitted to the local permitting agency. All treatment measures shall be designed to drain completely within 72 hours or per the local Vector Control District's Guidelines.

PROJECT TEAM RECOMMENDATIONS

- Work with civil engineer, architect and/or developer early in the process to coordinate parking lot design and grading to ensure parking lots are designed to drain into planting areas and that planting areas are sufficient size.
- Consider soil type and drainage rate, appropriate plant selection for periods of inundation and required maintenance.
- Review local jurisdictional requirements for post-construction stormwater treatment measures if project exceeds area thresholds. Most jurisdictions will require post-construction stormwater treatment measures if project size adds or replaces 10,000 square feet or more of impervious surfaces, including roofs. In addition, projects adding or replacing more than one acre of impervious surfaces, including roofs, may be required to meet hydromodification management criteria.
- Local permitting agencies may also have specific requirements and possible exemptions. For example, the City of Oakland requires a site plan that incorporates measures to manage stormwater runoff after construction be approved prior to issuance of permits for projects that add or replace less than 10,000 square feet of impervious surface or involve construction of one single family home.
- Refer to Practice B.2.b, below, for additional recommendations regarding capturing and treating stormwater.

Stormwater *is stormwater runoff, snow-melt runoff, surface runoff and drainage excluding infiltration and irrigation tail water. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance*

Landscape Based BMPs (Best Management Practices) *refers to any program, technology, process, sitting criteria, operational method or measure, or engineered system, which when implemented prevents, controls, removes, or reduces pollution. Some examples of landscape stormwater BMP's include bioretention areas, extended detention basins, flow through planter boxes, infiltration trenches, tree well filters, vegetated buffer strips and vegetated swales. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0*

Hydromodification management (HM) *techniques focus on retaining, detaining or infiltrating runoff and matching post-project flows and durations to pre-project patterns for a specified range of smaller, more frequent rain events, to prevent increases in channel erosion downstream. (Hydromodification Management Requirements Information for Developers, Builders and Project Applicants, Alameda Countywide Clean Water Program, November 2007)*

VERIFICATION

PROJECT TEAM

- Submit Accountability Form signed by the Engineer, Designer or Landscape Architect that as installed the project meets this requirement.
- If the project is required to submit specific documents for approval by the permitting agency submit the name and title of the individual approving the plans and the date approved.

RATER

- Verify that Accountability Form has been signed by Engineer, Designer or Landscape Architect
- Verify the name and title of the individual from the permitting agency has been submitted, along with the date of approval.

SYNERGIES AND TRADE-OFFS

- Preventing runoff from directly entering the storm drain by diverting runoff from the storm drain into landscape beds, vegetated swales or other landscape stormwater bmps can contribute to earning points for Credit B.1.b (No impervious surfaces directly connect to the storm drain)
- Capturing and filtering runoff from parking lots into landscape beds, vegetated swales or other landscape stormwater bmps can contribute to earning points for Credit B.2.b,c (Incorporate landscape measures, including vegetated swales, infiltration planters, detention basins and /or stormwater wetlands, that are designed to capture and filter 85% or 100% of average annual runoff)
- Capturing and filtering runoff from parking lots into swales or bioswales with flat bottoms can contribute to earning points for Credit B.2.d (Swales or bioswales specify flat bottoms of at least 18 inches across and/or rock cobble at points of concentrated flow)
- Capturing and filtering runoff from parking lots into bioswales not planted with turf can contribute to earning points for Credit B.2.e (Turf is not specified in bioswales)
- Specifying a diverse palette of California native species for vegetated BMPs can contribute to earning points for Credit E.8 (Diversify) and E.9 (Choose CA natives first).

RESOURCES AND BAY-FRIENDLY TOOLS

- Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance http://www.cleanwaterprogram.org/uploads/ACCWP_C3_Technical_Guidance_090506-300dpi.pdf
- Alameda Countywide Clean Water Program. *Soil Specifications for Stormwater Treatment Measures*, http://www.cleanwaterprogram.org/uploads/Soil_Specifications_NDS_approved_May_8_2007_051407.pdf
- Contra Costa Clean Water Program Stormwater C.3 Guidebook http://www.cccleanwater.org/new-developmentc3/stormwater-c3-guidebook/
- City of Emeryville Stormwater Sizing Worksheet http://www.ci.emeryville.ca.us/planning/sizing_worksheet_v8.xls
- EPA: Low Impact Development (LID) and Other Green Design Strategies, http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=124Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp-w2k.com/default.htm
- Guidelines for the Standard Urban Storm Water Mitigation Plan Storm Water Best Management Practices for New Development and Redevelopment For the Santa Rosa Area and Unincorporated Areas around Petaluma and Sonoma, June 3, 2005 www.sonoma-county.org/prmd/sw/pdf/susmp.pdf

b. Incorporate landscape measures, including vegetated swales, infiltration planters, detention basins and/or stormwater wetlands, that are designed to capture and filter

i. 85% of average annual stormwater runoff (2 points) OR

ii. Incorporate landscape measures, including vegetated swales, infiltration planters, detention basins and/or stormwater wetlands, that are designed to capture and filter 100% of average annual runoff (total 4 points)

POINTS: 4

PRACTICE DESCRIPTION

Incorporate landscape based BMPs that are designed to capture and filter 85% or 100% of the average annual stormwater runoff. Landscape measures include vegetated swales (also referred to as bioswales), infiltration planters, detention basins, stormwater wetlands, dry wells and dry streambeds.

Test infiltration of soils under landscape based BMPs and amend to meet either Alameda County Clean Water Program Soil specifications 9 or other local agency specifications or Low Impact Development requirements (See definition under B.1). The addition of quality compost is highly recommended

PROJECT TEAM RECOMMENDATIONS

- Work with civil engineer, architect and/or developer early in the process to coordinate surface drainage of hardscape and retention and treatment of stormwater.
- Refer to the post-construction (C.3) stormwater handbook from the local jurisdiction for specific requirements and guidance on calculating the runoff and sizing the landscape treatment facilities. Verify submittal requirements by the local permitting agency. San Francisco Bay Area guidebooks are listed under resources.
- Pay particular attention to soil type and percolation rate. Per ACCWP soil specifications for post-construction stormwater treatment measures, sandy loam or loamy sand soils with a percolation rate of 2”-10” or 5” -10”, respectively.
- The addition of quality compost to the existing and/or import soils will help create soil structure, improving the water holding capacity and ability to filter pollutants. A mulch layer of organic material that holds together when inundated will also filter and help with absorption and retention of runoff. Consider additional ways to improve filtering capacity of the soils and plants, such as inoculating the soil with mycorrhizae.

Vegetated swales (bioswales)- *are open shallow channels with thick vegetation covering the side slopes and bottom that collect and slowly convey runoff to downstream discharge points.*

Infiltration planters *or flow through planters Structure designed to treat stormwater by intercepting rainfall and slowly draining it through filter media and out of planter.*

Detention basins *are constructed basins with drainage outlets that are designed to detain runoff from a storm for some minimum time (e.g., 48 hours) to allow settling of sediment and pollutants.*

Stormwater wetlands *are constructed detention basins that have a permanent pool of water throughout the year and capacity for temporary additional storage of runoff that is released via an outlet structure. They differ from wet ponds in that they are typically shallower and have greater vegetation coverage.*

Above definitions are from: Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0

- Refer to additional recommendations under B.2.a, above.

VERIFICATION

PROJECT TEAM

- Submit Accountability Form signed by the Engineer, Designer or Landscape Architect that as installed the project meets this requirement.
- If the project is required to submit specific documents for approval by the permitting agency submit the name and title of the individual approving the plans and the date approved.
- Submit the results of the analysis or estimate of infiltration rate and recommendations for amending the soil, if required to meet Alameda Countywide Clean Water Program or other local or LID specifications.

RATER

- Verify that Accountability Form has been signed by Engineer, Designer or Landscape Architect
- Verify the name and title of the individual from the permitting agency has been submitted, along with the date of approval.
- Verify results of analysis or estimate of infiltration rate has been submitted, if required.

SYNERGIES AND TRADE-OFFS

- Preventing runoff from directly entering the storm drain by capturing 85% or 100% of average annual stormwater runoff can contribute to earning points for Credit B.1.b (No impervious surfaces directly connect to the storm drain)
- Designing landscape areas to capture runoff from parking lots can contribute to earning points for Credit B.2.a (Capture and filter runoff from parking lots into landscape beds, vegetated swales or other landscape stormwater bmps)
- Analyzing the soil and determining infiltration rate can contribute to earning points for Credit C. 1 (Assess the soil and test drainage).
- Incorporating quality compost into the soils under landscape based BMPs can contribute to meeting the requirements and earning points for Credit C.7 (Amend the soil with compost before planting).
- Specifying a diverse palette of California native species for vegetated BMPs can contribute to earning points for Credit E.8 (Diversify) and E.9 (Choose CA natives first).

RESOURCES AND BAY-FRIENDLY TOOLS

- Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance http://www.cleanwaterprogram.org/uploads/ACCWP_C3_Technical_Guidance_090506-300dpi.pdf
- Alameda Countywide Clean Water Program. *Soil Specifications for Stormwater Treatment Measures*, http://www.cleanwaterprogram.org/uploads/Soil_Specifications_NDS_approved_May_8_2007_051407.pdf
- Contra Costa Clean Water Program Stormwater C.3 Guidebook http://www.cccleanwater.org/new-developmentc3/stormwater-c3-guidebook/
- City of Emeryville Stormwater Sizing Worksheet http://www.ci.emeryville.ca.us/planning/sizing_worksheet_v8.xls
- EPA: Low Impact Development (LID) and Other Green Design Strategies, http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=124Santa Clara Valley Urban Runoff Pollution Prevention Program http://www.scvurppp-w2k.com/default.htm
- Guidelines for the Standard Urban Storm Water Mitigation Plan Storm Water Best Management Practices for New Development and Redevelopment For the Santa Rosa Area and

Unincorporated Areas around Petaluma and Sonoma, June 3, 2005 www.sonoma-county.org/prmd/sw/pdf/susmp.pdf

c. Bioswales specify flat bottoms of at least 18 inches across and/or rock cobble at points of concentrated flow

POINTS: 1

PRACTICE DESCRIPTION

The bottom of any specified **swales or** bioswales shall be flat for a minimum of 18 inches across to slow and increase filtration of the runoff. Rock cobble should be placed anywhere flows may concentrate and cause erosion, such as curb cuts from parking lots and roadways that direct runoff into planters.

PROJECT TEAM RECOMMENDATIONS

If site grading and details are prepared by civil engineer; coordinate swale cross-section and rock cobble placement.

VERIFICATION

PROJECT TEAM

- Submit plans that show where landscape-based stormwater BMP's are located and location of rock cobble AND/OR
- Submit swale or bioswale details that specify flat bottoms for a minimum of 18 inches across

RATER

- Verify that plans show where landscape based stormwater BMP's are located and location of rock cobble AND/OR
- Verify that swale or bioswale details specify flat bottoms for a minimum of 18 inches across.
- Visually verify (by spot check) that as installed the project meets this requirement

SYNERGIES AND TRADE-OFFS

- Specifying landscape based stormwater BMP's without turf can contribute to earning points for Credit B.2.e (Turf is not specified in bioswales)

RESOURCES AND BAY-FRIENDLY TOOLS

- Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance http://www.cleanwaterprogram.org/uploads/ACCWP_C3_Technical_Guidance_090506-300dpi.pdf

d. Turf is not specified in bioswales

__Turf__ is defined as spreading or stoloniferous grasses that when regularly mowed form a dense growth of leaf blades and roots. Areas planted with lawn alternatives, such as Carex pansa and other tufted grass or sedge species are not considered turf.

POINTS: 1

PRACTICE DESCRIPTION

Mowed turf, which requires ongoing mowing, water and possible chemical inputs, is not planted in landscape based stormwater BMP's.

PROJECT TEAM RECOMMENDATIONS

Select plants that will tolerate periods of inundation and drought, filter sediments and uptake pollutants. Refer to Resources and Bay-Friendly Tools and local jurisdiction's guidelines for landscape based stormwater BMP's planting recommendations.

VERIFICATION

PROJECT TEAM

- Submit planting plans verifying that no turf is specified in landscape based stormwater BMP's.

RATER

- Verify that plans show that turf is not specified in landscape based stormwater BMP's.
- Visually verify (by spot check) that as installed the project meets this requirement.

SYNERGIES AND TRADE-OFFS

- Specifying landscape based stormwater BMP's with flat bottoms can contribute to earning points for Credit B.2.d (Bioswales specify flat bottoms of at least 18 inches across and/or rock cobble at points of concentrated flow)
- Planting landscape based stormwater BMP's with California native, Mediterranean or other climate adapted plants that require occasional, little or no summer water for 75% of all non-turf plants can contribute to earning points for Credit E.3.a.i.
- Planting landscape based stormwater BMP's with native plants can contribute to earning points for Credit E.9.a

RESOURCES AND BAY-FRIENDLY TOOLS

- Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance http://www.cleanwaterprogram.org/uploads/ACCWP_C3_Technical_Guidance_090506-300dpi.pdf

e. Direct rain water from all down spouts to planters, swales or landscaped areas.

POINTS: 1

PRACTICE DESCRIPTION

Down spouts are placed to empty directly into planters, swales or landscaped areas. Infiltration of soils receiving the water from the downspouts shall be tested and if required, amended to bring the percolation rate to meet Alameda Countywide Clean Water Program or other local agency or LID specifications.

PROJECT TEAM RECOMMENDATIONS

Work with architect/ civil engineer and/or developer of any buildings to ensure all downspouts are directed to landscape areas and not directly connected to the storm drain system.

VERIFICATION

PROJECT TEAM

- Submit Accountability Form signed by the Engineer, Designer or Landscape Architect that as installed the project meets this requirement

RATER

- Verify that Accountability Form has been signed by Engineer, Designer or Landscape Architect
- Visually verify (by spot check) that as installed the project meets this requirement

SYNERGIES AND TRADE-OFFS

- Capturing and filtering water from all impervious roof areas into planters, swales or landscaped areas can contribute to earning points for Credit B.2.b.c (Incorporate landscape measures, including vegetated swales, infiltration planters, detention basins and /or stormwater wetlands, that are designed to capture and filter 85% or 100% of average annual runoff)
- Analyzing the soil and determining infiltration rate can contribute to earning points for Credit C. 1 (Assess the soil and test drainage).
- Incorporating quality compost into the soils under landscape based BMPs can contribute to meeting the requirements and earning points for Credit C.7 (Amend the soil with compost before planting).

RESOURCES AND BAY-FRIENDLY TOOLS

- Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance http://www.cleanwaterprogram.org/uploads/ACCWP_C3_Technical_Guidance_090506-300dpi.pdf

C. EARTHWORK AND SOIL HEALTH

1. ASSESS THE SOIL AND TEST THE DRAINAGE

Credit C.1						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
2		1				
Corresponds to BFL Guidelines Practice 1.2						

a. Submit laboratory soil analysis results and recommendations for compost and natural fertilizers.

POINTS: 3

PRACTICE DESCRIPTION

An analysis of one or more soil samples that are representative of the site conditions shall be completed by an accredited and approved testing laboratory. Sample collection procedures shall adhere to recommendations of the soil testing laboratory. Contractor shall request that the laboratory make recommendations based on amending with compost and an 'organic' approach to soil and landscape management, Analyses to be performed include:
pH, electrical conductivity, nitrate, ammonium, phosphorus, potassium, calcium, saturation percent, sodium, chloride, sodium adsorption ratio, boron, % sand-silt-clay, lime, % organic

It is also recommended that the infiltration rate and drainage characteristics be determined, particularly for soils in bioswales and other stormwater BMPs.

PROJECT TEAM RECOMMENDATIONS

- Sample problematic areas separately.
- Provide the laboratory with your target soil organic matter content, and the total landscape area to be amended upon which they can then make accurate recommendations for amending the soil.
- Provide soil lab with the types of plantings intended, turf, perennial bed, annual bed, swale, etc. so that they can customize their recommendations accordingly.
- Integrate soil analysis into a soil management plan.
- Consult a geotechnical engineer or soil scientist for initial assessment of infiltration for all beds but particularly for soils under stormwater BMPs such as bioswales.

VERIFICATION

PROJECT TEAM

- Submit soil analysis report and accompanying recommendations from the accredited soil laboratory.

RATER

- Verify soil analysis has been completed and that recommendations from the lab are based on an 'organic' approach.

SYNERGIES AND TRADE-OFFS

- Analyzing the soil and determining infiltration rates can contribute to earning points for Credit B.2 (Design a system to capture and filter storm water).
- Providing the laboratory with a target soil organic matter content of 3.5% or 5% can contribute to meeting the requirement or earning points for Credit C.7 (Amend the soil with compost before planting).
- Requesting recommendations for amending or fertilizing the soil be based on an organic approach can contribute to earning points for Credit C.5 (Feed soils naturally & avoid synthetic fertilizers).

RESOURCES AND BAY-FRIENDLY TOOLS

- *Bay-Friendly Landscape Guidelines lists local soil laboratories, page 66.*
- State of California, Department of Water Resources, Model Water Efficient Landscape Ordinance, Appendix B, Sample Soil Management Plan.

2. Remove and store topsoil before grading

Credit C.2						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		2				
Corresponds to BFL Guidelines Practice 3.1						

a. The removal, temporary storage, and re-spreading of topsoil is specified in the landscape design documents AND specifications include a maximum topsoil pile height of 6 feet, as well as measures to protect the stored topsoil from erosion.

POINTS: 2

Horticulturally suitable topsoil *has soluble salts less than 0.5mmhos/cm, free of large roots, clots and stones larger than 1 inch, noxious weeds, sticks, lumber, brush, litter and undesirable disease-causing organisms, as evidenced by previous plant growth.*

PRACTICE DESCRIPTION

Specify the removal, during grading, the temporary storage, and the replacement of horticulturally suitable topsoil. If horticulturally suitable topsoil is greater than 6 inches in depth, a minimum of 6 inches shall be removed and stored for re-spreading. If suitable topsoil is less than 6 inches, then entire topsoil depth shall be removed. Specifications shall include a maximum topsoil pile height of 6 feet. Stockpiled soil shall be protected with blankets or socks, or seeded for erosion control if the soil will be stockpiled over the rainy season.

It is highly recommended that the soil below the removed topsoil be scarified or tilled before stored topsoil is re-spread, especially if the stored topsoil will amount to less than 8 inches after replacing.

PROJECT TEAM RECOMMENDATIONS

- Integrate this practice into a soil management plan.
- Review the specifications for removing and storing topsoil with the contractor before grading.

VERIFICATION

PROJECT TEAM

- Submit specifications for removal, storage and replacement of topsoil and details for protecting stored topsoil from erosion.

RATER

- Verify specifications and details have been submitted.
- (Optional) Visually verify stockpiling and protection of soil.

SYNERGIES AND TRADE-OFFS

- Amending stored topsoil with compost can contribute to meeting the requirement and earning points for Credit C.7 (Amend the soil with compost before planting).
- Ripping, scarifying or tilling the remaining soil before the removed topsoil is replaced can contribute to earning points for Credit C.4 (Aerate compacted soils)

RESOURCES AND BAY-FRIENDLY TOOLS

- Guidelines and Resources for Implementing Soil Quality and Depth BMPT5.13
  www.BuildingSoil.org/tools/Soil_BMP_text.pdf
- State of California, Department of Water Resources, Model Water Efficient Landscape Ordinance, Appendix B, Sample Soil Management Plan.

3. Protect soil from compaction

Credit C.3						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		3				
Corresponds to BFL Guidelines Practice 3.2						

a. Grading specifications or construction plans call for the installation and maintenance of fencing to prohibit parking or materials staging in areas identified for protection.

POINTS: 2

PRACTICE DESCRIPTION

Areas that are to be planted, or areas with native vegetation to be protected are identified as off limits to parking of vehicles, equipment and other materials. This practice is implemented regardless of need for grading. Fencing shall provide a strong physical and visual barrier and be a minimum of 3-4 feet high. The site shall be walked with the contractor and equipment operators prior to beginning construction.

PROJECT TEAM RECOMMENDATIONS

- Integrate the protection of identified areas with the site's stormwater pollution prevention plan and soil management plan.
- Clearly identify limited areas for parking cars and equipment and for staging materials that are outside areas of protection and on the site where roads and utility corridors will be placed.
- Work with the contractor to identify appropriate equipment: axle loads exceeding 10 tons per axle can compact soils as deep as 3 feet and in many cases activities can be completed with mini-track loaders or other smaller scale equipment.

VERIFICATION

PROJECT TEAM

- Submit construction documents with location, type and height of all fencing identified.
- Submit an Accountability Form, signed by the Landscape Architect, Designer or Contractor indicating that the property has been walked with equipment operators prior to clearing and grading to clarify these boundaries

RATER

- Verify construction documents have been submitted with fencing identified.
- Verify Accountability Form has been signed by Landscape Architect, Designer or Contractor.
- (Optional) Visually verify installed fencing before construction.

SYNERGIES AND TRADE-OFFS

- Integrating this practice with a plan to limit grading can contribute to earning points for Credit A. 5.a. (Minimize site disturbance).
- Preserving existing mature healthy trees in areas identified for protection can contribute to earning points from Practice A.7.a (The landscape is designed to preserve 80% of existing mature healthy trees and penalties are included).

RESOURCES AND BAY-FRIENDLY TOOLS

- State of California, Department of Water Resources, Model Water Efficient Landscape Ordinance, Appendix B, Sample Soil Management Plan.
- www.BuildingSoil.org/tools/Soil_BMP_text.pdf

REFERENCES

- *Puget Sound Action Team, Washington State University, Low Impact Development*

b. Design documents specify that soil is not worked when wet

POINTS: 1

PRACTICE DESCRIPTION

Design documents specify that clearing, grading and heavy construction is completed entirely during the dry season, usually April through October.

PROJECT TEAM RECOMMENDATIONS

- Integrate this practice into a soil management plan.

VERIFICATION

PROJECT TEAM

- Submit construction documents with instructions to begin and complete all soil activities during the dry season and to avoid all activities if the soil is wet.

RATER

- Verify construction documents include the appropriate instructions.

RESOURCES AND BAY-FRIENDLY TOOLS

- State of California, Department of Water Resources, Model Water Efficient Landscape Ordinance, Appendix B, Sample Soil Management Plan.

4. Aerate compacted soils

Credit C.4						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		2				
Corresponds to BFL Guidelines Practice 3.7						

a. Design documents include specification to alleviate compacted soils to a depth of at least 8 inches, before planting, for all landscaped areas that can not be protected during construction. (1 point)

b. Design documents include specification to alleviate compacted soils to a depth of at least 12 inches, before planting, for all landscaped areas that can not be protected during construction. (1 point)

POINTS: 2

PRACTICE DESCRIPTION

The optimal practice is to protect all planting areas from construction equipment and staging materials as equipment can compact soil to a depth of many inches. If the planting areas are not protected, then the soil should be ripped, scarified or tilled during soil preparation to a minimum depth of 8 or 12 inches.

PROJECT TEAM RECOMMENDATIONS

- Integrate the alleviation of compacted soils into a soil management plan.
- Incorporate compost into the soil at the same time it is being aerated for best results.

VERIFICATION

PROJECT TEAM

- Submit design documents and/or construction documents that include instructions for alleviating compaction.
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor indicating soil has been ripped or tilled to a depth of 8 or 12 inches or more.

RATER

- Verify design or construction documents include instructions for alleviating compaction.
- Verify Accountability Form has been signed by Landscape Architect, Designer or Contractor.
- (Optional) Visually verify by digging at least one 8 or 12 inch test hole per acre of turf and at least one per acre of planting bed. Test holes must be excavated using only a garden spade driven by the inspector's weight.

SYNERGIES AND TRADE-OFFS

- Incorporating compost at the time of tillage can contribute to meeting the requirement or earning points for Credit C.7 (Amend the soil with compost before planting).

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines Practice 3.2
- www.BuildingSoil.org/tools/Soil_BMP_text.pdf
- State of California, Department of Water Resources, Model Water Efficient Landscape Ordinance, Appendix B, Sample Soil Management Plan.
- US Composting Council, *Field Guide to Compost Use.*

5. FEED SOILS NATURALLY & AVOID SYNTHETIC FERTILIZERS

Credit C.5						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		1				
Corresponds to BFL Guidelines Practice 3.8 & 3.9						

a. Fertilizers or soil amendment materials prohibited by OMRI in its generic materials list are prohibited in construction of the project.

POINTS: 1

PRACTICE DESCRIPTION

Bay-Friendly Landscaping relies on compost and organic fertilizers from natural sources that release elements slowly.

Amendments and fertilizers that are not approved or are restricted for use in crop production by OMRI shall not be specified for use during the construction and establishment phases of the project.

Organic Materials Review Institute (OMRI) *approves amendments and fertilizers for use in crop production. The OMRI Generic Materials List is a catalog of over 900 substances that are allowed, restricted, or prohibited for use in organic agriculture and food processing. Based on the National Organic Program, the list serves as a reference guide for organic farmers, handlers, processors, inspectors, certifiers, agricultural professionals, and all others with an interest in materials for use in organic production. Materials approved for use in organic production are appropriate for use in landscapes.* *http://omri.org/OMRI_generic_list.html*

PROJECT TEAM RECOMMENDATIONS

- Submit a soil sample for analysis and request recommendations for an organic approach to the management of the soil.

VERIFICATION

PROJECT TEAM

- Submit an Accountability Form signed by the Landscape Contractor indicating that no materials prohibited by OMRI have been used in the construction or establishment phases.
- Submit construction document that specify the use of organic amendments and fertilizers.

RATER

- Verify that construction documents require organic fertilizers and amendments.
- Verify Accountability Form has been signed by the Landscape Contractor.

SYNERGIES AND TRADE-OFFS

- Using compost as the soil amendment can contribute to meeting the requirement or earning points for Credit C.7 (Amend the soil with compost before planting).
- Using compost made from plant debris (recycled mulch) can also contribute to earning points for Credit D.1.d. (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste.

RESOURCES AND BAY-FRIENDLY TOOLS

- *Bay-Friendly Landscape Guidelines* Practice
- www.BuildingSoil.org/tools/Soil_BMP_text.pdf
- *Field Guide to Compost Use*, US composting Council www.uscompostingcouncil.org

6. MULCH

a. REQUIRED: Planting plans indicate that after construction, all soil on site is protected with a minimum of 3 inches of mulch.

POINTS: This practice is required for all commercial& civic landscapes that are to be recognized as Bay-Friendly.

PRACTICE DESCRIPTION

A three-inch (3") layer of mulch is spread over the surface of all non-turf planting areas. It is highly recommended that trees identified for removal are chipped and used on-site as mulch or that recycled or green waste mulch be purchased. It is very important that root crowns be kept free of mulch. It is also recommended that landscape fabric not be used under the recycled mulch. All layers of sheet mulch, including cardboard, paper, compost, or other chipped materials if used, will count towards the 3 inches of mulch.

PROJECT TEAM RECOMMENDATIONS

- Specify a three-inch (3") layer of mulch planting notes, specifications, details and in cost estimate.
- If sheet mulching is specified, include a sheet mulching detail in planting plans.
- Include notes on clearing and demolition plans and specifications if on-site trees are to be chipped for mulch.
- Integrate this practice into a soil management plan.
- Be sure that grading instructions include a soil level at least 3 inches lower than the surrounding hardscapes to insure that the finished mulch is at grade or slightly lower to facilitate ease of maintenance and to keep mulch out of storm drains.

VERIFICATION

PROJECT TEAM

- Submit square footage of planting areas as well as cubic yards required to cover planting areas to a minimum three-inch (3") depth.
- Submit a delivery ticket or receipt of purchased mulch and/or
- Submit receipts for sheet mulching materials and/or
- (Optional) Submit photos of trees being chipped for mulch (if applicable).

RATER

- Verify delivery tickets/receipts for purchased materials reflect needed amounts of materials.
- Visually verify the type and depth of the mulch (depth can be spot checked with a ruler).
- If sheet mulch is specified, Rater visually verifies the layer of cardboard has been installed.

SYNERGIES AND TRADE-OFFS

- Using mulch made from plant debris (recycled mulch) can also contribute to earning points for Credit D.1.d. (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste.
- Chipping trees identified for removal, and using on-site as mulch can also contribute to earning points for A.3.a.ii (Construction documents specify that of the trees identified for removal, some are chipped for use as mulch on-site) and D.2 (Reduce and recycle landscape construction waste).
- Sheet mulching can also contribute to earning points for practice C.8.a (Sheet mulch is specified for weed control). See model sheet mulching specifications in Appendix A.

RESOURCES AND BAY-FRIENDLY TOOLS

- Available for download from http://www.stopwaste.org/home/index.asp?page=777
  - *A Bay-Friendly Landscaping Guide to Mulch: Save Money, Control Weeds and Create Healthy Landscapes*
  - *Bay-Friendly Landscape Guidelines* Practice 4.1
  - *Local Sources for Compost, Mulch and Recycled Cardboard for Sheetmulching*
  - Model mulch and sheetmulching specifications
- *Guidelines and Resources for Implementing Soil Quality & Depth BMP T5.13* can be downloaded from www.ecy.wa.gov/programs/wq/stormwater/manual.html
- State of California, Department of Water Resources, *Model Water Efficient Landscape Ordinance, Appendix B, Sample Soil Management Plan.*

Cubic Yard Calculation

1 Cubic Yard = 3ft x 3ft x 3ft = 27 Cubic Ft

1 Foot = 12 inches

A = Total planting area in square feet to cover

B = Total inches of amendment or mulch required for planting areas

Total Cubic Yards of amendment or mulch required = (A / 27) x (B/12)

Cubic Yards Required to Apply 3 Inches of Mulch	
1000 Square Feet	9.25 cubic yards
One Acre	403 cubic yards

7. AMEND THE SOIL WITH COMPOST BEFORE PLANTING

Credit C.7						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		R + 3				
Corresponds to BFL Guidelines Practice 4.1						

a. Compost is specified as the soil amendment, at the rates indicated by a soil analysis, to bring the soil organic matter content to a minimum of:

i. Required: 3.5% by dry weight OR 1" of quality compost OR

ii. 5% by dry weight (total 2 points) AND/OR

iii. Specify the use of compost from processors that participate in the US Composting Council's Standard Testing Assurance program.

POINTS: The first part of this practice is required for all commercial & civic landscapes that are to be recognized as Bay-Friendly. Up to 3 additional points may be earned for going above and beyond the requirement.

PRACTICE DESCRIPTION

i. To meet the requirement, the amount of compost recommended by a professional soil laboratory to bring the soil organic matter content to 3.5% is incorporated into the planting area topsoil. Alternatively a minimum one-inch (1") of quality compost shall be incorporated into the planting area topsoil.

If imported or site soil meets the organic matter content of 3.5% or more, or if the plant palette primarily includes California native species that are adapted to soils with little or no organic matter, then the required practice of adding compost is waived.

ii. The amount of compost recommended by a professional soil laboratory to bring the soil organic matter content to 5% is incorporated into the planting area topsoil, with the same allowable waivers.

iii. The compost is purchased from a producer who participates in the U.S. Composting Council's Standard Testing Assurance Program.

Compost *is the product of controlled biological decomposition of organic materials, often including urban plant debris and food waste. It is an organic matter resource that has the unique ability to improve the chemical, physical and biological characteristics of soils or growing media. It contains plant nutrients but is typically not characterized as a fertilizer. Excerpted from US Compost Council , Field Guide to Compost Use*

Quality compost *is a well decomposed, stable, weed free organic matter source, derived from agricultural and/or food waste and/or plant trimmings, contain no substances toxic to plants, possess no objectionable odors. It does not resemble the feedstock (the original materials from which it was derived. It is highly recommended that it be produced in accordance with the U.S. Composting Council's Standard Testing Assurance Program.* www.compostingcouncil.org

PROJECT TEAM RECOMMENDATIONS

- Integrate this practice into a soil management plan.
- Specify a minimum of 1" of quality compost or as recommended in the soils report, as the soil amendment in plans, specifications and details.
- Request a soil analysis and amendment recommendations from a qualified soil laboratory. Ask that the recommendations be based on an organic approach to landscaping, and ask the lab to calculate the amount compost required for the square footage to which it is to be applied.

VERIFICATION

PROJECT TEAM

i. and ii.

If a waiver is requested based on soil organic matter content or the needs of plant palette,

- Submit a completed plant palette with species that need little/no soil organic matter identified, and include the source of information on their soil needs OR
- Submit a soils report that indicates the soil has an organic matter content of 3.5% or greater.

Under all other circumstances:

- Submit the site soil or imported topsoil analysis. No soils analysis is required if 1" of compost is used.
- Submit compost details from construction documents.
- Submit the receipt or delivery ticket for the compost, indicating the amount of the compost delivered/purchased.

iii.

- Submit documentation showing compost is purchased from a processor that participates in the US Composting Council's Standard Testing Assurance Program.

RATER

i. and ii.

- If a waiver is requested based on plant palette, verify plant palette and soil needs (spot check source by looking up soil needs in identified source).
- If a waiver is requested based on adequate soil organic matter content, confirm by reviewing soil analysis.
- Verify compost details have been included in construction documents.
- Verify delivery tickets/ receipts for compost delivered or purchased reflect needed amounts of materials.

iii.

- Verify from receipts that compost is USCC STA program certified.

SYNERGIES AND TRADE-OFFS

- Submitting soil analysis recommendations for quality compost can also contribute to earning points for Credit C.1.a. (Submit laboratory soil analysis results and recommendations for compost and natural fertilizers)
- Tilling quality compost to a depth of 8-12 inches can also contribute to earning points for Credit C.4 (Aerate compacted soils)
- Specifying compost from recycled local organic materials such as plant waste can also contribute to earning points for Credit D.1.d (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste.

RESOURCES AND BAY-FRIENDLY TOOLS

- Available for download from http://www.stopwaste.org/home/index.asp?page=777
  - *A Bay-Friendly Landscaping Guide to Mulch: Save Money, Control Weeds and Create Healthy Landscapes*
  - *Bay-Friendly Landscape Guidelines* Practice 4.1
  - *Local Sources for Compost, Mulch and Recycled Cardboard for Sheetmulching*
  - *Model Bay-Friendly Landscape Maintenance Specifications*
- Caldrons has an online compost calculator: http://www.dot.ca.gov/hq/LandArch/policy/compost_specs.htm
- *Field Guide to Compost Use*, US composting Council www.uscompostingcouncil.org
- State of California, Department of Water Resources, Model Water Efficient Landscape Ordinance, Appendix B, Sample Soil Management Plan.
- U.S. Composting Council Standard Testing Assurance program explanation and list of participating producers can be found at: **www.compostingcouncil.org**

Cubic Yard Calculation

1 Cubic Yard = 3ft x 3ft x 3ft = 27 Cubic Ft

1 Foot = 12 inches

A = Total planting area in square feet to cover

B = Total inches of amendment or mulch required for planting areas

Total Cubic Yards of amendment or mulch required = (A / 27) x (B/12)

Cubic Yards Required to Apply 3 Inches of Mulch	
1000 Square Feet	9.25 cubic yards
One Acre	403 cubic yards

8. USE IPM DESIGN AND CONSTRUCTION PRACTICES TO PREVENT PEST PROBLEMS

Credit C.8						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		1			4	
Corresponds to BFL Guidelines Practice 6.1.a						

Sheet mulching *uses a layer of paper or cardboard underneath the mulch to enhance weed suppression and soil building benefits. This layered mulch system is often used during landscape construction to optimize mulch benefits and encourage plant establishment.* (StopWaste.Org, *A Bay-Friendly Landscaping Guide to Mulch)*

a. Sheet mulch is specified for weed control

POINTS: 3

PRACTICE DESCRIPTION

Sheet mulch shall be specified for weed control

PROJECT TEAM RECOMMENDATIONS

- Use the specifications included in *A Bay-Friendly Landscape Guide to Mulch*
- Cardboard can be bought in large rolls from paper supply companies to reduce labor and materials cost. Wet the cardboard immediately to prevent it from blowing away and to facilitate manipulating the material.
- If using drip irrigation, place irrigation on top of cardboard and below compost and mulch.
- Be sure that the finish grade of the sheet mulch is at the same height or slightly lower than the surrounding hardscape in order to keep mulch in place.

VERIFICATION

PROJECT TEAM

- Submit sheet mulching details included in construction documents.
- Submit tags or receipts for all layers, and/or photo documentation of weed barrier layer.

RATER

- Verify sheet mulching detail has been included in construction documents.
- Verify tags or receipts or photos for all layers.
- Visually verify weed barrier layer while verifying mulch layer.

SYNERGIES AND TRADE-OFFS

- Sheet mulch can contribute to meeting the requirements for Credit C6 (Mulch)
- Using compost and/or mulch made from plant debris (recycled mulch) can also contribute to earning points for Credit D.1.d. (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste.
- Chipping trees identified for removal, and using on-site as mulch can also contribute to earning points for A.3.a.ii (Construction documents specify that of the trees identified for removal, some are chipped for use as mulch on-site) and D.2 (Reduce and recycle landscape construction waste).

b. Synthetic chemical pre-emergents are avoided

POINTS: 2

PRACTICE DESCRIPTION

Synthetic pre-emergent herbicides that are listed as prohibited by OMRI shall be avoided. Alternative weed control measures shall be specified, such as sheet mulching, watering sites and tilling over a few cycles to exhaust weed seed banks or spot spraying.

VERIFICATION

PROJECT TEAM

- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor that the criteria for this credit have been met.

RATER

- Verify Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

RESOURCES AND BAY-FRIENDLY TOOLS

- Available for download from http://www.stopwaste.org/home/index.asp?page=777
  - *A Bay-Friendly Landscaping Guide to Mulch: Save Money, Control Weeds and Create Healthy Landscapes*
  - *Bay-Friendly Landscape Guidelines* Practice 6.1
  - *Local Sources for Compost, Mulch and Recycled Cardboard for Sheetmulching*
  - *Model Bay-Friendly Landscape Maintenance Specifications*
- California Invasive Plant Council, *The Weed Worker's Handbook, A Guide to Techniques for removing Bay Area Invasive Plants,*
- *The Peaceful Valley Farm Supply for a source of alternative weed controls, www.groworganic.com*

9. KEEP SOIL AND ORGANIC MATTER WHERE IT BELONGS

Credit C.9						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		1			1	
Corresponds to BFL Guidelines Practice 3.3						

a. Compost berms or blankets or socks are specified for controlling erosion

POINTS: 2

PRACTICE DESCRIPTION

Compost blankets shall be specified for temporary erosion and sediment control during the construction of the project, and shall be a depth that is appropriate to the slope, as per the California Department of Transportation (Caldrons) Specifications. Compost blankets shall be stabilized with netting or other confinement systems and the compost particle size and compost depth shall be specially designed if applying to steeper slopes AND/OR Compost berms or socks shall be specified for all perimeter sediment controls. No silt fences or straw bales will be used.

Compost for any erosion control BMPs is specified as per the California Department of Transportation or the US EPA, and is produced by a participant in the US Composting Council's Standard Testing Assurance (STA) program.

PROJECT TEAM RECOMMENDATIONS

- Specify the compost used for compost blankets be tilled into the soil before planting.

VERIFICATION

PROJECT TEAM

- Submit calculations of area to be blanketed, and amount of compost required for targeted depth.
- Submit specifications for compost products and source of specifications (Caldrons or US EPA).
- Submit a delivery ticket or receipt of purchased compost, and/or socks indicating amounts and that the compost is supplied from a participant in the US Composting Council's STA program.

Compost blankets *1-3 inch layers of compost that are blown onto slopes up to 2:1 or up to 1:1 with additional stabilization. The compost can also be spread on shallower slopes. The use of compost blankets is a USEPA approved BMP for construction sites. They make excellent surface contact, preventing rilling underneath and thereby controlling erosion. Compost blankets can be less expensive than other erosion BMPs because they do not need to be removed, hauled and landfilled.* www.BuildingSoil.org

Compost berms and socks *are also US EPA approved for perimeter sediment and pollutant control, and are increasingly used instead of silt fences and straw bales. Berms can be blown in place or placed with a front end loader. Socks can be filled in place by compost suppliers or filled and delivered on pallets. They do not need to be trenched in and are highly effective at filtering out sediments, oil, grease and metals.* www.BuildingSoil.org

RATER

- Verify calculations are accurate.
- Verify receipts for compost and that the amount of compost purchased for use as a blanket will cover the area as calculated.
- (Optional) Visually verify the depth of the compost blanket and/or installation of compost berms or socks.

SYNERGIES AND TRADE-OFFS

- Turning a compost blanket used for erosion control into the soil before planting can contribute to meeting the requirement or earning points for Credit C.7 (Amend the soil with compost)
- Using compost made from plant debris (recycled mulch) can also contribute to earning points for Credit D.1.d. (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste.

RESOURCES AND BAY-FRIENDLY TOOLS

- Available for download from http://www.stopwaste.org/home/index.asp?page=777
  - *A Bay-Friendly Landscaping Guide to Mulch: Save Money, Control Weeds and Create Healthy Landscapes*
  - *Bay-Friendly Landscape Guidelines* Practice 3.3
  - *Local Sources for Compost, Mulch and Recycled Cardboard for Sheetmulching*
  - *Model Bay-Friendly Landscape Maintenance Specifications*
- Caldrons Compost Specifications and compost calculator: http://www.dot.ca.gov/hq/LandArch/policy/compost_specs.htm
- www.BuildingSoil.org/tools/Soil_BMP_text.pdf

D. MATERIALS

1. USE SALVAGED ITEMS & RECYCLED CONTENT MATERIALS

Credit D.1						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
	16					
Corresponds to BFL Guidelines Practice 2.6						

Recycling *is the collection, reprocessing, marketing and use of materials that were diverted or recovered from the solid waste stream (LEED New Construction & Major Renovation Version 2.2 reference Guide)*

Salvaged materials *are items that are put to a new use after their initial use, without being remanufactured between uses.*

Recycled content products *are those made from materials derived from discarded goods. They are remanufactured between uses.*

FSC certified wood *is certified in accordance with the Forest Stewardship Council's criteria*

a. Non-plant landscape materials are salvaged or made from recycled content materials or FSC certified wood

- **i. Decking (100% of non structural materials) (1 point)**
- **ii. Fencing (100% of non structural materials) (2 points)**
- **iii. Outdoor furniture such as bike racks, benches, tables and chairs (50% minimum) (2 points)**
- **iv. Planters or retaining walls (100% of either or both) (1 point)**
- **v. Parking stops or lighting/sign posts (100% of either or both) (1 point)**
- **vi. Play structures or surfaces (100% of either or both) (2 points)**
- **vii. Edging or decorative glass mulch (100% of either or both) (1 point)**

POINTS: 10

PRACTICE DESCRIPTION

Non-plant landscape materials are salvaged or made from recycled content materials or FSC certified wood. The percentages are calculated per each category of item that qualifies. For example, all of the non structural decking on the entire project must be salvaged and/or recycled content and/or FSC certified. In addition, the recycled content must be:

- Plastic: 100% recycled content with 90-100% postconsumer content
- Plastic/Rubber: 90-100% total with 90-100% postconsumer content
- Plastic composites: 95-100% recycled content with 50-100% postconsumer content
- Aluminum: 25% recycled content with 25% postconsumer
- Steel from the Basic Oxygen Furnace (BOF) process: 25-30% recycled content with 16% postconsumer content
- Steel from the Electric Arc Furnace (EAF) process 100% total with 67% postconsumer content

.

PROJECT TEAM RECOMMENDATIONS

Assess which items can be salvaged from the site and reused early in the design process and include salvage of these items in the demolition plan.

VERIFICATION

PROJECT TEAM

- Submit plans showing the quantity of each product meeting requirements above
- Submit tags and receipts for FSC wood and/or product literature indicating correct recycled content of plastic, rubber surfaces and/or composite lumber, or that furnishings have reclaimed lumber and/or metal components OR
- Submit specifications and an Accountability Form signed by the Landscape Architect, Designer or Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify quantity of each product meets requirements above
- Verify tags, receipts and manufacturer literature indicates correct recycled content OR
- Verify that specifications have been submitted and an Accountability Form has been signed by Landscape Architect, Designer or Contractor.
- Visually verify compliance on site (spot check).

SYNERGIES AND TRADE-OFFS

- Salvaging materials onsite can contribute to meet the requirements for Credit D.2. (Reduce and recycle landscape construction waste)
- Specifying recycled lighting posts that also have low energy light fixtures can contribute to earning points for Credit D.4.a. (Low energy light fixtures are specified for all site lighting)
- Specifying recycled light posts that are also photovoltaic can contribute to earning points for Credit D.4.b. (Photovoltaic is specified for site lighting).

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines Practice 2.6 https://www.stopwaste.org/docs/bay-friendly_landscape_guidelines_-_all_chapters.pdf
- Builders Guide to Reuse and Recycling http://www.stopwaste.org/docs/buildersguide-05.pdf
- Recycled Content Park & Recreation Products in Alameda County http://www.stopwaste.org/docs/parkandrec5.pdf
- Build it Green Green Product Directory http://accessgreen.builditgreen.org/
- EPA Wastes Resource Conservation - Comprehensive Procurement Guidelines http://www.epa.gov/epawaste/conserve/tools/cpg/products/
- The Forest Stewardship Council www.fsc.org

REFERENCES

- Build it Green, GreenPoint Rated Multifamily Rating Manual, V. 1.5, June 2008. Credit C3 (FSC Certified Wood for Framing Lumber), Credit E.12

b. A minimum 25% of recycled aggregate (crushed concrete) is specified for walkway, driveway, roadway base and other uses

Recycled aggregate *is clean crushed concrete and crushed asphalt pavement.*

POINTS: 2

PRACTICE DESCRIPTION

A minimum 25% of recycled aggregate shall be specified for all areas where Caldrons Class II materials are specified. Purchased crushed concrete or asphalt as well as materials salvaged from the jobsite such as crushed concrete, crushed asphalt or existing aggregate will qualify as recycled aggregate to meet the criteria for this credit.

PROJECT TEAM RECOMMENDATIONS

Assess whether existing concrete or asphalt on site could be crushed for reuse early in the design process or if existing aggregate can be reused. Note salvaging this material on the demolition plan. Recycled aggregate can also be purchased and should be specified on the plans, details, and specifications and in the cost estimate.

VERIFICATION

PROJECT TEAM

- Submit tags or vendor receipts showing recycled aggregate percentage OR
- Submit specifications and an Accountability Form signed by the Owner, Developer, Landscape Architect, Designer or Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify tags or receipts have been submitted and that percentage meets the standard OR
- Verify that specifications have been submitted and an Accountability Form has been signed by Owner, Developer, Landscape Architect, Designer or Contractor.
- Optional: field verification

SYNERGIES AND TRADE-OFFS

- Salvaging recycled aggregate from onsite could contribute to meeting the requirement for Credit D.2. (Reduce and recycle landscape construction waste)

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines Practice 2.6 http://www.stopwaste.org/home/index.asp?page=431
- Builders Guide to Reuse and Recycling http://www.stopwaste.org/docs/buildersguide-05.pdf
- Build it Green Green Product Directory http://accessgreen.builditgreen.org/

REFERENCES

- Build it Green, GreenPoint Rated Multifamily Rating Manual, V. 1.5, June 2008. Credit C1 (Recycled aggregate)

c. Replace Portland cement in concrete with flyash or slag.
i. 20% (1 point) OR
ii. 25% (2 points total)

POINTS: 2

Fly Ash *is a by product from coal combustion. It can be used as a substitute for Portland cement in concrete.*

Slag *is a by product of metal smelting and can be used as a substitute for Portland cement in concrete.*

PRACTICE DESCRIPTION

Flyash AND/OR slag replaces Portland cement in concrete to the specified percentage on a per weight basis for all flatwork and poured in place concrete.

VERIFICATION

PROJECT TEAM

- Submit tags or receipts showing flyash or slag percentage in the concrete mix OR
- Submit specifications and an Accountability Form signed by the Engineer, Designer or Contractor stating percentage for compliance.

RATER

- Verify tags or receipts have been submitted and that percentage is meets the standard OR
- Verify that specifications have been submitted an Accountability Form has been signed by the Engineer, Landscape Architect, Designer or Contractor

SYNERGIES AND TRADE-OFFS

- Specifying permeable concrete paving could contribute to earning points for Credit B1 (Minimize impervious surfaces)

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines Practice 2.6 https://www.stopwaste.org/docs/bay-friendly_landscape_guidelines_-_all_chapters.pdf

REFERENCES

- Build it Green, GreenPoint Rated Multifamily Rating Manual, V. 1.5, June 2008. Credit C2 (Recycled Flyash in Concrete)

d. Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste

i. 100% of compost OR 100% of mulch (1 point)

ii. 100% of both (2 points total)

POINTS: 1

Compost *is the product of controlled biological decomposition of organic materials, often including green waste and food waste*

Mulch *is any material spread evenly over the surface of the soil to enhance the growth of plants and the appearance of the landscape.* (StopWaste.Org, *A Bay-Friendly Landscaping Guide to Mulch)*

Recycled mulch *is chipped or shredded wood and green waste from used pallets or untreated lumber scraps, branches, leaves and tree trunks. Its use provides the benefits of mulch and keeps wood and green waste out of landfills.* (StopWaste.Org, *A Bay-Friendly Landscaping Guide to Mulch)*

PRACTICE DESCRIPTION

All purchased compost and/or mulch shall be produced from local, organic materials such as plant, food or wood waste.

VERIFICATION

PROJECT TEAM

- Submit tags or receipts showing quantity, supplier and feedstock of compost and/or mulch

RATER

- Verify that tags or receipts show quantity, supplier and feedstock of compost and/or mulch qualify

SYNERGIES AND TRADE-OFFS

- If mulch is supplied by chipping on-site trees identified for removal for Credit A.3.a.ii (Construction documents specify that of the trees identified for removal, some are chipped for use as mulch onsite), then points can not also be earned for this credit.
- Submitting soil analysis recommendations for quality compost can contribute to earning points for Credit C.1.a. (Assess the soil and test drainage)
- Specifying 3" of mulch will contribute to meeting the requirements for Credit C.6.a (Required planting specifications and plans indicate that after construction, all soil on site is protected with a minimum of 3 inches of mulch)
- Specifying Quality compost as the soil amendment could contribute to earning points for Credit D7 (Amend the soil with compost before planting)

RESOURCES AND BAY-FRIENDLY TOOLS

- The *Bay-Friendly Landscape Guidelines* and other printed materials can be downloaded from: http://www.stopwaste.org/home/index.asp?page=777, including
  - *Bay-Friendly Landscape Guidelines* Practice 2.6
  - *A Bay-Friendly Landscaping Guide to Mulch: Save Money, Control Weeds and Create Healthy Landscapes*
- Guidelines and Resources for Implementing Soil Quality & Depth BMP T5.13 www.ecy.wa.gov/programs/wq/stormwater/manual.html
- US Composting Council www.compostingcouncil.org
- Local Sources of Compost, Mulch and Recycled Cardboard for Sheet Mulching http://www.stopwaste.org/home/index.asp?page=782.

2. REDUCE AND RECYCLE LANDSCAPE CONSTRUCTION WASTE

Credit D.2						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
	R + 5					
Corresponds to BFL Guidelines Practice 2.7						

a. REQUIRED: Required: Divert 50% of landscape construction and demolition waste.

POINTS: This practice is required for all commercial& civic landscapes that are to be recognized as Bay-Friendly.

PRACTICE DESCRIPTION

Identify the types and quantities of materials generated at the job site and reuse or recycle an average of at least fifty (50) percent, by weight, of all C&D debris from construction, demolition, and renovation projects.

Create and follow pre and post construction debris recovery plans that include

- allocating space for recycling bins and containers on the job site
- securing recycling bins against illegal dumping
- training workers before demolition or construction begins
- separating green waste from other materials
- If applicable, establishing and using a cut-pile to reduce waste from scrap pieces of wood.
- Documenting the results of the waste management efforts

Put waste recycling and reuse specifications into contract language and require contractors to review the waste management plan with subcontractors.

Construction and Demolition Debris *means used or discarded materials removed from premises during construction or renovation of a structure resulting from construction, remodeling, repair, or demolition operations on any pavement, house, commercial building, or other structure. It generally consists of wood, drywall, metals, concrete, dirt, cardboard, plastic pots and more. StopWaste.Org Model C&D Policy*

Green waste *consists of the plant debris from trees, shrubs, groundcover and turf that is generated during demolition, installation or maintenance phases of the project.*

PROJECT TEAM RECOMMENDATIONS

- Verify the local jurisdiction's minimum requirement and reporting procedures for C&D recycling.
- State the percent diversion goal in the design documents.
- List specific goals and recycling and reuse requirements in plans and specifications
- Require contractors to review the waste management plan with subcontractors and to include contract language requiring subcontractors comply with the plan.
- To facilitate this process occurring smoothly, plans should be submitted with the Build It Green Sample Debris Recovery Statement or equivalent form required by local jurisdictions or regularly used by the Builder.
- Hauler and gate tags may show that all materials were sent to a C&D Recycling facility. However, that does not mean that 100% of all of the materials were recycled, as not all C&D materials can be recycled. Most large C&D facilities have a calculated diversion rate and can provide you with documentation stating the percentage of materials recycled at that facility. (The diversion rates range from 50% to 90%).

VERIFICATION

PROJECT TEAM

- Submit the Pre Construction Debris Recovery Plan in the planning stages of construction,
- Submit Post Construction Debris Recovery Plan, and documentation of results (i.e. hauler or facility gate tags, builder's waste tabulation supplied by local waste authority).
- Submit the diversion rate from the C&D facility.

RATER

- Verify that Pre Construction Debris Recovery Plan and Post Construction Debris Recovery Plan were submitted and documentation confirms this has been accomplished by comparing hauler and gate tags to facility diversion rates.
- Conduct field observations to get a sense of waste diversion practices (optional). However, field observation can not be used as a judgment or verification method of the documented results as some builders have waste separated and recycled off site and it is not evident on site.

SYNERGIES AND TRADE-OFFS

- Chipping trees identified for removal, and using mulch on-site is highly recommended and can also contribute to earning points for Credit A.3.a.ii (Construction documents specify that of the trees identified for removal, some are chipped for use as mulch onsite), C.6.a (Required: Planting specifications and plans indicate that after construction, all soil on site is protected with a minimum of 3 inches of mulch) and Credit D.1.d. (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste)
- Reusing site materials can also contribute to earning points for Credit D.1. (use salvaged items and recycled content materials)
- Donating unused materials can also contribute to earning points for Credit D.2.d. (Donate unused materials)

RESOURCES AND BAY-FRIENDLY TOOLS

- Find out where to recycle C&D debris, including wood, drywall, metals, concrete, soil and cardboard from StopWaste.Org, *Builders' Guide to Reuse & Recycling: A Directory for Construction and Demolition Materials*, *www*.BuildGreenNow.Org
- StopWaste.Org also provides extensive information about C&D waste management, including a sample Waste Management Plan for recycling C&D materials. Visit www.BuildGreenNow.Org to download these documents electronically.
- Build It Green Sample Debris Recovery Statement www.builditgreen.org
- For information on recycling facilities in California, visit the California Integrated Waste Management Board at www.ciwmb.ca.gov/ConDemo
- Model Construction & Demolition specifications, can also be downloaded from: http://www.stopwaste.org/docs/c-d_waste_management.pdf

REFERENCES

- Build it Green, *GreenPoint Rated Multifamily Rating Manual, V. 1.5*, June 2008

b. Divert 100% of asphalt concrete and Portland cement concrete and 65% of remaining materials (2 points) OR

c. Divert 100% of asphalt concrete and Portland cement concrete and 80% or more of remaining materials (Total 4 points)

POINTS: 4 points

PRACTICE DESCRIPTION

Identify the types and quantities of heavy and inert materials generated at the job site and where local facilities are available for heavy and inert materials, divert at 100% (by weight) of the asphalt concrete and Portland cement concrete construction debris, AND 65% or 80% or more of all other waste, including green waste. If local facilities are not available for heavy and inert materials, the diversion of asphalt concrete and Portland cement concrete are exempt.

Create and follow pre and post construction debris recovery plans that include

- allocating space for recycling bins and containers on the job site
- securing recycling bins against illegal dumping
- training workers before demolition or construction begins
- separating green waste from other materials
- If applicable, establishing and using a cut-pile to reduce waste from scrap pieces of wood.
- Documenting the results of the waste management efforts

PROJECT TEAM RECOMMENDATIONS

- Determine that local facilities are available for diverting heavy and inert materials.
- Verify the local jurisdiction's minimum requirement and reporting procedures for C&D recycling.
- State the percent diversion goal in the design documents.
- List specific goals and recycling and reuse requirements in plans and specifications
- Require contractors to review the waste management plan with subcontractors and to include contract language requiring subcontractors comply with the plan.
- To facilitate this process occurring smoothly, plans should be submitted with the Build It Green Sample Debris Recovery Statement or equivalent form required by local jurisdictions or regularly used by the Builder.
- Hauler and gate tags may show that all materials were sent to a C&D Recycling facility. However, that does not mean that 100% of all of the materials were recycled, as not all C&D materials can be recycled. Most large C&D facilities have a calculated diversion rate and can provide you with documentation stating the percentage of materials recycled at that facility. (The diversion rates range from 50% to 90%).

VERIFICATION

PROJECT TEAM

- Submit the Pre Construction Debris Recovery Plan in the planning stages of construction,
- Submit Post Construction Debris Recovery Plan, and documentation of results (i.e. hauler or gate tags, builder's waste tabulation supplied by local waste authority).
- Submit the diversion rate from the C&D facility.

RATER

- Verify that Pre Construction Debris Recovery Plan and Post Construction Debris Recovery Plan were submitted and documentation confirms this has been accomplished.
- Conduct field observations to get a sense of waste diversion practices (optional). However, field observation can not be used as a judgment or verification method of the documented results as some builders have waste separated and recycled off site and it is not evident on site.

SYNERGIES AND TRADE-OFFS

- Chipping trees identified for removal, and using mulch on-site is highly recommended and can also contribute to earning points for Credit A.3.a.ii (Construction documents specify that of the trees identified for removal, some are chipped for use as mulch onsite), C.6.a (Required: Planting specifications and plans indicate that after construction, all soil on site is protected with a minimum of 3 inches of mulch) and Credit D.1.d. (Purchased compost and/or mulch is recycled from local, organic materials such as plant or wood waste)
- Reusing site materials can also contribute to earning points for Credit D.1. (use salvaged items and recycled content materials)
- Donating unused materials can also contribute to earning points for Credit D.2.d. (Donate unused materials)

RESOURCES AND BAY-FRIENDLY TOOLS

- Find out where to recycle C&D debris, including wood, drywall, metals, concrete, soil and cardboard from StopWaste.Org, *Builders' Guide to Reuse & Recycling: A Directory for Construction and Demolition Materials*, *www*.BuildGreenNow.Org
- StopWaste.Org also provides extensive information about C&D waste management, including a sample Waste Management Plan for recycling C&D materials. Visit www.BuildGreenNow.Org to download these documents electronically.
- Build It Green Sample Debris Recovery Statement www.builditgreen.org
- For information on recycling facilities in California, visit the California Integrated Waste Management Board at www.ciwmb.ca.gov/ConDemo
- Model Construction & Demolition specifications, can also be downloaded from: http://www.stopwaste.org/docs/c-d_waste_management.pdf

REFERENCES

- Build it Green, *GreenPoint Rated Multifamily Rating Manual, V. 1.5*, June 2008

d. Donate unused materials

PRACTICE DESCRIPTION

Unused materials, such as benches, wood scraps, plants, planting pots, etc. is donated to a local school or community garden, or other entity(s), in order to minimize material sent to the landfill.

PROJECT TEAM RECOMMENDATIONS

- State the percent diversion goal in the design documents, including the intent to donate unused materials.
- Identify materials to be donated and method of delivery in plans and specifications.

VERIFICATION

PROJECT TEAM

- Submit letter or receipt from receiving organization for donated materials OR
- Submit an Accountability Form signed by the Designer or Contractor.

RATER

- Verify receipt or letter from receiving organization has been submitted indicating that unused materials have been donated OR
- Verify an Accountability Form signed by the Designer or Contractor has been submitted.

SYNERGIES AND TRADE-OFFS

- Donating unused materials can also contribute to meeting the requirement for Credit D.2.a (Divert 50% of landscape construction waste)

3. REDUCE THE HEAT ISLAND EFFECT WITH COOL SITE TECHNIQUES

Credit D.3						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
				2		
Corresponds to BFL Guidelines Practice 5.2						

a. At least 50% of the paved site area includes cool site techniques

POINTS: 2

PRACTICE DESCRIPTION

Reduce heat islands by applying any combination of the following cool site techniques to a minimum of 50% of the paved site area.

Covered parking (underground parking garage or under overhangs/awnings/roof), roof or exposed podium patio must meet the criteria of solar reflectance greater than or equal to 0.3 or a reflectance index greater than or equal to 29%

White concrete, gray concrete or other light colored paving materials or pavers with an albedo of greater than or equal to .30 or a solar reflective index (SRI) of 29% or greater

Open grid paving system

Specifying trees, large stature shrubs and/or vegetated structures (such as trellises)

Locating paving to take advantage of shade from trees, and/or large stature shrubs on adjacent properties.

PROJECT TEAM RECOMMENDATIONS

Site plan identifies the goal for implementing cool site techniques.

- Identify all paved site areas (PA).
- Identify all paved site areas that have covered parking. (CP)
- Identify all paved site areas that will have an open grid paving system (OGP).
- Identify all paved site areas with light colored paving (LCP).
- Conduct a shade study to calculate the shaded area provided at noon on summer solstice (June 21) by trees, large stature shrubs and/or vegetated structures, assuming a mature height and width. Do not double count canopies that overlap. (VS).
- % cool site = (CP+ OCP + LCP +VS)/ (PA).

*The **Heat island effect** is the experience of warmer temperatures in urban landscapes compared to adjacent rural areas, resulting from the retention of solar energy on constructed surfaces. Principal surfaces that contribute to the heat island effect include streets, sidewalks, parking lots and buildings.* (USGBC, LEED New Home Construction & Major Renovation, v2.2 Reference Guide, September 2006.)

***Albedo** or **solar reflectance** is a measure of ability of a surface material to reflect sunlight- including the visible, infrared and ultraviolet wavelengths on a scale of 0 to 1. Solar reflectance is also called "albedo" Solar Reflectance is measured according to ASTM E 903, ASTM E 1918 or ASTM C 1549*

***Paved site area** includes sidewalks, patios, walkways, driveways, parking lots and other non-roof hardscapes, regardless of permeability.*

***Open-grid paving** is defined as having less than 50% imperviousness and containing vegetation in the open cells. (GreenPoint Rated MultiFamily Rating Manual, v1.2, July 2007)*

VERIFICATION

PROJECT TEAM

- Submit relevant site plan and calculations as defined in project recommendations.
- Submit an Accountability Form signed by the Landscape Architect or Designer that as installed the project meets the criteria for this credit.

RATER

- Verify that site plan has been submitted, calculations are complete
- Verify that an Accountability Form has been signed by the Landscape Architect or Designer.

***Large stature shrubs** are those that, under normal conditions, can reach a mature height of 12 feet or more. Examples include Arbutus 'Marina', some Arctostaphylus spp., some Ceanothus spp., Sambucus mexicana, Nerium oleander trained as a single or multistemmed tree*

SYNERGIES AND TRADE-OFFS

- Preserving mature healthy, large stature trees can also earn points for Credit A.7. (Conserve or restore natural areas and wildlife corridors).
- Using an open-grid system can contribute to earning points for Credit B.1 (Minimize impervious surfaces).
- Specifying that all stone and other non-concrete hardscape materials are produced within 500 miles of the project site can contribute to earning points for Credit D.6 (Specify low embodied energy products).
- Providing trees and vegetation with the space that each plant will require to reach its mature shape and size will contribute to earning points for credit E.1 (Select appropriate plants: choose & locate plans to grow to natural size and avoid shearing).
- Specifying drought tolerant large stature species can also earn points for Credit E.3 (Grow drought tolerant CA native, Mediterranean or climate adapted plants).
- Shading hardscapes with trees and other vegetation can contribute to earning points for Credit E.7 (Plant trees)
- Specifying a diversity of trees can contribute to earning points for Credit E.8 (Diversity)
- Specifying California native species can contribute to earning points for Credit E.9 (Choose California natives first)

RESOURCES AND BAY-FRIENDLY TOOLS

- Center for Urban Forest Research, Where are all the cool parking lots, http://cufr.ucdavis.edu
- Center for Urban Forest Research, Fact Sheet #3: Making Parking Lots More Tree Friendly, http://cufr.ucdavis.edu
- USGBC, LEED New Construction & Major Renovation v2.2 Reference Guide, September 2006

REFERENCES

- USGBC LEED for Homes Rating System, January 2008
- USGBC, LEED for Homes Verification & Submittal Guidelines
- Build It Green, GreenPoint Rated Multifamily Rating Manual, v1.2, July 2007 Credit 9a

4. DESIGN LIGHTING CAREFULLY

Credit D.4						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
				9		
Corresponds to BFL Guidelines Practice 5.4						

a. Low energy fixtures are specified for all site lighting.

POINTS: 2

PRACTICE DESCRIPTION

High efficiency, low energy consuming fixtures shall be specified for all site lighting.

Low energy fixtures *are light fixtures that are Energy Star Qualified or LED.*

VERIFICATION

PROJECT TEAM

- Submit lighting plan and documentation indicating light fixtures are Energy Star Qualified or LED fixtures.
- Submit an Accountability Form signed by the Lighting Designer and/or Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify that lighting plan and documentation have been submitted and that fixtures are Energy Star Qualified or LED.
- Verify that Accountability Form has been signed by Lighting Designer and/or Contractor.

SYNERGIES AND TRADE-OFFS

- Specifying recycled lighting posts can contribute to earning points for Credit D.1. (Non-plant landscape materials are salvaged or made from recycled content materials or FSC certified wood)
- Installing photovoltaic panels to general a percentage of building/site energy needs can contribute to earning points for Credit D.4.b. (Photovoltaic is specified for site lighting)
- Specifying fixtures that are Dark Sky certified can contribute to earning points for credit D.4.c (Reduce light pollution and trespass)
- Specifying fixtures that do not cast direct beam illumination onto adjacent properties or right of ways can contribute to earning points for Credit D.4.d

RESOURCES AND BAY-FRIENDLY TOOLS

- Illuminating Engineering Society of No. America Lighting for Exterior Environments
- IDA the light pollution authority www.darksky.org
- The California Energy Commission http://www.energy.ca.gov/efficiency/lighting/outdoor_reduction.html
- California's Energy Efficiency Standards for Residential and Nonresidential buildings http://www.energy.ca.gov/title24/
- Energy Star http://www.energystar.gov/

b. Photovoltaic is specified for site lighting.

i. All path lighting is solar powered (1 point))

ii. 50% of all other site lighting (2 points) OR

iii. 100% of all other site lighting (4 points total)

POINTS: 5

PRACTICE DESCRIPTION

All path lighting is powered by solar cells within the light fixtures and/or, a percentage of all other site lighting is powered by onsite solar photovoltaics. It is to be assumed that if a PV system is installed to provide a percentage of the estimated annual electric energy demand for the site and/or building, that same percentage of the site lighting demand will also be met.

VERIFICATION

PROJECT TEAM

- Submit lighting plan and cut sheets showing that all path lighting is solar powered AND/OR
- Submit a copy of the CF-1R-PV or C-46 solar report (or other appropriate forms) based on what was actually built (system size, output and percentage of load served by PV system).

RATER

- Verify that lighting plan and cut sheets have been submitted and path lighting is solar powered OR
- Visually verify that photovoltaics have been installed and verify percentage of load served by the PV system.

SYNERGIES AND TRADE-OFFS

- Specifying recycled lighting posts could contribute to earning points for Credit D.1. (Non-plant landscape materials are salvaged or made from recycled content materials or FSC certified wood
- Specifying low energy fixtures may contribute to earning points for Credit D.4.a. (Low energy fixtures are specified for all site lighting)
- Specifying fixtures that are Dark Sky certified could contribute to earning points for credit D.4.c (Reduce light pollution and trespass)
- Specifying fixtures that do not cast direct beam illumination onto adjacent properties or rights of way could contribute to earning points for Credit D.4.d

RESOURCES AND BAY-FRIENDLY TOOLS

- *Bay-Friendly Landscape Guidelines* Practice 5.4 https://www.stopwaste.org/docs/bay-friendly_landscape_guidelines_-_all_chapters.pdf
- Illuminating Engineering Society of No. America Lighting for Exterior Environments
- IDA the light pollution authority www.darksky.org
- The California Energy Commission http://www.energy.ca.gov/efficiency/lighting/outdoor_reduction.html

c. Reduce light pollution and trespass: exterior luminaries emit no light above horizontal or are Dark Sky certified.

Light pollution *occurs when outdoor fixtures let excess light escape into the night sky.*

Light trespass *occurs when outdoor light fixtures spill light onto neighboring properties.*

Full cut off luminaries *emit no light above horizontal.*

Dark Sky Certified *means that a light is certified by the International Dark-Sky Association, a third party certification for luminaries that minimize glare, reduce light trespass, and don't pollute the night sky. http://www.darksky.org*

POINTS: 1

PRACTICE DESCRIPTION

Full cut-off luminaries or Dark Sky certified fixtures are used for all exterior lighting that is installed by the builder. Landscape lighting that points upward shall not be allowed. Exceptions to this include lighting placed in areas where shielding is unnecessary to control light pollution (such as fixtures placed under overhangs) or where the builder does not install the lighting.

VERIFICATION

PROJECT TEAM

- Submit lighting plan showing lighting fixtures or schedules and/or cut sheets showing Dark Sky qualified luminaries OR
- Submit an Accountability Form signed by the Lighting Designer and/or Lighting Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify that lighting plan and/or cut sheets are submitted showing qualified luminaries OR
- Verify that Accountability form is signed by the Lighting Designer and/or Lighting Contractor
- Visually verify compliance.

SYNERGIES AND TRADE-OFFS

- Specifying recycled lighting posts could contribute to earning points for Credit D.1 (Non-plant landscape materials are salvaged or made from recycled content materials or FSC certified wood)
- Specifying low energy fixtures may contribute to earning points for Credit D.4.a. (Low energy fixtures are specified for all site lighting)
- Specifying photovoltaic fixtures may contribute to earning points for Credit D.4.b. (Photovoltaic is specified for site lighting)
- Specifying fixtures that do not cast direct beam illumination onto adjacent properties or right of ways could contribute to earning points for Credit D.4.d

RESOURCES AND BAY-FRIENDLY TOOLS

- Illuminating Engineering Society of No. America Lighting for Exterior Environments
- IDA the light pollution authority www.darksky.org
- The California Energy Commission http://www.energy.ca.gov/efficiency/lighting/outdoor_reduction.html

REFERENCES

- Build it Green, GreenPoint Rated Multifamily Rating Manual, V. 1.5, June 2008, Credit D.8.A (Exterior luminaries Emit No Light Above Horizontal OR Are Dark Sky certified)

d. The site and exterior building lighting does not cast direct beam illumination onto adjacent properties or right of ways

POINTS: 1

PRACTICE DESCRIPTION

For areas more than 15 feet away from the property line, the following values are not exceeded:

• For residential-only areas: 0.2 average foot-candles (FC).

• For mixed use areas: 0.6 average FC.

Alternatively, lamp must not be visible at the property line when viewed at a maximum elevation of 5 feet; OR more than fourteen feet (14') into adjacent property when viewed at ground level.

VERIFICATION

PROJECT TEAM

- Submit photometric site plan with analysis showing average foot-candles have not been exceeded OR
- Submit an Accountability Form signed by the Lighting Designer and/or Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify that photometric site plan OR
- Verify that Accountability Form signed by the Lighting Designer and/or Contractor.
- (Optional) Visually verify compliance.

SYNERGIES AND TRADE-OFFS

- Specifying recycled lighting posts can contribute to earning points for Credit D.1. (Non-plant landscape materials are salvaged or made from recycled content materials or FSC certified wood)
- Specifying low energy fixtures may contribute to earning points for Credit D.4.a. (Low energy fixtures are specified for all site lighting)
- Specifying photovoltaic fixtures may contribute to earning points for Credit D.4.b. (Photovoltaic is specified for site lighting)
- Specifying fixtures that are Dark Sky certified could contribute to earning points for credit D.4.c (Reduce light pollution and trespass)

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Guidelines Practice 5.4 https://www.stopwaste.org/docs/bay-friendly_landscape_guidelines_-_all_chapters.pdf

REFERENCES

- Build it Green, GreenPoint Rated Multifamily Rating Manual, V. 1.5, June 2008, Credit D.8.B (Control Light Trespass Onto neighboring Areas Through Appropriate Fixture Selection & Placement)

5. CHOOSE AND MAINTAIN EQUIPMENT FOR FUEL CONSERVATION

Credit D.5						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
				1		
Corresponds to BFL Guidelines Practice 5.5						

a. Specify solar powered pump(s) for water features

POINTS: 1

PRACTICE DESCRIPTION

Solar powered pump(s) shall be specified for water features

PROJECT TEAM RECOMMENDATIONS

Identify the solar powered pump on plans, specifications and in cost estimate. If designed as a custom system, verify the power generated is sufficient to operate the pump, especially if it is multi-phased.

VERIFICATION

PROJECT TEAM

- Submit the make and model of the solar powered pump that was installed
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify that the Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

6. SPECIFY LOW EMBODIED ENERGY PRODUCTS.

Credit D.6						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
				2		
Corresponds to BFL Guidelines Practice 5.6						

Embodied energy *is energy that is used during the entire life cycle of the commodity for manufacturing, transporting and disposing of the commodity as well as the inherent energy captured within the product itself. (LEED New Construction & Major Renovation Version 2.2 reference Guide)*

a. 100% of any stone and non-concrete hardscape materials are produced within 500 miles of the project site

POINTS: 2

PRACTICE DESCRIPTION

Stone must be mined and manufactured within the 500 mile radius. All other non-concrete hardscape materials must be produced within 500 miles of the project site. The origin of the source materials for all hardscape materials (except stone) is not considered.

PROJECT TEAM RECOMMENDATIONS

Identify potential products to be included during the design process and note on plans and in specifications.
Consult with local suppliers and manufacturers to locate products that meet the criteria for this credit. and support local industry.

VERIFICATION

PROJECT TEAM

- Submit cut sheets for all stone indicating sources and submit cut sheets for non hardscape materials indicating where they are produced.
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify that cut sheets were submitted and materials qualify.
- Verify that the Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Specifying stone and non concrete hardscape materials that are salvaged from the site is encouraged and can contribute to earning points for Credit D.2. (Reduce and recycle landscape construction waste)

7. USE INTEGRATED PEST MANAGEMENT

Credit D.7						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
					2	
Corresponds to BFL Guidelines Practice 6.1a						

Integrated Pest Management *is a holistic approach to mitigating insects, plant diseases, weeds, and other pests. It involves the use of many strategies for managing, but not eliminating pests. Integrated Pest Management (IPM) uses cultural, mechanical, physical, and biological control methods before using pesticides to control pests and diseases in the landscape.. Chemical controls are applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control is applied.*

a. Design documents include construction specifications that require integrated pest management

POINTS: 2

PRACTICE DESCRIPTION

Construction specifications call for integrated pest management. Pre-emergent herbicides are not used as a first and only weed control method.

VERIFICATION

PROJECT TEAM

- Submit final specifications that include integrated pest management
- Submit an Accountability Form signed by the Landscape Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify that specifications include integrated pest management
- Verify an Accountability Form has been signed by the Landscape Contractor.

SYNERGIES AND TRADE-OFFS

- Specifying Organic pest management can contribute to earning points for Credit C8.a (Use organic pest management)

RESOURCES AND BAY-FRIENDLY TOOLS

- University of California Agriculture and Natural Resources. US IPM Online Statewide Integrated Pest Management Program http://www.ipm.ucdavis.edu/
- Bio-Integral Resource Center BIRC The Integrated Pest Management Specialist http://www.birc.org/
- Our Water- Our World http://www.ourwaterourworld.org/
- Model Bay-Friendly Maintenance Specifications http://www.stopwaste.org/home/index.asp?page=782

8. USE ORGANIC PEST MANAGEMENT

Credit D.8						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
						2
Corresponds to BFL Guidelines Practice 7.4						

a. Design documents include construction specifications that prohibit the use of pesticides that are not allowed by OMRI in its generic materials list for the maintenance of the landscape.

POINTS: 2

PRACTICE DESCRIPTION

Design documents shall include construction specifications that prohibit the use of pesticides that are not allowed by OMRI in its generic materials list for the maintenance establishment period of the landscape.

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VERIFICATION

PROJECT TEAM

- Submit specifications that prohibit the use of pesticides that are not allowed by ORMI in its generic materials list for the maintenance establishment period of the landscape.
- Submit an Accountability Form signed by the Landscape Contractor that as installed the project meets the criteria for this credit.

RATER

- Verify that specifications prohibit the use of pesticides that are not allowed by ORMI in its generic materials list for the maintenance establishment period of the landscape.
- Verify an Accountability Form has been signed by the Landscape Contractor.

*The **Organic Materials Review Institute (OMRI)** is a national nonprofit organization founded in 1997 to support the organic community. OMRI reviews products to determine their suitability for producing, processing and handling organic food and fiber under the USDA National Organic Program Rule (OMRI General Materials List)*

SYNERGIES AND TRADE-OFFS

- Specifying Organic pest management will contribute to earning points for Credit C7.a (Use integrated pest management)

RESOURCES AND BAY-FRIENDLY TOOLS

- OMRI Generic Materials List a directory of substances allowed and prohibited in organic production and handling http://omri.org/
- Model Bay-Friendly Maintenance Specifications http://www.stopwaste.org/home/index.asp?page=782

E. PLANTING

1. SELECT APPROPRIATE PLANTS: CHOOSE & LOCATE PLANTS TO GROW TO NATURAL SIZE AND AVOID SHEARING

Credit E.1						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
	R + 1					
Corresponds to BFL Guidelines Practice 2.1 a-c						

Shearing *is a method of pruning, used for forming and maintaining plants or hedges of uniform shape, by routinely cutting them back with hedge shears and resulting in a geometric growth habit.*

a. REQUIRED: No species will require shearing

POINTS: This practice is required for all commercial& civic landscapes that are to be recognized as Bay-Friendly.

PRACTICE DESCRIPTION

Species will be selected and plants spaced to allow them to grow to their mature size and natural shape without shearing at any point in the lifespan of the plant. (Pruning for structural integrity and plant health is permitted.) Shrubs and groundcover plants located in a row or adjacent to buildings, sidewalks, or roads will be spaced between their minimum and maximum mature plant spread, according to a published reference, to fit into their planting area without overhang. Trees must meet the spacing requirements only when adjacent to buildings or other vertical obstructions. Vines are not subject to spacing requirements. Projects including existing sheared hedges or plants to remain that do not meet the requirements above will not meet this required credit. References can include:

- Bornstein, Carol, David Fross and Bart O'Brien, *California Native Plants for the Garden*
- East Bay Municipal Utility District's publication *Water Conserving Plants for the Bay Area*
- *Sunset Western Garden Book*

PROJECT TEAM RECOMMENDATIONS

- Use of the Bay-Friendly Plant Legend template facilitates verification of the plant palette.
- Prepare plans to scale showing all species and spacing.

VERIFICATION

PROJECT TEAM

- Submit plant legend indicating plant species, spacing and mature spread of plant. Indicate the source of information on spacing and spread.
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor verifying that installed plants meet this requirement.

RATER

- Verify mature size of all plants in the plant legend and compare to spacing.
- Verify Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Selecting appropriate plants that will not require shearing can also contribute to earning points for credit E.1.b (Plants specified can grow to mature size within space allotted them)

BAY-FRIENDLY TOOLS & RESOURCES

- The following can be downloaded from: **http://www.stopwaste.org/home/index.asp?page=777**
  - *Bay-Friendly Landscape Guidelines* Practice 2.1
  - Bay-Friendly Plant Palette template,
  - Bay-Friendly Natural Hedges to Avoid Shearing plant list

b. Plants specified can grow to mature size within space allotted them

POINTS: 1

PRACTICE DESCRIPTION

Trees, shrubs and groundcovers are selected and spaced to allow them to grow to mature size within the landscape area in which they are to be planted.

Even when formal hedging or shapes are not planned as elements of the landscape, species can be selected and specified for a space that is too small for them to reach their mature size and shape, or too many of the plants are specified for the space to allow all of them to reach their mature size and shape. Spacing of all plants must be within the minimum and maximum plant spread according to third party source, such as the following:

- Bornstein, Carol, David Fross and Bart O'Brien, *California Native Plants for the Garden*
- East Bay Municipal Utility District's publication *Plants and Landscapes for Summer Dry Climates*
- *Sunset Western Garden Book,*

PROJECT TEAM RECOMMENDATIONS

- Use of the Bay-Friendly Plant Legend template facilities the verification of the plant palette.
- Prepare plans to scale showing all species and spacing to avoid overcrowding.

VERIFICATION

PROJECT TEAM

- Submit plant legend indicating plant species, spacing, and mature spread of the plants. Indicate source of information on spacing & mature spread.
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor verifying that installed plants meet this requirement.

RATER

- Verify mature size and compare to spacing of all plants in the plant legend.
- Verify Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Plants specified can grow to mature size within space allotted them can also contribute to earning points for Credit E.1.a (Required: No species will require shearing)

BAY-FRIENDLY TOOLS & RESOURCES

- The following can be downloaded from: **http://www.stopwaste.org/home/index.asp?page=777**
  - *Bay-Friendly Landscape Guidelines* Practice 2.1
  - Bay-Friendly Plant Palette template,
  - Bay-Friendly Natural Hedges to Avoid Shearing plant list

2. SELECT APPROPRIATE PLANTS: DO NOT PLANT INVASIVE SPECIES

Credit E.2						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
	R					
Corresponds to BFL Guidelines Practice 2.1 d						

An invasive species *is defined as a species that is non-native (or alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Federal Executive Order 13112*

a. REQUIRED: None of the species listed by Cal-IPC as invasive in the San Francisco Bay Area are included in the planting plan

POINTS: This practice is required for all commercial& civic landscapes that are to be recognized as Bay-Friendly.

PRACTICE DESCRIPTION

None of the species listed by Cal-IPC *Don't Plant a Pest* as invasive in the San Francisco Bay Area shall be included in the planting plan

VERIFICATION

PROJECT TEAM

- Compare the complete list of plants in the plant palette to the Cal-IPC list of plants that are invasive to the San Francisco Bay-Area
- Submit the complete plant palette
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor confirming that no invasive species were substituted for specified species

RATER

- Compare the Cal-IPC list of invasive species with the plant palette to confirm no invasive species have been specified.
- Verify Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

BAY-FRIENDLY TOOLS & RESOURCES

- *Bay-Friendly Landscape Guidelines Practice 2.1d*
- http://www.cal-ipc.org/ip/inventory/weedlist.php
- *Don't Plant a Pest* brochures for plants & trees from www.cal-ipc.org

REFERENCES

- http://www.invasivespeciesinfo.gov/laws/execorder.shtml
- LEED for Homes, VERIFICATION, SS2.1

3. GROW DROUGHT TOLERANT CA NATIVE, MEDITERRANEAN OR CLIMATE ADAPTED PLANTS

Credit E.3						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
			R + 5			
Corresponds to BFL Guidelines Practice 4.2						

a. Specify drought tolerant California native, Mediterranean or other climate adapted plants that require occasional, little or no summer water for

i. REQUIRED: 75% of all non-turf plants

ii. 100% of all non-turf plants (2 points)

POINTS: The first part of this practice is required for all commercial, multifamily & civic landscapes that are to be recognized as Bay-Friendly. Up to 2 additional points may be earned for going above and beyond the requirement.

PRACTICE DESCRIPTION

A minimum of 75% of the total number of plants in non-turf areas must be species that require no or little summer watering. California native or Mediterranean species are strongly recommended.

All species should be adapted to the climate in which they will be planted, as indicated by a plant reference book. If plants are given a range of water needs from "occasional to moderate" for example, the landscape designer must determine if the plant will require either occasional or moderate watering based on site, soil, and climate conditions and categorize the plant appropriately. Sources used to determine climate adaptation and watering requirements include:

- Bornstein, Carol, David Fross and Bart O'Brien, *California Native Plants for the Garden*
  - Qualifying irrigation designation: "occasional", "infrequent", or "drought tolerant"
- East Bay Municipal Utility District's publication *Plants and Landscapes for Summer Dry Climates*
  - Qualifying irrigation designation: "occasional", "infrequent" or "no summer water".
- *Sunset Western Garden Book,*
  - Qualifying irrigation designation: "little or no water"
- University of California Cooperative Extension's *Guide to Estimating Irrigation Water Needs of Landscape Plantings in CA,* www.owue.water.ca.gov/docs/wucols00.pdf
  - Qualifying irrigation designation: "Low" or "Very Low"

PROJECT TEAM RECOMMENDATIONS

- Use of the Bay-Friendly Plant Legend template facilities the calculation of percent plants that meet this criteria and the verification of the plant palette.
- If hydroseeding or specifying plugs, include one plant per 2.25 square feet in the calculation of percent plants that meet these criteria, assuming the species in the hydroseed mix and plugs are drought tolerant.

VERIFICATION

PROJECT TEAM

- Submit a plant legend that identifies species, number of plants, irrigation requirements (and source of that requirement), total number of drought tolerant plants and total number of non-turf plants.
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor verifying that installed plants meet this requirement.

RATER

- Verify that a plant legend was submitted with 75% or more plants meeting the drought tolerant requirement and that the calculations are correct.
- Spot check the irrigation requirement identified in the Bay-Friendly Plant legend by comparing it to its source.
- Verify that an Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Grouping plants by water needs and exposure can also contribute to earning points for Credit E.5 (Implement hydrozoning).
- Specifying a diversity of plant species can also contribute to earning points from Practice E.8. (Diversify)
- Specifying 50% California native plant species to meet the requirements of this practice can also contribute to earning points from Practice E.9 (Choose CA natives first)

BAY-FRIENDLY TOOLS & RESOURCES

- The following can be downloaded from: **http://www.stopwaste.org/home/index.asp?page=777**
  - *Bay-Friendly Landscape Guidelines* Practice 2.1
  - Bay-Friendly Plant Palette template,
  - Bay-Friendly Natural Hedges to Avoid Shearing plant list

b. 100% of the non-turf plant palette needs no irrigation once established.

POINTS: 3

PRACTICE DESCRIPTION

100% of the non-turf plant palette needs no summer irrigation once established.

California native or Mediterranean species are strongly recommended. All species should be adapted to the climate in which they will be planted. Sources used to determine climate adaptation and watering requirements include:

- Bornstein, Carol, David Fross and Bart O'Brien, *California Native Plants for the Garden*
  - Qualifying irrigation designation: "drought tolerant"
- East Bay Municipal Utility District's publication *Plants and Landscapes for Summer Dry Climates,* www.ebmud.com.
  - Qualifying irrigation designation: "no summer water".
- *Sunset Western Garden Book*
  - Qualifying irrigation designation: "no irrigation needed"
- University of California Cooperative Extension's *Guide to Estimating Irrigation Water Needs of Landscape Plantings in CA,* www.owue.water.ca.gov/docs/wucols00.pdf
  - Qualifying Irrigation Designation: "Very Low"

PROJECT TEAM RECOMMENDATIONS

- Use of the Bay-Friendly Plant Legend template facilities the calculation of percent plants that meet this criteria and the verification of the plant palette.

VERIFICATION

PROJECT TEAM

- Submit a plant legend that identifies species, number of plants, irrigation requirements (and source of that requirement), total number of drought tolerant plants and total number of non-turf plants.
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor verifying that installed plants meet this requirement.

RATER

- Verify that a plant legend was submitted with 100% of the plants qualifying.
- Spot check the irrigation requirement identified in the Bay-Friendly Plant legend by comparing it to its source.
- Verify that an Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Grouping plants by water needs and exposure can also contribute to earning points for Credit E.5 (Implement hydrozoning).
- Specifying a diversity of plant species can also contribute to earning points from Practice E.8. (Diversify)
- Specifying 50% California native plant species to meet the requirements of this practice can also contribute to earning points from Practice E.9 (Choose CA natives first)

BAY-FRIENDLY TOOLS & RESOURCES

- The following can be downloaded from: **http://www.stopwaste.org/home/index.asp?page=777**
  - *Bay-Friendly Landscape Guidelines* Practice 2.1
  - Bay-Friendly Plant Palette template,
  - Bay-Friendly Natural Hedges to Avoid Shearing plant list

4. MINIMIZE THE LAWN

Credit E.4						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
			R + 9			
Corresponds to BFL Guidelines Practice 4.3						

a. Turf is not specified in areas less than 8 feet wide or in medians, unless irrigated with subsurface or low volume irrigation.

POINTS: 2

PRACTICE DESCRIPTION

In order to minimize overspray and runoff, and to improve irrigation efficiency, turf shall not be utilized in medians or areas less than 8 feet wide in any direction, unless irrigated with subsurface or low volume irrigation.

PROJECT TEAM RECOMMENDATIONS

Planting concept includes a statement that turf will not be planted in areas less than 8 feet wide or in medians, if applicable.

VERIFICATION

PROJECT TEAM

- Submit planting plans that indicate no turf in medians or areas 8 feet wide or less OR
- Submit irrigation plans that indicate subsurface or low volume irrigation in medians or all areas less than 8 feet wide.
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor verifying that installation meets this requirement.

RATER

- Verify that planting plan shows no turf in medians or areas less than 8 feet wide OR
- Verify that irrigation plans indicate subsurface drip or low volume irrigation in medians or areas less than 8 feet wide
- Visually spot check areas less than 8 feet wide. If turf is found in such areas, confirm that it is watered by subsurface drip or low volume irrigation.
- Verify Accountability Form has been signed by the Landscape Architect, Designer or Contractor

Turf *is defined as an area planted with spreading or stoloniferous grasses that require regular mowing to form a dense growth of leaf blades and roots. Areas planted with lawn alternatives, such as Carex pansa and other tufted grass or sedge species, are not included in the calculation of the turf area*

Low-Volume Irrigation *refers to the use of equipment and devices specifically designed to both limit the volume of water being applied and to efficiently deliver that water within the root zone of the plant. It applies water at low pressure through a system of tubing or lateral lines and low volume emitters. It is also referred to as micro-irrigation and includes drip (or trickle), micro-spray jets, micro-sprinklers, or bubbler irrigation.*

Subsurface irrigation *is a highly-efficient watering technique that reduces outdoor water use by 30 to 40 percent. The system consists of drip irrigation tubing installed 3-5 inches below the surface of the soil, or with a series of subsurface pans that transpire water through a sand bed. The water is applied directly to plant roots, eliminating runoff and overspray.*

SYNERGIES AND TRADE-OFFS

- Earning points for this practice can also contribute to meeting the requirement or earning points for Credit E.4.c (A maximum of 25% or more of total irrigated area is specified as turf, with sports and multiple use fields exempted) and meeting the requirement for Credit F.2.b (Sprinkler and spray heads are not specified for areas less than 8 feet wide).

BAY-FRIENDLY TOOLS & RESOURCES

- The following can be downloaded from: **http://www.stopwaste.org/home/index.asp?page=777**
  - *Bay-Friendly Landscape Guidelines* Practice 4.3
  - Bay-Friendly Plant Palette template,
  - Bay-Friendly Natural Hedges to Avoid Shearing plant list
  - Bay-Friendly *Lawn Alternatives* plant list
- *Easy Lawns, Low Maintenance Native Grasses for Gardeners Everywhere,* Brooklyn Botanic Garden Publications

b. Turf shall not be installed on slopes exceeding 10%

POINTS: 2

PRACTICE DESCRIPTION

Turf is not permitted on slopes exceeding 10%.

VERIFICATION

PROJECT TEAM

- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor verifying that installation meets this requirement.

RATER

- Verify Accountability Form is submitted and signed by appropriate party.
- Visually verify that turf is not installed on slopes that obviously have a rise of more than 6 inches over 5 feet of run (i.e. slopes that are obviously greater than 10%)

SYNERGIES AND TRADE-OFFS

- Reducing the overall turf can also contribute to meeting the requirement or earning points for Credit E.4 (Minimize the lawn).

c. Total irrigated area specified as turf is limited to:

- **i. REQUIRED: A maximum of 25% of total irrigated area, with sports or multiple use fields exempted**
- **ii. A maximum of 15%, with sports or multiple use fields exempted (total 2 points)**
- **iii. No turf is specified (total 5 points)**

POINTS: The first part of this practice is required for all commercial, multifamily, & civic landscapes that are to be recognized as Bay-Friendly. Up to 5 additional points may be earned for going above and beyond the requirement.

PRACTICE DESCRIPTION

Turf shall not be included as a fill-in material or solely as a decorative feature but rather as a planned and functional element of the landscape. Multi-use fields such as an area for play, sports and other events are exempt for i. and ii. The total irrigated decorative turf is limited to a maximum of 25%, 15% or 0% of total irrigated landscape area less the area devoted to multi use fields.

Where turf is proposed, it is recommended that a drought tolerant Tall Fescue or variety with similar water requirement be specified.

VERIFICATION

PROJECT TEAM

- Submit calculations of square feet of turf, excluding sports and multiple use fields, and square feet of total irrigated area.
- Submit planting plans with sports and multiple use fields identified. Include a statement about the purpose of multiple use fields
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor that installed turf meets the requirements for this credit.

RATER

- Verify that all the calculations are submitted, compare them to the planting plan and confirm that the percentage of turf meets the criteria for this credit.
- Confirm that the use of sports and multiple use turf areas has been identified.
- Verify that the Accountability Form has been submitted and signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

Reducing turf by not including it on slopes greater than 10%, in medians, or in strips 8 feet wide or less or in medians can also contribute to earning points for Credit E.4.

Irrigated area is equivalent to Landscape area *and is defined as all of the planting, turf areas and water features subject to the Maximum Applied Water Allowance (MAWA) calculation in a water budget. The following are not included as part of the landscape area: footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, pervious and non-pervious hardscapes,, open spaces and existing native vegetation..*

Sports or multiple use field *is defined as the portion of the landscape area that is dedicated to active play such as parks, sports fields and golf courses, where turf provides a playing surface, and is equivalent to 'recreational area' as defined by CA Water Efficient Landscape Ordinance.*

Special Landscape Area *is the portion of the landscape area that is dedicated to edible plants, areas irrigated with recycled water and recreational areas.*

5. Implement hydrozoning

Credit E.5						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
			2			
Corresponds to BFL Guidelines Practice 4.4						

Hydrozone *means a portion of the landscaped area having plants with similar water. A hydrozone may be irrigated or non-irrigated*. CA Department Water Resources, Model Water Efficient Landscape Ordinance

a. Group plants by water requirements and sun exposure

POINTS: 2

PRACTICE DESCRIPTION

Create separate zones for different water requirements and sun exposure. Each hydrozone shall have plant materials with similar water use. Individual hydrozones that mix high and low water use plants shall not be permitted. Individual hydrozones that mix plants of moderate and low water use plants or moderate and high water use plants may be allowed if:
(i) the plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or
(ii) the plant factor of the higher water using plant is used for calculations..

The design of the irrigation system shall conform to the hydrozones of the landscape design plan. Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions and plant materials with similar water use. It is highly recommended that trees that need summer irrigation be valved separately from turf and groundcover/shrub areas

Identify the hydrozones, by number, letter or other designation on planting and irrigation plans and dedicate a separate irrigation valve(s) to each hydrozone.

PROJECT TEAM RECOMMENDATIONS

- Use of the Bay-Friendly Plant Legend template facilities the placing of plants in hydrozones.

VERIFICATION

PROJECT TEAM

- Submit the Hydrozone Table from the CA Landscape Water Efficient Landscape Ordinance AND
- Submit planting and irrigation plans with hydrozones delineated by number, letter, color or other method AND Identify factors such as sun exposure and microclimate that will influence water needs
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor that the landscape, as installed, meets the criteria for this credit.

RATER

- Verify Water Efficient Landscape Worksheet has been completed
- Verify hydrozones are identified on plans with appropriate details
- Verify that an Accountability Form is signed by the Landscape Architect, Designer or Contractor.

RESOURCES AND BAY-FRIENDLY TOOLS

CA Department of Water Resource, Model Water Efficient Landscape Ordinance, http://www.water.ca.gov/wateruseefficiency/landscapeordinance/

6. Provide shade to moderate building temperatures

Credit E.6						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
				2		
Corresponds to BFL Guidelines Practice 5.1						

a. Protect existing shade and/or specify new trees such that 50% or more of west facing glazing and walls

POINTS: 2

PRACTICE DESCRIPTION

Existing trees are protected and/or new deciduous trees are planted to the west of the building in order to keep afternoon sun off the windows and walls in the summer. The amount of shade is calculated based on the mature height and spread of the species, for 4 pm in September. All trees must be deciduous in order to also maximize solar gain during the winter. It is also recommended that vegetation be placed to shade air conditioner units.

PROJECT TEAM RECOMMENDATIONS

- Identify the goal for shading buildings by trees and other vegetation in the site plan.
- Conduct a study of shade produced by existing trees on site or neighboring site.
- Build a model landscape and schedule use of a heliodon can demonstrate the shading effects of the landscape during different seasons.

VERIFICATION

PROJECT TEAM

- Submit total square feet of west facing building walls and windows.
- Submit shade study with calculations of square feet of shade produced by trees at full size in September at 4 pm.

Do not double count for overlapping canopies. Calculate and submit the percentage.
Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor that installed trees meet the requirements for this credit.

RATER

- Verify calculations were completed, that canopies are not double counted and that the total west facing wall and window square feet that is to be shaded by trees divided by the total square footage is .50 or greater.
- Verify that the Accountability Form is signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Preserving mature healthy trees that shade buildings can also earn points for Credit A.7. (Conserve or restore natural areas and wildlife corridors).
- Providing trees, large stature shrubs and/or other vegetation with the space that each will require to reach its mature shape and size will contribute to earning points for credit E.1 (Select appropriate plants: choose & locate plans to grow to natural size and avoid shearing).
- Specifying drought tolerant species that shade buildings can also earn points for Credit E.3 (Grow drought tolerant CA native, Mediterranean or climate adapted plants).
- Specifying a diversity of trees and other vegetation that shade buildings can contribute to earning points for Credit E.8 (Diversity)
- Specifying California native species can contribute to earning points for Credit E.9 (Choose California natives first)

RESOURCES AND BAY-FRIENDLY TOOLS

- To schedule use of PGE's heliodon, contact www.pge.com/pec/heliodon

REFERENCES

- USGBC, *LEED for Homes Rating System*, January 2008
- USGBC, *LEED for Homes Verification & Submittal Guidelines*

7. Plant trees

Credit E.7						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
				3		1
Corresponds to BFL Guidelines Practice 6.7						

a. At least 50% of the paved site area is shaded by trees or other vegetation

POINTS: 2

PRACTICE DESCRIPTION

Locate trees, large stature shrubs and/or vegetated structures (such as trellises) to provide shading for at least 50% of the paved site area. Trees and large stature shrubs that are designed to create a hedge must be provided with the space to form a hedge without shearing.

Shading from trees and vegetation not on the project site is eligible if a shade study is conducted.

Shading should be calculated for noon on June 21, when the sun is directly overhead and based on the mature canopy of the tree or shrub. Do not double count the area shaded by overlapping vegetation.

It is highly recommended that trees that require summer irrigation be on separate irrigation valves and that they be irrigated with drip or bubblers.

Paved site area *includes sidewalks, patios, walkways, driveways, parking lots and other non-roof hardscapes, regardless of permeability.*

Large stature shrubs *are those that, under normal conditions, can reach a mature height of 12 feet or more. Examples include Arbutus 'Marina', some Arctostaphylus spp., some Ceanothus spp., Sambucus mexicana, Nerium oleander trained as a single or multistemmed tree.*

PROJECT TEAM RECOMMENDATIONS

- Identify the goal for shading of paved areas by trees and other vegetation in the site plan.
- Conduct a study of shade produced by trees on neighboring sites and use to inform the layout of paved area.

VERIFICATION

PROJECT TEAM

- Submit calculations of all paved site areas that will be shaded by trees or large stature shrubs and the total paved area.
- If shade from trees on neighboring sites is included, submit the results of a shade study. Do not double count for overlapping canopies. Calculate and submit the percentage.
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor that plant substitutions do not impact the requirements for this credit.

RATER

- Verify calculations were completed, that canopies are not double counted and that the total paved area that is to be shaded by trees and large divided by the total paved site area is .50 or greater.
- Verify that statement is signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Preserving mature healthy trees that shade paved site areas can also earn points for Credit A.7. (Conserve or restore natural areas and wildlife corridors).
- Shading hardscapes with trees and other vegetation is one option for obtaining points for Credit D.3 (Reduce the heat island effect with cool site techniques); points will be cumulative (i.e. if the site earns 2 points for E.6, 2 points are also awarded for 3.a for a total of 4 points).
- Providing trees, large stature shrubs and/or other vegetation with the space that each will require to reach its mature shape and size will contribute to earning points for credit E.1 (Select appropriate plants: choose & locate plans to grow to natural size and avoid shearing).
- Specifying drought tolerant species that shade paved site areas can also earn points for Credit E.3 (Grow drought tolerant CA native, Mediterranean or climate adapted plants).
- Specifying a diversity of trees and other vegetation that shade paved site areas can contribute to earning points for Credit E.8 (Diversity)
- Specifying California native species can contribute to earning points for Credit E.9 (Choose California natives first)

RESOURCES AND BAY-FRIENDLY TOOLS

- Build It Green, *GreenPoint Rated Multifamily Rating Manual, v1.2,* July 2007
- Center for Urban Forest Research, *Where are all the cool parking lots,* http://cufr.ucdavis.edu
- Center for Urban Forest Research, *Fact Sheet #3: Making Parking Lots More Tree Friendly,* http://cufr.ucdavis.edu
- USGBC, *New Construction & Major Renovation, v 2.2 Reference Guide,* September 2006.

REFERENCES

- USGBC, *LEED for Homes Rating System*, January 2008
- USGBC, *LEED for Homes Verification & Submittal Guidelines*

b. At least one tree species is a large stature species

Large stature trees *are those that under normal conditions can support canopies of 50 feet or more in height and width. James Urban, Urban Trees & Soils*

POINTS: 2

PRACTICE DESCRIPTION

Specify at least one large stature tree species. Do not place the tree where it will grow to within 10 feet of high voltage powerlines at maturity.

VERIFICATION

PROJECT TEAM

Identify large stature species in plant palette, and include its mature height and spread, and reference the source of this information.

- Submit an Accountability form signed by the Landscape Architect, Designer or Contractor that installed plants meet the requirements of this credit.

RATER

- Verify that Accountability Form is signed by the Landscape Architect, Designer or Contractor.
- Confirm the mature size and spread of the tree species by comparing the information provided in the plant palette to the reference.

SYNERGIES AND TRADE-OFFS

- Preserving mature healthy, large stature trees can also earn points for Credit A.7. (Conserve or restore natural areas and wildlife corridors).
- Shading hardscapes with trees and other vegetation is one option for obtaining points for Credit D.3 (Reduce the heat island effect with cool site techniques); points will be cumulative (i.e. if the site earns 2 points for E.6, 2 points are also awarded for 3.a for a total of 4 points).
- Providing every large stature trees with the space that each will require to reach its mature shape and size will contribute to earning points for credit E.1 (Select appropriate plants: choose & locate plans to grow to natural size and avoid shearing).
- Specifying drought tolerant large stature species can also earn points for Credit E.3 (Grow drought tolerant CA native, Mediterranean or climate adapted plants).
- Specifying a diversity of trees can contribute to earning points for Credit E.8 (Diversity)
- Specifying California native species can contribute to earning points for Credit E.9 (Choose California natives first)

RESOURCES AND BAY-FRIENDLY TOOLS

- PG&E Safe Tree Planting checklist: http://www.pge.com/microsite/safety_esw_ngsw/esw/trees/plant_checklist.html

8. DIVERSIFY

Credit E.8						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
						4
Corresponds to BFL Guidelines Practice 7.1						

a. Landscapes less than 20,000 square feet shall have a minimum of:
20 distinct species (1 point) OR
30 distinct plant species (total 3 points)

b. Landscapes with 20,000 to 43,560 square feet (1 acre) shall include a minimum of
30 distinct species (1 point) OR
40 distinct species (total 2 points) OR
50 distinct plant species (total 4 points)

c. Landscapes of greater than 1 acre shall include a minimum of 40 distinct plant species AND
one additional species per acre over 1 acre (2 points) OR
two additional species per acre over 1 acre (total 4 points)

The site *is the area within the legal boundaries of a property and encompasses all areas of the property including constructed areas and non-constructed areas. It is the same as the property area*. USGBC LEED, New Construction & Major Renovation v2.2, September 2006

Landscape area is equivalent to Irrigated area *and is defined as all of the planting, turf areas and water features subject to the Maximum Applied Water Allowance (MAWA) calculation in a water budget. The following are not included as part of the landscape area: footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, pervious and non-pervious hardscapes,, open spaces and existing native vegetation . Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation*

POINTS: 4

PRACTICE DESCRIPTION

The numbers of distinct species increases with square footage of the landscape area. Hydroseed mixes and plugs count towards diversity. It is suggested the species flower or bear fruit at different times of the year and that the landscape is designed to include layers of vegetation: groundcovers, shrubs and trees that provide a variety of nesting sites.

PROJECT TEAM RECOMMENDATIONS

- Use of the Bay-Friendly Plant Legend template facilitates the calculation of the numbers of species.

VERIFICATION

PROJECT TEAM

- Submit the total square footage of landscaped area and number of distinct species in the plant palette.
- Submit Accountability Form signed by the Landscape Architect, Designer or Contractor that plantings meet diversity requirement.

RATER

- Verify the number of plant species in the plant palette as compared to the square feet of landscaped area.
- Verify Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Preserving mature healthy trees can also earn points for Credit A.7. (Conserve or restore natural areas and wildlife corridors).
- Using CA natives to create a plant buffer can also earn points towards Credit A.7.c (Create or protect a diverse plant buffer of low maintenance vegetation along creeks, shorelines or monocultured landscaped areas).
- Providing all species with the space that each will require to reach their mature shape and size will contribute to earning points for credit E.1 (Select appropriate plants: choose & locate plans to grow to natural size and avoid shearing).
- Specifying drought tolerant species can also earn points for Credit E.3 (Grow drought tolerant CA native, Mediterranean or climate adapted plants).
- Specifying California native species can contribute to earning points for Credit E.9 (Choose California natives first)

RESOURCES AND BAY-FRIENDLY TOOLS

- The following can be downloaded from: **http://www.stopwaste.org/home/index.asp?page=777**
  - *Bay-Friendly Landscape Guidelines* Practice 7.1, including Tips for Success on Flowering Periods of Plants that Attract Beneficial Insects, page 51
  - Bay-Friendly Plant Palette template,

REFERENCES

- USGBC LEED, *New Construction & Major Renovation v2.2 Reference Guide,* September 2006

9. CHOOSE CALIFORNIA NATIVES FIRST

Credit E.8						
Possible Points:						
Landscape Locally	Landscape Locally	Landscape Locally	Landscape Locally	Conserve Energy	Water & Air Quality	Wildlife Habitat
						2
Corresponds to BFL Guidelines Practice 7.2						

a. CA natives are specified for 50% of non-turf plants

PRACTICE DESCRIPTION

California native species shall be specified for 50% of non-turf plants, by number. Sources used to identify CA native species include but are not limited to:

- Bornstein, Carol, David Fross and Bart O'Brien, *California Native Plants for the Garden*
- East Bay Municipal Utility District's publication *Water Conserving Plants for the Bay Area,* www.ebmud.com.
- Sunset Magazine's *Western Garden Book,*
- University of California Cooperative Extension's *Guide to Estimating Irrigation Water Needs of Landscape Plantings in CA,* www.owue.water.ca.gov/docs/wucols00.pdf

PROJECT TEAM RECOMMENDATIONS

- Use of the Bay-Friendly Plant Template facilities the calculation of percent plants that meet this criteria and the verification of the plant palette.

VERIFICATION

PROJECT TEAM

Submit a completed plant palette that identifies California native species, number of plants, and total number of non-turf plants.

- Submit Accountability Form signed by the Landscape Architect, Designer or Contractor that all plantings conform to the requirements of this credit.

RATER

- Verify the calculation of 50% CA native plants as complete and accurate.
- Verify Accountability Form has been signed.

SYNERGIES AND TRADE-OFFS

- Preserving mature healthy California native trees can also earn points for Credit A.7. (Conserve or restore natural areas and wildlife corridors).
- Using CA natives to create a plant buffer can also earn points towards Credit A.7.c (Create or protect a diverse plant buffer of low maintenance vegetation along creeks, shorelines or monocultured landscaped areas).
- Grouping California native plants by water needs and exposure can also contribute to earning points for Credit D.5 (Implement hydrozoning).
- Specifying a diversity of plant species can contribute to earning points from Practice D.8. (Diversify)
- Specifying California native plant species that are low water using can also contribute to meeting the requirement or earning points from Practice D.3 (Grow drought tolerant CA native, Mediterranean or climate adapted plants).

- Providing all species with the space that each will require to reach their mature shape and size will contribute to earning points for credit E.1 (Select appropriate plants: choose & locate plans to grow to natural size and avoid shearing).

RESOURCES AND BAY-FRIENDLY TOOLS

- The following can be downloaded from: **http://www.stopwaste.org/home/index.asp?page=777**
  - *Bay-Friendly Landscape Guidelines* Practice 7.2, including Tips for Success: Sources of California Natives, page 50.
  - Bay-Friendly Plant Palette template,
- Beidleman, Linda and Eugene N. Kozloff, *Plants of the San Francisco Bay Region,* UC Press 2003
- Bornstein, Carol, David Fross and Bart O'Brien, *California Native Plants for the Garden,* Cacuma Press, 2005
- Calflora: http://www.calflora.org/
- California Native Plant Society: http://www.cnps.org/
- California Native Plant library: http://www.theodorepayne.org/gallery/glossary.htm
- East Bay Municipal Utility District, *Plants and Landscape for Summer Dry Climates,* 2004

F. IRRIGATION

1. DESIGN FOR ON-SITE RAINWATER COLLECTION, RECYCLED WATER AND/OR GRAYWATER USE

Credit F.1						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
			8			
Corresponds to BFL Guidelines Practice 4.5						

a. Irrigation systems and/or all ornamental uses of water (ponds, fountains, etc) are plumbed for delivering recycled water where it is available from a municipal source.

POINTS: 3

CODE CONSIDERATIONS

The use of stormwater, recycled water and graywater is subject to California State Law and California Building Code. California Water Code Section 13550-13556 states that using potable domestic water for nonpotable uses, including cemeteries, golf courses, parks, industrial and residential irrigation, and toilet flushing, is an unreasonable use of potable water if recycled water is available. In communities where recycled water is available, state law requires the installation of dual plumbing systems in new construction. To avoid confusion, the recycled water is carried in purple pipes.

Cities and counties that currently do not have a recycled water treatment system may also require dual plumbing systems in new construction and in buildings when they are substantially remodeled, in order to build the infrastructure for recycled water when it is available in the future.

PRACTICE DESCRIPTION

Design the plumbing such that irrigation system and ornamental uses of water are supplied (or can be supplied in the future) by municipal recycled water. Use purple pipes or wrap pipe with purple tape to indicate they carry recycled water.
Recirculating water systems shall be used for decorative water features. Surface area of a water feature shall be included in the high water use hydrozone area of the water budget calculation

Design separate recycled water systems according to the California Department of Health Services Title 22 design requirements, which requires locating drinking fountains to avoid contamination from recycled water, designing good site drainage systems and designing grading to prevent ponding and overspray.

Recycled water, *also called reclaimed water is defined in Title 22, Chapter 3 of the California Code of Regulations, refers to tertiary-treated water produced from the three-stage treatment of municipal wastewater. Recycled water is virtually colorless and odorless, and is allowable for fully body human contact but not for direct human consumption. The sensible use of recycled water affords an excellent choice for essentially all non-potable applications. Properly managed, recycled water is safe to use.* *http://www.owue.water.ca.gov/recycle/docs/Appendix_C_LawsRegs.pdf*

Purple pipe *is a key component of dual plumbing systems that enable homeowners, businesses, industry and public facilities to use recycled water outside and potable drinking water indoors…Today, pipes and other materials carrying recycled water are clearly marked purple to eliminate any confusion.*
Purple pipe is just like other PVC piping, except that it carries reclaimed water rather than fresh Water Recycling and Reuse, Local Government Commission, www.lgc.org

PROJECT TEAM RECOMMENDATIONS

- Determine if the site currently has or is projected to have access to recycled water by contacting your water supplier.
- Determine if the municipality in which the landscape project is located requires purple pipe for supplying recycled water when it is available in the future.
- Evaluate the potential financial incentives from the water supplier such as a reduction in connection fees and/or water supply charges.
- Establish the use of recycled water as a project goal during programming.

VERIFICATION

PROJECT TEAM

- Provide evidence that a municipal recycled water system is currently in place or will be in the future.
- Identify ornamental water features on site plan and provide evidence, such as manufacturer's product description, that they re-circulate water.
- Submit irrigation plans showing recycled water use or plumbing for future use

RATER

- Verify evidence has been submitted showing a municipal recycled water system is currently in place or will be in the future.
- Verify that ornamental water features re-circulate water.
- Visually verify that the irrigation system and/or ornamental water feature, as identified on the submitted plans, are plumbed with purple pipe to receive recycled water.

RESOURCES AND BAY-FRIENDLY TOOLS

- American Water Works Association's Dual Water Systems Manual, 800-926-7337, www.awwa.org.
- American Water Works Association, California-Nevada Section, *Guidelines for Distribution of Nonpotable Water*
- California Code of Regulations, Appendix J, Reclaimed Water Systems for Non-Residential Buildings, Uniform Plumbing Code, , www.bsc.ca.gov, Under heading California Building Standards Code, Select "Where do I purchase the 1998 codes?"
- California DWR's Office of Water Use Efficiency www.owue.water.ca.gov
- Dublin San Ramon Services District, www.dsrsd.com
- EBMUD Office of Water Recycling, 510.287.1691, www.ebmud.com.
- Guidelines for the Distribution of Nonpotable Water, American Water Works Association, California-Nevada Section, 909.291.2101.
- Public Technology, Inc., US Green Building Council, US DOE, and US EPA, *Sustainable Building Technical Manual*, Part 3, Chapter 6.
- Reclaimed Water Criteria, Chapter 3, California Administrative Code, Title 22, Division 4, State of California, Department of Health Services, Environmental Health, Mike Finn, 510.540.2430.
- Recycled Water Distributors in CA; http://www.scwa.ca.gov/about_your_water/documents/Calif-Recycled-Water-Calif.pdf
- WateReuse, www.watereuse.org
- Water Recycling 2030: Recommendations of California's Recycled Water Task Force: http://www.owue.water.ca.gov/recycle/docs/TaskForceReport.htm
- U.S. EPA's Water Recycling and Reuse Website www.epa.gov/region9/water/recycling
- Zone 7 Water District: www.zone7.com

b. Design a system that can store and use rainwater or graywater to satisfy a percentage of the landscape irrigation

i. **10% (3 points) OR**
ii. **50% (4 points total) OR**
iii. **100% of dry season landscape water satisfied with harvested rainwater (5 points total)**

Graywater is waste water from sinks, showers, bathtubs and washing machine, that is not contaminated by human waste. Not suitable for drinking, it is an intelligent resources, when used for subsurface irrigation of trees and shrubs.

POINTS: 5

CODE CONSIDERATIONS
Rainwater and graywater capture systems are subject to local codes and may require special permits.

PRACTICE DESCRIPTION
Design a system that can store and use rainwater to satisfy a percentage of the landscape irrigation and/or design and install a graywater reuse system for landscape irrigation (i.e. not a septic system). The system must include a tank or dosing basin that can be used as part of the irrigation system. Graywater must be collected from at least one of the following: showers, clothes washers, some combination of faucets and other sources estimated to exceed 5,000 gallons per year. It must be used for subsurface irrigation of trees and shrubs, and must not be applied to above ground plant matter. It is recommended that it be used for watering more than one area and not concentrated in one part of the landscape.

VERIFICATION
PROJECT TEAM
- Submit an Accountability Form signed by the Landscape Architect or Designer or Irrigation Contractor stating compliance with code and the criteria for this credit.
- Submit irrigation plan showing graywater delivery subsurface to trees and shrubs
- Submit any system equipment literature

RATER
- Verify that the Accountability Form has been signed by the Landscape Architect or Designer or Irrigation contractor.
- Verify that graywater is delivered subsurface to trees and shrubs.
- Visually verify that the rainwater and/or graywater system has been installed (optional).

SYNERGIES AND TRADE-OFFS
- Calculations of the irrigation needs and percent supplied by greywater/rainwater can contribute to earning points for Credit F.2.e (Design and install an irrigation system that will be operated at 70% of reference ET)

REFERENCES
- Water Recycling and Reuse, Local Government Commission, www.lgc.org

2. Design and install high efficiency irrigation systems

Credit F.2						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
			R + 10			
Corresponds to BFL Guidelines Practice 4.6						

a. REQUIRED: Specify weather based (automatic, self adjusting) irrigation controller(s) that includes a moisture and/or rain sensor shutoff

POINTS: The first part of this practice is required for all commercial& civic landscapes that are to be recognized as Bay-Friendly. Up to 10 additional points may be earned for going above and beyond the requirement.

Weather based (or "smart") irrigation controllers *are automatic timing devices that use evapo-transpiration or weather data to remotely control irrigation valves.*

A self adjusting irrigation controller *is an automatic timing device that uses sensor data (e.g. soil moisture sensor) to remotely control valves. CA Model Water Efficient Landscape Ordinance.*

Evapotranspiration *is the water lost from the soil through evaporation and transpiration.*

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PRACTICE DESCRIPTION

Weather-based irrigation controllers or soil moisture based controllers or other self-adjusting irrigation controllers, shall be required for all irrigation systems. The component for adjusting the system must also be installed (e.g. A weather station must be installed if the controller is adjusted based on signals from an on-site weather system). Sensors (rain, freeze, wind, etc) either integral or auxiliary, that suspend or alter irrigation operations during unfavorable weather conditions such as rain or a freeze, shall be required of all irrigation systems.
Additionally, the controller shall have at a minimum the following capabilities:

- Water budgeting feature (percent adjustment);
- multiple start time capability;
- runtimes able to support low volume applications;
- irrigation intervals for days of the week or same day intervals;
- 3 or more operating programs {A (turf)/ B(shrubs)/ C (water feature)}.

VERIFICATION

PROJECT TEAM

- Submit the make and model of the irrigation controller

Provide an Accountability Form signed by the Landscape Architect, Designer or Contractor that the installed controller is a self-adjusting model and includes shut off capacity.

RATER

- Visually verify that the installed controller is the make and model specified.
- Verify that the Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

RESOURCES AND BAY-FRIENDLY TOOLS

- *Bay-Friendly Landscape Guidelines,* Practice 4.6
- Irrigation Association and the Center for Irrigation Technology (CIT) at California State University, Fresno, provide performance reports on smart controllers visit: http://www.irrigation.org/SWAT/swat.aspx?id=298
- For a list of manufacturers of self-adjusting irrigation controllers, visit: http://www.ebmud.com/for-customers/for-residential-customers/conservation-rebates-and-incentives/self-adjusting-irrigatio

REFERENCES

- EBMUD *Regulations Governing Water Service to Customers of the East Bay MUD, July 2007.*
- Metropolitan Water District of So. California*, California Friendly Model Home Pilot Program, Sample Specifications for California Friendly Landscapes*

b. REQUIRED: Sprinkler and spray heads shall not be permitted in areas less than 8 feet wide

PRACTICE DESCRIPTION

The irrigation system is designed to prevent overspray and runoff. Sprinkler and spray heads are not specified in areas less than or equal to 8 feet wide. Acceptable alternatives include drip, subsurface drip, bubblers or no irrigation. Bubblers shall not exceed 1.5 gallons per minute per bubbler.

VERIFICATION

PROJECT TEAM

- Submit Accountability Form signed by the Landscape Architect, Designer or Contractor verifying that irrigation as installed meets these requirements.

RATER

- Verify that Accountability Form has been signed by Landscape Architect, Designer or Contractor.
- Spot check that no sprinkler or spray heads have been installed in planted areas less than or equal to 8 feet wide

SYNERGIES AND TRADE-OFFS

- Earning points for this practice can also contribute to earning points for Credit E.4.a (Turf is not specified in areas less than 8 feet wide or in medians, unless irrigated with subsurface or low volume irrigation) and for Credit F.2.c (Specify and install irrigation equipment with an operational distribution uniformity of 80% or greater, such as drip or bubblers.)

REFERENCES

- East Bay Municipal Utility District, *Regulations Governing Water Service to Customers of the EBMUD,* July 2007, Authority Resolution 33610-07

c. Specify and install irrigation equipment with an operational distribution uniformity of 80% or greater, such as drip or bubblers for:

i. **75% or greater of non-turf irrigated areas (2 points) OR**

ii. **100% of non-turf irrigated areas (5 points total)**

POINTS: 5

PRACTICE DESCRIPTION

For 75% or greater of non-turf irrigated areas: specify and install irrigation equipment with an operational distribution uniformity of 80% or greater, such as low volume micro-spray or point application devices (drip) or bubblers.

Non-turf areas on slopes equal to or greater than 25% shall be included in the percentage of the landscape that is irrigated with low volume irrigation. Maximum flow rate for drip emitters shall be 2 gallons per hour. Bubblers shall not exceed 1.5 gallons per minute per bubbler.

VERIFICATION

PROJECT TEAM

- Submit Irrigation plans indicating the use of drip (including subsurface drip or microspray) and/or bubblers. Include manufacturer specified flow rate for bubblers and low volume micro-spray or drip AND
- Submit square feet of total non-turf area and calculations of percent of non-turf area that is irrigated by drip or bubblers OR
- Submit the Hydrozone Worksheet required by the local Water Efficient Landscape Ordinance
- Submit an Accountability Form signed by the Landscape Architect, Designer or Contractor that the installed irrigation system meets the criteria for this credit.

RATER

- Verify calculations are completed accurately.
- Verify irrigation plans OR Worksheet indicate use of drip or bubblers and that manufacturer specified flow rate does not exceed criteria.
- Verify Accountability Form has been signed by the Landscape Architect, Designer or Contractor.

SYNERGIES AND TRADE-OFFS

- Specifying and installing irrigation equipment to meet the efficiency standard of this credit in medians and strips less than 8 feet wide can contribute to meeting the requirement of Credit F.2.b (Sprinkler and spray heads shall not be permitted in areas less than 8 feet wide).

Landscape area is equivalent to Irrigated area *and is defined as all of the planting, turf areas and water features subject to the Maximum Applied Water Allowance (MAWA) calculation in a water budget. The following are not included as part of the landscape area: footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, pervious and non-pervious hardscapes,, open spaces and existing native vegetation . Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation*

Distribution uniformity *is a measure of how evenly irrigation water is being applied. It is expressed as a percentage between 0 and 100%. 100% DU is theoretically possible but virtually impossible in actual practice. There must be a good distribution uniformity before there can be a good irrigation efficiency.* *www.waterright.org*

Low-Volume Irrigation *refers to the use of equipment and devices specifically designed to both limit the volume of water being applied and to efficiently deliver that water within the root zone of the plant. It applies water at low pressure through a system of tubing or lateral lines and low volume emitters. It is also referred to as micro-irrigation and includes drip (or trickle), micro-spray jets, micro-sprinklers, or bubbler irrigation.*

Stream rotator heads *or rotor type sprinkler heads apply water slower and in larger streams to avoid misting and drift, and allowing soils to better absorb it. Studies indicate that rotary sprinklers can result in significantly higher distribution uniformity (80% or greater), compared to fixed pattern spray heads*

d. For all turf areas: Specify and install equipment with a precipitation rate of 1 inch or less per hour and an operational distribution uniformity of 70% or greater.

POINTS: 2

PRACTICE DESCRIPTION

For all turf areas: Specify and install equipment with a precipitation rate of 1 inch or less per hour and designed to achieve an operational distribution uniformity of 70% or greater. Stream rotator heads are encouraged, The use of standard spray heads shall be avoided. All sprinklers shall have matched precipitation rates within each control and valve circuit. Points shall also be awarded for use of subsurface drip irrigation in turf areas.

Also recommended:

- Specify an appropriate pressure regulating device at POC, valve or sprinkler, when
- pressure exceeds optimal manufacturer recommendation.
- Specify shorter radius, low angle sprinklers to prevent overspray and wind drift,
- Locate sprinklers a minimum of 2 inches and a maximum of 3 inches away from pavement or header edge to prevent damage or misalignment from routine maintenance.
- Separate top, bottom and middle of slopes on separate valves.

VERIFICATION

PROJECT TEAM

- Submit irrigation documents with sprinkler or subsurface drip irrigation specifications for turf areas OR the Hydrozone Worksheet required for the relevant Water Efficient Landscape Ordinance. Include manufacturer specified precipitation rate (in inches/hour) for all sprinkler heads (in turf areas).
- Submit an Accountability Form signed by the Landscape Architect, Designer or Irrigation Contractor that the installed irrigation equipment meets the criteria for this credit.

RATER

- Verify irrigation documents, and manufacturer specified precipitation rate.
- Verify the Accountability Form has been signed by the Landscape Architect, Designer or Irrigation Contractor.

SYNERGIES AND TRADE-OFFS

- Specifying and installing irrigation equipment in turf with a slightly higher efficiency (such as subsurface drip) can contribute to also earning points for Credit F.2.b (Specify and install irrigation equipment with an operational distribution uniformity of 80% or greater, such as drip or bubblers).

e. Design and install irrigation system that will be operated at 70% of reference ET

POINTS: 3

PRACTICE DESCRIPTION

The irrigation system shall be designed and installed such that the Estimated Total Water Use (ETWA) is less than the budgeted water, i.e. the Maximum Applied Water Allowance (MAWA).

Stream rotator heads are required, use of standard spray heads is not allowed.

Use the formulas below to calculate:

- maximum applied water allowance (MAWA),
- estimated total water use (ETWU),

$$MAWA = (ETo)\ (0.62)[\ (LA)(0.70) + (SLA)(0.3)]$$

$$ETWU = ETo\ (0.62)\ [\ \frac{(PF)(HA)}{(IE)} + SLA\ ]$$

ETo = Reference evapotranspiration (inches per year)
LA = Landscaped area (square feet)
SLA = Special Landscape Area (square feet)
PF = Plant factor (Ks per WUCOLS) for each hydrozone
HA = Hydrozone area (square feet)
(0.70) = ET adjustment factor
(0.62) = factor for converting to gallons per square foot
IE = irrigation efficiency

Landscape area is equivalent to Irrigated area *and is defined as all of the planting, turf areas and water features subject to the Maximum Applied Water Allowance (MAWA) calculation in a water budget. The following are not included as part of the landscape area: footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, pervious and non-pervious hardscapes,, open spaces and existing native vegetation . Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation.*

Sports or multiple use field is equivalent to recreational area *and is defined as the portion of the landscape area that is dedicated to active play such as parks, sports fields and golf courses, where turf provides a playing surface.*

Special Landscape Area *is the portion of the landscape area that is dedicated to edible plants, areas irrigated with recycled water and recreational areas.*

Reference ET (ET_0) *is the standard measurement of environmental parameters which affect the water use of plants. It is given in inches per day, month or year and is an estimate of the evapotranspiration of a large field of 4-7 inch tall cool season turf that is well watered.*

VERIFICATION

PROJECT TEAM

- Submit the Water Efficient Landscape Workbook Worksheet (Water Budget Calculation) from the local Model Water Efficient Landscape Ordinance, using 0.7 for the ET adjustment factor.
- Submit Accountability Form signed by Landscape Architect, Designer or Irrigation Contractor that no sprinkler heads are standard spray heads.

RATER

- Verify Water Budget Calculation is completed and that math is accurate and that 0.7 is used as the ET adjustment factor in the equation and that ETWU is less than MAWA.
- Verify Accountability Form has been signed by Landscape Architect, Designer or Irrigation Contractor.

SYNERGIES AND TRADE-OFFS

- Designing and installing a landscape that needs no supplemental irrigation, Credit E.3.c (100% of all non-turf plant palette needs no irrigation once established) can contribute to earning points for meeting this Credit.

RESOURCES AND BAY-FRIENDLY TOOLS

- *CA Department of Water Resource, Model Water Efficient Landscape Ordinance, http://www.owue.water.ca.gov/docs/WaterOrdIndex.cfm*
- University of California Cooperative Extension's *Guide to Estimating Irrigation Water Needs of Landscape Plantings in CA (WUCOLS),* www.owue.water.ca.gov/docs/wucols00.pdf

3. INSTALL A DEDICATED METER FOR LANDSCAPE WATER USE OR INSTALL A SUBMETER

Credit F.3						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
			2			
Corresponds to BFL Guidelines Practice 4.7						

a. A dedicated irrigation meter or submeter is specified

POINTS: 2

PRACTICE DESCRIPTION

A dedicated irrigation meter shall be installed for all new projects with a landscape area greater than 5,000 square feet. If not a dedicated meter, sub-meters shall be installed on new landscapes less than 5,000 square feet or all renovated sites.

VERIFICATION

PROJECT TEAM

- Submit square feet of landscape area
- Submit documentation of installation: either a receipt from the water supplier OR manufacturer cut sheets OR an Accountability Form signed by the Landscape Architect, Designer or Irrigation Contractor verifying that the meter or submeter was installed.

RATER

- Verify square feet of landscape and specifications of dedicated meter or submeter as per appropriate to the size.
- Verify submittal of receipt OR cut sheets OR an Accountability Form signed by the Landscape Architect, Designer or Irrigation Contractor.

G. MAINTENANCE

1. KEEP PLANT DEBRIS ON SITE:

Credit G.1						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
	7					
Corresponds to BFL Guidelines Practice 2.2						

Grasscycling *means leaving the clippings on the lawn after mowing, so they decompose and release their nutrients in the soil.*

a. Grasscycle

POINTS: 2

PRACTICE DESCRIPTION

Maintenance specifications and/or task list requires grasscycling for all lawns from April through October, or longer. Exceptions include

- Sports turf "in season" when clippings will interfere with play.
- Unseasonal rain, which may require temporarily halting of grasscycling because of excessive moisture.

In such cases, the clippings must be used as mulch or composted or transported to a plant debris recycling facility. Do not use grass clippings as mulch if an herbicide has been applied to the turf.

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit maintenance manual or task list that includes grasscycling
- Submit Accountability Form signed by Landscape Contractor or Owner confirming grasscycling will be practiced as per the criteria for this credit.

RATER

- Verify manual or task list includes grasscycling.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

SYNERGIES AND TRADE-OFFS

- Including a policy or specifications to compost grass clippings during the rainy season can contribute to earning points for Credit G.1.c (Compost plant debris).

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 18 or http://www.stopwaste.org/home/index.asp?page=777

b. Produce mulch from plant debris

***Mulch** is any material spread evenly over the surface of the soil to enhance the growth of plants and the appearance of the landscape. (*StopWaste.Org, *A Bay-Friendly Landscaping Guide to Mulch)*

POINTS: 2

PRACTICE DESCRIPTION

Maintenance specifications and/or task list requires that grass clippings, leaves and/or seed free vegetative debris less than 4 inches (including cut or chipped woody prunings) be re-incorporated into the mulch layer of landscaped areas away from storm drain. Do not use grass clippings as mulch if an herbicide has been applied to the turf.

PROJECT TEAM RECOMMENDATIONS

- Identify areas away from hardscapes as leaf repositories.
- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that includes using plant debris on-site as mulch.
- Submit Accountability Form signed by Landscape Contractor or Owner confirming mulching of plant debris will be practiced as per the criteria for this credit.

RATER

- Verify specifications or task list includes required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

SYNERGIES AND TRADE-OFFS

- Including a policy or specifications to use plant debris as mulch can contribute to earning points for Credit 5 (Mulch regularly).

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 16 or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified

c. Produce compost from plant debris

***Compost** is the product of controlled biological decomposition of organic materials, often including urban plant debris and food waste.*

POINTS: 3

PRACTICE DESCRIPTION

Composting plant debris on site shall be included in maintenance specifications or task list.

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals
- Composting on site can range in scale from a backyard compost bin to a medium scale operation. A level site with access to water and adequate space to manage the materials is needed as well as a commitment for ongoing management of the system.

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that includes composting plant debris on-site.
- Submit Accountability Form signed by Landscape Contractor or Owner confirming composting of plant debris will be practiced as per the criteria for this credit.

RATER

- Verify specifications or task list includes required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

RESOURCES AND BAY-FRIENDLY TOOLS

- Compost At Work: **http://www.stopwaste.org/home/index.asp?page=108** is a useful document for setting up a compost system
- Bay-Friendly Landscape Model Maintenance Specifications, page [insert page number here] or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified
- Compost: A Bay-Friendly Garden Starts with Healthy Soil", available for download from http://www.stopwaste.org/home/index.asp?page=442 (large file, 7.5 mb).
- Do the Rot Thing, free how to movie for home and small scale compost systems at: https://www.stopwaste.org/AlamedaCommerce/ProductList.aspx
- The Rodale Book of Composting, Rodale Press, Emmaus, Pennsylvania
- On-Farm Composting Handbook, Cornell University, http://www.css.cornell.edu/compost/OnFarmHandbook/onfarm_TOC.html

2. SEPARATE PLANT DEBRIS FOR CLEAN GREEN DISCOUNTS

Credit G.2						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
	3					
Corresponds to BFL Guidelines Practice 2.8						

a. Ongoing maintenance requires all exported plant debris be separated from other refuse and taken to a facility where it will be used to produce compost or mulch

POINTS: 3

PRACTICE DESCRIPTION

Maintenance specifications and/or task list shall require all exported plant debris be separated from other refuse and taken to a facility where it will be used to produce compost or mulch.

PROJECT TEAM RECOMMENDATIONS

- Identify vendor, closest landfill or transfer station that offers a clean green discount for plant debris that is free from any trash.
- If the vendor for a commercial site does not automatically offer such a clean green discount, one can often be negotiated.
- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that includes separating plant debris from all other refuse
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that plant debris will be kept separated from other waste and taken to an appropriate facility to be made into compost or mulch.

RATER

- Verify specifications or task list includes required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page [insert page number here] or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified

3. PROTECT SOIL FROM COMPACTION

Credit G.3						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		1				
Corresponds to BFL Guidelines Practice 3.2						

a. Ongoing maintenance requires that soil is not worked when wet, generally between October and April

POINTS: 1

PRACTICE DESCRIPTION

Maintenance task list shall specify that soil is not worked when wet, generally between October and April. When temporary access is needed over non-paved areas, distribute the load over the soil with 6" thick coarse organic mulch or reusable planks.

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that includes using plant debris on-site as mulch.
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that soil will not be worked when wet.

RATER

- Verify specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 8 or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified

4. FEED SOILS NATURALLY & AVOID SYNTHETIC FERTILIZERS

Credit G.4						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		3				
Corresponds to BFL Guidelines Practice 3.8 & 3.9						

a. Ongoing maintenance includes topdressing turf with finely screened quality compost after aeration and/or 1-4 times per year

POINTS: 1

PRACTICE DESCRIPTION

Maintenance manual shall include specifications to topdress turf with finely screened quality compost after aeration and/or 1-4 times per year.

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that include topdressing turf with compost after aeration and/or on a regular basis, at least once a year.
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that turf will be topdressed with compost after aeration 1-4 times per year.

RATER

- Verify specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 8 &9 http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified
- *Field Guide to Compost Use*, US Composting Council, http://www.compostingcouncil.org/education/publications.php

Topdressing *is a method of applying fertilizers, minerals or compost, by spreading a thin layer over the top of soil or directly to turf or other groundcovers.*

Compost *is the product of controlled biological decomposition of organic materials, often including green waste and food waste.*

Quality compost *is a well decomposed, stable, weed free organic matter source, derived from agricultural and/or food waste and/or yard trimmings, contain no substances toxic to plants, possess no objectionable odors. It does not resemble the feedstock (the original materials from which it was derived. It is highly recommended that it be produced in accordance with the U.S. Composting Council's Standard Testing Assurance Program. www.compostingcouncil.org*

b. Ongoing maintenance uses compost, compost tea or other naturally occurring, non-synthetic fertilizers for all landscape areas

POINTS: 1

PRACTICE DESCRIPTION

Plant and soil amendments for maintenance shall be specified as compost, compost tea or other naturally occurring, non-synthetic fertilizers for all landscape areas

Compost tea *is a liquid solution or suspension made by steeping compost in water. It is used as both a fertilizer and as part of a program for preventing plant disease.*

Naturally occurring, non synthetic fertilizers *come from plants, animals and mined minerals. Examples include: sea kelp (seaweed), alfalfa meal, corn gluten meal and cottonseed meal; cover crop plants turned into the soil; blood meal, bone meal, fish meal, and mined limestone, soft rock phosphate and gypsum. The use is intended to feed soil organisms who then produce plant food in a plant available form. These materials can be applied in pelleted, powdered & granulated form or as liquid fertilizer via irrigation or foliar sprays.* Adapted from Peaceful Valley Farm Supply, www.groworganic.com

PROJECT TEAM RECOMMENDATIONS

- Submit a soil sample for analysis and request recommendations for an organic approach to the management of the soil.
- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that includes using compost, compost tea or other naturally occurring, non-synthetic fertilizers.
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that ongoing maintenance uses compost, compost tea or other naturally occurring, non-synthetic fertilizers.

RATER

- Verify specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

SYNERGIES AND TRADE-OFFS

- Including compost, compost tea and other naturally occurring fertilizers for preventing plant disease in an Integrated Pest Management or an organic maintenance plan can contribute to earning points for Credit G.7 (Use IPM as part of maintenance practices)

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 8 or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified
- For more information on compost tea: www.composttea.org; www.attra.org; www.soilfoodweb.com

c. Ongoing maintenance prohibits fertilizers that are not allowed by Organic Materials Review Institute.

POINTS: 1

PRACTICE DESCRIPTION

Amendments and fertilizers that are prohibited or are restricted for use in crop production by OMRI are prohibited in the maintenance specifications, task list and/or agency policy.

Organic Materials Review Institute (OMRI) *approves amendments and fertilizers for us in crop production. The OMRI Generic Materials List is a catalog of over 900 substances that are allowed, restricted, or prohibited for use in organic agriculture and food processing. Based on the National Organic Program, the list serves as a reference guide for organic farmers, handlers, processors, inspectors, certifiers, agricultural professionals, and all others with an interest in materials for use in organic production. Materials approved for use in organic production are appropriate for use in landscapes.* http://www.omri.org/omri-lists

PROJECT TEAM RECOMMENDATIONS

- Submit a soil sample for analysis and request recommendations for an organic approach to the management of the soil.
- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit agency policy, maintenance specifications and/or task list prohibiting the use of fertilizers that are not allowed by OMRI.
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that fertilizers that are not allowed by OMRI will not be used.

RATER

- Verify specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

SYNERGIES AND TRADE-OFFS

- Prohibiting fertilizers that are not allowed by OMRI as part of an Integrated Pest Management or an organic maintenance plan can contribute to earning points for Credit G.7 (Use IPM as part of maintenance practices)

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page [insert page number here] or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified
- Peaceful Valley Farm Supply provides a comprehensive list of options at: www.groworganic.com

5. MULCH REGULARLY

Credit G.5						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
		1	1			
Corresponds to BFL Guidelines Practice 4.1						

Mulch *is any material spread evenly over the surface of the soil to enhance the growth of plants and the appearance of the landscape. (*StopWaste.Org, *A Bay-Friendly Landscaping Guide to Mulch)*

a. Ongoing maintenance requires regular reapplication of organic mulch, to a minimum depth of 3 inches

POINTS: 2

PRACTICE DESCRIPTION

Regular reapplication of organic mulch, to a minimum depth of 3 inches for all exposed soil, shall be included in the maintenance specifications or task list. Minimizing the use of blowers in mulched beds and using, recycled, locally produced plant debris mulch are highly recommended.

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals
- Provide owner and/or property manager with the Bay-Friendly Landscape Guide to Mulch

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that includes regular reapplication of mulch to all exposed soils.
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that mulch will be maintained at 3 inches depth

RATER

- Verify specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

SYNERGIES AND TRADE-OFFS

- Using plant debris generated on site can contribute to earning points for Credit G.1.b (Produce mulch from plant debris)

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 10 or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified

6. MANAGE AND MAINTAIN IRRIGATION SYSTEM SO EVERY DROP COUNTS

Credit G.6						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
			4			
Corresponds to BFL Guidelines Practice 4.7-9						

a. Ongoing maintenance includes a schedule for reading the dedicated meter or submeter and reporting water use

POINTS: 1

PRACTICE DESCRIPTION

Maintenance task list shall include a schedule for reading the dedicated meter or submeter and reporting the landscape water use to the property owner or manager.

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that include reading the water meter and reporting water use to the property owner or manager.
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that landscape water use reports based on landscape meters will be reported on a regular basis.

RATER

- Verify specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 10 or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified

b. At completion of the installation, the contractor shall provide the property owner with 1. precipitation rate for each valve zone, 2. area calculations for each irrigation zone and the irrigation plans which include the location of irrigation supply shut off, 3. internet address for watering index information

POINTS: 2

PRACTICE DESCRIPTION

At completion of the installation, the contractor shall educate the property owner on the irrigation system by providing information on

- precipitation rate for each valve zone
- area calculations for each irrigation zone
- irrigation plans which include the location of irrigation supply shut off,
- internet address for watering index information

Irrigation plans should also include detailed information on irrigation controller and other components.

PROJECT TEAM RECOMMENDATIONS

- Provide maintenance personal or contractor with 'as built' irrigation plans.
- Provide property owner or manager with a list of Irrigation Association certified professional landscapers

VERIFICATION

PROJECT TEAM

- Submit Accountability Form signed by the Landscape or Irrigation contractor that the irrigation plans and required information has been provided to the property owner or his/her representative, such as the property manager.

RATER

- Verify Accountability Form has been signed by the Landscape or Irrigation Contractor

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 10 or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified
- Irrigation Association www.irrigation.org

c. Ongoing maintenance includes regular checking of irrigation equipment, and/or checking soil moisture content with soil probes before watering AND/OR immediate replacement of broken equipment with equal or superior materials

POINTS: 1

PRACTICE DESCRIPTION

Maintenance specifications and/or task list requires that maintenance personal or contractor monitor soil moisture within plant root zones using a soil probe, and to adjust irrigation schedules accordingly, if a soil moisture sensor is not signaling the irrigation controller.
Maintenance specifications and/or task list also requires

- assessment of the irrigation system, while it is in operation, at every visit during the watering season
- all malfunctioning equipment be repaired prior to the next scheduled irrigation
- all replacement parts be of the same manufacturer, type, and application rates as existing, or approved equals or upgrades
- that contractor submits monthly documentation of irrigation checks and notes any changes or adjustments to the system on 'as built' irrigation plans.

It is highly recommended that the maintenance specifications and/or task list include a bi-annual schedule for irrigation audits.

PROJECT TEAM RECOMMENDATIONS

- Provide property owner or manager with a list of Irrigation Association certified
- professional landscapers
- Provide maintenance personal or contractor with 'as built' irrigation plans.

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list that includes the regularly scheduled irrigation assessment for meeting the criteria of this credit.
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that includes the regularly scheduled irrigation assessment for meeting the criteria of this credit.

RATER

- Verify specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 10 or http://www.stopwaste.org/home/index.asp?page=777
- Irrigation Association, www.irrigation.org

7. USE IPM AS PART OF MAINTENANCE PRACTICES

Credit G.7						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
					4	
Corresponds to BFL Guidelines Practice 6.1 B-F						

a. Ongoing maintenance includes integrated pest management specifications

POINTS: 2

PRACTICE DESCRIPTION

An integrated pest management program shall be included in the maintenance specifications and/or task list. The main components of the IPM program will include:

- maintaining healthy, attractive plants, maximizing resistance to pests and out-compete weeds;
- monitoring for presence of pests and to evaluate pest impact to plant health and appearance, and nuisance to the public;
- providing control treatments that have minimal negative effects on all but the pest and that protect air and water quality with a priority given to mechanical, cultural, physical and biological controls. The least toxic pesticide is selected as a last resort and applied in the smallest effective quantities.

Integrated Pest Management *is a holistic approach to mitigating insects, plant diseases, weeds, and other pests. It involves the use of many strategies for managing, but not eliminating pests. Integrated Pest Management (IPM) uses cultural, mechanical, physical, and biological control methods before using pesticides to control pests and diseases in the landscape.. Chemical controls are applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control is applied.*

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals
- Submit a proposal to property owner or manager to guide them in developing an Integrated Pest Management policy.

VERIFICATION

PROJECT TEAM

- Submit written agency Integrated Pest Management policy or
- Submit maintenance specifications and/or task list that relies on integrated pest management approach.
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that integrated pest management will be used for pest and weed control.

RATER

- Verify policy or specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

SYNERGIES AND TRADE-OFFS

- Using mulch as part of an integrated pest management program to control weeds can contribute to earning points for Credit G.5 (Mulch regularly)

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 12 or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified
- For a copy of the Regional IPM Resource Manual, contact Naresh Duggal at naresh.duggal@ceo.sccgov.org
- *Weed Workers Handbook* , Invasive Plant Council, http://www.cal-ipc.org/resources/index.php

b. At least one landscaping staff member or contractor is trained in the use of IPM or is a Bay-Friendly Qualified Professional

POINTS; 2

PRACTICE DESCRIPTION

At least one landscaping staff member or contractor shall be trained in the use of IPM or is a Bay-Friendly Qualified Professional

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit name and qualifications of trained staff member or contractor OR
- Submit maintenance manual or task list requires the contractor is trained in IPM or is a Bay-Friendly Qualified Professional

RATER

- Verify Bay-Friendly Qualified professional by visiting www.Bay-Friendly.org/bf-qualified or contacting aramirez@stopwaste.org OR
- Verify maintenance manual or task list includes requirement for IPM training or BFWP

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page [insert page number here] or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified

8. CHOOSE AND MAINTAIN YOUR MATERIALS, EQUIPMENT & VEHICLES CAREFULLY

Credit G.8						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
					3	
Corresponds to BFL Guidelines Practice 6.4						

a. Ongoing maintenance requires that all oil leaks are repaired immediately and that repairs are not done at the landscape site

POINTS: 1

PRACTICE DESCRIPTION

Maintenance specifications and/or task list specifies that all oil leaks are repaired immediately and that equipment repairs are not done at the landscape site.

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit maintenance specifications and/or task list
- Submit an Accountability Form signed by the Landscape Contractor or Owner verifying that oil leaks are repaired immediately and done offsite.

RATER

- Verify maintenance specifications and/or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page [insert page number here] or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified

b. Landscape maintenance equipment uses biobased lubricants and/or alternative fuels

POINTS: 2

PRACTICE DESCRIPTION

Landscape maintenance contractor uses equipment that relies on biobased lubricants and/or alternative fuels.

VERIFICATION

PROJECT TEAM

- Submit equipment list that meets the criteria for this credit, including equipment type, manufacturer, model number and lubricant and/or fuel.
- Submit an Accountability Form signed by the Landscape Contractor verifying that Biobased lubricants will be used in equipment.

RATER

- Verify equipment list has been submitted.
- Verify Accountability Form has been signed by the Landscape Contractor.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page [insert page number here] or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified
- Office of the Federal Environmental Executive, Green Purchasing, Biobased Products, http://www.ofee.gov/gp/bioprod.asp

Credit G.7						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
						2
Corresponds to BFL Guidelines Practice 7.4						

9. USE ORGANIC PEST MANAGEMENT

a. Ongoing maintenance prohibits the use of pesticides that are not allowed by OMRI in its generic materials list

POINTS: 2

PRACTICE DESCRIPTION

Maintenance specifications and/or task list prohibits the use of pesticides that are not allowed by OMRI in its generic materials list.

Organic Materials Review Institute (OMRI) *approves amendments and fertilizers for us in crop production. The OMRI Generic Materials List is a catalog of over 900 substances that are allowed, restricted, or prohibited for use in organic agriculture and food processing. Based on the National Organic Program, the list serves as a reference guide for organic farmers, handlers, processors, inspectors, certifiers, agricultural professionals, and all others with an interest in materials for use in organic production. Materials approved for use in organic production are appropriate for use in landscapes.* http://www.omri.org/omri-lists

PROJECT TEAM RECOMMENDATIONS

- Provide owner and/or property manager with a list of local Bay-Friendly Qualified Landscape Maintenance Professionals

VERIFICATION

PROJECT TEAM

- Submit agency policy, maintenance specifications and/or task list prohibiting the use of pesticides that are not allowed by OMRI.
- Submit an Accountability Form signed by the Landscape Contractor or Owner prohibiting the use of pesticides that are not allowed by OMRI.

RATER

- Verify specifications or task list include the required instructions.
- Verify Accountability Form has been signed by the Landscape Contractor or Owner.

SYNERGIES AND TRADE-OFFS

- Credit can not be given for both the above and Credit G.7 (Use IPM as part of maintenance practices)

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Landscape Model Maintenance Specifications, page 12 or http://www.stopwaste.org/home/index.asp?page=777
- Bay-Friendly Qualified Landscape Maintenance Professionals are listed at www.BayFriendly.org/bf-qualified
- Organic Materials Review Institute, http://www.omri.org/
- NOFA New England Organic Farming (landscape section) http://www.organiclandcare.net/

H. INNOVATION

1. BAY-FRIENDLY LANDSCAPE GUIDELINES AND PRINCIPLES ARE DEFINED AND REFERENCED IN THE CONSTRUCTION BID DOCUMENTS

Credit H.1						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
3						

POINTS: 3

PRACTICE DESCRIPTION

The document titled: *Bay-Friendly Landscape Guidelines: Sustainable Practices for the Landscape Professional* and the 7 principles described in the Guidelines shall be defined and referenced in the construction bid documents

VERIFICATION

PROJECT TEAM

- Submit construction bid documents with reference to the guidelines and principles highlighted.

RATER

- Verify references have been included in construction bid documents.

2. DESIGN & INSTALL EDUCATIONAL SIGNAGE

Credit H.2						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
4						

a. Provide instructional signs and other educational materials to describe the landscapes Bay-Friendly design, construction and maintenance practices

POINTS: 4

PRACTICE DESCRIPTION

Permanent instructional signs shall be installed to describe at least 6 of the Bay-Friendly practices implemented during the design and construction of the landscape. Signs for ongoing maintenance practices can also be included. It is highly recommended that a single sign identifying the landscape as a Bay-Friendly Rated landscape be designed and displayed where it will receive the greatest visibility. It is also highly recommended that the signs be made with recycled content materials. It is strongly encouraged to submit proposed signs and sign location plan for approval well before the completion of construction.

VERIFICATION

PROJECT TEAM

- Submit site and/or construction documents plan showing location of signs and listing additional educational materials to be prepared.
- Submit full-size (1:1) digital files of all proposed educational signs describing Bay-Friendly practices.

RATER

- Submit full-size (1:1) digital files (jpg or pdf) of all proposed educational signs describing Bay-Friendly practices to the Coalition for approval.
- Verify that the practices described on signs match those implemented on the Bay-Friendly Scorecard.
- Visually verify installation of signs. Photos of installation may be accepted.

SYNERGIES AND TRADEOFFS

- Specifying that all signs be made from recycled content and/or salvaged materials can contribute to earning points for Credit D.1.v (Use salvaged and recycled content materials).

3. CREATE A BAY-FRIENDLY MAINTENANCE TASK LIST

Credit H.3						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
1	1	1	1	1	1	1

a. Provide a detailed Bay-Friendly maintenance task list and/or use the BF Maintenance Specification Guidelines as an official reference document in the landscape maintenance contract and/or with on site landscape staff

POINTS: 7

PRACTICE DESCRIPTION

Provide a detailed maintenance task list that includes at least 7 of the practices listed in Section G of the BFL Scorecard, including

- Separating plant debris for clean green discounts and
- Mulch regularly.

Alternatively, officially reference the BF Maintenance Specification Guidelines in the landscape maintenance contract and/or in instructions to on site landscape staff.

VERIFICATION

PROJECT TEAM

- Submit a maintenance task list or maintenance contract or staff instructions with reference to Bay-Friendly Model Maintenance specifications identified.

RATER

- Verify that the maintenance task list includes the minimum practices and/or the reference to the model specifications is complete and accurate.

RESOURCES AND BAY-FRIENDLY TOOLS

- Bay-Friendly Model Landscape Maintenance Specifications

4. EMPLOY A HOLISTIC APPROACH

Credit H.4						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat
1	1	1	1	1	1	1

a. Site analysis is submitted AND 65% of landscape construction waste is diverted AND planting plan includes a diverse palette AND 50% of non-turf plants are California native species AND none of the landscape area is in turf AND compost is specified for amending the soil during installation AND natural fertilizers are specified as the exclusive source of nutrients AND integrated OR organic pest management is specified

POINTS: 7

PRACTICE DESCRIPTION

The following credits are earned elsewhere in the scorecard but together earn additional points because of their integration offers a holistic approach

- A Site analysis is submitted (Credit C.1) AND
- 65% of landscape construction waste is diverted (Credit D.2.b) AND
- The planting plan includes a diverse palette (Credit E.8) AND
- 50% of non-turf plants are California native species (Credit E.9) AND
- No turf is specified (Credit E.4.e) AND
- Compost is specified for amending the soil during installation (Credit C.7) AND
- natural fertilizers are specified as the exclusive source of nutrients (Credit C.5 or Credit G.4) AND
- integrated OR organic pest management is specified (Credit D.7 or Credit D.8 or Credit G.7 or G.9)

VERIFICATION

PROJECT TEAM

- No additional submittals are required.

RATER

- Verify submittals for above practices have met the criteria for the credits.

5. DESIGN YOUR OWN BAY-FRIENDLY INNOVATION.

Credit H.4						
Possible Points:						
Landscape Locally	Less to Landfill	Nurture the Soil	Conserve Water	Conserve Energy	Water & Air Quality	Wildlife Habitat

POINTS: Up to 4

PRACTICE DESCRIPTION

Design your own Bay-Friendly innovation. Enter a brief description into the scorecard. Submit additional information if necessary to fully communicate the innovation. Points will be evaluated by Bay-Friendly Rater.

VERIFICATION

PROJECT TEAM

- Submit innovation description.
- Submit Accountability Form signed by the Owner, Engineer, Landscape Architect, Designer or Contractor that as installed the project meets this requirement.

RATER

- Verify that innovation description is complete and accurate.
- Verify that Accountability Form has been signed by Owner, Engineer, Landscape Architect, Designer or Contractor.
- Submit for Bay-Friendly Team review.

Glossary

Albedo or **solar reflectance** is a measure of ability of a surface material to reflect sunlight-including the visible, infrared and ultraviolet wavelengths on a scale of 0 to 1. Solar reflectance is also called “albedo” Solar Reflectance is measured according to ASTM E 903, ASTM E 1918 or ASTM C 1549

A **Brownfield site** means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Partial definition excerpted from Public Law 107-118 (H.R. 2869) - "Small Business Liability Relief and Brownfields Revitalization Act" signed into law January 11, 2002. http://www.epa.gov/brownfields/glossary.htm

Compost is the product of controlled biological decomposition of organic materials, often including urban plant debris and food waste. It is an organic matter resource that has the unique ability to improve the chemical, physical and biological characteristics of soils or growing media. It contains plant nutrients but is typically not characterized as a fertilizer. Excerpted from US Compost Council , Field Guide to Compost Use

Compost blankets 1-3 inch layers of compost that are blown onto slopes up to 2:1 or up to 1:1 with additional stabilization. The compost can also be spread on shallower slopes. The use of compost blankets is a USEPA approved BMP for construction sites. They make excellent surface contact, preventing rilling underneath and thereby controlling erosion. Compost blankets can be less expensive than other erosion BMPs because they do not need to be removed, hauled and landfilled. www.BuildingSoil.org

Compost berms and socks are also US EPA approved for perimeter sediment and pollutant control, and are increasingly used instead of silt fences and straw bales. Berms can be blown in place or placed with a front end loader. Socks can be filled in place by compost suppliers or filled and delivered on pallets. They do not need to be trenched in and are highly effective at filtering out sediments, oil, grease and metals. www.BuildingSoil.org

Compost tea is a liquid solution or suspension made by steeping compost in water. It is used as both a fertilizer and as part of a program for preventing plant disease.

Composting is the controlled biological decomposition of organic materials

Construction and Demolition Debris means used or discarded materials removed from premises during construction or renovation of a structure resulting from construction, remodeling, repair, or demolition operations on any pavement, house, commercial building, or other structure. It generally consists of wood, drywall, metals, concrete, dirt, cardboard, plastic pots and more. StopWaste.Org Model C&D Policy

Dark Sky Certified means that a light is certified by the International Dark-Sky Association, a third party certification for luminaries that minimize glare, reduce light trespass, and don't pollute the night sky. http://www.darksky.org

Detention basins are constructed basins with drainage outlets that are designed to detain runoff from a storm for some minimum time (e.g., 48 hours) to allow settling of sediment and pollutants. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0

Distribution uniformity is a measure of how evenly irrigation water is being applied. It is expressed as a percentage between 0 and 100%. 100% DU is theoretically possible but virtually impossible in actual practice. There must be a good distribution uniformity before there can be a good irrigation efficiency. www.wateright.org

Embodied energy is energy that is used during the entire life cycle of the commodity for manufacturing, transporting and disposing of the commodity as well as the inherent energy captured within the product itself. LEED New Construction & Major Renovation Version 2.2 reference Guide

Evapotranspiration is the water lost from the soil through evaporation and transpiration.

Fly Ash is a by product from coal combustion. It can be used as a substitute for Portland cement in concrete.

FSC certified wood is certified in accordance with the Forest Stewardship Council's criteria

Full cut off luminaries emit no light above horizontal.

Grasscycling means leaving the clippings on the lawn after mowing, so they decompose and release their nutrients in the soil.

Graywater is waste water from sinks, showers, bathtubs and washing machines that is not contaminated by human waste. Not suitable for drinking, it is an intelligent resources, when used for subsurface irrigation of trees and shrubs.

Greenfield site: Sites that are not previously developed or graded and remain in a natural state. USGBC, LEED, New Construction & Major Renovation,v2,2 Reference Guide, September 2006

Green waste consists of the plant debris from trees, shrubs, groundcover and turf that is generated during demolition, installation or maintenance phases of the project.

The **Heat island effect** is the experience of warmer temperatures in urban landscapes compared to adjacent rural areas, resulting from the retention of solar energy on constructed surfaces. Principal surfaces that contribute to the heat island effect include streets, sidewalks, parking lots and buildings. USGBC, LEED New Home Construction & Major Renovation, v2.2 Reference Guide, September 2006.

Horticulturally suitable topsoil has soluble salts less than 0.5mmhos/cm, free of large roots, clots and stones larger than 1 inch, noxious weeds, sticks, lumber, brush, litter and undesirable disease-causing organisms, as evidenced by previous plant growth.

Hydromodification management (HM) techniques focus on retaining, detaining or infiltrating runoff and matching post-project flows and durations to pre-project patterns for a specified range of smaller, more frequent rain events, to prevent increases in channel erosion downstream. Hydromodification Management Requirements Information for Developers, Builders and Project Applicants, Alameda Countywide Clean Water Program, November 2007

Impervious Surface is the total area of surfaces on a developed site that inhibit infiltration of stormwater. The surfaces include, but are not limited to, conventional asphalt or concrete roads, driveways, parking lots, sidewalks or alleys, and rooftops (Low impact development technical guidance manual for Puget sound January 2005)

Infiltration planters or flow through planters Structure designed to treat stormwater by intercepting rainfall and slowly draining it through filter media and out of planter. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0

Integrated Pest Management is a holistic approach to mitigating insects, plant diseases, weeds, and other pests. It involves the use of many strategies for managing, but not eliminating pests. Integrated Pest Management (IPM) uses cultural, mechanical, physical, and biological control methods before using pesticides to control pests and diseases in the landscape.. Chemical controls are applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control is applied.

Large stature shrubs are those that, under normal conditions, can reach a mature height of 12 feet or more. Examples include Arbutus ‘Marina’, some Arctostaphylus spp., some Ceanothus spp., Sambucus mexicana, Nerium oleander trained as a single or multistemmed tree

Landscape area is equivalent to Irrigated area and is defined as all of the planting, turf areas and water features subject to the Maximum Applied Water Allowance (MAWA) calculation in a water budget. The following are not included as part of the landscape area: footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, pervious and non-pervious hardscapes,, open spaces and existing native vegetation . Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation

Landscape Based BMPs (Best Management Practices) refers to any program, technology, process, sitting criteria, operational method or measure, or engineered system, which when implemented prevents, controls, removes, or reduces pollution. Some examples of landscape stormwater BMP’s include bioretention areas, extended detention

basins, flow through planter boxes, infiltration trenches, tree well filters, vegetated buffer strips and vegetated swales. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0

Light pollution occurs when outdoor fixtures let excess light escape into the night sky.

Light trespass occurs when outdoor light fixtures spill light onto neighboring properties.

Low energy fixtures are light fixtures that are Energy Star qualified.

Low impact development (LID) is a stormwater management strategy that emphasizes conservation and use of existing natural site features integrated with distributed, small-scale stormwater controls to more closely mimic natural hydrologic patterns in residential, commercial and industrial settings. Low impact development technical guidance manual for Puget Sound January 2005

Low-Volume Irrigation refers to the use of equipment and devices specifically designed to both limit the volume of water being applied and to efficiently deliver that water within the root zone of the plant. It applies water at low pressure through a system of tubing or lateral lines and low volume emitters. It is also referred to as micro-irrigation and includes drip (or trickle), micro-spray jets, micro-sprinklers, or bubbler irrigation.

Mulch is any material spread evenly over the surface of the soil to enhance the growth of plants and the appearance of the landscape.

Natural enemies are organisms that kill, decrease the reproductive potential or otherwise reduce the numbers of another organism. Natural enemies that limit pests are key components of integrated pest management programs. Important natural enemies of insect and mite pests include predators, parasites, and pathogens.

Naturally occurring, non synthetic fertilizers come from plants, animals and mined minerals. Examples include: sea kelp (seaweed), alfalfa meal, corn gluten meal and cottonseed meal; cover crop plants turned into the soil; blood meal, bone meal, fish meal, and mined limestone, soft rock phosphate and gypsum. The use is intended to feed soil organisms who then produce plant food in a plant available form. These materials can be applied in pelleted, powdered & granulated form or as liquid fertilizer via irrigation or foliar sprays. Adapted from Peaceful Valley Farm Supply, www.groworganic.com

Open-grid paving is defined as having less than 50% imperviousness and containing vegetation in the open cells. GreenPoint Rated MultiFamily Rating Manual, v1.2, July 2007

Open space is often defined by local zoning requirements. If local zoning requirements do not clearly define open space, open Space means land areas that are not build upon or substantially altered from their natural state. They provide important ecological functions, natural resources, or cultural resources that are worthy of conservation and protection. Such areas may contain, but are not limited to, forests, farmland, old fields, floodplains, wetlands, and shore lands. Open Space can also encompass scenic vistas, recreational areas, and historic sites.

Organic Materials Review Institute (OMRI) approves amendments and fertilizers for use in crop production. The OMRI Generic Materials List is a catalog of over 900 substances that are allowed, restricted, or prohibited for use in organic agriculture and food processing. Based on the National Organic Program, the list serves as a reference guide for organic farmers, handlers, processors, inspectors, certifiers, agricultural professionals, and all others with an interest in materials for use in organic production. Materials approved for use in organic production are appropriate for use in landscapes.
http://omri.org/OMRI_generic_list.html

Paved Area is the surface that accommodates pedestrian, bicycle or vehicular traffic. It includes sidewalks, patios, walkways, driveways, parking lots and other non-roof hardscapes, regardless of permeability

Paved site area includes sidewalks, patios, walkways, driveways, parking lots and other non-roof hardscapes, regardless of permeability.

Permeable Paving is hardscape or a paved surface that accommodates pedestrian, bicycle vehicular traffic while also allowing surface runoff to infiltrate into surface soil and/or permeable subbase. Examples include asphalt or concrete rendered porous by the aggregate structure.

Purple pipe is a key component of dual plumbing systems that enable homeowners, businesses, industry and public facilities to use recycled water outside and potable drinking water indoors…Today, pipes and other materials carrying recycled water are clearly marked purple to eliminate any confusion.
Purple pipe is just like other PVC piping, except that it carries reclaimed water rather than fresh Water Recycling and Reuse, Local Government Commission, www.lgc.org

Previously developed sites are those that contained buildings, roadways, parking lots or were graded or altered directly by human activities. USGBC, LEED, New Construction & Major Renovation,v2,2 Reference Guide, September 2006

Quality compost is a well decomposed, stable, weed free organic matter source, derived from agricultural and/or food waste and/or plant trimmings, contain no substances toxic to plants, possess no objectionable odors. It does not resemble the feedstock (the original materials from which it was derived. It is highly recommended that it be produced in accordance with the U.S. Composting Council's Standard Testing Assurance Program.
www.compostingcouncil.org

Recycled aggregate is clean crushed concrete and crushed asphalt pavement**.**

Recycled content products are those made from materials derived from discarded goods. They are remanufactured between uses.

Recycled mulch is chipped or shredded wood and green waste from used pallets or untreated lumber scraps, branches, leaves and tree trunks. Its use provides the benefits of mulch and keeps wood and green waste out of landfills.

Recycled water, also called reclaimed water is defined in Title 22, Chapter 3 of the California Code of Regulations, refers to tertiary-treated water produced from the three-stage treatment of municipal wastewater. Recycled water is virtually colorless and odorless, and is allowable for fully body human contact but not for direct human consumption. The sensible use of recycled water affords an excellent choice for essentially all non-potable applications. Properly managed, recycled water is safe to use.
http://www.owue.water.ca.gov/recycle/docs/Appendix_C_LawsRegs.pdf

Recycling is the collection, reprocessing, marketing and use of materials that were diverted or recovered from the solid waste stream (LEED New Construction & Major Renovation Version 2.2 reference Guide)

Reference ET (ET_0) is the standard measurement of environmental parameters which affect the water use of plants. It is given in inches per day, month or year and is an estimate of the evapotranspiration of a large field of 4-7 inch tall cool season turf that is well watered.

Runoff Coefficient is the ratio of the runoff rate to rainfall. For example, a runoff coefficient of 0.65 means that sixty five percent of the rainfall that falls on this type of surface will flow off as runoff. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0

Shearing is a method of pruning, used for forming and maintaining plants or hedges of uniform shape, by routinely cutting them back with hedge shears and resulting in a geometric growth habit.

Salvaged materials are items that are put to a new use after their initial use, without being remanufactured between uses.

A self adjusting irrigation controller is an automatic timing device that uses sensor data (e.g. soil moisture sensor) to remotely control valves. CA Model Water Efficient Landscape Ordinance.

Sheet mulching uses a layer of paper or cardboard underneath the mulch to enhance weed suppression and soil building benefits. This layered mulch system is often used during landscape construction to optimize mulch benefits and encourage plant establishment.

Stream rotator heads or rotor type sprinkler heads apply water slower and in larger streams to avoid misting and drift, and allowing soils to better absorb it. Studies indicate that rotary sprinklers can result in significantly higher distribution uniformity (80% or greater), compared to fixed pattern spray heads

The **site** is the area within the legal boundaries of a property and encompasses all areas of the property including constructed areas and non-constructed areas. It is the same as the property area. USGBC LEED, New Construction & Major Renovation v2.2, September 2006

Slag is a by product of metal smelting and can be used as a substitute for Portland cement in concrete.

Special Landscape Area is the portion of the landscape area that is dedicated to edible plants, areas irrigated with recycled water and recreational areas.

Sports or multiple use field is equivalent to recreational area and is defined as the portion of the landscape area that is dedicated to active play such as parks, sports fields and golf courses, where turf provides a playing surface.

Stormwater is stormwater runoff, snow-melt runoff, surface runoff and drainage excluding infiltration and irrigation tail water. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance

Stormwater wetlands are constructed detention basins that have a permanent pool of water throughout the year and capacity for temporary additional storage of runoff that is released via an outlet structure. They differ from wet ponds in that they are typically shallower and have greater vegetation coverage. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0

Topdressing is a method of applying fertilizers, minerals or compost, by spreading a thin layer over the top of soil or directly to turf or other groundcovers.

Turf is defined as spreading or stoloniferous grasses that when regularly mowed form a dense growth of leaf blades and roots. Areas planted with lawn alternatives, such as Carex pansa and other tufted grass or sedge species are not considered turf.

Urban growth boundary is an officially adopted and mapped line dividing land to be developed from land to be protected for natural or rural uses. Urban growth boundaries (also called urban limit lines) are regulatory tools often designated for long periods of time (20 or more years) to provide greater certainty for both development and conservation goals. (Governor's Office of Planning and Research, State of California General Plan Guidelines, 2003)

Vegetated swales (bioswales)- are open shallow channels with thick vegetation covering the side slopes and bottom that collect and slowly convey runoff to downstream discharge points. Alameda Countywide Clean Water Program c.3 Stormwater Technical Guidance August 31, 2006 Version 1.0

Weather based (or "smart") irrigation controllers are automatic timing devices that use evapo-transpiration or weather data to remotely control irrigation valves.

Wildlife refers to undomesticated birds, mammals, reptiles, and amphibians.

STAFF REPORT

Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline

Approved on
October 6, 2011

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This report assesses the vulnerability of San Francisco Bay and its shoreline to the impacts of climate change, identifies information needs for future vulnerability assessments, and suggests near-term and long-term strategies to address climate change impacts. Where feasible, those strategies are incorporated into recommended findings and policy revisions to the *San Francisco Bay Plan*. The preparation of this report was supported by a grant from the National Oceanographic Atmospheric Administration, Office of Coastal Resource Management.

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Executive Summary

San Francisco Bay is a national treasure that helps sustain the economy of the western United States, provides wonderful opportunities for recreation, nourishes fish and wildlife, provides unparalleled scenic splendor, and in countless other ways enriches our lives. The Bay is the principal visual icon of our region, whether seen when traveling by car or rail along the shoreline, landing at an airport, strolling along the shoreline, or watching the fog stream in on a summer's day. Managing the threats to the Bay and shoreline development from sea level rise will be one of the defining challenges we face in the 21st century.

A richly varied composite of urbanization and nature exists in and around San Francisco Bay. Urban waterfronts, critical habitat areas, industrial areas and residential neighborhoods coexist within walking distance of each other. Overlaid on these shoreline places is a vital system of public infrastructure, including freeways, seaports, railroads and airports, which knit the shoreline communities together and connect them to the rest of the region, California and the world. This tapestry helps make the beauty of the Bay Area world-renowned and underpins its economy, the health of its natural systems and the quality of life of its inhabitants. Over the past 150 years, the productive use of the Bay's shoreline has become the cornerstone of the region's prosperity and forged an inseparable bond between the people of the Bay Area and the Bay itself.

The nine-county San Francisco Bay Area is home to approximately seven million people making the Bay one of the world's most urbanized estuaries. Climate change has the potential to dramatically impact the economy, environment and quality of life in the Bay Area. Changes in personal behavior, institutional actions, and government policies are needed to reduce greenhouse gas emissions, moderate temperature increases attributed to global warming, and mitigate climate change. To some extent, the choice to alter lifestyles and institutional priorities now will reduce the degree to which the world must adapt to the effects of climate change. However, no matter how effectively the world reduces greenhouse gas emissions, oceans have already warmed, sea levels are already rising at accelerated rates, and are likely to accelerate further. Therefore, while mitigating climate change by reducing greenhouse gas emissions is essential, adapting to climate change and its impacts is unavoidable.

Local governments and land management agencies already face challenging issues, such as dealing with competing land uses, ensuring that adequate shoreline areas remain available for water-dependent uses, upgrading aged infrastructure, reducing traffic congestion, protecting

habitat and water quality, maintaining flood protection, and providing public shoreline access. Shoreline vulnerability assessments can help government agencies and the public understand how existing planning and management challenges will be exacerbated by climate change and assist in developing strategies for dealing with these challenges.

The Vulnerability Assessment

Two sea level rise projections were selected as the basis for the vulnerability assessment in this report: a 16-inch (40 cm) sea level rise by mid-century and a 55-inch (140 cm) rise in sea level by the end of the century. When BCDC initiated its effort to amend the Bay Plan to address climate change in 2009, the State of California was still in the process of formulating statewide policy direction for adapting to sea level rise. In 2010 the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT) developed a Sea Level Rise Interim Guidance document that advises the use of projections (relative to sea level in 2000) for the state that range from 10 to 17 inches by 2050, 17 to 32 inches by 2070, and 31 to 69 inches at the end of the century (based on work by Vermeer and Ramstorf, 2009). This document was endorsed by a resolution of the California Ocean Protection Council in 2011. The projections used in BCDC's report fall within the ranges suggested by the CO-CAT's Sea Level Rise Interim Guidance document. The CO-CAT has recognized that it may not be appropriate to set definitive sea level rise projections, and, based on a variety of factors, state agencies may use different sea level rise projections. Although the CO-CAT values are generally recognized as the best science-based sea level rise projections for California, scientific uncertainty remains regarding the pace and amount of sea level rise. Moreover, melting of the Greenland and Antarctic ice sheets may not be reflected well in current sea level rise projections. The interim guidance will be updated consistent with the National Academy of Sciences sea level rise assessment report, expected in 2012, and other forthcoming studies.

Using the two sea level rise projections, the vulnerability assessment focused on three planning areas or systems: shoreline development, the Bay ecosystem, and governance. Key sectors within each system, such as land uses or subregions of the Bay, were used to assess their sensitivity, adaptive capacity and, ultimately, their vulnerability.

1. Shoreline Development

Residents, businesses and entire industries that currently thrive on the shoreline will be at risk of flooding by the middle of the century, and probably earlier, if nothing is done to protect, elevate or relocate them. A 16-inch rise (relative to sea level in 2000) would potentially expose

281 square miles of Bay shoreline to flooding, and a 55-inch rise would potentially expose 333 square miles to flooding. If no adaptation measures were taken, a 55-inch rise in sea level would place an estimated 270,000 people in the Bay Area at risk from flooding, 98 percent more than are currently at risk. The economic value of Bay Area shoreline development (buildings and their contents) at risk from a 55-inch rise in sea level is estimated at $62 billion—two-thirds of all the estimated value of development vulnerable to sea level rise along California's entire coastline. In those areas where lives and property are not directly vulnerable, the secondary and cumulative impacts of sea level rise will affect public health, economic security and quality of life. Additionally, changes in climate may cause increased storm activity, which in combination with higher sea level, may cause even greater flooding. It is expected that extreme storm events will cause most of the shoreline damage from flooding.

Shoreline development located in an area potentially exposed to a 100-year high water event in 2000 could be potentially exposed to regular tidal inundation by mid-century, not taking existing and planned shoreline protection into account. Approximately half of that development is residential, totaling 103 square miles. Over 128 square miles of residential development is at risk of flooding by the end of the century. Where residents are not directly at risk of flooding, access to important services such as commercial centers, health care, and schools would likely be impeded by flooding of the service centers or the transportation infrastructure that links them. Rising sea levels could impact the delivery of petroleum products, electricity, and drinking water to Bay Area residents and businesses. Dealing with this range of impacts will be more difficult for low-income residents because they have less financial flexibility and fewer resources to pursue alternative housing and transportation.

Populations may suffer if wastewater treatment is compromised by inundation from rising sea levels, given that a number of treatment plants discharge to the Bay. Impaired water quality and higher temperatures can result in algal blooms and a higher potential for the spread of water-born disease vectors.

Large commercial and industrial areas are at risk of flooding, especially in San Francisco, Silicon Valley, and Oakland. Approximately 72 percent of each of the San Francisco and Oakland Airports is at risk from a 16-inch sea level rise and about 93 percent of each is at risk from a 55-inch sea level rise, which could disrupt as many as 30 million airline passengers annually and approximately one million metric tons of cargo. Flooding of highway segments in the regional transportation network could disrupt the movement of goods from ports, which

handled approximately 25 million metric tons of cargo in 2007-2008. Other water-related industries would be similarly affected. Flooding of the rail system would be particularly serious, because multiple carriers share a single line in most locations around the Bay.

Waterfront parks and public access provide opportunities to enjoy the Bay and remind us of its place in the region. There are 36 square miles of waterfront parks, of which 14 percent are at risk under the lower scenario and 18 percent at risk under the higher scenario. Fifty-seven percent of the public access required by BCDC is at risk under the low scenario and 87 percent at risk under the high scenario. The decline of waterfront recreational opportunities would impact the quality of life in the Bay Area.

To address widespread flooding from storm activity and sea level rise, risk assessments and adaptive strategies will be needed. Risk assessments should use the best available science-based projection for sea level rise at the end of the century and should identify all types of potential flooding, degrees of uncertainty, consequences of defense failure, and risks to existing habitat from proposed flood protection devices. Approaches for ensuring public safety in developed vulnerable shoreline areas through adaptive management include, but are not limited to: (1) protecting existing and planned appropriate infill development; (2) accommodating flooding by building or renovating structures or infrastructure systems that are resilient or adaptable over time; (3) discouraging permanent new development when adaptive management strategies cannot protect public safety; (4) allowing only new uses that can be removed or phased out if adaptive management strategies are not available as inundation threats increase; and (5) where feasible and appropriate, removing existing development where public safety cannot otherwise be ensured. Determining the appropriate approach and financing structure requires weighing various policies and is best done through a collaborative approach that directly involves the affected communities and other governmental agencies with authority or jurisdiction. Some adaptive management strategies may require action and financing on the regional or sub-regional level across jurisdictions.

Where shoreline protection is necessary to protect development, it should be constructed to provide protection for a 100-year flood that takes future sea level rise into account. Shoreline protection can be structural, natural, or a combination of both. Choosing the appropriate form of shoreline protection—one that both protects public safety and minimizes ecosystem impacts—is critically important. In the long-term, the region needs to engage in an open and vigorous public dialogue to make the difficult decisions about where and how existing

development should be protected and infill development encouraged, where new development should or should not be permitted, and where existing development should eventually be removed to allow the Bay to migrate inland.

2. The Bay

The numerous plants and animals that inhabit the Bay provide many benefits to humans. For example, tidal wetlands provide critical flood protection, improve water quality, and sequester carbon. The brackish marshes in the North Bay and Suisun Marsh contain a great diversity of species and provide an important resting place along the Pacific Flyway. The impacts of climate change are expected to substantially alter the Bay ecosystem by inundating or eroding wetlands and transitional habitats, altering species composition, changing freshwater inflow, and impairing water quality. Changes in salinity from reduced freshwater inflow may adversely affect fish, wildlife and other aquatic organisms in intertidal and subtidal habitats. The highly developed Bay shoreline constrains the ability of tidal marshes to migrate landward, while the declining sediment supply in the Bay reduces the ability of tidal marshes to grow upward as sea level rises.

The Bay will continue to evolve in response to the climatic forces that enabled it to come into being. Historic modification of the ecosystem, through filling, diking, and building on the shoreline and reducing freshwater inflow, as well as ongoing stressors such as pollution and invasive species, have resulted in the decline of many native species and increased the vulnerability of surrounding communities to damaging floods. Substantial progress has been made in restoring the Bay ecosystem by returning diked areas to tidal action and reducing pollution, while efforts to increase freshwater inflow have been less successful. Future efforts to restore the Bay ecosystem can benefit from careful design that accounts for the known processes affecting formation of habitats in the Bay, the constraints imposed by existing stressors, and the future vulnerabilities associated with climate change.

Key questions that resource managers must address regarding climate change include: identifying opportunities for tidal wetlands and tidal flats to migrate landward, managing and maintaining adequate volumes of sediment for marsh sedimentation, developing and planning for natural flood protection, and maintaining sufficient upland buffer areas around tidal wetlands. Furthermore, rare and valuable habitats, like beaches, should be high priority for restoration and conservation.

Developing effective strategies to protect tidal wetlands from sea level rise is extremely challenging because the projections of future sea level rise continually change. Since the 1980s, when widespread scientific concern about climate change and sea level rise emerged, projections for sea level rise have varied widely. This range of variation, based on different climate models and emission scenarios, creates a great deal of uncertainty for decision-makers; therefore, wetland protection strategies must be adaptable to changing conditions.

As the rate of sea level rise accelerates and the potential for shoreline flooding increases, the demand for new shoreline protection projects will likely increase. Most structural shoreline protection projects involve some fill, which can adversely affect the natural resources of the Bay. Structural shoreline protection can also cause erosion of tidal marshes and tidal flats, prevent wetland migration to accommodate sea level rise, and create a barrier to physical and visual public access to the Bay. Shoreline protection also has cumulative impacts. In some instances, it may be possible to combine habitat restoration, enhancement or protection with structural approaches to provide protection from flooding and control shoreline erosion, thereby minimizing the impacts of shoreline protection on natural resources.

Cumulative impacts of structural shoreline protection can have far reaching adverse impacts to the Bay ecosystem. Planning for sea level rise at a regional level can reduce those impacts and address difficult issues, such as the desire to provide shoreline protection for undeveloped shoreline areas.

3. Governance

The Bay Area faces a range of vulnerabilities in its systems of governance that reduce the region's ability to adapt to sea level rise and other climate change impacts on the Bay and shoreline. A look at the region's overall governance system suggests that existing challenges to regional planning caused by the patchwork of federal, state, regional and local government authorities in the Bay region will be exacerbated by climate change impacts.

BCDC faces governance vulnerabilities in its laws and policies. The Commission's jurisdiction on the shoreline is limited to 100 feet landward of the mean high tide line, and within this area, BCDC's authority is limited to requiring maximum feasible public access and consistency with designated priority land uses. The Commission's law is based on the principles of the public trust doctrine, which may move inland as sea level rises. Furthermore, because BCDC implements its authority on a permit-by-permit basis, the Commission is limited in its ability to address the cumulative impacts of individual shoreline protection projects. The

existing framework of BCDC's laws and policies that focus on preventing the Bay from shrinking is an overarching constraint to the Commission's ability to effectively plan for and adapt to climate change impacts.

Local governments and other management agencies, especially in cities and counties, have broad authority over shoreline land use. However, they lack policy incentives, resources and regional guidance for addressing climate change impacts in land use planning. To address these gaps, local governments need information about Bay-related impacts of climate change that is region-specific and site-specific. The information should include a regional model that projects 50 and 100 years into the future. The projections should be developed through a public, inclusive process in order to be widely accepted and used throughout the region. The system most commonly used by local governments for analyzing information is GIS. However, local planners and resource managers can benefit from guidance documents, such as sample ordinances.

Lack of staff and adequate financial resources are the primary barriers to planning for impacts of climate change, both statewide and in the Bay Area. Any assistance to local governments and public management agencies must address this issue either by providing more staff and financial resources or by providing information that is easily integrated into existing operations, planning tools, guidance documents and planning processes (e.g., General Plan updates).

Adaptation Strategies

Adapting to climate change on the San Francisco Bay shoreline is critical to the region's economic stability, safety and public health. Flooding from sea level rise alone threatens the long-term viability of our neighborhoods, job centers, transportation, water and wastewater infrastructure, schools and fire stations and vital ecosystem services on which our quality of life and the regional and state economies depend.

To integrate rapidly advancing scientific knowledge about the impacts of climate change, adaptation planning for the Bay and shoreline must be a flexible and iterative process. Shoreline planning will be increasingly challenging as the line between uplands and Baylands becomes more dynamic, thereby requiring a creative planning approach that integrates both the natural and the built environment. An ecosystem-based, adaptive management approach would integrate the human component of ecosystems into ecosystem management by bringing stakeholders into decision-making processes, promoting interagency collaboration, and providing direction through those processes.

This report presents a framework for selecting adaptation strategies to address key vulnerabilities and risks at various scales and timeframes. In the near term, the Commission can require applicants to develop resilient designs and adaptation strategies when planning shoreline areas or designing larger shoreline projects within BCDC's limited jurisdiction. Ultimately, effective adaptation will require strategies that integrate climate mitigation and adaptation efforts regionally. The Commission can help facilitate a collaborative process to develop a regional strategy to deal effectively with sea level rise and other adaptation challenges in the Bay Area.

Proposed Bay Plan Amendment

Adaptation to climate change should be incorporated into the Bay Plan in the following manner:

1. Create a climate change policy section of the Bay Plan that addresses the following:
    a. Incorporating sea level rise projection ranges in project design and planning and using them in the permitting process;
    b. Developing a long-term strategy to address sea level rise and storm activity and other Bay-related impacts of climate change in a way that protects the shoreline and the Bay and allows for appropriate, well-planned development that responds to the impacts of climate change and future sea level rise;
    c. Working with the Joint Policy Committee (JPC) and other agencies to integrate mitigation and adaptation strategies at a regional scale, to coordinate the adaptation responses of multiple government agencies, to analyze and address social equity issues, and to support research that provides useful climate change information and tools;
    d. Providing recommendations and requirements to guide planning and permitting of development in areas vulnerable to sea level rise; and
    e. Including policies that promote wetland protection, creation, enhancement and migration.
2. Amend findings and policies on tidal marshes and tidal flats to ensure that buffer zones are incorporated into restoration projects where feasible and sediment issues related to sustaining tidal marshes are addressed.

3. Amend the policies on safety of fills by updating the findings and policies on sea level rise and moving some to the new climate change section of the Bay Plan.
4. Amend the policies on protection of the shoreline to address protection from future flooding.
5. Amend findings and policies on public access to ensure that public access is sited, designed and managed to avoid significant adverse impacts from sea level rise and to ensure long-term maintenance of public access areas through site-specific adaptive management strategies.

CHAPTER 1
Causes of Sea Level Rise

Greenhouse gas (GHG) emissions have already contributed to an increase in average global temperature and may trigger irreversible impacts from continued global warming. A rise in global temperature is expected to be accompanied by other climatic changes and impacts, such as increased frequency of temperature extremes; changes in precipitation patterns; reduced soil moisture content; melting of polar ice caps, land-based ice sheets and glaciers; ocean warming and consequent changes in sea level and water circulation. Detrimental impacts to ecosystems will likely affect public health and the economy. This chapter explains the causes of climate change, the United Nations Intergovernmental Panel on Climate Change (IPCC) scenarios, the California Climate Action Team's scenarios, and the Bay Area's contributions to and efforts to mitigate GHG emissions. It further explains the causes of sea level rise, increased storm activity, and sea level rise scenarios that should be used to minimize risks on the shoreline. Finally, this chapter describes the approach to the vulnerability assessment in Chapters 2-4 and discusses shoreline protection options.

The Greenhouse Effect and Global Warming

The "greenhouse effect" is a natural system that controls the Earth's temperature. Water vapor, carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), residing in the Earth's atmosphere, absorb heat emitted from the Earth's surface and radiate heat back to the surface. The Earth's surface temperature would be about 61°F (34°C) colder than it is now without this natural heat trapping system (CAT 2006).

The Earth's climate is dynamic and constantly changing. However, recent observations and modeling indicate that the rate and magnitude of change occurring today is unprecedented for the most recent geologic period (the Quaternary period or last 2 million years). Ice core samples provide information about historic concentrations of GHGs and provide information about human contributions to global climate change. Concentrations of CO_2 in the samples correlate to recent observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. The IPCC reported in its Fourth Assessment Report (AR4) that the current observed global average temperature increase is about 0.36°F (0.2 °C) per decade (IPCC 2007).

There are both human and natural causes of climate change. Radiative forcing is a measure of how the balance of incoming and outgoing energy in the Earth-atmosphere system is influenced by factors that alter the climate system, such as changes in the amount of GHGs in the atmosphere, in solar radiation, and in land surface. Radiative forcing is studied to analyze how much various human and natural factors contribute to warming or cooling (IPCC 2007). The IPCC AR4 examined radiative forcing from human and natural factors and concluded that: (1) it is extremely unlikely that global climate change of the past 50 years can be explained without human contributions of GHGs; (2) carbon dioxide is the most important human contribution to greenhouse gases; and (3) the primary source of the increased CO_2 is from fossil fuel use with land-use change as another significant, but smaller contribution. There is a broad consensus in the scientific community that climate change is occurring and the release of GHGs caused by human activities is accelerating this change.

Emissions Scenarios. While scientists agree that the planet is warming, the amount and timing of this change is less certain and likely will remain so for some time. In order to predict future climate change, it is necessary to know how much GHGs will be produced in the future. It is difficult to predict future GHG emissions without knowing how global development will proceed. The IPCC addressed this uncertainty by developing future global development scenarios, which are included in a Special Report on Emissions Scenarios (SRES). For each scenario, the key activities that influence global development rates were altered to produce a range of future development patterns. Specific variables, such as population, economic growth, technological change, resource availability, and land-use changes were considered in order to quantify GHG emissions relative to each scenario (IPCC 2000). Four scenarios were developed to cover a wide range of variables: the A1 scenario breaks into four sub-scenarios, one of which (A1FI) has the highest emissions of all the scenarios; the A2 scenario also has high emissions; B1 has the lowest emissions; and B2 is a middle-range emissions scenario.

The SRES was published in 2000 and the scenarios continue to be widely used in assessments of future climate change. In AR4, a warming of about 0.36° F (0.2° C) per decade is projected for a range of SRES emission scenarios. Even if the concentrations of all greenhouse gases and aerosols (small particles in the atmosphere that absorb and scatter radiation, such as smoke or dust) were kept constant at 2000 levels, a further warming of about 0.2°F (0.1°C) per decade would be expected (IPCC 2007). The projected global temperature increase at the end of the century in the range of SRES is between 3.2° F and 6.8° F (1.8 °C and 3.8 °C) (Table 1.1). Mitigating or reducing GHG emissions is critical to slow climate change, but mitigation will not stop changes that are already underway. Therefore, adapting to climate change is equally critical as mitigating climate change.

Table 1.1. Projected Global Average Surface Warming at the End of the Century

Scenario	Temperature Change (Degrees at 2090-2099 relative to 1980-1999)			
	Best Estimate		Likely Range	
	°F	°C	°F	°C
Constant year 2000 concentrations	1.1	0.6	0.5 – 1.6	0.3-0.9
B1	3.2	1.8	2.0 – 5.2	1.1 - 2.9
B2	4.3	2.4	2.5 – 6.8	1.4 – 3.8
A2	6.1	3.4	3.6 – 9.72	2.0 – 5.4
A1FI	6.8	3.8	4.3 – 11.5	2.4 – 6.4

Adapted from IPCC 2007.

The California Climate Action Team. While the IPCC assessments of climate change rely on global models, adapting to climate change requires an understanding of how climate change will impact specific regions so that planning can take place at the state and regional levels. The California Climate Action Team (CAT) relies on the IPCC emissions scenarios for assessing the primary impacts of climate change on a regional level, namely changes in the frequency and intensity of precipitation and temperature increases (Cayan et al. 2006 (a), Cayan et al. 2006 (b) and Cayan et al. 2009).

For its 2009 California climate change assessment, the CAT chose two IPCC scenarios to evaluate: A2 (a medium-high emissions scenario) and B1 (a low emissions scenario). Researchers used the A2 and B1 scenarios to run multiple global climate computer models and performed additional research to project specific climate changes in California (Cayan et al. 2009).

The CAT projects that temperatures will get higher in the inland areas of California than on the coast. Overall, the projected warming is consistent with IPCC projections: between 1.8°F and 5.4°F (1°C and 3°C) by mid century and between 3.6°F and 9°F (2°C and 5°C) by the end of the century (Cayan et al. 2009). Temperature increases in the lower range of warming are projected to be similar to the difference in average annual temperature between Monterey and Salinas. In the upper range of projected warming, the temperature difference would be closer to that between San Francisco and San Jose (Cayan et al. 2006 (a)).

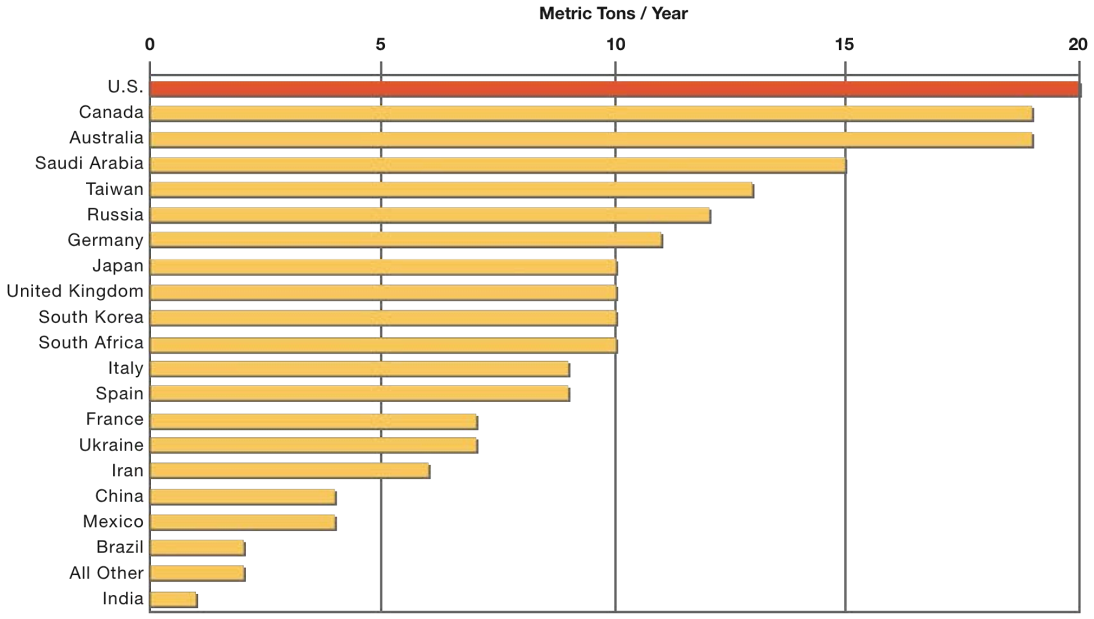
The CAT findings regarding precipitation were similar to findings for the globe, with a tendency toward drier conditions at the end of the century (Cayan et al. 2009). Generally, even a small decline in precipitation can be problematic for California because demand for water for environmental, urban and agricultural purposes already exceeds supply. Furthermore, about one third of California's water currently falls as snow in the Sierra Nevada Mountains and much of the water stored in the Sierra snowpack and reservoirs is used in the Central Valley,

the Bay Area and Southern California during the spring and summer. As temperatures rise, the snowpack will melt earlier and less precipitation will fall as snow, further hampering California's ability to store enough water and provide it to agricultural fields and growing populations. Changes in the amount and timing of fresh water that flows to the Bay from the Sierra Nevada watershed will directly affect the Bay ecosystem.

As an example of the scope of the impacts within one economic sector, California's $30 billion agriculture industry currently uses almost 80 percent of developed water in the state (DWR 2006). However, in addition to adverse impacts stemming from changes in the state's water management system, some of the state's most lucrative crops, such as wine grapes, fruits and nuts could falter under higher temperatures. Furthermore, high temperatures can stress dairy cows, severely hampering what is currently a $3 billion industry.

Figure 1.1 U.S. Contribution To Global CO_2 Emissions (per Capita)

Source: U.S. Energy Information Administration; Bay Area Air Quality Management District, 2007



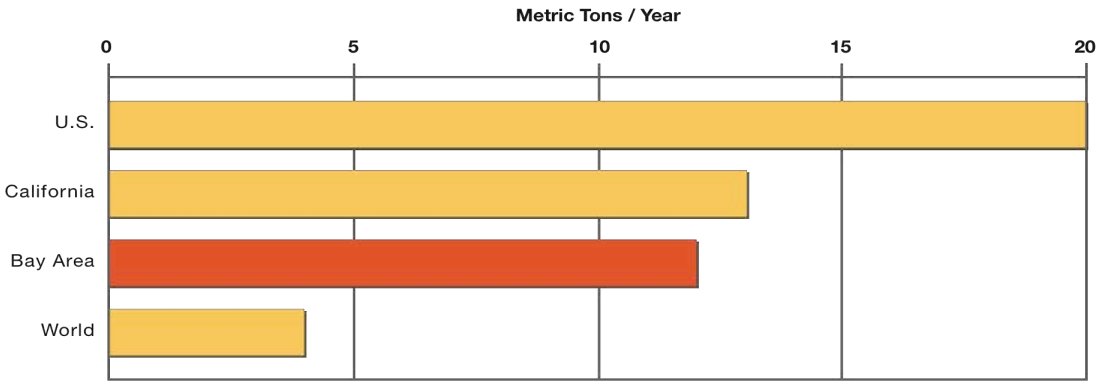
With so much at risk for California, on June 1, 2005, the Governor issued an Executive Order establishing GHG emission targets for the state. California strengthened its commitment to address climate change with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 requires the state to reduce GHG emissions to 1990 levels by 2020 and to 80 percent below 1990 levels by 2050 (CARB 2008).

On August 25, 2008, the State Assembly passed SB 375 and the Governor signed it into law on September 30th, 2008. The bill mandates an integrated regional land-use-and-transportation-planning approach to reducing GHG emissions from automobiles and light trucks, principally by reducing vehicle miles traveled. Within the Bay Area, the bill assigns responsibilities to the Association of Bay Area Governments (ABAG) and to the Metropolitan Transportation Commission (MTC). Both agencies are members of the Joint Policy Committee (JPC), which also includes the Bay Area Air Quality Management District and BCDC. The JPC developed a policy document to guide ABAG and MTC in fulfilling their responsibilities in collaboration with their JPC partners (JPC 2009).

Bay Area GHG Contributions. The Bay Area is a major contributor of GHG emissions. In order to understand how the Bay Area fits into the global emissions scheme, some context is necessary. The United States produces more CO_2 emissions per capita than any other country in the world and twice the emissions of most "developed" countries (Figure 1.1). California is the twelfth largest source of climate change pollutants in the world, ranked between South Korea and Italy, and emits more GHGs than most nations. When CO_2 is measured in per capita metric tons/year, the Bay Area is only slightly below the statewide average (Figure 1.2).

Figure 1.2 Bay Area Contribution to CO_2 Emissions (per Capita)

Source: USEIA, CA Climate Action Team, BAAQMD; Bay Area Air Quality Management District, 2007

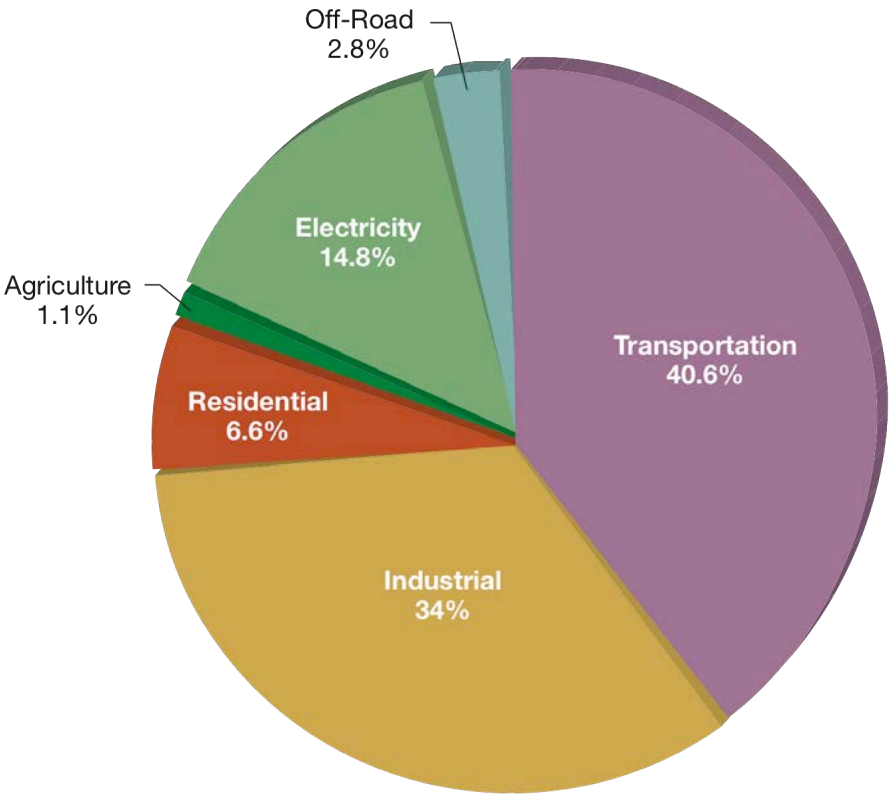


California's climate change emissions come primarily from fossil fuel combustion in the transportation sector, which makes up 41.2 percent of the state's GHG emissions. Energy production and industrial uses are other major contributors.

The Bay Area Air Quality Management District reports the Bay Area breakdown of climate change emissions is similar to the statewide breakdown. The two sectors with the highest emissions are transportation and industrial, which make up 40.6 and 34 percent of the total GHG emissions respectively (Figure 1.3).

Figure 1.3 Bay Area GHG Sources

Source: BAAQMD, 2007



The JPC developed a strategy to address climate change, which reflects the diverse responsibilities of the four regional agencies that make up the JPC: the Bay Area Air Quality Management District, the Association of Bay Area Governments, the Metropolitan Transportation Commission, and BCDC. Given that transportation is the primary source of GHG emissions in the Bay Area, the JPC's climate change strategy includes numerous objectives

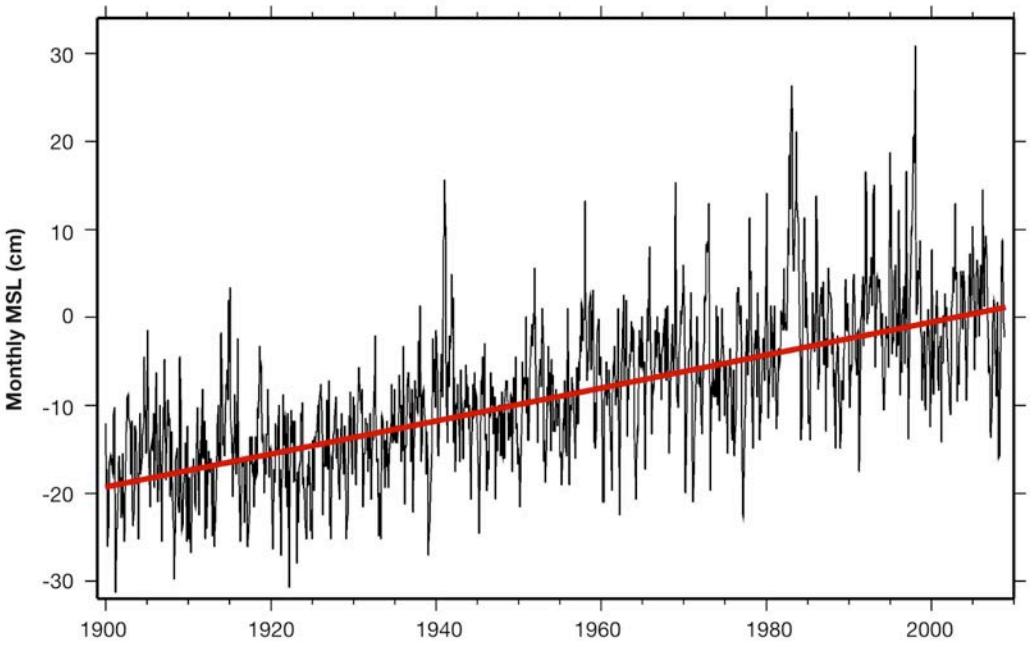
aimed at reducing driving through a variety of methods, including focused growth and transit-oriented development and public transportation funding strategies, which all reduce the need to drive. BCDC is responsible for carrying out the elements of the strategy that address adapting to sea level rise and other Bay-related impacts of climate change.

Sea Level Rise

Warming of the planet causes sea level to rise and increases the potential for damaging floods that will affect coastal communities around the world. There are two major processes that contribute to global mean sea level rise, primarily by increasing the volume of water in the global ocean. Those processes are: (1) the addition of water from glaciers and ice sheets (land-based ice) (Bindoff et al. 2007); and (2) thermal expansion, which is when water expands as it warms, causing sea level to rise. These processes are complex and difficult to project into the future. While the melting of floating sea ice (e.g., icebergs) has significant adverse environmental impacts, it does not contribute additional water to the oceans and, therefore, does not directly contribute to global sea level rise.

Figure 1.4 Sea Level Rise in San Francisco Bay

Source: Cayan et. al. 2006; San Francisco Tide Gauge

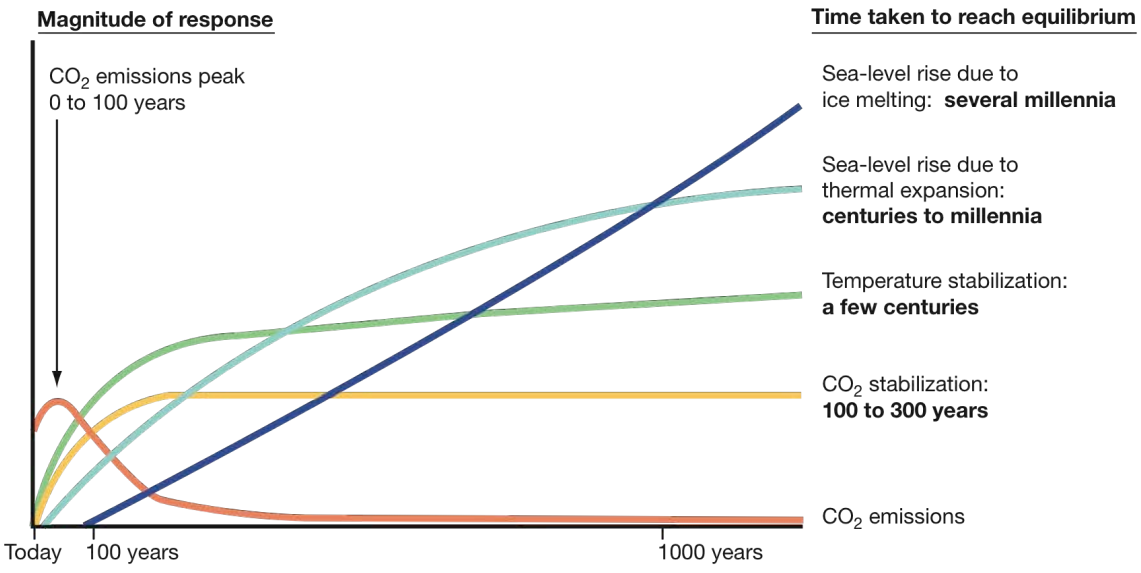


The San Francisco tide gauge at Fort Point is the longest continually monitored gauge in the United States. Sea level rise trends measured at this tide gauge and two other long-running tide gauges on the west coast show sea level rise of nearly 7.9 inches (19 cm) per century or 0.08 inches (2 mm) per year (Figure 1.4) (Cayan et al. 2006(b)). This rate of sea level rise is consistent with global sea level rise.

The rate of global sea level rise is increasing. The 20th century rise was estimated to be 6.7 inches (17 cm) or 0.067 inches (1.7 mm) per year on average. From 1961 to 2003, GHG emissions had been accumulating long enough to increase the rate of rise to 0.07 inches (1.8 mm) per year (IPCC 2007). Analyses of observed sea level rise over the last approximately 15 years show that the rate of rise increased significantly above that of previous decades (Church and White 2006). The IPCC concluded that from 1993-2003, the rate of sea level rise increased to about 0.12 inches (3.1 mm) per year (IPCC 2007), demonstrating the likely effect of human-induced warming on sea level.

Figure 1.5 Long Term Trend in Sea Level Rise

Source: Intergovernmental Panel on Climate Change; Department of Water Resource, based on IPCC



No matter how effectively the world mitigates GHG emissions, oceans have already warmed, sea levels are already rising at accelerated rates, and are likely to continue rising. The ocean has been absorbing more than 80 percent of the heat added to the climate system and has already warmed to depths of at least 9,843 feet (3000 m) (IPCC 2007). Perhaps the most notable finding from the IPCC is that the effects of GHG emissions will continue long after emissions are reduced. The IPCC projects that global temperature will continue rising for a few centuries before stabilizing. Sea level rise from thermal expansion will continue for centuries to millennia. Sea level rise from ice-sheet melting will continue for several millennia (Figure 1.5) (IPCC 2007).

Ice-Sheet Melting and Uncertainty. There is a great deal of uncertainty surrounding the future contributions to global sea level rise from the melting of the Greenland and Antarctic ice sheets. Most scientists agree that the rate of ice-sheet melt will accelerate as melt-water seeps through cracks in the ice sheet and causes further acceleration of melting and movement of the ice sheet toward the sea. The IPCC concluded that losses from the ice sheets have "very likely" contributed to sea level rise from 1993 to 2003. (In IPCC terminology, very likely means a greater than 90 percent probability of occurring.) However, there is no scientific consensus on how to model or project future rates of ice-sheet melt.

The nature of ice-sheet melt is not fully understood. Observations show that as ice melts, the melt water runs over ice and causes it to melt at a faster rate, carving deep crevices and weakening the ice. Further, the meltwater runs under the ice sheets and weakens buttressing ice shelves, which can cause large portions of ice sheets to collapse. The central question is whether ice-sheet melting will accelerate by an order of magnitude and whether this could occur in a timeframe of hundreds or thousands of years (Oppenheimer 2006).

Warming of 3.6-5.4°F (2-3°C) could cause melting that would induce "multiple positive feedbacks, including reduced surface albedo, loss of buttressing ice shelves, [and] dynamical response of ice streams to increased melt-water" (Hansen 2006). Surface albedo is a ratio of incoming radiation that is reflected to that which is absorbed. White ice has a high albedo—it reflects most solar radiation, which means that as sea-ice melts, the oceans absorb more heat from radiation. Due to these feedback effects, some scientists believe that the ice sheet response could move beyond a point of equilibrium within a few centuries (Hansen 2006). However, even with ice-sheet melt, sea level rise is very unlikely to exceed 6.6 feet (200 cm) by 2100 (Pfeffer et al. 2008).

Although numerical modeling remains inadequate to project future ice-sheet melt, additional studies of the last interglacial period confirm that the warming needed to cause shrinkage of the Greenland Ice Sheet averaged less than 6.3°F (3.5°C) (Overpeck et al. 2006). Further, recent observations and innovations have improved modeling of ice-sheet behavior,

but models still do not assess feedback loops and, therefore, fail to factor the interrelatedness of ice-sheet melting, ocean circulation, and climate change (Alley et al. 2005). The AR4 projections for warming in the years 2090-2099 ranged from 3.2°F (1.8°C) for the lowest emissions scenario (B1) to 7.2°F (4°C) for the highest emissions scenario (A1FI). Therefore, mid and higher emissions scenarios produce temperature increases by the end of the century that would, at a minimum accelerate ice-sheet melt.

Sea Level Rise Scenarios

There is broad scientific consensus that the rate of sea level rise has increased with higher global surface temperatures. The point of debate is what the rate of sea level rise will be in the future. Similar to the approach used to evaluate global warming, using scenarios of future sea level rise enable us to understand the risks and develop a strategy that will support the appropriate responses. Scenarios of future sea level rise enable us to understand the risks and develop a framework now that will support the appropriate responses.

In 2007, German scientist, Stefan Rahmstorf developed an empirical approach to projecting future sea level rise by calculating the relationship between sea level rise and global mean surface temperature. Rahmstorf first determined the historic trend in the relationship and then projected that trend into the future using the IPCC's projected temperature increases associated with the SRES scenarios: 2.5°F (1.4°C) for the lowest emissions scenario to 10.4°F (5.8°C) for the highest emissions scenario (Rahmstorf 2007). Rahmstorf's corresponding estimates of sea level rise by 2100 range from 20 inches (50 cm) to 55 inches (140 cm) respectively.

Research funded by the CAT for the 2009 report to the Governor used the A2 and B1 scenarios and Rahmstorf's methodology to project sea level rise in California in 2050 and 2099. These sea level rise projections are also adjusted to include the effects of dams on sea level rise (Cayan et al. 2009). Past construction of dams and reservoirs may have stored enough water worldwide to mask acceleration in the rate of sea level rise prior to the notable acceleration detected in 1993. Most dams were constructed during the 1950s through the 1970s. Building of dams for additional upland water storage has since slowed, which means that sea level rise may now be accelerating faster than the IPCC and scientists have predicted (Chao 2008). The CAT-funded research estimated that sea level would increase between 12 and 18 inches (30 and 45 cm) by 2050 and between 20 and 55 inches (50 and 140 cm) by 2099.

The Delta Vision Blue Ribbon Task Force established by Governor Schwarzenegger to develop a strategic management plan for the California Delta, employed an Independent Science Board (ISB) to review literature and provide recommendations on sea level rise. The ISB found that: (1) the current IPCC projections are conservative and underestimate recently

measured SLR; (2) empirical models, such as Rahmstorf's empirical method, yield significantly higher estimates of sea level over next few decades and are better for short to mid-term planning; and (3) neither the IPCC nor Rahmstorf account for accelerating contributions from ice sheet melting, which will likely contribute significantly to future sea level rise with the potential for very rapid increases of up to a meter by 2100. Based on these findings, the ISB recommended adopting an estimated rise in sea level of 55 inches (140 cm) by 2100 and recommended adopting a sea level rise estimate for 2050 as well.

On November 14, 2008, the Governor issued Executive Order S-13-08, that, in part, directed state agencies to consider a range of sea level rise scenarios for the years 2050 and 2100 to assess project vulnerability, reduce expected risks, and increase resiliency to sea level rise. The order also directed agencies to request that the National Academy of Sciences convene an independent panel to prepare a "California Sea Level Rise Assessment Report." In advance of the National Academy of Sciences report, in 2010, senior staff from 16 state agencies of the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT) reached agreement on a Sea-Level Rise Interim Guidance Document, with science-based input from the California Ocean Protection Council's Science Advisory Team and the California Ocean Science Trust. The CO-CAT recommended that state agencies use the ranges of sea level rise (SLR) presented in a paper by Vermeer and Rahmstorf (2009), adjusted to use 2000 rather than 1990 as the baseline, as a starting point (Table 1.2), "and select SLR values based on agency and context-specific considerations of risk tolerance and adaptive capacity."

Table 1.2. CO-CAT Sea Level Rise Scenarios using 2000 as the Baseline

Year		Average of Models	Range of Models
2030		7 in (18 cm)	5-8 in (13-21 cm)
2050		14 in (36 cm)	10-17 in (26-43 cm)
2070	**Low**	23 in (59 cm)	17-27 in (43-70 cm)
	Medium	24 in (62 cm)	18-29 in (46-74 cm)
	High	27 in (69 cm)	20-32 in (51-81 cm)
2100	**Low**	40 in (101 cm)	31-50 in (78-128 cm)
	Medium	47 in (121 cm)	37-60 in (95-152 cm)
	High	55 in (140 cm)	43-69 in (110-176 cm)

The table was published with the following note: "These projections do not account for catastrophic ice melting, so they may underestimate actual SLR. The SLR projections included in this table do not include a safety factor to ensure against underestimating future SLR. For dates after 2050, three different values for SLR are shown based on low, medium, and high future greenhouse gas emission scenarios. These values are based on the Intergovernmental Panel on Climate Change emission scenarios as follows: B1 for the low projections, A2 for the medium projections and A1FI for the high projections." The CO-CAT's Sea Level Rise Interim Guidance document was endorsed by a resolution of the California Ocean Protection Council in 2011. The interim guidance will be updated consistent with the National Academy of Sciences 2012 report, and other forthcoming studies.

Sea Level Rise and Extreme Events. Most shoreline damage from flooding will occur as a result of storm activity in combination with higher sea level. Climate change-induced sea level rise will combine with the key factors that currently contribute to coastal flooding: high tides, storm surge, high waves and high runoff from rivers and creeks (Cayan et al. 2009).

Storms and flooding in California occur during the winter from November to April and are influenced by several climate patterns, most prominently the El Niño Southern Oscillation (ENSO) (Miller 2003, Cayan et al. 2008). Every two to seven years, ENSO alternates between two phases, La Niña and El Niño. In contrast to La Niña, "El Niño years" generally result in persistently low air pressure, greater rainfall, and high winds (Cayan et al. 2008), all of which contribute greatly to coastal flooding hazards.

Low air pressure causes an instantaneous rise in sea level above predicted tides, referred to as storm surge (Cayan et al. 2008). During storms with high rainfall, Bay tributaries flood, elevating flood stage in creeks and rivers beyond the initial storm surge, and low air pressure increases wind activity, generating erosive waves superimposed on the already high sea level (Bromirski and Flick 2008). This combination of factors, during an El Niño event in the winter of 1982-83, caused over $500 million in damage in the San Francisco Bay Area (ABAG 2006).

As sea level rises, storm-induced flooding will become more frequent and more hazardous to public health and safety. Over the recent period of accelerated sea level rise (1993 to 2003), there was an increase in both the number of storm surge events and high tides exceeding previously observed extremes. This increase in storm activity and extreme tides is projected to continue into the future (Cayan et al. 2008, Bromirski and Flick 2008). Should the state's water reservoirs lack capacity to capture rainfall and earlier Sierra snow melt, water managers will need to release flows through the Delta during winter months, resulting in even higher water levels in the Delta and Suisun Marsh (Knowles and Cayan 2002, Cayan et al. 2008).

Different regions of the Bay may be more vulnerable to these floods than others (see Figure 1.6 for Bay regions). Tides in the South Bay are higher than the ocean and other areas of the Bay, which will amplify storm surge events (PWA 2005). The combined effects of sea level rise, storm surge and river flooding may result in water levels elevated as high as 51 inches for a period of 10 to 12 hours in the Delta and Suisun Marsh region (Bromirski and Flick 2008), an area where much of the land is already below mean tide elevation and is surrounded by fragile levees (DWR and DFG, 2008).

Therefore, significant flooding impacts from sea level rise can be expected during the early part of this century, due to winter storms and sea level rise.

BCDC Policy Analysis. Most of the permit applications that BCDC receives are for projects with a lifespan of at least 50 – 90 years. For the purposes of this policy analysis and to provide timeframes that are most relevant to the Commission's regulatory and planning functions, a mid-century and end-of-century sea level rise projection are used. The shorter timeframe is most applicable for projects, such as institutional or commercial development. The longer timeframe attempts to anticipate future impacts within a reasonable degree of certainty for large-scale projects with longer life cycles, such as new neighborhoods or major public infrastructure projects. While these are only projections, not predictions, the necessary response to rising sea level may be similar whether sea level rises more slowly or more quickly. The primary difference will be in the scale and speed of response that will be required.

Box 1.1. Definitions

Resilience: The ability of a system to absorb and rebound from the impacts from weather extremes, climate variability, or change and to continue functioning (Luers and Moser)

Adaptation: Actions in response to potential or experienced impacts of climate change that lead to a reduction in risks or a realization of benefits.

Mitigation: Actions that reduce the emission of greenhouse gases into the atmosphere or enhance their sequestration and thereby reduce the probability of reaching a given level of climate change.

Vulnerability: The extent to which a natural or social system is susceptible to the adverse effects of climate change, climate variability and extremes—a function of risk and adaptive capacity.

Adaptive Capacity: The ability of a system to adjust or respond to climate change, climate variability and extremes, to accomplish the following: (1) moderate potential damages; (2) take advantage of new opportunities arising from climate change; or (3) accommodate the impacts.

When BCDC initiated its effort to amend the Bay Plan to address climate change in 2009, the State of California was still in the process of formulating statewide policy direction for adapting to sea level rise, as described above. This report assesses vulnerability using 16 inches of sea level rise at mid-century and 55 inches at the end of the century because: (1) given the potential for sea level rise to threaten lives and damage property and natural resources in the Bay, it is prudent to use a conservative scenario; and (2) it is consistent with other state efforts. The sea level rise projections used in this report fall within the ranges that were subsequently endorsed by the California Ocean Protection Council in 2011, i.e., 10-17 inches at mid-century and 31-69 inches at end of century. A number of terms that are common in discussions of adaptation are defined in Box 1.1.

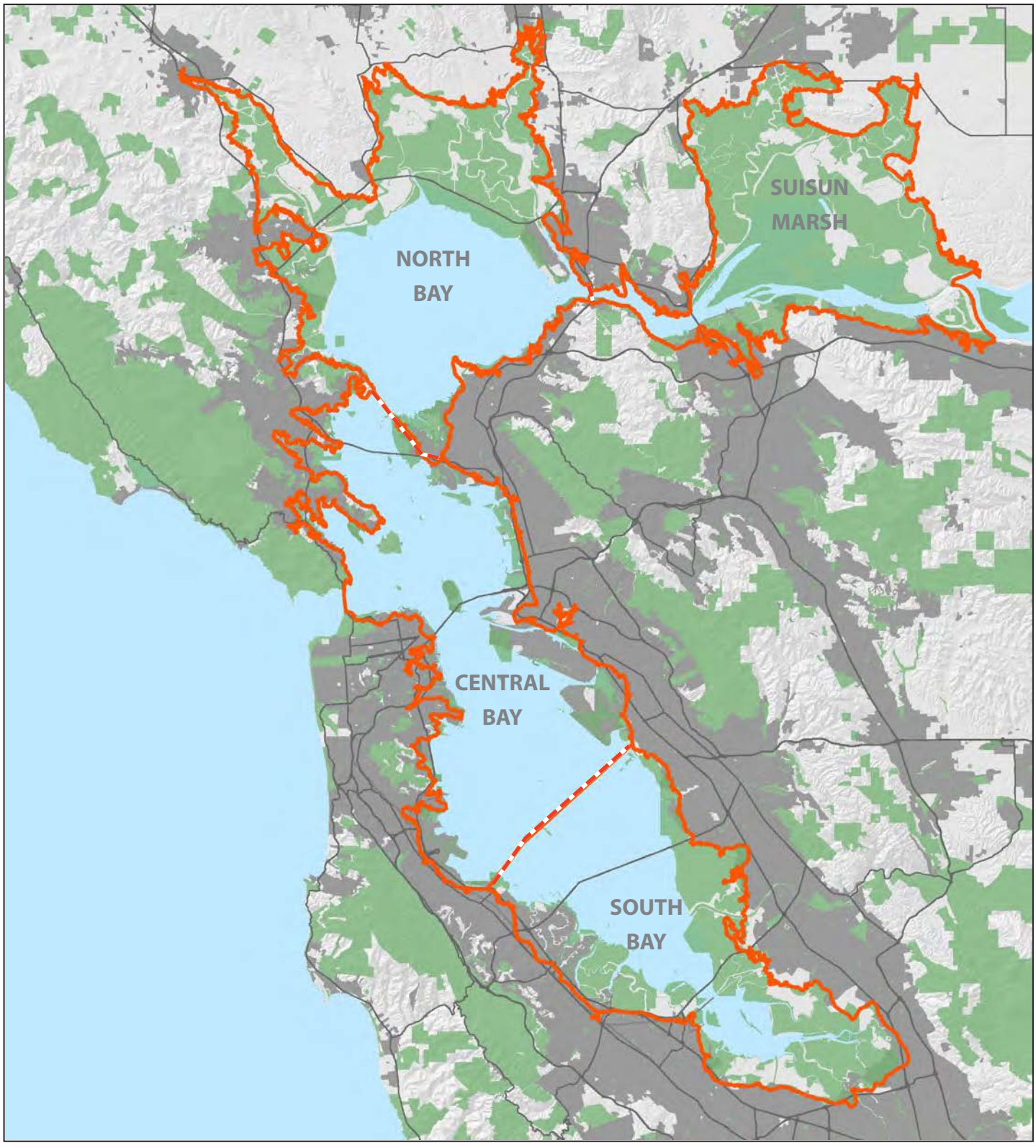
Figure 1.6

Bay Area Land Uses and Bay Subregions

Open Space
Urban Area
Historic Shoreline
Private Undeveloped
Major roads and highways

0 4 8 MILES

NORTH



SOURCE: Urban and open space (GreenInfo 2004), Regions (EcoAtlas 2009)

Vulnerability Assessment

The following three chapters describe the vulnerability assessment performed for this report. The assessment is both qualitative and quantitative, including a review of literature and original analysis using GIS sea level rise data. It focuses on three planning areas or systems: the shoreline environment, the Bay ecosystem, and governance. Key sectors within each system are identified and analyzed to ascertain their current and expected challenges and projected climate change impacts. Based on the information available, which in some cases is limited, and recognizing the general uncertainty involved in projecting climate change impacts, a vulnerability assessment is performed that identifies the degree of sensitivity, adaptive capacity, and vulnerability. This assessment is summarized at the end of each chapter based on a standard methodology developed through The Climate Project for King County in Washington (The Climate Project 2007).

The emphasis of this assessment is regional, which may limit its application to specific projects or limited areas, such as the shoreline within any given city. While the assessment is valuable, it is limited by the information available and the uncertainty regarding future change. To make the assessment feasible, BCDC worked with the California Energy Commission's Public Interest in Energy Research (PIER) program to commission the development of sea level rise data and a cost assessment of potential impacts from sea level rise.

The sea level rise data were provided by the United States Geologic Survey (USGS), which used a hydrodynamic computer model to identify areas at risk in two scenarios, 16 inches and 55 inches of sea level rise. The USGS assembled the best available digital elevation data for the Bay shoreline into a regional grid. Historic (1996-2007) tidal data were used to determine the highest average monthly tide, then the sea level rise estimates were integrated into the tidal datum (Knowles 2008)[1].

While the data are the best available for mapping and analysis of shoreline areas that may be exposed to sea level rise, there are limitations for their use. The data were developed using an average of the highest tide in each month, which captures most storm surge within a year. However, the data do not include wave activity that occurs during storms, nor the highest tides.

---

[1] The data for this assessment was developed by USGS analyzing the area vulnerable to inundation from the average highest monthly tide, factoring in 16 and 55 inches (40 and 140 cm) of sea level rise. The data used by Knowles and the Pacific Institute in two recent reports on sea level rise in San Francisco Bay are based on an average highest yearly tide, factoring in the same two scenarios. However, the difference between these data is insignificant. Although the average yearly high tide inundates an area approximately 1% (2,000 acres) greater than the average monthly high tide, the additional areas affected are evenly distributed around the Bay and are barely distinguishable on maps. Furthermore, the difference may likely be attributable to the resolution of the elevation data upon which the USGS work is based. Consultation with USGS and other experts confirmed that the difference is well within the range of uncertainty of the data and the analyses.

Consequently, an area that floods from wave activity during winter storms, such as the Embarcadero in San Francisco, is not considered exposed. Importantly, where the elevation of land is below the water level, it is shown as potentially exposed to sea level rise, whether or not shoreline protection exists. This is because adequate information was not available on levee heights or location. Additionally, the data does not indicate the depth of flooding. Low-lying land or depressions in upland areas may also appear to be exposed to inundation, even if there is no path for water to reach the isolated, low-lying area. Despite these limitations, the data is useful for drawing general conclusions about the region's vulnerability to sea level rise and storm surge.

Analysis using the data shows that approximately 180,000 acres (281 square miles) of shoreline are potentially exposed to more flooding or permanent inundation with 16 inches (40 cm) of sea level rise and approximately 213,000 acres (332 square miles) are vulnerable at 55 inches (140 cm) (Figures 1.7-1.18). With 55 inches of sea level rise, an additional 33,000 acres (51 square miles) are potentially exposed. These additional areas are scattered around the perimeter of the shoreline potentially exposed to flooding or more frequent inundation under the 16-inch sea level rise scenario.

The area inundated in the 16-inch projection is already subject to some degree of flood risk. Analysis performed by USGS indicates that the area inundated under the lower projection is roughly equivalent to the area exposed to a 100-year high water event in 2000, not taking existing and planned shoreline protection into account (Knowles 2008). In other words, the area exposed to today's extreme flood event is roughly equivalent to the area potentially exposed to regular tidal inundation by mid-century (Figure 1.19).

Vulnerability from Subsidence. Relative sea level rise, rather than global sea level rise alone, provides the most accurate measure of water level along the Bay shoreline. Relative sea level rise is the sum of global sea level rise and the change in vertical land motion. Thus, if sea level rises and the shoreline subsides[2], the relative rise in sea level could be greater than the global rise. For many years the South Bay shoreline, including urbanized areas and salt ponds, experienced high rates of subsidence from groundwater depletion, which has now apparently stopped. Where subsidence continues, such as in areas where peat soils oxidize, relative sea level rise could cause more significant shoreline flooding in those areas than it would if the

[2] Subsidence, or sinking of the land surface, is generally caused by: vertical motion along a fault line, applying loads to incompetent soils, oxidation of organic matter in soils, or groundwater withdrawal from the subsurface of the land resulting from compaction.

shoreline land mass remained at a constant level, or rose (BCDC 1988). As rates of global sea level continue to increase with climate change, at some point, the rate of vertical land movement in the Bay Area will become less significant in determining the impact of sea level rise. However, areas that have subsided may be particularly vulnerable to sea level rise and extreme events.

The Suisun Marsh is one area of the Bay where relative sea level rise is significant, due to ongoing subsidence. When managed wetlands (wetlands behind levees) such as those located in the Suisun Marsh are allowed to dry out, the organic matter in the soil oxidizes. Loss of this organic matter may lead to local and regional ground subsidence. The continuing subsidence of managed wetlands can affect levee stability and increase the risk of failure (DWR, 1995; Mount and Twiss, 2005). Levee failure during floods in the Suisun Marsh and the Delta will cause saltwater intrusion into groundwater aquifers, saltwater contamination of agricultural lands, and changes to the salinity of freshwater and brackish ecosystems.

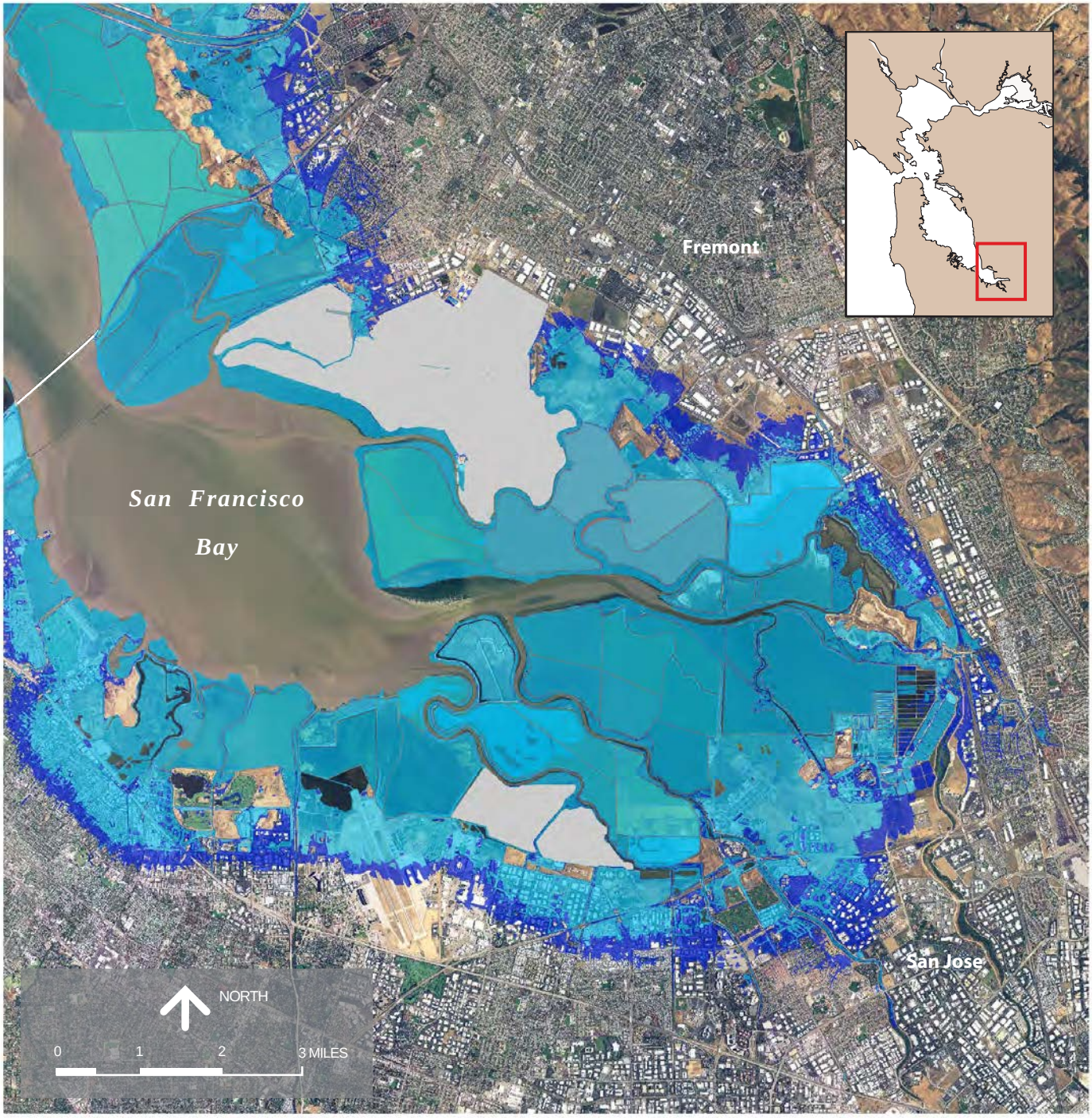
Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

No data

South Bay
Shoreline Areas Potentially Exposed to Sea Level Rise

DISCLAIMER: *The inundation data used in these maps do not account for shoreline protection or wave activity. These maps are for informational purposes only. Users agree to hold harmless and blameless the State of California and its representatives and its agents for any liability associated with the use of the maps. The maps and data shall not be used to assess actual coastal hazards,insurance requirements, or property values or be used in lieu of Flood Insurance Rate Maps issued by the Federal Emergency Management Agency (FEMA).*



Sea level rise data provided by:

USGS science for a changing world

SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

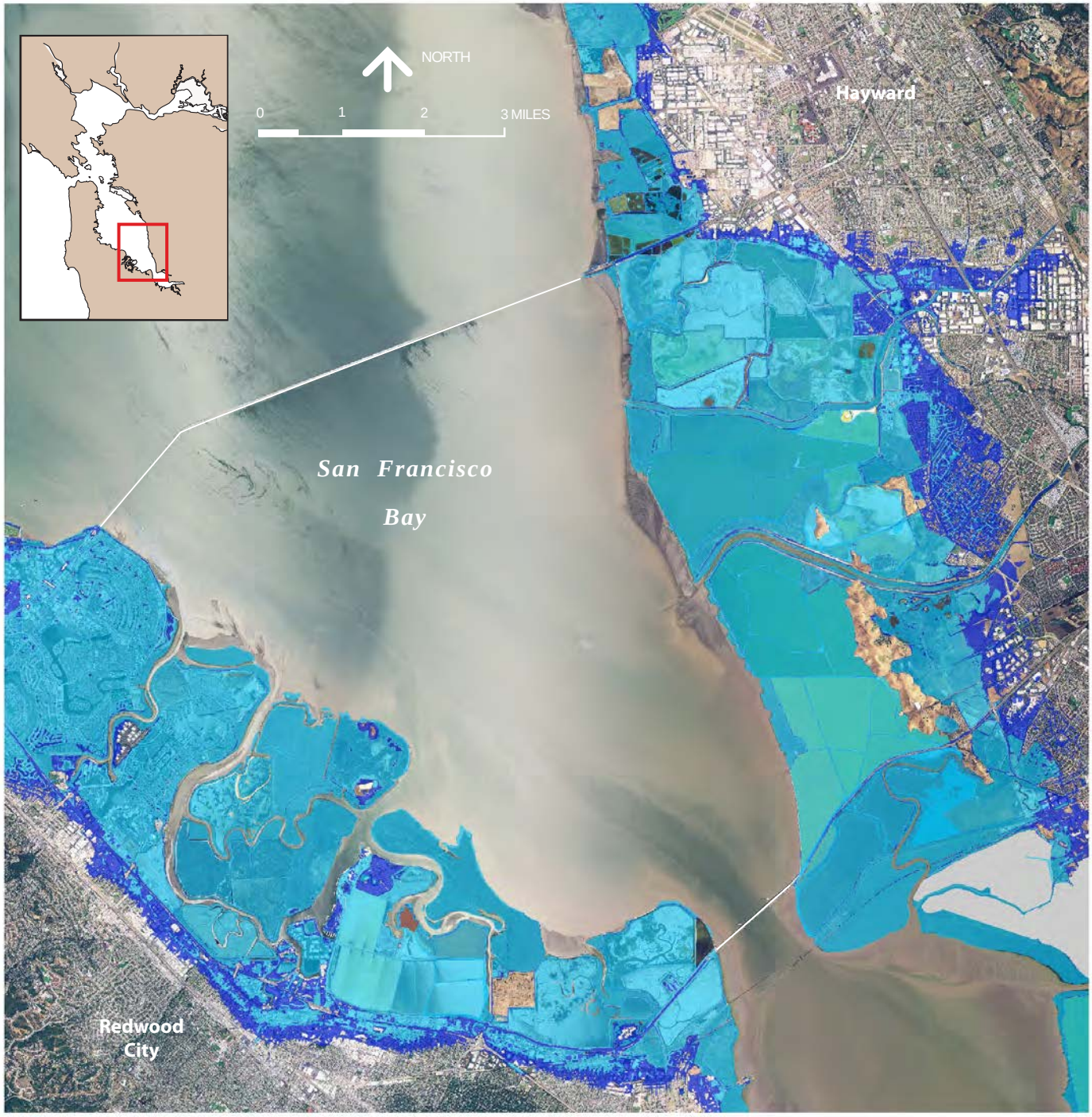
Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

No data

Central Bay South
Shoreline Areas Potentially Exposed to Sea Level Rise

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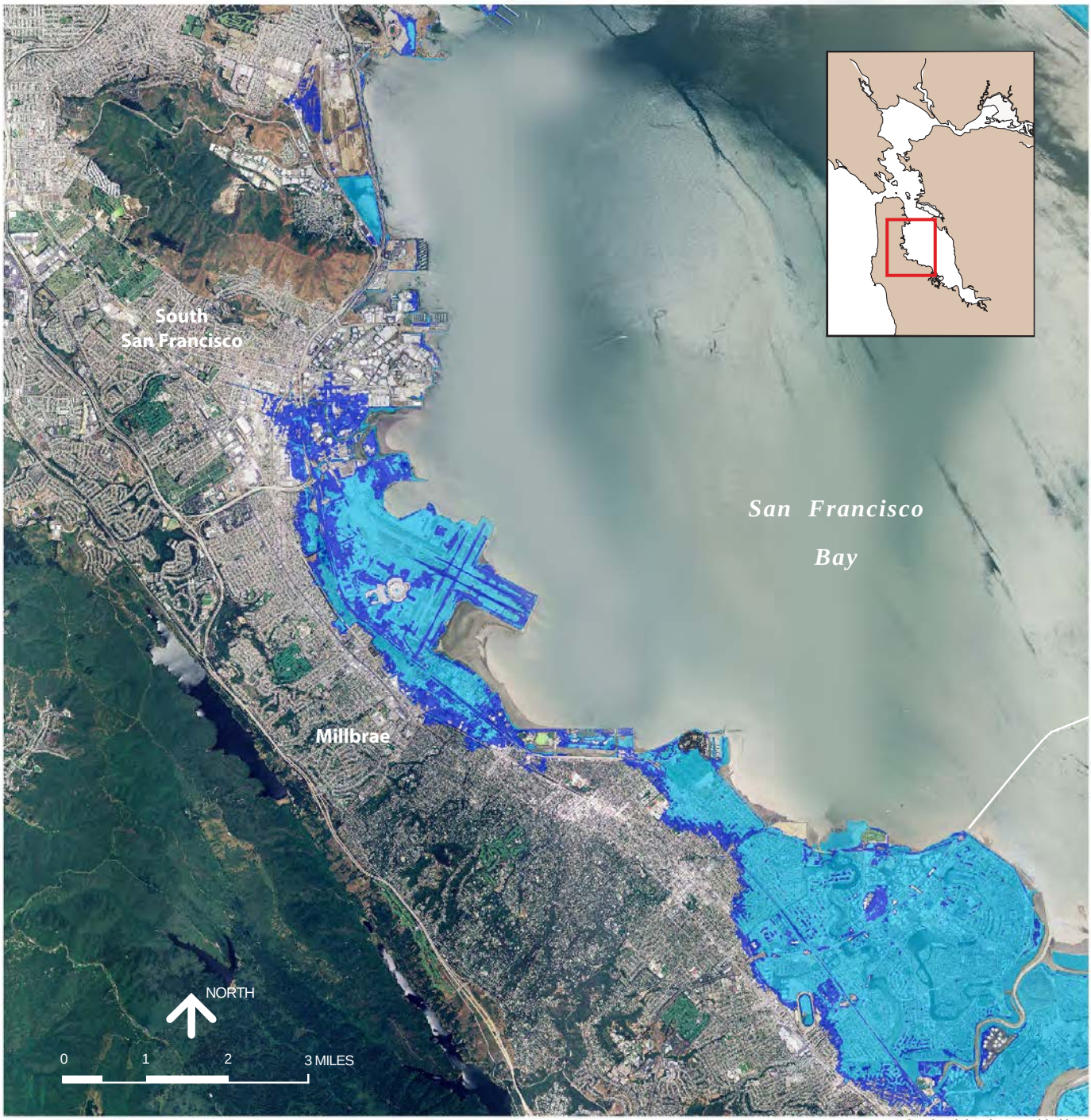
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Central Bay West Shore
Shoreline Areas Potentially Exposed to Sea Level Rise

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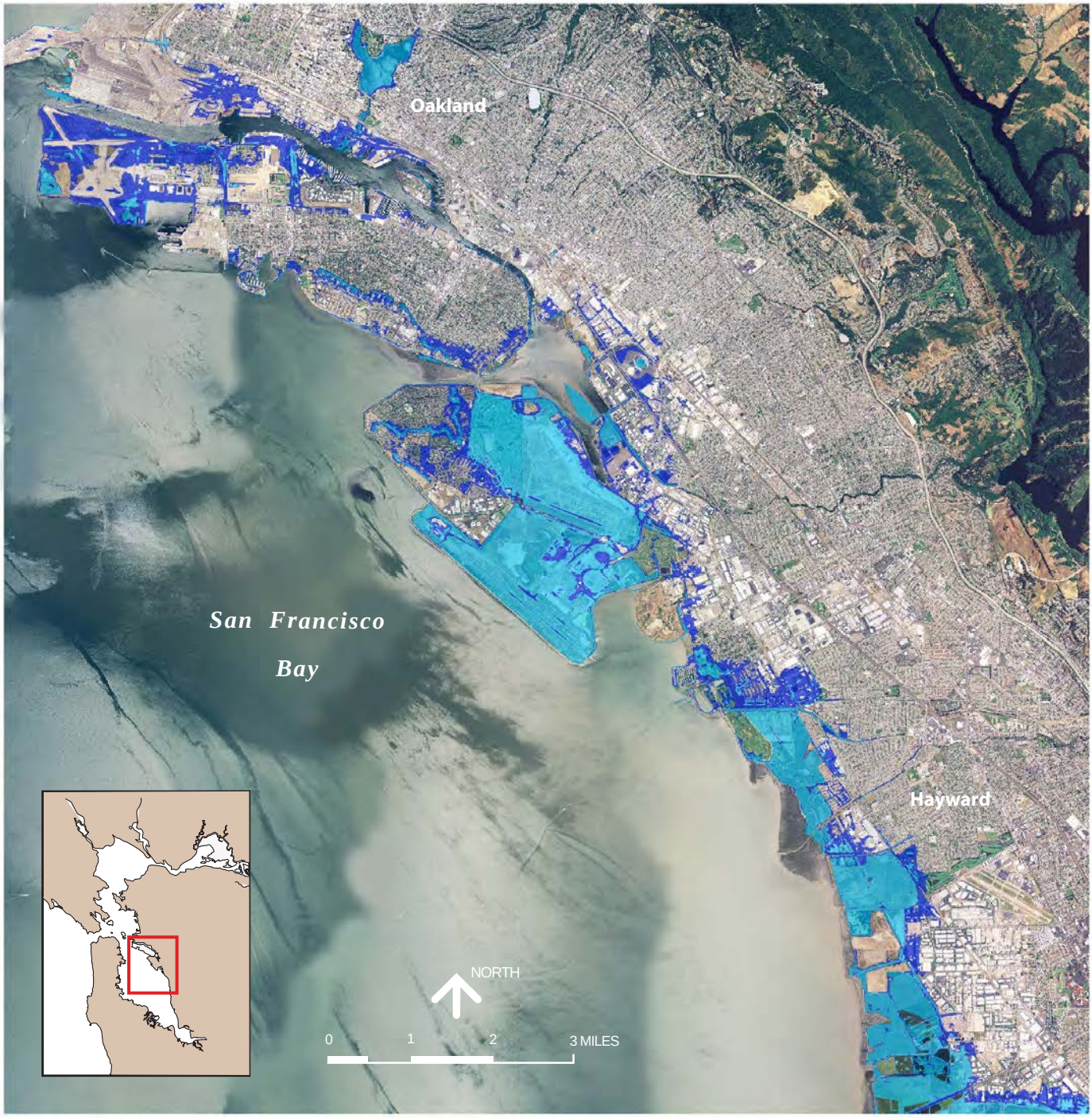
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Central Bay East Shore
Shoreline Areas Potentially Exposed To Sea Level Rise

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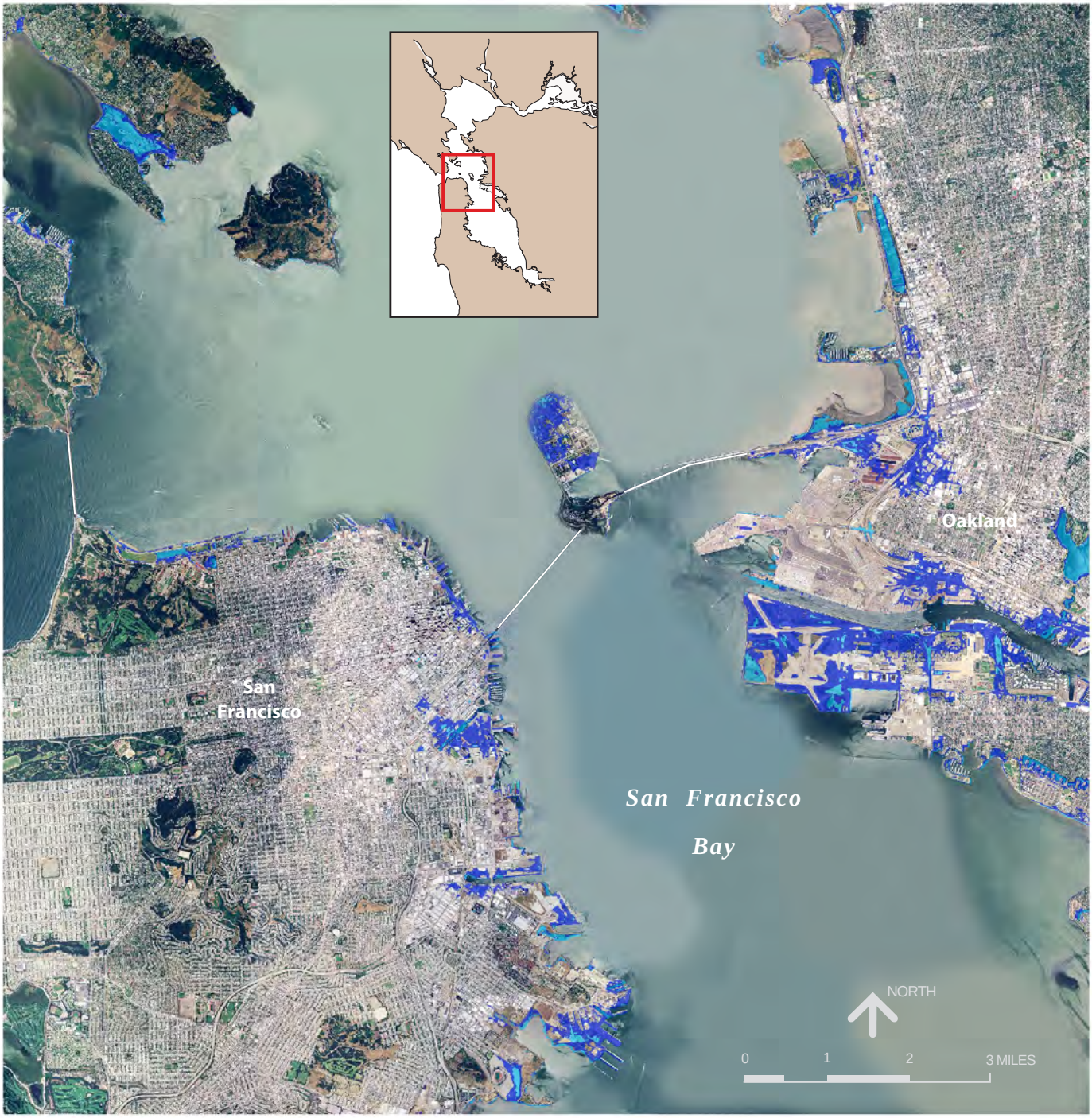
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Central Bay Shoreline Areas Potentially Exposed to Sea Level Rise

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Sea level rise data provided by:

USGS science for a changing world

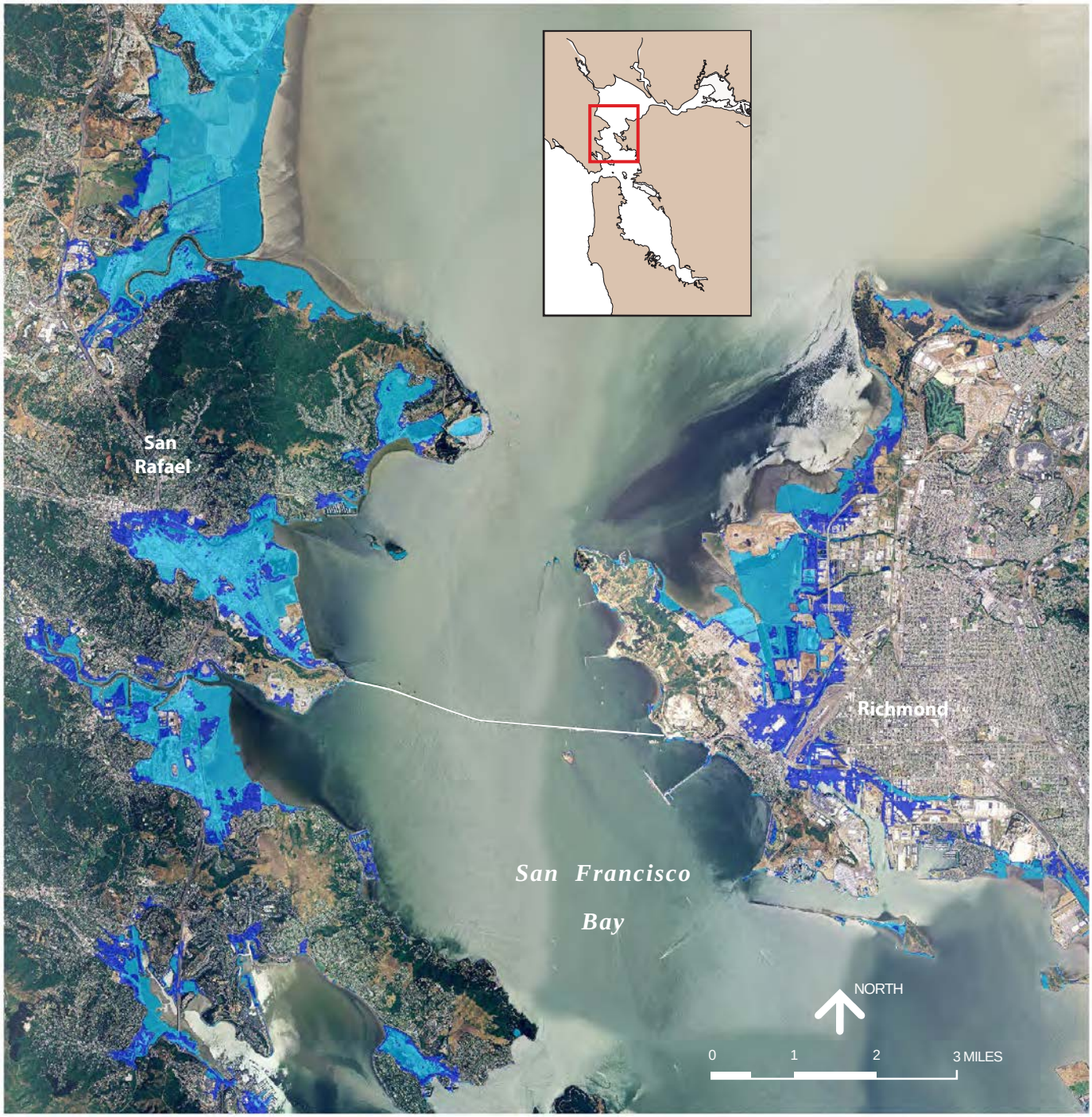
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Central Bay North
Shoreline Areas Potentially Exposed to Sea Level Rise

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USGS science for a changing world

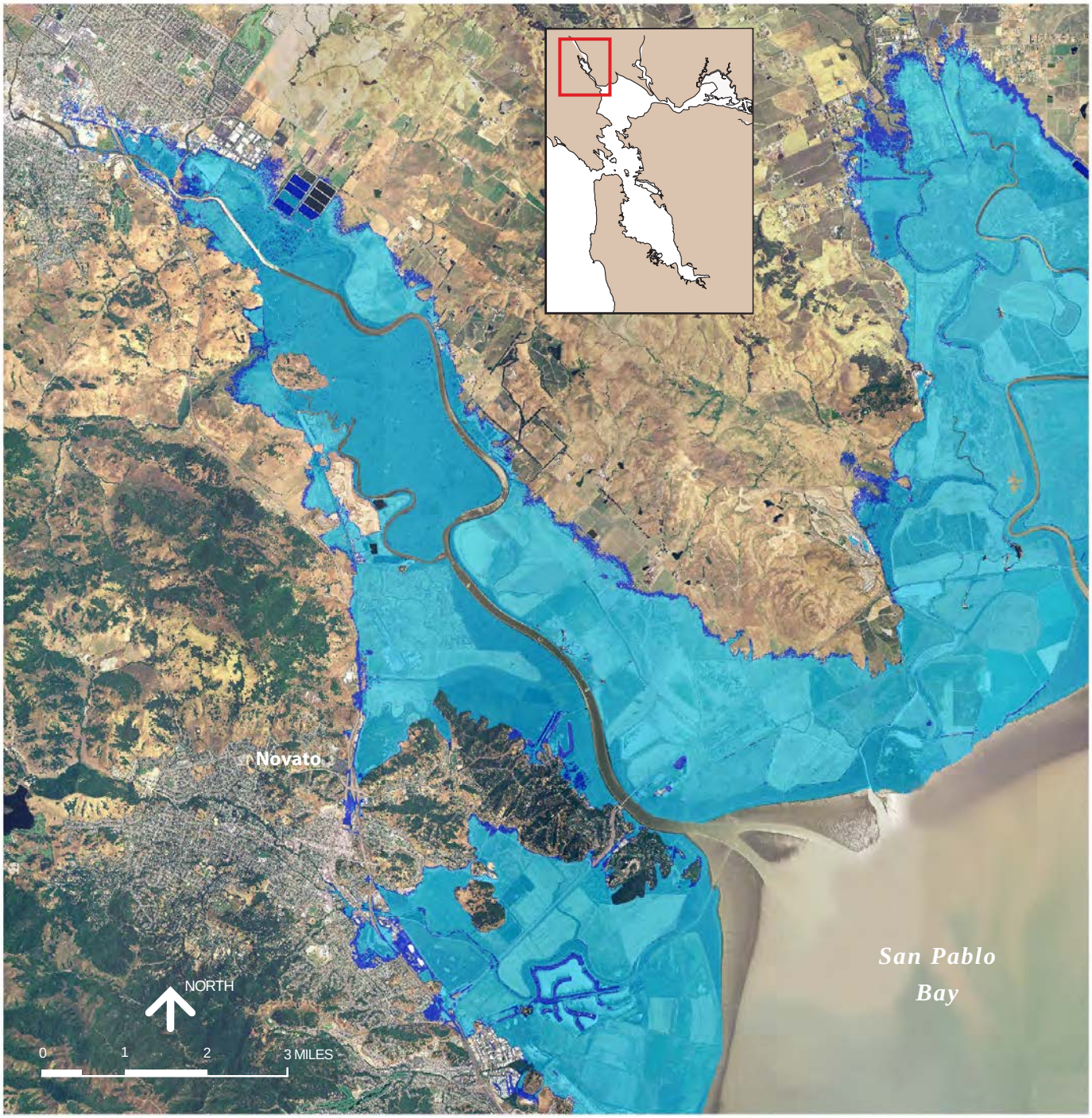
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Petaluma River
Shoreline Areas Potentially Exposed to Sea Level Rise

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Sea level rise data provided by:

USGS science for a changing world

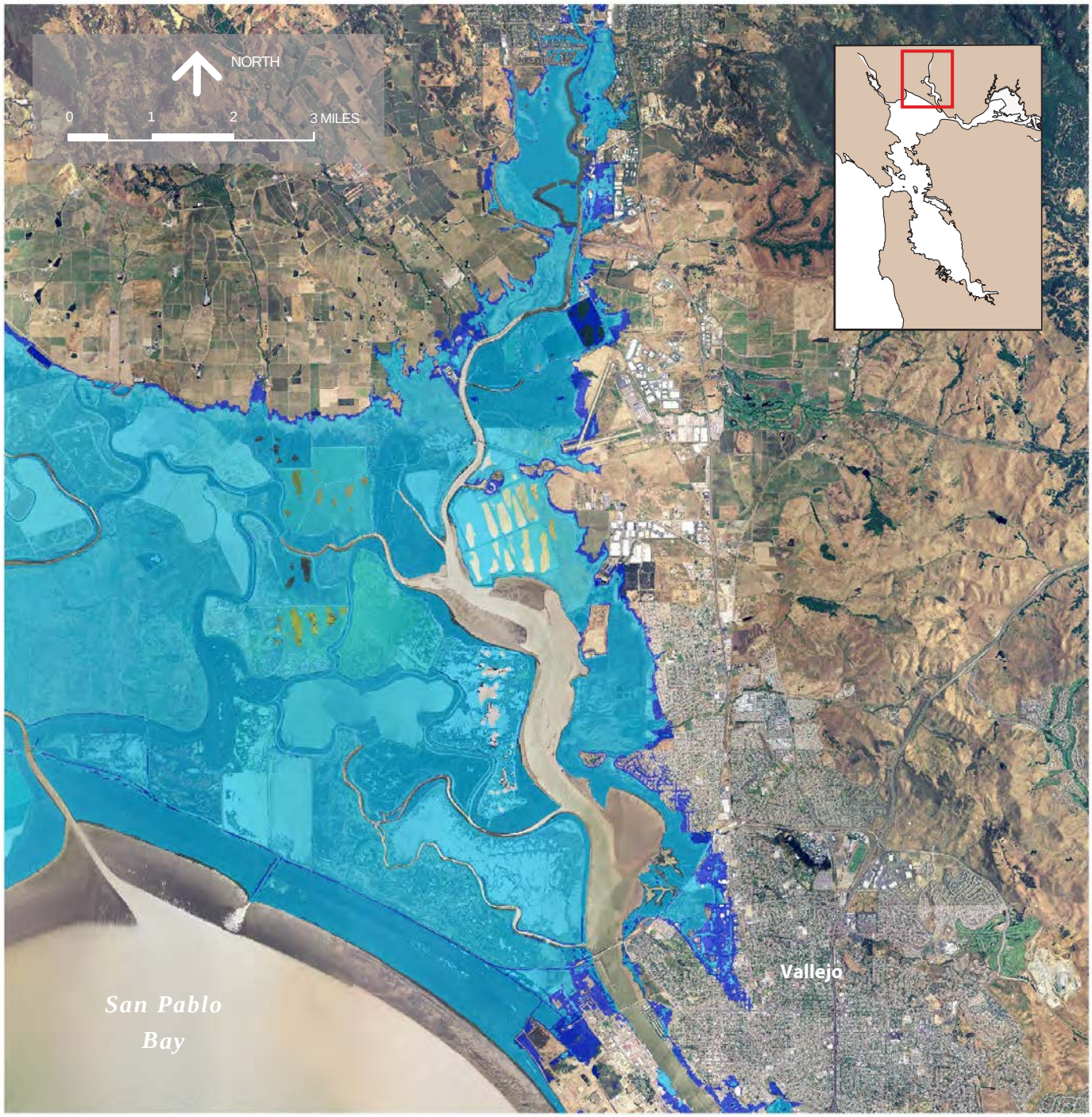
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Napa River
Shoreline Areas Potentially Exposed to Sea Level Rise

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Sea level rise data provided by:

USGS science for a changing world

SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

San Pablo Bay/Carquinez Strait Shoreline Areas Potentially Exposed to Sea Level Rise

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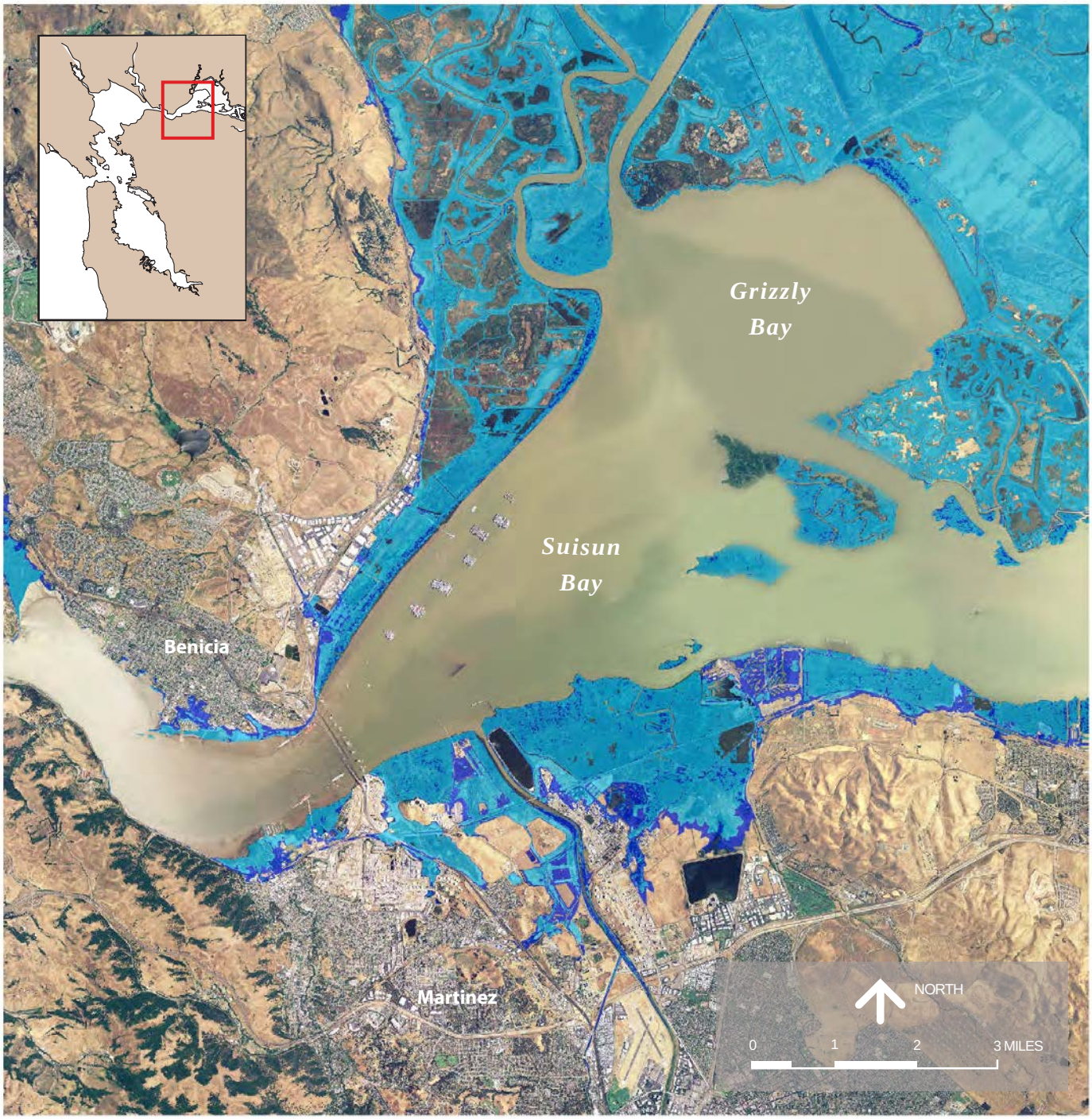
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Grizzly Bay
Shoreline Areas Potentially Exposed to Sea Level Rise

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USGS science for a changing world

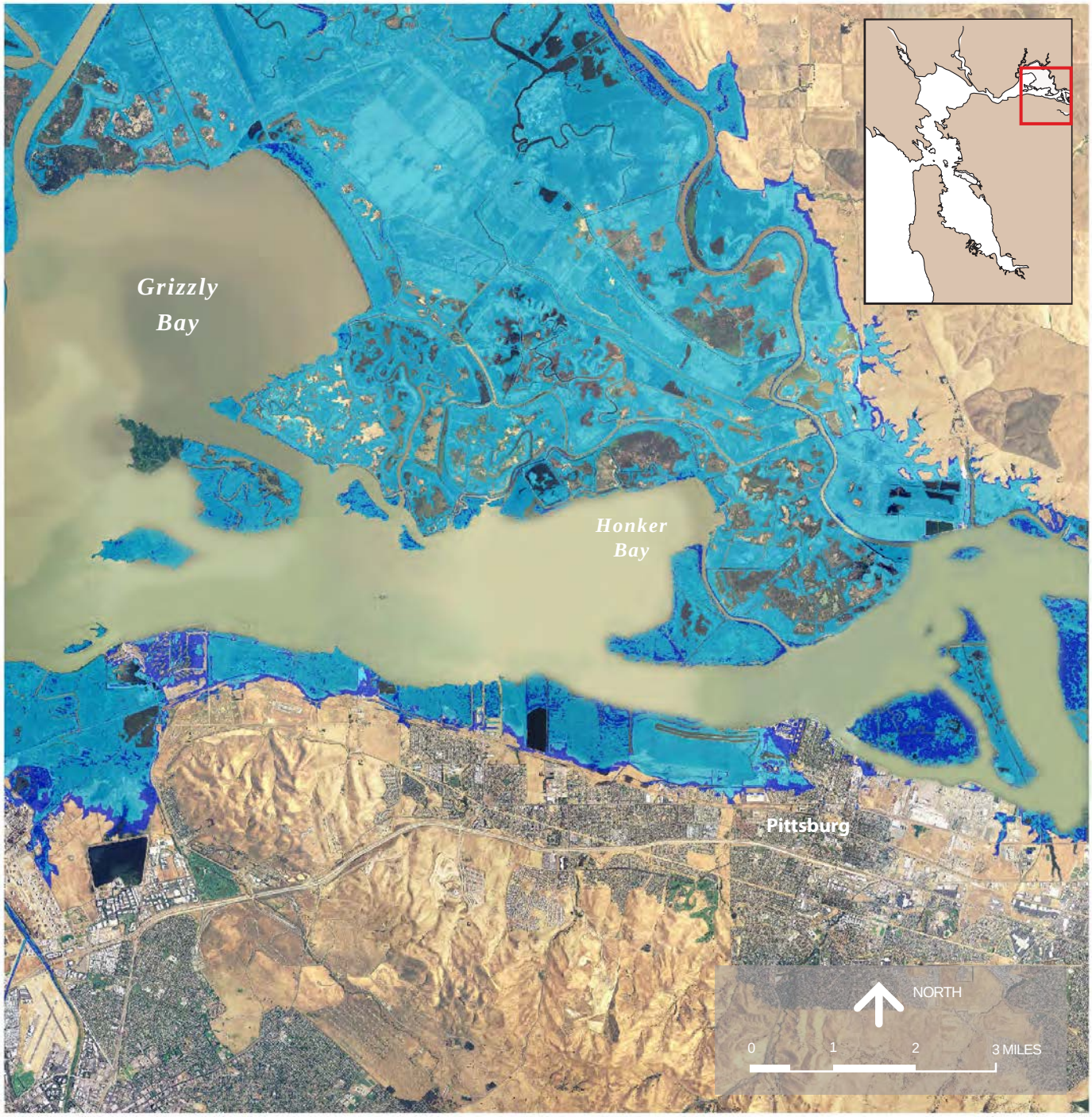
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Honker Bay
Shoreline Areas Potentially Exposed to Sea Level Rise

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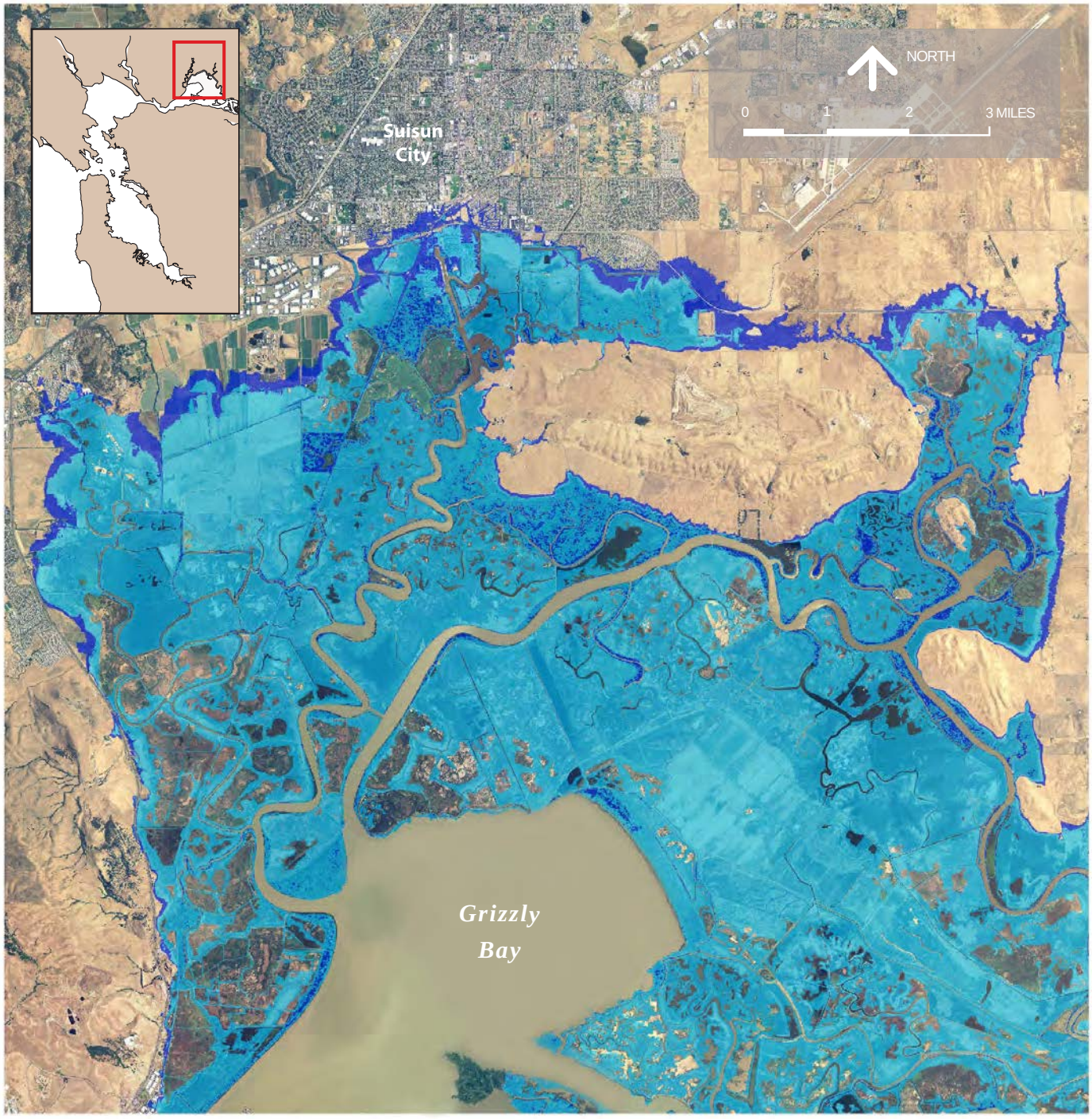
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Suisun Marsh
Shoreline Areas Potentially Exposed to Sea Level Rise

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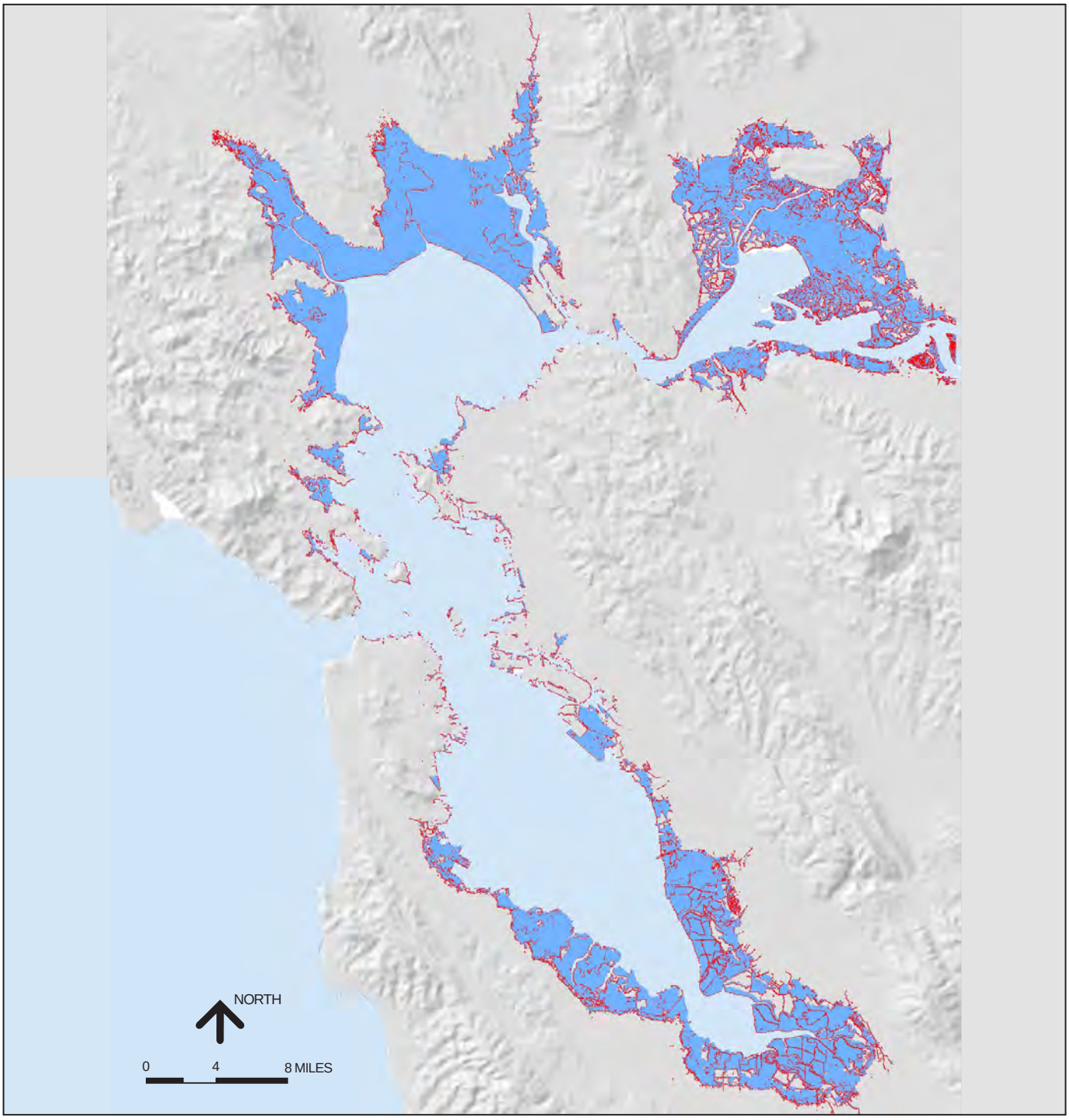
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Area potentially exposed to a 100-year high water event

Area potentially exposed to an approximate 16-inch sea level rise

Comparison of Current 100-Year High Water Event and Average High Tide at Mid-Century

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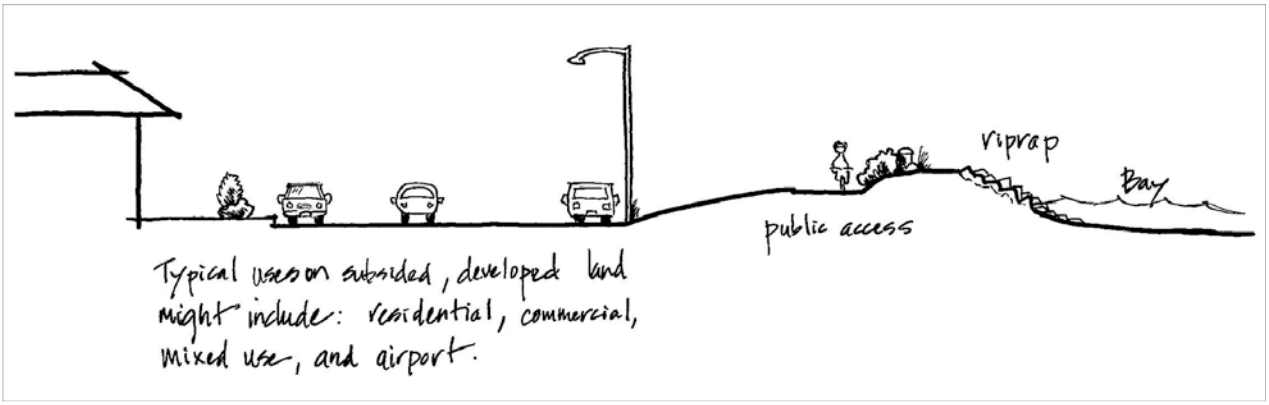
SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002.

Shoreline Protection

San Francisco Bay and the shoreline support some of the densest urban development in the United States as well as ample open space and some of the most extensive tidal wetland habitats (Figure 1.6). Shoreline development, public safety, and the Bay ecosystem are at risk from current flooding and increased future flooding and storm activity. Public infrastructure and shoreline development that are critical to the region's health, safety and welfare will require protection. Wetlands must be sustained to continue providing important habitat and healthy functioning of the Bay ecosystem as well as flood protection and carbon sequestration. A variety of shoreline features and development exist around the Bay, some of which are more vulnerable than others, and all present unique challenges for protection and adaptation to sea level rise[3]. Discovering ways to protect shoreline development and wetlands is one of the major challenges in adapting to future sea level rise.

Figure 1.20 Typical Section: Subsided Land with Structural Shoreline Protection

Source: BCDC



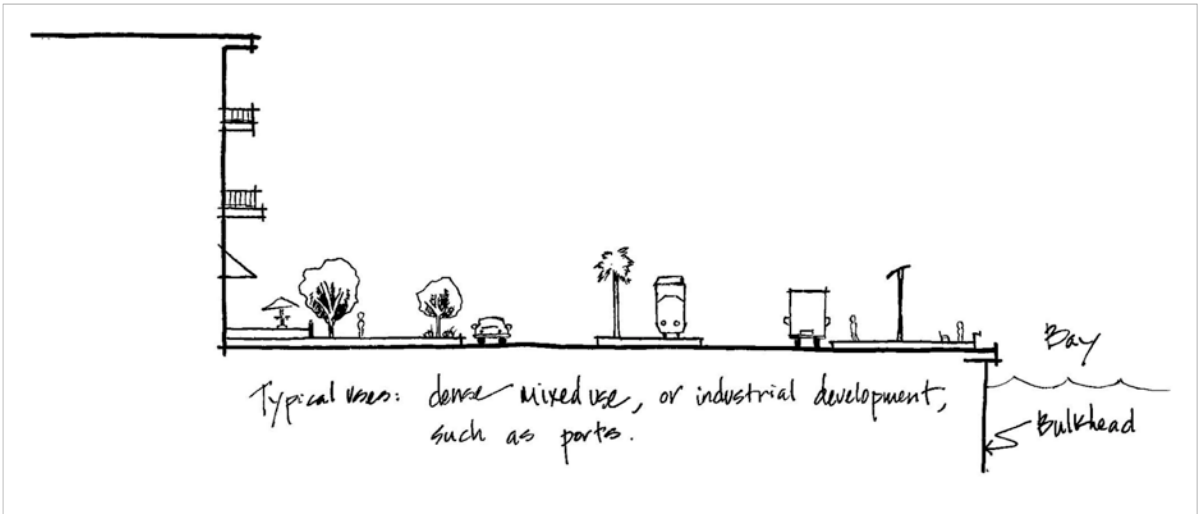
Sea level rise and flooding on the Bay shoreline will lead to a greater risk of erosion, causing local governments and landowners to evaluate protection techniques and strategies. Currently, static structures or structural protection, such as seawalls, riprap revetments and levees, are the most common form of protection against flooding and erosion along the shoreline (Figures 1.20-1.22). Although expensive, these structures are attractive options because the engineering

[3] A series of figures showing typical shoreline conditions are included to further an understanding of the variety of shoreline conditions discussed here and in future chapters.

standards for their design and implementation are fully developed and widely used (BCDC 1988a, Smits et al. 2006). Static structures on the edge of a dynamic Bay shoreline can result in erosion of adjacent tidal flats or marshes and eventually the flood protection itself (Williams 2001, Lowe and Williams 2008, Schoellhammer et al. 2005, Smits et al. 2006, Heberger et al. 2008).

Figure 1.21 Typical Section: Urban Shoreline with Bulkhead

Source: BCDC

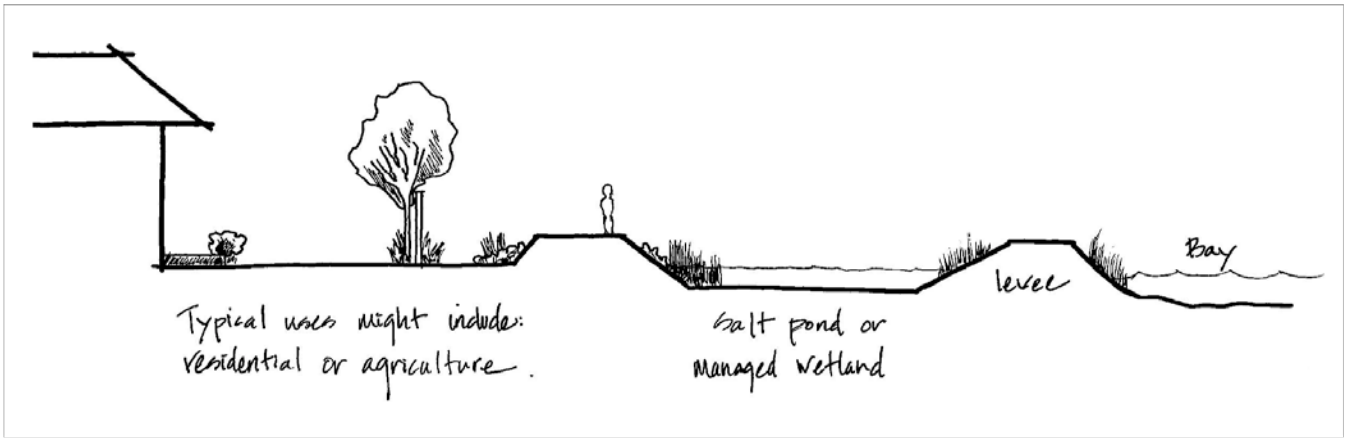


Construction and maintenance of shoreline protection typically requires fill in the Bay (BCDC 1988a). From 1978 to 1987, BCDC authorized nearly 300,000 cubic yards of fill for shoreline protection, most of which was used to construct riprap revetments (BCDC 1988a). Many of these revetments degraded tidal flats that provide important habitat to birds and dissipate wave energy. Thus, residential communities and infrastructure on the shoreline, as well as the Bay ecosystem, may be significantly impacted by the cumulative effect of additional engineered structures along the Bay shoreline to address sea level rise.

Both the construction and maintenance cost of protection structures increases over time, particularly as sea level rises and the damaging effect of storms increases. Since 1990, the construction cost of a waterside levee rose to approximately $1,500 per linear foot, a 320 percent increase, and seawalls are even more expensive at approximately $5,300 per linear foot (Heberger et al. 2008). Maintenance costs range from 1-15 percent of the construction cost per year over the life of the project, which does not include the cost of damages to public safety, infrastructure, or the ecosystem (Heberger et al. 2008).

Figure 1.22 Typical Section: Wetlands and Levees

Source: BCDC



The Pacific Institute reports that statewide the cost of protecting against a 55-inch rise in sea level using static structures would be $14 billion. This cost estimate assumes that, throughout the Bay, levees are sufficient to provide shoreline protection. However, the existing shoreline protection is a mix of levees, riprap and bulkheads or seawalls. Evaluating the full cost of protection measures on the Bay shoreline requires a full assessment of existing structures, both in terms of the level of flood protection and the resistance to erosion under sea level rise projections. In many cases, the wave energy will be sufficient that local governments may desire the additional protection of a seawall, which is far more expensive. Furthermore, Bay levees are constructed, in many cases, using loosely compacted Bay mud that are often insufficient to support the additional weight of material required for retrofitting (URS 2005, PWA 2005). This deficiency is offset, to a degree, because the cost estimate is based on areas potentially exposed to sea level rise and flooding irrespective of whether current protection exists—a more risk-averse approach. Considering that there are multiple types of shoreline protection other than levees, and, that where existing levees cannot be raised, they may require replacement with an alternative method of protection, the Pacific Institute's cost estimate for the Bay is probably low.

Providing structural shoreline protection may actually increase vulnerability by encouraging development in flood-prone areas directly behind the structure and giving those who live behind the structure a false sense of security (Heberger et al. 2008, Smits et al. 2006, United Nations 2004). In areas of the Netherlands, as progressively larger protection structures were built, development behind the structures intensified and populations in those areas increased. The protection structures completely eliminated water circulation in several

estuaries, which were ultimately abandoned as functioning ecosystems (Smits et al. 2006). Large areas of the Mississippi Delta are being considered for restoration, in part, to restore previous wave attenuation benefits and help avoid repetition of the devastating impacts caused by Hurricane Katrina, a tragic example of relying too heavily on shoreline protection structures (Day et al. 2007). Loss of this ecosystem benefit is just one of the reasons for ambitious tidal wetland restoration efforts in the Bay-Delta estuary (Save the Bay 2007). While sedimentation and tidal wetlands alone may not completely protect against flooding and erosion (Jongejan 2008), early adaptation of existing development, prevention of new development in flood prone areas, and the flood protection benefit of tidal wetlands can help reduce the cost of adaptation.

The *San Francisco Bay Plan* (Bay Plan) requires a design review process for engineering projects, such as major shoreline protection works on fill. The Bay Plan also includes policies to guide the Commission decisions regarding compensatory mitigation for unavoidable adverse impacts resulting from projects in the Bay. Approving structural shoreline protection on a project-by-project basis may create additional, cumulative adverse impacts to Bay habitat. Analysis of these cumulative impacts and potential planning approaches that will minimize them are needed. Both the USGS and the USACE are currently investigating regional and local effects of shoreline inundation and flooding, respectively, in the South Bay. Additional analysis can provide local governments and landowners with adequate information for designing erosion control and shoreline protection (Knowles 2008, USACE 2008).

Summary and Conclusions

The planet is getting warmer and there is broad scientific consensus that human release of GHGs is driving this change. Greenhouse gases that naturally reside in the earth's atmosphere, absorb heat emitted from the earth's surface and radiate heat back to the surface—a natural process called the "greenhouse effect." The planet is now warming at an accelerated rate due largely to the rapid release greenhouse gases into the atmosphere since industrialization. Temperatures in California are projected to rise between 1.8°F and 5.4°F (1°C and 3°C) by mid century and between 3.6°F and 9°F (2°C and 5°C) by the end of the century. As air temperatures warm, the oceans warm, glaciers and ice sheets melt, causing sea level to rise.

A range of sea level rise projections has been estimated, but they may not adequately reflect future contributions from ice-sheet melt. The estimates for this analysis are based on higher GHG emissions scenarios. Choosing a higher scenario is a more risk-averse approach to protecting public safety. Two sea level rise scenarios were selected for analysis: a 16-inch (40 cm) sea level rise by mid-century and a 55-inch (140 cm) rise in sea level by the end of the century. These scenarios are generally consistent with other state SLR estimates.

Extreme storm events will cause most shoreline damage from flooding. Changes in climate may increase storm activity, which, in combination with higher sea level, will result in more frequent and extensive flooding. The data used for this analysis reflects storm activity, but does not include wave activity. With the 16-inch projection, 180,000 acres (281 square miles) of shoreline are potentially exposed to more flooding or permanent inundation by mid-century and 213,000 acres (332 square miles) are at risk from a 55-inch sea level rise at the end of the century.

Structural shoreline protection can hold floodwaters back from the shoreline. Incorporating both engineering and ecosystem elements can be used to in some cases to mitigate some of the impacts of structural shoreline protection (Lowe and Williams 2008).

Cumulative impacts of structural shoreline protection can have far reaching adverse impacts to the Bay ecosystem. Because structural shoreline protection requires long-term maintenance and can have unintended adverse impacts, it should be seen as only one of several adaptation options for a shoreline area (BCDC 1988a, BCDC 1988b, Smits et al. 2006).

CHAPTER 2
Shoreline Development

Vibrant cities, towns, communities, international airports, critical businesses, research facilities, freeways, railroads, farms, parks, trails and important habitat areas stretch along the shoreline of San Francisco Bay. These shoreline land uses are essential to the region's economy, provide needed housing and jobs for the region's residents, provide habitat for many ecological communities and allow the public to enjoy the Bay. In short, continued, productive use of the shoreline is the cornerstone of the region's prosperity and fosters a strong bond between the region's residents and the Bay.

The nine-county San Francisco Bay Area is home to approximately seven million people, making it the nation's fifth most populous urban center. All nine counties—San Francisco, San Mateo, Santa Clara, Alameda, Contra Costa, Solano, Napa, Sonoma, and Marin—front on the Bay. There are 101 cities within the region and 46 cities situated along the shoreline making the San Francisco Bay one of the world's most urbanized estuaries. The Bay Area's three largest cities are, San Jose (pop. 945,942), San Francisco (pop. 805,235), and Oakland (pop. 390,724) (U.S. Census Bureau, 2010).

The San Francisco Bay Area is one of the most economically productive regions in the nation (Bay Area Council Economic Institute, 2008). The highly skilled workforce is employed in a variety of fields, including health care, technology, information services, finance, education, life sciences, manufacturing and retail. The natural harbor and its proximity to Pacific trading partners allow the region to export more products than most states (Bay Area Council Economic Institute, 2008). The Bay Area is also home to some of the world's leading universities and research institutions making it a key global center for innovation.

If no adaptation measures are taken, an estimated 270,000 people in the Bay Area will be at risk of flooding from a 55-inch rise in sea level—a 98 percent increase over the region's current vulnerability to flooding (Heberger et al. 2009). Shoreline development at risk (buildings and their contents) is estimated at $62 billion—nearly double the estimated cost of sea level rise flood risk along California's Pacific Coast (Heberger et al. 2009). Where lives and property are not directly vulnerable, the secondary and cumulative impacts of sea level rise will affect public health, economic security and quality of life.

Shoreline planners and managers already face challenging issues, such as managing competing land uses, ensuring that shoreline areas are available for water-dependent uses, upgrading aged infrastructure, reducing traffic congestion, protecting habitat and water quality, maintaining flood protection, and providing public shoreline access. In this chapter, shoreline vulnerability is assessed to understand planning and management challenges that may be exacerbated with climate change and identify new challenges that may arise.

Residential Land Use

Land use patterns vary significantly within the region. San Francisco County is the most urbanized with 82 percent of its land developed, while rural Napa County, a highly productive agricultural area, has less than four percent of its land developed. Approximately 16 percent, about 700,000 acres (1,093 square miles), of the region's 4.4 million acres (6,875 square miles) are developed. Over half of this urbanized area is residential and approximately 40 percent contains employment centers, major infrastructure and schools (ABAG 2008). In addition to urban areas, the region has extensive, productive agricultural lands and abundant open space and parks. Within the area potentially exposed to a 55-inch rise in sea level, approximately 51 percent is residential, 32 percent is commercial, and 14 percent is industrial.

Much of the shoreline is former Bay that was filled to create land for housing. Construction of levees along the Bay margin and channeling of creeks and rivers opened up large tracts of land for residential development, most of which is in the current 100-year floodplain. In accordance with the National Flood Insurance Program standards, local governments established elevation requirements for levees, homes, and local roads in floodplains to lessen potential flood risks. However, these standards are based on past flooding events rather than future sea level rise and storm events. Residential development located on subsided land and near the mouth of Bay tributaries—especially at the head of tide where high tide meets tributary outflow—are particularly vulnerable to flooding. One such community is the town of Alviso, in northern San Jose, which is subject to both sources of vulnerability—it has significantly subsided below sea level, sits in close proximity to Alviso Slough, and has suffered periodically from devastating floods. Storm-related flooding also affects some communities in other low-lying and riparian areas, such as Corte Madera and Petaluma.

Difficult choices at the local and regional level are required to determine how to protect housing from future flooding. Approximately 66,000 residential acres (103 square miles) are potentially exposed to a 16-inch sea level rise. Most of this acreage is developed with low-density housing (less than 5 residents per acre). However, 560 acres (0.8 square miles) have over

30 residents per acre and over 5,600 acres (8 square miles) have between 5 and 30 residents per acre. Over 82,000 residential acres (128 square miles) are vulnerable to a 55-inch sea level rise. While most of this area is used for low-density housing, over 1,000 acres (1.5 square miles) contain over 30 residents per acre and over 9,800 acres (15 square miles) contain between 5 and 30 residents per acre (Table 2.1).

Through the JPC, the Commission is a partner in an incentive-based program to focus development near transit and, thereby, reduce driving and GHG emissions. This program, among other important goals, should consider alternatives to siting residences in areas that are vulnerable to flooding (Box 2.1). In consultation with local governments, the FOCUS program has identified Priority Development Areas for infill development in the Bay Area. These Priority Development Areas, along with other sites, are anticipated to be key components of the Bay Area's Sustainable Communities Strategy that will be adopted and periodically updated pursuant to SB 375. One of the Commission's objectives in adopting climate change policies is to facilitate implementation of the Sustainable Communities Strategy. Some shoreline areas that are vulnerable to flooding are already improved with public infrastructure and private development that has regionally significant economic, cultural or social value, and can accommodate infill development. In such cases, the regional goal of concentrating housing and job density near transit conflicts with the goal of minimizing flood risk by avoiding development in low-lying areas vulnerable to flooding. Reconciling these different worthy goals and taking appropriate action requires weighing competing policy considerations and would be best accomplished through a collaborative process involving diverse stakeholders, similar to that being undertaken to develop the Sustainable Communities Strategy.

Table 2.1 Residential Acreage Potentially Exposed to More Flooding or Permanent Inundation due to Sea Level Rise

Residential Land Use	Approximate Acreage Exposed to Flooding or Inundation	
	16-inch sea level rise	55-inch sea level rise
Low-density	59,900	72,100
Medium-density	5,600	9,800
Higher-density	560	1,000
Total	66,000	82,000

Source: U.S. Census Bureau 2000.

Box 2.1 The FOCUS Program

FOCUS is a partnership among ABAG, BAAQMD, BCDC, and MTC that encourages future development and growth in areas near existing or planned transit and within existing communities. It is a strategy to work with local and regional entities in the nine-county San Francisco Bay Area by identifying priority development areas (PDAs) that qualify local governments for financial incentives. Priority conservation areas (PCAs) are identified to preserve regionally significant resources, such as agriculture, natural or scenic resources and recreational areas.

PDAs are locally identified, infill development opportunities located within existing communities. They are generally areas of at least 100 acres (0.1 square miles) where there is local commitment to creating more housing in a pedestrian friendly environment that is served by one of the regional transit agencies. The approximately 150 PDAs comprise approximately 106,000 acres (165 square miles) of urban and suburban land. While this constitutes a small percentage of the region's total land area, the proposed areas could accommodate over half of the region's projected housing growth to the year 2035 at relatively modest densities (ABAG website, 2009). Importantly, the increased density around transit can be an effective strategy to reduce greenhouse gas emissions.

Forty PDAs, comprising over 60,000 acres (93 square miles), have a portion of area that is vulnerable to sea level rise. Approximately 2,000 acres (3 square miles) or three percent of the 60,000 acres are vulnerable to a 16-inch sea level rise. Ten percent, or 6,000 acres (9.3 square miles), are vulnerable to a 55-inch sea level rise. It is important to realize that this analysis was conducted with data that identifies the entire extent of the PDA's. It does not necessarily imply that actual development would occur within vulnerable areas. Future efforts should focus on determining the likelihood of secondary impacts upon the identified PDA's, such as impacts to surrounding transportation infrastructure. Appropriate adaptation strategies should be developed for any vulnerable site (Figures 2.1- 2.2).

Residents with Increased Vulnerability. One definition of a resilient community is a community that "takes intentional action to enhance the personal and collective capacity of its citizens and institutions to respond to, and influence the course of social and economic change" (CCE 2000). A critical characteristic that enables communities to respond to and influence social and economic change is their current economic security, because it adds to their overall feeling of safety and security (Coburn 2008). Other attributes of resilient communities, such as active participation in democracy, willingness to draw on resources within the community, or confidence (Coburn 2008) may be compromised by a lack of economic security. For example, a low-income community may have a willingness to draw on resources within the community, but several of the essential resources on which to draw are missing: money being the obvious resource; or time spent working and commuting that might otherwise be available as a resource.

A number of low-income communities on the Bay shoreline are potentially exposed to sea level rise. A disproportionate number of low-income residents are potentially exposed to a 55-inch rise in sea level in five Bay Area counties: Contra Costa, Solano, Sonoma, Marin, and Napa (Heberger et al. 2009)[1].

[1] This information comes from a statewide study of coastal and Bay shoreline impacts. Marin and Sonoma Counties may or may not have greater proportions of low-income residents on the coast or Bay shoreline. Furthermore, because the study applies statewide, a lower percentage was used in the calculation of low-income that may exclude some Bay Area residents (see "5" below).

A low-income community is an area where 30 percent or more of the households earn less than 200 percent of the national poverty threshold.[2] Low-income communities are less likely to have sufficient resources to rebuild housing after a flood or to relocate. The canal district in San Rafael (Figure 2.3) is an example of a predominantly low-income community that is highly vulnerable to flooding.

Low-income communities are likely to be less resilient to the indirect, cumulative impacts of climate change and adaptation efforts. For example, a 16-inch sea level rise will only reach the margins of low-income neighborhoods in Redwood City, East Menlo Park and East Palo Alto (Figure 2.4). However, critical transportation infrastructure that traverse these areas—Highway 101 and the entrances to the Dumbarton Bridge, and Caltrain railroad—will likely be significantly affected by sea level rise. Retrofitting this essential transportation infrastructure could have direct impacts on these neighborhoods. For instance, construction activity on transportation infrastructure can change or disrupt access to public transportation, local shopping, jobs, or medical centers. Easy access to such facilities is something that an automobile owner or an individual with more flexibility in their work schedule takes for granted. On a regional level, the impacts from disruption of services would be offset by the benefits from retrofitting important highways and rail corridors. Low-income households may have fewer resources or alternatives available to withstand interim impacts.

A recent report by the California Climate Change Center estimates that 150,000 Asian, black and Latino residents live in areas at risk of a 100-year flood event along the Bay with a 1.4-meter rise in sea levels (Heberger et al. 2009), and confirms that "along the San Francisco Bay…communities of color are disproportionately impacted by sea-level rise" (Heberger et al. 2009). Bay Area counties with populations that disproportionately include people of color vulnerable to sea level rise, compared to the county as a whole, are Contra Costa, Marin, Solano, Napa, Sonoma, Alameda and San Mateo (Heberger et al. 2009). The report concludes that "the greater proportion of people of color in areas affected by a 1.4-meter sea-level rise highlights the need for these counties to take concerted efforts to understand and mitigate potential environmental injustice" (Heberger et al. 2009).

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[2] These thresholds are maintained by the U.S. Census Bureau and are scaled based on size and age of a household. Two hundred percent of the national poverty threshold is the standard equation used by other Bay Area agencies to represent low-income based on the standard of living requirements in the Bay Area.

In such communities, it is especially important to take proactive measures to prevent harm and reduce vulnerabilities, such as reinforcing residential buildings, obtaining insurance, storing emergencies supplies, and having access to transportation, evacuation services and emergency medical care. This may be particularly difficult in areas with high concentrations of rental housing and low English-speaking populations. In areas potentially exposed to sea level rise along the Bay, there are currently 47,000 rental households and 9,700 "linguistically isolated" households (meaning no one over the age of 14 speaks fluent English, (Heberger et al. 2009). People of color in California also live disproportionately near (within 3 kilometers) hazardous waste facilities (Heberger et al. 2009). It is estimated that 130 EPA-regulated sites that contain hazardous wastes are currently potentially exposed to a 100-year flood event in San Francisco Bay; the number of facilities at risk increases to 330 with a 1.4-meter rise in sea levels (Heberger et al. 2009). Additional studies are needed to determine where vulnerable populations are located in proximity to these and other sites with hazardous or toxic substances. The California Climate Change Center notes, "what we choose to protect and how we pay for it may have a disproportionate impact on low-income neighborhoods and communities of color" (Heberger et al. 2009).

Some residents are more vulnerable to sea level rise because it would be physically difficult to evacuate in the case of an emergency flood situation or more difficult to relocate if special facilities are required. People with disabilities, the elderly, or those who are already ill may experience these difficulties. Children will also have greater difficulty evacuating, requiring the assistance of their parents. Single parents may face particular difficulty helping children evacuate or relocating to a new home. Additionally, these populations are more vulnerable to a drop in economic status, which could subject them to the additional vulnerabilities faced by low-income residents. Additional research is necessary to develop more information on the potential impacts to particularly vulnerable populations and to develop quantitative data on their vulnerability to future flooding. This should be a high regional priority.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

No data

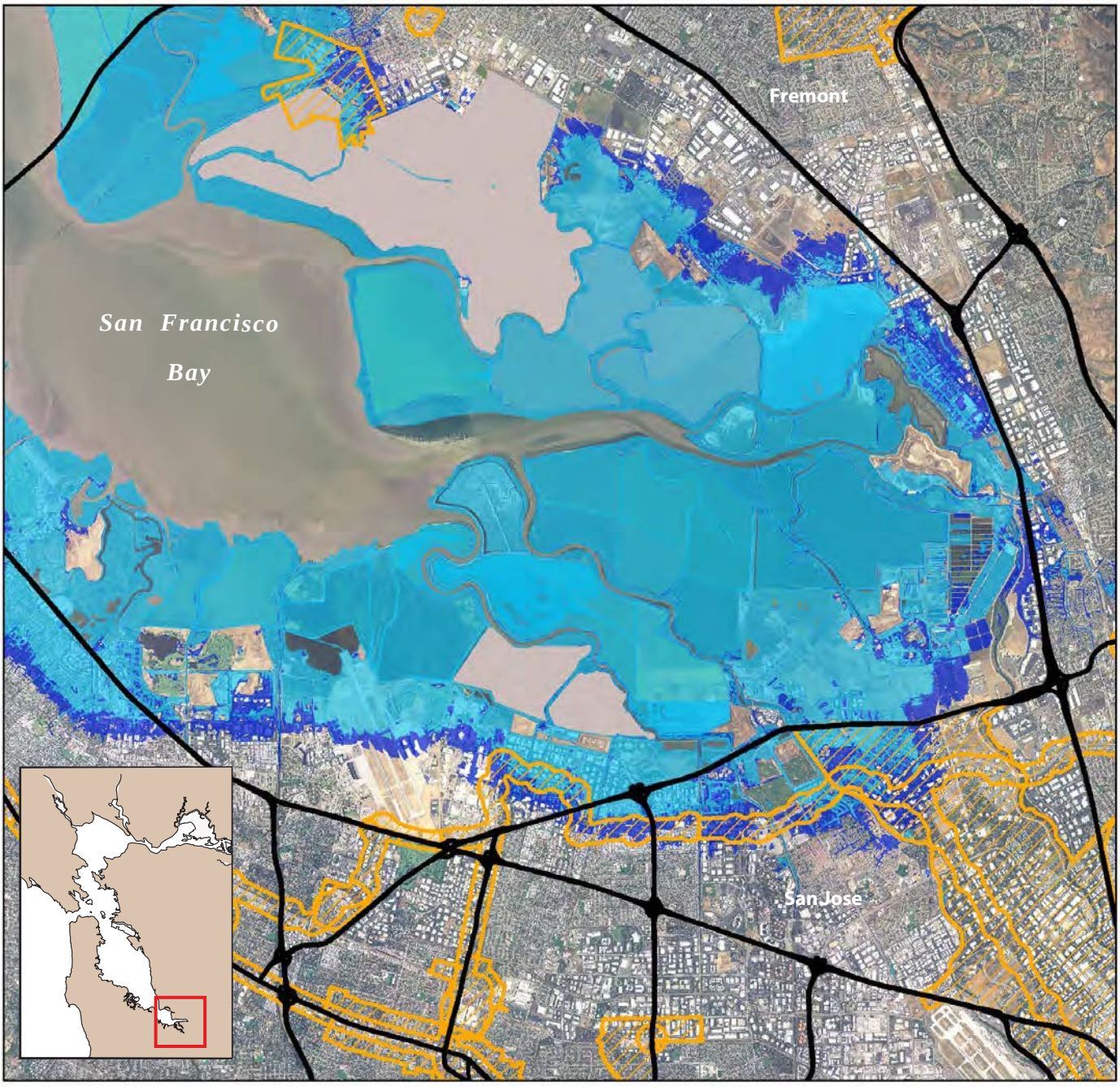
Priority Development Area — Major Roads and Highways

South Bay
Priority Development Areas
Potentially Exposed to Sea Level Rise

0 1 2 3 MILES

NORTH

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Sea level rise data provided by:

USGS science for a changing world

SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002; ABAG, 2008.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

No data

Priority Development Area

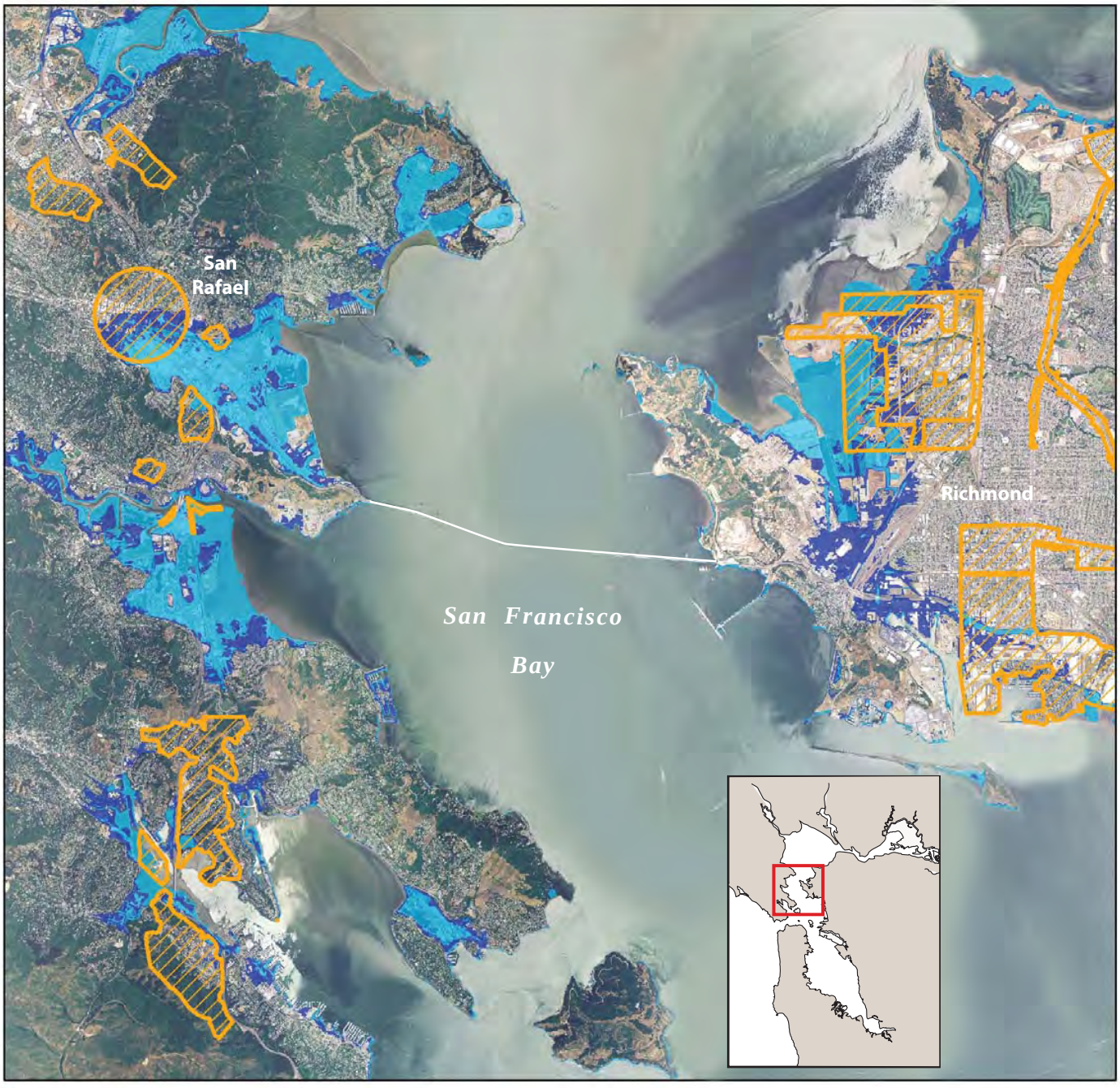
Major Roads and Highways

Central Bay North
Priority Development Areas
Potentially Exposed to Sea Level Rise

0 1 2 3 MILES

NORTH

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Sea level rise data provided by:

USGS science for a changing world

SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002; ABAG ,2008.

30% or more of the households below Federal Poverty Level

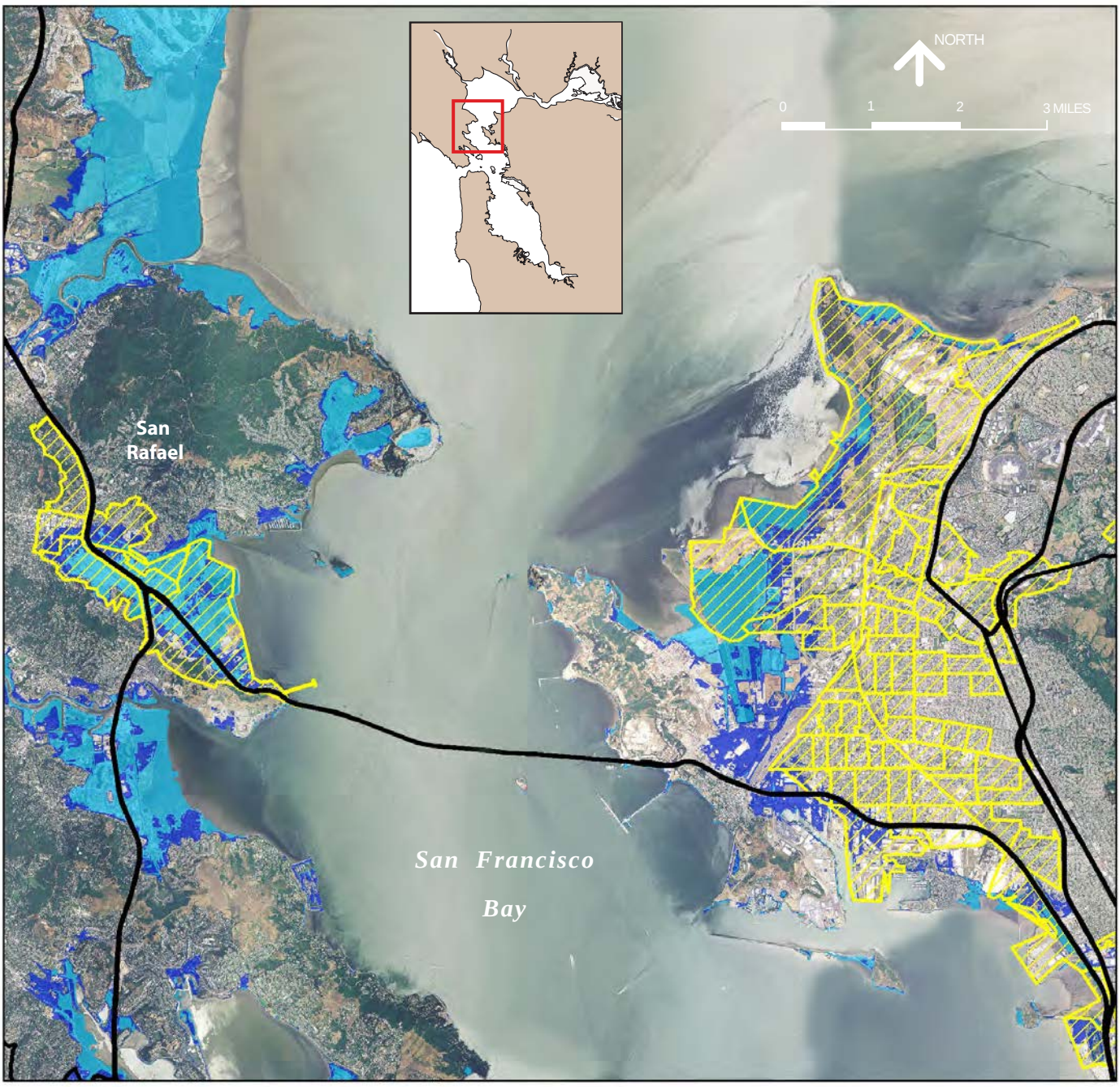
Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Major roads and highways

Central Bay North Low Income Residential Areas Potentially Exposed To Sea Level Rise

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30% or more of the households below Federal Poverty Level

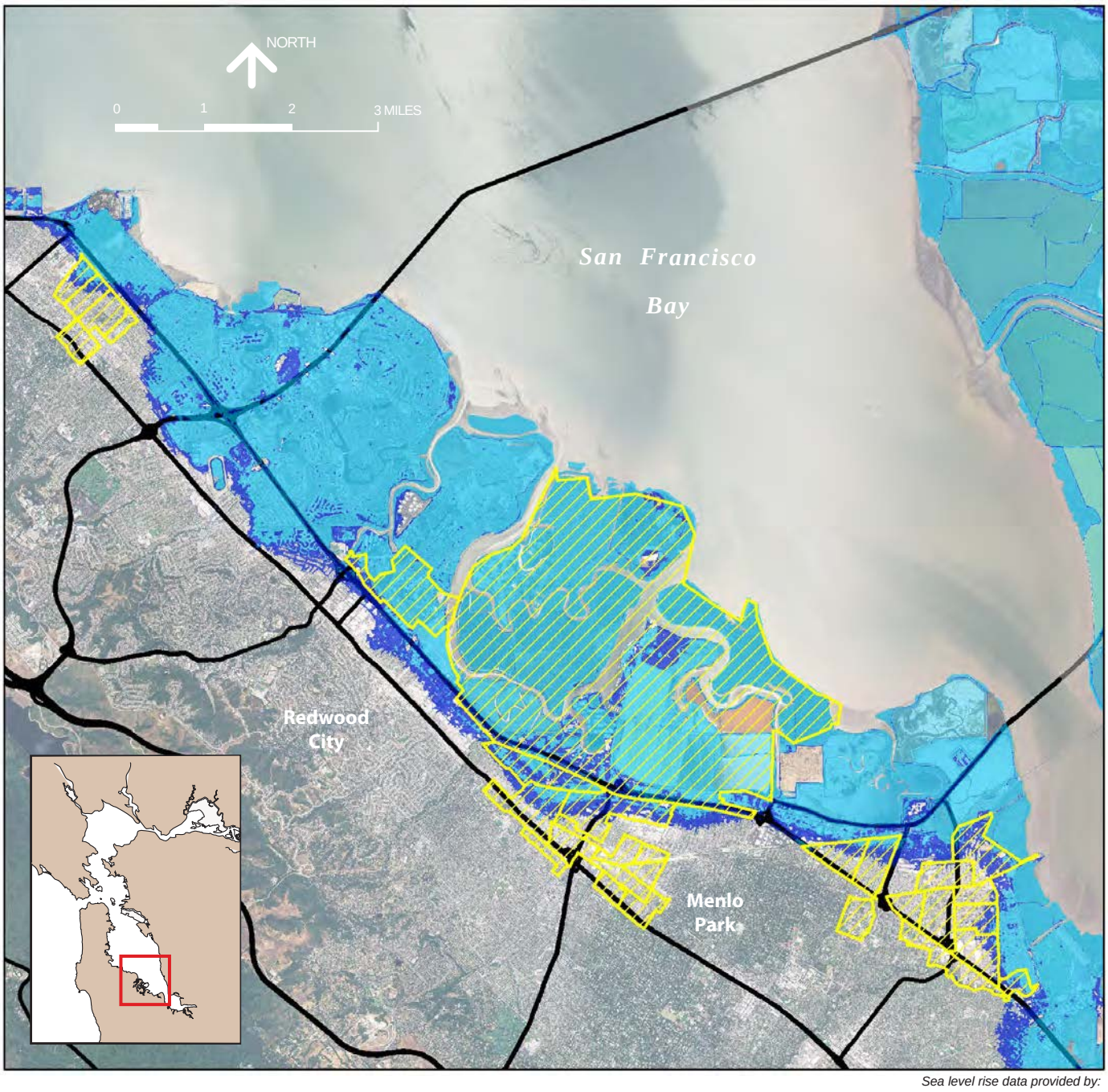
Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Major roads and highways

Central Bay South Low Income Residential Areas Potentially Exposed To Sea Level Rise

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Sea level rise data provided by:

USGS science for a changing world

SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002; Census Bureau, 2000.

Schools and Emergency Services. Important civic institutions such as schools, fire stations and hospitals are at increased risk of flooding under both sea level rise scenarios. Thirty-five schools are located in the current 100-year flood plain—where the risk of flooding increases substantially by mid-century. That number increases to 81 with 55-inches of sea level rise (Heberger et al. 2009). Eleven fire stations, nine police stations, and 42 healthcare facilities are potentially exposed to flooding or permanent inundation with 55-inches of sea level rise (Heberger et al. 2009). The extent to which this could compromise emergency response in an extreme event requires additional attention in coordination with the Federal Emergency Management Agency, cities and counties.

Commercial and Industrial Land Use

In 1969, when the Legislature adopted the Bay Plan into law, it recognized that some regionally significant land uses require a shoreline location. Without protecting shoreline areas for these land uses, there would be future pressure to fill the Bay to accommodate them. Therefore, the Bay Plan designates areas of the shoreline that are suitable for water-oriented priority uses: airports, ports, water-related industry, wildlife refuges and waterfront parks and beaches. Currently there are 86 designated areas comprising over 167,000 acres (260 square miles) throughout the nine-county region. These priority use areas help make the Bay Area one of the most economically prosperous, ecologically rich and healthy urban centers in the world and they all will experience some increase in potential exposure to flooding.

Airports. Two international airports in the region, San Francisco International (SFO) and Oakland International (OAK) are located on the Bay shoreline. These two airports provide important linkages with international and domestic trading partners and serve as major hubs of the national and global air passenger system and air cargo network.

SFO is the principal international air passenger gateway within the region. In 2010, SFO was the ninth busiest airport in the country at over 39 million passengers, up from 36 million passengers in 2007 (Airports Council International-North America 2010). In 2010, SFO also handled 427,000 metric tons of cargo, down from 563,000 metric tons in 2007 (ACI-NA 2010). In 2010, OAK handled approximately 9.9 million passengers, down from 14.8 million passengers in 2007 (ACI-NA 2010). Additionally, OAK handled roughly 511,000 metric tons of cargo in 2010, down from 648,000 metric tons in 2007 (ACI-NA 2010). Air cargo is the fastest growing segment of the goods movement economy and is forecast to triple in the next twenty to thirty years (MTC, 2004).

Both airports have limited land available for expansion of passenger and cargo facilities and runways. Funding for such improvements is limited due to federal budget constraints and the deteriorating financial health of national airlines. The two airports cover approximately 4,700 acres (7.3 square miles) along the shoreline of the Bay. Without any shoreline protection, over 3,400 acres (five square miles) or 72 percent of these designated lands would be potentially exposed to a 16-inch sea level rise while approximately 4,400 acres (six square miles) or 93 percent of these designated lands would be potentially exposed to a 55-inch sea level rise (Figure 2.5).

At OAK, the perimeter dike serves as the flood protection system for the airport's South Field, including the main air carrier runway and passenger terminal facilities. The dike was constructed using dredged bay mud, sand, and gravel during the 1950s to 1970s. Two active fuel lines are buried under the dike crest. As part of its Airport Perimeter Dike Improvement Project, the Port of Oakland plans to construct improvements to the dike, portions of which currently do not meet FEMA 100-year flood protection standards (Port of Oakland, 2011). The Port estimates that the dike system protecting OAK can currently support approximately 36 inches of sea level rise at mean higher high water. Proposed dike improvements include, where necessary, raising the height of the dike, stabilizing inboard slopes, protecting against seepage, and strengthening portions of the dike that are vulnerable to seismically-induced liquefaction.

SFO was built on landfill and has addressed runway subsidence through a regular program of repaving and overlay. A partial seawall protects the runways and reduces their exposure to flooding. In order to address the gaps remaining in the existing shoreline protection system, SFO has been coordinating with FEMA to certify its seawalls and update flood maps. SFO is investigating the issue of storm surge to determine whether additional seawall or levee heights are needed and whether existing drainage is sufficient. As sea level rises, raising levees or other adaptation measures will be necessary to protect runways from flooding. Detailed vulnerability assessments for the airports will need to consider existing shoreline protection, extreme tides, storm surge, wind-driven wave run up and other factors.

Congestion within the highway networks that serve each airport makes airport access difficult for passengers and cargo distributors. SFO is linked to the highway transportation network via the U.S. 101 and also has direct Bay Area Rapid Transit (BART) passenger service. Segments of the U.S. 101 and the BART tracks near the airport are potentially exposed to a 16-inch sea level rise. OAK is linked to the region via the I-880 corridor, which is vulnerable to flooding near Port of Oakland and the Bay Bridge approach (Figure 2.6).

The Regional Airport Planning Committee—a collaborative effort between BCDC, the Metropolitan Transportation Commission and the Association of Bay Area Governments—was formed to address regional airport planning issues. During its recent update to the Regional Airport Systems Plan Analysis, the committee analyzed methods to reduce GHG emissions from airports and address the affects of future sea level rise.

Ports. There are five major ports in the Bay Area located at Oakland, Richmond, San Francisco, Redwood City and Benicia. Like the region's airports, the ports rely on the transportation network to move cargo and employees to and from the ports. The ports handle a variety of cargo types, including container cargo, dry bulk, break bulk, neo bulk and liquid bulk. Maritime cargo handled by these five ports was 19,114,199 metric tons in 2010, a 58 percent increase since 1994 (BCDC 2011). The Port of Oakland (Port), the nation's fifth busiest container port, handles the largest volume of cargo within the region and currently exports more cargo than it imports. In 2010, the Port handled over 2.3 million twenty-foot equivalent units (TEUs; a standardized size of the containers in which goods are shipped) (Port of Oakland 2011). The port generates over 28,800 direct, indirect, and induced jobs in the Bay Area, and an estimated 444,000 jobs in California are in some way related to the Port's activity (Martin Associates 2011). The Port was estimated to generate $3.7 billion annually for the regional economy in 2008 (MTC 2008). However, containerized trade declined sharply in 2008 and 2009 due to the recession (The Tioga Group 2009).

Commercial, residential, port, and other industrial uses compete for highly desirable shoreline property.[3] Port activities are normally inconsistent with commercial and residential uses and raise concerns over public health and noise. Constituencies are created that may oppose port improvements or expansion due to this perception. However, ports serve an important economic function and require shoreline locations. In addition to occupying waterfront sites, ports require maintenance activities that can impact the Bay: maintaining deep-water channels and berths through dredging for the movement of large vessels is not compatible with growth of estuarine ecological communities.

[3] Most of the property on which the Port of Oakland's marine terminals and other facilities are located is subject to the terms of State of California tideland trust grants, which generally limit land uses to harbor and airport uses and other uses of statewide interest, such as fishing, public recreation, and enjoyment of the waterfront.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Port and Water-Related Industry

Airport Waterfront Park, Beach

Major Roads and Highways BART Railroad

Central Bay West Shore Transportation Network and Shoreline Priority Use Areas Potentially Exposed to Sea Level Rise

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Sea level rise data provided by:

SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002; BCDC, 2009; MTC, 2009.

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SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002; BCDC, 2009; MTC, 2009.

Shoreline flooding and damage to Bay Area ports as a result of sea level rise would likely have a ripple effect through much of the west coast economy. All of the region's ports are vulnerable in varying degrees to projected sea level rise. Collectively, 2,700 acres (four square miles) of land is designated for port use. Approximately 100 acres (0.16 square miles) or four percent of land within the port areas are potentially exposed to a 16-inch sea level rise while approximately 500 acres (0.78 square miles) or 20 percent of land within the port areas are potentially exposed to a 55-inch sea level rise. Additionally, segments of the ground transportation network that make vital connections to the Port of Oakland are at greater risk of flooding (Figure 2.6). Several vulnerabilities exist in the Central Corridor, the major trade route in the region, which originates at the Port of Oakland, runs roughly parallel with I-80, and heads toward Sacramento and beyond.

Water-Related Industry. Water-related industries are those that require shoreline locations to receive and process raw materials and distribute finished products via deep water shipping lanes, rail corridors or highways. For example, water-related industrial operations include chemical and petroleum refining and storage, metal refining and fabrication, food processing, mineral resource processing and dredge material handling facilities.

The costs of doing business in the Bay Area rank among the highest in the nation. These high costs combined with other changes to the region's economy have driven many manufacturing jobs out of the region, resulting in a job loss of 11 percent since 1995 (Bay Area Economic Forum, 2004). Additional factors that have compromised the competitive advantage of Bay Area industries include, globalization, technology-driven improvements in productivity, a shift away from a manufacturing-based economy towards a service-based economy, as well as demographic shifts (Bay Area Economic Forum, 2004). Like ports and airports, water-related industries occupy desirable shoreline property that is subject to encroachment of mixed-use and residential land use into adjacent areas. Several communities have expressed interest in redeveloping water-related industrial sites with non-industrial development, continuing a trend that has been underway in the region for decades.

Collectively, designated water-related industrial lands cover approximately 12,350 acres (19 square miles). Approximately, 2,000 acres (3 square miles) or 16 percent of these designated areas are potentially exposed to a 16-inch sea level rise while approximately 3,500 acres (5 square miles) or 28 percent of these designated areas are potentially exposed to a 55-inch sea level rise. Future flooding could disrupt the operations of water-related industries and, thus, the provision of important resources to the region. For example, many of the petroleum refineries provide fuel for the region's airports, goods movement and commuters.

Table 2.2. Summary of Land Use Acreages Potentially Exposed to Flooding or Permanent Inundation due to Sea Level Rise

Land Use	Existing Area (acres)	Acreage Exposed to Sea Level Rise	
		16 inches	55 inches
Airports	4,700	3,400	4,400
Ports	2,700	100	500
Water-related Industry	12,350	2,000	3,500
Total	19,750	5,500	8,400

Indirect Effects of Sea Level Rise

In addition to the direct effects of sea level rise, such as increased flooding, sea level rise can be expected to have indirect impacts on groundwater. Sea level rise is expected to lead to salinity intrusion into groundwater along the shoreline, potentially impacting shoreline wells and shifting the coastal vegetation to more salt-tolerant species. Sea level rise will also raise the water table along the shoreline, increasing the risk of flooding by limiting the amount of precipitation that can infiltrate the ground. A higher water table will also increase the risk of soil liquefaction during an earthquake (Holzer 2006).

Public Health Impacts of Climate Change

Sea level rise is just one of many potential impacts of climate change on the San Francisco Bay region. Climate change is likely to impact public health in the region by changing conditions such as air quality, heat events, water quality and the distribution of vectors and infectious diseases. The populations most vulnerable to impacts include those who are already ill, people with disabilities, children, the elderly and the poor (Luers et al. 2006). The state currently experiences the worst air quality in the nation and over 90 percent of the population lives in areas that exceed either the ozone or particulate matter air quality standards. Ozone and particulate matter combined, contribute to over 8,800 deaths and $71 billion in health related costs per year (Luers et al. 2006). Higher temperatures will exacerbate air pollution by increasing the frequency, duration and intensity of conditions that lead to air pollution formation. Other factors such as wildfires contribute to unhealthy air quality conditions. In the summer of 2008, regional air quality was directly impacted by wildfires, which are expected to increase in frequency under climate change conditions.

Heat events are also likely to be more intense, last longer and occur earlier in the year relative to historical events (1961-1990) (Dreschler et al. 2005). Higher temperatures can lead to increased risk of heat-related illnesses (heat exhaustion, dehydration, heat stroke and respiratory distress) or mortality, particularly among the most vulnerable populations, such as the elderly, young children and people with chronic illnesses.

Water quality impacts on the Bay can affect Bay Area residents. Marine processes that affect the Bay ecosystem (Chapter 3) are impacted by temperature increases and sea level rise, which can kill phytoplankton, alter fresh and salt water mixing and upwelling, and disrupt primary productivity. Impacts upon these processes could lead to algal blooms and hypoxia, which could impact water quality.

Other public health impacts could include the potential for expansion of the range of infectious diseases and vectors as a result of changing environmental conditions. Vector borne disease may become a public health concern as the life cycles of organisms such as mosquitoes, ticks, fleas and rodents change as a result of climate change. Waterborne disease occurrences linked to storm runoff from heavy rainfall, flooding, and sewage overflow could become a health concern (Dreschler et al. 2005). However, predicting the impacts of vector borne diseases is challenging due to the multiple interactions between climate, host and vector organism, vector control programs and public response to control programs.

Other Shoreline Land Uses, Infrastructure and Institutions

Beyond the land uses that have been discussed above, there are other regionally important, non-recreational shoreline land uses, infrastructure, and institutions that may be vulnerable to future coastal flooding. These include water and sewage treatment plants, flood control channels, landfills, contaminated sites, pipelines, power transmission lines, schools, fire stations and hospitals.

Wastewater Treatment Facilities. Most of the Bay Area's water and sewage treatment facilities treat wastewater and sewage that is discharged in the Bay. There are 22 wastewater treatment plants on the shoreline that are vulnerable to a 55-inch rise in sea level (Heberger et al. 2009), many of which lack the capacity to handle current storm flows resulting in frequent sewage spills. Without modifying these facilities, more frequent storms associated with sea level rise will increase the number of spills in the Bay. Many treatment plants rely on gravity to discharge treated water into the Bay. As Bay water levels rise, this mechanism could fail and significantly impact facility operations. Flooding of treatment facilities can disrupt operations or damage pumps and related machinery. Should Bay waters exceed the elevation of plant intake structures, saltwater intrusion into treatment facilities will alter biotic conditions necessary for

the breakdown of waste material. Sea level rise will likely require significant investments to retrofit or relocate some sewage treatment plants. Although the Commission's law requires that new fill, such as intake structures, must minimize impacts to water quality, the San Francisco Bay Regional Water Quality Control Board has primary authority over water quality in the Bay.

Flood Control Channels. In addition to the rivers and creeks that feed the bay, there are a number of flood control channels that drain upland areas. Sea level rise and potential changes in the precipitation patterns may alter the flow dynamics of these channels. With higher Bay water levels and more extreme storm events, Bay water will intrude further into flood control channels making it more difficult for fresh water to drain rapidly from upland areas. This will increase flood risks in locations further upstream. More precise identification of upland areas near creeks and flood channels where this type of flooding may occur is needed for addressing future flood risks. Exploring alternative methods of flood control may be necessary.

Contaminated Lands. Prior to BCDC's creation, many municipalities filled the Bay for disposal of garbage and waste materials. These landfills contain contaminants and toxins. Some are still in operation while others have reached capacity, have been closed and converted to other shoreline land uses, such as waterfront parks. Higher sea levels and extreme storm events will cause flooding and erosion, or raise ground water levels that may impact the integrity of shoreline landfills and release contaminated leachate, adversely impacting ecosystems and public health.

In addition, there are a number of shoreline areas that contain contaminated land as a result of past industrial, commercial or military uses that were more common along the shoreline over the past century. For example, many of the retired shoreline military sites contain contaminated lands that have yet to be fully remediated. Many sites have been remediated with their wastes encapsulated onsite, under the assumption that they would remain upland and dry. If these sites become flooded, subject to groundwater intrusion or eroded, they could release contaminants. While extensive and ongoing efforts have been made to remediate contaminated sites around the Bay, it will be imperative to address this issue before contaminated sites begin to be impacted by sea level rise.

Pipelines and Transmission Lines. Numerous pipelines and power transmission lines cross under the Bay, cut across wetlands, and parallel the shoreline, distributing water, petroleum and energy. Transmission towers sit on footings within the Bay, which must be constructed at

elevations so that towers are either above high tide or can withstand increased exposure to corrosive salt water. The footings must also be engineered keep towers standing through extreme storm events.

Pipelines carry petroleum products across important wetlands, including the Suisun Marsh—one of the largest habitats on the Pacific Flyway, which is at great risk of flooding under both the 16-inch and 55-inch scenarios. In 2004, a 14-inch-in-diameter pipeline ruptured and discharged 123,774 gallons of diesel fuel oil into the marsh damaging approximately 224 acres (0.3 square miles) and injuring a variety of birds, small mammals, fish, reptiles, and aquatic and terrestrial invertebrates (Kinder Morgan 2008). The California Department of Fish and Game's Office of Oil Spill Prevention and Response (OSPR) was instrumental in containing the spill. To prevent future pipeline spills that could be caused by rising sea level, OSPR and regulatory agencies must ensure that pipelines traversing the Bay, wetlands, and vulnerable uplands are retrofitted to withstand higher water levels or relocated.

The Regional Transportation Network

The Bay Area relies heavily upon its transportation network. Central to the quality of life enjoyed by residents and the region's overall economic prosperity, is an interconnected network of railroads, major roads and highways, BART, ferries and bicycle lanes. These transportation elements allow for the movement of goods within the region and with domestic and international trading partners, while providing mobility to residents by getting them from their houses to their jobs, families, friends and to recreational areas. Residents travel within the region by a variety of modes. In 2000, 83 percent of all trips within the region were made by auto, 10 percent by walking, 5 percent by transit and 2 percent by bicycle (MTC staff, 2009).

Transportation-dependent industries, such as ports and airports, employ almost half of the workers in the region. Goods-producing businesses spent approximately $8.6 billion on transportation in 2000 (MTC, 2004). The major roads and highways and rail network serve to link the regional ports and airports with inland markets including the important Central Valley agricultural economy. Projections for goods movement within the Central Corridor indicate that by 2016 goods movement along the corridor is projected to grow to approximately 90 million tons and will be valued at $101 billion (TCIF/MTC, 2008).

The transportation network also provides mobility to residents and includes the Bay Area Rapid Transit (BART) system, the regional rail and ferry network, sidewalks, trails, and a regional bike network. The BART system spans 104 miles, contains 43 stations and carries an average of 357,000 riders every week (BART, 2008). Passenger rail service is provided by a number of operators including Amtrak, Altamont Commuter Express (ACE) and Caltrain. Ferry service is provided by the Golden Gate Highway Transportation District, Blue and Gold Fleet,

Vallejo Baylink, and Harbor Bay Maritime. As of 2001, annual ferry ridership exceeded over 4,000,000 passengers and has been steadily increasing in the last decade (WTA, 2003). Bicycling within the region has also been increasing and a network of bike lanes is being linked to the public transportation network. Certain Bay Area cities have higher percentages of bike ridership including, Berkeley (4.9 percent) and Palo Alto (5.8 percent), when compared with the rest of the nation (0.1 percent) (U.S Census Bureau 2000 and MTC, 2001).

Major Roadways and Highways. Although the Bay is an essential part of life in the Bay Area, it is sometimes viewed an impediment to the mobility of goods (BCDC, 2005), requiring bridges to cross its water and long stretches of highway to traverse the shoreline. Trucks move most goods within the region, making major roads and highways a critical component of the goods movement network. This network supports local businesses that require delivery of supplies for production and finished products to consumers. Goods producing industries contribute $213 billion to the regional economy and account for 37 percent of the region's industrial output (MTC, 2004). Many of the major nodes of the goods movement network, such as ports and airports, are situated on the shoreline and are connected to producers and consumers via the road network. Four primary road corridors, I-880, I-580, I-80 and U.S. 101 handle 80 percent of the goods movement within the region. These roadways serve to link the major economic centers of the region, including San Francisco, Oakland, San Jose and Silicon Valley, thus providing mobility to the region's work force while also providing access to region's open space and myriad recreational opportunities.

The regional road and highway network is highly congested and many critical components of the network need repair. The congestion on Bay Area freeways, as measured by the daily vehicle hours of delay, has increased significantly from approximately 25,000 hours in 1981 to just over 160,000 (Caltrans District 4 HICOMP, 2008). Many of the major roads and highways, such as I-80 in Berkeley and U.S. 101 in the South Bay are situated between highly urbanized communities and/or critical infrastructure and the Bay, which constrains options for the expansion of the existing network. In other parts of the region, such as Highway 37 in the North Bay, the major roads and highways traverse the Bay and sensitive wetland communities. Avoiding adverse impacts on Bay resources creates additional challenges and constraints for road expansion and maintenance projects to address the current maintenance needs and relieve congestion.

Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

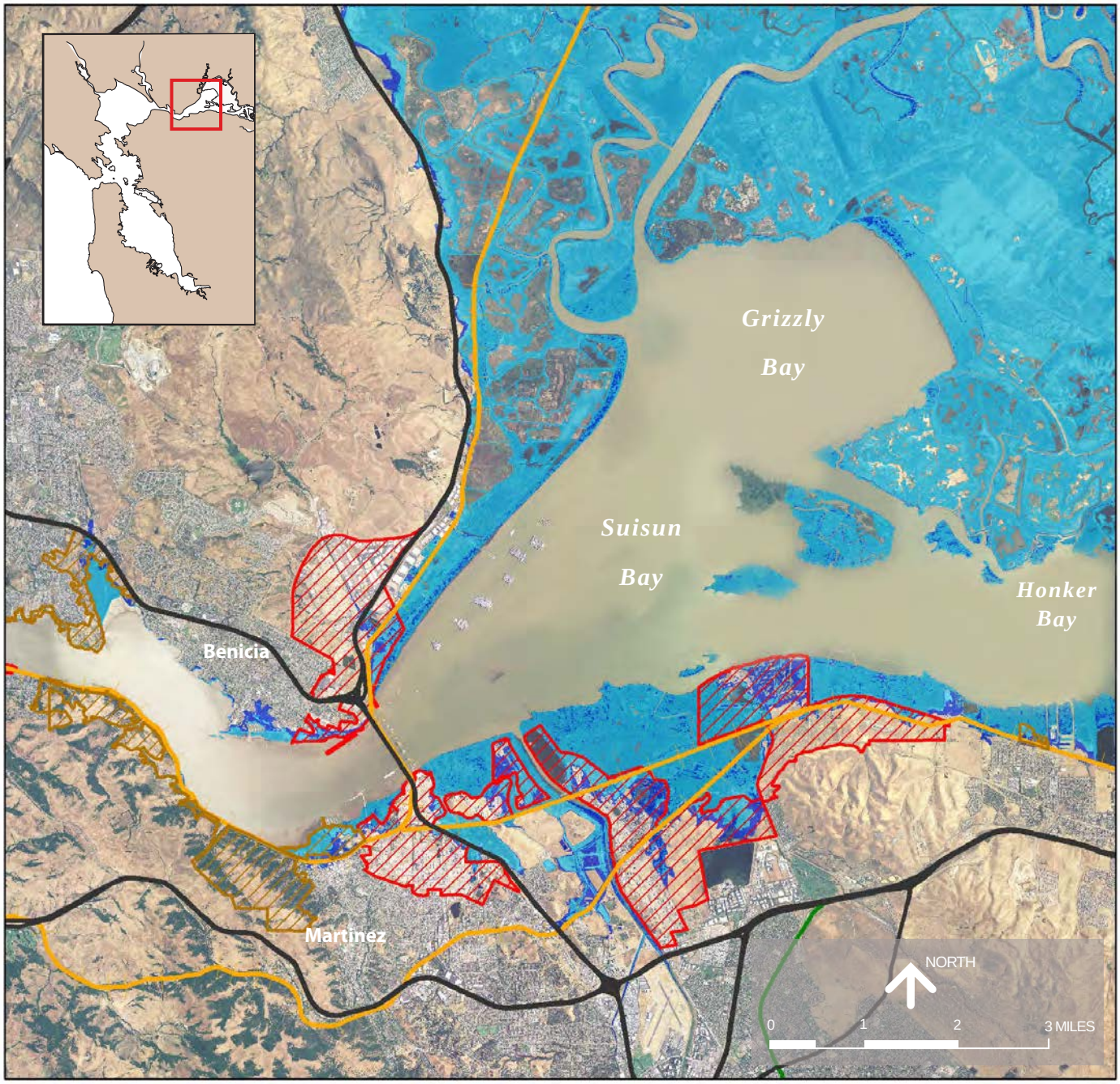
Port and Water-Related Industry

Airport Waterfront Park, Beach

Major Roads and Highways BART Railroad

Grizzly Bay Transportation Network and Shoreline Priority Use Areas Potentially Exposed to Sea Level Rise

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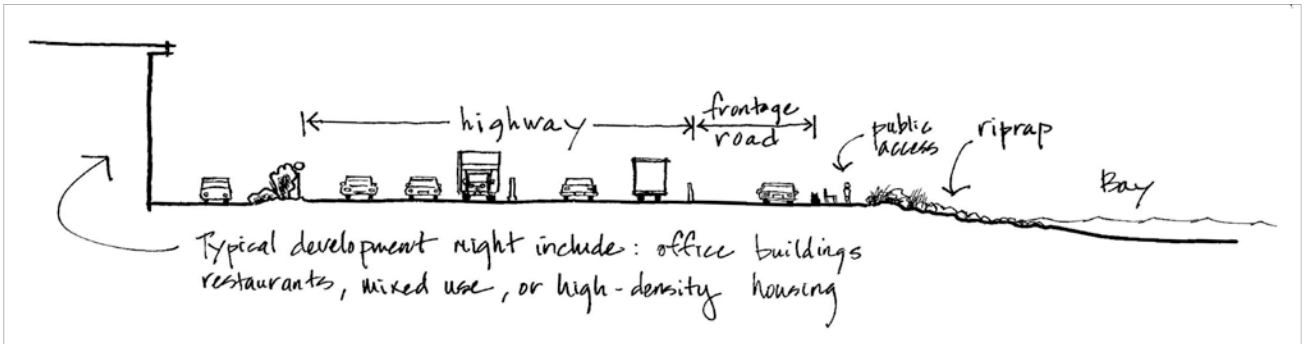
Sea level rise data provided by:

USGS science for a changing world

SOURCE: Knowles, N. 2008. Siegel, S.W. and P. A. M. Bachand, 2002; BCDC, 2009; MTC, 2009.

Figure 2.8 Typical Section: Highway Adjacent to the Bay

Source: BCDC



Because of their proximity to the Bay, many of the major roads and highways within the region may be significantly impacted by sea level rise and extreme flooding events. Approximately 99 miles of the major roads and highways within the region are potentially exposed to a 16-inch rise in Bay water levels and approximately 186 miles of major roads and highways are potentially exposed to a 55-inch rise. Interstate 880 along the eastern shoreline of the South Bay, U.S. 101 in Santa Clara, San Mateo and Marin Counties, Highway 37 in the North Bay, I-680, and Highway 12 in Solano County include significant portions of roadway that are potentially exposed to flooding (Figure 2.5-2.7).

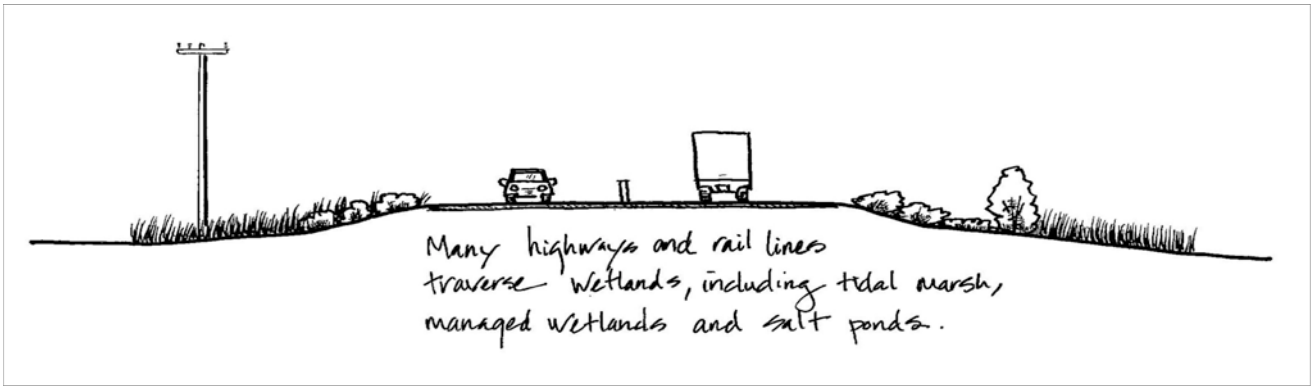
Many roads and highways will be subject to secondary impacts from sea level rise. For example, much of 1-80 along the Berkeley and Albany shoreline is not directly subject to flooding due to the existing elevation of the roadway (Figure 2.8). However, erosion from increased storm activity can undermine existing protective and/or highway structures, which can substantially increase the cost of maintaining the highway. Other secondary impacts may occur where traffic from one impacted road is diverted onto another road. Increased construction activity that is necessary to make transportation infrastructure more resilient to sea level rise can cause more congestion and impact residential communities adjacent to roadways. Congestion causes delays in the movement of goods throughout the region and adds time to residents' already lengthy commutes. Finally, the supporting structures of many of the region's bridges may be susceptible to unanticipated, prolonged contact with corrosive salt water.

Rail Network. The regional rail network has more than 600 miles of track, moves vast quantities of freight and passengers, and links the region with the Central Valley and inland areas (BCDC, 2005). Leading products moved by the rail system include, steel, waste, scrap, petroleum products, crushed stone and automobiles. (MTC, 2004). Freight service is provided by two Class I rail carriers, Union Pacific (UP), which links the region with Roseville and the

Central Valley, and Burlington Northern Santa Fe (BNSF), which links the region to Stockton and beyond. Many water-related industries, including oil refineries and auto terminals located along the shoreline of the East Bay rely heavily upon rail service. There are a number of locations along the rail network that link multiple transportation sectors. For example, intermodal areas are located near the Ports of Richmond and Oakland. These ports rely heavily on rail to transport inbound cargo containers to inland processing and manufacturing locations. Likewise, the rail network serves to bring cargo from inland locations for export to trading partners.

Passenger service links the major jobs centers in San Francisco, Oakland and San Jose with other Bay Area cities and towns and with inland cities in the Central Valley such as Sacramento and Stockton. The primary passenger rail service providers include, Bay Area Rapid Transit (BART), San Francisco MUNI, Caltrain, Amtrak's Capitol Corridor, and Altamont Commuter Express (ACE). BART is an especially critical component of the region's passenger rail network, providing commuter service for residents in Alameda, Contra Costa, San Francisco and San Mateo counties.

Figure 2.9 Typical Section: Highway or Rail Line Through Wetlands
Source: BCDC



Except for BART and MUNI, Bay Area railroads use the same tracks for both passenger and freight service, which creates significant congestion. At-grade rail crossings slow traffic on rail and surface roads. Furthermore, freight demand is expected to grow upwards of 350 percent over the next 50 years (MTC, 2007) and many of the rail lines are in highly urbanized areas where options for major modifications or expansion are limited. Other stretches of rail are bordered by sensitive Bay habitats and ecological communities, which further constrain options for rail expansion (Figure 2.9).

Approximately 70 miles of railroad are potentially exposed to flooding or permanent inundation with a sea level rise of 16-inches while 105 miles are potentially exposed to a 55-inch sea level rise. The rail segments that are particularly vulnerable to flooding include, the Central Corridor where it passes through the Suisun Marsh (Figures 2.7), the tracks along the northern Contra Costa shoreline near Martinez, the Caltrain corridor on the Peninsula, the ACE, and Capitol Corridor in the South Bay. Because these rail segments are shared by multiple users and already experience congestion, flooding could paralyze rail service regionwide. The economic impacts of a system-wide rail failure would be staggering. Furthermore, protection of this infrastructure from sea level rise will also be costly and may require funds to be redirected from projects that address current pressures on the system.

Waterfront Parks and Beaches

Waterfront parks and beaches promote enjoyment of the Bay, the region's most important open space, and enhance the quality of life for Bay Area residents. Recreation on the shoreline and in the Bay foster a life-long bond between residents and the Bay, improves their health, and provides a respite from the stress of living in a crowded, high-paced urban environment (BCDC, 2006). Recreational opportunities can be found at beaches, parks, marinas, shoreline trails and water trails, boat launches and fishing piers. People use waterfront parks, beaches, and public access to hike, bicycle, kayak, swim, fish or just watch the sunset.

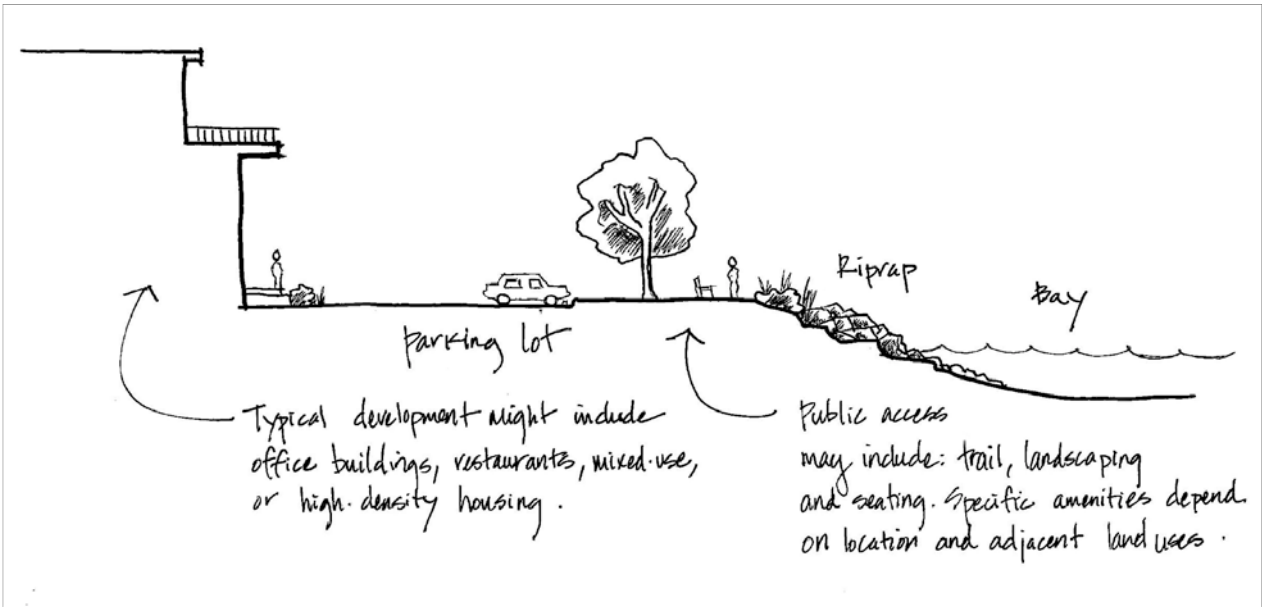
The region has an average of approximately 95 acres (0.1 square miles) of open space per 1,000 residents, much of which is located in hills surrounding the Bay (BCDC, 2006). Available open space and recreational lands may not be able to keep pace with the region's growing population. In the 1990's, population grew at two percent while the addition to the open space only grew at 1.1 to 1.6 percent per year (Bay Area Open Space Council, 1999). Creating shoreline recreational opportunities that reflect the diversity in race, culture, age and income levels is another important challenge. Some communities, particularly on heavily urbanized parts of the shoreline, lack sufficient open space and recreational lands. Many of the waterfront parks and beaches are the most accessible recreation areas to the highly urbanized and diverse communities along the shoreline. Prospects for expanding shoreline and Bay recreational opportunities are further limited by their proximity to sensitive habitat, the cost of purchasing shoreline property, and the long-term maintenance and operations expenses. In many cases, remediation of contaminants may also increase the costs of converting some sites to waterfront parks.

Approximately 23,000 acres (35 square miles) are designated in the *San Francisco Bay Plan* as waterfront parks and beaches. Approximately 3,250 acres (5 square miles) or 14 percent of the region's waterfront park and beach areas are located in areas potentially exposed to flooding or

permanent inundation with a 16-inch sea level rise. A 55- inch sea level rise would potentially impact approximately 4,300 acres (6 square miles) or 18 percent of the region's waterfront parks and beaches. As sea level rises, it will become more costly to maintain existing waterfront park and beach areas as well as to provide new recreational opportunities to meet the demands of a growing population. Furthermore, use of shoreline areas may increase as temperature increases result in more high-heat days. Finally, providing recreational opportunities along the shoreline that do not adversely impact sensitive ecological communities will likely contribute to the challenges of providing and maintaining shoreline recreational opportunities in the future, especially if sea level rise reduces the viability of Bay habitats.

Figure 2.10 Typical Section: Public Access

Source: BCDC



Public Access Required by BCDC

Another defining feature of the region's shoreline is the abundant and diverse public access opportunities that ring the Bay. Public access includes physical access to and along the shoreline as well as visual public access to the Bay from other public spaces. Shoreline public access includes waterfront parks, promenades, piers, trails, plazas, overlooks, and connections linking public streets to the Bay. BCDC has required shoreline public access as part of shoreline development since 1969. Every proposed shoreline development must provide "maximum feasible public access, consistent with a proposed project." As a result of BCDC permit requirements, there are 700 sites that provide over 300 miles of public access to and along the

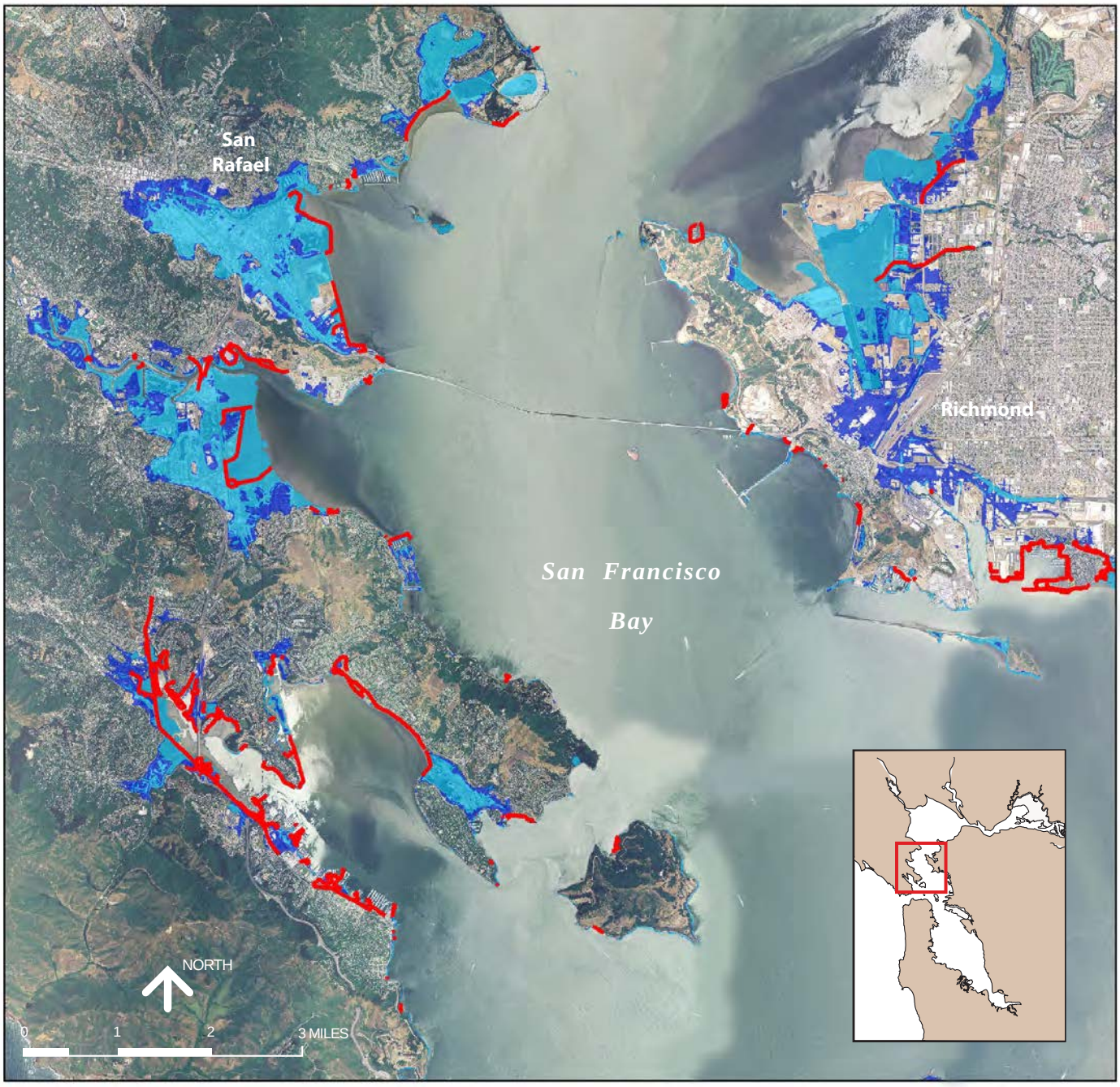
Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Public access required by BCDC

Central Bay North
Public Access Required by BCDC Potentially Exposed To Sea Level Rise

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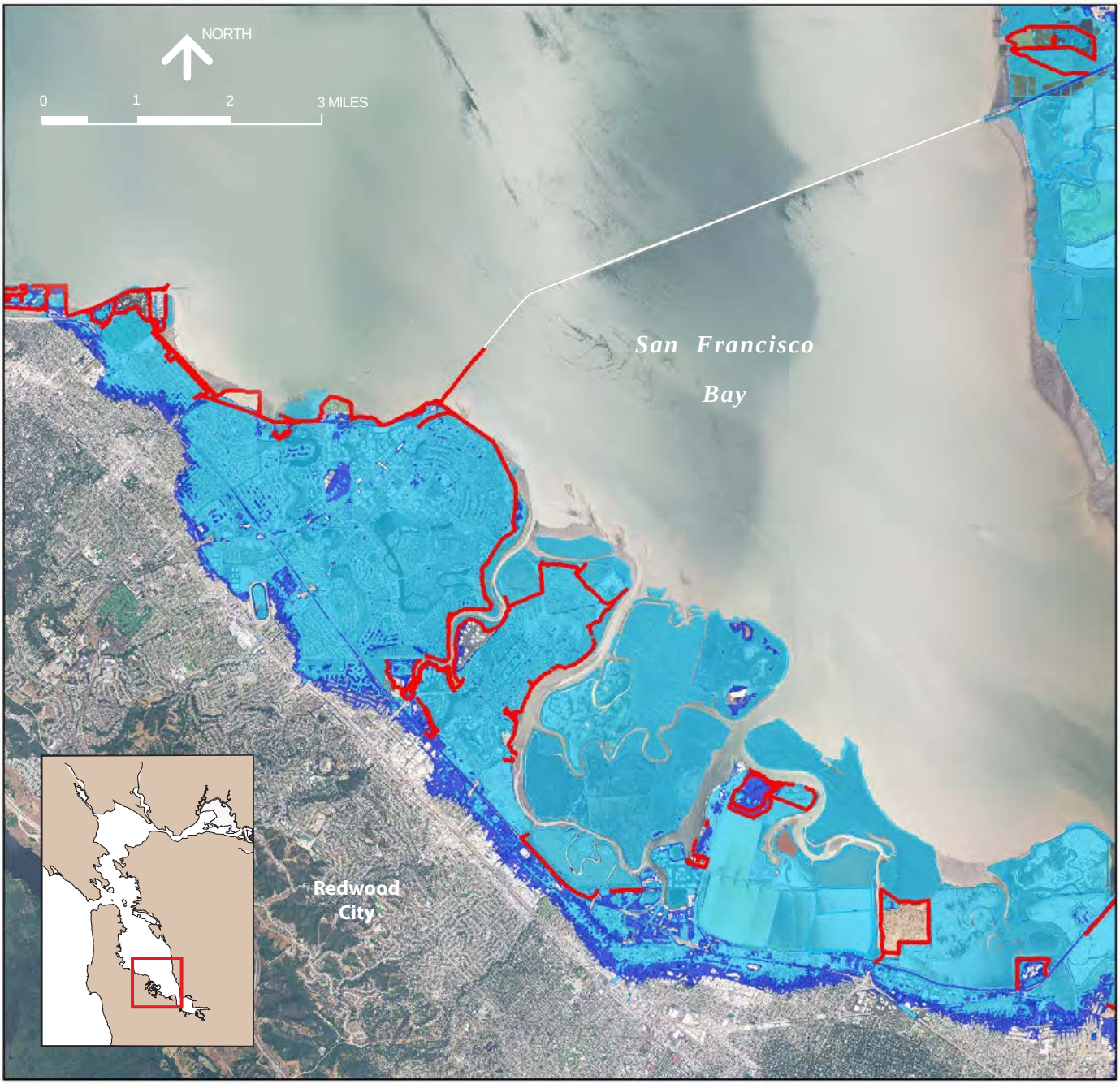
Area potentially exposed to an approximate 16-inch sea level rise

Area potentially exposed to an approximate 55-inch sea level rise

Public access required by BCDC

Central Bay West Shore Public Access Required by BCDC Potentially Exposed To Sea Level Rise

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approximately 1,000 miles of Bay shoreline. Public access generates regional benefits that are similar to waterfront parks and beaches. However, public access areas are usually smaller and associated with some type of development (Figure 2.10).

Many of the public access areas required by BCDC are also components of the San Francisco Bay Trail, which is a project to provide a recreational trail around the entire Bay. Some of the public access required by BCDC is part of a network of trailheads providing on-water access for non-motorized small boats and sail craft—the San Francisco Bay Area Water Trail.

The vast majority of public access is located within the Commission's 100-foot shoreline band jurisdiction (100 feet from the Bay) and, therefore, potentially exposed to flooding from sea level rise and storm activity. Over 400 public access sites, or approximately 57 percent, are located in areas that are potentially exposed to a 16-inch increase in sea level rise. Over 616 locations, approximately 87 percent, are located in areas exposed to a 55-inch increase in sea level rise (Figures 2.11 and 2.12). Public access located on elevated structures, such as fishing piers, bridges and wharves is not included in these estimates. The impacts to elevated public access features will largely depend on factors such as their design and construction as well as the resilience of the adjacent shoreline.

The increased likelihood of flooding will require difficult choices regarding the location, design and maintenance of existing and future public access. In urban areas, locating public access further inland may not be feasible. In open space areas, wildlife communities require adequate space and buffers to respond to sea level rise, which will further constrain public access siting and design options. Where structural shoreline protection is required, raising existing or constructing new structures may block physical and visual access to the Bay, especially where land has subsided. Access stairs or ramps to the top of shoreline protection structures may be necessary to provide access to the Bay. However, stairs or ramps may not satisfy the requirement to provide barrier-free public access to all, and new shoreline protection structures that also support public access will have to be designed with the needs of people with disabilities in mind. The widespread impacts to the region's existing public access will limit opportunities to provide a sense of visual continuity and connectedness for public access.

Summary and Conclusions

Residents, businesses and entire industries that currently thrive on the shoreline are subject to flooding by the middle of the century, and probably earlier. By mid-century, shoreline development located in the current 100-year flood plain will be subject to flooding from not just a 100-year flood, but from a high tide. A summary of these vulnerabilities is provided in Table 2.3. Approximately half of that development is residential, totaling 66,000 acres (103 square

miles). Over 82,000 acres (128 square miles) of residential development is potentially exposed to flooding by the end of the century. Where residents are not directly vulnerable to flooding, access to important services such as commercial centers, health care, and schools would likely be impeded by flooding of the service centers or the transportation infrastructure that links

Table 2.3 Summary of Shoreline Vulnerabilities

Shoreline Uses	Current and Expected Challenges	Projected Climate Change Impacts	Vulnerability Assessment		
			Degree of Sensitivity	Adaptive Capacity	Vulnerability
Residential	Significant residential acreage and disproportion-ate amount of low-income residents.	Widespread flooding of approximately 270,000 residents and 82,000 residential acres (128 square miles).	High- Lost investments and/or relocating residents has major financial and social repercussions. Low-income residents are especially sensitive.	Medium- for those with the resources. Low- for low-income residents.	High
Airports	Subsided runways at SFO. Difficulty moving goods on land from SFO & OAK.	Flooding of 72-93% of acreage for airport operations. Secondary impacts to ground movement of cargo and passengers from flooding of transportation network.	High- Airports are critical to the regional economy. They are especially sensitive to primary and secondary impacts of flooding.	High- Shoreline protection for runways and upgrading important ground transportation is costly, but would likely be a high regional priority.	Medium-High
Ports	Difficulty moving goods via highways and rail.	Moderate flooding of ports (4-20% of total acreage). Most flooding impacts regional goods movement.	Medium-High- Ports are central to the regional economy. Rail lines and highways essential to goods movement are sensitive to flooding.	Medium- Goods movement is central to port activities. Ports are unlikely to be burdened with the cost of transportation infrastructure.	Medium-High
Water-related Industry	High business costs and job loss. Competing shoreline uses.	Localized flooding, that is especially troubling for individual sites (16-28 percent of total acreage)	Medium- The industry is already losing jobs, but flooding is localized rather than widespread.	Medium- Flood damage or new shoreline protection would be concentrated in a few areas.	Medium

Continuation of Table 2.3 Summary of Shoreline Vulnerabilities

Shoreline Uses Continued	Current and Expected Challenges	Projected Climate Change Impacts	Vulnerability Assessment		
			Degree of Sensitivity	Adaptive Capacity	Vulnerability
Major Roads and Highways	Congested and in need of repairs.	Widespread flooding (99-186 miles), including key highways and interchanges.	High- Many highways are adjacent to the Bay and cross the Bay. Flooding projected on some key passenger and truck routes.	Medium- Current congestion and maintenance issues make costly adaptations difficult.	High
Rail	Congested with multiple users sharing single tracks.	Widespread flooding (70-105 miles of track), including key segments.	High- Rail lines carry passengers and freight, are located on low-lying lands, and wetlands. Freight demand projected to grow	Low- Current location of tracks limits options for expansion or modifications..	High
Waterfront Parks and Beaches	Bay Area population is growing faster than recreational opportunities. Expensive shoreline property limits potential conversion to waterfront parks.	Moderate flooding relative to other shoreline uses (14-18 percent of waterfront parks). Beaches receive widespread flooding.	Medium- Waterfront parks provide a unique experience that requires a shoreline location, but will experience moderate flooding.	Low There are few available locations for waterfront parks.	Medium-High
Public Access	Public access is required on a project-by-project basis, making regional coordination challenging.	Widespread flooding of most public access (57-87 percent of public access sites).	High- Public access is not currently designed or sited to address flooding.	Low- Public access is unique to the shoreline. As the shoreline moves, public access must be designed to move with it, but upland movement may be blocked by development.	High

them. Rising sea levels can impact the delivery of petroleum products, electricity, and drinking water to Bay Area residents and businesses. The range of impacts can be more difficult for low-income residents because they generally have less financial flexibility and fewer resources to pursue alternative housing and transportation.

Water quality will suffer if wastewater treatment facilities, landfills or contaminated sites are flooded from sea level rise and storm activity. Compromised water quality and higher temperatures can result in algal blooms and a higher potential for the spread of water-born vectors.

Large commercial and industrial areas are vulnerable to flooding, especially in San Francisco, Silicon Valley, and Oakland. Approximately 72 percent of the San Francisco and Oakland airports is potentially exposed to a 16-inch sea level rise and 93 percent is potentially exposed to 55 inches of sea level rise, which can disrupt the transport of as much as 30 million passengers and approximately one million metric tons of cargo. Flooding of highway segments in the regional transportation network can disrupt the movement of goods from ports, which handled approximately 25 millions metric tons of cargo in 2007-2008. Other water-related industries would be similarly affected. Flooding of the rail system would be particularly serious, since multiple users share a single line in most locations around the Bay.

The Bay is a magnificent body of water that helps sustain the economy of the western United States, provides great opportunities for recreation, nourishes fish and wildlife, affords scenic enjoyment and in countless other ways helps to enrich our lives (Bay Plan, 2008). It is central to many activities in the region, whether traveling by car or rail along the shoreline, landing at an airport, strolling along the shoreline, or watching the fog stream in on a summer's day. Waterfront parks and public access provide opportunities to enjoy the Bay and remind us of its place in the region. There are 23,000 acres (35 square miles) of waterfront parks, of which 14 percent is vulnerable under the lower scenario and 18 percent is vulnerable under the higher scenario. Fifty-seven percent of the public access required by BCDC is vulnerable under the low scenario and 87 percent is vulnerable under the high scenario. The decline of waterfront recreational opportunities will impact the quality of life in the Bay Area and could affect the region's deep connection to the Bay.

To address the widespread flooding from storm activity and sea level rise, shoreline protection projects will be needed. Shoreline protection can be structural, natural, or a combination of both. Choosing the appropriate form of shoreline protection—one that both protects public safety and minimizes ecosystem impacts—is critically important. In the long-term, the region needs to engage in an open and vigorous public dialogue to make the difficult decisions about what to protect, and where and what kind of new development is appropriate in vulnerable areas, and areas where further development should be avoided.

CHAPTER 3
The San Francisco Bay Ecosystem

San Francisco Bay, the largest estuary along the Pacific shore of North and South America, is constrained in its ability to adapt to climate change by the intensity of human uses in and around the Bay. The close proximity of urban and industrial development to the Bay dramatically reduces the adaptive capacity of the ecosystem and limits the potential for restoring additional habitats that could otherwise compensate for altered temperature, salinity, and sediment systems. The Bay provides many benefits to the surrounding human community while supporting numerous plants, animals, and migratory birds who feed on fish and shellfish (BCDC 2002). Maintaining these ecosystem benefits must be a key element of the region's climate change adaptation strategy.

Tidal wetlands provide critical flood protection and improve water quality by reducing and preventing shoreline erosion and filtering pollutants from surrounding areas. Tidal wetlands also store carbon in their soils (Mitch and Gosselink 2000, Trulio et al. 2007), which may help to mitigate climate change by sequestering GHGs. Tidal salt marshes in the South Bay sequester between 54-385 grams of carbon per square meter per year (Patrick and DeLaune 1990), an amount equivalent to at least 6,000 gallons of gasoline emissions (EPA 2005). Greco Island, one of the oldest tidal salt marshes in the Bay, sequesters 150-250 grams of carbon per square meter per year and has been doing so for at least 100 years (Callaway and Drexler, unpublished, cited in Trulio et al. 2007).

In many locations, humans have altered, degraded, or eliminated these ecosystem benefits. Roads, levees, dredging, and urban development have fragmented and destroyed much of the once contiguous shoreline habitats of the Bay. Sand mining, shell mining and dredging activities have altered subtidal habitats. There are now 40,000 acres (62 square miles) of tidal marsh, a reduction of 80 percent since the late 1800s. Similarly, tidal flats have been reduced up to 60 percent to 29,000 acres (45 square miles) from bay fill and erosion. Only seven out of an estimated 23 miles of former sandy beaches remain (Goals, 1999).

The existing Bay ecosystem is largely a managed environment. Elements of the Bay ecosystem continue to withstand pressures from climate change and human alteration, exhibiting remarkable resiliency. The adaptive capacity of the Bay ecosystem to withstand the rapid climate changes predicted for the next century depends both on the magnitude of impacts resulting from climate change and the management actions taken in response to those impacts. Further habitat loss resulting from climate change and future construction of levees and other

flood protection infrastructure along the shoreline would threaten the survival of critically endangered species and natural communities. The challenge is to preserve the appropriate amount and diversity of habitats to maintain healthy species populations, while, at the same time, finding sustainable flood protection solutions for shoreline development and industry. Retaining the benefits that the Bay ecosystem provides will require a new management approach that recognizes the dynamic nature of the ecosystem. While past management strategies for the Bay ecosystem focused on conserving a static ecosystem or restoring a previous ecological state, new strategies must be based on anticipating future conditions, such as accelerating sea level rise, and implementing adaptive management as the ecosystem evolves over time.

Sea Level Rise in the Bay Ecosystem

Under current sea level conditions, the ebb and flow of the tides inundates the intertidal mudflats (tidal flats) and low to middle tidal marshes at the edge of the Bay on a regular basis, while storms and other extreme weather events cause occasional flooding of high marsh and upland areas. Low-lying areas behind levees also are flooded occasionally when levees are overtopped or fail due to storms, earthquakes or burrowing animals. The lower of the two sea level rise scenarios (16 inches) is sufficient to impact 90 to 95 percent of the existing tidal marshes and tidal flats by changing the frequency and duration of inundation. Of these tidal marsh areas, almost 20 percent exist lower in the tidal zone, which makes them vulnerable to permanent submersion and erosion (PWA and Faber 2004, Pacific Institute 2009). A 16-inch rise in sea level would also permanently flood approximately 70 to 75 percent of the subsided wetlands in Suisun Marsh if their fragile levees were to fail. The few remaining beaches (about 45 acres or 0.07 square miles) on the margin of the Central Bay are all vulnerable to sea level rise. Increased frequency and duration of inundation in some areas and permanent flooding of other areas induced by sea level rise would initiate a number of complex physical, ecological, and biological responses in estuarine ecosystems, which, when combined with other impacts of climate change, would increase the vulnerability of the Bay ecosystem. While wetlands can adapt to sea level rise, given sufficient sediment and room to migrate, armoring of the shoreline and other human impacts may hamper or prevent this and result in more loss of tidal marsh habitats.

Constraints to Wetland Adaptation. The shape of the Bay-Delta estuary formed over the past 3,000 years in response to gradual sea level rise and the circulation of sediment by tides, waves, and inflowing rivers (Byrne et al. 2001, Wells and Gorman 1994, Atwater 1979). The Bay-Delta estuary now supports a mosaic of habitats, extending from the subtidal water column where fish live to the tidal flats and tidal marshes. Tidal wetlands not only protect the shoreline from the flooding and erosive effects of storms, but also provide a setting for the surrounding communities to connect with the Bay ecosystem. Accelerated rates of sea level rise may outpace sedimentation in tidal flats and tidal marshes, which would lead to erosion and drowning of these habitats in the Bay-Delta estuary.

Tidal flats in the Bay are already eroding as a result of insufficient volumes of sediment from tributary watersheds. The area of tidal flats in the North Bay decreased by 68,000 acres (106 square miles) over the period from 1951-1983, and 4,500 acres (7 square miles) in the South Bay between 1858 and 2005 (Jaffe et al. 2007, Jaffe and Foxgrover 2006). The decline in sediment flowing into the Bay is the result of dam construction, flood control, water diversions and other management actions in the tributary watersheds.

Early studies estimate as much as 80 to 90 percent of the sediment reaching the Bay came from the Sacramento and San Joaquin rivers (Krone, 1979; Porterfield, 1980). During the Gold Rush era, hydraulic mining in the Sacramento and San Joaquin watersheds resulted in approximately 590 million cubic yards of sediment being deposited in the Bay and a 60 percent increase in the area of tidal flats over the period from 1856 to 1887 (Jaffe et al. 2007). Much of this mining sediment contains mercury, which was used to extract gold and is now widespread in Bay sediment. Under some conditions, such as increased acidity, the inorganic mercury in this sediment can be converted to methylmercury, a highly toxic form.

In 1884, the California Supreme Court (Sawyer Decision) outlawed the discharge of mine tailings to rivers. This decision dramatically reduced the volume of sediment that was coming from the Sacramento and San Joaquin watersheds by the early 1900s (Porterfield, 1980), despite the ongoing logging, urbanization, and agricultural development, activities that typically cause soil erosion. A primary cause for the continued sediment decline during the 20th century was the construction of dams for water supply that prevented sediment from reaching the Bay (Krone, 1979; Ogden Beeman and Associates and Krone and Associates 1992).

From the 1940s to the 1970s, the damming of rivers trapped sediment in both the Sacramento and San Joaquin watersheds and local tributaries of the Bay (e.g., Napa River, Sonoma River, and Alameda Creek). Damming also reduced flood flows, limiting the capacity of rivers to transport sediment from the Delta to the Bay (Porterfield, 1980; McKee et al. 2006;

Wright and Schoellhammer, 2004). Now, research demonstrates that sediment from local tributaries to the Bay may constitute as much as 43 percent of the annual sediment delivered to the North Bay (McKee et al. 2006), and the loss of tidal flats is an indication that the Bay watersheds are contributing less sediment.

Subsidence of diked areas further complicates the restoration of tidal wetlands, which would aid the Bay's ability to adapt to sea level rise. Sites planned for tidal marsh restoration are, in many cases, subsided two to six feet below mean sea level (e.g., South San Francisco Bay, Suisun Marsh) (PWA and Faber 2004, Watson 2004, Poland & Ireland 1969, Orr et al. 2003), which is substantially lower than the elevation at which marsh plants usually grow. A fundamental component of tidal marsh restoration is the recruitment of native plants, which thrive under specific flooding conditions that are controlled by their elevation with respect to the tides. The target elevation can be achieved by placing dredged material on site or by promoting natural sediment deposition through re-suspension and transport of muddy sediment from tidal flats. Once an adequate elevation is reached, marsh plants tend to colonize the site and initiate organic matter accumulation, which aids the tidal marsh in keeping up with sea level rise (PWA and Faber 2004, Orr et al. 2003). Regional partnerships such as the Long-Term Management Strategy (LTMS) for dredged material from the San Francisco Bay Area (LTMS Plan 2001) are already working to address the decline in sediment supply by maximizing the beneficial use of dredged material for wetland restoration.

However, higher rates of sea level rise may jeopardize efforts to restore tidal wetlands and maintain the current form of the Bay-Delta estuary. Erosion of subtidal areas may also expose mercury-laden sediment and impact circulation patterns in the Central Bay, possibly contributing to scour of bottom sediment, a primary physical control on habitats in subtidal regions of the Bay (NOAA 2007). The erosion of tidal flats and tidal marshes would result in additional loss of recreational, flood protection, and water quality benefits.

In order for estuarine migration to occur, gently sloping areas of transitional habitat containing a combination of wetland and upland features are needed. These wetland-upland transition zones are high in species diversity and also provide refuge for endangered species like the salt marsh harvest mouse and the California clapper rail during high tides. These areas could potentially evolve into tidal marsh habitat as sea level rises. However, wetland-upland transition zones have been almost entirely eliminated due to development of the Bay shoreline in close proximity to the upland edge of tidal habitats. In many areas, the wetland-upland transition zone consists of only a few feet of vegetation along the steeply sloping side of a levee.

Salinity Change in Tidal and Subtidal Habitats. Higher salinity due to climate change will stress plant communities and species of concern in the Bay, and some may not thrive or persist in the face of this impact (Callaway et al. 2007, Spalding and Hester, 2007). Climate change has the potential to impact estuarine salinity in three main ways: (1) changes in total precipitation; (2) changes in seasonal patterns of precipitation and runoff, i.e., a shift from snow to rain and earlier snowmelt; and (3) sea level rise.

These salinity shifts may be moderated or exacerbated by management of reservoirs and water diversions (Callaway et al. 2007). Water managers rely on freshwater conditions in the Delta to preserve drinking water supplies for the growing populations of the Bay Area and Southern California, as well as the agricultural lands and brackish habitats of Suisun Marsh. These goals are accomplished by releasing water from reservoirs during spring, summer, and autumn when there is less rainfall and higher temperatures.

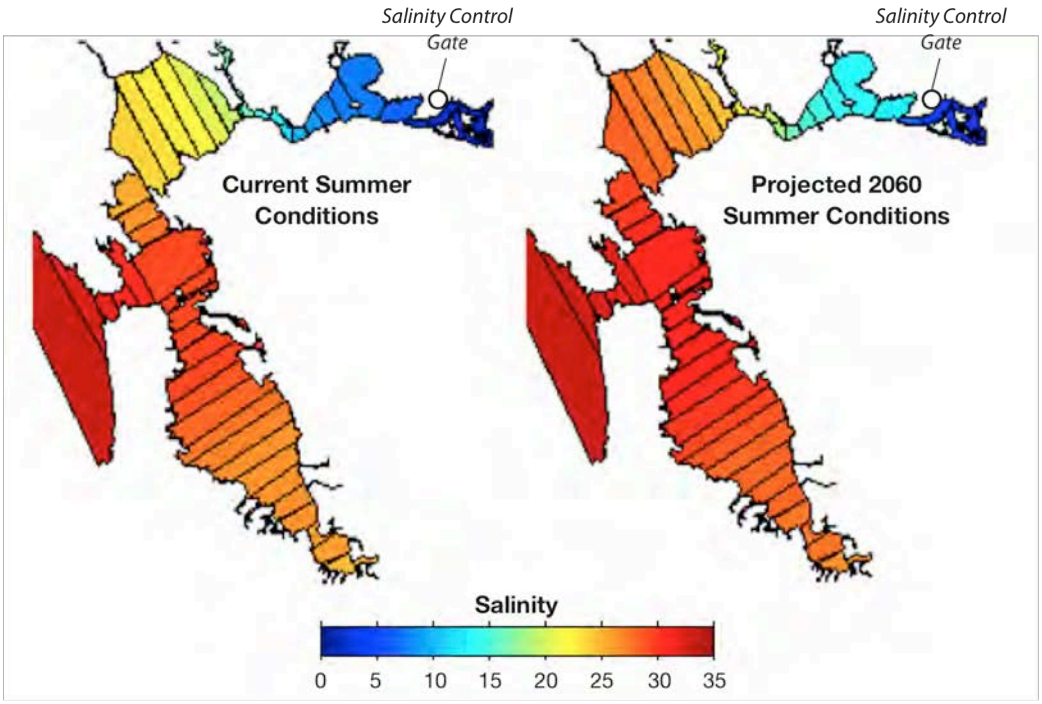
California's water reservoirs are designed with the assumption that a large portion of the state's water will be stored in the snowpack. Warmer temperatures associated with climate change are projected to result in more precipitation falling as rain instead of snow in the winter, causing a 50 percent loss of the Sierra snowpack by 2090. Warmer temperatures will also melt the snowpack earlier in the year (Figure 3.1) (Knowles and Cayan 2002). Earlier snowmelt would require water managers to release excess water from reservoirs, causing more water to flow into the Suisun Marsh and the Bay following winter storms and reducing flows at other times of the year (Barnett et al. 2008). For example, spring flows (April-June) are expected to decline from 36 percent of total annual flow in 2030 to 20 percent of total annual flow in 2090 (Knowles and Cayan 2002).

The shift in freshwater flows from spring to winter is projected to increase salinity in the South Bay, San Pablo Bay, and especially Suisun Marsh (Knowles and Cayan 2002). Infrequent flushing from the tides in high marsh areas, especially during summer months, make these areas particularly vulnerable to salinity shifts (Callaway et al. 2007). High marsh areas are particularly important because they contain many of the rare and endangered species that are found in California tidal marshes (Baye et al. 2000).

Salinity increases due to climate change may dramatically impact the brackish and freshwater marshes found in Suisun Marsh and near the confluence with Bay tributaries. Since brackish and freshwater tidal marshes tend to be more productive and provide habitat for a greater diversity of plants than salt marshes, elimination of these valuable wetlands or their conversion to salt marshes could reduce the habitat available to rare and endangered species (Callaway et al. 2007, Newcombe and Mason 1972, Baye et al. 2000, Lyons et al. 2005).

Figure 3.1 Salinity Change in San Francisco Bay

SOURCE: Dr. Noah Knowles, USGS



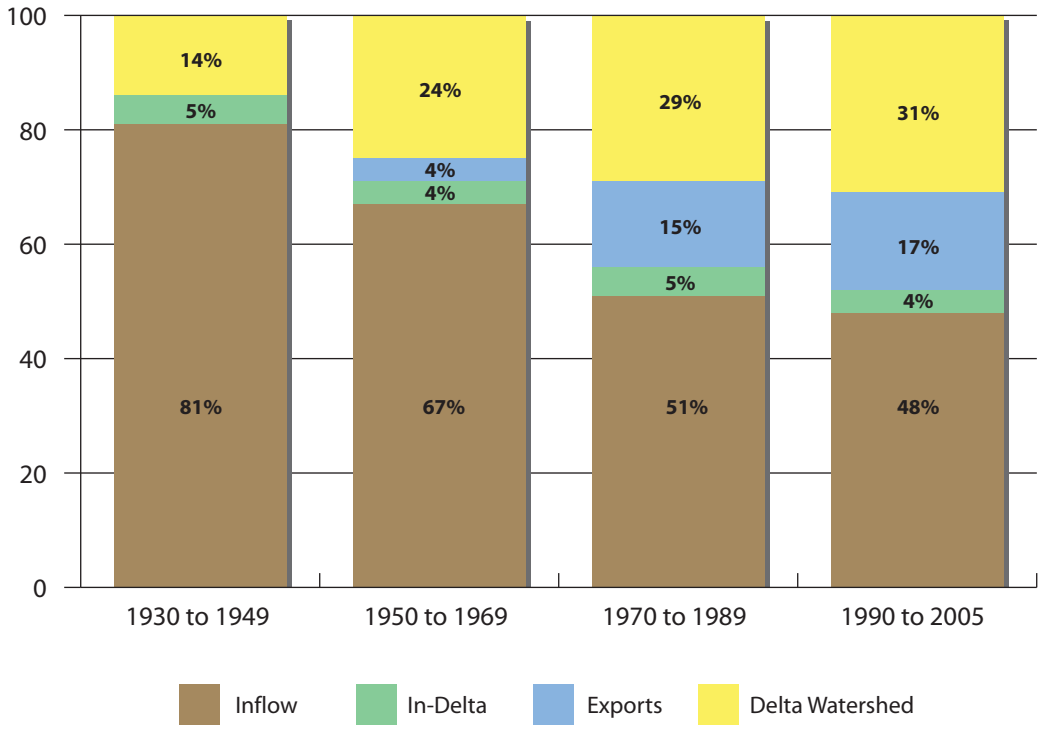
Wet-Year summer salinity field shifts upstream 10-15km due to reduced spring/summer snowmelt runoff

Efforts to use water control structures, such as salinity gates, to artificially reduce salinity in Suisun Marsh in dry years are likely to become increasingly difficult in the face of climate change. The Suisun Marsh Salinity Control Gates (Figure 3.2) restrict the flow of higher salinity water from incoming tides and retain low-saline, Sacramento River water from the previous outgoing tide. An eastward shift of the salinity gradient caused by sea level rise will likely reduce opportunities for importing freshwater into the Suisun Marsh.

These impacts from climate change heighten an already complex debate over water management. Exports from the Sacramento-San Joaquin Delta (Delta) by the state and federal water projects, water use in the Delta watershed, and in-Delta water use have reduced the total volume of water entering the Bay. Flows from the Delta account for about 90 percent of freshwater flows to the Bay, while ten percent of flows come from the watersheds surrounding the Bay (San Francisco Estuary Project, Aquatic Habitat Institute 1991). A comparison of annual averages from the years 1930-1949 and the years 1990-2005 shows that inflow from the Delta to the Bay has been reduced from 81 percent to 48 percent of total flows (Figure 3.2) (Delta Vision 2008).

Figure 3.2 Changes to Freshwater Inflow to the Estuary

SOURCE: Delta Vision 2008



To address the impacts of water diversions, the United States Environmental Protection Agency (EPA) and United States Fish and Wildlife Service (FWS) established a water quality standard for salinity, referred to as X2, to ensure adequate minimum freshwater inflow to the Bay to benefit the reproductive success and survival of the early life stages of many estuarine species[1] (Kimmerer 2002). The X2 measurement corresponds to the upstream location of the mixing zone of fresh and salt water and moves eastward or westward, both seasonally and from year-to-year, depending on the volume and timing of freshwater inflow. The standards require X2 to be maintained at particular locations within the Delta and Suisun Bay between February and June, depending on the amount of precipitation.

The anticipated impacts from climate change and the increasing demand for drinking water and agriculture will limit the ability of water managers to maintain the X2 standard. Inability to maintain X2 may contribute to the extinction of fish species, some of which are a vital economic resource. Fish, such as the threatened Delta smelt and endangered salmon, rely on higher flows in winter and spring, which may be difficult to maintain with less water available in reservoirs (Kimmerer 2002).

Other Water Quality Impacts

Increases in air temperature, salinity, and changes in precipitation and runoff patterns will impact both the Pacific Ocean and the tributaries flowing into the Bay, threatening water quality and human health. Warmer air temperatures may prevent cool waters in the Pacific Ocean, rich in oxygen and nutrients, from circulating to the surface and to various parts of the California coast, including the Bay (Roemmich & McGowan 1995, Harley et al. 2006). When combined with numerous new and existing pollutants and altered tidal circulation, these effects may produce algal blooms resulting in reduced water oxygen levels.

The increased carbon dioxide concentrations in the atmosphere that are causing global warming are also causing the world's oceans to become more acidic. This is because carbon dioxide dissolves into ocean water and increases acidity. Levels of acidity in the ocean may exceed any found in the 200-300 million year fossil record (Caldeira & Wickett 2003, Feely et al. 2004, Harley et al. 2006). This impact may endanger most of the world's coral reefs.

[1] X2 is defined as the distance upstream from the Golden Gate Bridge to the point where daily average salinity at one meter from the bottom is two parts per thousand (Jassby et al. 1995).

High carbon dioxide levels will increase the acidity of Bay waters as well. Although the effects on the Bay are unknown, high levels of acidity may prevent organisms from forming shells and skeletons of calcium carbonate because of a chemical reaction that dissolves calcium carbonate into its constituent ions when acidity is high (Doney et al., 2009). In the Bay, it could particularly impact organisms at the base of the food web that form carbonate shells, such as bivalves, crustaceans and copepods.

Invasive and Migrant Species

The geographic ranges occupied by certain species will shift in response to changing environmental conditions due to climate change. While the impacts of climate change may harm or benefit a particular species, the shifting of conditions under which native species evolved will aid invasive species (i.e., non-native species that spread quickly and crowd out native species) or native species that are either better adapted to the changed conditions or more tolerant of a wide range of conditions. For example, warmer conditions will make the Bay more hospitable to migrant species from the south, and species adapted to a wide range of temperatures will fare better those that require colder conditions to survive.

Invasive species and expanding populations of some natives can threaten other native species through competition for resources, predation, parasitism, interbreeding with native populations, transmitting diseases, or causing physical or chemical changes to the invaded habitat (California Natural Resources Agency 2009). Climate change may increase the potential for invasive species to become established and spread in the Bay, resulting in a loss of native biodiversity and native species that are vital to our economy (e.g., salmon).

The spread of invasive species would further impact one of the most highly invaded estuaries in the world (Cohen and Carlton 1998). In many cases, invasive species are introduced through boat hulls, ballast water, and intentional introductions for commercial and recreational use. The Asian clam (*Corbula amurensis*) was introduced into the northern Bay in the 1980s and, through an explosive increase in population, replaced the resident clams and began filtering enough algae from the water column to significantly reduce the food available to other species (Carlton et al. 1990).

Two non-native crab species, the green crab and Chinese mitten crab, contribute to erosion and loss of marsh habitat through burrowing in tidal channels. In addition, smooth cordgrass (*Spartina alterniflora*) can outcompete native cordgrass, altering vegetative structure and habitat

for endangered species, such as the California clapper rail. The spread of smooth cordgrass to tidal flats may inhibit the exchange of sediment from tidal flats to tidal marshes, preventing marsh migration and impacting migratory bird populations.

In addition, species that are native to certain parts of the state may migrate to new regions and some resident natives could experience increased population growth that could potentially alter community structure and species interactions (California Natural Resources Agency 2009). Recent population bursts among native corvids (crows and ravens) and California gulls are examples of native species population increases that intensify competition for resources and predation on native species.

In the long run, maintaining native biodiversity will require accommodating the movement and migration of multiple native species (California Natural Resources Agency 2009) as well as migrating species. For example, preserving the species native to brackish marshes may require creation of habitat corridors that connect these habitats to freshwater marshes, which will become brackish over time as salinity moves further inland due to sea level rise.

Threat of Extinction

The Bay ecosystem supports a diverse range of threatened and endangered species. Climate change impacts, such as warmer water temperatures and reductions in the amount of tidal marsh, are likely to make it harder to recover threatened and endangered species and may cause more species to become threatened and endangered.

The plummeting populations of several species of Delta and North Bay fishes during the early 2000s is referred to as the pelagic (open water) organism decline (POD). The abundance indices for 2002-2004 include record lows for the Delta smelt and young striped bass and near-record lows for threatened longfin smelt and threadfin shad. The POD has been attributed to a combination of factors: toxins, such as pesticides and herbicides; invasive species, such as the such as the overbite clam, which consumes plankton and other food needed by small fish; and the huge pumps used for state and federal water project operations, which entrain small fish and impact salinity and circulation patterns in the estuary.

The Delta smelt is listed as threatened by the U.S. Fish and Wildlife Service and as endangered by the California Department of Fish and Game. Warmer estuarine waters resulting from climate change will further increase the risk of extinction for this and other fish species dependent upon cold water. Water temperatures beyond 25 degrees Celsius are lethal to Delta smelt, a threshold that is already reached in the estuary during summer heat waves.

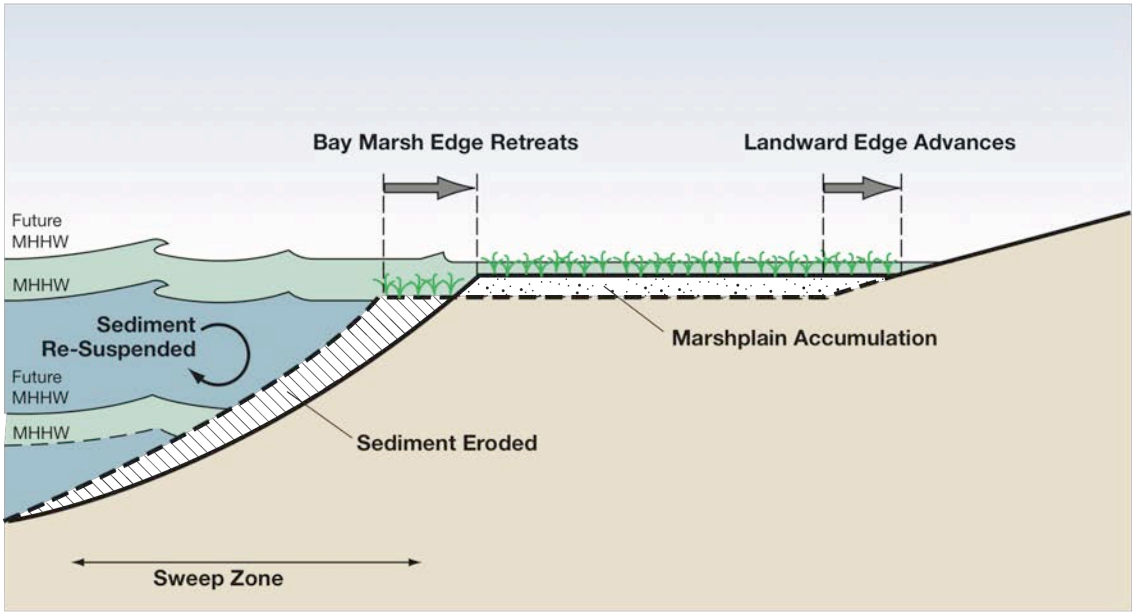
The endangered California clapper rail and salt marsh harvest mouse seek refuge in high tidal marshes and upland transition zones during extreme high water events. Sea level rise and declining sediment supply threaten high marsh and upland transition zones that act as refugia for the clapper rail and mouse, posing a significant challenge to providing adequate habitat to enable the recovery of these species.

Tidal marshes and tidal flats are important habitat for a number of bird species migrating along the Pacific Flyway. For many birds who rely on tidal marshes and flats, the loss of breeding habitat results in smaller populations. As tidal habitats are lost or degraded, some birds may move to other less suitable habitats, but reproduction in degraded habitats tends to be lower and mortality tends to be higher. The birds that breed in these poorer quality habitats may eventually become threatened or endangered (Pulliam and Danielson, 1991).

Although resource managers are shifting their emphasis from single-species management to an ecosystem-based management approach, preventing extinction remains an important goal and is required by the state and federal endangered species acts. In addition, monitoring the abundance of threatened and endangered species, particularly those that provide early warning of climate change, is critical to ensuring the health of the Bay ecosystem.

Figure 3.3 Estuary Migration

SOURCE: Lowe and Williams, 2008



Shoreline Protection Impacts

Static structures have been constructed on tidal marshes and tidal flats, a practice that restricts migration of the Bay ecosystem landward during sea-level rise. Shorelines move upward and landward with sea level rise, forming tidal marshes and tidal flats further inland. As sea level rises, high-energy waves erode mud from tidal flats and deposit that sediment onto adjacent tidal marshes (Figure 3.3). Plants establish on tidal marshes trapping additional sediment and accumulating organic material. If sedimentation and organic accumulation in tidal marshes is sufficient, tidal wetlands persist on the Bay shoreline in the same relative position, rising at the same rate as sea level (PWA and Faber 2004, Watson 2004). If sedimentation is slower than sea level rise, tidal marshes and tidal flats begin to erode and the area in front of shoreline protection structures converts to open water (PWA and Faber, 2004, Lowe and Williams 2008).

Because tidal marshes and tidal flats decrease wave heights or attenuate waves, the loss of tidal marsh seaward of protection structures further exacerbates potential flooding and erosion during storms by allowing larger waves to reach the structures. Studies in the United Kingdom (Möller 2001, 2002, 2006) estimate that salt marshes in front of levees reduce wave heights by as much as 40 percent, reducing required levee height and lowering the total cost of the levee by 30 percent (Turner and Dagley 1993). Seawalls, in particular, create a hard, smooth surface that reflects wave energy back onto the shoreline, eroding and undermining the base of the structure and leading to failure (BCDC 1988a). Riprap revetments dissipate this energy somewhat, but are also vulnerable to erosion at the base of the structure and at each end (BCDC 1988a). Sea level rise requires that engineers retrofit existing structures to protect against larger waves, usually by raising the height of the structure and by strengthening the seaward base (Lowe and Williams 2008, Smits et al. 2006, Heberger et al. 2008).

Ecological Consequences of a Tidal Barrage. In 2007, BCDC reported on the potential impacts on San Francisco Bay from a tidal "barrage" across the Golden Gate (barrage is the technical term for a barrier or dam across a waterway). It is foreseeable that such a structure could be proposed as an alternative to the extensive shoreline protection structures that may be built in response to sea level rise. After the North Sea flood in 1953, the Dutch sacrificed entire estuaries to build similar structures. The results of BCDC's study indicate that constructing a barrage at the mouth of San Francisco Bay would likely be physically and economically impractical, as well as ecologically damaging. The ecological consequences of the barrage would likely be very high. It would affect sedimentation, wetlands, fresh and salt water mixing, animal migration, and endangered species. More than likely it would change the landscape of the Bay Area, affecting the North Bay and South Bay most heavily.

Damming the Bay would result in less salt water entering the Bay and more fresh water being trapped within. Overall the Bay would become more brackish and less saline. Exchange of nutrients and plankton between the ocean and Bay would also be greatly reduced. There would be reduced ability to assimilate wastewater discharges, resulting in reduced water quality and the need for expensive modifications to wastewater treatment facilities.

A barrage would likely greatly decrease sediment exchange between the Bay and the ocean. The reduced sediment load has the potential to increase coastal erosion. Currently scientists and planners are examining whether the existing wetlands will be able to keep pace with sea level rise. As sea level rises in the ocean, a barrage would decrease tidal range in the Bay, eliminating many intertidal areas by converting them to subtidal areas, further decreasing Bay tidal flats and wetlands.

Fish and marine mammals are likely to be the most affected as migratory pathways would be greatly reduced, and species using the Bay as a nursery ground, such as Dungeness crab and many species of flat fish, would be blocked. Changing the salinity regime would also eliminate species that require higher salinities from the Bay. Birds that are dependent on marine fish for food and shorebirds that depend on the mud flats would likely have to relocate. Science has shown that the Bay is one of the most important stops of the Pacific flyway, altering this habitat would have global effects on birds that stop here on their yearly migration.

The Bay is home to numerous threatened and endangered species such as Chinook salmon, steelhead and green sturgeon. Sturgeon have been known to go through lock systems but only on an accidental basis. Placing fish gates and ladders in the barrage would alleviate some of the issues, but creating obstacles for already stressed and endangered species only pushes them further towards extinction. Reducing fish populations would also affect endangered least terns and brown pelicans, reducing their chances for survival.

While creating a barrier to sea level rise may seem to solve flooding issues due to storm surges and rising ocean waters, it may exacerbate flooding inside the Bay during heavy winter storms. Reducing the ability of fresh water to be released into the ocean would cause severe flooding if excess water has no place to go. Should long-term sea level rise exceed 6.56 feet (2 meters), then tidal flows would no longer be possible and outflow from tributaries would require pumping through the barrage.

Watershed Land Use

Watershed management must account for the need for sediment to feed Bay marshes and mudflats, while not hampering pollution control or increasing sediment impacts to creeks that require clean gravels for spawning salmon and steelhead trout.

Inflowing waters and sediments from local tributary watersheds of the San Francisco Bay are increasingly recognized as important components of a healthy Bay ecosystem (Collins and Grossinger 2004). Tributaries of the Bay contribute freshwater and sediment that help sustain the tidal marshes and tidal flats where rivers meet the Bay (Collins and Grossinger 2004, Grossinger et al. 2007). Approximately ten percent of the tidal flats in the Bay and Delta are in the tidally influenced portions of major tributaries of the Bay.

However, natural flows of water and sediment from watersheds to the Bay have been altered by development. Urbanization in Bay area watersheds has led to increases in paved, impermeable surfaces, construction of storm drains, and culverting and channelization of creeks. As a result, during storms, rain that is unable to soak into the ground flows over paved surfaces, washing accumulated pollutants into storm drains, creeks and, eventually, the Bay. Faster, more concentrated storm flows enter creeks, increasing channel erosion and bank undercutting, which degrades fish habitat and undermines bridges, buildings and trails located along creeks. In some areas, flooding has become more severe.

Over ten years of research for the Regional Monitoring Project (RMP) has shown that sediment is the main transport mechanism for pollutants entering the Bay (Schoellhammer 2007, Flagel and Davis 2007). Total Maximum Daily Loads (TMDLs) limiting suspended sediment in creeks under the federal Clean Water Act have established a regulatory mechanism for reducing pollutant loads into the Bay and protecting salmon and steelhead spawning habitat. Localities have begun implementing best management practices such as floodplain setbacks and easements, infiltration basins, and creek and riparian habitat restoration, in order to accommodate flood flows and limit sediment and pollutant loads to creeks and the Bay.

However, given the decrease in sediment supply and loss of tidal flats, fine sediment supply from watersheds could be critical for maintaining equilibrium in tidal marshes, particularly in light of sea level rise. The challenge for future watershed management strategies will be to enable sufficient amounts of clean sediment to pass through watersheds to the Bay, while avoiding adverse impacts to fish and water quality (Box 3.1).

Restoration and Adaptive Management

Managing the health of the Bay requires a regional process to establish goals for the protection and restoration of wetlands or Baylands, ensuring the cumulative success of individual efforts. The Baylands Ecosystem Habitat Goals report (Goals), released in 1999, represents a consensus among area scientists and resource managers. It serves as a guide for sustaining diverse and healthy communities of fish and wildlife resources in the San Francisco Bay Estuary by providing recommendations for the necessary kinds, amounts, and distribution of baylands and related habitats. The Goals provide a flexible vision for restoration that translates into tangible actions.

In the decade since its release, over 75 projects have been initiated to restore baylands along the fringes of San Pablo Bay, South Bay, Suisun Marsh, and throughout the Sacramento-San Joaquin Delta. These projects range in size from just a few acres to some 15,000 acres (23 square miles) of salt ponds in the South Bay. Roughly 67,000 acres (104 square miles) have been restored to natural areas or are planned for restoration (Wetland Tracker 2008). These projects represent a tremendous public investment in preserving the baylands for future generations; however, the impacts of climate change may jeopardize that investment if the Goals are not updated to account for climate change.

Box 3.1 Shoreline Management and Watershed Management Planning

Shoreline Management. Shoreline management plans generally address erosion and flooding hazards in coastal areas. They are widely used in the United Kingdom and the European Union to plan for the effects of sea level rise. Shoreline management planning involves dividing the shoreline into a series of natural units or drift cells within the shoreline planning area and developing a management plan for each cell. The shoreline management plans further divide the cells by land use and develop strategies for the following 50-100 years, such as: holding the line, managed realignment (similar to managed retreat), or no intervention. In the UK, the Department of Environment Flood and Rural Affairs developed guidelines with which strategies must be consistent. Implementing the strategies is left to the local authorities. Shoreline management plans are designed to be regularly updated to effectively adapt to changing circumstance and new scientific information as the climate conditions change (DEFRA 2007).

The advantages of shoreline management plans are similar to watershed management plans where they avoid a piecemeal approach by setting clear guidelines for a specific planning area that is determined based on ecosystem processes, such as littoral drift cells or a watershed. This is especially effective for managing shoreline erosion because the each individual hard shoreline structure that is approved can cause erosion on adjacent properties and eliminate potential marsh migration areas.

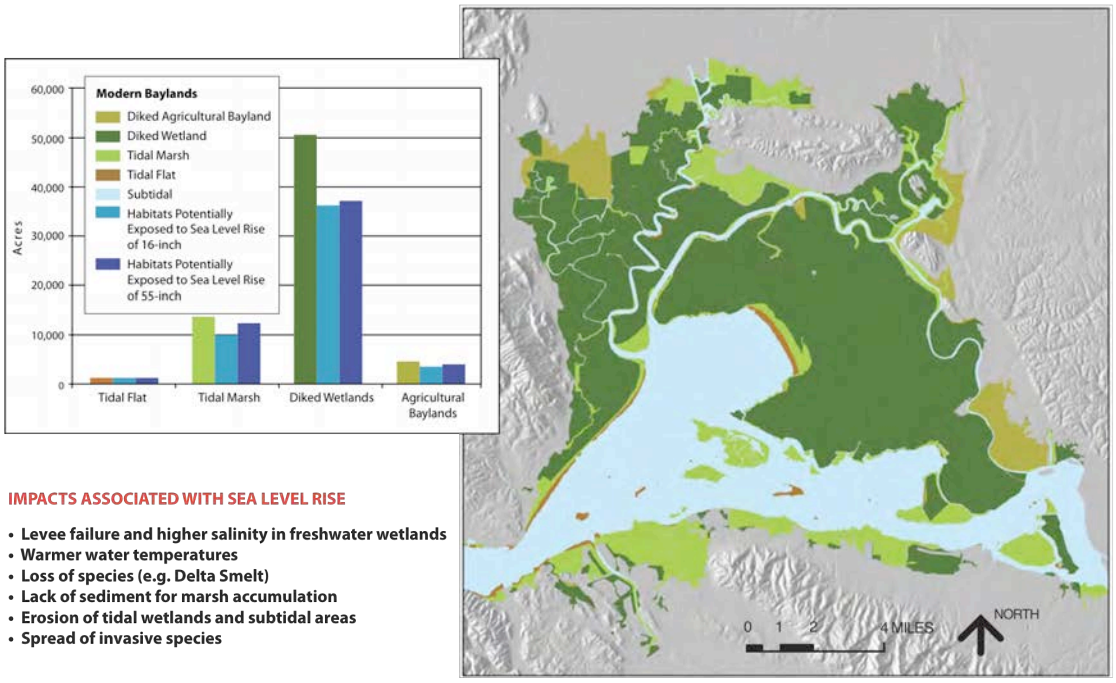
Watershed Management. Integrated watershed management is a planning concept developed to reconcile competing uses that degrade watersheds. It aims to meet multiple objectives across large spatial scales by coordinating the actions of numerous communities and sectors (MEAM 2008). Some primary goals of integrated watershed management are to provide adequate freshwater flow for ecosystem and human needs, maintain healthy riparian habitat and water quality, and mitigate past and future watershed impacts.

There are many examples of watershed (or catchment) management frameworks and programs around the world. Locally-based programs, such as the California Coastal Commission's Critical Coastal Area program (http://www.coastal.ca.gov/nps/cca-nps.html), aim to track and minimize contaminants and development pressures throughout an entire watershed, e.g., Sonoma Creek, upstream of San Francisco Bay. Other examples, such as the Bay Area Integrated Water Management Plan (IRWMP), aim to develop regional cooperation between many resource agencies and local stakeholders, in many cases resulting in a watershed management plan. Watershed management plans reflect a set of common goals that meet the needs of the watershed community, including humans and ecosystems.

Climate change impacts may require updating the Goals as regional targets for types, amounts, and distribution of habitats to ensure that we maintain and expand the invaluable resources that the Baylands provide. Within the next 10 to 50 years, the Baylands will face more flooding of potentially greater magnitude that could erode or degrade water quality and existing wildlife habitat in irreparable ways. While restoring historic habitat conditions may not be feasible, restoring ecosystem function is essential for enable habitats to adapt to the new stressors and challenges resulting from climate change. The best available science must be used to strategically select restoration sites that are likely to continue to provide ecological services as they evolve in response to sea level rise and other climate change impacts.

Figure 3.4 Suisun Marsh Habitats Potentially Exposed to Sea Level Rise

SOURCE: Baylands (EcoAtlas 2009), Hillshade (USGS NED)



IMPACTS ASSOCIATED WITH SEA LEVEL RISE

- **Levee failure and higher salinity in freshwater wetlands**
- **Warmer water temperatures**
- **Loss of species (e.g. Delta Smelt)**
- **Lack of sediment for marsh accumulation**
- **Erosion of tidal wetlands and subtidal areas**
- **Spread of invasive species**

Suisun Marsh (Figure 3.4). The Suisun Marsh Charter Group formed in 2001 to develop a new restoration and management plan for the Marsh. The first phase of the Suisun Marsh Plan will involve converting between 2,000 and 9,000 acres (3 and 14 square miles) of managed wetlands to tidal marsh and enhancing between 39,000 and 46,000 acres (60 and 72 square miles) of managed wetlands to benefit a variety of species.

Tidal restoration objectives include restoring tidal marshes contiguous with upland transitions; expanding the distribution and amount of sloughs and shallow subtidal habitat; restoring natural processes, increasing productivity and nutrient export to adjacent Bay waters; and enhancing populations of listed and sensitive native species (Wilcox 2006). Constraints to tidal restoration include subsidence, limited sediment supply, protecting infrastructure, effects on salinity, protection of neighboring properties and reduction of managed marsh. Since most of the managed wetlands in the Marsh are at or below sea level and sediment supply is limited, breaching levees would create shallow water habitat rather than tidal wetlands in many areas (Figure 3.4).

Tidal restoration opportunities will be constrained by their salinity effects on other parts of the Delta, particularly those areas where water is withdrawn for export by the state and federal water projects. Levee failure in diked wetlands would increase salinity variability by returning them to tidal action if the levees were not repaired. If a major earthquake or flood were to cause catastrophic levee failure and the flooding of several Delta islands, the tidal prism would increase dramatically, resulting in increased salinity in the Bay and Suisun Marsh, as well as changes in erosional and depositional patterns in the estuary (Healey 2008). The Suisun Marsh Plan will have to consider the potential salinity impacts of sea level rise, climate-induced changes in the hydrological regime of the Bay-Delta Watershed, and proposed changes in storage and conveyance by the state and federal water projects**.**

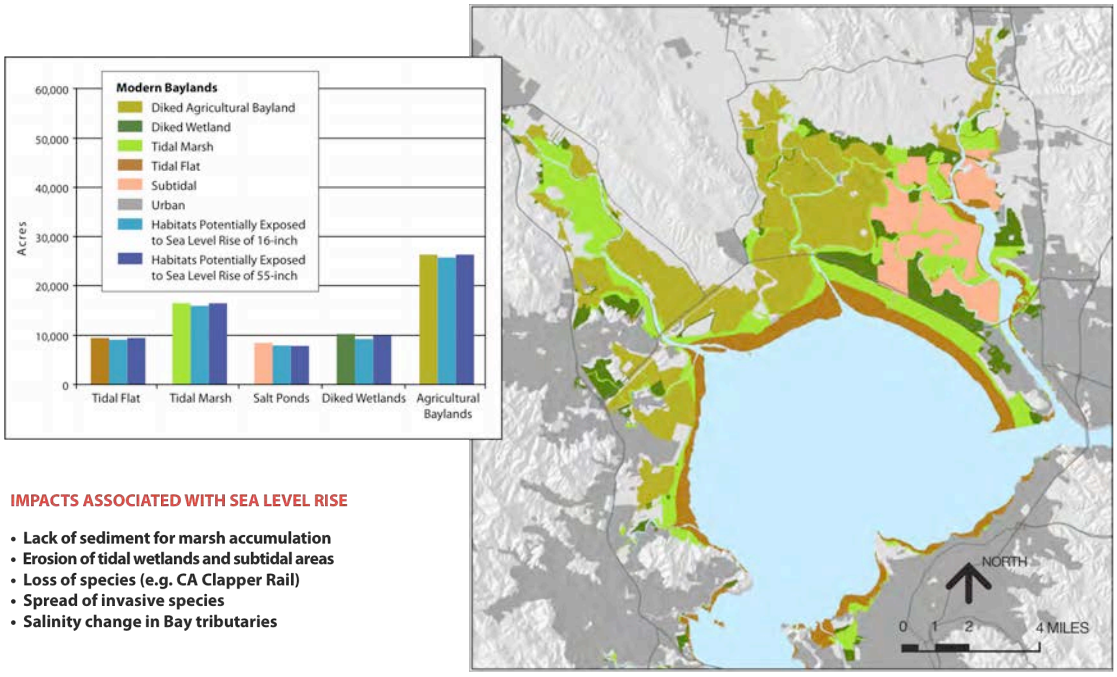
Sea level rise will make managed wetlands increasingly difficult to maintain. Higher water levels will put more pressure on fragile levees, increasing the risk of failure. Sea level rise will also reduce managers' ability to use gravity to periodically drain the wetlands in order to flush out salts and manage vegetation by discing and planting.

North Bay (Figure 3.5). Most of the North Bay supports a mix of diked agricultural baylands, managed wetlands, and tidal marsh. The Petaluma and Napa Rivers and Sonoma and Tolay Creeks also flow into the North Bay, supporting large areas of brackish marsh. Currently, approximately 14,000 acres (22 square miles) of Baylands are restored or are in the process of being restored to tidal habitat in the North Bay. An additional 10,000 acres (15 square miles) are

planned for tidal habitat restoration, despite recent erosion of the tidal flats in the North Bay. Tidal flats in the North Bay are replenished increasingly by sediment from local tributaries such as the Napa River and Sonoma Creek. These local tributary watersheds are sufficiently large to supply adequate amounts of sediment. However, current watershed management practices, such as damming, are reducing sediment throughput to the Bay, leading to erosion of the tidal flats and marshes.

Figure 3.5 North Bay Marsh Habitats Potentially Exposed to Sea Level Rise

SOURCE: Baylands (EcoAtlas 2009), Hillshade (USGS NED)

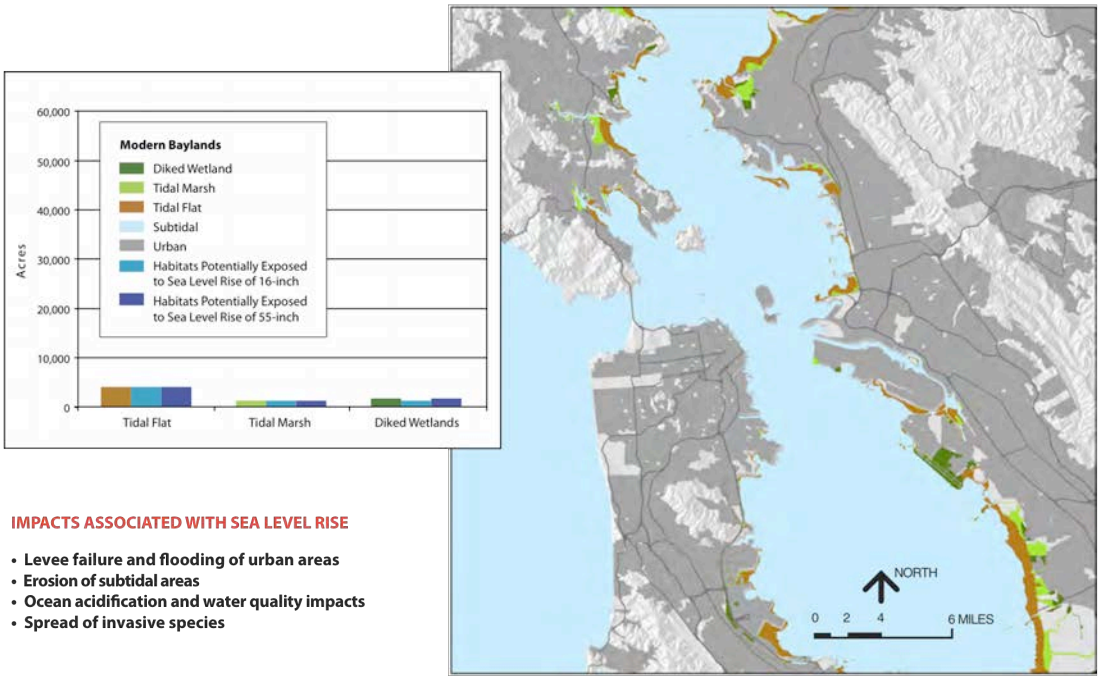


Central Bay (Figure 3.6). Subtidal areas are the dominant habitat in the Central Bay, which includes the Golden Gate, San Francisco and Oakland shorelines. It is the deepest part of the Bay, and thus, is the central shipping corridor. Most of the shoreline is developed with riprap revetments or bulkheads. However, the largest eelgrass beds in the Bay are located here. Eelgrass beds provide shelter and food to small fish, and Pacific herring lay their eggs on eelgrass (State Coastal Conservancy 2010).

The Subtidal Habitat Goals Project, led by BCDC, the California Coastal Conservancy, the California Ocean Protection Council, the National Oceanic and Atmospheric Administration (NOAA), and the San Francisco Estuary Partnership, is a collaborative effort to advance the understanding of submerged habitats, such as eelgrass beds, in San Francisco Bay. The project provides the basic information needed for planning conservation, restoration, research, and management activities related to subtidal habitat in the San Francisco estuary. The project report contains an appendix on climate and other long-term changes likely to affect the future of subtidal habitats (State Coastal Conservancy 2010).

Figure 3.6 Central Bay Habitats Potentially Exposed to Sea Level Rise

SOURCE: Baylands (EcoAtlas 2009), Hillshade (USGS NED)



IMPACTS ASSOCIATED WITH SEA LEVEL RISE

- **Levee failure and flooding of urban areas**
- **Erosion of subtidal areas**
- **Ocean acidification and water quality impacts**
- **Spread of invasive species**

South Bay (Figure 3.7). The South Bay is the focus of the largest tidal restoration project ever planned for the Pacific Coast, the South Bay Salt Ponds (SBSP) restoration project. Preliminary design for the SBSP project involves restoration of 15,000 acres (23 square miles) to a mixture of tidal flat, tidal marsh, and transitional habitat. The project's goals are to restore and enhance wetlands in the South San Francisco Bay while providing for flood management and wildlife-oriented public access and recreation. The project seeks a balance between restoring wetland habitat and maintaining existing pond habitat, with alternative scenarios ranging from 50 percent each of wetlands and ponds to 90 percent wetlands and ten percent ponds. The project participants identified eight key uncertainties that could make meeting the project objectives difficult. These included sediment dynamics, bird response to changing habitats, non-avian species responses, mercury issues, invasive and non-native species, water quality, public access and wildlife, and social dynamics. The overarching uncertainty of global climate change is incorporated into each of the specific key uncertainties.

Figure 3.7 South Bay Marsh Habitats Potentially Exposed to Sea Level Rise

SOURCE: Baylands (EcoAtlas 2009), Hillshade (USGS NED)

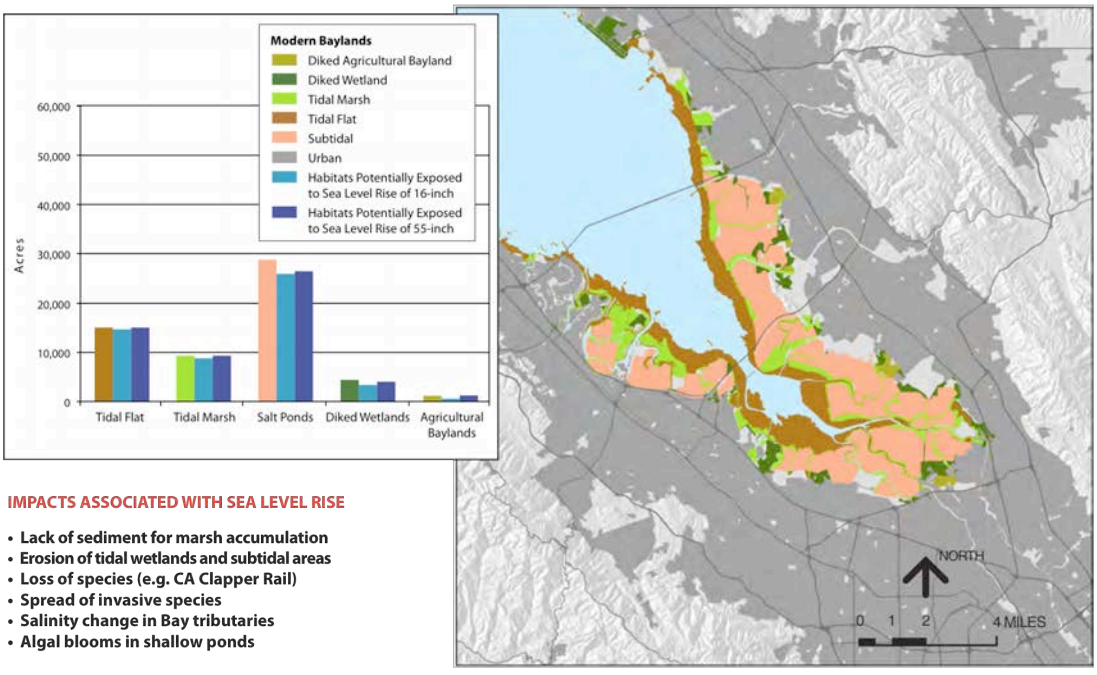


Table 3.1 Summary of Vulnerabilities in the Bay Ecosystem

Bay Ecosystem Subregions	Current and Expected Challenges	Projected Climate Change Impacts	Vulnerability Assessment		
			Degree of Sensitivity	Adaptive Capacity	Vulnerability
Suisun Marsh	Subsided wetlands that rely on salinity gates to restrict the flow of higher salinity water into the Marsh. Older levees constructed on peat.	Potential flooding from levee failure. Change in salinity. Loss of species. Lack of sediment. Erosion and invasive species.	High – Subsidence and older levees make the Marsh very sensitive to flooding. Salinity changes can significantly alter habitats.	Low/Medium – Without levee improvements and rethinking management strategies, the Marsh will suffer. Marsh has space to migrate upland.	High
North Bay	Tidal flats are eroding, reducing sediment supply to marshes. Brackish marsh has high biodiversity, but requires freshwater inflow.	Increased erosion and lack of sediment for restoration. Invasive species and loss of biodiversity. Salinity changes near and in tributaries.	High – Managed wetlands are especially susceptible to erosion. Brackish marsh is relatively unique habitat in the Bay.	Medium – Current rates of erosion and lack of sediment may hamper marsh restoration efforts and upland migration. Plentiful open space is available for upland migration.	Medium High
Central Bay	Intense human activity, including shipping, dredging, mining and industrial uses that threaten eel grass beds and impact water quality.	Erosion of subtidal areas. Acidification and other water quality impacts. Spread of invasive species. Major structural shoreline protection to protect urban shoreline can increase erosion.	Medium – Unique subtidal habitats, like eel grass beds, are difficult to restore and their limited numbers could result in total loss.	Medium Low - Eel grass beds may not be adaptable. A great deal of uncertainty remains regarding the effects of acidification and salinity. Little space for marsh migration.	Medium
South Bay	Major restoration efforts will require sufficient amounts of sediment for success. Levees surrounding salt ponds are older and may require improvements.	Lack of sediment for marsh accumulation and increased erosion. Spread of invasive species. Algal blooms in shallow ponds.	High - Current restoration efforts require adequate sediment to succeed.	Low - Although restoration will improve ecosystem functions, little space is available for marsh migration.	High

Initial investigation of the impacts of sea level rise on the SBSP project suggest that sufficient sediment exists to raise subsided sites to elevations suitable for plant growth. However, long term replenishment of the tidal flats, a critical source of sediment, may be in jeopardy if resource managers do not successfully manage sediment in the South Bay. Potential adaptive management actions to address sediment supply include: incorporating monitored changes in sediment supply and mudflat distribution into project phasing; using low-crested levees along the bayfront edge to reduce wave energy, protect restored tidal areas, and encourage marsh sedimentation; reconnecting existing mudflats to salt ponds to allow for natural sedimentation; using dredged material to raise pond elevations to a level conducive for growth of vegetation, augmenting natural sedimentation; and prioritizing restoration in ponds adjacent to intertidal mudflats and/or ponds at higher elevations which will require less dredged material and natural sediment supply to offset migration from sea level rise.

Summary and Conclusions

The Bay is inhabited by numerous plants and animals and provides many benefits to humans. For example, tidal wetlands provide critical flood protection, improve water quality, and sequester carbon. Brackish marshes in the North Bay and Suisun Marsh support the greatest diversity of species and provide an important resting place along the Pacific Flyway. The impacts of climate change will substantially alter the Bay ecosystem by inundating or eroding wetlands and transitional habitats, altering species composition, changing freshwater inflow, and impairing water quality. Changes in salinity from reduced freshwater inflow will affect fish, wildlife and other aquatic organisms in intertidal and subtidal habitats. The highly developed Bay shoreline constrains the ability of tidal marshes to migrate landward, while the declining sediment supply in the Bay reduces the ability of tidal marshes to grow upward as sea level rises. The vulnerabilities from future climate change are further summarized in Table 3.1.

The Bay will continue to evolve in response to the climatic forces that enabled it to come into being. Historic modification of the ecosystem, through filling, diking, and building on the shoreline and reducing freshwater inflow, as well as ongoing stressors such as pollution and invasive species, have resulted in the decline of many native species and increased the vulnerability of surrounding communities to damaging floods. Substantial progress has been made in restoring the Bay ecosystem by returning diked areas to tidal action and reducing pollution, while efforts to increase freshwater inflow have been less successful. Future efforts to restore the Bay ecosystem can benefit from careful design that accounts for the known processes affecting formation of habitats in the Bay, the constraints imposed by existing stressors, and the future vulnerabilities.

Key issues that resource managers must address regarding climate change include: identifying opportunities for tidal wetlands and tidal flats to migrate landward, managing and maintaining adequate volumes of sediment for marsh sedimentation, developing and planning for natural flood protection, and maintaining sufficient upland buffer areas around tidal wetlands. Furthermore, habitats, like beaches, should be high priority for restoration and conservation.

Developing effective strategies to protect tidal wetland and tidal flat from sea level rise is challenging because the projections of future sea level rise continually change. This range of variation, based on different climate models and emission scenarios, creates a great deal of uncertainty for decision-makers; therefore, wetland protection strategies must be adaptable to changing conditions.

CHAPTER 4
Governance: What BCDC and Local Jurisdictions Can Do

The vulnerabilities of the Bay shoreline and ecosystems to sea level rise and other climate change impacts will create new technical challenges for shoreline planning, and require difficult decisions to prioritize protection of shoreline development and Bay resources. This chapter assesses the vulnerabilities in Bay Area governance systems that may hinder the region's ability to meet these challenges. The analysis begins by identifying vulnerabilities in the overall organization of government agencies and their authorities, and then focuses on BCDC and local governments because of their central roles in adapting to the impacts of climate change on the Bay and its shoreline.

BCDC is addressing regional adaptation for a variety of reasons. The Commission has authority over San Francisco Bay and shoreline from just outside of the Golden Gate Bridge to the Delta, and its laws and policies establish the agency's responsibility for protecting and enhancing the Bay, and encouraging the Bay's responsible use. As one of California's federally-designated state coastal management agencies, BCDC has access to state and federal resources to support coastal management, and the authority to review federal and federally-permitted activities under the federal Coastal Zone Management Act (CZMA). The Commission also has an integral regional role in planning for the Bay through its participation in the Joint Policy Committee, and its partnerships with other federal, state, regional and local agencies and organizations.

This chapter also lays out the needs of local jurisdictions to effectively address the challenges climate change will pose to their communities. Understanding these needs is essential because local governments have broad land use authority and thus a clear responsibility to adapt to climate change.

The Governance Landscape

BCDC's regional authority and local governments' land use authority give these agencies primary roles in adapting to sea level rise impacts, but they are just some of the many government agencies that are relevant to adaptation planning in the Bay Area. Management authority over Bay and shoreline resources is sliced up among numerous other government agencies as well. Provision of services such as flood control and water supply and quality is managed by different local, regional, state, and federal agencies based on authorities granted to

them through various federal, state, and local laws and policies. These sectoral management activities intersect geographic boundaries of agency jurisdiction and land ownership that define the Bay region's parks, wildlife areas, residential communities and industrial and commercial areas. Together, these divisions create a patchwork of jurisdictions and authorities that challenges the region's ability to respond to broad geographic and cross-sectoral impacts such as those expected with a changing climate. In the Bay Area, a number of multi-jurisdictional planning programs have successfully addressed complex environmental issues but, too often, have failed to follow through. Examples of successful follow-through include the Long Term Management Strategy's Dredged Materials Management Office and permit streamlining, the South Bay Salt Pond Restoration Project, and hazard mitigation planning.

These challenges are not all unique to adaptation planning. Other regional and sub-regional planning efforts such as the South Bay Salt Ponds Restoration Project, an effort led by the State Coastal Conservancy, and the Multi-Jurisdictional Local Hazard Mitigation Plan, led by the Association of Bay Area Governments (ABAG) (Box 4.1), have faced similar cross-jurisdictional and sectoral issues. These efforts have relied on inter-agency partnerships and extensive outreach to key stakeholders and the public to effectively integrate and address the diversity of authorities and interests relevant to these projects.

However, despite many similarities to past planning efforts, adaptation planning involves additional complexities that government agencies have not previously had to address. Whereas past regional planning efforts have been able to assume a (basically) static environment, or "backdrop" for the planning project, the entire impetus for and context of adaptation planning is a changing environment. Added to this changing backdrop are complexities that are uncommon to other planning projects: climate change impacts are slow to develop and long lasting, but create environmental changes that are relatively rapid compared to historic change; expected intensities of impacts are well beyond the range of historic effects; uncertainty about expected impacts is very high; and there is a dearth of experience in rapidly assessing the efficacy of adaptation actions. These complexities magnify the importance of conducting comprehensive regional planning for adaptation, yet exacerbate the challenges associated with this type of planning. These challenges present yet another situation where too many authorities can make it difficult to be flexible in planning for and responding to these complex and relatively rapid changes. Some balance of redundancy and flexibility is required.

Box 4.1 Hazard Mitigation Planning in the Bay Area

Effective adaptation planning is limited by the number of and divisions among management authorities in the Bay Area. These existing governance challenges will be exacerbated by climate change impacts. Agencies have had to address overlapping jurisdictions and authorities in other Bay Area regional planning efforts. Preparation of the Multi-Jurisdictional Local Hazard Mitigation Plan (Plan) for the Bay Area is one example of this.

Development of the Plan was a "joint effort by the cities, counties, and special districts in the Bay Area to build a more disaster-resistant region," and to meet requirements of the federal Disaster Mitigation Act (DMA) of 2000 for all local governments to develop and adopt this type of plan. The Association of Bay Area Governments (ABAG) coordinated this multi-jurisdictional planning effort to identify hazards to communities, assess risks, and develop a disaster resistance goal and objectives, and a comprehensive list of strategies (or actions) to mitigate the identified risks. ABAG conducted numerous workshops with local governments to determine the scope of work, identify key hazards and develop mitigation strategies for eight different planning, or "commitment," areas. Once the overall Plan for the Bay Area was completed, each city, county and special district prepared an "annex" to the Plan with a more specific assessment of hazards and risks within its jurisdiction, and prioritization and application of mitigation strategies. (For the 2005 Plan, more than 90 local governments prepared annexes.)

In the Plan, ABAG highlights two important characteristics of hazard mitigation that are also true of adaptation planning. First, it recognizes that "disasters do not respect the boundaries between … individual jurisdictions," and that hazard mitigation requires coordinated, cross-jurisdictional planning. Second, it recognizes that hazard mitigation planning is iterative and that the Plan needs periodic updates.

This example of a regionally-coordinated, multi-jurisdictional planning effort offers possible lessons for adaptation planning. The DMA has clear financial incentives for local governments to participate in hazard mitigation planning in the form of disaster recovery grants that become available to municipalities that have plans in place. Assessing vulnerabilities to hazards such as floods, fire and earthquakes requires extensive geographic data analysis. Instead of each local government conducting a separate data collection and mapping effort, ABAG compiled available data and created interactive, web-based mapping tools that allowed each jurisdiction to assess its vulnerabilities within the different commitment areas. This ensured consistency of the analysis across the many jurisdictions, and minimized the workload for local governments.

This planning effort is an opportunity for improving the region's adaptive capacity to climate change impacts. As the Plan is updated, the hazard mitigation strategies can be expanded (as appropriate) to address relevant climate change impacts such as sea level rise. Taking advantage of opportunities to integrate adaptation planning into this existing effort could reduce the amount of additional work that climate change will create for local and regional planners.

In the Bay Area, five federal agencies are actively involved in shoreline adaptation: the National Oceanic and Atmospheric Administration (NOAA), the United States Geological Survey (USGS), the Federal Emergency Management Agency (FEMA), the United States Army Corps of Engineers (Corps), and the Environmental Protection Agency (EPA). As one example of federal involvement, the Corps is partnering with the State Coastal Conservancy and the Santa Clara Valley Water District to conduct the South San Francisco Bay Shoreline Study, which will identify project alternatives and recommend for federal funding for one or more projects for flood damage reduction, ecosystem restoration and related purposes such as public access. Although flooding risks from creeks have been reduced by a number of existing projects in the area, the area remains vulnerable to tidal flooding, and is expected to become more vulnerable as sea level rises. This project is being closely coordinated with the South Bay Salt Ponds Restoration Project, which is discussed in Chapters 3 and 5.

The state has numerous agencies that are actively addressing climate change adaptation. To date, BCDC has worked primarily with three of the agencies that have been instrumental in funding and managing important research projects related to sea level rise in San Francisco Bay: the California Energy Commission's Public Interest in Energy Research program, the

California Coastal Conservancy, and, more recently, the Ocean Protection Council. BCDC also works with the regional agencies on the Joint Policy Committee to carry out the JPC's climate change strategies. Several nearby regional agencies are taking an active role in planning for climate change in the Delta and the Suisun Marsh: the Delta Protection Commission, the Delta Stewardship Council, the Delta Conservancy, and the Suisun Marsh Charter Group. The Commission provides a staff member to coordinate with these regional efforts.

The Commission's Jurisdiction and Authority

The Commission was established in 1965 as the nation's first state coastal management agency. Alarmed by the fact that between 1850 and 1960 an average of four square miles of the Bay was filled each year, citizens in the Bay Area successfully organized to advocate for new state legislation that would protect the Bay. The McAteer-Petris Act was passed in 1965 to establish BCDC as a temporary state agency. The Commission was charged with preparing a plan for the long-term use of the Bay and regulating development in and around the Bay while the plan was being prepared.

The *San Francisco Bay Plan* (Bay Plan), which was completed in January 1969, includes policies to protect the Bay as a resource and policies to guide development of the shoreline, ranging from ports and public access to water quality and habitat. The Bay Plan also contains maps of the entire Bay that designate shoreline areas that should be reserved for water-related purposes like ports, industry, waterfront parks, airports, and wildlife refuges. The Commission is directed to pursue an active planning program to study Bay issues so that Commission plans and policies are based upon the best available current information.

In August 1969, the McAteer-Petris Act was amended to make BCDC a permanent agency and to incorporate the policies of the Bay Plan into state law. In 1977, the Suisun Marsh Presrvation Act expanded the Commission's authority to provide special protection of the Suisun Marsh. The Suisun Marsh Protection Plan includes policies that guide the Commission and local jurisdictions in their review of marsh development permits as well as the Commission's review of local protection plans developed by local jurisdictions within the marsh.

BCDC is the federally-designated state coastal management agency for the San Francisco Bay segment of the California coastal zone. This designation empowers the Commission to use the authority of the federal Coastal Zone Management Act to ensure that federal and federally-permitted or funded activities are consistent with the McAteer-Petris Act and the Suisun Marsh Preservation Act and Protection Plan, BCDC regulations, and the policies of the Bay Plan.

Because the Commission was created in response to rampant filling of the Bay and a dearth of shoreline public access, the primary focus of the Commission's authority is on preventing unnecessary fill in the Bay and improving public access. Although fill is defined very broadly, this focus limits the ability of the Commission to address climate change issues.

The Commission's Jurisdiction. The Commission has jurisdiction over San Francisco Bay, including the Suisun Marsh, certain named waterways, salt ponds, managed wetlands, and a 100-foot shoreline band. Section 66610 of the McAteer-Petris Act describes the area of the Commission's jurisdiction over San Francisco Bay as follows:

> …"all areas that are subject to tidal action from the south end of the Bay to the [mouth of the] Golden Gate (Point Bonita-Point Lobos) and to the Sacramento River line (a line between Stake Point and Simmons Point, extended northeasterly to the mouth of Marshall Cut), including all sloughs and specifically, the marshlands lying between mean high tide and five feet above mean sea level….

The Commission typically refers to the above description as its Bay jurisdiction. Section 66610 also describes the Commission's shoreline band jurisdiction, which includes the land "between the shoreline of San Francisco Bay…[as described above] …and a line 100 feet landward of and parallel with that line." The Commission does not have shoreline band jurisdiction upland and adjacent to certain named waterways, salt ponds or managed wetlands.

In the 1970s, the Commission worked with other agencies and advocacy groups to develop the Suisun Marsh Protection Plan, which was enacted into law with the passage of the Suisun Marsh Preservation Act of 1977. The Act gives the Commission permit authority over an approximately 89,000-acre primary management area. Local jurisdictions retain permit authority over a 22,500-acre secondary management area, pursuant to their local protection programs approved by the Commission.

The Commission's Permit Authority. Section 66632 of the McAteer-Petris Act grants the Commission authority to require permits for projects in "any water, land or structure, within the area of the Commission's jurisdiction" for the following activities: (1) the placement of fill; (2) the extraction of materials; and (3) any substantial change in use of any water, land or structure. It further requires that projects provide "maximum feasible public access."

1. **Fill.** The McAteer-Petris Act broadly defines the term "fill" to include "earth or any other substance or material, including pilings or structures placed on pilings, and structures floating at some or all times and moored for extended periods…." Projects that involve the placement of fill in the Commission's Bay and certain waterway jurisdiction must be

consistent with Section 66605 of the McAteer-Petris Act, which requires the Commission to perform a tiered analysis. First, the Commission must determine whether the public benefits of the fill exceed the public detriment. Then, the Commission can approve fill only for a water-oriented use or minor fill to improve shoreline appearance or public access. Finally, the fill can be approved only when: (a) there is no alternative upland location for the fill; (b) it is the minimum amount of fill necessary to achieve the purpose of the fill; (c) the nature, location and extent of the fill minimizes harmful effects to the "environment," as defined in the California Environmental Quality Act (CEQA); (d) the fill is constructed with sound safety standards for public health, safety, and welfare; (e) the fill establishes a permanent shoreline; and (f) the applicant has valid title to the property.

Where a shoreline area is constructed on Commission-approved Bay fill, the Commission retains its Bay jurisdiction over that portion of the shoreline. The Commission may approve fill for shoreline protection, minor fill to improve shoreline appearance, for a water-oriented use, or to establish a permanent shoreline, provided that the fill satisfies all other provisions of the law.

2. **Extraction of Materials.** The Commission has the authority to require permits for proposals that involve the extraction of materials (e.g. dredging) in the Bay, certain waterways, salt ponds, and managed wetlands. The Bay Plan policies on dredging, in part, require dredging activities to be consistent with the Long Term Management Strategy for dredged materials in San Francisco Bay, establish the interagency Dredge Materials Management Office, encourage the beneficial reuse of dredged materials, and provide specific requirements for approving permits for dredging activities.

3. **Substantial Change in Use.** The Commission's regulations define a "substantial change in use" in salt ponds and managed wetlands as "any change in use including abandonment…[and] draining…." In other areas within the Commission's jurisdiction a substantial change in use is defined as "construction, reconstruction, alteration, or other activity, whether or not involving a structure…" and includes: a change in the category of use of a structure, in the intensity of use, an adverse affect on public access or future public access, or any subdivision of land pursuant to the Subdivision Map Act.

Salt Ponds and Managed Wetlands. The Commission's evaluation of fill projects in salt ponds and managed wetlands is limited to consistency with Section 66605 (c) through (g) of the McAteer-Petris Act. The requirement to weigh the public benefits and detriments of the fill does not apply to salt ponds and managed wetlands in the Commission's jurisdiction. Likewise, the

test of whether fill in such areas could be sited on an alternative upland location is not required. Regarding permit requirements in salt ponds, the "extraction of materials" is limited to materials extracted for activities associated with salt production. Furthermore, the Commission's salt pond jurisdiction extends to dikes and protective structures that form the ponds.

Managed wetlands located in primary and secondary management areas of the Suisun Marsh are subject to additional policies in the Suisun Marsh Protection Plan and the Suisun Marsh Preservation Act of 1977. Those policies address a range of ecosystem and infrastructures issues, such as: water supply and quality, natural gas resources, utilities, transportation, and recreation.

The 100-Foot Shoreline Band. Within the Commission's shoreline band jurisdiction the Commission may only deny a permit for a project that: (1) fails to provide maximum feasible public access consistent with the project; or (2) conflicts with the use designated in a priority use area (McAteer-Petris Act Section 66632.4). Despite this limitation, the Commission is granted authority to require permits for projects in the 100-foot shoreline band for all of the reasons described above. However, the Commission can only condition a permit—require changes to the project—to provide maximum feasible public access and to be consistent with a priority use.

The Commission evaluates every permit application to ensure that project proposals provide the "maximum feasible public access consistent with the project." The Bay Plan policies on public access guide the Commission's evaluation of public access proposals. Those policies further provide guidance for public access and wildlife compatibility, and the siting and design of public access areas. The policies also require public access to be permanently guaranteed and maintained.

Priority use areas are for shoreline uses that are important to the region and require a shoreline location. They include, water-related industries, airports, wildlife refuges, and waterfront parks and beaches. Shoreline areas are designated as priority use areas in order to minimize the need to fill the Bay if land is unavailable for those uses.

Existing Bay Plan Policies Pertaining to Sea Level Rise. In 1989, the Commission updated the Bay Plan to address potential impacts from sea level rise, based on the best available information about sea level rise at the time. In 2000, the Commission amended the Bay Plan policies on Tidal Marshes and Tidal Flats. As a result of the 1989 and 2000 policy updates, the Bay Plan was amended to include the following policies:

- **Safety of Fills, Policy 4.** To prevent damage from flooding, structures on fill or near the shoreline should have adequate flood protection including consideration of future relative sea level rise as determined by competent engineers. As a general rule, structures on fill or near the shoreline should be above the wave run-up level or sufficiently set back from the edge of the shoreline so that the structure is not subject to dynamic wave energy. In all cases, the bottom floor level of structures should be above the highest estimated tide elevation. Exceptions to the general height rule may be made for developments specifically designed to tolerate periodic flooding.
- **Safety of Fills, Policy 6**. Local governments and special districts with responsibilities for flood protection should assure that their requirements and criteria reflect future relative sea level rise and should assure that new structures and uses attracting people are not approved in flood prone areas or in areas that will become flood prone in the future, and that structures and uses that are approvable will be built at stable elevations to assure long-term protection from flood hazards.
- **Tidal Marshes and Tidal Flats, Policy 5**. This policy provides specific requirements for the design and evaluation of tidal marsh restoration projects, which includes an analysis of the following: (a) the effects of relative sea level rise; (b) the impact of the project on the Bay's sediment budget; (c) localized sediment erosion and accretion; (d) the role of tidal flows: (e) potential invasive species introduction, spread, and their control; (f) rates of colonization by vegetation; (g) the expected use of the site by fish, other aquatic organisms and wildlife; and (h) site characterization.

Except in the case where a structure is proposed on Bay fill, the policies on safety of fills largely provide guidance to permit applicants and local governments on siting and designing projects to minimize impacts from flooding. The Commission's authority in the shoreline band to require changes in the siting and design of a project is limited to addressing impacts to present or future public access or the use of a priority use area for its designated purpose.

The Public Trust Doctrine and Takings. The public trust doctrine establishes a "public easement" over tidal and submerged lands that provides the public with rights to those lands for certain uses. The extent to which those public rights extend inland as sea level rises will impact how the Commission makes future regulatory decisions. The Commission's legal staff prepared a report to the Commission on the implications of rising sea levels on its public trust responsibilities and the relative role of "takings." The information below is summarized from the draft report.

The public trust doctrine dates back to Roman times and was imported to America from English common law. Traditionally, the public trust doctrine guaranteed public rights to navigable waters and submerged lands only for certain uses: fishing, navigation and commerce. Over time, each state developed and expanded its own public trust doctrine and the kinds of uses it protects. Through legislation and court decisions in California and other states the doctrine has expanded to include recreational uses and the preservation of lands in their natural state. Uses inconsistent with the public trust (non trust-related uses), are generally those that do not require waterfront locations like residential and non water-related commercial office uses.

The McAteer-Petris Act confers upon BCDC the authority to require "maximum feasible public access," ensure that public benefits of projects clearly exceed public detriments, and preserve water-oriented uses. These statutory provisions are direct expressions of the public trust doctrine.

A key element of the public trust doctrine is its effect on the regulation of private property. Government must compensate property owners under the Fifth Amendment of the U.S. Constitution if it "takes" private property for public uses. The "takings clause" limits the regulation of private property to protect natural resources and prevent environmental harm. However, the courts have held that government actions to enforce common law public easements such as the public trust doctrine, may be insulated from Fifth Amendment takings claims.

When government takes private property for a public purpose through eminent domain or condemnation, such as a highway or public works project, the property owner is compensated for the loss of value of the property. A taking by government regulation, or so-called "regulatory taking" may also occur when an agency permit allows a physical occupation without sufficient justification or renders a property valueless. However, the courts have been unable to establish a clear formula to determine when a regulatory taking occurs.

In summary, within the Commission's Bay, certain waterway, salt pond, and managed wetland jurisdiction, the Commission has clear, but, limited authority to address climate change, sea level rise and related impacts for projects that involve the placement of fill in all waters within the Commission's jurisdiction, including salt ponds and managed wetlands. This authority includes the ability to condition projects to be adaptable to sea level rise. For shoreline protection projects that involve Bay fill, the Commission has the authority to ensure that the fill is placed in a manner that minimizes harmful effects to the environment, which includes harmful effects from future flooding and harmful effects to waters within the Commission's jurisdiction.

Within the 100-foot shoreline band, the Commission's authority is limited to the provision of public access and the designation of priority use areas. This limitation is significant because it prevents the Commission from ensuring that development on the shoreline is sited and designed to avoid or minimize impacts from future flooding. The Commission can have an important advisory role to make recommendations on the siting and design of shoreline development to protect Bay resources and promote the wise development of the Bay shoreline.

BCDC's laws and policies create two other governance limitations. First, the Commission implements its authority on a permit-by-permit basis, and this limits the potential to analyze and address the cumulative impacts of individual projects, such as shoreline protection. Second, the focus of the McAteer-Petris Act and the Bay Plan on preventing the Bay from getting smaller creates an awkward policy framework from which to build a set of comprehensive climate change policies that sufficiently address the challenges of an expanding Bay.

The public trust doctrine is based on the historic value that the public has a right of access to the shorelines of navigable waters. The public trust formed the foundation for the McAteer-Petris Act and it is the background principle that can enable a number of adaptation strategies. In exercising the public trust, regulatory agencies must act carefully to avoid "taking" the rights of private property owners under the Fifth Amendment. There is no clear test to determine the extent to which a "public easement" can move inland as sea level rises without "taking" private property. This uncertainty about the migration of the public easement could limit the Commission's ability to adopt and implement policies that ensure long-term provision of shoreline public access.

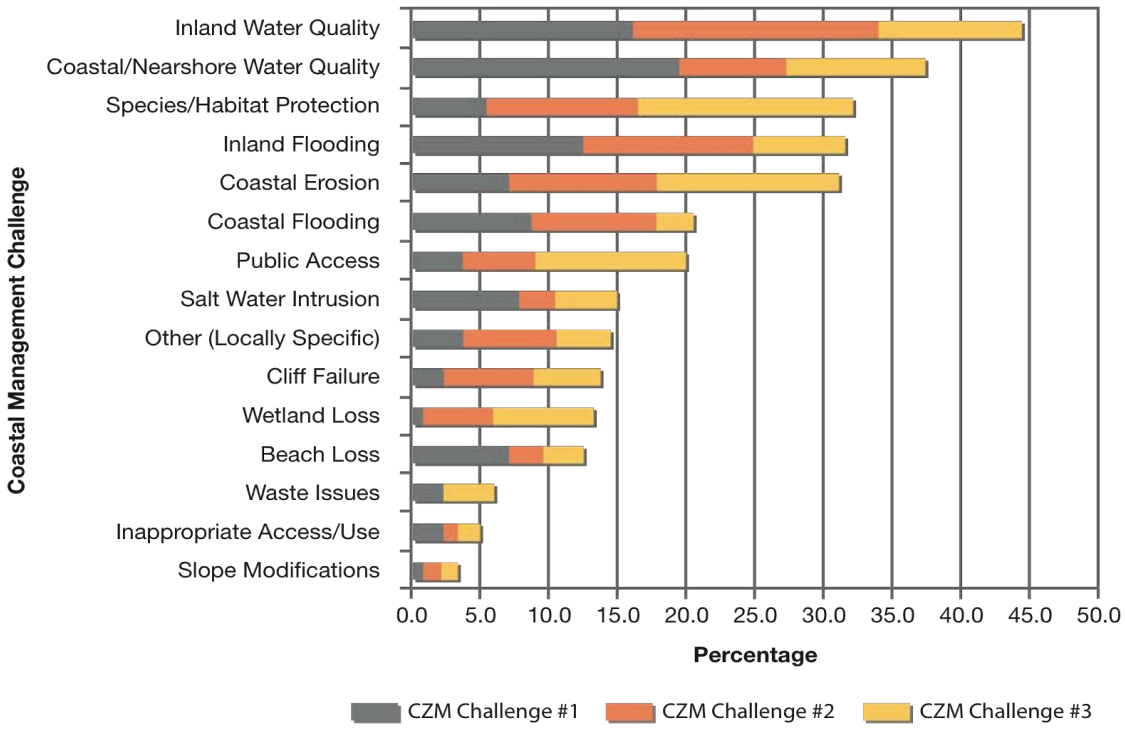
Needs Assessment for Local Jurisdictions

Local jurisdictions shoulder much of the responsibility for land use planning, flood management, water quality protection, and wastewater treatment, all of which will be affected by the Bay-related impacts of climate change. Cities and counties are granted "police powers" by the state, which allow them to protect the overall well-being of their communities (lives, health, and property) by enacting and enforcing ordinances and regulations. The state requires cities and counties to prepare and adopt comprehensive General Plans, consistent with state law, for physical development within their respective jurisdictions. In order to engage in effective adaptation planning, each local jurisdiction needs some level of knowledge about climate change that can be incorporated into ordinances, regulations and General Plans.

Statewide Survey. In 2006, the National Center for Atmospheric Research (NCAR) conducted a survey of local coastal managers in California in order to assess their information needs and their capacity to develop adaptation strategies. NCAR surveyed 299 municipal and county governments on the open coast and along the Bay shoreline. One of the key findings of the study was that coastal managers are already dealing with impacts of climate change. Eight of the top fifteen current challenges identified by coastal mangers can "directly or indirectly be related to climate variability and/or sea level rise (Moser and Tribia 2007(a))" (Figure 4.1).

Figure 4.1 Top Coastal Zone Management Challenges

Source: Moser and Tribbia 2007a



In the NCAR survey of local coastal managers, the topics that were assessed included, but were not limited to: level of knowledge of climate change impacts on coastal zones; information use and information needs related to coastal decision-making; and perceived barriers to adapt to climate change. Major findings from the NCAR study pertain directly to information needs and barriers to taking action:

- **Staffing and Resources.** Staffing is a major barrier to gathering and identifying climate change information. When asked to identify barriers to planning for climate change, 74 percent of respondents cited insufficient staff resources to analyze information; 60 percent identified lack of staff time to gather information and begin getting informed, and 46 percent mentioned lack of technical assistance from state or federal agencies (Moser and Tribia 2007a).
- **Information Accessibility and Relevance.** Vulnerability assessments are key to planning for climate change. Assistance in determining what is most at risk is a priority, especially "locally or regionally specific projections of particular changes in climate….[S]cientific information, even if uncertain, needs to be translated into management relevant variables or metrics (Moser and Tribbia 2007b)." While flooding scenarios are important, a permit analyst deals with rates of shoreline erosion, usually on a project-by-project basis. Projections are needed for timeframes that are relative to the life of a proposed project.
- **Information Location and Format.** For scientific information to be easily accessible and useful to local coastal managers, it should be processed into formats that are used by planners and permit analysts. (Moser and Tribia 2007b).

Although there are some differences in the issues encountered by coastal managers on the open coast and in the San Francisco estuary, qualitative data from a regional summit and a series of interviews conducted by BCDC are generally consistent with the NCAR findings.

In 2006, the Bay Area Air Quality Management District (Air District) hosted a regional climate change summit during which local jurisdictions identified areas where they need assistance. Although the discussion focused on greenhouse gas reductions, elements of the discussion provide important data regarding Bay Area local jurisdictions. Following the summit, the Air District staff identified needs and barriers common to Bay Area governments.

Similar to the findings discussed above, participants cited lack of knowledge as a barrier to confronting climate change and identified a specific desire for improving information accessibility through centralized information storage, such as a climate information clearinghouse or web portal. Participants also asked for guidelines for implementing climate change programs, such as sample ordinances. Participants identified lack of resources and competing internal priorities as major barriers to confronting climate change.

The data from the statewide survey and the Air District's summary of regional needs (BAAQMD 2006) provided BCDC with enough data to proceed with targeted, structured interviews with individuals from local jurisdictions (counties, cities, water districts, flood control districts, water quality agencies, and resource agencies). The purpose of the interviews was to assess common needs of local planners and resource managers within the Bay Area. BCDC's objectives in conducting additional interviews were to supplement and refine the existing data. Rather than replicate work that had already been completed, BCDC performed a qualitative analysis to integrate the existing data and apply lessons learned on the statewide level to the Bay Area.

Other common themes emerged from the interviews. A consistent comment was a request for a comprehensive regional model or set of projections of climate change impacts. The NCAR finding regarding the need for relevant information in a usable format was further echoed in the interviews. All three of these surveys of climate change planning at the local and regional levels concluded that planners and resource managers need better access to information. They would like to be able to turn to a web clearinghouse, or portal, for up-to-date information and downloads. Most interview participants want processed data in the form of GIS shapefiles or policy guidance documents. Only a few prefer unprocessed data that they can incorporate into in-house models. Regardless, a web portal seems to be a preferred distribution method.

The interviews further revealed distinctions between two types of local planners and resource managers: (1) local government land use planning departments; and (2) resource-based coastal managers, such as staff of flood control districts, water districts, water treatment facilities, and resource agencies. Local government land use planning departments were typically less knowledgeable about the Bay-related impacts of climate change than those in the second group or type. They were more likely than group two participants to identify their primary barrier as lack of financial resources and staff. The agencies they rely on for assistance and information were most often cited as the Federal Emergency Management Agency and the Army Corps of Engineers. Besides the obvious bias of being the interviewer and author, it is worth noting that BCDC was cited by almost all participants.

Utilities and others in the second group possessed a greater understanding of Bay-related impacts, especially pertaining to their individual purposes (e.g., water delivery, water treatment, etc.). The most commonly identified barrier was a lack of regional or site-specific information. Group two participants commonly rely on consultants to gather information or produce site-specific analysis.

Other governance vulnerabilities to climate change impacts exist because local governments operate within a policy environment that fails to provide incentives to proactively change their approaches to shoreline development. For example, Proposition 13 has forced local governments to rely more on new development for revenues from development fees and sales taxes, thus creating a fiscal disincentive to limit new shoreline development. Even where financial and policy incentives do encourage planning to improve disaster preparedness and mitigate the impacts of hazards, such as storm flooding, local governments are not required to consider future scenarios of climate change impacts in their planning efforts.

Summary and Conclusions

The Bay Area faces a range of vulnerabilities in its systems of governance that are evaluated here and summarized in Table 4.1. Governance vulnerabilities reduce the region's ability to adapt to sea level rise and other climate change impacts on the Bay and shoreline. A look at the region's overall governance system suggests that existing challenges to regional planning caused by the patchwork of federal, state, regional and local government authorities in the Bay region will be exacerbated by climate change impacts.

Table 4.1 Summary of Vulnerabilities in Bay Area Governance Systems

Governance	Current and Expected Challenges	Projected Climate Change Impacts	Vulnerability Assessment		
			Degree of Sensitivity	Adaptive Capacity	Vulnerability
BCDC	Limited jurisdiction and authority on the shoreline. Limited ability to address cumulative impacts through permit authority.	Inability to effectively address sea level rise and flooding in permits and planning efforts due to focus on preventing fill, and limited authority to deny permits on the shoreline. Uncertainty about changes to public easement due to sea level rise.	High – Bay and (most) shoreline projects designed to address sea level rise and flooding will require BCDC permit.	Low/Medium – Amendment of Bay Plan policies within existing law and policy framework can marginally improve BCDC's capacity to address sea level rise and flooding in some permits.	High

Continuation of Table 4.1 Summary of Vulnerabilities in Bay Area Governance Systems

Governance	Current and Expected Challenges	Projected Climate Change Impacts	Vulnerability Assessment		
			Degree of Sensitivity	Adaptive Capacity	Vulnerability
Local Governments	Already operating at capacity in terms of staff and funding resources.	Additional demands for staff and funding resources. Lack of information about impacts and guidance on adaptation planning.	High – Local governments will have major responsibilities for adaptation.	Medium – Have authority for conducting community adaptation planning, but lack incentives to change approaches to shoreline development.	High
Governance Landscape	Challenges to regional planning and implementa-tion of regional plans caused by patchwork of government agencies' authorities in the Bay Area.	Need for flexible and adaptive regional adaptation planning and management will be challenged by the patchwork of authority.	Medium – Adaptation requires coordinated regional planning and implementa-tion.	Medium - Region will be able to draw on experience from past regional planning efforts, but complexities of climate change create new, unfamiliar planning challenges.	Medium

BCDC faces governance limitations in its laws and policies. The Commission's jurisdiction on the shoreline is limited to 100 feet from the mean high tide line, and within this area BCDC's authority is limited to requiring maximum feasible public access and consistency with priority use areas. This limits the ability of the Commission to address issues like climate change and sea level rise in the shoreline band. The Commission's law is based on principles in the public trust doctrine, and the extent to which the public easement established by the public trust can move inland is undetermined. Furthermore, because BCDC implements its authority on a permit-by-permit basis, the Commission is limited in its ability to address the cumulative impacts of individual shoreline protection projects. The existing framework of BCDC's laws and policies that focus on preventing the Bay from shrinking is an overarching constraint to the Commission's ability to effectively plan for and adapt to climate change impacts.

Local governments and other management agencies, especially in cities and counties, have broad authority over shoreline land use. However, they lack policy incentives, resources and regional guidance for addressing climate change impacts in land use planning. To address these gaps, local governments need information about the Bay-related impacts of climate change that is region-specific and site-specific. The information should include a regional model that

projects 50-100 years into the future or the expected "life of a project." The projections should be developed through a public, inclusive process in order to be widely accepted and used throughout the region. The system most commonly used by local governments for analyzing information is GIS. However, local planners and resource managers can benefit from guidance documents, such as sample ordinances.

Lack of staff and adequate financial resources are the primary barriers to planning for coastal impacts of climate change, both statewide and in the Bay Area. Any assistance to local governments and public management agencies must address this issue either by providing more staff and financial resources or by providing information that is easily integrated into existing operations, planning tools, guidance documents, and planning processes (e.g., general plan updates).

CHAPTER 5
Adaptation Strategies

California is a leader in working to reduce greenhouse gas emissions. However, no matter how successful these efforts are, the state needs to plan for the inevitable impacts of climate change caused by past emissions, including sea level rise.

Some of California's most highly valued cities and natural areas are in low-lying lands around San Francisco Bay. Critical Bay Area assets may be lost as sea level rises. The most imminent threat facing the region is more frequent and extreme flooding of residential areas, which make up 50 percent of the lands potentially affected by sea level rise and storms. Managing the threats to Bay resources and shoreline development from sea level rise will be one of the defining challenges we face in the 21st century.

Communities that fail to plan for these changes will find themselves responding to emergencies with increasing frequency (Pacific Council 2010). Reacting to crises without taking proactive steps to prepare is likely to have devastating societal, economic and environmental costs. Therefore, the region should develop an adaptation framework upon which to build as science advances, innovative technologies and management strategies emerge, ecosystems change, and lessons are learned from successes and failures.

This chapter discusses issues to consider when planning for climate change adaptation, and presents a decision-making framework that can increase adaptive capacity of the Bay ecosystem and the built shoreline environment. This chapter also presents staff recommendations to the Commission for updating the Bay Plan to address climate change, and facilitating a regional climate change strategy that includes strengthening agency partnerships and assisting local governments.

Adaptation Planning Considerations

A prudent approach to addressing climate change impacts is to use a robust planning framework and active stakeholder participation to select an appropriate set of responses for a specific site, community or subregion of the Bay Area, prioritize them, and implement them over time, incorporating lessons learned into the process. The following issues should be considered when developing adaptation strategies.

Adaptation Planning Strategies. To make the best use of the limited resources available to local governments, climate change planning can be "mainstreamed" into existing planning efforts (Luers and Moser 2006, USEPA 2008, Moser and Tribbia 2007). For example, some Bay Area cities have assessed climate change impacts in the process of updating their General Plans, and adopted adaptive land use policies to reduce or prepare for these impacts.

Adaptation strategies that address immediate or ongoing concerns while reducing future risks (often called "no regrets" or "low regrets" strategies) can readily be integrated into current planning efforts (Luers and Moser 2006). Water conservation is an example of a potential no regrets strategy that mitigates greenhouse gas emissions by reducing the needed for treatment and transport of water, and improves resilience to climate change impacts on water supply. Another example is the restoration of tidal marshes to provide open space, natural habitat and flood protection.

Other strategies can be used to mainstream adaptation efforts, for example incorporating actions to address future climate change into routine efforts, such as repair and maintenance projects, without incurring substantial additional costs at the time of the upgrade (Luers and Moser 2006). For example, to reduce possible flood damage costs, expensive home appliances, such as furnaces, water heaters, clothes washers and dryers, can be relocated to an upper story at the time of replacement. To the extent that these strategies can be identified, they should be implemented immediately.

Box 5.1 Adaptive Management in the South Bay Salt Pond Restoration Project

Adaptive management is a widely recognized approach to addressing uncertainty in resource management. It is often characterized as "learning by doing." An adaptive management approach takes account of uncertainty in the design and implementation of resource management policy and maximizes the opportunity to learn from management actions. Monitoring the success of our management actions in both the Bay ecosystem and along the natural and built shoreline is the fundamental process for reducing uncertainty and implementing effective management. The adaptive management process links values, science, and managers in the decision-making process and throughout project implementation.

The South Bay Salt Pond Restoration Project (Project) is based on an Adaptive Management Plan (Plan). The Plan creates a framework for achieving project objectives through learning from restoration and management actions by monitoring restoration progress and gradually reducing scientific and social uncertainties.

The Project's goal is to restore and enhance over 15,000 acres (23 square miles) of wetlands in the South San Francisco Bay while providing for flood management and wildlife-oriented public access and recreation. The Project seeks a balance between restoring wetland habitat and maintaining existing pond habitat, with alternative scenarios ranging from 50 percent each of wetlands and ponds to 90 percent wetlands and 10 percent ponds. Project participants identified eight key uncertainties that could make meeting the project objectives difficult. These included sediment dynamics, bird response to changing habitats, non-avian species responses, mercury issues, invasive and non-native species, water quality, public access and wildlife, and social dynamics. The overarching uncertainty of global climate change is incorporated, de facto, into each of the specific key uncertainties.

The Project participants agreed that, due to the many uncertainties, the mix of habitats that will optimally meet the project objectives—including the amount of tidal restoration and its location—cannot be predicted at this time. Therefore, the project will be implemented and evaluated in phases and will use adaptive management as the process for determining how far the system can move toward full tidal action and associated tidal habitats, while still meeting the project objectives (Trulio et al. 2007).

The Project is led by the U.S. Fish and Wildlife Service, California Department of Fish and Game, Conservancy, Santa Clara Valley Water District, and Alameda County Flood Control and Water Conservation District.

Adaptive Management. Adaptation planning and implementation should be based on the principles of adaptive management so that they take into account uncertainty and maximize the opportunities to learn from management actions. (See Box 5.1.) This requires careful monitoring, which takes time, financial resources, and scientific and technical expertise. Although advances in science have led to better climate change projections, there is still a large degree of uncertainty about future rates of sea level rise. There is also uncertainty about climate change impacts and the effectiveness of adaptation measures. Scientific and technical knowledge will continue to develop at a rapid rate, requiring planners and resource managers to create flexible management strategies and identify triggers for changing course when necessary.

Ecosystem-Based Management. Shoreline planning will become increasingly challenging as the line between uplands and baylands becomes more dynamic, thereby requiring a creative planning approach that integrates natural resource management and land use planning. Ecosystem-based management (EBM) integrates human needs and systems into marine or estuarine environmental management, bringing stakeholders into decision-making processes, and providing direction through those processes. EBM also recognizes the need for iterative approaches to managing complex systems, i.e., adaptive management. EBM can provide a portfolio of approaches and the online tools to support these approaches, ranging from tools for stakeholder outreach to mapping tools.

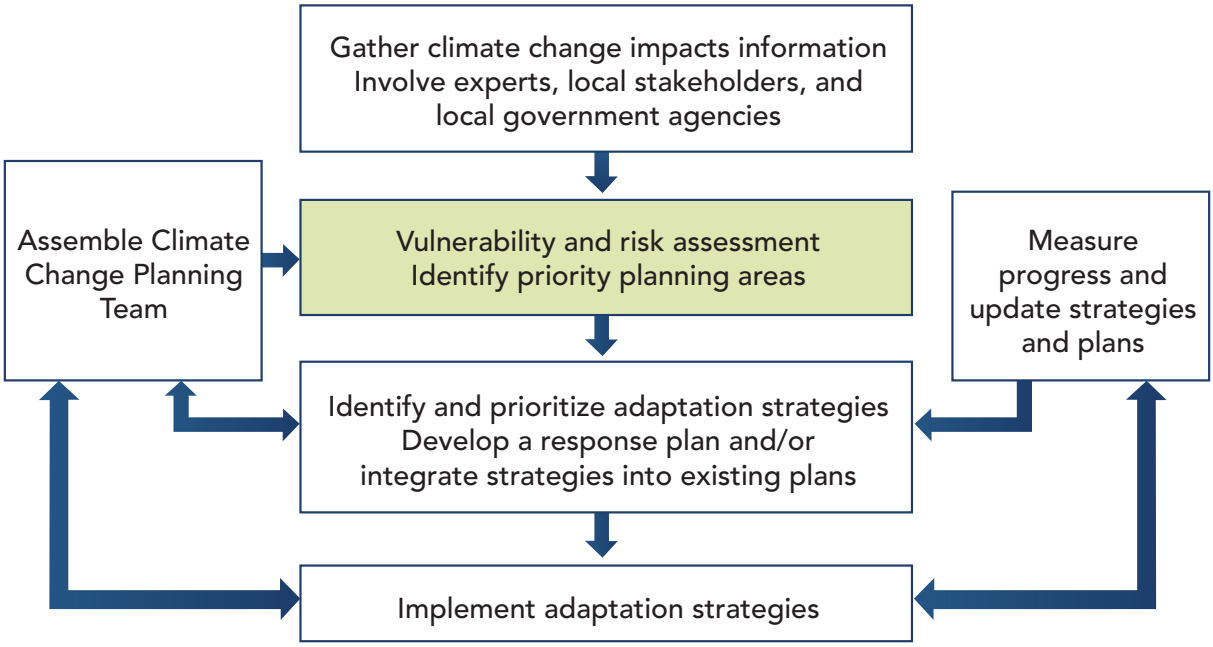
Integrating Mitigation and Adaptation. While mitigation lessens future impacts by taking steps to reduce greenhouse gas emissions and capture greenhouse gases, adaptation makes communities, infrastructure and the natural environment more resilient to the impacts from emissions. Mitigation has traditionally been at the forefront of the global climate change dialogue as the world attempts to avoid further altering the Earth's atmosphere. Adaptation reduces the vulnerability of natural systems and human communities to existing or predicted climate change impacts.

Integrating mitigation and adaptation planning can reduce inefficiencies and potential conflicts while providing greater protection. For example, conserving and restoring tidal marsh provides flood protection and achieves mitigation by sequestering carbon. In addition, increased habitat will be available to climate-stressed species. Another example is the siting of new sustainable communities outside of current and future floodplains. Development of sustainable communities, in which housing is located near jobs and public transit, reduces greenhouse gas emissions from driving, while focusing such development in upland areas is one means of reducing its vulnerability to sea level rise.

Adaptation Planning Framework

Most adaptation planning frameworks include a few key steps: identifying a planning area and scoping of potential climate change impacts, conducting vulnerability and risk assessments, developing and implementing an adaptation plan, and conducting monitoring and adaptive management. (See Figure 5.1.) BCDC developed the framework used in this report based on its review of several examples. The analysis in this report provides the basis for the Commission to identify ways to promote adaptation within BCDC's limited jurisdiction and to recommend that a collaborative process be undertaken in partnership with other regional agencies, local governments and stakeholders to develop a regional strategy to deal effectively with sea level rise and other adaptation challenges in the Bay Area. The iterative nature of this framework will allow BCDC to continually incorporate new scientific knowledge and analytical tools as they are developed.

Figure 5.1. Climate Change Adaptation Planning Model



Vulnerability and Risk. A vulnerability assessment helps communities identify the resources—the people, places, buildings, infrastructure, and natural areas—that are most susceptible to climate change impacts. A risk assessment builds on the information developed in a vulnerability assessment by describing the likelihood that specific impacts will occur and the consequences those impacts would have for the community. Together, these assessments are important steps in an adaptation planning process that can help communities define key issues related to climate change impacts, determine how best to respond, and decide when to take action.

In a vulnerability assessment, communities examine how people, property, and resources are susceptible to the types of impacts associated with climate change. They begin by reviewing information about global and regional climate change trends to identify locally relevant impacts such as more frequent flooding and inundation due to sea level rise. Then, to better understand these impacts, the community can use its knowledge of existing resources and stressors to determine how and when it could be sensitive to change. Last, the community can determine its capacity to cope with these impacts now and into the future.

In a risk assessment, communities combine information about the economic, social, legal, and ecological consequences of specific impacts with the likelihood that those impacts will occur in order to set priorities. A highly likely impact (such as higher daily tides) that has considerable negative consequences (such as inundation of critical transportation infrastructure or groundwater intrusion into a community's water supply) is a high-risk impact that should be elevated to an adaptation planning priority.

In this report, a vulnerability analysis was conducted to understand the effects of climate change on San Francisco Bay and the shoreline. This effort began with identifying three systems that encompass the broad scope of climate change planning considerations: shoreline development, the Bay ecosystem, and governance. Current challenges facing each system were identified to provide a qualitative assessment of adaptive capacity and identify where challenges will be exacerbated with climate change. Two climate change scenarios were selected to evaluate the impacts on the Bay and shoreline. Where possible, quantitative analysis was provided to illuminate the scale of the impact, such as the size of an area or population affected. In the discussion on governance, current challenges were identified in terms of the limits of the Commission's jurisdiction and authority and the needs of local governments.

Adaptation Strategies for San Francisco Bay and its Shoreline

Effective adaptation to address the climate change impacts identified in the vulnerability analysis will require action by a wide range of organizations and individuals. The ocean and coastal resources chapter of the 2009 California Climate Adaptation Strategy provides some guiding principles for making difficult decisions about maintaining and enhancing natural resources while protecting development and public safety:

- Protect public heath and safety and critical infrastructure.
- Protect, restore, and enhance ocean and coastal ecosystems, on which our economy and wellbeing depend.
- Ensure public access to coastal areas and protect beaches, natural shoreline, and park and recreational resources.
- Plan and design new development and communities so they will be sustainable over the long term in the face of climate change.
- Facilitate adaptation of existing development and communities to reduce their vulnerability to climate change impacts over time.
- Begin now to adapt to the impacts of climate change.

The Bay Area will need to select adaptation strategies to address key vulnerabilities that occur at various scales and timeframes. In the near term, the Commission has limited legal authority to ensure that sea level rise is taken into consideration in the design of projects within BCDC's jurisdiction. In the long run, the Commission can help facilitate a collaborative process to develop a regional strategy to deal effectively with sea level rise and integrate climate change mitigation and adaptation planning in the Bay Area. The following sections focus on adaptation strategies that the Commission can undertake and encourage through amendment of the Bay Plan to address the issues identified in the vulnerability assessment and discuss the Commission's role in facilitating the development of a regional strategy.

1. Shoreline Development

The heavily developed Bay shoreline supports multiple, competing uses, including residential, commercial, industrial, and recreational uses. Shoreline development that is now potentially exposed to a 100-year high water event could be exposed to the average high tide by mid-century. Approximately half of the development potentially at risk is residential. Large commercial and industrial areas will also be at risk of flooding or permanent inundation, especially in San Francisco, Silicon Valley, and Oakland. Ports, airports, water-related industry,

wastewater treatment plants, waterfront parks and beaches, trails, and other important facilities are all at risk. In addition, many of the major roads, highways and railroads within the region may be significantly impacted by sea level rise and extreme flooding events.

Critical public infrastructure and essential development on the Bay shoreline will require protection to prevent flooding and permanent inundation from sea level rise, yet protecting all developed areas may prove to be financially infeasible or ecologically destructive. In the long-term, the region needs to engage in an open and vigorous public dialogue to make the difficult decisions about where and how existing development should be protected and infill development encouraged, where new development should or should not be permitted, and where existing development should eventually be removed to allow the Bay to migrate inland.

The Commission has limited authority to address climate change, sea level rise and related impacts for projects that involve the placement of fill in the Bay. Within the 100-foot shoreline band, the Commission's authority is limited to requiring maximum feasible public access and land use consistency within priority use areas. This limitation prevents the Commission from requiring that development on the shoreline is sited and designed to avoid or minimize impacts from future flooding due to sea level rise. However, the Bay Plan can be amended to incorporate the following objectives for achieving resilience to flooding when planning and designing shoreline projects.

Risk Assessments and Adaptive Management Plans. Risk assessments should be conducted for larger shoreline projects and updates of plans addressing shoreline areas vulnerable to flooding. These assessments should use the best available science-based projection for sea level rise at the end of the century and should identify all types of potential flooding, degrees of uncertainty, consequences of defense failure, and risks to existing habitat from proposed flood protection devices. Shoreline plans and larger shoreline projects should be designed to be resilient to a mid-century sea level rise projection, and if it is likely the project will remain in place longer than mid-century, an adaptive management plan should be prepared to address the long-term impacts. To be cost-effective risk assessments should not be prepared for projects that do not significantly increase overall risks to public safety, such as small projects, repairs of existing facilities, interim uses and public parks.

Evaluating Project Proposals. Large projects proposed in vulnerable areas should be evaluated on a case-by-case basis to determine the project's public benefits, resilience to flooding, and capacity to adapt to climate change impacts. Projects with regional benefits, such as environmental remediation, critical public infrastructure, infill that concentrates employment or housing near transit service, and natural resource restoration or enhancement, should be

encouraged if their regional benefits and their advancement of regional goals outweigh the risks from flooding. Projects that do not negatively impact the Bay and do not increase risks to public safety, such as repairs, small projects, interim uses and public parks, should also be encouraged.

Safety of Fills. Flood damage to fills and shoreline areas can result from a combination of sea level rise, storm surge, rainfall, high tides, and winds blowing onshore. The most effective way to prevent such damage is to locate projects and facilities above the 100-year flood level that takes future sea level rise into account during the expected life of the project. Adequate measures should be provided to prevent damage from sea level rise and storm activity that may occur on fill or near the shoreline over the expected life of a project. The Commission may approve fill that is needed to provide flood protection for existing projects and uses, as long as the fill is the minimum necessary and serves a water-oriented use.

New projects on the shoreline should either to either be set back from the edge of the shore so that the project will not be subject to dynamic wave energy, be built so the bottom floor level of structures will be above a 100-year flood elevation that takes future sea level rise into account for the expected life of the project, be specifically designed to tolerate periodic flooding, or employ other effective means of addressing the impacts of future sea level rise and storm activity. Rights-of-way for levees or other structures protecting inland areas from tidal flooding should be sufficiently wide on the upland side to allow for future levee widening to support additional levee height so that no fill for levee widening is placed in the Bay.

Shoreline Protection. Critical public infrastructure and essential development on the Bay shoreline will require protection to prevent inundation and flooding from sea level rise. BCDC's existing shoreline protection policies focus on protecting the shoreline from erosion. Due to sea level rise, the Commission needs amended policies to enable it to address shoreline flooding as well as erosion. Shoreline protection can be structural, natural, or a combination of both. Choosing the appropriate form of shoreline protection—one that both protects public safety and minimizes ecosystem impacts—is critically important.

New shoreline protection projects and the maintenance or reconstruction of existing projects and uses should be allowed if the project is necessary to provide flood or erosion protection for (a) existing development, use or infrastructure, or (b) proposed development, use or infrastructure that is consistent with other Bay Plan policies. The type of the protective structure should be appropriate for the project site, the uses to be protected, and the erosion and flooding conditions at the site. Knowledgeable professionals, such as civil engineers experienced in coastal processes, should participate in the design.

Addressing the impacts of sea level rise and shoreline flooding may require large-scale flood protection projects, including some that extend across jurisdictional or property boundaries. Coordination with adjacent property owners or jurisdictions to create contiguous, effective shoreline protection is critical when planning and constructing flood protection projects. Failure to coordinate may result in inadequate shoreline protection (e.g., a protection system with gaps or one that causes accelerated erosion in adjacent areas). Each project should be integrated with current or planned adjacent shoreline protection measures.

Shoreline protection projects should include provisions for nonstructural methods such as marsh vegetation and integrate shoreline protection and Bay ecosystem enhancement, using adaptive management, whenever feasible. Along shorelines that support marsh vegetation, shoreline protection projects should establish transitional upland vegetation as part of the protective structure whenever feasible. Shoreline protection projects should be properly designed and constructed to prevent significant impediments to physical and visual public access. The adverse impacts to natural resources and public access from new shoreline protection should be avoided. Where adverse impacts cannot be avoided, habitat mitigation or alternative public access should be provided.

High Water Level Metric. The Bay Plan policies should be amended to use a more appropriate measure of high water levels. Staff considered three alternative measures that could be used as a base high water level metric on to which sea level rise can be added when designing projects to be resilient or adaptable to climate change: (1) highest estimated tide (2) Base Flood Elevation (BFE) provided by the Federal Emergency Management Agency (FEMA); and (3) a case-by-case determination of the appropriate high-water metric, based on individual project characteristics.

BCDC's existing Bay Plan policies require all projects within the Commission's jurisdiction to be built above the highest estimated tide and wave run up levels for the life of the project. The highest estimated tide (NGVD) with an expected recurrence interval of 100 years is available for sites around the Bay, based on a 1984 Army Corps of Engineers analysis of the highest yearly tide level observed at the Presidio for the period from 1855-1983. Since the highest estimated tide is based on an extrapolation of data from one tide gauge (the Presidio), and is based on the historic record, this metric has limited utility for producing accurate estimates of future conditions in the entire estuary. In addition, site-specific conditions such as wave run up and watershed contributions from runoff are generally underestimated by this metric. The case-by-case approach creates a great deal of uncertainty regarding the appropriate metrics to be used for project evaluations, and would create difficulties for permit applicants and their consultants when analyzing project vulnerabilities and developing resilient designs and adaptation plans.

Representatives of the Bay Area Flood Protection Agencies Association (BAFPAA), the Bay Area's regional flood control experts, recommended that BFE provided on maps published by FEMA be used, because: (1) BFE reflects 100-year flood stillwater elevations plus wave run up; (2) FEMA wave run up values are conservative; (3) interpolation between nearest published elevations is an acceptable way to estimate elevations for locations that do not have a published BFE (BAFPAA 2010). Therefore, the Bay Plan should be revised to recommend using the estimated 100-year flood elevation that takes sea level rise into account (i.e., BFE plus sea level rise) in risk assessments, in the design of projects on fill or near the shoreline, and in the design of shoreline protection projects.

Public Access. Accelerated flooding from sea level rise and storm activity will severely impact existing shoreline public access, resulting in temporary or permanent closures. Periodic and consistent flooding would increase damage to public access areas, which can then require additional fill to repair, raise maintenance costs, and cause greater disturbance and displacement of the site's natural resources. Risks to public health and safety from sea level rise and shoreline flooding may require new shoreline protection to be installed or existing shoreline protection to be modified, which may impede physical and visual access to the Bay. Flooding from sea level rise and storm activity increases the difficulty of designing public access areas (e.g., connecting new public access that is set at a higher elevation or located farther inland than existing public access areas). Public access should be sited, designed, managed and maintained to avoid significant adverse impacts from sea level rise and shoreline flooding. Any public access provided should either be designed to remain viable in the event of future sea level rise or flooding, or equivalent access should be provided nearby.

2. Bay Ecosystem

The Bay ecosystem is already stressed by human activities that lower its adaptive capacity, such as diversion of freshwater inflow and conversion of tidal wetlands. These activities have resulted in losses in critical estuarine functions, loss of habitat extent, and compromised water quality. Climate change will further alter the ecosystem by inundating or eroding wetlands and transitional habitats, changing sediment dynamics, altering species composition, raising the acidity of Bay waters, changing freshwater inflow or salinity, altering the food web, and impairing water quality, all of which may impair the system's ability to rebound and function. Changes in salinity from reduced freshwater inflow will affect fish, wildlife and other aquatic organisms in intertidal and subtidal habitats. Further inundation of tidal wetlands is potentially devastating to the San Francisco Bay ecosystem. Moreover, further loss of tidal wetlands will increase the risk of shoreline flooding.

Tidal Marshes and Tidal Flats. The highly developed Bay shoreline constrains the ability of tidal marshes to migrate landward, while the declining sediment supply in the Bay reduces the ability of tidal marshes to grow upward as sea level rises. The loss of transitional habitats, such as the upland ecotone, to erosion or inundation would devastate a diverse number of species, including California clapper rail and the salt marsh harvest mouse who use these habitats for refuge during high tides.

Key issues that resource managers must address regarding adaptation planning for tidal marshes and tidal flats include: protecting undeveloped areas with current or potential habitat value, identifying opportunities for tidal wetlands and tidal flats to migrate landward by maintaining sufficient upland buffer areas, developing and planning for natural flood protection, managing and maintaining adequate volumes of sediment for marsh restoration and preservation, and updating regional ecosystem targets to take climate change into consideration.

Some undeveloped low-lying areas that are at risk of shoreline flooding contain important habitat or provide opportunities for habitat enhancement. Preservation or restoration of tidal habitat in these areas could help offset the loss of tidal habitat due to sea level rise in other areas.

Buffers are areas established adjacent to a habitat to reduce the adverse impacts of surrounding land use and activities. Buffers around tidal wetlands could minimize loss of habitat from shoreline erosion resulting from accelerated sea level rise and allow tidal habitats to move landward.

Nonstructural shoreline protection methods, such as tidal marshes, can provide effective flood control. In some instances, it may be possible to combine habitat restoration, enhancement or protection with structural approaches to provide protection from flooding and control shoreline erosion, thereby minimizing the shoreline protection project's impact on natural resources.

Sedimentation is an essential factor in the creation, maintenance and growth of tidal marsh and tidal flat habitat. However, scientists have observed that the volume of sediment entering the Bay annually is declining. As sea level rises, an inadequate sediment supply could adversely affect the sustainability of tidal wetland restoration projects. Human actions, such as dredging, disposal, ecosystem restoration, and watershed management, can affect the distribution and amount of sediment available to sustain and restore wetlands.

The Baylands Ecosystem Habitat Goals report provides a regional vision of the types, amounts, and distribution of wetlands and related habitats that are needed to restore and sustain a healthy Bay ecosystem, including restoration of 65,000 acres of tidal marsh. These recommendations were based on conditions of tidal inundation, salinity, and sedimentation in the 1990s. While achieving the regional vision would help promote a healthy, resilient Bay ecosystem, global climate change and sea level rise are expected to alter ecosystem processes in ways that require new, regional targets for types, amounts, and distribution of habitats.

The Bay Plan can be amended to incorporate the following objectives for achieving environmental sustainability in the face of climate change. Habitat preservation and enhancement should be encouraged in undeveloped areas that are both vulnerable to future flooding and currently sustain significant habitats or species, or possess conditions that make the areas especially suitable for ecosystem enhancement. Each ecosystem restoration project should include an appropriate buffer, where feasible, between shoreline development and habitats to protect wildlife and provide space for marsh migration as sea level rises. Shoreline protection projects should include provisions for establishing marsh and transitional upland vegetation as part of the protective structure, wherever feasible. Comprehensive Bay sediment research and monitoring should be supported to understand sediment processes necessary to sustain and restore wetlands. Monitoring methods should be updated periodically based on current scientific information. Regional ecosystem targets should be updated periodically to guide conservation, restoration, and management efforts that result in a Bay ecosystem resilient to climate change and sea level rise.

3. Governance

Managing the threats to the Bay and shoreline development from sea level rise will create major challenges for the governance system in the Bay Area. Numerous government agencies create a patchwork of authority that requires a strong, but flexible network of partnerships. As mentioned above, failure to coordinate across property lines and jurisdictional boundaries could result in gaps in the shoreline protection system and accelerated erosion in adjacent areas. An uncoordinated approach to flood protection could also result in cumulative adverse impacts to tidal marshes and other important habitats. Conversely, coordinated regional planning will be essential to gaining political support for regional funding for flood protection and ecosystem restoration programs.

Regional Strategy. The Commission was created in 1965 because haphazard filling was shrinking the Bay. Although this issue has been successfully addressed, climate change and accompanying sea level rise are causing the Bay to expand at an increasing rate. Sea level rise has put shoreline development and habitats throughout the region at risk, and creating the need for a comprehensive regional strategy that addresses this challenge.

Developing a regional strategy to address sea level rise will help the Bay Area avoid the pitfalls of the piecemeal approach and capitalize on the opportunity to continue to lead the nation in climate change adaptation. The goal of this strategy should not be to restore the Bay to historic conditions. Instead, the strategy should describe a vision for resilient communities and adaptable natural areas around a dynamic and changing Bay that will have different sea level elevations, different salinity levels, different species and different chemistry than the Bay has today. The strategy should embrace an adaptive management strategy aimed at putting conditions in place that can respond in a desired way to changes that will come about in the future as a result of climate change. The task sounds daunting, but for over 60 years, the Bay Area has pioneered regional action regarding difficult decisions and environmental hazards (See Box 5.2.).

This new strategy should draw from the lessons learned during the formulation and implementation of BCDC's existing, highly effective San Francisco Bay Plan, particularly the plan's goal of balancing conservation and development. The new strategy should integrate ecosystem-based adaptive management principles to ensure that future development, shoreline retreat, flood protection and wetland enhancement strategies are coordinated to achieve a vibrant, healthy Bay co-existing with sustainable communities around the Bay.

The regional strategy should also build on the FOCUS program initiated by the Association of Bay Area Governments and the Metropolitan Transportation Commission to promote a more compact Bay Area land use pattern. In consultation with local governments, the FOCUS program has identified Priority Development Areas (PDAs) for infill development in the Bay Area. These PDAs, along with other sites, are anticipated to be key components of the Bay Area's Sustainable Communities Strategy that will be adopted and periodically updated pursuant to SB 375.

One of the Commission's objectives in adopting climate change policies is to facilitate implementation of the Sustainable Communities Strategy. Some shoreline areas that are already improved with public infrastructure and private development that have regionally significant economic, cultural or social value, and can accommodate infill development, including some PDAs, are also vulnerable to shoreline flooding. In such cases, the regional goal of concentrating

housing and job density near transit conflicts with the goal of minimizing flood risk by avoiding development in low-lying areas vulnerable to flooding. Reconciling these different worthy goals and taking appropriate action requires weighing competing policy considerations and is best accomplished through a collaborative process involving diverse stakeholders, similar to that being undertaken to develop the Sustainable Communities Strategy.

The Commission, in collaboration with the Joint Policy Committee, other regional, state and federal agencies, local governments, and the general public, should formulate a regional sea level rise adaptation strategy for protecting critical developed shoreline areas and natural ecosystems, enhancing the resilience of Bay and shoreline systems and increasing their adaptive capacity. Ideally, the regional strategy will determine where and how existing development should be protected and infill development encouraged, where new development should and should not be permitted, and where existing development should eventually be removed to allow the Bay to migrate inland.

To develop a regional strategy, the Commission could amend the Bay Plan policies to recommend that:

- The regional strategy incorporate an adaptive management approach;

Box 5.2 Regional Problems, Regional Solutions: A History of Regional Action on Public Safety and Environmental Issues in the Bay Area.

The Bay Area Air Quality Management Districts' website describes how the region came together to address poor air quality (http://www.baaqmd.gov/50th/index.html). When America's fighting forces came home from World War II, many settled in the last place they saw before going overseas--California's embarkation ports. Here, they went to school on the GI Bill, married, bought homes, and began the biggest "baby boom" the world has ever seen. With this population growth came expanding urban areas, shrinking agricultural lands, and the building of housing developments farther from urban centers. For the first time in many years, cars were available, affordable, and now necessary to reach the new suburbs.

The term "smog," originally coined to describe the combination of smoke and fog prevalent in London, soon became a household word in the Bay Area, with open fires from dumps and wrecking yards burning 24 hours a day. Initially measured in levels of eye irritation, air pollution was becoming a major problem, causing significant damage to Bay Area crops.

In 1946, the California Legislature enacted the first air pollution control law authorizing the formation of county air pollution control districts. Los Angeles County opened the first air pollution control office in early 1947 and Santa Clara County followed soon after. However, by 1950, it was evident that pollution overflowed political boundaries, and that a single-county district was not the answer for the Bay Area. In 1955, the Bay Area Air Pollution Control Law was adopted, establishing the Bay Area Air Pollution Control District as the first regional air pollution control agency in the nation.

Alarmed by the fact that between 1850 and 1960 an average of four square miles of the Bay were filled each year, in 1961 citizens in the Bay Area formed the Save San Francisco Bay Association, now called Save the Bay. At the urging of this organization, state legislation--the McAteer-Petris Act--was passed in 1965 to establish the San Francisco Bay Conservation and Development Commission (BCDC) as a temporary state agency. The Commission was charged with preparing a plan for the long-term use of the Bay and regulating development in and around the Bay while the plan was being prepared.

The San Francisco Bay Plan, which was completed in January 1969, includes policies on issues critical to the wise use of the Bay ranging from ports and public access to design and transportation. The Bay Plan also contains maps of the entire Bay which designate shoreline areas that should be reserved for water-related purposes like ports, industry, public recreation, airports, and wildlife refuges.

- The strategy be consistent with the goals of SB 375 and the principles of the California Climate Adaptation Strategy;
- The strategy be updated regularly to reflect changing conditions and scientific information and include maps of shoreline areas that are vulnerable to flooding based on projections of future sea level rise and shoreline flooding;
- The maps be prepared under the direction of a qualified engineer and regularly updated in consultation with government agencies with authority over flood protection; and
- Particular attention be given to identifying and encouraging the development of long-term regional flood protection strategies that may be beyond the fiscal resources of individual local agencies.

The Commission could also recommend that the entities that formulate the regional strategy consider the following strategies and goals:

- Advance regional public safety and economic prosperity by protecting: (i) existing development that provides regionally significant benefits; (ii) new shoreline development that is consistent with other Bay Plan policies; and (iii) infrastructure that is crucial to public health or the region's economy, such as airports, ports, regional transportation, wastewater treatment facilities, major parks, recreational areas and trails;
- Enhance the Bay ecosystem by identifying areas where tidal wetlands and tidal flats can migrate landward; assuring adequate volumes of sediment for marsh accretion; identifying conservation areas that should be considered for acquisition, preservation or enhancement; developing and planning for flood protection; and maintaining sufficient transitional habitat and upland buffer areas around tidal wetlands;
- Integrate the protection of existing and future shoreline development with the enhancement of the Bay ecosystem, such as by using feasible shoreline protection measures that incorporate natural Bay habitat for flood control and erosion prevention;
- Encourage innovative approaches to sea level rise adaptation;
- Identify a framework for integrating the adaptation responses of multiple government agencies;
- Integrate regional mitigation measures designed to reduce greenhouse gas emissions with regional adaptation measures designed to address the unavoidable impacts of climate change;
- Address environmental justice and social equity issues;

- Integrate hazard mitigation and emergency preparedness planning with adaptation planning by developing techniques for reducing contamination releases, structural damage and toxic mold growth associated with flooding of buildings, and establishing emergency assistance centers in neighborhoods at risk from flooding;
- Advance regional sustainability, encourage infill development and job creation, and provide diverse housing served by transit;
- Encourage the remediation of shoreline areas with existing environmental degradation and contamination in order to reduce risks to the Bay's water quality in the event of flooding;
- Support research that provides information useful for planning and policy development on the impacts of climate change on the Bay, particularly those related to shoreline flooding;
- Identify actions to prepare and implement the strategy, including any needed changes in law; and
- Identify mechanisms to provide information, tools, and financial resources so local governments can integrate regional climate change adaptation planning into local community design processes.

Adaptation Tools for Local Government. Local governments and other management agencies with broad authority over shoreline land use and flood risk mitigation will play important roles in developing and implementing a regional strategy for sea level rise adaptation. Until a regional strategy is developed, local governments will have the primary responsibility for addressing sea level rise, but they often lack adequate information, financial and technical resources, and policy guidance. Assistance to local governments and public management agencies can provide staff and financial resources and/or information that can easily be integrated into existing operations, planning tools, guidance documents, and planning processes.

Local governments can use a variety of tools to implement climate change adaptations strategies. Regulatory, market-based and spending tools such as those described below have potential to help fund the protection of existing and planned development, promote resilient development that can accommodate flooding, shift new development away from floodplains, address the needs of vulnerable populations, and preserve open space and public benefits.

- **Flood Zone Mapping, Codes and Ordinances.** Local governments rely on flood zones mapped by the Federal Emergency Management Agency (FEMA). FEMA currently bases flood risk analysis on past events, but can incorporate additional risk associated with sea level rise into its maps if requested to do so by a local government. Within the 100-year floodplain, FEMA requires communities to meet its flood protection standards in order to qualify for federal flood insurance. FEMA provides the incentive of lower insurance rates to local governments through the Community Rating System, in which local governments receive higher ratings for practicing "good" floodplain management. For example, higher ratings are awarded for implementing building codes that provide flood protection and for requiring that development sites are elevated.

  BCDC's staff is currently working with partners to develop a regional sea level rise visualization tool that would enable local governments and others to see how various projected sea levels would impact their communities. While this type of visualization would not have any regulatory status, it could be used to inform long-range planning efforts.

- **Clustered Development.** One type of open space zoning that could be applied to reduce flood risk is clustered development, which only allows development in one area of a parcel. Where parcels are adjacent, sometimes development is clustered near adjacent property lines to maximize open space within a few parcels. Under this strategy, development could be allowed in flood zones, but strategically located back from the shoreline to provide space for the shoreline to move.

- **Purchase or Transfer of Development Rights.** A purchase or transfer of development rights program is usually a voluntary program in which landowners sell the development rights of their land to an intermediary, usually a nonprofit land trust or a public agency. Such programs have traditionally been used to protect farmland and scenic vistas from development, but could be applied to flood zones as well. Once the development rights are sold, the right to develop or subdivide that land is permanently relinquished. The landowner retains all other rights and responsibilities associated with the land (Gathering Waters Conservancy). Relinquishing the development rights is similar to having a conservation easement on the property. To establish the value of the development rights, the estimated sale price of the property with a conservation easement is subtracted from the current market value of the property with its development rights (Western Governors' Association 2001).

In the case of transfer of development rights program, a landowner who wishes to develop at higher density in another location can purchase rights from the intermediary organization or agency. This type of program is advantageous to local governments because it does not cost them anything, as long as there is a market for increased density. If such a program were applied to reduce development in a flood zone, the program could require that the development credits be transferred only to areas within a certain boundary but outside the flood zone.

- **Social Equity Study and Financial Assistance Programs.** As discussed in Chapter 2, additional research is necessary to develop more information on the potential impacts of sea level rise to particularly vulnerable populations, including low-income communities, persons with limited English proficiency, the elderly, children, and persons with disabilities or chronic illnesses, and to develop quantitative data on their vulnerability to future flooding. The region must work collaboratively to develop outreach and assistance programs for those most in need. Measures to include vulnerable populations in regional decision-making should be identified and implemented. Social-equity, environmental justice organizations and public agencies are already working on climate change mitigation and other measures to reduce climate change impacts to and increase resilience of vulnerable populations. Addressing risks and impacts associated with sea level rise must be incorporated into these efforts now to allow sufficient time to successfully adapt in the future.
- **Development Conditions.** Local governments can consider imposing special conditions when issuing permits for development of individual parcels or subdivisions that they have determined are vulnerable to sea level rise. The following examples are provided and discussed in greater detail in the Georgetown Climate Center's Sea Level Rise Adaptation Toolkit (Grannis 2011):
    - Restrictions on hard armoring—the landowner agrees not to build hard coastal armoring in the future to protect structures from flooding. These types of conditions can plan for and authorize soft-armoring solutions.
    - Removal requirements—the landowner agrees to remove structures when the tideline recedes such that his or her structure encroaches on public lands. As the seas rise, the boundary between private lands and public beaches (the tideland) will be pushed inland. This type of condition allows landowners to develop property but with the expectation that development will eventually cede to the rising seas.

- Dedications—the landowner dedicates an easement to preserve natural buffers, floodways, or to provide public access.…
- Impact fees—the developer is required to pay a fee to cover the costs of potential emergency response, flood-proofing infrastructure servicing the new development, future armoring, or mitigating impacts to natural resources from future armoring.
- Flood-proofing requirements—developers must design the new development and its supporting infrastructure to be more resilient to flood impacts. For example, permits could require that roads be elevated and that sewer lines be flood-proofed.

- **Limitations on Rebuilding in High Risk Areas.** If structures in certain zoned areas are subsequently damaged by flooding, jurisdictions could limit reconstruction. The following examples are discussed in greater detail in the Georgetown Climate Center's Sea Level Rise Adaptation Toolkit (Grannis 2011):
  - Allow limited rebuilding—landowners are allowed to build smaller, more resilient structures to replace older, damaged structures; or additional setbacks could be required.
  - Totally prohibit rebuilding—landowners are prohibited from rebuilding properties destroyed when located in flood- or erosion-prone areas.
  - Allow reconstruction without armoring—landowners are allowed to rebuild properties largely as they were but with the condition that they will not build protective armoring. Regulators could then prohibit rebuilding if the structure is subsequently damaged or destroyed.

The Commission currently assists local governments in adaptation planning by providing training workshops; producing case studies featuring local examples of adaptation in action; maintaining a clearinghouse of climate change resources on the BCDC website; and working collaboratively on an adaptation planning pilot project in Alameda County, the Adapting to Rising Tides (ART) project. The Commission also works in partnership with several other agencies and organizations that provide adaptation support to local governments, such as the National Oceanic and Atmospheric Administration's Coastal Services Center, the San Francisco Bay National Estuarine Research Reserve, the Association of Bay Area Governments, ICLEI-Local Governments for Sustainability, U.S. Environmental Protection Agency's Climate Ready

Estuaries program, and FEMA. Additional cooperation can help the region develop a strategy that protects the Bay ecosystem and public access to the shoreline while recognizing the key role of local governments in planning for climate change both within and beyond the Commission's jurisdiction.

Table 5.1. Summary of Adaptation Strategies

Shoreline Development
Conduct risk assessments for shoreline areas and larger shoreline projects.
Design projects to be resilient to a mid-century sea level rise projection and adaptable to longer-term impacts.
Build projects that do not negatively impact the Bay and do not increase risks to public safety, or if projects do increase flood risks, ensure that regional public benefits outweigh the increased risk of flooding.
Protect new projects from future storm activity and sea level rise by using setbacks, elevating structures, designing structures that tolerate flooding or other effective measures.
Set aside land on the upland side of levees to allow for future levee widening to support additional levee height so that no fill is placed in the Bay.
Build shoreline protection only if necessary to protect existing or appropriate planned development.
Design and construct shoreline protection to avoid blocking physical and visual public access.
Integrate shoreline protection projects with current or planned adjacent shoreline protection measures.
Include provisions for nonstructural shoreline protection methods such as marsh vegetation, whenever feasible.
Avoid, reduce or mitigate adverse impacts to natural resources and public access from new shoreline protection.
Site, design, manage and maintain public access to avoid significant adverse impacts from sea level rise and shoreline flooding.
Design any public access to remain viable in the event of future sea level rise or flooding, or provide equivalent access to be provided nearby.

Bay Ecosystem
Preserve and enhance habitat in undeveloped areas that are both vulnerable to future flooding and have current or potential value for important species.
Include a buffer, where feasible, between shoreline development and habitats to protect wildlife and provide space for marsh migration as sea level rises.
Design shoreline protection projects to include provisions for establishing marsh and transitional upland vegetation as part of the protective structure, wherever feasible.
Conduct comprehensive Bay sediment research and monitoring to understand sediment processes necessary to sustain and restore wetlands.
Update regional habitat conservation and restoration targets to achieve a Bay ecosystem resilient to climate change and sea level rise.

Governance
Develop a regional strategy for conservation and development of the Bay and its shoreline that incorporates adaptive management.
Ensure that the strategy is consistent with the climate change mitigation goals of SB 375 and the principles of the California Climate Adaptation Strategy.
Update the strategy regularly to reflect changing conditions and scientific information.
Include maps of shoreline areas that are vulnerable to flooding based on projections of future sea level rise and shoreline flooding.
Prepare the maps under the direction of a qualified engineer and regularly update them in consultation with government agencies with authority over flood protection.
Identify and encourage the development of long-term regional flood protection strategies that may be beyond the fiscal resources of individual local agencies.
Address environmental justice and social equity issues.
Integrate hazard mitigation and emergency preparedness planning with adaptation planning.
Develop a framework for integrating the adaptation responses of multiple government agencies.
Provide information, tools, and financial resources to help local governments integrate regional climate change adaptation planning into local community design processes.

Summary of Proposed Bay Plan Amendment

Adaptation to climate change should be incorporated into the Bay Plan in the following manner:

1. Create a climate change policy section of the Bay Plan that addresses the following:
   a. Incorporating sea level rise projection ranges in project design and planning and using them in the permitting process;
   b. Developing a long-term strategy to address sea level rise and storm activity and other Bay-related impacts of climate change in a way that protects the shoreline and the Bay and allows for appropriate, well-planned development that responds to the impacts of climate change and future sea level rise;
   c. Working with the Joint Policy Committee (JPC) and other agencies to integrate mitigation and adaptation strategies at a regional scale, to coordinate the adaptation responses of multiple government agencies, to analyze and address equity issues, and to support research that provides useful climate change information and tools;
   d. Providing recommendations and requirements to guide planning and permitting of development in areas vulnerable to sea level rise; and
   e. Including policies that promote wetland protection, creation, enhancement and migration.
2. Amend findings and policies on tidal marshes and tidal flats to ensure that buffer zones are incorporated into restoration projects where feasible and sediment issues related to sustaining tidal marshes are addressed.
3. Amend the policies on safety of fills by updating the findings and policies on sea level rise and moving some to the new climate change section of the Bay Plan.
4. Amend the policies on protection of the shoreline to address protection from future flooding.
5. Amend findings and policies on public access to provide public access that is sited, designed and managed to avoid significant adverse impacts from sea level rise and ensures long-term maintenance of public access areas through site-specific adaptive management strategies.

Conclusion

Global climate change has been described as one of the most challenging problems ever faced by humans. The quality of the lives of future generations depends on how the current generation deals with this challenge. The course outlined in this report is an initial, cautious and modest step in the long journey the people of the Bay Area will need to take to ensure that our region remains viable, sustainable and prosperous in the future and that our beloved San Francisco Bay continues to be protected.

APPENDIX A
METHODS FOR DEVELOPING DATA

In order to perform the analysis and mapping performed in this report it was necessary to accurately identify areas vulnerable to projected sea level rise. A team led by Noah Knowles, USGS, built a hydrodyamic model to identify areas at risk of inundation under a variety of sea level rise scenarios. In order to identify areas vulnerable to these inundation scenarios it was necessary to assemble the best available elevation data into a regional grid, integrate historic (1996-2007) tidal data and overlay with estimated increases in sea level, 40 and 140 cm.

A regional digital elevation data set was assembled that was comprised of a number of data sources, including LiDAR (Light Detection and Ranging) in the South Bay and in portions of Solano County and Napa County. Additional photogrammetry and satellite based data was assembled to create the regional data set. The data has a horizontal resolution of 2 m and nearly all areas have a vertical accuracy of between 10 and 30 cm.

In order to integrate the elevation of the water within the estuary, a hydrodynamic model of the system was driven by hourly data collected between 1996-2007 at the Golden Gate. This historic data captures the temporal range in tides as well as storm based inputs such as storm surge. The model then propagates the fluctuations throughout the Bay and towards the Delta as far east as Mallard Island. The model was verified using tide gauge data in various locations throughout the Bay. Based on the historic data, the mean monthly high water was mapped for the Bay at 200 m resolution, which corresponds with present day average monthly high water. Finally, the water surface height within the model was modified by 40 cm and 140 cm to integrate Rahmstorf's projections (2007). Further verification was performed by comparing water height fields for present day and projected conditions to land elevations (Knowles 2008).

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SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION
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Resolution No. 11-08

Adoption of Bay Plan Amendment No. 1-08 Adding New Climate Change Findings and Policies to the Bay Plan; And Revising the Bay Plan Tidal Marsh and Tidal Flats; Safety of Fills; Protection of the Shoreline; and Public Access Findings and Policies

Whereas, Government Code Section 66652 states that "the Commission at any time may amend, or repeal and adopt a new form of, all or any part of the San Francisco Bay Plan but such changes shall be consistent with the findings and declaration of policy" contained in the McAteer-Petris Act; and

Whereas, the *San Francisco Bay Plan* (Bay Plan) policies pertaining to sea level rise and climate change have not been reviewed and updated comprehensively since their adoption in 1989; and

Whereas, the Commission's strategic plan included the initiation of the review and possible update of the Bay Plan findings and policies concerning climate change; and

Whereas, between 1850 and 1960, one-third of San Francisco Bay was diked, filled or reclaimed as land. Alarmed by projections that as much as 70 percent of the remaining Bay might be lost by 2020, in 1965 the California Legislature passed the McAteer-Petris Act to create a new temporary state agency—the San Francisco Bay Conservation and Development Commission (BCDC). The new law directed BCDC to prepare a plan for the long-term use and protection of San Francisco Bay. The Commission delivered its *San Francisco Bay Plan* to the Legislature on time and under budget in 1968. The plan contained findings and policies the Commission recommended be used to guide future regulatory decisions on activities in and around the Bay. In 1969, the Legislature made BCDC a permanent state agency, adopted the Bay Plan by reference into state law, and directed the Commission to use the Bay Plan findings, policies and maps to guide the Commission's regulatory decisions on permit applications for development and other activities within BCDC's jurisdiction; and

Whereas, the Bay Plan includes findings and policies on 26 subject areas ranging from water quality and weather to commercial fishing and airports. All of the policies have equal status, and every BCDC permit decision must be consistent with all applicable policies. However, the policies are applied on a case-by-case basis to the specific conditions of that site where a project is proposed and the nature of the proposed project. As a result, not all of the policies apply in all situations. For example, the policies on dredging are not relevant to a proposed development project located entirely on existing land along the shoreline, and the policies on ports are not applied to a wetlands restoration project proposed in a salt pond; and

Whereas, in addition to serving as mandatory state policies that are enforced by the Commission through its regulatory authority, some the Bay Plan policies are declarations of the Commission's intention to undertake future studies or planning, and others offer advice to local governments, other agencies and organizations in dealing with Bay management issues. However, both state law and the Bay Plan stipulate that any such recommendations are advisory only and cannot be enforced by the Commission; and

Whereas, the Legislature directed the Commission to keep the Plan up to date so that it reflects the latest scientific research on the Bay and addresses emerging issues that could impact the Bay in the future. To accomplish this, the Legislature empowered the Commission to amend the Bay Plan if two thirds (18) of the 27 members of the Commission vote for the amendment, after providing an opportunity for public review of the proposed amendment and after holding a public hearing on the amendment. Over the past 42 years, the Commission has made numerous amendments to the Bay Plan, some of which dealt with simple matters, such as changing a boundary of a Plan map designation, and some of which have addressed major issues, such dredging and dredged material disposal; and

Whereas, the initial step in revising the Bay Plan is a policy decision by the Commission whether to consider an amendment dealing with a specified issue. Thereafter, the staff prepares a report containing the results of research and policy analysis on the issue, preliminary recommended findings and policies and an environmental assessment of the proposed amendment. One such staff report entitled, *Sea Level Rise: Predictions and Implications for San Francisco Bay*, was released in December 1987. Relying on this report in 1989, the Commission amended the findings and policies in the section of the Bay Plan dealing with Safety of Fills, making BCDC one of the first public agencies in the country to address the issue of sea level rise when making permit decisions and to provide policy advice to local governments; and

Whereas, perhaps the biggest change in the twenty years since the Commission first adopted sea level rise policies is the attention received by the international, consensus-based approach to delivering scientific conclusions for policy-makers initiated by the United Nations Intergovernmental Panel on Climate Change (IPCC). Because the IPCC represents a wide range of scientific opinion, its conclusions are generally conservative, but widely accepted. However, another important change in the last twenty years is that the effects of climate change are already being observed. Conclusions in both the IPCC and state-sponsored work are based, in part, on observed changes in global surface temperature, ocean water temperature, ocean acidification, and land and sea ice melt. Finally, what was lacking twenty years ago was conclusive evidence that climate change is caused largely by human actions—primarily the release of carbon dioxide into the atmosphere. Today, such evidence solidly links the significant human contribution to greenhouse gases, beginning with industrialization, to increases in global temperature; and

Whereas, in 2006, the State of California used IPCC scenarios to develop a report on climate change impacts in the state. In that same year, the legislature passed the Global Warming Solutions Act requiring reductions in greenhouse gas emissions. The most recent update to the IPCC assessment reports was in 2007 and, in 2008, the state reported the results of an updated analysis of climate change scenarios. Both reports conclude that the reduction of greenhouse gases now will reduce the degree to which the world must adapt to the effects of climate change. However, it is inevitable that over the next century global temperatures will increase 1° to 3° C (1.8° to 5.4° F). To deal with this increase in temperature, adapting to climate change and its impacts is both unavoidable and essential; and

Whereas, three years ago, the Commission decided to again deal with the issue of sea level rise within the larger context of global climate change. To accomplish this, in November 2008, the Commission initiated the process of considering Bay Plan Amendment No. 1-08 by authorizing the staff to propose amendments of the findings and policies in four sections of the Bay Plan—Tidal Marshes and Tidal Flats, Safety of Fills, Protection of the Shoreline, and Public Access—and to develop additional findings and policies in an entirely new section to the Plan entitled Climate Change.

Whereas, in April 2009, the staff released a report entitled *Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on the Shoreline*. In addition to providing extensive background information on the most current scientific research on climate change, the report contained maps depicting the low-lying areas around the Bay that could be vulnerable to future flooding from sea level rise and storm surge. Along with the background report, the staff provided a preliminary recommendation on proposed Bay Plan amendments to address climate change; and

Whereas, the background report indicated that while the rate of global climate change will depend on the volume of future greenhouse gas emissions, sea level rise in San Francisco Bay could be as much as 16 inches by mid-century and 55 inches by the end of the century. By mid-century, 180,000 acres of Bay shoreline could be vulnerable to flooding, and 213,000 acres vulnerable by the end of the century. The area vulnerable to inundation with a 16-inch sea level rise roughly corresponds to today's 100-year floodplain. The economic value of Bay Area shoreline development at risk from a 55-inch rise in sea level is estimated at $62 billion—nearly double the estimated value of development vulnerable to sea level rise along California's Pacific Ocean coastline. An estimated 270,000 people in the Bay Area would be at risk of flooding from a 55-inch rise in sea level, 98 percent more than are currently at risk from flooding; and

Whereas, the Commission held its first public hearing on the preliminary staff recommendation on May 7, 2009. To respond to requests for more time for public review and input, the Commission held three more public hearings, held three public workshops and kept the public comment period open for three months. The staff revised its preliminary recommendation to address the public comments and incorporate suggestions that had been made to improve the amendment language, and a revised preliminary recommendation was released on October 1, 2009. The Commission held another public hearing on the revised preliminary staff recommendation on November 5, 2009, and another public workshop on December 3, 2009; and

Whereas, a third staff recommendation and response to comments was released on September 3, 2010. The Commission held eight public hearings on this draft during the fall of 2010, and the staff worked with local governments, business interests and environmental organizations to further refine the amendment language. In all, since April 2009, the Commission has held 35 public hearings, workshops and meetings on the amendment language as it has evolved, and the Commission will hold another public hearing on September 1, 2011 before voting on the amendment on October 6, 2011; and

Whereas, five principal policy goals will be achieved by adopting proposed Bay Plan Amendment No. 1-08.

1. Outdated language on sea level rise policy that has been in the Bay Plan since 1989 will be eliminated. This current policy language recommends that new development not be approved in low-lying areas that are in danger of flooding now or in the future unless the development is elevated above possible flood levels. The amended policies allow protection from flooding, encourage innovative means of dealing with flood danger, and make it clear that local governments will determine how best to deal with development proposals inland of the Commission's jurisdiction.
2. A variety of types of projects that have regional benefits will be encouraged, and proposed new development will continue to be evaluated by the Commission on a case-by-case basis to determine if the benefits of a project outweigh the risk from flooding and to ensure steps are taken to deal with the flooding danger.

3. The Bay and other valuable natural resources within BCDC's jurisdiction will continue to have the same level of protection that has worked so well for the past half-century.
4. Because wetlands play vital roles in both reducing greenhouse gases and providing flood protection, existing tidal wetlands will continue to be protected and, where appropriate, expanded. To accomplish this, resource protection and habitat enhancement in undeveloped low-lying areas will be encouraged, but development will not be absolutely prohibited in these areas.
5. The Commission will commit itself to working with its regional partners, local governments, businesses, labor, environmentalists, investors, insurers, and the general public to develop a comprehensive regional strategy that deals with all the impacts of climate change. Such a strategy is essential to the Bay Area's long-term economic prosperity; and

Whereas, in addition to concerns that have been expressed about specific language in the proposed findings and policies, there has been considerable concern expressed about the maps of shoreline areas that are potentially vulnerable to flooding from sea level rise and storm surge. These maps can be found in both the staff background report and on the Commission's website; and

Whereas, at the most basic level, the maps depict areas around the Bay that have low elevations. Overlays compare these ground elevations with projected Bay water depths that are 16 inches (0.4 meter) and 55 inches (1.4 meters) higher to illustrate possible sea levels around the middle of the 21st century and the beginning of the 22nd century. The maps do not take into account wind and waves that would increase the extent of inundation, and do not show existing levees that might provide protection from flooding, because detailed information on wind and wave conditions and levee heights and strengths was not available at a regional scale. Nor do the maps show where new levees or other shoreline protection to prevent flooding could be built, or the cost of any such protection. These limitations of the maps are reflected in the following legal disclaimer on each map:

> "Inundation data does not account for existing shoreline protection or wave activity. These maps are for informational purposes only. Users, by their use, agree to hold harmless and blameless the State of California and its representatives and its agents for any liability associated with its use in any form. The maps and data shall not be used to assess actual coastal hazards, insurance requirements, or property values or be used in lieu of Flood Insurance Rate Maps issued by the Federal Emergency Management Agency (FEMA)."

Despite efforts to make it clear that the maps simply show low land elevations in relation to possible future water depths, three types of objections to the maps have been raised. The first is that the presence of the maps is inhibiting capital from being invested in what critics call the "inundation zone" around the Bay. While it may be true that some investors may be more cautious about supporting development around the Bay, the maps are not the cause of concern. As noted, the maps simply depict areas around the Bay that have low elevations in relation to projected water depths. These elevations will be the same whether or not BCDC's maps exist. Similar maps have been published by the U.S. Geological Survey, the California Energy Commission, the Pacific Institute, and others; and

Whereas, the second objection to the maps is that they depict the area over which BCDC intends to exert regulatory authority even though the maps will not be adopted as part of the Bay Plan and, therefore, cannot be used by the Commission in making regulatory decisions; and

Whereas, the Commission's "Bay" jurisdiction extends to the Mean High Tide line, an elevation that is established by the National Oceanic and Atmospheric Administration. If nothing is done to protect low-lying areas around the Bay, over time these areas could become flooded and eventually fall within BCDC's jurisdiction. With this in mind, some have conjectured that BCDC intends to extend its jurisdiction over this area now. This simply is not true. BCDC cannot change its jurisdiction without a change of state law, and BCDC has not requested such a change. And even if an area becomes flooded by Bay waters, BCDC has a legal obligation to notify a landowner of the flooding, and the landowner then has a year to repair any levee or other shoreline protection. If these repairs are made, BCDC's jurisdiction remains unchanged. If the area has no pre-existing shoreline protection, the proposed policies in Bay Plan Amendment No. 1-08 would allow the construction of such protection; and

Whereas, the third objection raised about the maps is that the Commission could use its authority under the federal Coastal Zone Management Act and the California Environmental Quality Act to exert jurisdiction over development proposals within the low-lying areas around the Bay that are vulnerable to future flooding and to pre-empt local government control. The Commission never had any such intention. Rather, the Commission's intention is to adopt Bay Plan Amendment No. 1-08, pursuant to the provisions of the McAteer-Petris Act and the Suisun Marsh Preservation Act of 1977. The Amendment is not intended to, and does not increase or decrease BCDC's jurisdiction or authority under either act. To express this intention and to reassure critics, proposed Bay Plan Climate Change Policy 1 was drafted in consultation with the Attorney General's staff and attorneys representing the business community, labor and local governments. Proposed Climate Change Policy 1 explicitly states that the climate change findings and policies will apply only within BCDC's current jurisdiction, that local governments will retain their authority over development more than 100 feet inland from the Bay shoreline, and that the provisions of the Bay Plan do not apply outside the Commission's jurisdiction for purposes of implementing the California Environmental Quality Act. Proposed Policy 1 also responds to public comments requesting that the Commission restrict the use of the policies for Coastal Zone Management Act consistency determinations; and

Whereas, on November 18, 2010, the Commission considered, six possible Optional Strategic Approaches for Dealing with Proposed Bay Plan Amendment No. 1-08 Concerning Climate Change to respond to concerns about the third preliminary staff recommendation:

1. Revise the proposed language in response to comments from the public as part of the process of updating the 21-year-old sea level rise findings and policies in the Bay Plan and adding a new section to the Plan to deal more broadly with climate change and adapting to sea level rise to address concerns that the proposed amendments would vastly increase BCDC's regulatory authority, usurp local autonomy, institute a moratorium on development in low-lying areas, and block all development.
2. Abandon the process of updating the Bay Plan and leave the current sea level rise findings and policies in place.
3. Amend the Bay Plan to delete the current sea level rise findings and policies.
4. Amend the Bay Plan to update the current sea level rise findings and policies in a new section dealing with climate change to clearly specify that the new provisions will be used exclusively to guide the Commission in making regulatory decisions within its permit jurisdiction and are not intended to be advisory for local governments.
5. Amend the Bay Plan to update the current sea level rise findings and policies in a new climate change section that calls only for the preparation of a long-term regional sea level rise adaptation strategy, and not include any interim guidance for the Commission or advice for local governments.

6. In combination with any of the options above, develop a guidance document that can be used by the Commission, local governments and others when dealing with sea level rise. The document would explicitly state that the guidelines are not binding or enforceable.

At its December 2, 2010 meeting, after receiving public comment on the six options, the Commission directed the staff to prepare a revised recommendation that would propose findings and policies that are exclusively for the Commission's use in carrying out BCDC's regulatory responsibilities within its current permit jurisdiction (Option 4). The Commission postponed to 2011 a decision on whether and in what form any guidance or advice will be provided for dealing with sea level rise outside BCDC's regulatory jurisdiction. To date, the Commission has not provided any additional direction with respect to preparing stand-alone guidelines for local governments; and

Whereas, on December 16, 2010, the Commission considered another Staff Report on Policy Alternatives for Bay Plan Amendment No. 1-08 Concerning Climate Change that considered a range of possible alternative approaches for addressing comments and issues raised during the public hearings on the third preliminary recommendation. The staff report discussed (1) the preparation of risk assessments for planning shoreline areas and designing larger projects within the Commission's permit jurisdiction; (2) the preparation of a regional adaptation strategy to address sea level rise; and (3) limiting development in low-lying areas within the Commission's jurisdiction to a broad list of project types. The Commission considered a range of alternatives for each of these policies and directed staff to utilize the discussion and public input to modify the staff recommendation; and

Whereas, over the course of the Commission's consideration of Bay Plan Amendment No. 1-08, various alternatives for dealing with sea level rise were advanced. Environmental organizations recommended that state legislation should be enacted to give BCDC regulatory jurisdiction over all low-lying areas around the Bay affected by sea level rise. The California Climate Adaptation Strategy recommends that state agencies should consider prohibiting projects that would place development in undeveloped areas containing critical habitat or containing opportunities for tidal wetland restoration. Business groups and local governments suggested the Commission should not amend the Bay Plan at all until the economy improves and there is more certainty about the impacts of climate change. The Commission considered these ideas but selected a more moderate course of action—one that will provide the Commission with updated policies for regulating development within BCDC's jurisdiction to address the impacts of sea level rise and will commit the Commission to working in partnership with all stakeholders on a comprehensive and long-range climate change resilience strategy for the Bay Area; and

Whereas, the San Francisco Bay Conservation and Development Commission: (1) on November 5, 2008 approved a Descriptive Notice of the proposed Bay Plan amendment and set the public hearing date for February 5, 2009; (2) on November 6, 2008 distributed the Adopted Descriptive Notice and notice of the public hearing to all agencies, organizations and individuals interested in the proposed amendment; (3) rescheduled the public hearing to May 7, 2009, with a public notice mailed on January 23, 2009; (4) mailed the staff background report, *Living with a Rising Bay*, and the first staff preliminary recommendation and environmental assessment on April 7, 2009 to all agencies, organizations and individuals interested in the proposed amendment (interested parties); (5) held a public hearing on May 7, June 4, and July 16, 2009 pertaining to proposed Bay Plan policy language changes and received comments on the background report, preliminary recommendation and environmental assessment sent on April 7, 2009 and the hearing was closed on July 16, 2009; (6) on October 1, 2009, staff distributed a revised (second) preliminary staff recommendation and response to comments to all agencies, organizations and individuals interested in the proposed amendment; and (7) the Commission held and closed a public hearing on November 5, 2009; and (8) mailed a

third preliminary staff recommendation and response to comments to the Commission and interested parties on September 3, 2010; (9) the Commission held six public hearings (October 7 and 21; November 2, 4, and 18; and December 2, 2011) on this draft and the Commission closed the public hearing on December 2, 2011 and closed the written comment period on December 17, 2010; (10) on July 29, 2011, the staff mailed a fourth preliminary recommendation, revised environmental assessment and response to comments on the third staff preliminary recommendation to the Commission and interested parties; (11) on September 1, the Commission held and closed a public hearing on staff's recommendation; (12) on September 23, 2011, staff mailed a final recommendation, including a response to comments on staff's fourth preliminary recommendation, which included revisions to the staff background report, *Living with a Rising Bay*, incorporating changes based on comments received during prior public hearings and changes in scientific information during the lengthy amendment process all to the Commission and interested parties; and (13) on October 6, 2011, the Commission voted on the staff's final recommendation; all in accord with the requirements and procedures set out in Government Code Section 66611 and 66652 and the California Code of Regulations, Sections 11000, 11001, 11003, 11004, and 11005; and

Whereas, throughout the three-plus year plan amendment process, the staff and Commission held numerous meetings and workshops outside of the formal public hearing and public review process with local governments; business, environmental, social equity, and flood control groups throughout the region to answer questions and receive comments on the many staff recommendations and to devise alternative policy approaches; and

Whereas, on May 15, 2009, the staff presented to the Joint Policy Committee (JPC) its recommended updates to the Bay Plan findings and policies and recommended that the JPC support the proposed Bay Plan updates and agree to play a key role in developing a regional strategy to the address the Bay-related impacts of climate change. On July 17, 2009, the staff presented the findings and policies again to the JPC and the JPC unanimously agreed it should play a key role in developing regional sea level rise policies and endorsed the general policy direction of the Bay Plan amendments proposed by BCDC, subject to the refinement of the exact language to incorporate public comment and to encourage a context-sensitive policy approach and innovation in those situations which merit special attention; and

Whereas, the San Francisco Bay Conservation and Development Commission has evaluated the environmental impact of revising the San Francisco Bay Plan by adding a new climate change finding and policy section and modifying the tidal marsh and tidal flats, safety of fills, protection of the shoreline and public access findings and policies, under the Commission's functional equivalency regulations authorized by Public Resources Code Section 21080.5, and finds that all avoidable significant adverse environmental impacts as a result of the amendment to the Bay Plan policies are reduced to a less than significant level and that, therefore the amendment to the policies will have no significant environmental impact; and

Amending the Bay Plan is only a preliminary first step to project review. Each project that comes before the Commission requires further environmental review, and specific or potential environmental impacts can be identified and mitigated at subsequent stages. The amendments do not commit the Commission to approve or disapprove any particular project or any particular type of project. They do not specify a particular land use for any area of land. At this stage it is not known what projects will be undertaken under the Bay Plan amendments, where they will be located, or what impacts they will have on the Bay. The impacts of any particular future development project are speculative.

Because the Bay Plan amendments do not authorize physical alterations or commit the Commission to approve or deny any particular future physical alteration, the impacts of the amendments at this stage are very limited in scope and effect. The potential impacts of projects to be considered by the Commission in the future are highly speculative. The Commission will be able to conduct a more detailed review to determine the impacts of specific projects undertaken pursuant to these policies if and when they are proposed on a case-by-case basis. The proposed amendments improve the Commission's program for protecting the environment within its jurisdiction, including the built and natural environments. Finally, the amendments do not substantially alter the extent to which BCDC may address environmental impacts in permitting decisions under its existing laws and policies that protect the Bay. Indeed, the amendments provide the Commission with additional tools to address environmental impacts of future projects. Therefore, adoption of these amendments does not have significant adverse environmental effects.

Whereas, the amendment to the Bay Plan, including the addition of a new climate change finding and policy section and amendments to the tidal marshes and tidal flats, safety of fills, shoreline protection and public access findings policies, enacted by this resolution is intended to be a revision in the Commission's coastal management program for the San Francisco Bay segment of the California coastal zone as approved by the U.S. Department of Commerce under the federal Coastal Zone Management Act of 1972, as amended; and

Whereas, global climate change has been described as one of the most challenging problems ever faced by humans. The quality of the lives of future generations depends on how the current generation deals with this challenge. The course outlined in Bay Plan Amendment No. 1-08 is an initial, cautious and modest step in the long journey the people of the Bay Area will need to take to ensure that our region remains viable, sustainable and prosperous in the future and that our beloved San Francisco Bay continues to be protected; and

Whereas, these amendments are adopted pursuant to the McAteer-Petris Act (Gov. Code §§66600 et seq.) and the Suisun Marsh Preservation Act of 1977 (Pub. Res. Code §§29000 et seq.), and they are not intended to, and do not, increase or decrease BCDC's jurisdiction or authority under either act.

Now, Therefore, Be it Resolved That, the San Francisco Bay Conservation and Development Commission authorizes the Executive Director to make minor, non-substantive editorial changes to this Resolution, in particular to comply with the determinations of the Office of Administrative Law in its review of the Resolution under the California Administrative Procedures Act; and

Be it Further Resolved That, the San Francisco Bay Conservation and Development Commission hereby adopts Bay Plan Amendment No. 1-08 which amends the Bay Plan as follows:

1. Amends the Bay Plan tidal marshes and tidal flats findings and policies with the <u>underlined</u> language added and the ~~strikethrough~~ language deleted, as follows:

Tidal Marshes and Tidal Flats

Findings

g. The Baylands Ecosystem Habitat Goals report provides a regional vision of the types, amounts, and distribution of wetlands and related habitats that are needed to restore and sustain a healthy Bay ecosystem, including restoration of 65,000 acres of tidal marsh. <u>These recommendations were based on conditions of tidal inundation, salinity, and sedimentation in the 1990s. While achieving the regional vision would help promote a healthy, resilient Bay ecosystem, global climate change and sea level rise are expected to</u>

alter ecosystem processes in ways that may require new, regional targets for types, amounts, and distribution of habitats.

i. Tidal marshes are an interconnected and essential part of the Bay's food web. Decomposed plant and animal material and seeds from tidal marshes wash onto surrounding tidal flats and into subtidal areas, providing food for numerous animals, such as the Northern pintail. In addition, tidal marshes provide habitat for insects, crabs and small fish, which in turn, are food for larger animals, such as the salt marsh song sparrow, harbor seal and great blue heron. Diking and filling have fragmented the remaining tidal marshes, degrading the quality of habitat and resulting in a loss of species and an altered community structure.

k. Landward marsh migration may be necessary to sustain marsh acreage around the Bay as sea level rises. As sea level rises, high-energy waves erode inorganic mud from tidal flats and deposit that sediment onto adjacent tidal marshes. Marshes trap sediment and contribute additional material to the marsh plain as decaying plant matter accumulates. Tidal habitats respond to sea level rise by moving landward, a process referred to as transgression or migration. Low sedimentation rates, natural topography, development, and shoreline protection can block wetland migration.

~~k~~l. Sedimentation is an essential factor in the creation, maintenance and growth of tidal marsh and tidal flat habitat. ~~However, S~~scientists studying the Bay ~~estimate~~ have observed that ~~sedimentation will not be able to keep pace with accelerating sea level rise, due largely to declines in~~ the volume of sediment entering the Bay annually from the Sacramento and San Joaquin Delta is declining. As a result, the importance of sediment from local watersheds as a source of sedimentation in tidal marshes is increasing. As sea level rise accelerates, the erosion of tidal flats may also accelerate, thus potentially exacerbating shoreline erosion and adversely affecting the ecosystem and the sustainability of ~~future wetland~~ ecosystem restoration projects. An adequate supply of sediment is necessary to ensure resilience of the Bay ecosystem as sea level rise accelerates.

m. Human actions, such as dredging, disposal, ecosystem restoration, and watershed management, can affect the distribution and amount of sediment available to sustain and restore wetlands. Research on Bay sediment transport processes is needed to understand the volume of sediment available to wetlands, including sediment imported to and exported from the Bay. Monitoring of these processes can inform management efforts to maintain an adequate supply of sediment for wetlands.

n. Buffers are areas established adjacent to a habitat to reduce the adverse impacts of surrounding land use and activities. Buffers also minimize additional loss of habitat from shoreline erosion resulting from accelerated sea level rise and allow tidal habitats to move landward. Buffer areas may be important for achieving the regional goals for the types, amounts, and distribution of habitats in the Baylands Ecosystem Habitat Goals report or future updates to these targets.

~~l.~~ o. Plant and animal species not present in San Francisco Bay prior to European contact in the late 18th century, known as non-native species, which thrive and reproduce outside of their natural range have made vast ecological alterations to the Bay and have contributed to the serious reduction of native regulations of certain plants and animals through: (1) predation; (2) competition for food, habitat, and other necessities; (3) disturbance of habitat; (4) displacement; or (5) hybridization. Many non-native species enter the Bay from commercial ship ballast water that is discharged into the Bay. Approximately 170 species have invaded the Bay since 1850, and possibly an additional 115 species have been deliberately introduced. By 2001, over 1,200 acres of recently

restored tidal marshes have been invaded by introduced cordgrass species, such as salt meadow cordgrass, dense-flowered cordgrass, English cordgrass and smooth cordgrass. At present an average of one new non-native species establishes itself in the Bay every 14 weeks. Control or eradication is a critical step in reducing the harm associated with non-native species.

~~m.~~p. Fill material, such as rock and sediments dredged from the Bay, can enhance or beneficially contribute to the restoration of tidal marsh and tidal flat habitat by: (1) raising areas diked from the Bay to an elevation that will help accelerate establishment of tidal marsh; and (2) establishing or recreating rare Bay habitat types.

Policies

4. Where ~~and whenever possible~~feasible, former tidal marshes and tidal flats that have been diked from the Bay should be restored to tidal action in order to replace lost historic wetlands or should be managed to provide important Bay habitat functions, such as resting, foraging and breeding habitat for fish, other aquatic organisms and wildlife. As recommended in the Baylands Ecosystem Habitat Goals report, around 65,000 acres of areas diked from the Bay should be restored to tidal action to maintain a healthy Bay ecosystem on a regional scale. Regional ecosystem targets should be updated periodically to guide conservation, restoration, and management efforts that result in a Bay ecosystem resilient to climate change and sea level rise. Further, local government land use and tax policies should not lead to the conversion of these restorable lands to uses that would preclude or deter potential restoration. The public should make every effort to acquire these lands ~~from willing sellers~~for the purpose of habitat restoration and wetland migration.

5. The Commission should support comprehensive Bay sediment research and monitoring to understand sediment processes necessary to sustain and restore wetlands. Monitoring methods should be updated periodically based on current scientific information.

~~5~~6. Any ecosystem~~tidal~~ restoration project should include clear and specific long-term and short-term biological and physical goals, and success criteria, and a monitoring program to assess the sustainability of the project. Design and evaluation of the project should include an analysis of: (a) ~~the effects of relative~~how the system's adaptive capacity can be enhanced so that it is resilient to sea level rise and climate change; (b) the impact of the project on the Bay's sediment budget; (c) localized sediment erosion and accretion; (d) the role of tidal flows; (e) potential invasive species introduction, spread, and their control; (f) rates of colonization by vegetation; (g) the expected use of the site by fish, other aquatic organisms and wildlife; ~~and~~(h) an appropriate buffer, where feasible, between shoreline development and habitats to protect wildlife and provide space for marsh migration as sea level rises; and (i) site characterization. If success criteria are not met, appropriate ~~corrective~~adaptive measures should be taken.

Climate Change (Add New Section to Part IV)

Findings

a. Greenhouse gases naturally reside in the earth's atmosphere, absorb heat emitted from the earth's surface and radiate heat back to the surface causing the planet to warm. This natural process is called the "greenhouse effect." Human activities since industrialization have increased the emissions of greenhouse gases through the burning of fossil fuels. The accumulation of these gases in the atmosphere is causing the planet to warm at an accelerated rate.

b. The future extent of global warming is uncertain. It will be driven largely by future greenhouse gas emissions levels, which will depend on how global development proceeds. The United Nations Intergovernmental Panel on Climate Change (IPCC) developed a series of global development scenarios and greenhouse gas emissions scenarios for each development scenario. These emissions scenarios have been used in global models to develop projections of future climate, including global surface temperature and precipitation changes.

c. Global surface temperature increases are accelerating the rate of sea level rise worldwide through thermal expansion of ocean waters and melting of land-based ice (e.g., ice sheets and glaciers). Bay water level is likely to rise by a corresponding amount. In the last century, sea level in the Bay rose nearly eight inches. Current science-based projections of global sea level rise over the next century vary widely. Using the IPCC greenhouse gas emission scenarios, in 2010 the California Climate Action Team (CAT) developed sea level rise projections (relative to sea level in 2000) for the state that range from 10 to 17 inches by 2050, 17 to 32 inches by 2070, and 31 to 69 inches at the end of the century. The CAT has recognized that it may not be appropriate to set definitive sea level rise projections, and, based on a variety of factors, state agencies may use different sea level rise projections. Although the CAT values are generally recognized as the best science-based sea level rise projections for California, scientific uncertainty remains regarding the pace and amount of sea level rise. Moreover, melting of the Greenland and Antarctic ice sheet may not be reflected well in current sea level rise projections. As additional data are collected and analyzed, sea level rise projections will likely change over time. The National Academy of Sciences is in the process of developing a Sea Level Rise Assessment Report that will address the potential impacts of sea level rise on coastal areas throughout the United States, including California and the Bay Area.

d. Climate change will alter key factors that contribute to shoreline flooding, including sea level and storm frequency and intensity. During a storm, low air pressure can cause storm surge (a rapid rise in water level) and increased wind and wave activity can cause wave run up, which will be higher as sea level rises. These storm events can be exacerbated by El Niño events, which generally result in persistent low air pressure, greater rainfall, high winds and higher sea level. The coincidence of intense winter storms, extreme high tides, and high runoff, in combination with higher sea level, will increase the frequency and duration of shoreline flooding long before areas are permanently inundated by sea level rise alone.

e. Shoreline areas currently vulnerable to a 100-year flood event may be subjected to inundation by high tides at mid-century. Much of the developed shoreline may require new or upgraded shoreline protection to reduce damage from flooding. Shoreline areas that have subsided are especially vulnerable to sea level rise and may require more extensive shoreline protection. The Commission, along with other agencies such as the National Oceanic and Atmospheric Administration, the Federal Emergency Management Agency, the United States Army Corps of Engineers, cities, counties, and flood control districts, is responsible for protecting the public and the Bay ecosystem from flood hazards. This can be best achieved by using a range of scientifically based scenarios, including projections, which correspond to higher rates of sea level rise. In

planning and designing projects for the Bay shoreline, it is prudent to rely on the most current science-based and regionally specific projections of future sea level rise, develop strategies and policies that can accommodate sea level rise over a specific planning horizon (i.e., adaptive management strategies), and thoroughly analyze new development to determine whether it can be adapted to sea level rise.

f. Natural systems and human communities are considered to be resilient when they can absorb and rebound from the impacts of weather extremes or climate change and continue functioning without substantial outside assistance. Systems that are currently under stress often have lower adaptive capacity and may be more vulnerable or susceptible to harm from climate change impacts. Human communities with adaptive capacity can adjust to climate change impacts by taking actions to reduce the potential damages, taking advantage of new opportunities arising from climate change, and accommodating the impacts. Understanding vulnerabilities to climate change is essential for assessing climate change risks to a project, the Bay or the shoreline. Risk is a function of the likelihood of an impact occurring and the consequence of that impact. Climate change risk assessments identify and prioritize issues that can be addressed by adaptation strategies.

g. In the context of climate change, mitigation refers to actions taken to reduce greenhouse gas emissions, and adaptation refers to actions taken to address potential or experienced impacts of climate change that reduce risks. Adaptation actions that protect existing development and infrastructure can include protecting shorelines, promoting appropriate infill development, and designing new construction to be resilient to sea level rise. Another option is relocating structures out of flood and inundation zones. Some actions can integrate adaptation, mitigation, and flood protection strategies and may be cost-effective when implemented before sea level rises. For example restoring tidal marshes sequesters carbon, provides flood protection and provides habitat, and may protect lives, property and ecosystems. Identifying appropriate adaptation strategies requires complex policy considerations. Implementing many adaptation strategies will require action and funding by federal, state, regional and local agencies with planning, funding and land use decision-making authority beyond the Commission's jurisdiction.

h. In the context of sea level rise adaptation, it is likely that myriad innovative approaches will emerge, likely including financing mechanisms to spread equitably the costs of protection from sea level rise, design concepts and land management practices. Effective, innovative adaptation approaches minimize public safety risks and impacts to critical infrastructure; maximize compatibility with and integration of natural processes; are resilient over a range of sea levels, potential flooding impacts and storm intensities; and are adaptively managed. Developing innovative adaptation approaches will require financial resources, testing and refinement to ensure that they effectively protect the Bay ecosystem and public safety before they are implemented on a large scale. Developing the right mix of approaches would best be accomplished through a comprehensive regional adaptation strategy developed though a process involving various stakeholders and local, regional, state and federal agencies.

i. Adaptive management is a cyclic, learning-oriented approach that is especially useful for complex environmental systems characterized by high levels of uncertainty about system processes and the potential for different ecological, social and economic impacts from alternative management options. Effective adaptive management requires setting clear and measurable objectives, collecting data, reviewing current scientific observations, monitoring the results of policy implementation or management actions, and integrating this information into future actions.

j. The principle of sustainability embodies values of equity, environmental and public health protection, economic vitality and safety. The goal of sustainability is to conduct human endeavors in a manner that will avoid depleting natural resources for future generations and producing no more than can be assimilated through natural processes, while providing for improvement of the human condition for all the people of the world. Efforts to improve the sustainability of natural systems and human communities can improve their resilience to climate change by increasing their adaptive capacity.

k. Shoreline development and infrastructure, critical to public and environmental health and the region's economic prosperity, may be, or may become, vulnerable to flooding from sea level rise and storm activity. Public safety may be compromised and personal property and agricultural land may be damaged or lost during floods. Important public shoreline infrastructure and facilities, such as airports, ports, regional transportation facilities, landfills, contaminated lands and wastewater treatment facilities are at risk of flood damage that could require costly repairs, or result in the interruption or loss of vital services or degraded water quality. A current lack of funding to address projected impacts from sea level rise necessitates a collaborative approach with all stakeholder groups to find strategic and innovative solutions to advance the Bay Area's ability to meet environmental, public health, equity and economic goals.

l. Waterfront parks, beaches, public access sites, and the Bay Trail are particularly vulnerable to flooding from sea level rise and storm activity because they are located immediately adjacent to the Bay. Flooding of, or damage to these areas would adversely affect the region's quality of life, if important public spaces and recreational opportunities are lost.

m. The Bay ecosystem contains diverse and unique plants and animals and provides many benefits to humans. For example, tidal wetlands improve water quality, sequester carbon and can provide flood protection. Tidal high marsh and adjacent ecotones are essential to many tidal marsh species including endangered species. Agricultural lands along the Bay shoreline function as buffers that can reduce the adverse impacts of nearby land uses and activities on the Bay and tidal marshes and can also provide habitat for terrestrial species. The Bay ecosystem is already stressed by human activities that lower its adaptive capacity, such as diversion of freshwater inflow and loss of tidal wetlands. Climate change will further alter the ecosystem by inundating or eroding wetlands and ecotones, changing sediment dynamics, altering species composition, raising the acidity of Bay waters, changing freshwater inflow or salinity, altering the food web, and impairing water quality, all of which may impair the system's ability to rebound and function. Moreover, further loss of tidal wetlands will increase the risk of shoreline flooding.

n. Some Bay Area communities, particularly those whose residents have low incomes, disabilities or are elderly, may lack the resources or capacity to respond effectively to the impacts of sea level rise and storm activity. Financial and other assistance is needed to achieve regional equity goals and help everyone be part of resilient shoreline communities.

o. Approaches for ensuring public safety in developed vulnerable shoreline areas through adaptive management strategies include but are not limited to: (1) protecting existing and planned appropriate infill development; (2) accommodating flooding by building or renovating structures or infrastructure systems that are resilient or adaptable over time; (3) discouraging permanent new development when adaptive management strategies cannot protect public safety; (4) allowing only new uses that can be removed or phased out if adaptive management strategies are not available as inundation threats increase; and (5) over time and where feasible and appropriate, removing existing development

where public safety cannot otherwise be ensured. Determining the appropriate approach and financing structure requires the weighing of various policies and is best done through a collaborative approach that directly involves the affected communities and other governmental agencies with authority or jurisdiction. Some adaptive management strategies may require action and financing on the regional or sub-regional level across jurisdictions.

p. The Association of Bay Area Governments and the Metropolitan Transportation Commission initiated the FOCUS program to develop a regional strategy that promotes a more compact Bay Area land use pattern. In consultation with local governments, the FOCUS program has identified Priority Development Areas for infill development in the Bay Area. These Priority Development Areas, along with other sites, are anticipated to be key components of the Bay Area's Sustainable Communities Strategy that will be adopted and periodically updated pursuant to the Sustainable Communities and Climate Protection Act of 2008 (SB 375). One of the Commission's objectives in adopting climate change policies is to facilitate implementation of the Sustainable Communities Strategy. Some shoreline areas that are vulnerable to flooding are already improved with public infrastructure and private development that has regionally significant economic, cultural or social value, and can accommodate infill development.

q. When planning or regulating development within areas vulnerable to flooding from sea level rise, allowing small projects, such as minor repairs of existing facilities, and interim uses may be acceptable if they do not significantly increase overall risks to public safety.

r. In some cases, the regional goals of encouraging infill development, remediating environmentally degraded land, redeveloping closed military bases and concentrating housing and job density near transit may conflict with the goal of minimizing flood risk by avoiding development in low-lying areas vulnerable to flooding. Methods to minimize this conflict, include, but are not limited to: clustering infill or redevelopment in low-lying areas on a portion of the property to reduce the area that must be protected; formulating an adaptation strategy for dealing with rising sea level and shoreline flooding with definitive goals and an adaptive management plan for addressing key uncertainties for the life of the project; incorporating measures that will enhance project resilience and sustainability; and developing a project-based financial strategy and/or a public financing strategy, as appropriate, to fund future flood protection for the project, which may also protect existing nearby development. Reconciling these different worthy goals and taking appropriate action requires weighing competing policy considerations and would be best accomplished through a collaborative process involving diverse stakeholders, similar to that being undertaken by the Joint Policy Committee to develop the Sustainable Communities Strategy.

s. Some undeveloped low-lying areas that are vulnerable to shoreline flooding contain important habitat or provide opportunities for habitat enhancement. In these areas, development that would have regional benefits could preclude wetland enhancement that would also have regional benefits. Some developed areas may be suitable for ecosystem restoration, if existing development is removed to allow the Bay to migrate inland, although relocating communities is very costly and may result in the displacement of neighborhoods.

t. There are multiple local, state, federal, and regional government agencies with authority over the Bay and shoreline. Local governments have broad authority over shoreline land use, but limited resources to address climate change adaptation. Working collaboratively with local governments, including agencies with responsibility for flood protection is desirable to optimize scarce resources and create the flexibility needed to plan amidst a high degree of uncertainty.

u. Government jurisdictional boundaries and authorities in the Bay Area are incongruent with the regional scale and nature of climate-related challenges. The Joint Policy Committee, which is comprised of regional agencies, provides a framework for regional decision-making to address climate change through consistent and effective regionwide policy and to provide local governments with assistance and incentives for addressing climate change. The Commission can collaborate with the Joint Policy Committee to assure that the Bay Plan Climate Change policies are integrated with the emerging Sustainable Communities Strategy and other regional agencies' policies that deal with climate change issues.

v. The Commission's legal authority and regulatory jurisdiction were created to address the Legislative findings and advance the declarations of state policy established in the McAteer-Petris Act and the Suisun Marsh Preservation Act of 1977. Climate change and sea level rise were not considerations when this authority and jurisdiction were established.

w. The California Ocean Protection Council has endorsed the guiding principles of the California Climate Adaptation Strategy, which recommends that state agencies pursue the following policy objectives in their adaptation planning:

- Protect public health and safety and critical infrastructure;
- Protect restore, and enhance ocean and coastal ecosystems, on which the State economy and well-being depend;
- Ensure public access to coastal areas and protect beaches, natural shoreline, and park and recreational resources;
- Plan and design new development and communities for long-term sustainability in the face of climate change;
- Facilitate adaptation of existing development and communities to reduce their vulnerability to climate change impacts over time; and
- Begin now to adapt to the impacts of climate change.

The California Climate Adaptation Strategy recognizes that significant and valuable development has been built along the California coast for over a century. Some of the development is currently threatened by sea level rise or will be threatened in the near future. Similarly, the coastal zone is home to many threatened or endangered species and sensitive habitats. The strategy acknowledges that the high financial, ecological, social and cultural costs of protecting everything may prove to be impossible; in the long run, protection of everything may be both futile and environmentally destructive. The strategy recommends that decision guidance strategies frame cost-benefit analyses so that all public and private costs and benefits are appropriately considered.

The strategy further recommends that state agencies should generally not plan, develop, or build any new significant structure in a place where that structure will require significant protection from sea-level rise, storm surges, or coastal erosion during the expected life of the structure. However, the strategy also acknowledges that vulnerable shoreline areas containing existing development or proposed for new development that has or will have regionally significant economic, cultural, or social value may have to be protected, and infill development in these areas should be closely scrutinized and may be accommodated. The strategy recommends that state agencies should incorporate this policy into their decisions. If agencies plan, permit, develop or build any new structures in hazard zones, the California Climate Adaptation Strategy recommends that agencies employ or encourage innovative engineering and design solutions so that the structures are resilient to potential flood or erosion events, or can be easily relocated or removed to allow for progressive adaptation to sea level rise, flood and erosion.

The strategy further recommends that the state should consider prohibiting projects that would place development in undeveloped areas already containing critical habitat, and those containing opportunities for tidal wetland restoration, habitat migration, or buffer zones. The strategy also encourages projects that protect critical habitats, fish, wildlife and other aquatic organisms and connections between coastal habitats. The strategy recommends pursuing activities that can increase natural resiliency, such as restoring tidal wetlands, living shorelines, and related habitats; managing sediment for marsh accretion and natural flood protection; and maintaining upland buffer areas around tidal wetlands.

Policies

1. The Commission intends that the Bay Plan Climate Change findings and policies will be used as follows:
    a. The findings and policies apply only to projects and activities located within the following areas: San Francisco Bay, the 100-foot shoreline band, salt ponds, managed wetlands, and certain waterways, as these areas are described in Government Code section 66610, and the Suisun Marsh, as this area is described in Public Resources Code section 29101;
    b. For projects or activities that are located partly within the areas described in subparagraph a and partly outside such area, the findings and policies apply only to those activities or that portion of the project within the areas described in subparagraph a;
    c. For the purposes of implementing the federal Coastal Zone Management Act, the findings and policies do not apply to projects and activities located outside the areas described in subparagraph a, even if those projects or activities may otherwise be subject to consistency review pursuant to the federal Coastal Zone Management Act; and
    d. For purposes of implementing the California Environmental Quality Act, the findings and policies are not applicable portions of the Bay Plan for purposes of CEQA Guideline 15125(d) for projects and activities outside the areas described in subparagraph a and, therefore, a discussion of whether such proposed projects or activities are consistent with the policies is not required in environmental documents.

2. When planning shoreline areas or designing larger shoreline projects, a risk assessment should be prepared by a qualified engineer and should be based on the estimated 100-year flood elevation that takes into account the best estimates of future sea level rise and current flood protection and planned flood protection that will be funded and constructed when needed to provide protection for the proposed project or shoreline area. A range of sea level rise projections for mid-century and end of century based on the best scientific data available should be used in the risk assessment. Inundation maps used for the risk assessment should be prepared under the direction of a qualified engineer. The risk assessment should identify all types of potential flooding, degrees of uncertainty, consequences of defense failure, and risks to existing habitat from proposed flood protection devices.

3. To protect public safety and ecosystem services, within areas that a risk assessment determines are vulnerable to future shoreline flooding that threatens public safety, all projects—other than repairs of existing facilities, small projects that do not increase risks to public safety, interim projects and infill projects within existing urbanized areas—should be designed to be resilient to a mid-century sea level rise projection. If it is likely the project will remain in place longer than mid-century, an adaptive management plan should be developed to address the long-term impacts that will arise based on a risk assessment using the best available science-based projection for sea level rise at the end of the century.

4. To address the regional adverse impacts of climate change, undeveloped areas that are both vulnerable to future flooding and currently sustain significant habitats or species, or possess conditions that make the areas especially suitable for ecosystem enhancement, should be given special consideration for preservation and habitat enhancement and should be encouraged to be used for those purposes.

5. Wherever feasible and appropriate, effective, innovative sea level rise adaptation approaches should be encouraged.

6. The Commission, in collaboration with the Joint Policy Committee, other regional, state and federal agencies, local governments, and the general public, should formulate a regional sea level rise adaptation strategy for protecting critical developed shoreline areas and natural ecosystems, enhancing the resilience of Bay and shoreline systems and increasing their adaptive capacity.

   The Commission recommends that: (1) the strategy incorporate an adaptive management approach; (2) the strategy be consistent with the goals of SB 375 and the principles of the California Climate Adaptation Strategy; (3) the strategy be updated regularly to reflect changing conditions and scientific information and include maps of shoreline areas that are vulnerable to flooding based on projections of future sea level rise and shoreline flooding; (4) the maps be prepared under the direction of a qualified engineer and regularly updated in consultation with government agencies with authority over flood protection; and (5) particular attention be given to identifying and encouraging the development of long-term regional flood protection strategies that may be beyond the fiscal resources of individual local agencies.

Ideally, the regional strategy will determine where and how existing development should be protected and infill development encouraged, where new development should be permitted, and where existing development should eventually be removed to allow the Bay to migrate inland.

The entities that formulate the regional strategy are encouraged to consider the following strategies and goals:

a. advance regional public safety and economic prosperity by protecting: (i) existing development that provides regionally significant benefits; (ii) new shoreline development that is consistent with other Bay Plan policies; and (iii) infrastructure that is crucial to public health or the region's economy, such as airports, ports, regional transportation, wastewater treatment facilities, major parks, recreational areas and trails;

b. enhance the Bay ecosystem by identifying areas where tidal wetlands and tidal flats can migrate landward; assuring adequate volumes of sediment for marsh accretion; identifying conservation areas that should be considered for acquisition, preservation or enhancement; developing and planning for flood protection; and maintaining sufficient transitional habitat and upland buffer areas around tidal wetlands;

c. integrate the protection of existing and future shoreline development with the enhancement of the Bay ecosystem, such as by using feasible shoreline protection measures that incorporate natural Bay habitat for flood control and erosion prevention;

d. encourage innovative approaches to sea level rise adaptation;

e. identify a framework for integrating the adaptation responses of multiple government agencies;

f. integrate regional mitigation measures designed to reduce greenhouse gas emissions with regional adaptation measures designed to address the unavoidable impacts of climate change;

g. address environmental justice and social equity issues;

h. integrate hazard mitigation and emergency preparedness planning with adaptation planning by developing techniques for reducing contamination releases, structural damage and toxic mold growth associated with flooding of buildings, and establishing emergency assistance centers in neighborhoods at risk from flooding;

i. advance regional sustainability, encourage infill development and job creation, provide diverse housing served by transit and protect historical and cultural resources;

j. encourage the remediation of shoreline areas with existing environmental degradation and contamination in order to reduce risks to the Bay's water quality in the event of flooding;

k. support research that provides information useful for planning and policy development on the impacts of climate change on the Bay, particularly those related to shoreline flooding;

l. identify actions to prepare and implement the strategy, including any needed changes in law; and

m. identify mechanisms to provide information, tools, and financial resources so local governments can integrate regional climate change adaptation planning into local community design processes.

7. Until a regional sea level rise adaptation strategy can be completed, the Commission should evaluate each project proposed in vulnerable areas on a case-by-case basis to determine the project's public benefits, resilience to flooding, and capacity to adapt to climate change impacts. The following specific types of projects have regional benefits, advance regional goals, and should be encouraged, if their regional benefits and their advancement of regional goals outweigh the risk from flooding:

   a. remediation of existing environmental degradation or contamination, particularly on a closed military base;

   b. a transportation facility, public utility or other critical infrastructure that is necessary for existing development or to serve planned development;

   c. a project that will concentrate employment or housing near existing or committed transit service (whether by public or private funds or as part of a project), particularly within those Priority Development Areas that are established by the Association of Bay Area Governments and endorsed by the Commission, and that includes a financial strategy for flood protection that will minimize the burdens on the public and a sea level rise adaptation strategy that will adequately provide for the resilience and sustainability of the project over its designed lifespan; and

   d. a natural resource restoration or environmental enhancement project.

   The following specific types of projects should be encouraged if they do not negatively impact the Bay and do not increase risks to public safety:

   e. repairs of an existing facility;

   f. a small project;

   g. a use that is interim in nature and either can be easily removed or relocated to higher ground or can be amortized within a period before removal or relocation of the proposed use would be necessary; and

   h. a public park.

8. To effectively address sea level rise and flooding, if more than one government agency has authority or jurisdiction over a particular issue or area, project reviews should be coordinated to resolve conflicting guidelines, standards or conditions.

Safety of Fills

Findings

f. Flood damage to fills and shoreline areas can result from a combination of sea level rise, storm surge, ~~heavy~~ rainfall, high tides, and winds blowing onshore. The most effective way ~~T~~to prevent such damage~~,~~ is to locate projects and facilities~~structures~~ on fill or near the shoreline~~should be~~ above~~the~~ a~~highest expected water level~~ 100-year flood level that takes future sea level rise into account, during the expected life of the project.~~or should be protected for the expected life of the project by~~ Other effective approaches that can reduce flood damage include protecting structures or areas with levees, ~~of an adequate height~~ seawalls, tidal marshes, or other protective measures; and employing innovative design concepts, such as building structures that can be easily relocated, tolerate periodic flooding or are adaptively designed and managed to address sea level rise over time.

g. ~~Bay water levels are likely to increase in the future because of a relative rise in sea level. Relative rise in sea level is the sum of: (1) a rise in global sea level and (2) land elevation change (lifting or subsidence) around the Bay. If historic trends continue, global sea level should increase between four and five inches in the Bay in the next 50 years and could increase approximately one and one-half to five feet by the year 2100 depending on the rate of accelerated rise in sea level caused by the "greenhouse effect," the long-term warming of the earth's surface from heat radiated off the earth and trapped in the earth's atmosphere by gases released into the atmosphere. The warming would bring about an accelerated rise in sea level worldwide through thermal expansion of the upper layers of the oceans and melting of some of the earth's glaciers and polar ice packs.~~Sea level is rising at an accelerated rate due to global climate change. Land elevation change caused by tectonic (geologic, including seismic) activity, consolidation or compaction of soft soils such as Bay muds, and extraction of subsurface groundwater or natural gas extraction, is variable around the Bay. Consequently, some parts of the Bay will experience a greater relative rise in sea level than other areas. Relative rise in sea level is the sum of: (1) a rise in global sea level and (2) land elevation change (lifting or subsidence) around the Bay.~~For example, in Sausalito, the land area has been gradually lifting while in the South Bay excessive pumping from underground fresh water reservoirs has caused extensive subsidence of the ground surface in the San Jose area and as far north as Dumbarton Bridge (map of Generalized Subsidence and Fault Zones shows subsidence from 1934 to 1967). Indications are that if heavy groundwater pumping is continued indefinitely in the South Bay area, land in the Alviso area (which has already subsided about seven feet since 1912) could subside up to seven feet more; if this~~ Where subsidence occurs, more extensive ~~levees~~ shoreline protection and wetland restoration projects may be needed to minimize~~prevent inundation~~ flooding of low-lying areas by the extreme high water levels.

Policies

3. To provide vitally needed information on the effects of earthquakes on all kinds of soils, installation of strong-motion seismographs should be required on all future major land fills. In addition, the Commission encourages installation of strong-motion seismographs in other developments on problem soils, and in other areas recommended by the U.S. ~~Coast and Geodetic~~ Geological Survey, for purposes of data comparison and evaluation.

4. Adequate measures should be provided ~~T~~to prevent damage from sea level rise and storm activity~~flooding,~~ that may occur~~structures~~ on fill or near the shoreline over the expected life of a project. ~~should have adequate flood protection including consideration of future relative sea level rise as determined by competent engineers. As a general rule,~~ The Commission may approve fill that is needed to provide flood protection for existing projects and uses. New projects~~structures~~ on fill or near the shoreline should either be ~~above the wave runup level or sufficiently~~ set back from the edge of the shore so that the project~~structure is~~ will not be subject to dynamic wave energy~~., be built so~~In all cases, the bottom floor level of structure~~s should~~will be above a~~the highest estimated tide~~ 100-year flood elevation that takes future sea level rise into account for the expected life of the project~~., be~~Exceptions to the general height rule may be made for developments specifically designed to tolerate periodic flooding, or employ other effective means of addressing the impacts of future sea level rise and storm activity. Rights-of-way for levees or other structures protecting inland areas from tidal flooding should be sufficiently wide on the upland side to allow for future levee widening to support additional levee height so that no fill for levee widening is placed in the Bay.

~~5. To minimize the potential hazard to Bay fill projects and bayside development from subsidence, all proposed developments should be sufficiently high above the highest estimated tide level for the expected life of the project or sufficiently protected by levees to allow for the effects of additional subsidence for the expected life of the project, utilizing the latest information available from the U.S. Geological Survey and the National Ocean Service. Rights-of-way for levees protecting inland areas from tidal flooding should be sufficiently wide on the upland side to allow for future levee widening to support additional levee height so that no fill for levee widening is placed in the Bay.~~

~~6. Local governments and special districts with responsibilities for flood protection should assure that their requirements and criteria reflect future relative sea level rise and should assure that new structures and uses attracting people are not approved in flood prone areas or in areas that will become flood prone in the future, and that structures and uses that are approvable will be built at stable elevations to assure long-term protection from flood hazards.~~

~~Protection of the~~ Shoreline Protection

Findings

a. Well-designed shoreline protection projects, such as levees, wetlands, or riprap, can prevent shoreline erosion and damage from flooding.

~~a.~~b. ~~Erosion control~~Because vast shoreline areas are vulnerable to flooding and because much of the shoreline consists of soft, easily eroded soils, shoreline protection projects are often needed to ~~protect~~reduce damage to shoreline property and improvements~~from erosion. Because so much shoreline consists of soft, easily eroded soils, protective structures are usually required to stabilize and establish a permanent shoreline. These structures~~ Structural shoreline protection, such as riprap, levees, and seawalls, often requires periodic maintenance and reconstruction.

~~b~~.c. Most ~~erosion control~~ structural shoreline protection projects involve some fill, which can adversely affect natural resources, such as water surface area and volume, tidal circulation, and wildlife use~~, marshes, and mudflats~~. Structural shoreline protection can further cause erosion of tidal wetlands and tidal flats, prevent wetland migration to accommodate sea level rise, create a barrier to physical and visual public access to the Bay, create a false sense of security and may have cumulative impacts. Physical and visual public access can be provided on levees and other protection structures. As the rate of sea level rise accelerates and the potential for shoreline flooding increases, the demand for new shoreline protection projects will likely increase. Some projects may involve extensive amounts of fill.

~~c~~.d. Structural ~~S~~shoreline protection ~~structures, such as riprap and sea walls, are~~is most effective and less damaging to natural resources if ~~they are~~it is the appropriate kind of structure for the project site and erosion and flood problem, and ~~are~~is properly designed, constructed, and maintained. Because factors affecting erosion and flooding vary considerably, no single protective method or structure is appropriate in all situations. When a structure is not appropriate or is improperly designed and constructed to meet the unique site characteristics, flood conditions ~~of~~, and erosion forces at a project site, the structure is more likely to fail, require additional fill to repair, have higher long-term maintenance costs because of higher frequency of repair, and cause greater disturbance and displacement of the site's natural resources.

e. Addressing the impacts of sea level rise and shoreline flooding may require large-scale flood protection projects, including some that extend across jurisdictional or property boundaries. Coordination with adjacent property owners or jurisdictions to create contiguous, effective shoreline protection is critical when planning and constructing flood protection projects. Failure to coordinate may result in inadequate shoreline protection (e.g., a protection system with gaps or one that causes accelerated erosion in adjacent areas).

~~d.~~f. Nonstructural ~~erosion control~~shoreline protection methods, such as tidal marshes~~marsh plantings~~, can provide effective flood control, but are typically effective for erosion control only in areas experiencing mild erosion. ~~However, i~~In some instances, it may be possible to combine ~~marsh~~habitat restoration, enhancement or protection with structural approaches to provide protection from flooding and control shoreline erosion, thereby minimizing the ~~erosion control~~shoreline protection project's impact on natural resources.

~~e.~~g. Loose dirt, concrete slabs, asphalt, bricks, scrap wood and other kinds of debris, are generally ineffective in halting shoreline erosion or preventing flooding and may lead to increased fill or release of pollutants. Although providing some short-term shoreline protection, protective structures constructed of such debris materials typically fail rapidly in storm conditions because the material slides bayward or is washed offshore. Repairing these ineffective structures requires additional material to be placed along the shoreline, leading to unnecessary fill and disturbance of natural resources.

Policies

1. New shoreline ~~erosion control~~protection projects and the maintenance or reconstruction of existing ~~erosion control facilities~~projects and uses should be authorized if: (a) the project is necessary to ~~protect the shoreline from~~provide flood or erosion protection for (i) existing development, use or infrastructure, or (ii) proposed development, use or infrastructure that is consistent with other Bay Plan policies; (b) the type of the protective structure is appropriate for the project site, the uses to be protected, and the erosion and flooding conditions at the site; ~~and~~ (c) the project is properly engineered to provide erosion control and flood protection for the expected life of the project based on a 100-year flood event that takes future sea level rise into account; (d) the project is properly designed and constructed to prevent significant impediments to physical and visual public access; and (e) the protection is integrated with current or planned adjacent shoreline protection measures. Professionals knowledgeable of the Commission's concerns, such as civil engineers experienced in coastal processes, should participate in the design ~~of erosion control projects~~.

2. Riprap revetments, the most common shoreline protective structure, should be constructed of properly sized and placed material that meet sound engineering criteria for durability, density, and porosity. Armor materials used in the revetment should be placed according to accepted engineering practice, and be free of extraneous material, such as debris and reinforcing steel. Generally, only engineered quarrystone or concrete pieces that have either been specially cast, are free of extraneous materials from demolition debris, ~~or~~and are carefully selected for size, density, and durability~~, and freedom of extraneous materials from demolition debris~~ will meet these requirements. Riprap revetments constructed out of other debris materials should not be authorized.

3. Authorized protective projects should be regularly maintained according to a long-term maintenance program to assure that the shoreline will be protected from tidal erosion and flooding and that the effects of the ~~erosion control~~shoreline protection project on natural resources during the life of the project will be the minimum necessary.

4. Whenever feasible and appropriate, shoreline protecti~~ve~~on projects should include provisions for nonstructural methods such as marsh vegetation ~~where feasible~~and integrate shoreline protection and Bay ecosystem enhancement, using adaptive management. Along shorelines that support marsh vegetation, or where marsh establishment has a reasonable chance of success, the Commission should require that the design of authorized protecti~~ve~~on projects include provisions for establishing marsh and transitional upland vegetation as part of the protective structure, wherever ~~practicable~~feasible.

5. Adverse impacts to natural resources and public access from new shoreline protection should be avoided. Where significant impacts cannot be avoided, mitigation or alternative public access should be provided.

Public Access

Findings

f. Accelerated flooding from sea level rise and storm activity will severely impact existing shoreline public access, resulting in temporary or permanent closures. Periodic and consistent flooding would increase damage to public access areas, which can then require additional fill to repair, raise maintenance costs, and cause greater disturbance and displacement of the site's natural resources. Risks to public health and safety from sea level rise and shoreline flooding may require new shoreline protection to be installed or existing shoreline protection to be modified, which may impede physical and visual access to the Bay.

Re-letter findings f. and g. to g. and h., respectively.

~~h.~~i. Public access areas obtained through the permit process are most utilized if they provide physical access, provide connections to public rights-of-way, are related to adjacent uses, are designed, improved and maintained clearly to indicate their public character, and provide visual access to the Bay. Flooding from sea level rise and storm activity increases the difficulty of designing public access areas (e.g., connecting new public access that is set at a higher elevation or located farther inland than existing public access areas).

Re-letter findings i. and j. to j. and k., respectively.

~~k.~~l. Studies indicate that public access may have immediate effects on wildlife (including flushing, increased stress, interrupted foraging, or nest abandonment) and may result in adverse long- term population and species effects. Although some wildlife may adapt to human presence, not all species or individuals may adapt equally, and adaptation may leave some wildlife more vulnerable to harmful human interactions such as harassment or poaching. The type and severity of effects, if any, on wildlife depend on many factors, including physical site configuration, species present, and the nature of the human activity. Accurate characterization of current and future site, habitat and wildlife conditions, and of likely human activities, would provide information critical to understanding potential effects on wildlife.

~~l.~~m. Potential adverse effects on wildlife from public access may be avoided or minimized by siting, designing and managing public access to reduce or prevent adverse human and wildlife interactions. Managing human use of the area may include adequately maintaining improvements, periodic closure of access areas, pet restrictions such as leash requirements, and prohibition of public access in areas where other strategies are insufficient to avoid adverse effects. Properly sited and/or designed public access can avoid habitat fragmentation and limit predator access routes to wildlife areas. In some cases, public access adjacent to sensitive wildlife areas may be set back from the shoreline a greater distance because buffers may be needed to avoid or minimize human disturbance of wildlife. Appropriate siting, design and management strategies depend on the environmental characteristics of the site, ~~and~~ the likely human uses of the site, and the potential impacts of future climate change.

~~m.~~n. Providing diverse and satisfying public access opportunities can reduce the creation of informal access routes to decrease interaction between humans and wildlife, habitat fragmentation, and vegetation trampling and erosion. Formal public access also provides for more predictable human actions, which may increase the ability of wildlife to adjust to human use.

Policies

5. Public access should be sited, designed, managed and maintained to avoid significant adverse impacts from sea level rise and shoreline flooding.

~~5.~~6. Whenever public access to the Bay is provided as a condition of development, on fill or on the shoreline, the access should be permanently guaranteed. This should be done wherever appropriate by requiring dedication of fee title or easements at no cost to the public, in the same manner that streets, park sites, and school sites are dedicated to the public as part of the subdivision process in cities and counties. Any public access provided as a condition of development should either be required to remain viable in the event of future sea level rise or flooding, or equivalent access consistent with the project should be provided nearby.

~~6.~~7. Public access improvements provided as a condition of any approval should be consistent with the project and the physical environment, including protection of Bay natural resources, such as aquatic life, wildlife and plant communities, and provide for the public's safety and convenience. The improvements should be designed and built to encourage diverse Bay-related activities and movement to and along the shoreline, should permit barrier free access for persons with disabilities~~the physically handicapped~~ to the maximum feasible extent, should include an ongoing maintenance program, and should be identified with appropriate signs.

Renumber Public Access Policies 7 through 13 to 8 through 14.

We certify that this resolution was adopted by a vote of _____ "yes" votes, _____ "no" votes and _____ abstentions at the Commission meeting held October 6, 2011 at San Francisco, California.

Executed on this _____ day of _____, 2011 at San Francisco, California.

_____
R. SEAN RANDOLPH
Chairman

Executed on this _____ day of _____, 2011 at San Francisco, California

_____
WILL TRAVIS
Executive Director

255 Shoreline Drive, Suite 200
Redwood City, CA 94065
(650) 482-6300, Fax (650) 482-6399

MEMORANDUM

Date: March 16, 2015 **BKF No.:** 20130002-10

To: Charles Bryant, City of Emeryville
Miroo Desai, City of Emeryville

From: Thomas Morse, BKF
Ryan Bernal, BKF

Subject: Sherwin Williams – Stormwater Runoff Memorandum

Purpose

The purpose of this memorandum is to provide a summary of stormwater runoff associated with the conceptual design for the redevelopment of the Sherwin Williams property.

Background

The proposed project is at the northwest corner of Horton Street and Sherwin Avenue, and totals 10.01 acres, including the Sherwin Williams property as well as the adjacent city parcel. The site is currently occupied by 1 building, and the rest of the property is generally covered with asphalt concrete or gravel. The proposed project will renovate the existing building and construct 5 new buildings, park and open space, and streets and parking to support the site.

The existing site is divided into two drainage management areas (DMAs). DMA-1 serves the southern portion of the site, which directly drains to Sherwin Avenue and ultimately to the 15-inch main on Halleck Street. In the proposed condition the main on Sherwin Avenue will be extended to Horton Street and will continue along Horton Street until the intersection of Horton Street and 45th Street.

DMA-2 serves the remaining northern portion of the property. It is serviced by an on-site catch basin and an 18-inch main that runs through the Southern Pacific Transportation Company's right of way which ultimately outfalls to Temescal Creek. The proposed condition will extend storm drain into the site, which will ultimately connect to an improved 24-inch outfall to Temescal Creek. The proposed condition will not use the catch basins in the Southern Pacific Transportation Company's right of way.

Methodology

The Rational Method is used in this analysis and is defined as Q = C * I * A, where:

Q = peak flow (cfs)
C = runoff coefficient factor
I = rainfall intensity (in/hr)
A = area (acres)

This analysis uses a 10 year storm at a 10 minute duration. Based on NOAA's Point Precipitation Frequency Estimates (included as Attachment A), the design intensity a 10 year storm with a 10 minute duration is approximately 2.07 inches per hour.

Existing Runoff

See Table 1A and Table 1B for Existing C Factor calculation and Exhibit A for existing pervious/impervious areas.

Existing Runoff, DMA-1: Q = C * I * A = 0.89 * 2.07 in/hr * 2.88 acres = 5.31 cfs

Existing Runoff, DMA-2: Q = C * I * A = 0.90 * 2.07 in/hr * 7.13 acres = 13.14 cfs

Total Runoff, 18.45 cfs

Proposed Runoff

See Table 2A and Table 2B for Proposed C Factor calculation and Exhibit B for proposed pervious/impervious areas.

Proposed Runoff, DMA-1: Q = C * I * A = 0.74 * 2.07 in/hr * 3.28 acres = 5.02 cfs

Proposed Runoff, DMA-2: Q = C * I * A = 0.80 * 2.07 in/hr * 6.73 acres = 10.15 cfs

Total Runoff, 15.17 cfs

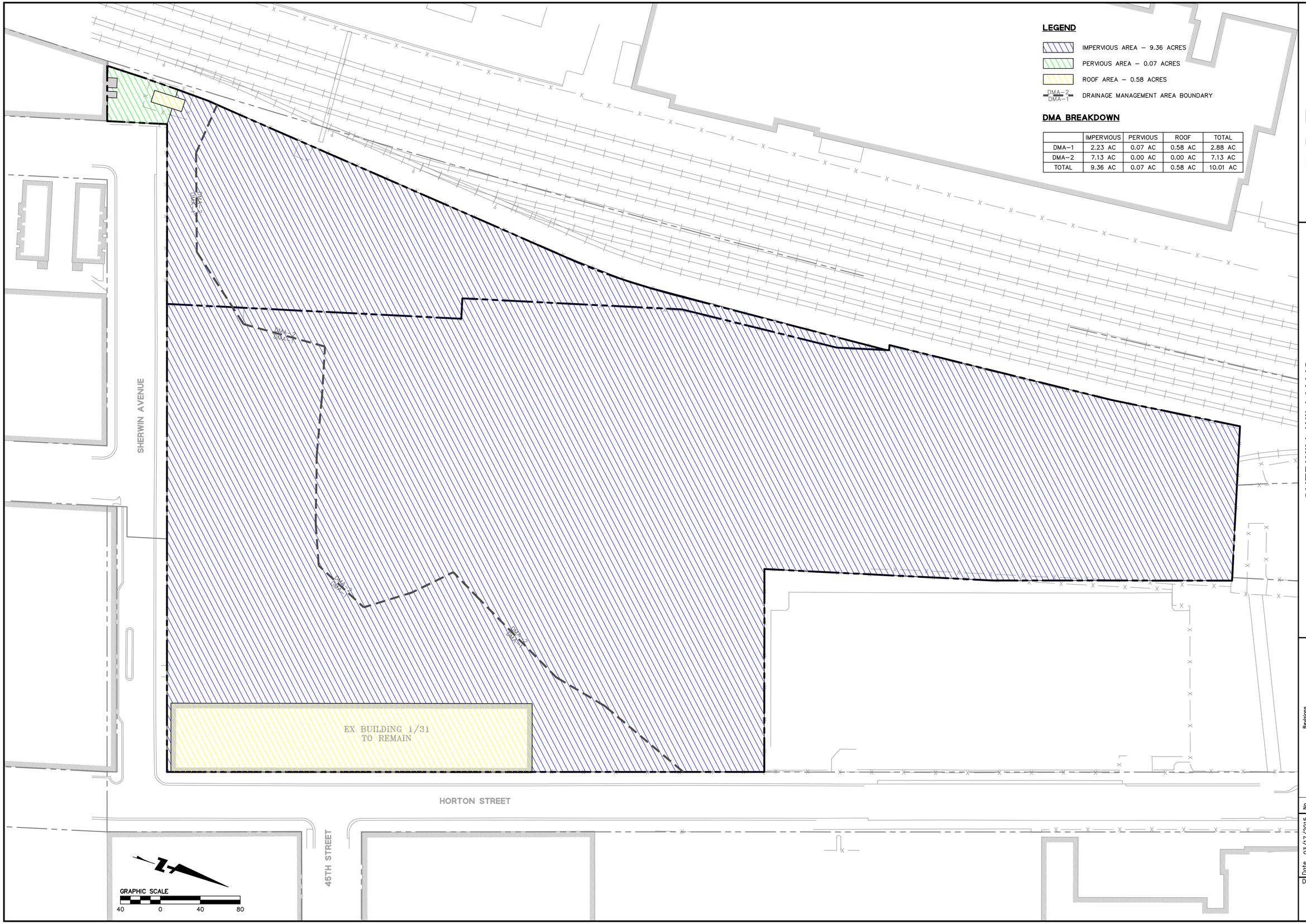
Conclusion

Redevelopment of the Sherwin Williams property will increase perviousness at the site and decrease total stormwater runoff from 18.45 cfs to 15.17 cfs. Within DMA-1, runoff will be reduced from 5.31 cfs to 5.02 cfs, a reduction of 5.5% from the existing condition. For DMA-2, runoff decreases from 13.14 cfs to 10.15 cfs, resulting in a reduction of 22.8% from the existing condition. Implementation of stormwater quality features (biotreatment planters) will further reduce runoff from the site. A storm drain report documenting the runoff rates for the final design will be submitted with the improvement plans for the project.

ATTACHMENTS:

- Exhibit A – Existing Pervious/Impervious Areas
- Exhibit B – Proposed Pervious/Impervious Areas
- Exhibit C – Existing Conditions Plan
- Exhibit D – Proposed Grading Plan
- Exhibit E – Proposed Utility Plan
- Table 1A – Existing Condition C Factor, DMA-1
- Table 1B – Existing Condition C Factor, DMA-2
- Table 2A – Proposed Condition C Factor, DMA-1
- Table 2B – Proposed Condition C Factor, DMA-2
- Attachment A – NOAA Point Precipitation Frequency Estimates

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LEGEND

- IMPERVIOUS AREA – 9.36 ACRES
- PERVIOUS AREA – 0.07 ACRES
- ROOF AREA – 0.58 ACRES
- DMA-2 / DMA-1 — DRAINAGE MANAGEMENT AREA BOUNDARY

DMA BREAKDOWN

	IMPERVIOUS	PERVIOUS	ROOF	TOTAL
DMA-1	2.23 AC	0.07 AC	0.58 AC	2.88 AC
DMA-2	7.13 AC	0.00 AC	0.00 AC	7.13 AC
TOTAL	9.36 AC	0.07 AC	0.58 AC	10.01 AC

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SHERWIN WILLIAMS
EXISTING PERVIOUS/IMPERVIOUS AREAS
EXHIBIT A

CITY OF EMERYVILLE
ALAMEDA COUNTY
CALIFORNIA

Revisions

No.	

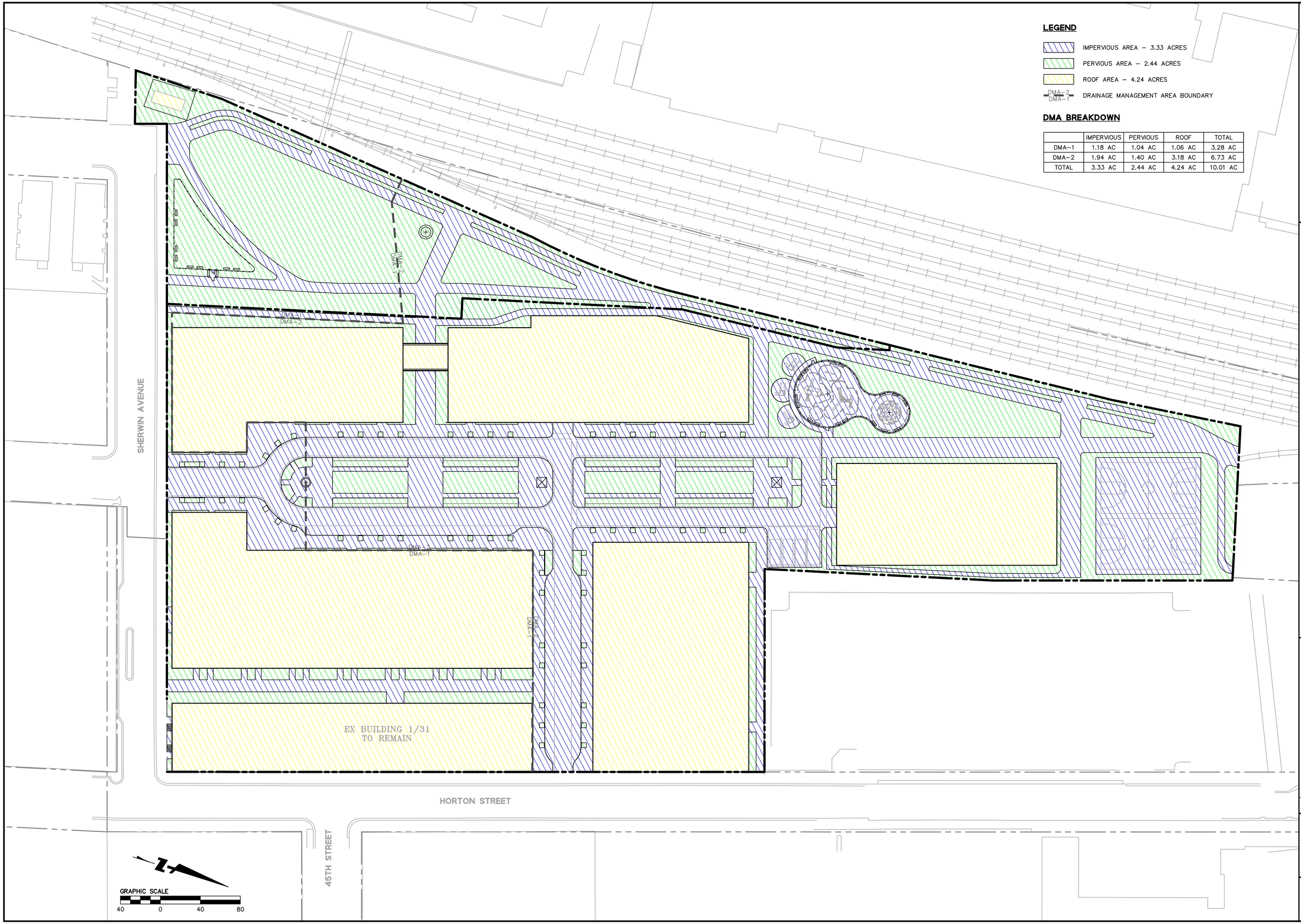
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Scale	1" = 40'
Design	RKB
Drawn	BPB
Approved	TRM
Job No	20130002

Drawing Number:

1 OF 5

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PLOT DATE: 03-19-15
PLOTTED BY: baye

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SHERWIN WILLIAMS
PROPOSED PERVIOUS/IMPERVIOUS AREAS
EXHIBIT B

ALAMEDA COUNTY
CALIFORNIA
CITY OF EMERYVILLE

Revisions	No.

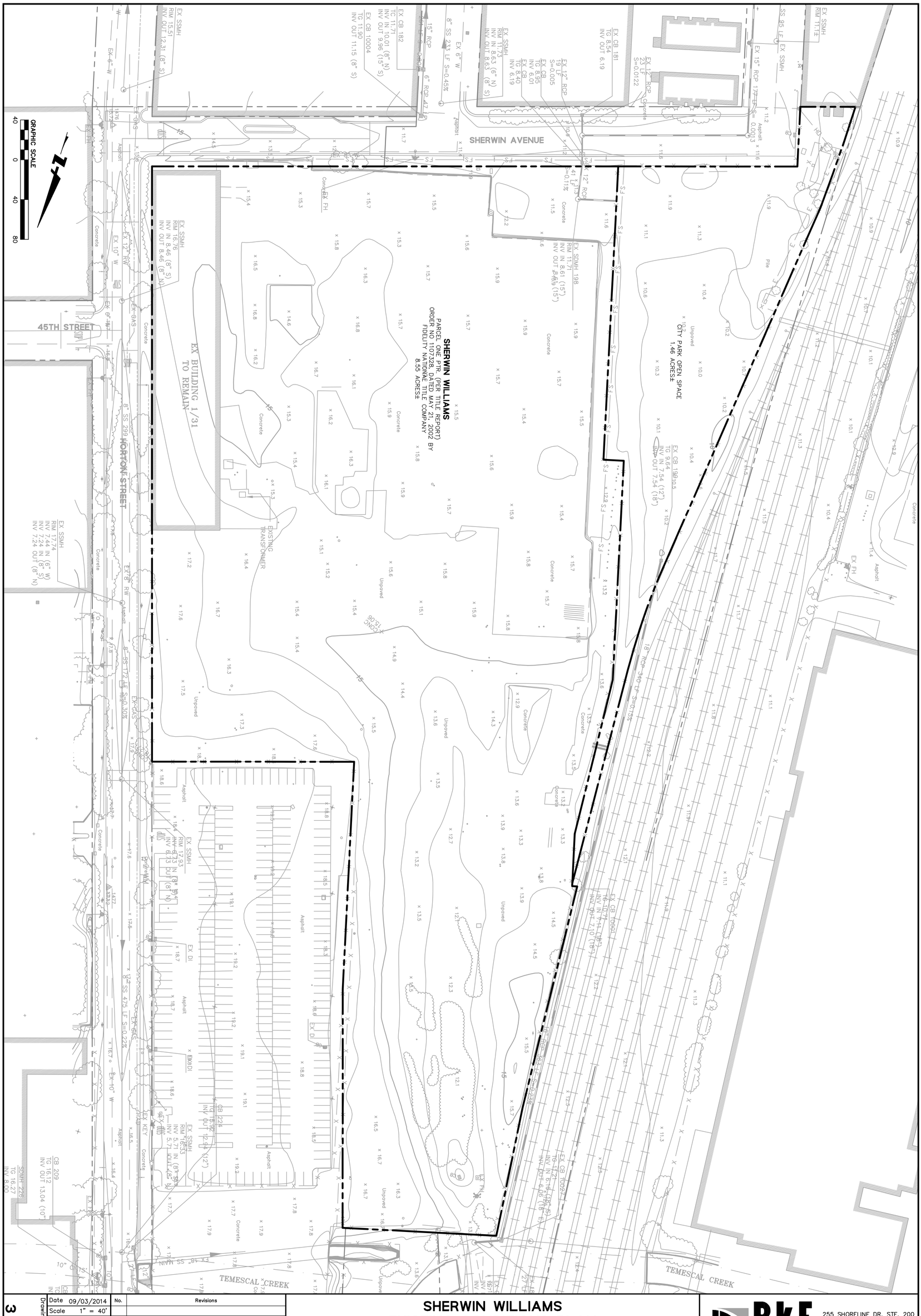
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Scale	1" = 40'
Design	RKB
Drawn	BPB
Approved	TRM
Job No	20130002

Drawing Number:

2 OF 5

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PLOT DATE: 03–19–15 PLOTTED BY: baye

DRAWING NAME: J:\Eng13\130002\Conceptual\C200-SWEXCOND.dwg
PLOT DATE: 03-19-15 PLOTTED BY: baye



Date	09/03/2014	No.	Revisions
Scale	1" = 40'		
Design	RKB		
Drawn	BPB		
Approved	TRM		
Job No	20130002		

Drawing Number: 3 OF 5

SHERWIN WILLIAMS
EXISTING CONDITIONS PLAN
EXHIBIT C

CITY OF EMERYVILLE ALAMEDA COUNTY CALIFORNIA

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BEGINNING OF WALL
TOW 12.0
BOW 11.0

TOW 14.0
BOW 10.8

TOW 14.0
BOW 11.1

TOW 14.0
BOW 12.2

TOW 15.3
BOW 13.5

END OF WALL
TOW 15.0
BOW 14.0

HALLECK STREET

SHERWIN AVENUE

HUBBARD STREET

HUBBARD CIRCLE WEST

HUBBARD CIRCLE EAST

HORTON STREET

45TH STREET

FF 16.7

FF 16.7

FF 16.7

FF 17.2

LP 15.4

LP 15.5

LP 15.6

TC 16.8
FL 16.3

CUT/FILL: NET IMPORT 7,800 CUBIC YARDS
TOTAL EARTHWORK VOLUME: 15,900 CUBIC YARDS

GRAPHIC SCALE
40 0 40 80

DRAWING NAME: J:\Eng13\130002\Conceptual\Option B\C400-SWPRGD.dwg
PLOT DATE: 03-19-15
PLOTTED BY: baye

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SHERWIN WILLIAMS
CONCEPTUAL GRADING PLAN
EXHIBIT D

ALAMEDA COUNTY
CALIFORNIA

CITY OF EMERYVILLE

Revisions

No.	

Date	12/04/2014
Scale	1" = 40'
Design	RKB
Drawn	MQT
Approved	TRM
Job No	20130002

Drawing Number:

4 OF 5

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MARIO J & VIRGINIA E PELLEGRINI

HALLECK STREET

SHERWIN AVENUE

HUBBARD STREET

HUBBARD CIRCLE WEST

HUBBARD CIRCLE EAST

SOUTHERN PACIFIC TRANSPORTATION COMPANY

TEMESCAL CREEK

EX HAMILTON SENIOR HOMES LLC

EX P&H ASSOCIATES

45TH STREET ARTIST COOPERATIVE INC

45TH STREET

HORTON STREET

THE CITY OF EMERYVILLE

EX CHIRON PROPERTY

PARCEL B-1

PARCEL B-2

PARCEL C-1

PARCEL C-2

PARCEL A

PARCEL D

EX SSMH RIM 11.1±

SS 95 LF

EX 15" RCP 177 LF S= 0.0013

EX 12" RCP 23 LF S=0.0122

EX CB 181 TG 8.54 INV OUT 6.19

EX SSMH RIM 11.73 INV IN 8.63 (6" N) INV OUT 8.63 (8" S) NEW INV IN 8.9 (8" N)

EX 15" SD 171 LF S=0.0013

EX 6" W

8" SS 233 LF S=0.45%

15" RCP

6" RCP 47 LF

EX CB 182 TC 11.71 INV IN 10.01 (8" N) INV OUT 9.96 (15" S)

EX CB 10004 TG 11.90 INV OUT 11.15 (8" S)

SDMH RIM 11.7 INV IN 9.4

12" SD 159 LF S=0.005

CB RIM 12.2 INV 9.7

SSMH RIM 16.1 INV 12.3

6" SS STUB INV 12.7

EX FH

CB RIM 12.9 INV 10.6

12" SD 5 LF S=0.005

12" SD STUB INV 10.7

2" IRR

12" SD 98 LF S=0.005

SDMH RIM 13.9 INV 10.0

4" RW

6" SS STUB INV 12.6

6" SS 67 LF S=0.01

6" W

6" FS

JT STUB

FDC

8" W

JT LINE

SSMH RIM 14.4 INV 11.8

SSMH RIM 16.2 INV 12.5

CB RIM 15.4 INV 9.7

8" SS 153 LF S=0.02

6" SS 33 LF S=0.01

8" SS 42 LF S=0.01

CB RIM 13.4 INV 10.8

12" SD 30 LF S=0.005

SDMH RIM 13.5 INV 10.6

12" SD 165 LF S=0.005

EX CB 199 TG 9.64 INV IN 7.54 (12") INV OUT 7.54 (18")

CB RIM 13.5 INV 11.5

18" RCP 340 LF S=0.15%

12" SD 107 LF S=0.005

12" SD 52 LF S=0.005

12" SD 25 LF S=0.005

12" SD 43 LF S=0.005

12" SD STUB INV 10.0

SDMH RIM 16.4 INV 9.5

SDMH RIM 16.5 INV 9.1

SDMH RIM 16.5 RIM 16.6 INV 8.9 INV 8.3

12" SD 81 LF S=0.005

12" SD 59 LF S=0.005

12" SD 25 LF S=0.005

CB RIM 15.5 INV 9.1

CB RIM 16.0 INV 9.1

12" SD 10 LF S=0.005

SDMH RIM 16.0 INV 8.9

6" W 6" FS

4" RW

12" SD 49 LF S=0.005

CB RIM 14.7 INV 10.5

SDMH RIM 14.3 INV 10.3

12" SD 25 LF S=0.005

CB RIM 14.7 INV 10.6

12" SD 4 LF S=0.005

12" SD STUB INV 10.7

12" SD 118 LF S=0.005

EX SSMH RIM 16.76 INV IN 8.46 (8" S) INV OUT 8.46 (8" N)

CB RIM 16.5 INV 11.7

6" SS STUB INV 8.9

12" SD 137 LF S=0.005

6" SS 30 LF S=0.01

CB RIM 15.6 INV 10.9

EX SSMH RIM 15.51 INV OUT 12.31 (8" S)

EX GAS

EX 12" RW

EX 10" W

12" SD 34 LF S=0.005

CB RIM 16.4 INV 12.0

8" SS 299 LF S=0.41%

EX 8" RW

CONNECT TO EX 10" W

EX SSMH RIM 17.74 INV 7.44 IN (6" W) INV 7.24 IN (8" S) INV 7.24 OUT (8" N)

6" SS 30 LF S=0.01

JT STUB 6" W 6" FS

6" SS STUB INV 8.7

8" SS 172 LF S=0.30%

12" SD STUB INV 10.9

12" SD 35 LF S=0.005

CB RIM 15.5 INV 8.1

CB RIM 15.6 INV 7.5

SSMH RIM 16.2 INV 12.3

SSMH RIM 16.5 INV 7.9

SSMH RIM 16.6 INV 7.3

18" SD 69 LF

18" SD 95 LF

18" SD 85 LF

12" SD 25 LF S=0.005

12" SD 38 LF S=0.005

8" SS 390 LF S=0.005

24" SD 182 LF S=0.005

24" SD 158 LF S=0.005

24" SD 45 LF S=0.005

24" SD 41 LF S=0.005

CONNECT TO CREEK INV 4.2

SDMH RIM 15.3 INV 4.4

8" SS 310 LF S=0.005

SDMH RIM 16.8 INV 6.6

SDMH RIM 16.8 INV 6.3

12" SD 8 LF S=0.005

6" SS 17 LF S=0.01

6" SS STUB INV 11.0

12" SD STUB INV 6.4

SDMH RIM 16.3 INV 6.8

FDC JT STUB 6" W 6" FS

CB RIM 17.1 INV 6.9

CB RIM 17.1 INV 6.3

SDMH RIM 16.8 INV 6.1

12" SD 136 LF S=0.005

12" SD 110 LF S=0.005

12" SD 25 LF S=0.005

EX DI

EX SSMH RIM 9.1

EX CB 10001 TG 10.71 INV IN 7.11 (18") INV OUT 7.10 (18")

CB RIM 14.5 INV 6.8

12" SD 81 LF S=0.005

SSMH RIM 16.0 INV 10.7

SDMH RIM 15.6 INV 5.3

18" RCP 363 LF S=0.23%

EX CB 10027 TG 11.21 INV IN 6.16 (18" S) INV OUT 6.06 (18" E)

EX 18" RCP 27 LF

EX SSMH RIM 17.93 INV 6.73 IN (8" S) INV 6.73 OUT (8" N)

EX DI

EX SSMH RIM 16.33 INV 5.71 IN (8" S) INV 5.71 IOUT (8" N)

CB 224 TG 15.92 INV OUT 12.94 (12")

EX 18" SS

2 WM

EX KEY NAD

12" 27 LF

CB 209 TG 16.12 INV OUT 13.04 (10")

SDMH 226 TG 16.27 INV 8.00

10" SS

CB TG 16.1 INV IN 7.9

GRAPHIC SCALE

40 0 40 80

DRAWING NAME: J:\Eng13\130002\Conceptual\Option B\C500-SWPRUT.dwg
PLOT DATE: 03-19-15
PLOTTED BY: baye

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SHERWIN WILLIAMS
CONCEPTUAL UTILITY PLAN
EXHIBIT E

CITY OF EMERYVILLE ALAMEDA COUNTY CALIFORNIA

No.	Revisions

Date	12/04/2014
Scale	1" = 40'
Design	RKB
Drawn	BPB
Approved	TRM
Job No	20130002

Drawing Number:

5 OF 5

Table 1A: Existing C Factor, DMA-1

Surface Type	C Factor	Area (Acres)	C*A (Acres)
Roof	0.90	0.58	0.52
Paving	0.90	2.23	2.01
Landscape	0.40	0.07	0.03
Total		2.88	2.56

Existing C Factor = CA/A = 0.89

Table 1B: Existing C Factor, DMA-2

Surface Type	C Factor	Area (Acres)	C*A (Acres)
Roof	0.90	0.00	0.00
Paving	0.90	7.13	6.42
Landscape	0.40	0.00	0.00
Total		7.13	6.42

Existing C Factor = CA/A = 0.90

Table 2A: Proposed C Factor, DMA-1

Surface Type	C Factor	Area (Acres)	C*A (Acres)
Roof	0.90	1.06	0.95
Paving	0.90	1.18	1.06
Landscape	0.40	1.04	0.42
Total		3.28	2.43

Existing C Factor = CA/A = 0.74

Table 2B: Proposed C Factor, DMA-2

Surface Type	C Factor	Area (Acres)	C*A (Acres)
Roof	0.90	3.18	2.86
Paving	0.90	2.15	1.94
Landscape	0.40	1.40	0.56
Total		6.73	5.36

Existing C Factor = CA/A = 0.80

ATTACHMENT A

NOAA Atlas 14, Volume 6, Version 2
Location name: Emeryville, California, US*
Latitude: 37.8320°, Longitude: -122.2919°
Elevation: 12ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**1.54** (1.37-1.74)	**1.94** (1.73-2.21)	**2.46** (2.18-2.81)	**2.89** (2.53-3.32)	**3.46** (2.92-4.14)	**3.90** (3.20-4.79)	**4.33** (3.46-5.48)	**4.79** (3.70-6.26)	**5.40** (3.97-7.42)	**5.87** (4.14-8.39)
10-min	**1.10** (0.984-1.25)	**1.39** (1.24-1.58)	**1.76** (1.57-2.01)	**2.07** (1.82-2.38)	**2.48** (2.09-2.97)	**2.79** (2.29-3.43)	**3.11** (2.48-3.93)	**3.43** (2.65-4.49)	**3.87** (2.84-5.32)	**4.20** (2.96-6.01)
15-min	**0.888** (0.792-1.01)	**1.12** (1.00-1.27)	**1.42** (1.26-1.62)	**1.67** (1.46-1.92)	**2.00** (1.68-2.39)	**2.25** (1.85-2.76)	**2.50** (2.00-3.17)	**2.77** (2.14-3.62)	**3.12** (2.29-4.28)	**3.39** (2.39-4.85)
30-min	**0.612** (0.546-0.694)	**0.772** (0.688-0.876)	**0.980** (0.870-1.12)	**1.15** (1.01-1.32)	**1.38** (1.16-1.65)	**1.55** (1.27-1.90)	**1.72** (1.38-2.18)	**1.90** (1.47-2.49)	**2.15** (1.58-2.95)	**2.33** (1.65-3.34)
60-min	**0.433** (0.386-0.491)	**0.546** (0.486-0.620)	**0.693** (0.615-0.790)	**0.812** (0.713-0.934)	**0.973** (0.821-1.17)	**1.10** (0.901-1.35)	**1.22** (0.974-1.54)	**1.35** (1.04-1.76)	**1.52** (1.12-2.09)	**1.65** (1.17-2.36)
2-hr	**0.314** (0.280-0.356)	**0.395** (0.352-0.448)	**0.500** (0.443-0.568)	**0.584** (0.513-0.672)	**0.699** (0.590-0.837)	**0.786** (0.647-0.966)	**0.876** (0.700-1.11)	**0.968** (0.747-1.27)	**1.09** (0.802-1.50)	**1.19** (0.838-1.70)
3-hr	**0.262** (0.234-0.297)	**0.329** (0.293-0.374)	**0.417** (0.370-0.475)	**0.488** (0.428-0.560)	**0.583** (0.492-0.699)	**0.657** (0.540-0.807)	**0.732** (0.585-0.926)	**0.809** (0.625-1.06)	**0.914** (0.672-1.26)	**0.995** (0.702-1.42)
6-hr	**0.186** (0.166-0.211)	**0.234** (0.209-0.266)	**0.298** (0.264-0.339)	**0.349** (0.306-0.401)	**0.419** (0.353-0.502)	**0.473** (0.389-0.580)	**0.527** (0.421-0.667)	**0.584** (0.451-0.764)	**0.661** (0.486-0.908)	**0.721** (0.509-1.03)
12-hr	**0.121** (0.107-0.137)	**0.154** (0.137-0.175)	**0.198** (0.176-0.226)	**0.234** (0.205-0.269)	**0.283** (0.238-0.338)	**0.320** (0.263-0.393)	**0.358** (0.286-0.453)	**0.398** (0.307-0.521)	**0.452** (0.332-0.622)	**0.495** (0.349-0.708)
24-hr	**0.079** (0.072-0.090)	**0.103** (0.093-0.117)	**0.134** (0.120-0.152)	**0.159** (0.141-0.182)	**0.193** (0.167-0.227)	**0.219** (0.186-0.263)	**0.246** (0.205-0.302)	**0.274** (0.222-0.345)	**0.312** (0.244-0.408)	**0.342** (0.259-0.461)
2-day	**0.051** (0.046-0.057)	**0.065** (0.059-0.074)	**0.085** (0.076-0.096)	**0.100** (0.090-0.115)	**0.122** (0.106-0.144)	**0.138** (0.118-0.166)	**0.155** (0.129-0.191)	**0.173** (0.140-0.217)	**0.196** (0.154-0.257)	**0.215** (0.163-0.290)
3-day	**0.039** (0.035-0.044)	**0.050** (0.045-0.056)	**0.064** (0.058-0.073)	**0.076** (0.068-0.087)	**0.092** (0.079-0.108)	**0.104** (0.088-0.125)	**0.117** (0.097-0.143)	**0.130** (0.105-0.163)	**0.147** (0.115-0.192)	**0.161** (0.122-0.217)
4-day	**0.032** (0.029-0.036)	**0.041** (0.037-0.047)	**0.053** (0.047-0.060)	**0.062** (0.056-0.071)	**0.076** (0.065-0.089)	**0.086** (0.073-0.103)	**0.096** (0.080-0.118)	**0.106** (0.086-0.134)	**0.121** (0.094-0.158)	**0.132** (0.100-0.178)
7-day	**0.023** (0.020-0.026)	**0.029** (0.026-0.033)	**0.037** (0.033-0.042)	**0.044** (0.039-0.050)	**0.053** (0.046-0.062)	**0.060** (0.051-0.072)	**0.067** (0.055-0.082)	**0.074** (0.060-0.093)	**0.083** (0.065-0.109)	**0.091** (0.069-0.122)
10-day	**0.018** (0.016-0.020)	**0.023** (0.021-0.026)	**0.030** (0.027-0.034)	**0.035** (0.031-0.040)	**0.042** (0.036-0.049)	**0.047** (0.040-0.057)	**0.053** (0.044-0.065)	**0.058** (0.047-0.073)	**0.065** (0.051-0.086)	**0.071** (0.054-0.096)
20-day	**0.012** (0.011-0.013)	**0.015** (0.014-0.017)	**0.020** (0.018-0.022)	**0.023** (0.021-0.026)	**0.028** (0.024-0.033)	**0.031** (0.026-0.037)	**0.034** (0.029-0.042)	**0.038** (0.031-0.047)	**0.042** (0.033-0.055)	**0.045** (0.034-0.061)
30-day	**0.010** (0.009-0.011)	**0.013** (0.011-0.014)	**0.016** (0.014-0.018)	**0.019** (0.017-0.022)	**0.022** (0.019-0.026)	**0.025** (0.021-0.030)	**0.028** (0.023-0.034)	**0.030** (0.024-0.038)	**0.033** (0.026-0.044)	**0.036** (0.027-0.048)
45-day	**0.008** (0.007-0.009)	**0.010** (0.009-0.012)	**0.013** (0.012-0.015)	**0.015** (0.014-0.017)	**0.018** (0.016-0.021)	**0.020** (0.017-0.024)	**0.022** (0.018-0.027)	**0.024** (0.019-0.030)	**0.026** (0.020-0.034)	**0.028** (0.021-0.038)
60-day	**0.007** (0.006-0.008)	**0.009** (0.008-0.010)	**0.011** (0.010-0.013)	**0.013** (0.012-0.015)	**0.016** (0.014-0.018)	**0.017** (0.015-0.021)	**0.019** (0.016-0.023)	**0.021** (0.017-0.026)	**0.023** (0.018-0.029)	**0.024** (0.018-0.032)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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PF graphical

Numerical Modeling of Tsunami Effects at Marine Oil Terminals in San Francisco Bay

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Executive Summary

Tsunami-induced wave heights and current velocities are investigated at Marine Oil Terminal (MOT) sites in San Francisco Bay. Marine Oil Terminals are locations where tank vessels (tankers) load and offload petroleum products to or from facilities on land for refining or distribution. We conducted a deterministic study to identify the most severe events that could reasonably impact the Marine Oil Terminal sites.

During historic times, 51 credible tsunamis have been recorded or observed in the San Francisco Bay region. Of these, only 5 produced runup that likely exceeded 0.5 m (1.6 ft) within the Bay. The best-documented tsunami events are the 1946, 1960 and 1964 tsunamis generated by distant earthquakes in Aleutian Islands, Southern Chile and Prince William Sound, Alaska respectively. In addition, three local tsunamis in the 19th century may also have generated waves in excess of 0.5 m (1.6 ft), however none were recorded on tide gages and the height is estimated from eyewitness accounts only.

We selected a suite of sources with the potential to impact San Francisco Bay based on historic events, Pacific basin tectonics, and regional seismicity to initialize our numerical simulations. Both near- and far-field sources were considered; far-field sources included large magnitude subduction zone earthquakes around the Pacific Rim while near-field sources are faults, step-over structures and potential landslide sources just offshore of the San Francisco Bay entrance and within the Bay itself.

We used the numerical model MOST (Titov and Gonzales, 1997; Titov and Synolakis, 1998) to simulate tsunami generation, propagation and runup. MOST uses an elastic deformation model to initialize the computation then solves the 2 dimensional shallow water wave equations to propagate the disturbance across an ocean basin. The robustness of the MOST model for San Francisco Bay is demonstrated through replication of recorded marigrams for the 1960 and 1964 tsunamis.

Twenty-three scenarios were modeled, ranging from a landslide in the Farallon Islands to a magnitude 6.6 earthquake in San Pablo Bay (the northern arm of San Francisco Bay) and magnitude 9+ earthquakes on subduction zones around the Pacific Rim. The model results allow an estimation of the maximum credible tsunami water heights at the MOT sites and a sensitivity study of sources likely to produce the greatest impacts.

Results suggest that large ruptures along the Alaska Peninsula and eastern segments of the Alaska-Aleutian subduction zone present a much greater hazard than any other source region either locally or in the Pacific. The greatest hazard is for terminals in the Richmond area caused by very large (M_w > 9) earthquakes on these segments of the Alaska-Aleutian subduction zone. Direct output from our modeling suggests these earthquakes could produce positive waves of over 5 m (16.4 ft) at the entrance to San Francisco Bay and 1.6 m (4.88 ft) at MOTs in Richmond, CA. A maximum drawdown (negative wave) of -3.74 m (-12.27 ft) and -1.6 m (-5.88 ft) would also be expected at these sites. Associated maximum current speeds at select locations would be on the order of 2 – 5 m/s (3.9 – 9.7 knots).

The results also suggest that the Cascadia subduction zone along the Pacific Northwest coast of Northern California to Southern British Columbia presents only a moderate tsunami hazard for locations within San Francisco Bay. The largest local event is produced by the step-over rupture of the Hayward fault to the Rogers Creek fault beneath San Pablo Bay, but it is significantly smaller than tsunamis generated by large events on the Alaska-Aleutian subduction zone. A large landslide on the Farallon Islands offshore of San Francisco Bay only produces peak water heights within the Bay of about 20 cm (.7 ft).

Based on our modeling results and a conservative factor of safety, we estimate maximum credible tsunami amplitudes at MOT locations in the Richmond area of 2.4 m (7.9 ft) and a current velocity of 2.7 m/sec (5.2 knots), in the western Carquinez Straits of 0.8 m (5.9 ft) and a current velocity of 0.6 m/sec (1.2 knots) and in the Portrero District of San Francisco of 1.8 m and 1.5 m/sec (2.9 knots). All of these values are significantly below the estimates of Garcia and Houston (1975).

1. INTRODUCTION

San Francisco Bay (Figure 1) is located on the west coast of North America. It is a mostly enclosed body of water with a narrow opening (the Golden Gate) to the North Pacific Ocean at approximately 37.8˚ N and 122.5˚ W (237.5˚ E). The Bay is fed mainly by river flows from the Sacramento, San Joaquin and Napa Rivers as well as many other minor streams. San Francisco Bay and its northern arm, San Pablo Bay, cover some 4100 square kilometers. The Bay is located within the San Andreas transform fault system, part of the boundary between the Pacific and North American tectonic plates. The majority of the slip on this plate boundary is accommodated by the San Andreas Fault, however part of the relative plate motions are taken up by several other smaller faults. Three earthquakes of likely magnitude 7 or larger and numerous smaller events have occurred in the Bay region in historic times.

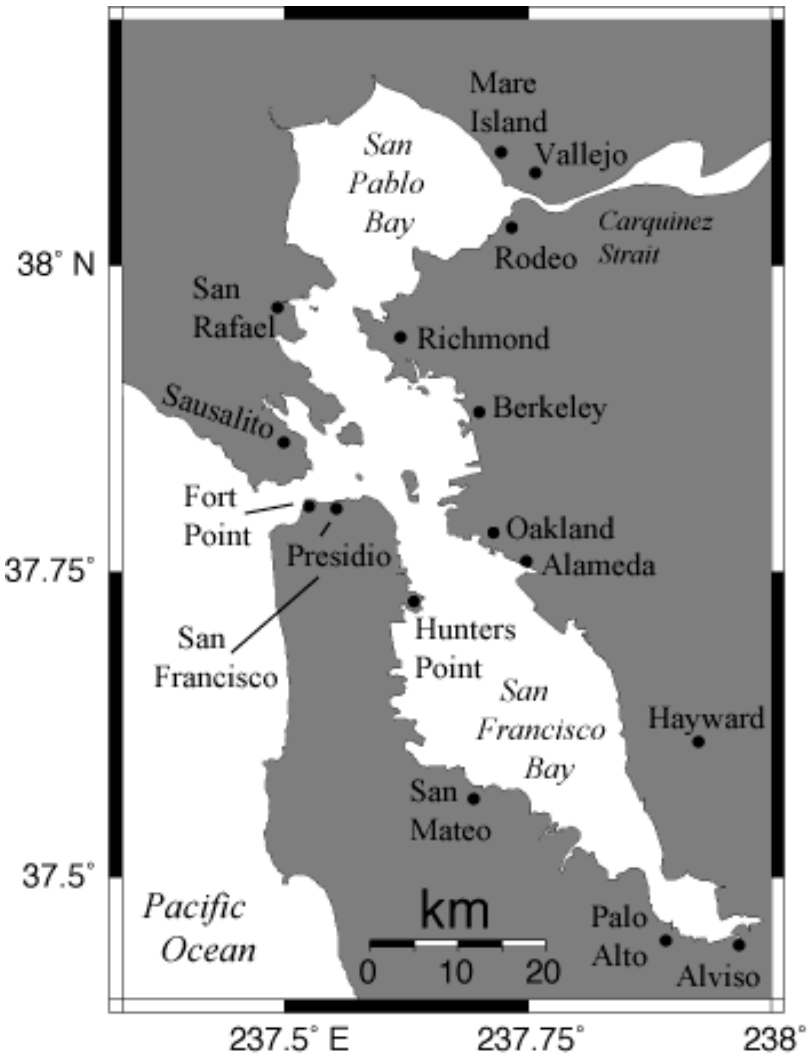


Figure 1 – San Francisco Bay area.

The San Francisco Bay area is home to approximately 6.8 million people, most of who live on coastal lands (USGS, 2002). San Francisco Bay is heavily industrialized and includes major port facilities in Oakland and San Francisco and fifteen marine oil terminals (MOTs) where petroleum products are transferred between ships and refineries on shore (California Building Code, 2001). The marine oil terminals are generally located on the eastern shore of the Bay near the cities of Oakland, Richmond and Vallejo. The list of terminals is given in Table 4 and their locations shown on Figure 3 and 10.

The bathymetry of San Francisco Bay is shown in Figure 2. Much of San Pablo Bay and the southern section of San Francisco Bay are quite shallow with depths generally less than 20 m (66 ft). In the central section of the Bay and near the Golden Gate, there is more bathymetric relief. The deepest part of the Bay is beneath the Golden Gate with depths of over 100 m (328 ft). The shallow bathymetry is a factor in the tsunami wave dynamics within the bay, as it attenuates tsunami waves that propagate through the bay.

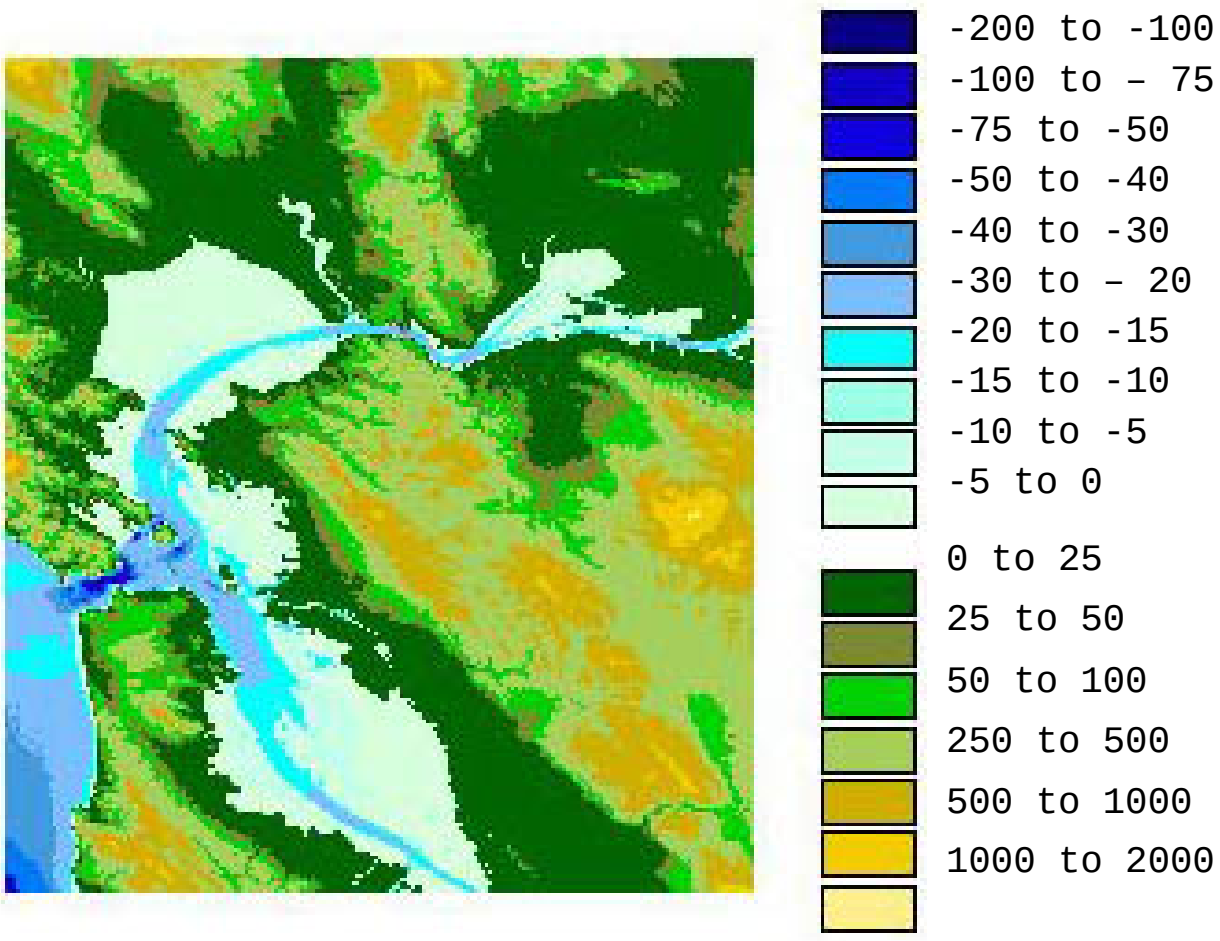


Figure 2 – Bathymetry and topography of San Francisco Bay. Colors represent the depth/elevation (in meters) for the intervals shown on the right.

2. SAN FRANCISCO BAY TSUNAMI HISTORY

During historic times, 51 credible tsunamis have been recorded or observed within the San Francisco Bay area (Table 1, Figure 3, also see Appendix 3).

Table 1 - Source Regions of Historic San Francisco Bay Tsunamis

Region	Number
SF Bay	6
Other California	2
Japan	9
Kurils and Kamchatka	7
Alaska and Aleutians	9
Hawaii	2
South America	10
SW Pacific	3
Central America	1
Unknown teletsunami	2
TOTAL	51

From Lander et al., 1993 and the NGDC

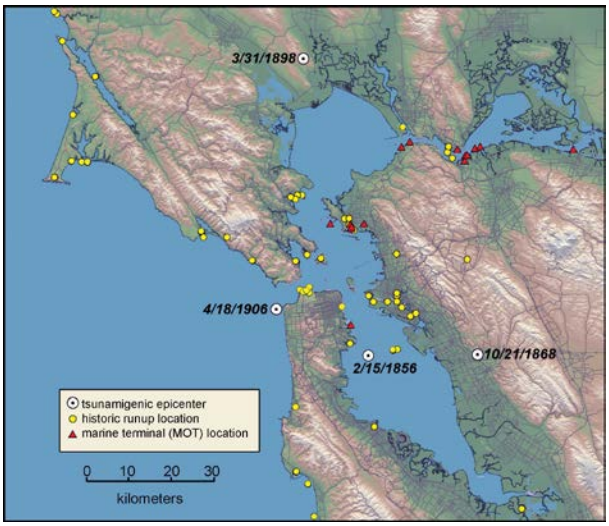


Figure 3 – Historic tsunami runup sites (yellow dots), tsunamigenic epicenters (white dots) and Marine Oil Terminal (MOT) locations.

Only 5 historic tsunamis produced runup that likely exceed 0.5 m (1.6 ft) within the San Francisco Bay (Appendix 3). The best-documented tsunami events are the 1946, 1960 and 1964 teletsunamis generated by earthquakes in the Aleutian Islands, Southern Chile and Prince William Sound, Alaska respectively. In addition, three local tsunamis in the nineteenth century may also have generated waves in excess of 0.5 m (1.6 ft), however none were recorded on tide gages and the height is estimated from eyewitness accounts only.

San Francisco Bay has had a tide gauge in place since 1854. The gauge has operated at three different sites, and the precise location has not always been clear. It was first installed at Fort Point for the years between 1854 and 1877, and then moved to Sausalito from 1877 through 1897. In 1897 the gauge was moved to its present location at the Presidio (Bromirski et al., 2000). Although the gauge has been in continuous operation since then, some of the records have been lost or events were not recorded due to instrumental problems or severe weather conditions. Other stations have operated on an interim basis including Hunters Point, Alameda, Oakland and Mare Island (see Figure 1). An array of temporary instruments was deployed after the 1960 Chilean earthquake including 33 instruments in the Bay and inland along the San Joaquin and Sacramento Rivers (Magoon, 1962).

2.1 HISTORICAL TELETSUNAMIS

Forty-three of the 51 historic tsunamis recorded or observed in San Francisco Bay come from teletsunami sources of at least 4 hours travel time (Table 1). The most common

source area is the northwestern Pacific (Japan and the Kamchatka-Kuril Trench), followed by South America and Alaska/Aleutian Islands as shown in Table 1. Of these, only two events caused damage in San Francisco Bay, tsunamis generated by the 1960 M_w 9.5 Chile earthquake and the 1964 M_w 9.2 Alaska earthquake.

2.1.1 The 1960 Chilean tsunami in San Francisco Bay

On May 22, 1960 a large earthquake in southern Chile generated a tsunami with runup in the immediate source area reaching at least 25 m (82 ft) (Instituto Hidrografico de la Armada, 1982) and causing over 1200 deaths. The tsunami crossed the Pacific and caused damage throughout the Pacific basin and additional casualties in Hawaii and Japan. The wave caused over $1 million in damage in Los Angeles and Long Beach harbors as well as a 3.9 m (13 ft) rise in sea level and associated runup in Crescent City (NGDC).

The tsunami waves from this event began arriving in San Francisco Bay on the morning of May 23rd, approximately 15 hours after the earthquake. The tsunami was recorded on the tide gauges at the Presidio and Alameda as well as on a 33-gauge array of water level recorders present in San Francisco Bay during the tsunami event (Magoon, 1962). The waves were observed on 6 of the 33 gauges and the maximum recorded wave heights are shown in Table 2.

Location	Max. wave height (m)
Presidio	0.88
Hunters Point	0.12
Alameda	0.58
Oakland	0.37
Carquinez Strait	0.03
Benicia	0.06

Table 2 - 1960 recorded wave heights from Magoon (1962)

Figure 4 shows the tide gauge recordings from the Presidio and Alameda. The tidal signal has been removed from these records; the original unfiltered records are shown in Appendix 6. The plots illustrate a feature of many recorded tsunamis within the bay. The initial cycle is relatively long period (72 minutes) followed by shorter period oscillations (about 30 minutes) and lasts more than 12 hours. The fundamental free period for oscillations in the bay is 114 min, the second harmonic is about 57 minutes and the third harmonic is 38 minutes (Wilson and Torum, 1967). Wilson and Torum speculate that the long duration short period oscillations are the result of near-resonance with the third harmonic that develops as a result of entrance constriction at the Golden Gate. The marigrams also illustrate the attenuation of wave energy as the waves transit the bay. The amplitude of the Alameda signal is about half the strength of the Presidio site. It should be emphasized that the largest waves recorded on the time series occurred some 4 to 8 hours after the first wave arrival. The only reported damage in the bay was a

catamaran yacht torn from its moorings in a lagoon north of the Golden Gate (Magoon, 1962). The San Francisco Ferry Service was disrupted by a current "running like the Mississippi River" (Lander et al., 1993).

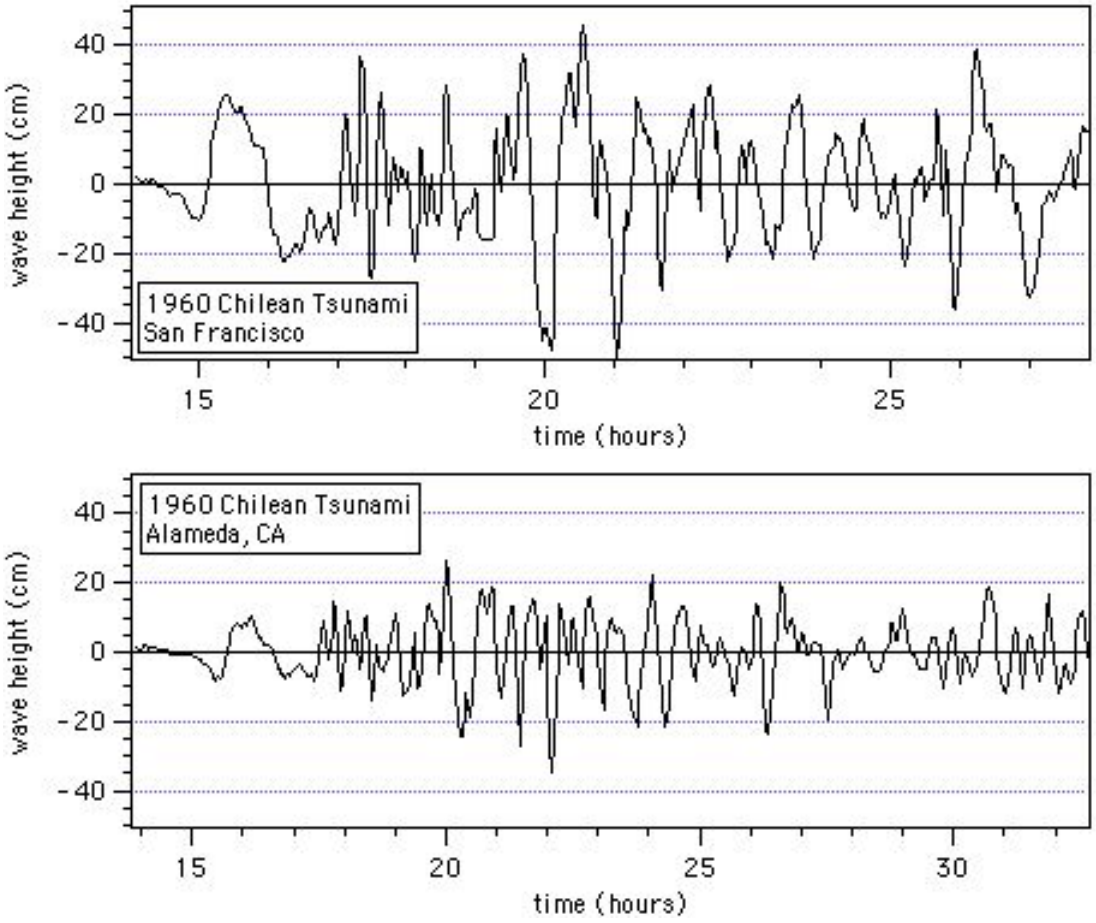


Figure 4 – Filtered tide gauge records (tide signal removed) from the first twelve hours of the 1960 Chilean tsunami at The Presidio (upper panel) and Alameda (lower panel). The time is in hours after the earthquake.

2.1.2 The 1964 Alaskan tsunami in San Francisco Bay

On March 28, 1964 a magnitude (M_w) 9.2 earthquake struck the Prince William Sound area of Alaska. The earthquake generated a tsunami that caused tsunami runup in excess of 60 m (197 ft) in Alaska. The tsunami waves strongly affected the California coast and caused significant damage to Crescent City as well as damage and flooding in San Francisco Bay. There were 12 fatalities in California, including 11 in Crescent City. Lander et al. (1993) report wave heights up to 2.1 m (7 ft) affecting areas inside San Francisco Bay. The strongest effects were observed in the northeastern parts of the bay, particularly in Sausalito and other Marin County locations on the Bay. Strong surges and high water were also observed in Berkeley, Richmond and Oakland. Damage included boats being torn from moorings, damaged docks and piers as well as floating docks, which came loose and were carried away from their original locations. Damage estimates

ranged up to $17 million statewide including $1 million in the San Francisco Bay area (Lander et al., 1993).

The tsunami was noted at 27 sites within the bay (Appendix 5) and caused damage to boats and floating structures (Magoon, 1966). There were numerous reports of strong currents within the bay. The largest amplitude waves were at the Presidio where the second oscillation had a 2.3 m (7.5 ft) peak to trough amplitude. Had the largest waves coincided with high tide, the absolute water level could have reached 3.8 m (12.5 ft) above sea level at the Presidio. Tide gauge records from the 1964 event at the Presidio and Alameda are shown in Figure 5. Spectral analysis by Wilson and Torum (1967) of the 1964 Presidio marigram identified 2 dominant periods in addition to the tidal forcing, a 100-minute period and a 38.5-minute period. They attribute the shorter period to resonance with the third harmonic of the bay oscillation and conclude that the geometry of the bay entrance will excite this period for any large tsunami entering through the Golden Gate.

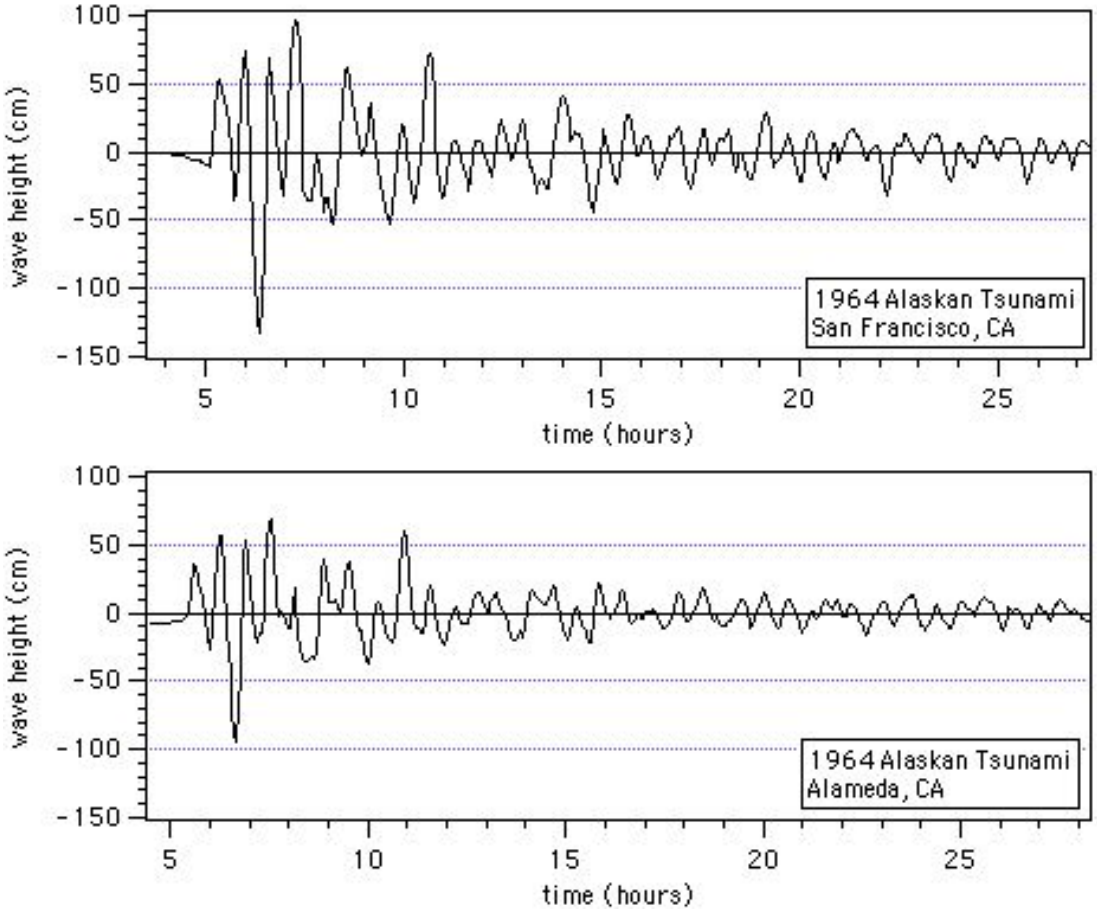


Figure 5 – Filtered tidal gauge records (tide signal removed) from the 1964 tsunami recorded at The Presidio (upper panel), and Alameda (lower panel). The time coordinate is in hours after the earthquake.

Magoon (1966) compiled runup data from both the 1960 and 1964 tsunamis within the bay and developed an empirical attenuation model (Figure 6). According to his data, the tsunami wave height was reduced by 50% between the Presidio, just inside the Golden Gate, and at Hunter's Point on the San Francisco Peninsula and Richmond or Oakland on the eastern shore of the Bay. The wave height was further reduced to 10% of its original height by the time it reached the northwestern shore of San Pablo Bay and the southern end of San Francisco Bay.

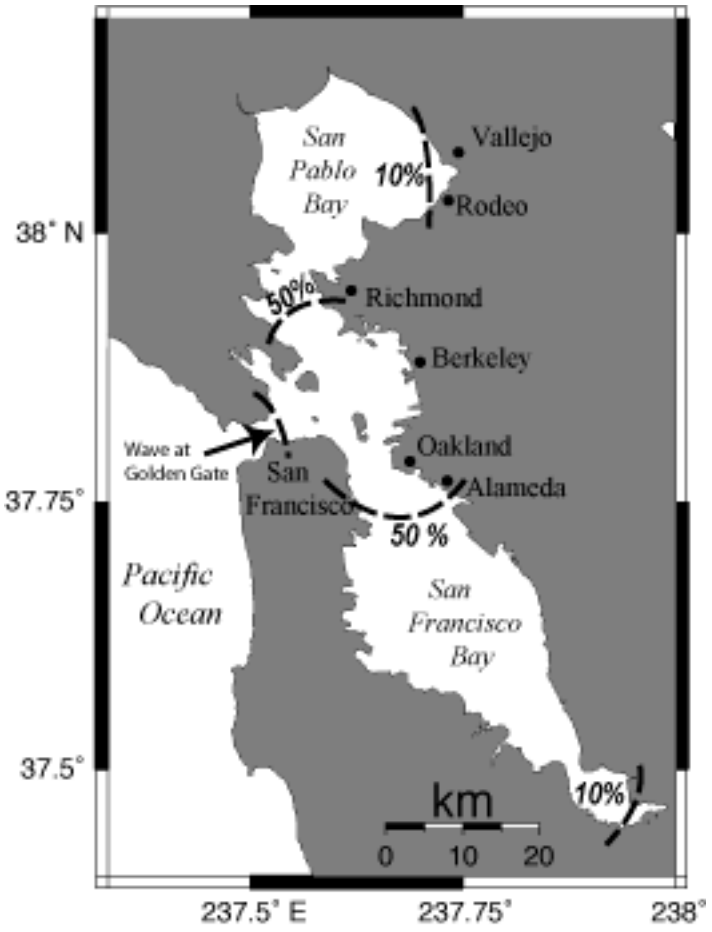


Figure 6 – Teletsunami attenuation model for San Francisco Bay based on observations from the 1960 (Chile) and 1964 (Alaska) tsunamis. (Magoon, 1966).

2.2 HISTORICAL LOCAL TSUNAMIS

Six credible local-source tsunamis and several possible tsunamis are documented for the San Francisco area. Two additional tsunamis were recorded from other source regions in northern California (Table 3). Of the 6 credible local source events, 4 were probably caused by earthquakes and 2 by earthquake-triggered landslides. One event in 1887 was associated with no known earthquake and, if real, may represent slumping within the bay. Perhaps the most notable aspect of historic local-source tsunamis is that they all occurred in the 19th and early 20th century. Toppozada (personal communication) suggests that the

high frequency of local events in the late 1800's reflects the overall activity of the San Andreas system prior to the 1906 San Francisco earthquake.

Table 3 - Local and regional San Francisco tsunamis

Year Month/ day	Source area	V*	C**	Location of Effects	Runup (m)	Comments
1851 11/13	N. California San Francisco	1	E	San Francisco Bay	Observed	Unusual water movement felt on ship. Possible seiche.
1852 11/25	N. California San Francisco	1	E	San Francisco	Observed	Lake Merced drained.
1854 10/22	N. California San Francisco	2-3	E	San Francisco	Observed	Vessels swayed. Water rose 0.6 m with high waves in calm weather near Angel Island.
1856 2/15	N. California San Francisco	3	L	San Francisco	0.6	Water rose and stayed high for 5 minutes. Followed M 5.9 quake.
1868 10/21	N. California Hayward fault 7.0 earthquake	1 1 3	L	Government Isl. Sacramento San Francisco	Observed Observed 4.5	Registered on tide gauge. 0.61 m wave observed. 6.0 m surge at Cliff House.
1869 2/10	N. California San Francisco	1	M	San Francisco	Observed	Earthquake recorded on tide gage?
1869 6/1	N. California	3	E?	San Francisco	Observed	Earthquake waves Recorded
1887 7/8	N. California	2	L?	Sausalito	Observed	Distinct waves. No source known.
1898 3/31[3]	N. California 6.7 EQ Rogers Cr. fault	3	E	San Francisco Bay	0.6	Earthquake on the Rogers Creek fault. Tossed boats in the bay.
1906 4/18	N. California	4	E	San Francisco	0.1	Recorded.
1927 11/4	*C. California EQ off Pt. Arguello*	*4*	*E*	*San Francisco*	*<0.1*	*Recorded*
1992 4/25	*N. California M 7.1 Cape Mendocino EQ*	*4*	*E*	*Alameda* *San Francisco*	*<0.1* *<0.1*	*Recorded* *"*

[1] V - Validity: (Soloviev and Go, 1974; and Cox and Morgan, 1977)
1 = Probably not a valid report
2 = Possibly a valid report
3 = Probably a valid report
4 = Certainly a valid report

[2] C – Cause of tsunami:
L = Landslide
M = Meteorological
E = Earthquake

[3] Toppozada et al. 1992

2.2.1 1868 Hayward fault earthquake

The 1868 Hayward Fault earthquake reportedly caused a 6 m (19.7 ft) surge of water at the Cliff House on the NW side of San Francisco, outside the Bay (Lander, 1993). This was attributed to an earthquake-triggered landslide. The accounts of the 1868 event are confusing. A number of vessels reported feeling the earthquake shock but only a few

reported any wave or current activity. Waves were reportedly recorded on a tide gage at Government Island (near Alameda) but the record has been lost. It is unlikely that the 1868 event generated a significant tsunami within the Bay.

2.2.2 1898 Mare Island earthquake

The 1898 Mare Island earthquake produced the largest credible local tsunami wave heights within San Francisco Bay. The 1898 Mare Island earthquake is believed centered on the southern end of the Rogers Creek fault (Toppozada et al., 1992). The Rogers Creek fault is probably the right-stepping continuation of the Hayward fault (Parsons et al., 2003). In a right-lateral strike-slip environment, a right step produces an area of localized extension (Figure 7). Under this model, it is not purely coincidence that the deepest part of San Pablo Bay would be centered over the step-over, since repeated movement on the two faults would cause subsidence in that area.

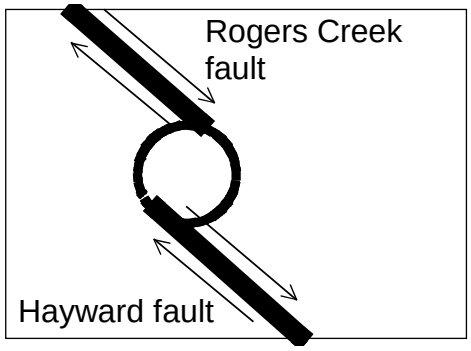


Figure 7 - Right step-over in a right lateral fault system creates a releasing bend and an area of extension and subsidence (dashed circle).

The 1898 Mare Island earthquake produced a tsunami estimated at .6 m (2 ft) at an unspecified location in the Bay (Toppozada et al., 1992). The accounts below (Lander et al., 1993) are typical of the reports:

> "…The waters of San Francisco Bay rose in a tidal wave two feet high, but almost immediately subsided." *The Record Union*

> "The water off the Oakland mole (breakwater) was churned into big seas, and the yachts were severely tossed about for several minutes. Large waves beat against the rocking ferry houses but did no damage." *The San Francisco Call*

Parsons and others (2003) examine the step-over zone between the Rogers Creek and Hayward faults in detail and include numerical modeling of a step-over-induced tsunami that is discussed in section 3 below. They report that historic hydrographic surveys before and after the earthquake suggest subsidence occurred in the step-over region, possibly related to the earthquake.

2.2.3 1906 San Francisco earthquake

A small tsunami was recorded at the Fort Point tide gauge after the April 18, 1906 San Francisco Earthquake. The tsunami was recorded as a 10 cm (4 inch) fall in sea level that began 7 to 10 minutes after the earthquake and lasted approximately 15 minutes. Following this water motion, there was no significant positive wave, but rather a series of two or three more withdrawals with a period of approximately 45 minutes and amplitude

of 5 cm (2 inch) (Lander et al., 1993; Geist and Zoback, 1999). Numerical modeling of the 1906 tsunami by Geist and Zoback (1999), suggest that the tsunami was generated by coseismic subsidence just offshore as the San Andreas fault crosses a short right step offshore of San Francisco.

3. PRIOR RESEARCH ON SAN FRANCISCO BAY TSUNAMIS

Several previous studies have looked at inundation, tsunami heights and estimated recurrence for San Francisco Bay. Ritter and Dupre (1972) mapped areas of potential tsunami inundation within the Bay (Figure 8). They assumed only teletsunami sources and used a water height of 20 feet (6.1 m) at the Golden Gate. This value was chosen because it was the approximate value of peak inundation at Crescent city in 1964. They used Magoon's (1966) attenuation relation to estimate heights of possible flooding throughout the bay. For example, the peak amplitude at Oakland is 3 m (10 ft), at Mare Island 0.6 m (2 ft). They extrapolated Wiegel's (1970) frequency of occurrence graph for San Francisco Bay (Figure 9) to estimate that the mapped inundation (Figure 8) represented a 200-year event. We note that Wiegel's graph is based primarily on five events (1946, 1952, 1957, 1960, 1964) and the slope extrapolated by Ritter and Dupre has been chosen to parallel the Crescent City recurrence graph with no justification.

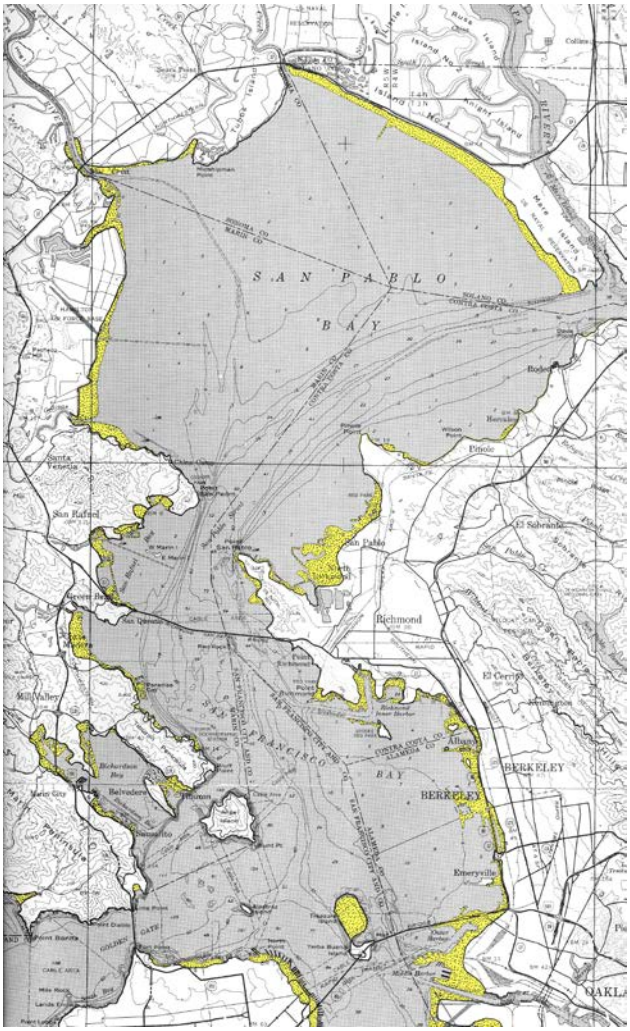


Figure 8 – Areas of potential tsunami inundation (yellow) by a 20 foot tsunami at the Golden Gate (after Ritter and Dupre, 1972).

Garcia and Houston (1975) made 100 and 500-year tsunami predictions for San Francisco Bay for the Federal Insurance Administration as input for a flood insurance study and report. They considered the probabilities of teletsunami sources from Alaska and the Aleutian trench alone, assuming that the 100-year and 500-year events are not strongly affected by events from other regions of the Pacific. They did not address the possibility of locally generated tsunamis. Using a numerical model, they predicted the height of these tsunami waves along the coast of North America as well as inside San Francisco Bay.

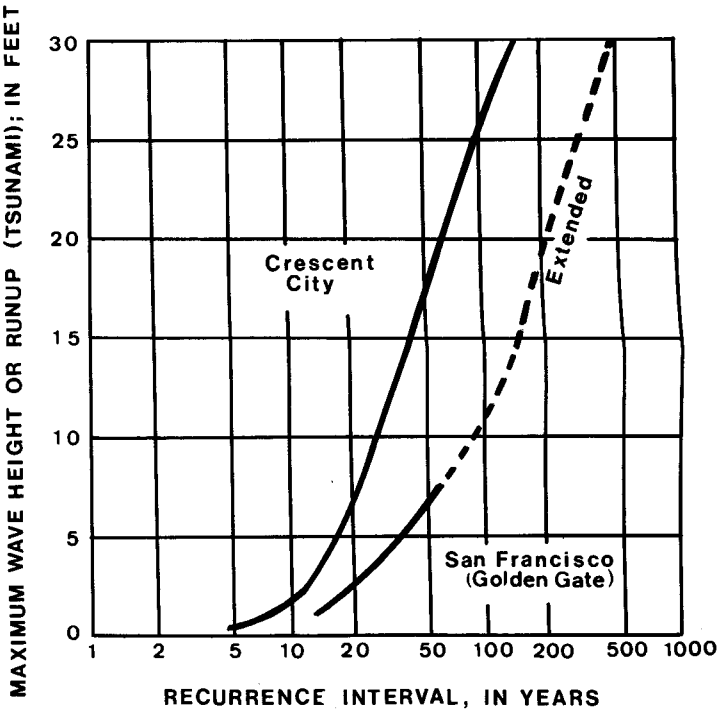


Figure 9 – Frequency of occurrence for maximum tsunami waves at the Presidio in San Francisco based on Wiegel, 1970 and extrapolated by Ritter and Dupre, 1972,

We note that both Garcia and Houston's (1975) 100-year and 500-year values do not mimic the attenuation relation showed by Magoon (1966). Their recurrence estimate for Alaska and Aleutian events was based only on historic events. The mid-20th century may be anomalous for large Alaska tsunamigenic events and these recurrence relationships need to be re-evaluated using the paleoseismic data now available. The restriction of sources to Alaska and the Aleutians also needs to be re-examined particularly in light of the Cascadia Subduction Zone (CSZ) megathrust that is believed to have an approximate 500 year return period and is capable of producing tsunami amplitudes in the source area comparable to 1964 Alaska or 2004 Sumatra. It should also be noted that the Houston and Garcia modeling, while ground breaking at the time, is very crude when compared to the level of sophistication available in modern numerical codes. Houston and Garcia computed tsunami wave amplitudes outside of San Francisco Bay, and then performed their calculations inside the Bay using a forced wave input with the precomputed amplitude and a set period of 38 minutes, a value based on observations after the 1964 Alaskan event. Our method (Section 4) differs in that we consider a wider variety of input sources from subduction zones around the Pacific and we directly compute the tsunami wave effects from source to the study area using the same model.

Eric Geist performed hydrodynamic modeling to examine the tsunamigenic potential of the Hayward – Rogers Creek step-over ((Parsons et al., 2003). Subsidence in the step-over region was modeled as by 0.35 m (1.2 ft) of slip on a high angle 18 km (11.3 miles) wide normal fault. The maximum wave height produced by this model was 0.1 m (.3 ft), well below the reported ~0.6 m (2 ft) height in Bay by the Union Record. It is possible

that the reported 1998 water heights are inaccurate as the event occurred at night and storm activity obscured any recording on the Presidio marigram (Lander, 1993). Geist used a uniform slip distribution and suggests that heterogeneous slip might locally amplify the peak water heights. Geist and Zoback (1999) used a similar method to model the 1906 tsunami as a right step-over offshore of the Golden Gate.

4. NUMERICAL METHOD AND MODEL

Numerical modeling of tsunamis is composed of three parts; generation, propagation and runup. The generation phase involves modeling a geophysical source such as a landslide, earthquake or volcanic eruption into an initial water surface displacement and associated velocity field. The next phase of the problem solves the equations of motion to propagate the initial condition from the source region across the computational domain. Finally the runup phase considers the interaction of the wave front with the shoreline and the propagation over dry land.

For this study we used the numerical model MOST (**M**ethod **O**f **S**plitting **T**sunami), to simulate each of the three processes in the tsunami modeling problem. For wave generation in the fault scenarios, the initial disturbance is assumed to be of tectonic origin. MOST uses a version of Okada's (1985) model for surface deformations due to a fault rupture below the surface of the earth. The resulting deformation on the sea floor is translated directly to the water surface and imposed as an initial condition to the wave propagation part of the process. For wave propagation, MOST solves the 2+1 (two horizontal spatial dimensions plus time) dimension non-linear shallow water wave equations. At the shoreline, MOST employs a moving shoreline algorithm to move the wave front across dry land (Titov and Synolakis, 1998). The MOST code has been extensively tested and validated against laboratory and field data and has been shown to be accurate and reliable across a wide range of spatial dimensions (Titov and Gonzales, 1997). The MOST model is currently in use at NOAA's Pacific Marine Environmental Laboratory as the primary tool for creating tsunami forecasting and hazard assessment tools and in the State of California for producing inundation and evacuation maps.

In addition to faults, one scenario (Farallon Islands) examined the tsunami hazard caused by a submarine landslide. All slides possess the same two basic features: a rupture surface (failure plane) and a displaced mass of material. The displaced material is moved through the acceleration of gravity along the failure plane. A slide that either hits the water from land above (subaerial) or a completely submerged slide can cause a tsunami by displacement of the water volume it moves through. The size of a slump-generated tsunami is related to the volume of displaced material, slip velocity, displacement distance, slope angle and coherence of the slide block. The sliding mass paradigm for modeling submarine landslides is based on the classic work of Wiegel (1955) modified by more recent studies (Raichlin and Synolakis, 2003). We used the same landslide characteristics used in recent studies of the tsunami hazard in the Palos Verdes, CA area (Borrero, 2002). For the initial wave, we assumed a total amplitude of 10 m using an asymmetric dipole shape with 7 m of drawdown and 3 m positive wave and 4 km of mass

displacement. These same conditions produced an initial wave around 8 – 12 m (26 – 39 ft) in Palos Verdes (Bohannon and Gardner, 2004), which is located in shallower water.

4.1 NUMERICAL GRIDS

The numerical grids used in this study were derived from a 3-arcsecond (approximately 75 x 90 m) combined topography and bathymetry grid and designed to capture all potential inputs to the MOT locations (Figure 10, Table 4). The model was set up with a system of three nested grids as shown in Figure 11. The outermost grid was sampled to 30-arcsec, the intermediate grid to 15-arcsec while the full resolution (3-arcsec) data was used for the innermost grid. Model output is designated at the specific MOT locations. Summary tables in Appendix 2 use the location IDs in Table 4.

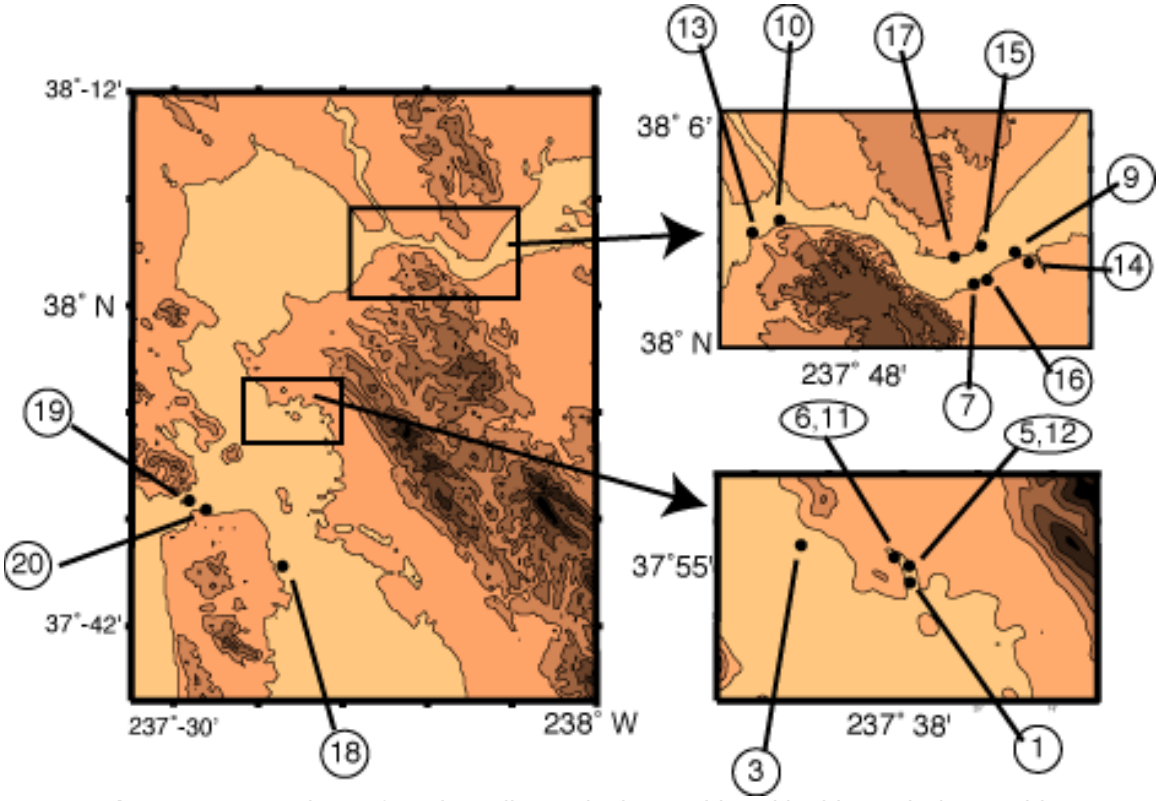


Figure 10 - Locations of Marine Oil Terminals considered in this study (see Table 4). Inner Richmond: locations 5, 6, 11, 12. Outer Richmond: location 3, Carquinez West: locations 10, 13. Carquinez East: locations 7, 9, 14, 15, 16, 17.

Table 4 – San Francisco Bay Area Marine Oil Terminal Locations

ID	Name	Latitude	Longitude
1	BP West Coast Products Richmond	37.9133	237.6342
3	Chevron USA, Inc., Richmond	37.9225	237.5892
5,12	Kinder Morgan and ConocoPhilips, Richmond	37.9167	237.6350
6,11	IMTT and Shore Terminals LLC, Richmond	37.9208	237.6317
7	Shell Oil Products, US, Martinez	38.0325	237.8758
9	Pacific Atlantic Terminals, Martinez	38.0467	237.8983
10	Pacific Atlantic Terminals, Selby	38.0592	237.7592
13	ConocoPhillips, Rodeo Refinery	38.0542	237.7417
14	Tesoro, Inc. - Avon Wharf	38.0492	237.9092
15	Tesoro, Inc. - Amorco Wharf	38.0350	237.8775
16	Valero Refining Berth 1, Benicia	38.0367	237.8817
17	Valero Refining Berth 2, Benicia	38.0417	237.8600
18	Mirant Potrero LLC, San Francisco	37.7517	237.6317
19	Golden Gate, entrance to San Francisco Bay	37.8150	237.5200
20	The Presidio (Fort Point)	37.8067	237.4167

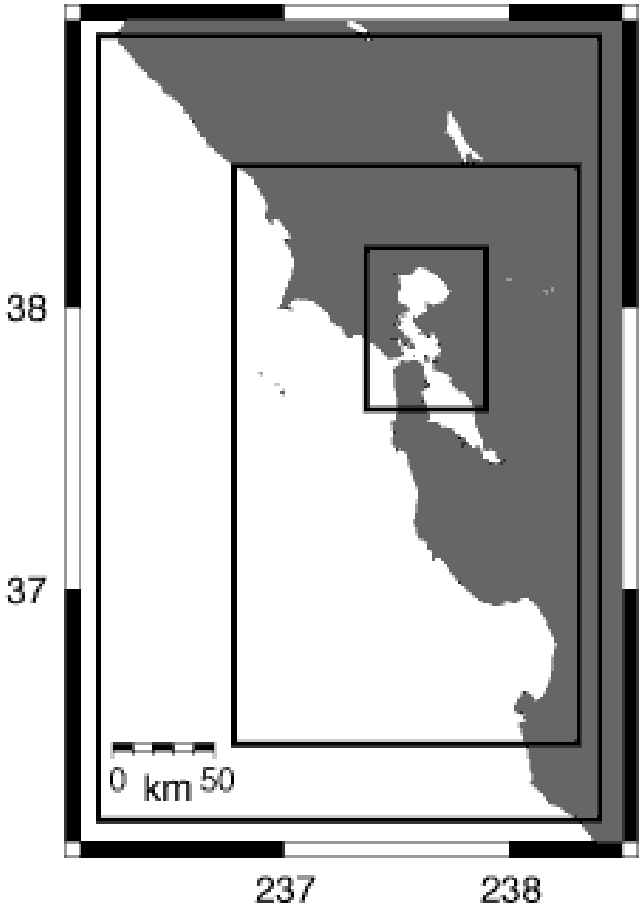


Figure 11 – Coverage areas for the three numerical grid regions.

5. TSUNAMI SOURCES

To investigate the tsunami effects at MOT locations San Francisco Bay, several near- and far-field sources were used. A far-field source is one where the source region is located a great distance from the region considered for the tsunami effects. If the source is an earthquake, this means that the affected area lies outside of the region where ground shaking is felt or where there is coseismic surface deformation. A near-field tsunami on the other hand is one where the tsunami source is close to the area affected, where ground shaking or surface deformation for earthquake sources would be experienced.

In the case of San Francisco Bay, the near-field source region would include faults and landslides inside the bay itself, as well as faults immediately offshore of the mouth of the Golden Gate. Potential far-field sources include large earthquakes on the various subduction zones around the Pacific Rim. This includes events on the Cascadia subduction zone, the Alaska-Aleutian subduction zone, the Kuril Island and Japan subduction zones (Figure 12) and the Chile-Peru subduction zone.

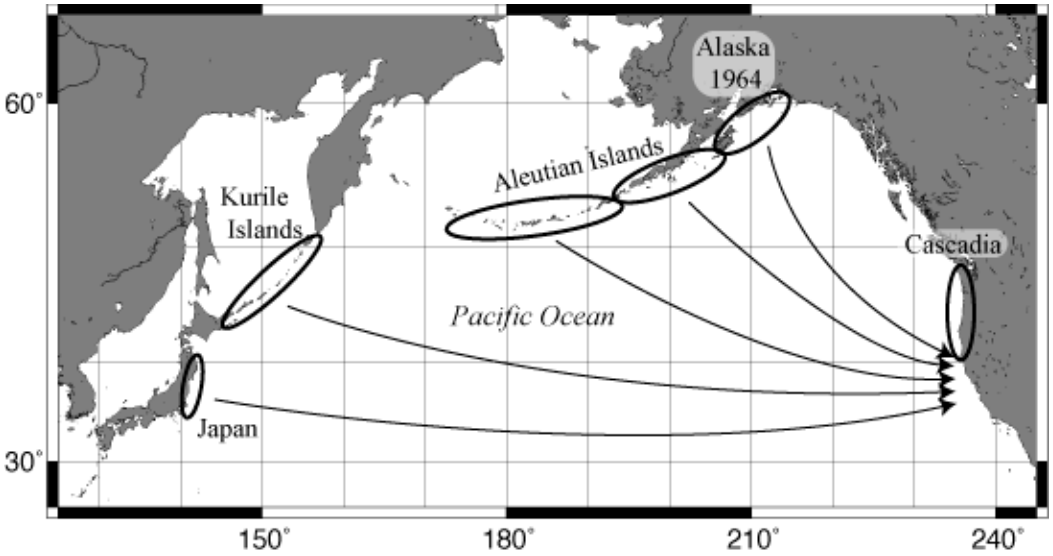


Figure 12 - Source regions in the North Pacific for far field tsunami propagating into San Francisco Bay.

5.1 SUBDUCTION ZONE SOURCES

In order to model the far-field events, we used NOAA's FACTS (Facility for the Analysis and Computation of Tsunami Simulations) database. This database contains the full trans-oceanic simulations for tsunamis generated on segments of the major subduction zones along the Pacific Rim. The database was created by subdividing each subduction zone into 2 parallel rows of 100 km long by 50 km wide fault segments (Figure 13). A pure thrust earthquake mechanism with unit slip (1 m) is then imposed on each segment and the resultant trans-oceanic wave propagation is computed and stored. Larger earthquakes and tsunamis are then created from this database by combining

segments and multiplying the output by an appropriate scalar to reach the desired earthquake magnitude.

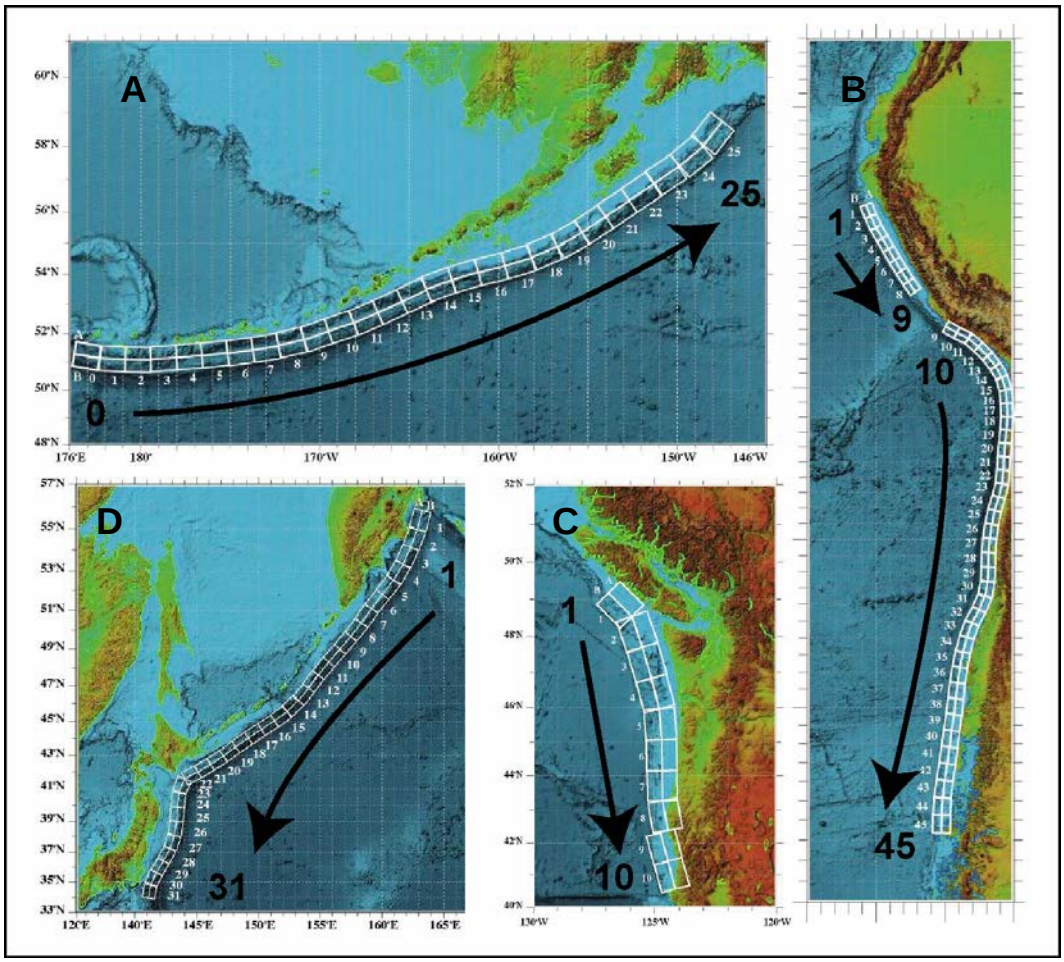


Figure 13 – Subduction zones of the Pacific Rim discretized into 2 parallel rows of 100 km long by 50 km wide fault segments. Clockwise from upper left; A-Alaska-Aleutian Islands, B-South America, C-Cascadia subduction zone, D-Kamchatka-Kuril-Japan subduction zone. Numbers refer to segments in Figure 18.

To calculate M_w, we use the formula: $M_w = 2/3 \log_{10} M_o - 6.0$ (Yeats et al., 1997), where M_o is the seismic moment in Nm (Newton meters). The seismic moment is calculated by the formula: $M_o = \mu u A$ where u is the slip on the fault, A is the area of the fault plane and μ is shear modulus of elasticity of the crust and is taken to be 3×10^{10} N/m^2 (Yeats et al., 1997). Sources can be constructed by adding 100 km long and 50 km wide segments. A magnitude 8.9 earthquake with a fault length of 800 km and a fault width of 100 km (from the two rows of 50 km wide segments) requires an average slip of 9.3 m (30.5 ft) on each fault segment. The computed tsunami from eight adjacent 100 km segments is multiplied by 9.3 and the results linearly combined into one resultant wave field. Times series of wave height and velocity are interpolated at the boundary of the outermost local grid (see Figure 11) and used as the initial condition to the local tsunami inundation model (Borrero et al., 2004). A summary of all the fault scenarios used in this study is given in Table 5.

$M_w = 2/3 \log_{10} M_o - 6.0$ where:
$M_o = \mu u A$, $A = L \times W$, $\mu = 3 \times 10^{10}$ N/m^2

Example: $M_w = 8.9$, L = 800 km and W = 100 km
Find displacement on the fault (u) in meters.
$(8.9 + 6.0)(3/2) = \log_{10} M_o$
$M_o = 2.24 \times 10^{22}$ Nm
$M_o = \mu u A$
2.24×10^{22} Nm = $(3 \times 10^{10}$ N/m$^2)$ $(8 \times 10^5$ m) $(1 \times 10^5$ m) (u)
u = 9.3 m

Equation 1 – Sample calculation for determining average fault slip from a given moment magnitude and fault geometry

Composite Tsunami Source Name	L (km)	W (km)	slip (m)	dip deg	rake deg	strike deg	depth (km)	Mo (Nm)	M_w
Alaska 1964								7.80E+22	9.26
Segment 1	400	200	10	10	90	218	5		
Segment 2	300	300	20	9	75	241	15		
Aleutian I	500	100	10	15	90	n/a	5	1.50E+22	8.78
Aleutian II	500	100	10	15	90	n/a	5	1.50E+22	8.78
Aleutian III	700	100	25	15	90	n/a	5	5.25E+22	9.15
Kuril I	1000	100	9	15	90	n/a	5	2.70E+22	8.95
Kuril II	400	100	10	15	90	n/a	5	1.20E+22	8.72
Kuril III	400	100	10	15	90	n/a	5	1.20E+22	8.72
Kuril IV	400	100	10	15	90	n/a	5	1.20E+22	8.72
Japan I	900	100	5	15	90	n/a	5	1.35E+22	8.75
Japan II	400	100	10	15	90	n/a	5	1.20E+22	8.72
Chile 1960	1000	100	20	15	90	n/a	5	6.00E+22	9.26
Chile 1960W	1000	200	23	15	90	n/a	5	1.38+23	9.43
Chile North	1400	100	25	15	90	n/a	5	1.05E+23	9.35
Cascadia I	600	100	10	15	90	n/a	5	1.80E+22	8.84
Cascadia II	800	100	11.1	15	90	n/a	5	2.70E+22	8.95
Cascadia III	1200	100	20	15	90	n/a	5	5.76E+22	9.17
Cascadia SN	-	-	-	-	-	-	-	4.61E+21	8.4
Segment 1	150	80	8	10	90	350	5		
Segment 2	90	80	8	10	90	340	5		
Cascadia SW	-	-	-	-	-	-	-	5.76E+21	8.5
Segment 1	150	100	8	10	90	350	5		
Segment 2	90	100	8	10	90	340	5		
Cascadia SP2	-	-	-	-	-	-	-	5.54E+21	8.5
Segment 1	150	100	8	10	90	350	5		
Segment 2	90	30	4	10	90	340	5		
Segment 3	90	70	8	10	90	340	10		
Segment 4	90	10	4	20	90	310	5		
Hayward-Rodgers Creek	10	18	1.5	70	-90	40	5	8.10E+18	6.61
San Gregorio	50	15	2	60	90	320	5	4.50E+19	7.10

Table 5 - Summary of source parameters used for each fault scenario. Strike values for the far-field sources derived from the FACTS database are listed as 'n/a' since they are dependent on the local curvature of the subduction zone.

5.1.1 Cascadia subduction zone

The Cascadia subduction zone (CSZ) (see Figures 12 and 13) is the boundary between the Pacific and North American tectonic plates along the Pacific Northwest margin of North America. The CSZ extends along the Pacific coast of North America from Cape Mendocino, California to Vancouver Island, British Columbia in Canada. The CSZ is believed to produce infrequent earthquakes of magnitude 8.5 or larger, with the most recent in 1700 A.D. rupturing the entire zone (Satake et al., 2003). We modeled several variations of earthquakes on the CSZ ranging in magnitude from 8.4 to 9.2. The source parameters are summarized in Table 5.

Cascadia I $M_w = 8.84$ – A total fault length of 600 km (375 miles) with a slip of 10 m (33 ft). This represents a rupture on the northern portion of the fault extending from Newport, Oregon to the middle of Vancouver Island Canada.

Cascadia II $M_w = 8.95$ – For this scenario we modeled an earthquake starting at the California – Oregon Border and rupturing to the north to the middle of Vancouver Island over a fault length of 800 km (500 miles) with an average slip of 11 m (36 ft).

Cascadia III $M_w = 9.17$ – For this scenario we modeled the largest credible rupture extending 1200 km (750 miles) from Cape Mendocino, California to Vancouver Island, British Columbia with an average slip of 20 m (65 ft). This is comparable to the December 26, 2004 Sumatra rupture.

Cascadia subduction zone southern segments – For the southern segments of the Cascadia subduction zone, we used three previously published source models (***Cascadia, SN, Cascadia SW, Cascadia SP2***) described in (Bernard et al., 1994).

Cascadia SN $M_w = 8.4$ – This is a 2-fault scenario with a total fault length of 240 km (150 miles) and a fault width of 80 km (50 miles) and average slip of 8 m (26 ft) on each segment.

Cascadia SW $M_w = 8.5$ **–** This scenario is identical to ***Cascadia SN*** except with a width of 100 km (62 miles) as opposed to 80 km (50 miles).

Cascadia SP2 $M_w = 8.5$ – This scenario considers slip partitioning on a more steeply dipping fault, the Little Salmon Fault, which lies above the main subduction interface in the accretionary wedge just south of Humboldt Bay, California. Seismic moment is conserved for this scenario and the total slip on the southern segment is reduced to compensate for the additional slip on the splay fault.

5.1.2 Alaska and the Aleutian Islands

Four sources were used to investigate the effects of tsunamis originating in Alaska and the Aleutian Islands. These include a scenario based on the March 28, 1964 Great

Alaskan earthquake, two hypothetical magnitude 8.8 events in the central part of the Aleutian Islands as well as a magnitude 9.15 event in the central Aleutians.

1964 Alaska M_w = 9.26 – The fault model for this scenario was created by NOAA-PMEL and based on investigations by Plafker (1972) and Johnson et al., (1996). They used two fault planes to model the deformation field resulting from the earthquake. The smaller, western plane had dimensions of 400 x 200 km (250 X 125 miles) and an average slip of 10 m (33 ft). The second fault plane to the east measured 300 x 300 km (190 X 190 miles) with an average slip of 20 m (66 ft).

Aleutian I M_w = 8.78 – Located west of the 1964 rupture and extending 500 km (312 miles) from Kodiak Island to the Alaska Peninsula, average slip of 10 m (33 ft).

Aleutian II M_w = 8.78 – Located west of Aleutian I, extending from the central Alaska Peninsula Island to Unimak Island with the same length and slip as Aleutian I**.**

Aleutian III M_w = 9.15 – This scenario was created to investigate the effects of a 'worst case' type scenario and combines the rupture in the two previous scenarios. An 800 km (500 mile) long fault with 25 m (82 ft) of slip was located in the region along the Aleutian Subduction Zone that was most likely to generate the strongest response within San Francisco Bay. The rupture extends from Kodiak Island to Unimak Island.

Numerous large ruptures have occurred along the central and western portions of the Alaska – Aleutian subduction zone in historic times and the Andreanof and Rat Island segments are capable of producing earthquakes in the upper 8 to lower 9 magnitude range. However, the arc in these areas is not directed favorably towards the west coast of the United States and even great earthquakes will not impact San Francisco Bay as significantly as the Aleutian III case.

5.1.3 Kuril Islands

Large earthquakes have occurred on the Kuril – Kamchatka Subduction Zone resulting in trans-pacific tsunamis. Two events in 1923 and one in 1952 were observed along the US west coast. The earthquakes had magnitudes of 8.3 (February 3, 1923), 7.2 (April 13, 1923) and 8.2 (November 4, 1952). For this study we used four different source models. ***Kuril I*** used a 1000 km (625 mile) long fault and an average of 9 m (29.5 ft) of slip for a magnitude 8.95 event. Three smaller scenarios (***Kuril II, III and IV***) were also simulated using a 400 km (250 mile) fault length and 10 m (33 ft) of average slip. The three smaller scenarios, each with M_w = 8.72, were placed at different locations along the Kuril trench to investigate the effect of location on the response within San Francisco Bay.

5.1.4 Japan

Large earthquakes off the coast of Japan have been responsible for numerous large tsunamis in Japan and several trans-pacific events. In particular, the Sanriku earthquake on June 15, 1896, which generated maximum local tsunami runup between 25 and 38 m

(82 to 125 ft) (Lander et al., 1993; Tanioka and Satake, 1996), produced a small tsunami in Sausalito. Tanioka and Satake studied this event and fixed the source parameters based on matching tsunami wave forms recorded at tidal stations to synthetic waveforms generated by numerical simulations. Other researchers (Aida, 1997) have also modeled the faulting characteristics for this event. It should be noted that the slip distribution and fault location between the various studies are quite different, for example Tanioka and Satake (1996) assume 5.7 m of slip over the fault while Aida (1997) assume more than 12 m. ***Japan I*** used a 900 km (560 miles) fault with 5 m (16.5 ft) of slip and a total moment magnitude of 8.75. A second scenario (***Japan II)*** assumed a fault length of 400 km (250 miles) and a slip of 10 m (33 ft) resulting in a M_w = 8.72 event.

5.1.5 South American subduction zone

In addition to the cases mentioned above we modeled two scenarios based on sources along the Peru-Chile subduction zone. The first scenario, ***Chile 1960*** modeled a source similar to the 1960 earthquake. This source used a total fault length of 1000 km (655 miles) and 20 m (66 ft) of displacement for a magnitude 9.26 event. A second scenario ***Chile 1960W*** models the 1960 event using a wider fault (200 m) and 23 m (75 ft) for a moment magnitude of 9.43, closer to the accepted 9.5 value for this event. A third scenario, ***Chile North*** used 1400 km (875 miles) of total fault length and 25 m (82 ft) of displacement to simulate an extremely large, M_w = 9.35, event on the northern section of the subduction zone.

Great earthquakes have also occurred on the Peru segment of the subduction zone. But these events are less favorably oriented to San Francisco Bay than the events further to the south and were not modeled.

5.2 NEAR-FIELD SOURCES

Near-field sources are underwater faults that might generate vertical deformation within the Bay or immediately adjacent to the Golden Gate or sites with the potential to produce large submarine or subaerial landslides. For faults, we calculate the seafloor displacement due to an earthquake using the elastic dislocation model based on the theory of Okada (1985). This tectonic displacement is then translated directly to the water surface as a static initial condition and allowed to propagate as a gravity wave. The details of each earthquake scenario and the faulting parameters used for the elastic dislocation model are listed in Table 5, as well as in Appendices 1 and 2. The precise location of

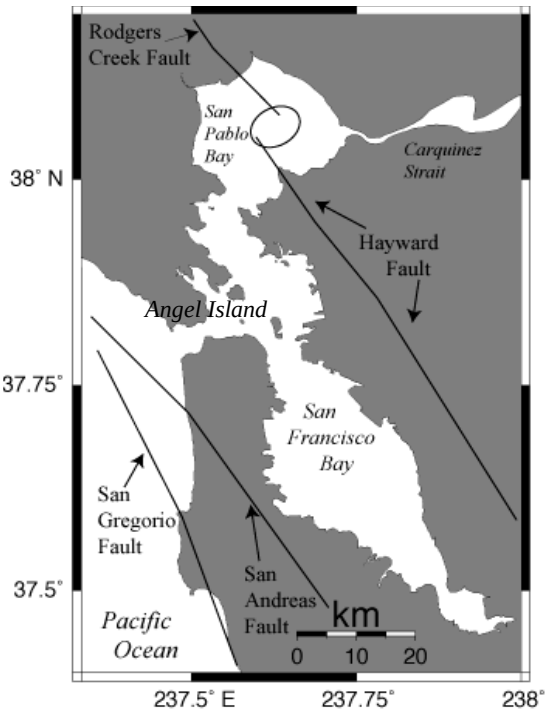


Figure 14 - Location of potentially tsunamigenic faults and slides in the vicinity of San Francisco Bay. The Farallon Islands are offshore, 35 miles west of the Golden Gate.

each source is shown in Appendix 1 along with a plot of the computed maximum wave height across the Pacific Basin and a plot of maximum computed wave height for San Francisco Bay.

Several local sources were considered in order to assess the tsunami hazard in San Francisco Bay. A 1999 USGS study placed a 10 to 30% probability of a magnitude 6.7 earthquake or greater in 30 years on any of three potentially tsunamigenic faults near San Francisco Bay (Working Group, 1999). The probability was listed as 10% for the offshore segment of the San Gregorio Fault, 21% for the offshore strand of the San Andreas Fault and 32% for the Rogers Creek Fault running through San Pablo Bay (Figure 13).

In addition to regional faults, we also examined the potential tsunami hazard caused by submarine or subaerial landslides. We examine potential areas of large slope instabilities within the Bay and adjacent to the Golden Gate.

5.2.1 San Gregorio fault

The San Gregorio fault is part of a system of offshore faults that parallel the coast from Point Arguello north to Bolinas Bay. Just west of San Francisco, the San Gregorio fault converges with the San Andreas Fault in a region of complex faulting which includes several other parallel fault strands including the Golden Gate fault and the Potato Patch fault (Bruns et al., 2002). These fault strands trend northwest and merge on shore as the northern segment of the San Andreas fault. Though it is believed to be predominantly strike-slip in nature, the fault does exhibit reverse faulting characteristics (USGS fault data base, Bruns et al (2002)) in an area west of the northern segment of the San Gregorio Fault known as the San Gregorio Structural Zone. In order to place an upper bound on the tsunamigenic potential of this fault, we model a large (M_w = 7.1) thrust mechanism earthquake with a fault length of 50 km (31 miles) that traverses the bight west of the entrance to San Francisco Bay. The detailed fault parameters for this scenario are listed in Table 5.

5.2.2 Hayward – Rodgers Creek fault step-over

Beneath San Pablo Bay is a step-over between the right lateral Hayward and Rodgers Creek faults (Figure 14). The details of this step-over were studied by Parsons et al. (2003). They contend that the Hayward – Rodgers Creek fault step-over is the source for the 1898 Mare Island earthquake and tsunami. They model the tsunami using slip mechanism on a normal fault which steps over from the Hayward to the Rodgers Creek fault. Their simulations were for an earthquake with an approximate magnitude of 6.0, which translates to 0.35 m (1 ft) of slip on a fault plane 6 km (4 miles) long by 18 km (11 miles) wide. Their simulations produce only 0.1 m (4 inch) tsunami waves, in contrast to the 0.6 m (2 ft) reported in historical accounts. We use similar fault geometry but apply more slip to again place an upper bound on the tsunami waves and currents that could be generated by such a mechanism. Our simulation uses a slip of 1.5 m (4.9 ft) resulting in a moment magnitude (M_w) of 6.61.

5.2.3 Landslide on the Farallon Islands

The Farallon Islands are a rocky archipelago 45 to 65 km (28 to 40 miles) offshore of the Golden Gate. The Farallons sit on the continental slope; the easternmost island sits in about 150 m (82 fathoms) water depth which quickly deepens to over 3000 m (1640 fathoms) only 5 miles to the southwest. The sea floor around the diorite islands is littered with the debris of submarine slides and debris flows ranging in scale from a few square meters to hundreds of square meters (Karl and Schwab, 2001). We modeled the largest credible landslide on the east slope of the easternmost island using the same parameters as the Palos Verdes slide (Borrero, 2002).

5.2.4 Other sources

We considered other potential local tsunami sources including slumps and landslides inside the Bay and excitation of seiching by earthquake surface waves. The topography on the Bay margins is generally gentle (Figure 1) and while landslides are common on steeper slopes, there is no history of large volume failures into the Bay. Most of the Bay is very shallow and even if a large slide were to enter the Bay, the volume of water displaced would be small. We briefly examined the only three sites within the Bay that may have tsunamigenic landslide potential to impact the MOT locations: Angel Island, the Golden Gate and the Carquinez Straits.

Angel Island is a 740-acre island in the central San Francisco Bay located 5 km (3 miles) north of San Francisco and 1.6 km (1 mile) southeast of Tiburon (Figure 14). The island is composed primarily of highly fractured Franciscan formation greywacke sandstones and greenstones, reaches an elevation of 238 m (781 feet) and is characterized by slope steepness in the 50 to 75% range (Olivia Chen Consultants, 2003). Although the island sits in a deeper than average part of the Bay, water depths are still less than 50 meters (27 fathoms) in areas any slides might reach. And while slope failures are common on the island, there is no evidence of failures on the scale of hundreds of meters. Any slide-caused tsunami from Angel Island would be small and quickly dissipate offshore and pose no hazard to the MOT locations.

The Golden Gate is a steep gorge cut into Franciscan greywacke, chert and greenstone that separates San Francisco from Marin County. The Bay reaches its maximum depth of 109 m (60 fathoms) in the Golden Gate. Only the headlines on the north side are steep enough to pose any slide hazard into the Bay and historically slides in this area have been small and few (Wentworth et al., 1997). There is no credible basis to support a large slide in this area.

The Carquinez Strait connects San Pablo Bay to Suisan Bay (Figure 14). Only the western end is steep enough to pose slide hazards. The Strait is less than a kilometer wide (.6 mile) and no deeper than 30 meters (16 fathoms). The landslide hazard is not mapped as high (Wentworth et al., 1997) and is not capable of posing a tsunami hazard comparable to the other sources examined in this study.

Seiches generated by earthquake surface waves have been known to produce tsunamis in closed bodies of water and bays (Barberopoulou et al., 2003). The large amplitude surface waves are believed amplified by basin geometry, exciting water oscillations or seiches. To produce significant seiching in a body of water, the forcing periods must be close to the natural period of the bay or one of the overtones. The characteristic periods and overtones for San Francisco Bay are much longer than surface wave periods and we do not consider non-tsunami induced seiches in San Francisco Bay to pose a hazard comparable to the other sources modeled in this study.

6. RESULTS AND DISCUSSION

Detailed plots of the numerical output from each scenario are given in Appendix 1 and a summary of peak positive and negative wave heights, current velocity and direction is given in Appendix 2. Table 6 summarizes peak water heights generated by the 23 scenarios at four locations.

Table 6 - Scenario Water Height Summary

SCENARIO	Mag	Golden Gate	Presidio	Outer Richmond	Inner Richmond	Carquinez
Alaska 1964	9.26	2.58	1.63	0.96	1.31	0.37
Aleutian I	8.78	2.09	1.34	0.90	1.13	0.31
Aleutian II	8.78	1.30	0.90	0.46	0.68	0.23
Aleutian III	9.15	5.35	2.90	1.56	1.59	0.54
Kuril I	8.95	0.32	0.28	0.31	0.62	0.09
Kuril II	8.72	0.20	0.32	0.12	0.24	0.07
Kuril III	8.72	0.47	0.27	0.26	0.56	0.07
Kuril IV	8.72	0.60	0.39	0.21	0.36	0.12
Japan I	8.75	0.24	0.25	0.22	0.49	0.04
Japan II	8.72	0.60	0.39	0.21	0.43	0.08
Chile 1960	9.26	0.61	0.39	0.21	0.43	0.08
Chile 1960W	9.43	1.34	0.78	0.42	0.82	0.17
Chile North	9.35	0.87	0.64	0.49	0.73	0.19
Cascadia I	8.84	0.54	0.34	0.26	0.55	0.14
Cascadia II	8.95	0.58	0.38	0.27	0.49	0.14
Cascadia III	9.17	1.39	1.39	0.67	0.87	0.22
Cascadia SN	8.40	0.45	0.29	0.15	0.28	0.08
Cascadia SW	8.50	0.42	0.26	0.14	0.24	0.06
Cascadia SP2	8.50	0.35	0.27	0.12	0.23	0.07
Hayward-Rodgers Creek	6.61	0.00	0.01	0.00	0.02	0.02
San Gregorio	7.10	0.60	0.40	0.26	0.42	0.11
Farallons	landslide	0.74	0.15	0.08	0.21	0.01

Columns: Mag - earthquake magnitude. Golden Gate – entrance to the Bay, ID 19. Presidio – the Presidio tide gauge location, ID 20. Outer Richmond – offshore Richmond, ID 3. Inner Richmond – inside the Richmond channel, ID 5&12. Carquinez - western entrance of the Carquinez Straits, ID 10.

The largest amplitude waves are generated by Aleutian III scenario followed by Alaska 1964. Both are discussed further in section 6.3 below. Cascadia III produces a 1.4 m

peak wave at the Presidio, larger than any historic event except the 1964 tsunami. This event could cause some damage to boats and floating structures in the Bay, especially if coincident with high tide, but the impacts should be slightly less than 1964. A Cascadia tsunami will cause major damage along the northern California, Oregon and Washington coasts but the San Francisco Bay area is favorably oriented parallel to the strike of the fault zone. Our modeling results are supported by field observations from the Indian Ocean tsunami that show wave amplitudes on the Sumatra coast decaying rapidly south of Meulaboh (Jaffe et al., in press 2006), in coastal areas with a similar location and orientation as San Francisco relative to Cascadia.

The three local sources produce very small waves inside the Bay. The Hayward-Rogers Creek step-over produces a peak height of 0.2 meters in the Carquinez Strait and in the Inner Richmond waterway, larger than the 0.1 m heights in Parsons et al. (2003) but still significantly less than 0.6 m estimated from the few available eyewitness accounts. The San Gregorio event produces slightly larger waves at Inner Richmond (0.4 m) but still much less than the larger teletsunami events. The Farallon landslide produces a negligible wave within the Bay. At the entrance to the Bay, the San Gregorio and Farallon landslide scenarios produce localized water heights comparable to the South American and northeastern Pacific subduction zones, but the volume of water displaced by these local scenarios is much smaller and translates into very small tsunami heights at the MOT locations.

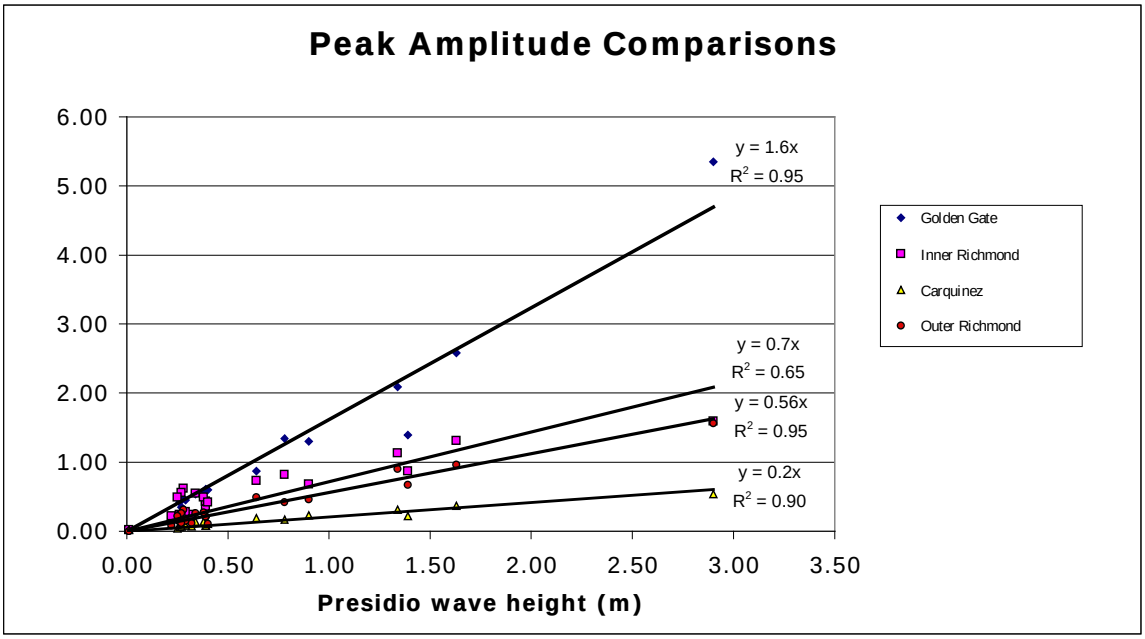


Figure 15 – Comparison of peak water height to Presidio tide gauge site for locations in Table 6. Linear trends for each data set given with R^2 regression values.

Figure 15 compares the peak positive water height value at the Golden Gate, Outer and Inner Richmond, and Carquinez locations (Table 6) to the Presidio tide gauge site. The amplitudes of each site show a rough linear relationship to the Presidio values. Presidio water heights average just over 60% of the water heights at the entrance to the Bay (Golden Gate). The Outer Richmond values are about 56% of the Presidio water heights, very close to the 50% attenuation Magoon (1966) estimates from 1960 and 1964

marigrams (see Figure 6). At the Carquinez locations, water heights are 20% or less of the Presidio values. The Inner Richmond sites show the most complexity, always larger than Outer Richmond and averaging 70% of the Presidio values. But the regression fit is not nearly as good as at the other sites, suggesting complex amplification within the narrow Richmond Channel.

6.1 COMPARISON TO HISTORICAL DATA.

To check the validity of our model and method, we first compared the model results of simulated historic events to available instrumental records. Tide gauge recordings from inside San Francisco Bay allow for a direct comparison of the modeled to observed wave behavior. Fortunately marigrams exist for the 1960 and 1964 tsunamis in San Francisco Bay.

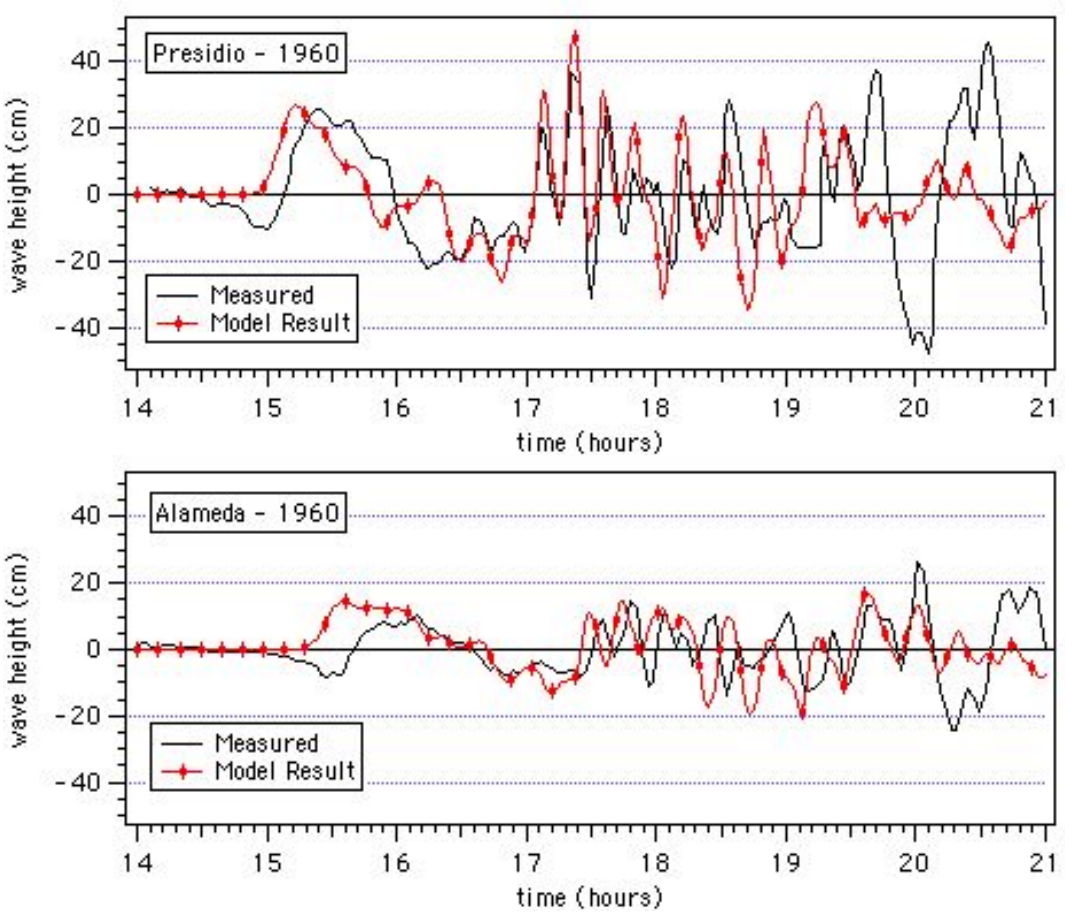


Figure 16 – Modeled vs. recorded time series of water levels at The Presidio and Alameda for the 1960 Chilean tsunami.

Figure 16 shows a comparison between the modeled and recorded wave heights for the 1960 tsunami at the Presidio, just inside the entrance to San Francisco Bay and at Alameda on the eastern shore of the Bay. The agreement between the model and the tide gauge data is remarkable in terms of amplitude and period. There is some discrepancy in the modeled arrival time, however it is only about 7 minutes and is negligible when compared to more than 14 hours of propagation time required for the waves to travel

from South America and reach the entrance of San Francisco Bay. Our model assumes an instantaneous rupture and displacement at the earthquake source, when in fact earthquakes of this size may take five minutes or longer to rupture the complete fault zone, which may explain a large part of the discrepancy. Tsunami travel time is also affected by the shallow water bathymetry in the earthquake source region and the deep ocean bathymetry along the tsunami travel path, neither of which are known perfectly. Our model captures the initial wave form and the first several hours of the 1960 tsunami quite well, but does not reproduce the large amplitude oscillations which begin some 5 hours after the first wave arrival and persist for over 3 hours (see Figures 4 and 16). The exact cause for these late arriving waves has not been explained in the literature, however it could be a resonance effect of the Bay as proposed by Wiegel (1970), an amplified response of the tide gauge itself or some combination of the two.

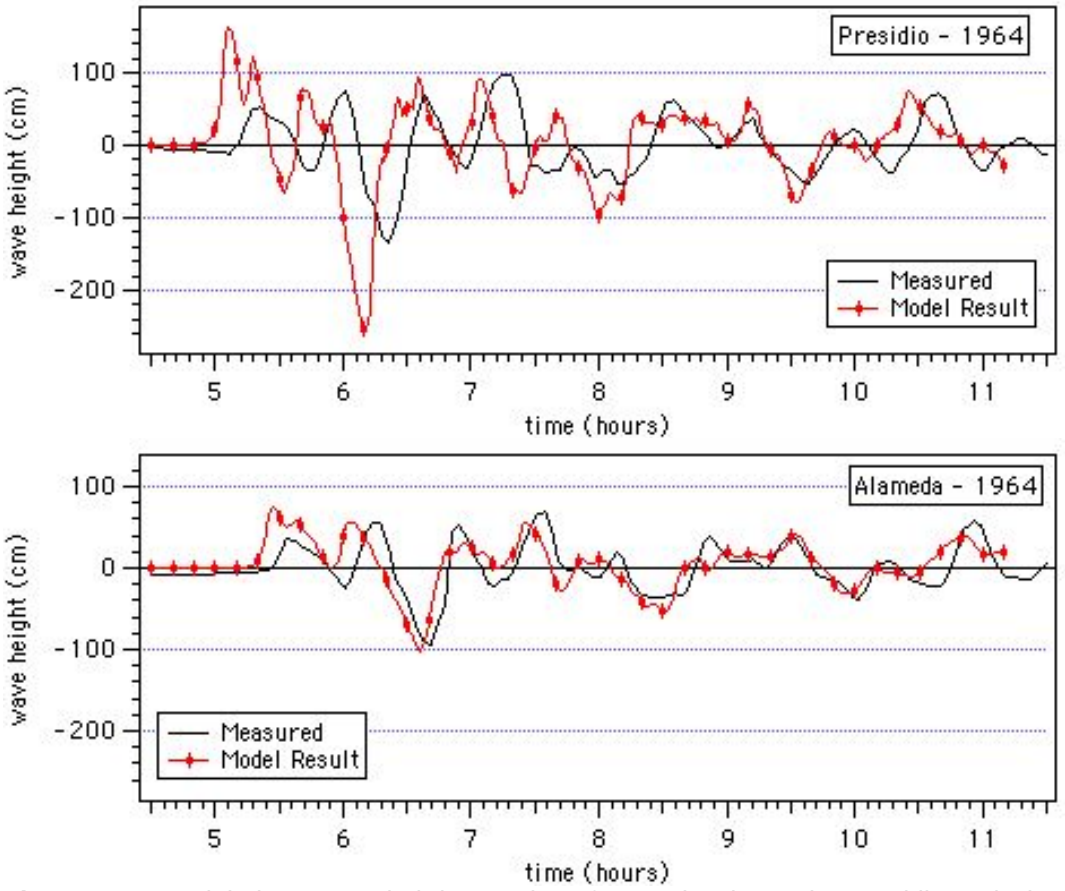


Figure 17 – Modeled vs. recorded time series of water levels at The Presidio and Alameda for the 1964 Alaskan tsunami.

A comparison of recorded and modeled wave heights for the 1964 event is shown in Figure 17. While the model over-predicts the initial wave peak and first large withdrawal, especially on the Presidio tide gauge, the amplitudes and periods of the subsequent peaks match quite well. There is a slightly larger discrepancy in arrival times, approximately 15 minutes, than in the 1960 case. Again we consider this negligible in terms hazard assessment at the MOT sites. The good fit of the model data to the tide

gauge recordings gives us confidence in the model and provides a strong foundation for investigating the relative influence of different far field sources.

6.2 EFFECT OF SOURCE REGION.

Using the FACTS database, we investigated the effect of the location of the tsunami source region on the wave height offshore of the entrance to San Francisco Bay. This was done by comparing the maximum computed wave height from each of the unit sources in the FACTS database (Figure 13).

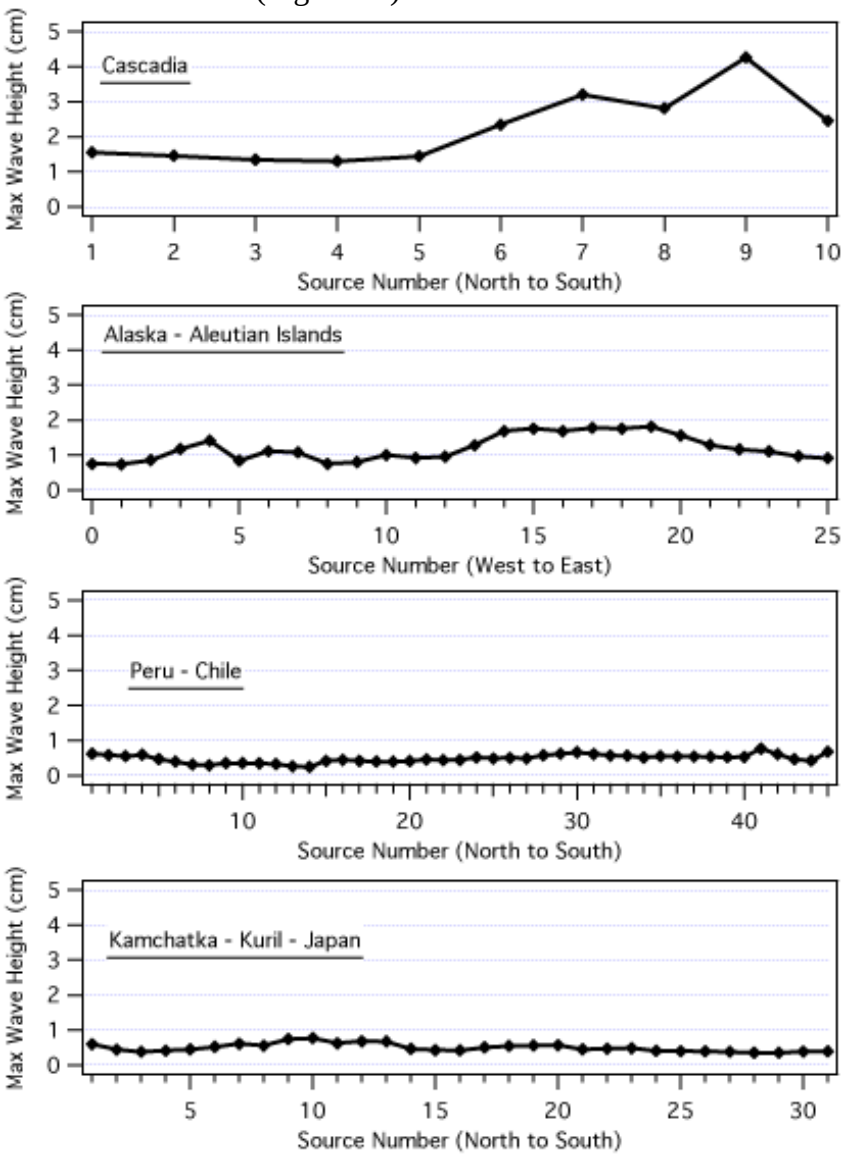


Figure 18 – Computed tsunami wave height at 37.7˚ N, 122.67˚ W (offshore of the entrance to San Francisco Bay) from individual unit (1-m) slip sources along four different subduction zones. Note, each slip source is the same length.

The resulting plots are shown in Figure 18. It appears that the largest response is from Cascadia. However, the response is at an offshore location, about 21 km (13 miles) west

of the Golden Gate, and only the 5 southern segments produce amplitudes of over 1.5 cm. The Cascadia segments are directed strongly towards the southwest (see Appendix 1, p. 81) and not towards San Francisco Bay. This is reflected in their relatively small wave amplitudes for Cascadia scenarios at the MOT locations within the Bay (Figure 19). Eight of the Alaska -Aleutian slip sources produce 1.5 cm or larger responses, especially segments 14 through 19 (See Figure 13), and they are directed towards the Bay.

Scenario Name	Number
Cascadia SN	1
Cascadia SP2	2
Cascadia SW	3
Cascadia I	4
Cascadia II	5
Cascadia III	6
Alaska 1964	7
Aleutian I	8
Aleutian II	9
Aleutian III	10
Kuril I	11
Kuril II	12
Kuril III	13
Kuril IV	14
Japan I	15
Japan II	16
Chile 1960	17
Chile 1960W	18
Chile North	19

Table 7 – Numbers of composite sources (Table 5) referenced in Figure 19 and Appendix 1.

To investigate the sensitivity of the response at each MOT location, we plotted the maximum wave height and drawdown at terminal locations for each of our tsunami sources (Figure 19). The sources are arranged in geographical order from east to west starting with Japan, followed by Kurils, Alaska, Cascadia and South America and assigned a number (Table 7). It is evident that that strongest response occurs at MOT locations in the Richmond area from sources in Alaska and the Aleutian Islands. The longest rupture of the Cascadia subduction zone produces the next largest response, producing peak heights and drawdowns close to 1 m at the MOT locations. While slightly larger than South America and the northwestern Pacific sources, this suggests that the CSZ is not the dominant player for tsunami hazards within the Bay. While great earthquakes on the CSZ will produce significant and damaging runup elsewhere, our modeling shows that most of this energy is radiated offshore towards Hawaii and Japan and relatively little wave energy is propagated south along the coast. This is also shown in the maximum trans-pacific wave height plots for the Cascadia subduction zone cases in Appendix 1. The smaller ruptures of the CSZ pose very little hazard in San Francisco

Bay. The largest South American sources are slightly smaller than Cascadia III with much smaller response seen for sources in the Kuril Islands and Japan.

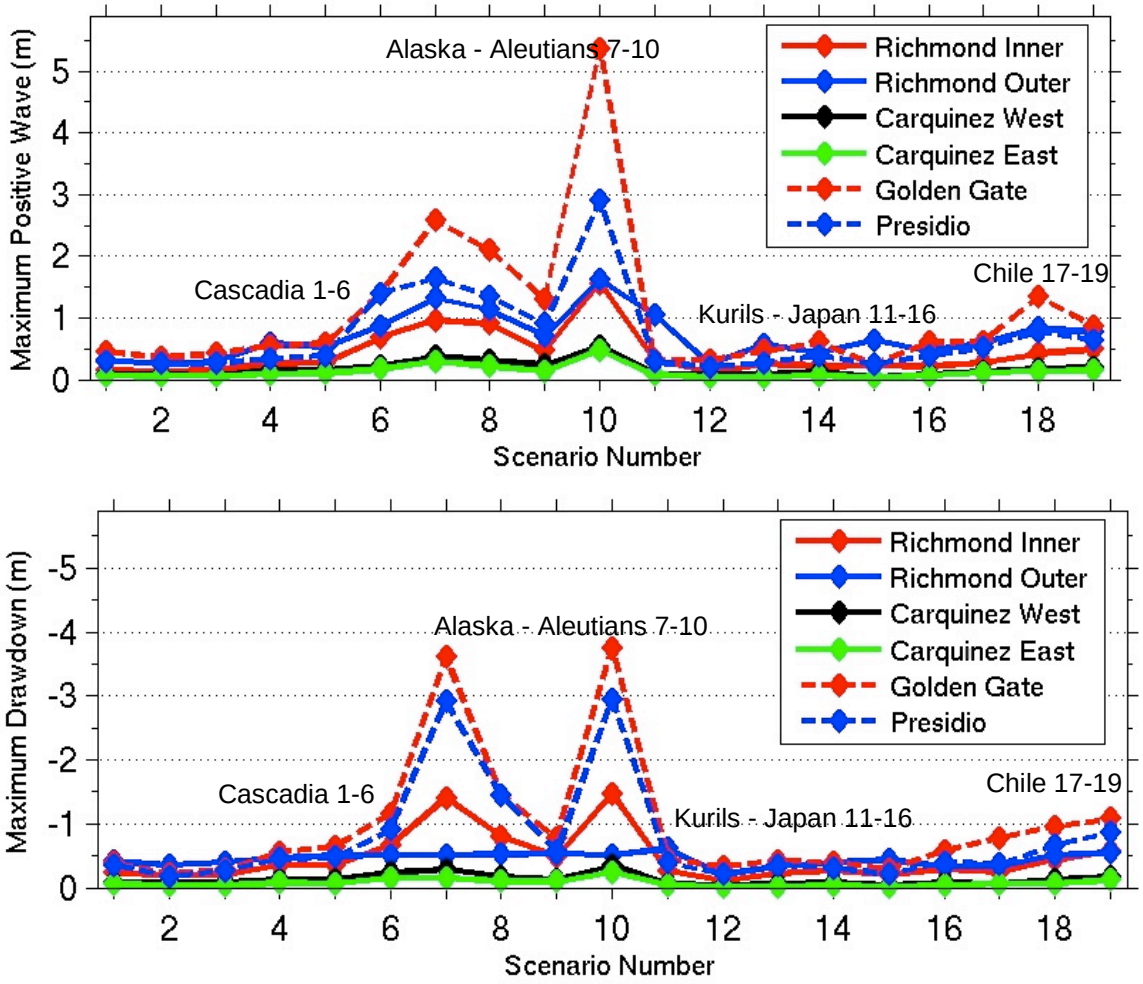


Figure 19 – Maximum positive (upper panel) and negative (lower panel) wave height for each scenario at specific locations within San Francisco Bay. The numbered source zones (1-19) – see tables 5 and 6 – are arranged from east to west with the South American sources listed last (numbers 17, 18 and 19, Table 7). Only sources from the Alaska-Aleutian Islands Subduction Zone produce positive or negative wave heights in excess of 1 m (3.3 ft) at an MOT location (i.e. Richmond Inner).

6.3 A WORST-CASE SCENARIO?

In an effort to create a plausible worst-case scenario, we combined historic information on past tsunamis affecting San Francisco Bay with our analysis of the tsunami response from displacements along the various subduction zone segments on the Pacific Rim. Since the largest response within San Francisco Bay results from displacements along the Alaska Peninsula segment of the Alaska-Aleutian subduction zone, we simulated the tsunami effects of a hypothetical M_w = 9.2 earthquake occurring along 800 km of this fault in the area of the zone most sensitive to San Francisco Bay response. This

earthquake would be similar in magnitude to the 1964 Alaskan earthquake or the 2004 Sumatra earthquake, however positioned along the Aleutian trench to give the largest impact in San Francisco Bay. For comparison, Figure 20 plots the simulated water levels for this event versus marigrams recorded during the 1964 tsunami.

The results suggest that the worst-case event would produce wave heights two to three times larger than what was experienced in 1964. Indeed the simulated wave heights and current speeds for this event are larger than for any other scenario that we modeled (See Appendices 1 and 2), however, they still do not reach the water heights estimated by Garcia and Houston (1975).

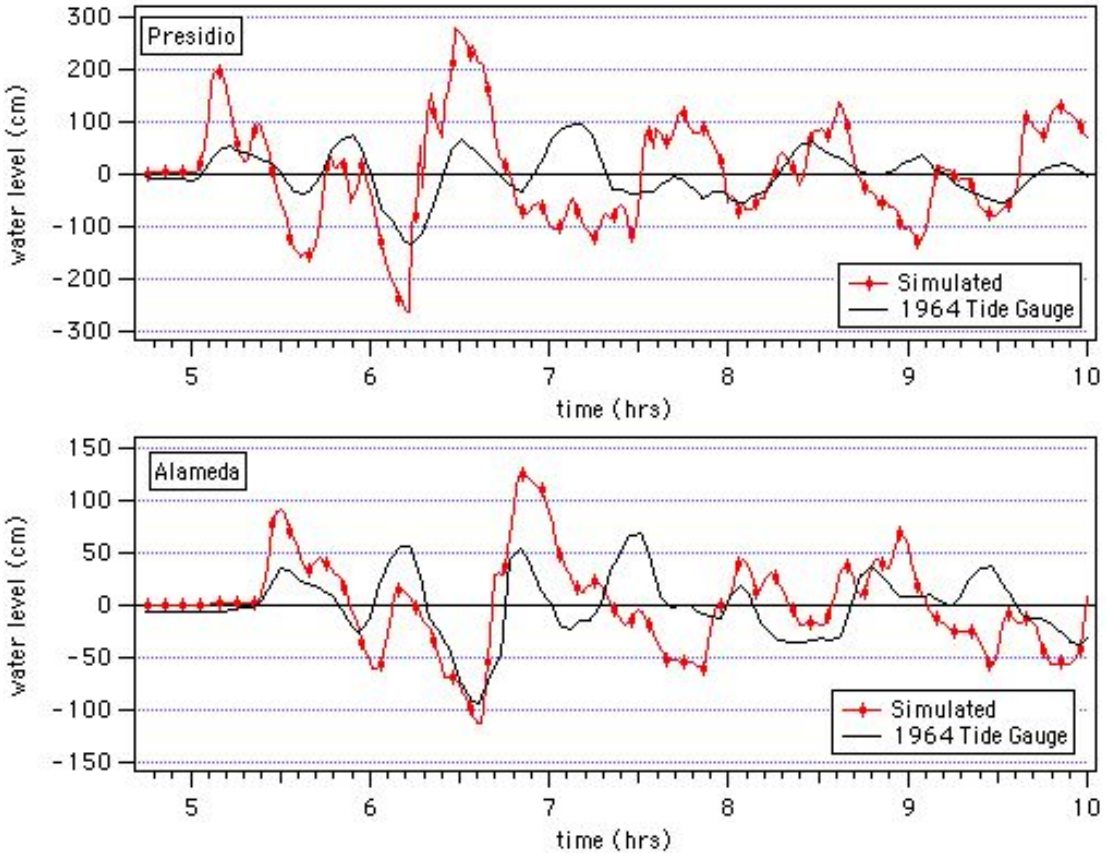


Figure 20 – Comparison between tide gauge records from the 1964 Alaskan tsunami and a simulated M_w = 9.2 earthquake generated tsunami at Presidio and Alameda.

Table 8 lists the maximum-modeled values for positive and negative water surface level at 6 regions inside San Francisco Bay for the largest far-field and local sources. The data suggest that the wave heights at the Carquinez Strait are on the order of 25% of the values seen at Richmond and 10% of those modeled for the Golden Gate. The terminals located in the Carquinez Strait show a much more muted response to the waves entering the Golden Gate. Table 8 also illustrates the attenuation from the Golden Gate to Richmond seen in Figure 15. For the outer Richmond area, the attenuation is on the order of 53% of the Presidio value whereas in the inner Richmond area, the attenuation is only 30%. These are both in the range of values for tsunami amplitude attenuation given by

Magoon (1966) based on his observations of the 1960 and 1964 tsunamis in San Francisco Bay and in line with the linear regressions shown in Figure 15, however the elevated wave heights for the inner Richmond locations should be noted. A more detailed study on the amplification of tsunami waves at the inner Richmond area should be performed to adequately explain the dynamics of this basin.

Region and Terminal ID	Far-field		Local	
	Wave height (+, m)	Wave height (-, m)	Wave height (+, m)	Wave height (-, m)
Richmond, outer (3)	1.56	-1.47	0.26	-0.18
Richmond, inner (1,5,6,11,12)	1.61	-1.62	0.44	-0.27
Carquinez, West (13,10)	0.55	-0.34	0.11	-0.21
Carquinez, East (7,9,14,15,16,17)	0.47	-0.24	0.10	-0.14
Golden Gate (19)	5.35	-3.74	0.60	-0.68
Presidio (20)	2.90	-2.93	0.40	-0.30

Table 8 - Maximum computed values of water surface rise and fall in meters for regions in San Francisco Bay from largest far-field and local tsunami sources. Numbers in parentheses correspond to locations in Figure 9. Note: 1 m = 3.28 ft.

Maximum-modeled current speeds for each site are listed in Table 9. The highest current speeds are seen in the inner Richmond area. These values are observed in the time record during rapid changes in the water surface elevation inside the semi enclosed basin where five oil terminals are located (see detailed time series plots in Appendix 1).

Region and Terminal ID	Far-field	Local
	Current speed (m/s)	Current speed (m/s)
Richmond, outer (3)	1.00	0.19
Richmond, inner (1,5,6,11,12)	2.73	0.62
Carquinez, West (13,10)	0.45	0.20
Carquinez, East (7,9,14,15,16,17)	0.42	0.16
Golden Gate (19)	2.88	0.51
Presidio (20)	4.98	0.47

Table 9 - Maximum computed values of current speed for regions in San Francisco Bay from far-field and local tsunami sources. Note: 1 m/s = 1.94 knots.

From the results of this study, it appears that the highest tsunami hazard exists for MOTs in the inner Richmond area from sources in Alaska and the Aleutian Islands. Inspection of animations of wave height plotted over time show how higher wave heights enter San Francisco Bay through the Golden Gate and propagate directly across the Bay into the Richmond, Berkeley and Oakland areas. All of the scenarios exhibit the long duration of wave activity that characterizes the marigrams from historic teletsunami events. The narrow waterway where these 5 MOTs are located is prone to resonant oscillations and this may be a cause of the elevated wave heights and current speeds seen here.

The study also suggests that near-field tsunami sources only present a second order tsunami hazard for marine facilities inside San Francisco Bay. The modeled wave heights and velocities for the largest near-field event (San Gregorio) are 25% or less of the largest far-field event (Aleutians III) (Tables 8, 9). We have included only one submarine landslide source in our scenarios, located in the Farallon Islands offshore of the mouth of the Bay. The bathymetry of San Francisco Bay is generally shallow with very gentle slopes and no history of massive slides into the Bay. Submarine landslides within the Bay are not considered a primary source for tsunami wave generation.

6.5 RECOMMENDATIONS FOR BAY AREA MOT SITES

We have conducted a deterministic study to identify the most severe events that could reasonably impact the Marine Oil Terminal sites in the San Francisco Bay area. The most significant historic event was the March 28, 1964 tsunami generated by the M_w 9.2 Alaska earthquake. In our modeled scenario runs, we simulated the 1964 event at the MOT sites. Of the 23-modeled scenarios, the event with the largest water heights and greatest water velocities within the Bay was a M_w 9.2 earthquake on the Alaska Peninsula segment of the Alaska-Aleutian subduction zone. This event generated peak water heights at the entrance to the Bay of over 5 meters. We note that our modeling results include uncertainties. Complex rupture in the source area and uncertainties in the bathymetry in the rupture area and along the tsunami travel path will cause some variation from the modeled results.

Table 10 – Water Heights and Current Velocities for Planning Purposes

		1964		Aleutians III	
ID*	Location	Height (m)	Velocity (m/sec)	Height (m)	Velocity (m/sec)
3	Outer Richmond	1.4	0.9	2.3	1.5
5	Inner Richmond	1.7	2.2	2.4	2.7
14	Martinez	0.3	0.4	0.7	0.2
10	Selby	0.5	0.4	0.8	0.5
13	Rodeo	0.5	0.3	0.8	0.6
17	Benicia	0.3	0.2	0.6	0.3
18	Portrero District, San Francisco	0.8	0.8	1.8	1.5
19	Entrance to San Francisco Bay	3.1	1.9	8.0	4.3
20	Presidio (Fort Point)	2.0	2.4	4.4	7.5

* See Figure 9 for location

For planning purposes we take a 150% factor of safety of our model runs for estimating peak water heights and current velocities for a 1964 event and for our worst-case scenario, the Alaska Peninsula rupture of the Alaska – Aleutians subduction zone. We consider this a conservative estimate; simulations of the 1960 and 1964 events suggest that our model slightly overestimates water heights and drawdowns. Table 10 summarizes our recommendations at the MOT locations. Note that the peak water levels can be in a positive or negative direction and peak current velocity direction varies and will be superimposed on the ambient tidal and flow regime in the Bay.

It is important to note that we assign no probabilities for any of the scenarios in our study. Recurrence estimates for Alaska 1964 events range from 350 years (Page et al., 1991) to 800 years (Plafker et al., 1992) and so this event does not likely represent the 50 to 100 year event as interpreted by Garcia and Houston (1975). There is no historic precedent for our "worst-case" scenario, a magnitude 9.2 event rupturing 800 kilometers from Kodiak Island to the Alaska Peninsula. The largest historic event on the Alaska Peninsula was a magnitude 8.3 earthquake in 1938 that produced a 0.2 m (.65 ft) wave at Crescent City but was not recorded within San Francisco Bay (Lander et al., 1993). Our Aleutians III scenario involves rupturing the western half of the 1964 rupture zone and continuing the rupture through the 1938 zone and into the Shumagin gap, an area of the Alaska-Aleutian subduction zone that has not produced an earthquake in historic times. There is no evidence to support or rule out such a rupture, but given the recent release of energy along the 1964 rupture, the likelihood of this event in the near future is very low.

Appendix 1 contains plots of the full time series for wave height and current speed for each terminal location for each scenario. Appendix 2 contains data tables for the maximum positive and negative water surface elevations and the maximum modeled current velocity and the direction of that flow. Appendices 3, 4,and 5 contain detailed historical information on the 1964 tsunami in San Francisco Bay and summarize recorded or observed events in San Francisco and in California. Appendix 6 contains data plots of the unprocessed tide gauge recordings from the 1960 and 1964 tsunamis at the Presidio and Alameda.

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PLAN

Operations and Maintenance Plan

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Section 1
Introduction

This Operation and Maintenance (O&M) Plan is for the continued management of remedy implemented and for the residual contaminants of concern (COCs) remaining at The Sherwin-Williams Company (S-W) property located at 1450 Sherwin Avenue in Emeryville, California and a portion of the adjacent former Rifkin property, located at 4525 – 4563 Horton Street, to which hazardous substances have migrated from the S-W property. Collectively the S-W property and this portion of the former Rifkin property are referred to as the "Site" within this document. The Site consists of approximately 10 acres. Novartis Vaccines and Diagnostics, Inc. (Novartis) is the current owner of the former Rifkin property.

An O&M Agreement, containing provisions regarding the activities, notification, submittals, emergency response, and communication procedures, will be entered into by S-W and DTSC to implement this O&M Plan.

The remedy implemented at the Site has been documented in the project's Remedy Implementation Completion Report (Completion Report), dated July 25, 2012 (CDM Smith, 2012). The remedy was implemented in accordance with the California Department of Toxic Substances Control (DTSC) Imminent and Substantial Endangerment Determination and Order and Remedial Action Order No. 05/06-007 (the Order) and the Remedial Action Plan (RAP), dated June 14, 2010, and Remedial Design Implementation Plan (RDIP), dated June 29, 2011, for the Site (DTSC, 2006; CDM 2010; and, CDM, 2011). The RAP, RDIP, and Completion Report were approved by DTSC in letters dated June 14, 2010, June 30, 2011, and August 6, 2012, respectively (DTSC, 2010; DTSC, 2011; and, DTSC, 2012a).

The remedy implementation occurred between March 2011 and April 2012, and consisted of the following key components:

- Installation and operation of an air monitoring system and air sampling program to evaluate the effectiveness of Site controls in maintaining the safety of the surrounding community.
- Installation and operation of a temporary soil vapor extraction and treatment system to remove volatile organics from the most impacted vadose zone excavation area.
- Relocation of a high-pressure natural gas line, from under the western sidewalk of Horton Street (i.e., adjacent to the excavation) to the other side of the street.
- Excavation and offsite disposal of vadose zone soil containing arsenic, lead, and/or organic contaminants to support future potential residential use of the Site.
- Removal and offsite disposal of aboveground and underground structures, pipes, and debris containing arsenic, lead, and/or organic contaminants, primarily consisting of the raised cap and former water treatment plant.
- Excavation dewatering, and onsite pre-treatment and discharge to sanitary sewer of extracted water.

- Excavation and offsite disposal of saturated zone soil containing arsenic, lead, and/or organic contaminants to support long-term protection of groundwater.
- Backfill of excavation areas to control groundwater movement within the Site.
- Placement of backfill and gravel cover to re-grade the Site to facilitate storm water drainage.
- Extension of the existing slurry wall along the southwestern portion of the Site.
- Installation of a membrane barrier and interceptor trench to prevent movement of groundwater from the S-W property to the former Rifkin property.
- Removal of portions of the existing slurry wall to control groundwater movement from the Site to offsite, downgradient (western) areas.
- Abandonment of a former underground storage tank (UST) at the Site.
- Abandonment of selected existing groundwater wells no longer required for the project.
- Installation of new groundwater wells required for the post-remedy implementation groundwater monitoring program.
- Development and recording of a Covenant and Agreement by DTSC with Alameda County Clerk-Recorder's Office to protect present or future human health or safety or the environment (Covenant) through identifying specific restrictions and requirements associated with the residual COCs at the S-W property and for maintaining and preserving the integrity of the remedy, as presented in the RAP, RDIP, Completion Report, and this O&M Plan.

The remedy implementation has achieved the project remedial action objectives (RAOs). The following presents the RAOs that were established for the Site in the RAP and remedy component that fulfills the RAO:

Remedial Action Objective (RAO)	*Remedy Component*
▪ Minimize direct contact/ingestion by humans with Site soil containing contaminants of concern (COCs) at concentrations exceeding the cleanup goals.	▪ Removal of vadose zone soil with COC concentrations above cleanup goals. ▪ Development and recording of the Covenant and Agreement to restrict the use of the S-W property (Covenant). ▪ Monitor for possible contamination in areas outside existing removal areas, as identified in this Operation and Maintenance (O&M) Plan and/or subsequent DTSC-approved modifications. ▪ Monitor soil gas conditions, as identified in this O&M Plan and/or subsequent DTSC-approved modifications.
▪ Minimize migration of and/or inhalation of airborne dust by humans from the Site containing COCs at concentrations exceeding the cleanup goals.	▪ Removal of vadose zone soil with COC concentrations above cleanup goals. ▪ Development and recording of the Covenant, controlling intrusive activity at the S-W property.

Remedial Action Objective (RAO)	*Remedy Component*
▪ Minimize exposure to and inhalation by humans of volatile organic COCs at concentrations in indoor air exceeding the cleanup goals.	▪ Removal of vadose zone soil with COC concentrations above cleanup goals. ▪ Development and recording of the Covenant for the S-W property. ▪ Monitor for possible contamination in areas outside existing removal areas, as identified in this O&M Plan and/or subsequent DTSC-approved modifications. ▪ Monitor soil gas conditions, as identified in this O&M Plan and/or subsequent DTSC-approved modifications.
▪ Minimize risk to down-gradient ecological receptors from offsite groundwater migration containing COCs at concentrations exceeding the cleanup goals.	▪ Removal of saturated zone soil with COC concentrations identified as source material. ▪ Backfill to control groundwater movement. ▪ Installation of slurry wall breaches and extension and maintain key portions of existing slurry wall to control groundwater movement. ▪ Grading of the Site to minimize storm water infiltration and prevent ponding. ▪ Monitor groundwater conditions, as identified in this O&M Plan and/or subsequent DTSC-approved modifications.
▪ Minimize onsite human contact with groundwater containing COCs at concentrations exceeding the cleanup goals.	▪ Removal of saturated zone soil with COC concentrations identified as source material. ▪ Development and recording of the Covenant.

Vadose zone soils with COCs above cleanup goals have been removed. Confirmation samples were collected from the vadose zone excavation sidewalls to demonstrate conformance with the cleanup goals as established in the RAP.

The RAOs were met through the implementation of the remedy. The remedy components that remain and require protection in order to maintain and preserve the integrity of the remedy are:

- Portions of Existing Slurry Wall to control groundwater movement
- Slurry Wall Extension to control groundwater movement
- Slurry Wall Breaches to control groundwater movement
- Interceptor Trench to control groundwater movement
- Membrane Barrier to control groundwater movement
- Selective Placement of Low- and High-Permeability Backfill to control groundwater movement

- Grading of the Site to minimize storm water infiltration and prevent ponding
- Groundwater Monitoring Wells to monitor groundwater conditions and evaluate remedy effectiveness

The locations of these components are presented in Attachment A, Drawing 1. All components are located below grade and not visible at the Site surface, except the groundwater monitoring wells, soil gas monitoring points and the Site grading. The tops of groundwater monitoring wells and soil gas monitoring points are visible at the Site surface.

Attachment A, Drawing 4 presents vadose zone confirmation soil sample locations. Attachment B presents the range of COCs in vadose zone samples identified at the Site and their respective cleanup goals. No remaining sample has a COC concentration above its respective cleanup goal.

Groundwater within the Site is expected to continue having COC concentrations above cleanup goals. Groundwater will be monitored, as identified in this O&M Plan and/or subsequent DTSC-approved modifications. Periodic groundwater monitoring reports will be prepared and submitted to DTSC (see Section 3.4.1 for reporting).

Soil gas within the Site will be monitored, as identified in this O&M Plan and/or subsequent DTSC-approved modifications. Periodic soil gas monitoring reports will be prepared and submitted to DTSC (see Section 3.4.1 for reporting).

The following presents the COCs identified for the S-W property and, their cleanup goals by media.

Contaminant of Concern	*DTSC-Approved Cleanup Goals*				
	Vadose Zone Soil (mg/kg)		*Soil Gas (ug/m3)*		
	Commercial Worker	*Unrestricted Resident*	*Commercial Worker*	*Unrestricted Resident*	*Groundwater (mg/L)*
Volatile Organic Compounds					
Acetone	1,800,000	70,000	NA	NA	1.5
Benzene	0.076	0.015	122	36.2	0.0010
2-Butanone	NA	NA	NA	NA	4.2
1,2-Dichloroethane	NA	NA	NA	NA	0.00050
1,2-Dichloropropane	NA	NA	NA	NA	0.0050
4-Chloroaniline	8,200	310	NA	NA	NA
Ethylbenzene	200,000	7,800	1,400	420	0.30
Methyl Isobutyl Ketone	NA	NA	NA	NA	0.12
Methyl Tert Butyl Ether	NA	NA	NA	NA	0.013
Tetrachloroethene	0.32	0.063	NA	NA	NA
Toluene	440	100	NA	NA	0.15
Trichloroethene	NA	NA	NA	NA	0.0050
1,2,3-Trichloropropane	NA	NA	NA	NA	0.0050
1,3,5-Trimethylbenzene	NA	NA	NA	NA	0.46
1,2,4-Trimethylbenzene	NA	NA	NA	NA	0.14
Vinyl Chloride	NA	NA	NA	NA	0.00050

Contaminant of Concern	DTSC-Approved Cleanup Goals				
	Vadose Zone Soil (mg/kg)		Soil Gas (ug/m3)		
	Commercial Worker	Unrestricted Resident	Commercial Worker	Unrestricted Resident	Groundwater (mg/L)
Xylenes	11,000	2,300	NA	NA	0.020
Semivolatile Organic Compounds					
Benzo(a)anthracene	9.5	1.1	NA	NA	NA
Benzo(b)fluoranthene	9.5	1.1	NA	NA	NA
Benzo(b,k)fluoranthene	9.5	1.1	NA	NA	NA
Naphthalene	41,000	1,300	NA	NA	0.017
Phenanthrene	160,000	4,500	NA	NA	NA
Inorganic Compounds					
Antimony	820	31	NA	NA	
Arsenic	24	24	NA	NA	0.036
Barium	140,000	5,500	NA	NA	NA
Cadmium	15	3.1	NA	NA	NA
Chromium (+3)	3,100,000	120,000	NA	NA	NA
Chromium (+6)	41,000	1,600	NA	NA	NA
Iron	NA	NA	NA	NA	0.30
Lead	5,600	250	NA	NA	NA
Manganese	NA	NA	NA	NA	0.050
Selenium	10,000	390	NA	NA	NA
Zinc	610,000	23,000	NA	NA	0.081

Notes:
mg/kg – milligrams per kilogram
ug/m3 – microgram per cubic meter
mg/L – milligram per liter
NA - not applicable; contaminant is not of concern in this media

The cleanup goals for the contaminants of concerns were established in the Remedial Action Plan (RAP) and approved by the DTSC. For vadose zone soil, cleanup goals are compared to the 95% upper confidence limits of the averages of the detections (95 UCL) from Site samples to demonstrate conformance with the cleanup goals. For soil gas and groundwater, cleanup goals are compared to detections in samples from Site monitoring points. With DTSC's approval of the Remedy Implementation Completion Report, DTSC confirmed that the vadose zone soil cleanup goals at the Site have been met.

Section 2
Site Operations

The operations of the remedy components that remain at the Site are passive and predominately underground. These remedy components are listed in Section 1 of this O&M Plan. By passive, it is meant that the components are static and do not require any power. However, they must remain whole in order to continue operating as designed. Future construction, development, and/or operations at the Site cannot constrain the objectives of each component without first evaluating its effects and obtaining DTSC approval prior to any modifications to the components, as provided in the Covenant.

The current Site conditions and operations require the placement of a Covenant on the S-W property to protect present or future human health or safety or the environment, and identify specific restrictions and requirements associated with the residual COCs at the S-W property and for maintaining and preserving the integrity of the remedy.

An assessment will be conducted annually to assure that Site construction/operations are not impacting the effectiveness of the remedy components. This assessment shall be made by every April and a report will be submitted to DTSC (see Section 3.4.1 for assessment reporting).

Section 3

Site Maintenance and Monitoring

3.1 Site Maintenance

The remedy components as described in Section 1.0 are passive and require no regular maintenance, except for the groundwater well and soil gas monitoring points. However, they must remain whole in order to continue operating as designed. Future construction, development, and/or operations at the Site cannot constrain the objectives of each component without first evaluating its effects and obtaining DTSC approval prior to any modifications to the components, as provided in the Covenant.

Monitoring Network Inspection and Maintenance

At the time of water level measurement, groundwater sampling, and/or soil gas sampling, the condition of each monitoring point will be documented in a field book, or an equivalent document. Condition items may be identified through visual inspection of the monitoring point, changes in monitoring point performance from those observed during previous monitoring events, and/or unexplained changes in field parameter measurements. Deficiencies or problems identified for a given monitoring point will be addressed within an appropriate timeframe.

Routine maintenance items (i.e., items that require minimal effort) will be addressed in a timely manner. Examples of routine items include darkening the datum mark for a monitoring point, replacement of bolts or seals, and lock replacement. Non-routine maintenance items typically require more extensive effort. Examples of non-routine items include repair of concrete pads surrounding the monitoring point, grading, and cracked casings; and for groundwater monitoring wells possible redevelopment. Items requiring more extensive effort, and that are not addressed in this O&M Plan, will be evaluated on an individual monitoring point basis and may require preparation of a work plan for DTSC review and approval.

In addition to the monitoring point inspection, the total depth of conventional monitoring points without dedicated equipment will be measured at least triennially. Total depth of conventional monitoring points with dedicated equipment will be measured if the equipment is removed from the casing or if there is an indication of a problem with the point. Total depth measurements will be documented in the field log book, or equivalent field document. The total depth will be compared against the depth listed in Appendix B and Appendix D, and previous total depth measurements. If significant sediment accumulation is observed, the point may warrant redevelopment.

3.2 Groundwater Monitoring

Attachment A, Drawing 2 presents the project groundwater well locations. Attachment C presents the groundwater monitoring program.

As needed, the program will be revised based on the Site conditions after DTSC approval.

3.3 Soil Gas Evaluation

Attachment A, Drawing 3 presents the project soil gas monitoring point locations. Attachment D presents the soil gas evaluation strategy.

After completion of the remedy implementation activities, soil gas monitoring wells were installed to collect and analyze soil gas samples. Soil gas samples have been collected in June 2012 and their results presented in Attachment D. The next scheduled soil gas monitoring event is in December 2012. After the December 2012 event, the June and December 2012 results will be evaluated and a report submitted to DTSC. After evaluation of the soil gas conditions, DTSC and Sherwin-Williams will determine whether additional action is needed.

3.4 Reporting

The following presents anticipated post-remedy implementation reporting for the Site through the first Five-Year Review in 2016.

3.4.1 Groundwater

The first post-remedy implementation groundwater monitoring report was submitted to DTSC on July 30, 2012, for the reporting period of March 1, 2012 through June 30, 2102 (ARCADIS, 2012). DTSC approved this report on September 25, 2012 (DTSC, 2012b). Subsequent reports will be provided to DTSC per the following schedule and annually thereafter unless modified through DTSC approval letter:

Groundwater Reporting Period	Submittal of Report to DTSC
July 1, 2012 through December 31, 2012	January 31, 2013
January 1, 2013 through June 30, 2013	July 31, 2013
July 1, 2013 through December 31, 2013	January 31, 2014
January 1, 2014 through June 30, 2014	July 31, 2014
July 1, 2014 through June 30, 2015	July 31, 2015
July 1, 2015 through June, 2016	July 31, 2016

The groundwater monitoring reports will include all information collected from assessment and monitoring events during the previous period. As needed, submittals may be made more frequently on individual topics to maintain the protection of the remedy and/or if the effectiveness of the remedy is in question. The reports will contain summaries of the monitoring program, groundwater elevation data, groundwater quality data, sampling methods utilized, and quality control and quality assurance data. The reports will include figures presenting interpreted groundwater movement and spatial representation of the dissolved arsenic in groundwater sample data. As appropriate with the collection of sufficient data over time, the reports will assess the effectiveness of the remedy.

3.4.2 Soil Gas

Following the collection and analysis of soil gas samples from the December 2012 event, a data summary and evaluation report will be submitted to DTSC. The report will be submitted by the later of January 31, 2013 or within six weeks after receipt of all analytical reports from the laboratory. The report will contain summaries of the monitoring program, deviations, if any, from the strategy and/or methodology presented in this O&M Plan, and soil gas sample results. The report will evaluate if the results are above cleanup goals and, if needed, present recommendations for continued soil gas evaluation.

3.4.3 Five-Year Review

The first Five-Year Review for the remedial action will be conducted for the period from remedy implementation through December 31, 2015. The purpose of the review is to determine if human health and the environment are being protected by the remedial action.

A draft work plan for the Five-Year Review will be submitted to DTSC by September 1, 2015 so that a final work plan can be completed and approved by DTSC by December 31, 2015. The work plan will present

- an outline for the Five-Year Review report,
- information on Site background
- information on Site construction, development, changes, and/or planned future use,
- a summary of the data and information gathered and documents/records completed since remedy implementation,
- a summary of additional remedial actions implemented, if any,
- deviations from the O&M Plan, if any, and
- a preliminary discussion of remedy effectiveness/protectiveness, including the remedy components, controls, and Covenant restrictions and requirements.

A draft Five-Year Review report will be submitted to DTSC by the later of (1) February 28, 2016 or (2) 45 days following DTSC approval of the work plan. The draft report will include a protectiveness statement, provide recommendations for continued evaluation, propose follow-up actions (if any), and outline future reporting requirements. It is anticipated the final report will be completed and approved by DTSC by June 30, 2016.

Section 4

Soil and/or Groundwater Management

Prior to intrusive activities at the Site, the following regulatory agencies must be notified and/or consulted:

- DTSC
- Bay Area Air Quality Management District (BAAQMD), depending on the scope of the proposed activities.

During such intrusive activities (i.e., drilling, well sampling, re-development of the Site properties, etc.) soil and/or groundwater potentially containing residual COCs may be encountered. In addition, the activities may have the potential to affect infiltration rate of storm water to underlying groundwater.

After notification/consultation with the above regulatory agencies, a soil and/or groundwater management plan may be required prior to implementing any activities, as provided in the Covenant. The plan could include, but not be limited to, the following elements:

- Dust and vapor controls,
- Storm water controls,
- Excavated soil stockpile management,
- Stockpile soil sampling procedures,
- Soil and/or groundwater disposal procedures, and
- Groundwater dewatering, treatment, and/or discharge.

Health and Safety

Attachment E presents health and safety plans (HASPs) for workers conducting activities presented in this O&M Plan, excluding management of potentially impacted soils during implementation of future activities. Those implementing such future activity will be responsible for preparing a specific HASP in accordance with Occupational Health and Safety Administration (OSHA) 29 CFR 1910.120 guidelines and Title 8 CCR Section 5192.

Section 5
References

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ARCADIS, 2012. Data Summary Report for Groundwater Monitoring Activities for the Period from March 1, 2012 through June 30, 2012. ARCADIS U.S., Inc. July 30, 2012.

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DTSC, 2012b. Letter providing approval of the July 30, 2012 Data Summary Report for Groundwater Monitoring Activities for the Period from March 1, 2012 through June 30, 2012. California Environmental Protection Agency, Department of Toxic Substances Control. September 25, 2012.

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DTSC, 2006. Imminent and Substantial Endangerment Determination and Order and Remedial Action Order. Docket No. IS/E 05/06-007. California Environmental Protection Agency, Department of Toxic Substances Control. May 10, 2006.

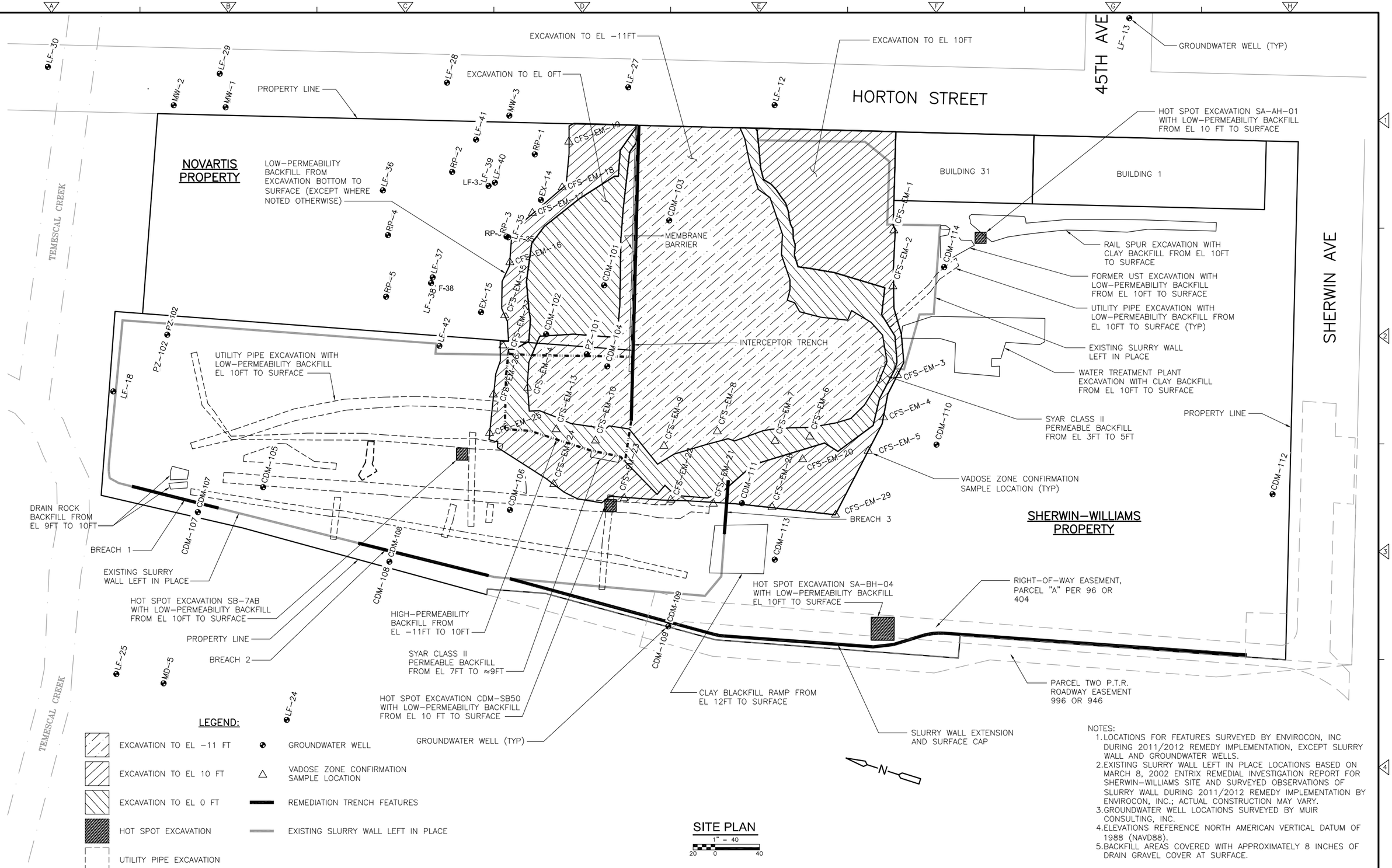
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LFR, 2006a. Groundwater Monitoring Plan Assessment, Sherwin-Williams Site, 1450 Sherwin Avenue, Emeryville, California. LFR Inc. June 28, 2006.

LFR, 2006b. Quality Assurance Project Plan, Sherwin-Williams Facility, 1450 Sherwin Avenue, Emeryville, California. LFR Inc. July 13, 2006.

Attachment A

Drawings



SITE PLAN

1" = 40

20 0 40

NOTES:

1. LOCATIONS FOR FEATURES SURVEYED BY ENVIROCON, INC DURING 2011/2012 REMEDY IMPLEMENTATION, EXCEPT SLURRY WALL AND GROUNDWATER WELLS.
2. EXISTING SLURRY WALL LEFT IN PLACE LOCATIONS BASED ON MARCH 8, 2002 ENTRIX REMEDIAL INVESTIGATION REPORT FOR SHERWIN−WILLIAMS SITE AND SURVEYED OBSERVATIONS OF SLURRY WALL DURING 2011/2012 REMEDY IMPLEMENTATION BY ENVIROCON, INC.; ACTUAL CONSTRUCTION MAY VARY.
3. GROUNDWATER WELL LOCATIONS SURVEYED BY MUIR CONSULTING, INC.
4. ELEVATIONS REFERENCE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. BACKFILL AREAS COVERED WITH APPROXIMATELY 8 INCHES OF DRAIN GRAVEL COVER AT SURFACE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: X
DRAWN BY: X
SHEET CHK'D BY: X
CROSS CHK'D BY: X
APPROVED BY:
DATE: MAY 2012

CDM Smith
100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596
Tel: (925) 933-2900

VERIFY SCALE

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SHERWIN-WILLIAMS COMPANY

SITE REMEDIATION
EMERYVILLE, CALIFORNIA

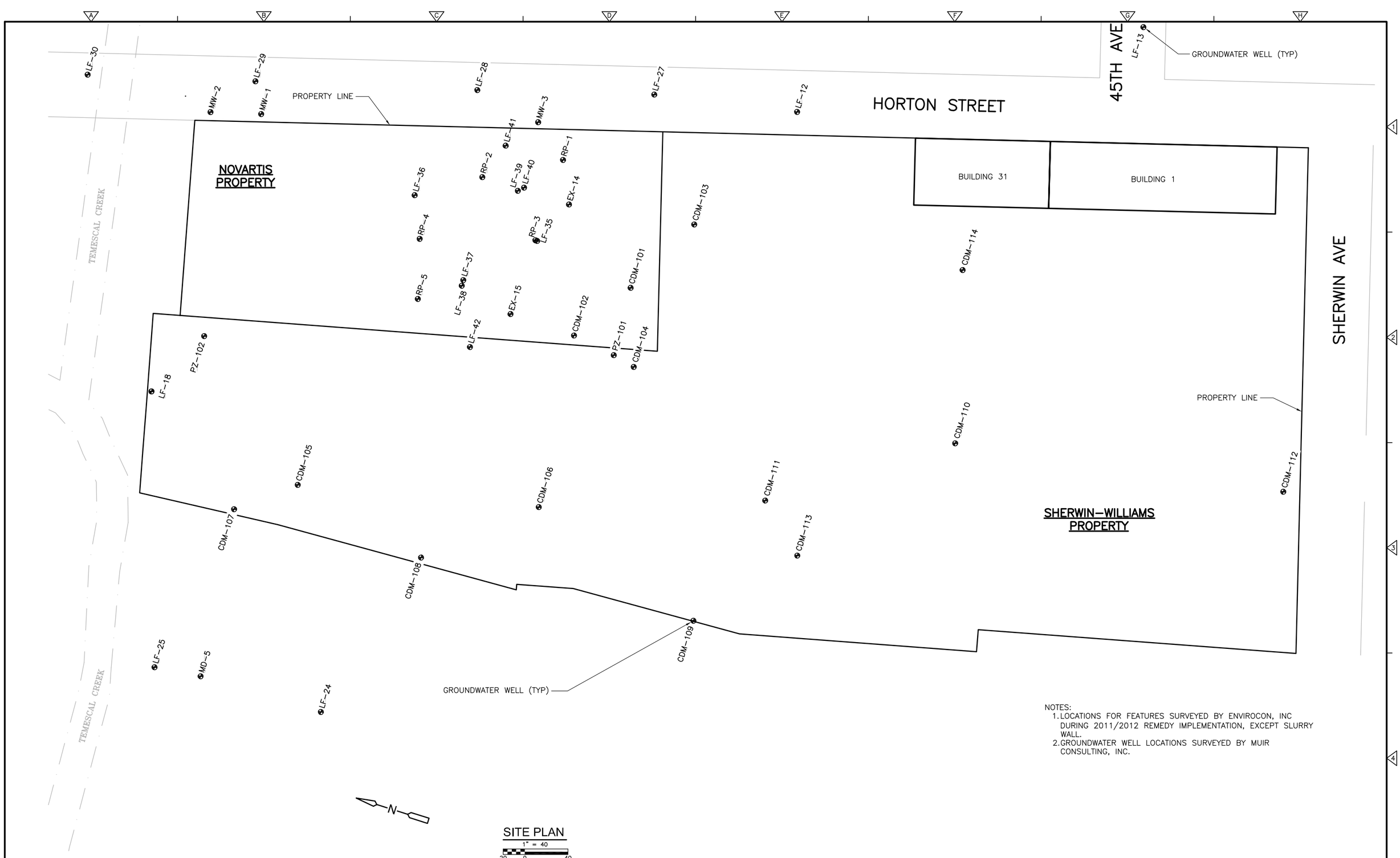
ASBUILT SITE PLAN

PROJECT NO. 13452−81494
FILE NAME: sw as−built.dwg

SHEET NO.
1

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SITE PLAN
1" = 40
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2. GROUNDWATER WELL LOCATIONS SURVEYED BY MUIR CONSULTING, INC.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: x
DRAWN BY: x
SHEET CHK'D BY: x
CROSS CHK'D BY: x
APPROVED BY:
DATE: MAY 2012

CDM Smith
100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596
Tel: (925) 933-2900

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SHERWIN-WILLIAMS COMPANY

SITE REMEDIATION
EMERYVILLE, CALIFORNIA

GROUNDWATER WELL LOCATIONS

PROJECT NO. 13452–81494
FILE NAME: sw as–built2.dwg

SHEET NO.
2

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HORTON STREET

45TH AVE

SHERWIN AVE

PROPERTY LINE

TEMESCAL CREEK

NOVARTIS PROPERTY

LOW-PERMEABILITY BACKFILL FROM EXCAVATION BOTTOM TO SURFACE (EXCEPT WHERE NOTED OTHERWISE)

BUILDING 31

BUILDING 1

SGMP-12

SGMP-10

SGMP-4

SGMP-9

SOIL GAS MONITORING POINT (TYP)

SGMP-1

EXISTING SLURRY WALL LEFT IN PLACE

SGMP-11

SGMP-2

SGMP-6

SGMP-5

SGMP-8

SGMP-7

SGMP-3

BREACH 1

BREACH 3

EXISTING SLURRY WALL LEFT IN PLACE

PROPERTY LINE

HIGH-PERMEABILITY BACKFILL FROM EL -11FT TO 10FT

BREACH 2

SHERWIN-WILLIAMS PROPERTY

N

SITE PLAN

1" = 40

20 0 40

NOTES:

1. LOCATIONS FOR FEATURES SURVEYED BY ENVIROCON, INC DURING 2011/2012 REMEDY IMPLEMENTATION, EXCEPT SLURRY WALL.
2. EXISTING SLURRY WALL LEFT IN PLACE LOCATIONS BASED ON MARCH 8, 2002 ENTRIX REMEDIAL INVESTIGATION REPORT FOR SHERWIN-WILLIAMS SITE AND SURVEYED OBSERVATIONS OF SLURRY WALL DURING 2011/2012 REMEDY IMPLEMENTATION BY ENVIROCON, INC.; ACTUAL CONSTRUCTION MAY VARY.
3. ELEVATIONS REFERENCE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. BACKFILL AREAS COVERED WITH APPROXIMATELY 8 INCHES OF DRAIN GRAVEL COVER AT SURFACE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: X
DRAWN BY: X
SHEET CHK'D BY: X
CROSS CHK'D BY: X
APPROVED BY:
DATE: MAY 2012

CDM Smith
100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596
Tel: (925) 933-2900

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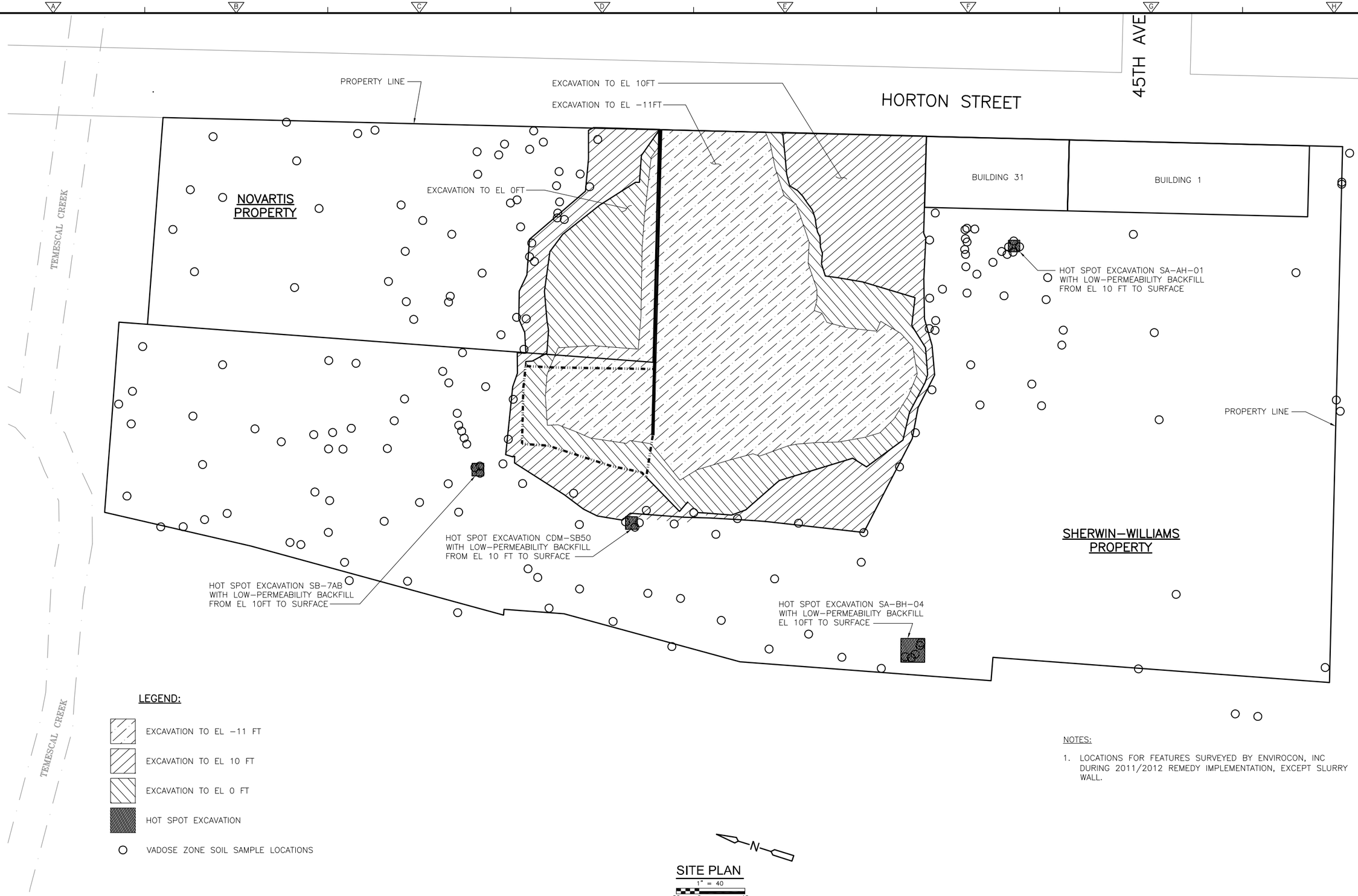
SHERWIN-WILLIAMS COMPANY

SITE REMEDIATION
EMERYVILLE, CALIFORNIA

SOIL GAS MONITORING POINTS

PROJECT NO. 13452-81494
FILE NAME: sw as-built1a.dwg

SHEET NO.
3



NOTES:

1. LOCATIONS FOR FEATURES SURVEYED BY ENVIROCON, INC DURING 2011/2012 REMEDY IMPLEMENTATION, EXCEPT SLURRY WALL.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: x
DRAWN BY: x
SHEET CHK'D BY: x
CROSS CHK'D BY: x
APPROVED BY:
DATE: MAY 2012

CDM Smith
100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596
Tel: (925) 933-2900

VERIFY SCALE
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SHERWIN-WILLIAMS COMPANY

SITE REMEDIATION
EMERYVILLE, CALIFORNIA

VADOSE ZONE SOIL SAMPLE LOCATIONS

PROJECT NO. 13452-81494
FILE NAME: FIGURE 4

SHEET NO.
4

P:\13452 Sherwin-Williams\81494 Emeryville\Completion Report\CAD\ FIGURE 4 08/21/12 11:16 talbotwk XREFs: CDM_2234, swexutil, swextopo, swexbndy, XR-SLRY-WALL, WELLS, (2011-04-14)SW topo, ACAD-WELLS, Aerialtoposh01
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Attachment B

Summary Residual Concentrations of Chemicals of Concern in Vadose Zone Soil

Attachment B
Summary of Chemicals of Concern in Vadose Zone Soil
Sherwin-Williams Emeryville Operation and Maintenance Plan

Chemical of Concern in RAP	*DTSC-Approved Cleanup Goal (mg/kg)*		*Samples Analyzed*	*Detections*	*Minimum Detection (mg/kg)*	*Maximum Detection (mg/kg)*	*95UCL (mg/kg)*
	Commercial Worker	*Unrestricted Resident*					
Volatile Organic Compounds							
Acetone	1800000	70000	69	20	ND	0.28	--
Benzene	0.076	0.015	69	1	ND	0.010	--
4-Chloroaniline	8200	310	69	1	ND	0.200	--
Ethylbenzene	200000	7800	89	27	ND	520	--
Tetrachloroethene	0.32	0.063	69	0	ND	ND	--
Toluene	440	100	87	24	ND	14	--
Xylenes	11000	2300	58	27	ND	1600	--
Semivolatile Organic Compounds							
Benzo(a)anthracene	9.5	1.1	68	0	ND	0	--
Benzo(b)fluoranthene	9.5	1.1	39	3	ND	0.96	--
Benzo(b,k)fluoranthene	9.5	1.1	39	2	ND	0.68	--
Naphthalene	41000	1300	81	21	ND	10	--
Phenanthrene	160000	4500	68	2	ND	1.7	--
Inorganic Compounds							
Antimony	820	31	41	2	ND	6.4	--
Arsenic	24	24	128	128	2.0	64	12
Barium	140000	5500	48	48	29	390	--
Cadmium	15	3.1	54	22	ND	7.2	2.1
Chromium (+3)	3100000	120000	48	48	9.6	61	--
Chromium (+6)	41000	1600					
Lead	5600	250	76	76	3.8	490	55
Selenium	10000	390	45	35	ND	1.6	--
Zinc	610000	23000	84	84	29	4070	--

Notes:

mg/kg - milligram per kilogram

ND - not detected

The cleanup goals for the chemicals of concerns, except arsenic, are site-specific risk-based threshold levels presented in the Remedial Action Plan (RAP).

The cleanup goal for arsenic in soil is its naturally occurring background concentration, as presented in RAP.

Site analyses were for total chromium (sum of +3 and +6 species); maximum total chromium detection is less than both chromium cleanup goals.

For chemicals of concern with maximum detections above their respective cleanup goals, the 95% upper confidence limits of the averages of the detections (95 UCL) are presented to demonstrate conformance with the cleanup goals; "--" is presented where this analysis is not warranted. This approach is consistent with the cleanup goals presented in the RAP.

Attachment C

Groundwater Monitoring Program

Attachment C

Groundwater Monitoring Program

The Groundwater Monitoring Program outlines provisions for a long term groundwater monitoring program to collect data to evaluate the effectiveness of the soil excavation, backfill, and slurry wall breaches/extension. The effectiveness of the final remedy will be evaluated based on its ability: (1) to promote natural attenuation of residual chemicals of concern (COCs) in groundwater, primarily arsenic; (2) to achieve Site cleanup goals within a reasonable timeframe; and (3) to control groundwater movement through the Site without producing long-term groundwater mounding.

The groundwater monitoring program consists of:

- Designation of a well network;
- Collection and evaluation of depths to groundwater and concentrations of COCs in groundwater in the well network;
- Development of criteria and methodologies to evaluate data that are collected; and
- Development of contingency actions with a decision framework for their initiation.

Statistical analysis will be used to evaluate trends in the concentration data. The depth to groundwater, and COC concentrations and concentration trends will be evaluated to determine if contingency action(s) are needed to achieve Site cleanup goals (see Section 1 of this Operation and Maintenance (O&M) Plan).

Based on the timing and nature of future redevelopment and future construction activities, and/or results from the groundwater monitoring program, it may be necessary to modify the groundwater monitoring network or monitoring requirements at some point in the future. As such, at any time after implementation of the remedy, The Sherwin-Williams Company (S-W) may request modifications to the groundwater monitoring program presented in this document. S-W will implement the changes to the groundwater monitoring program only after approval by the California Department of Toxic Substances Control (DTSC).

C.1 Groundwater Monitoring Well Locations

Attachment A, Drawing 2 of this Operation and Maintenance (O&M) Plan presents the locations of these monitoring wells and piezometers. Table C-1 provides a summary of construction details and a summary of the monitoring program after remedy implementation.

C.2 Monitoring Frequency and Sample Analysis

This section presents the monitoring and analysis programs 1) during remedy implementation and 2) for the first four years after remedy implementation.

C.2.1 Groundwater Quality Sampling and Analysis

Site groundwater monitoring program for the first four years after remedy implementation will be in accordance with Table C-1, and/or subsequent DTSC-approved modifications.

With the exception of wells CDM-112, CDM-113, and CDM-114, which will be sampled annually, S-W will sample all new monitoring wells installed on the S-W property on a semi-annual basis for the first two years after remedy implementation. Following these two years, S-W will use the data from the well samples and the data quality objectives to determine if semi-annual sampling should continue or whether the frequency can be reduced to annual.

Rifkin Guard Well RP-1 and RP4, and well MW-3, will be sampled for arsenic analysis on a quarterly basis as the arsenic concentrations at these wells during remedy implementation increased above their respective historical maximum detections. Quarterly sampling for each of these three wells will continue until statistical analysis of the results demonstrates that the arsenic concentration for each respective well is stable or decreasing; the frequency of sampling for the well will then be adjusted to semi-annual.

S-W will collect groundwater samples in accordance with the methodology for well sampling presented in the existing project Groundwater Monitoring Plan Assessment (LFR, 2006a) and Quality Assurance Project Plan (LFR, 2006b). The samples will be sent to a certified laboratory chosen by S-W and analyzed for arsenic by EPA Method 6010B, volatile organic compounds (VOCs) by EPA Method 8260B, and/or total petroleum hydrocarbons (TPH) as gasoline (TPH-G) by EPA Method 8260 and TPH as diesel and motor oil (TPH-D/MO) by EPA Method 8015M with silica gel cleanup (SGC). In addition, S-W will measure the following field parameters during purging and sample collection:

- Temperature
- pH
- Turbidity
- Dissolved Oxygen
- Specific Conductivity
- Oxidation-Reduction Potential

S-W will use field parameter results to support the representativeness of the well samples and monitor the relative distribution of oxidizing/reducing conditions.

C.2.2 Depth to Groundwater Measurements

Site groundwater monitoring program for the first four years after remedy implementation will be in accordance with Table C-1, and/or subsequent DTSC-approved modifications.

As the remedy has been designed to control groundwater movement, S-W will collect groundwater elevation data monthly for the first year from monitoring wells and piezometers to monitor whether groundwater movement patterns are consistent with projected design groundwater model conditions for the remedy, as presented in the Feasibility Study (FS) (CDM, 2009). S-W will use the first year's data set to evaluate the effectiveness of the slurry wall segments to divert groundwater, and the effectiveness of the slurry wall breaches to facilitate groundwater movement. After the first year, if groundwater

elevations and movement patterns are consistent with projected design conditions, the frequency of groundwater elevation monitoring will be revised to quarterly. S-W will utilize the quarterly elevation monitoring data sets to continue evaluation of potential seasonal variation in groundwater movement. S-W will evaluate the frequency of groundwater elevation monitoring annually.

Should future construction activities affect groundwater movement or rates of infiltration (e.g., redevelopment of the former Rifkin property or S-W property), S-W will initiate monthly monitoring during and post-construction for a period of at least one year to monitor whether groundwater movement patterns continue to be consistent with projected design groundwater model conditions. If groundwater elevations and movement patterns are consistent with projected design conditions, groundwater elevation monitoring will return to its previously established frequency.

Changes to the frequency of groundwater elevation monitoring resulting from a determination that groundwater movement patterns are inconsistent with projected design conditions are further discussed in Section C.5.3.

C.3 Groundwater Quality Effectiveness Criteria

S-W will analyze the analytical results from sampling of the groundwater monitoring wells to evaluate the effectiveness of the remedy. Table C-2 provides a summary of the groundwater quality effectiveness criteria that S-W will utilize to evaluate the effectiveness of the remedy. The criteria are discussed below.

C.3.1 Excavated and Backfilled Area on Former Rifkin Property

It is anticipated that COC concentrations in groundwater within this area will fluctuate after remedy implementation, as the groundwater comes into equilibrium with the backfill material and surrounding groundwater conditions. S-W will collect analytical samples from wells CDM-101 and CDM-102. Analytical results from a certified laboratory will be used to evaluate whether COC concentrations in groundwater in this area are stable or decreasing by no later than four years after remedy implementation. In addition, S-W will use analytical data of samples from these wells to evaluate whether arsenic concentrations in this area are less than 5,000 micrograms per liter (µg/L) by no later than four years after remedy implementation.

C.3.2 Excavated and Backfilled Area on S-W Property

It is anticipated that COC concentrations in groundwater within this area will fluctuate after remedy implementation, as the groundwater comes into equilibrium with the backfill material and surrounding groundwater conditions. Therefore, S-W will use analytical results of samples from wells CDM-103 and CDM-104 to evaluate whether COC concentrations in groundwater in this area are stable or decreasing by no later than four years after remedy implementation.

C.3.3 North Side on Former Rifkin Property

S-W will analyze analytical results of samples from the Rifkin Guard Wells to evaluate whether arsenic concentration trends are statistically stable or decreasing after remedy implementation.

C.3.4 Central Site on S-W Property

S-W will analyze analytical results of samples from wells CDM-105 and CDM-106 to determine if there is potential movement of COCs in groundwater toward the west side groundwater monitoring wells CDM-107 and CDM-108.

S-W will analyze results of analytical samples from wells CDM-110, CDM-111, CDM-113, and CDM-114 to determine if there is potential change in groundwater quality outside of the area affected by the excavated and backfilled area.

C.3.5 West Side on S-W Property

S-W will analyze results of analytical samples from wells CDM-107 and CDM-108 to evaluate whether trends of COC concentrations in groundwater migrating offsite through the slurry wall breaches toward the Union Pacific Railroad property are statistically stable or decreasing, and whether arsenic concentrations exceed 250 µg/L for CDM-107 or 500 µg/L for CDM-108. These arsenic concentration criteria are based on protection of Temescal Creek channel and further discussed in Section C.6.1.2.

S-W will analyze results of analytical samples from well CDM-109 to evaluate the effectiveness of the slurry wall extension in containing the onsite groundwater plume and to evaluate whether trends of COC concentrations in groundwater present outside the slurry wall are statistically stable or decreasing.

C.3.6 West Side on Union Pacific Railroad Property

S-W will analyze results of analytical samples from wells LF-24 and LF-25 to evaluate whether COC concentrations in groundwater near the Temescal Creek channel are less than Site cleanup goals or whether their trends are statistically stable or decreasing. Since installation in 1996, arsenic concentrations in samples from these wells have been stable or decreasing. Arsenic concentrations in samples from monitoring well LF-24 since the time of installation in 1996 have been less than 36 µg/L. Arsenic concentrations for LF-25 have been less than 36 µg/L since 2006 and are currently demonstrating a decreasing trend.

C.3.7 North Side on S-W Property

S-W will analyze results of analytical samples from well LF-18 to evaluate whether COC concentrations in groundwater near the Temescal Creek channel are less than Site cleanup goals or whether their trends are statistically stable or decreasing.

C.3.8 South Side on Sherwin Avenue

S-W will analyze results of analytical samples from well CDM-112 to evaluate whether COC concentrations in groundwater in this area are less than Site cleanup goals or whether their trends are statistically stable or decreasing.

C.4 Groundwater Movement Effectiveness Criteria

Table C-2 provides a summary of the groundwater movement criteria to be utilized to monitor the effectiveness of the remedy. The criteria are further discussed below.

C.4.1 Groundwater Movement Patterns

S-W will monitor the measurements of depths to groundwater in Site wells to determine if long-term groundwater movement patterns within the S-W property are consistent with projected design groundwater model conditions for the remedy, as presented in the FS (CDM, 2009), and are included at the end of this Attachment C. These projected design conditions include groundwater movement towards the slurry wall breaches and the absence of long-term, localized groundwater mounding.

C.4.2 Depths to Groundwater

S-W will evaluate groundwater elevation measurements to determine if the depths to groundwater are sufficient to minimize potential inundation of subsurface utility corridors.

C.4.3 Arsenic Mass Flux between CDM-101, CDM-102, CDM-104, and PZ-101

S-W will evaluate groundwater elevation measurements, along with concentrations of arsenic in groundwater, from CDM-101, CDM-102, CDM-104, and/or PZ-101 to determine if the net arsenic mass flux within the excavated and backfilled area between the locations of these proposed wells is towards the S-W property west of the former Rifkin property.

As appropriate, the criterion of net mass flux towards the S-W property could be evaluated using other COCs.

C.5 Remedy Effectiveness Evaluation

After remedy implementation, S-W will utilize the groundwater monitoring data sets to evaluate the effectiveness of the remedy and determine if contingency action(s) are needed to achieve Site cleanup goals. The following text summarizes the evaluation process and criteria to be used to determine the need for contingency actions.

C.5.1 Groundwater Quality for Wells CDM-101 thru CDM-104, CDM-107 thru CDM-109, CDM-112, LF-18, LF-24, LF-25, and Rifkin Guard Wells

S-W will evaluate COC concentration trends for these 17 wells by statistical testing, including but not limited to the Mann-Kendall (Gilbert, 1997) nonparametric statistical test. Consistent with U.S. EPA guidance (EPA, 1994), S-W will use a significance level of 0.05 (i.e., a 95% confidence level) in applying the Mann-Kendall nonparametric test. If an increasing COC concentration trend is found, S-W will increase the frequency of monitoring for the well to monthly for three months and use the 95% UCL concentrations from these four events (the previous scheduled event and subsequent three monthly events) in the Mann-Kendall nonparametric test in place of the previous quarterly event result. If this re-evaluation demonstrates a return to a stable or decreasing COC concentration trend, S-W will return the frequency of monitoring for the well to its previously established frequency listed in Table C-1. Otherwise, S-W will provide written recommendations to DTSC for implementation of a contingency action (see Section C.6).

If during establishment of a statistical arsenic concentration trend for wells CDM-107 and CDM-108, arsenic concentrations exceed 250 µg/L for CDM-107 or 500 µg/L for CDM-108, S-W will provide written recommendations to DTSC for implementation of a contingency action (see Section C.6). These arsenic concentration criteria are based on protection of Temescal Creek channel and are further discussed in Section C.6.1.

C.5.2 Groundwater Quality for Wells CDM-101 and CDM-102

If four years after remedy implementation the arsenic concentration threshold criterion of 5,000 µg/L is exceeded in samples from either wells CDM-101 or CDM-102, S-W will provide written recommendations to DTSC for implementation of a contingency action (see Section C.6).

C.5.3 Groundwater Movement Patterns

S-W will perform an estimate of groundwater flow direction and hydraulic gradient following each groundwater elevation monitoring event. S-W will then compare the groundwater flow direction and

measured hydraulic gradient to the projected design groundwater model conditions for the remedy, as presented in the FS (CDM, 2009), or as updated during preparation of the RDIP, and are included at the end of this Attachment C. As discussed in Section C.2, S-W will conduct the first assessment of this criterion after the first year of monthly groundwater elevation monitoring. The groundwater movement conditions that will be monitored as part of the annual assessment will include:

- The slurry wall extension controls groundwater movement to the north and south, in the area of CDM-111 and CDM-113;
- Net groundwater movement within the Excavated and Backfilled Area on S-W property is toward the interceptor trench or the wall breaches near the Union Pacific Railroad property, and not toward Horton Street;
- Net groundwater movement within Excavated and Backfilled Area on former Rifkin property is to the north-northwest;
- Net groundwater movement from the high permeability fill area surrounding CDM-104 is toward the slurry wall breaches near the Union Pacific Railroad property, and not toward the former Rifkin property; and
- Mounding of groundwater, to the extent it occurs, is seasonal and generally follows above average precipitation events and does not result in net groundwater movement toward the Rifkin property, movement of water over the top of the slurry wall, or flow around the slurry wall extension.

If the first assessment determines that groundwater movement patterns are consistent with projected design conditions and DTSC concurs, S-W will perform groundwater elevation monitoring quarterly as discussed in Section C.2.

If the first assessment or any subsequent annual assessment determines that groundwater movement patterns differ significantly from projected design conditions, S-W will provide written recommendation to DTSC for either implementation of additional monitoring/investigation steps or a contingency action.

Additional monitoring/investigation may include but is not limited to continued/return to monthly groundwater monitoring for an additional year, at which time a follow up assessment would be made and the monitoring revised as appropriate. Possible contingency action is discussed in Section C.6.

C.5.4 Depths to Groundwater

If one year after remedy implementation the depth to groundwater in any well is measured at or less than four (4) feet bgs, S-W will reinitiate monthly monitoring for the well to determine if depth to groundwater is exhibiting a rising trend. If the depth to groundwater from three consecutive monthly events is greater than four (4) feet bgs, S-W will return the frequency of monitoring for the well to its previously established frequency. Otherwise, monthly monitoring will continue. If the depth to groundwater in any well is measured at or less than three (3) feet bgs, S-W will provide written recommendations to DTSC for implementation of a contingency action (see Section C.6).

C.5.5 Arsenic Mass Flux between CDM-101, CDM-102, CDM-104, and PZ-101

The projected groundwater model design conditions are intended to prevent long-term (steady-state) groundwater and residual COC movement within the excavated and backfilled area between the

locations of these proposed wells towards the former Rifkin property. This additional criterion for monitoring the effectiveness of the remedy includes maintaining a positive mass flux from the former Rifkin property to the S-W property for each COC. As discussed in Section C.4.3, this criterion is anticipated to apply only to arsenic.

After each groundwater elevation monitoring event for the three wells and one piezometer, S-W will calculate the hydraulic gradient within the excavated and backfilled area on the former Rifkin property and the contiguous backfilled area to the west, on the S-W property. S-W will use the transect method (API, 2003) to calculate the arsenic mass flux in groundwater through the cross-sectional area underlying the Rifkin/S-W property line between these wells for each event using the following equation:

$w = (C)(K)(i)(A)(CF)$

where, w = chemical mass flux through the transect (g/day)

C = concentration of chemical through the transect (mg/L)

K = hydraulic conductivity at the transect (cm/sec)

i = hydraulic gradient at the transect (cm/cm)

A = cross-sectional area associated with the transect (ft3)

CF = conversion factor, 80.3 (ft/cm)/(sec/day)(L/ft3)(g/mg)

The calculated mass flux, w, value for each event will include both the magnitude and direction. The direction will be based on assigning a positive hydraulic gradient, i, if groundwater movement is toward Rifkin and negative for movement away from Rifkin. The concentration, C, for each event will be either (1) the concentration of CDM-104 if the groundwater movement is toward Rifkin, or (2) the average of the arsenic concentration of CDM-101 and CDM-102 if groundwater movement is away from Rifkin.

Due to the uncertainty introduced by variations in percent recovery; quality control; and matrix interferences, there will be inherent variations in the precision and bias of laboratory analytical results for the groundwater samples from the wells used in the flux calculations. Therefore, S-W will use a default tolerance limit of 20 percent to determine if concentrations are considered different for use in calculating mass flux, i.e., mass flux, w, will be set at zero for each event where arsenic concentrations from wells CDM-101, 102, and CDM-104 differ by or less than 20 percent. As appropriate, S-W will apply this criterion to other COCs, if concentrations of other COCs for these three wells differ by more than 20 percent.

After the first year of monthly groundwater monitoring, S-W will sum the monthly arsenic mass flux values to calculate the annual net arsenic mass flux. Each of the monthly mass flux values will represent an approximately equal duration (i.e., one month). If this first year net arsenic mass flux is negative (movement of arsenic away from Rifkin), S-W will proceed to quarterly groundwater monitoring, as discussed in Section C.2.

If the net arsenic mass flux during the first year or any subsequent year is positive (movement of arsenic toward Rifkin), S-W will provide written recommendation to DTSC for either implementation of additional monitoring/investigation steps or a contingency action.

Additional monitoring/investigation may include, but is not limited to, continued/return to monthly groundwater monitoring at these wells for an additional year, at which time a follow up assessment would be made and the monitoring revised as appropriate. Possible contingency action is discussed in Section C.6.

If the net arsenic mass flux during the first year or any subsequent year exceeds the equivalent to arsenic concentrations of 500 µg/L with a groundwater migration rate of 1 foot/day, S-W will provide written recommendation to DTSC for contingency action (see Section C.6).

C.6 Contingency Action

Section C.5 presented the criteria for which written recommendations to DTSC for contingency action will be required. The recommendations for contingency action will be consistent with best engineering practices to minimize the potential for any further spread of the COCs and to strive to restore a stable or decreasing groundwater plume. Such contingency action may include, but not be limited to: additional soil excavation and backfill; modifications to permeability of placed fill; in-situ groundwater treatment or in-place geochemistry modifications within the Site or at the slurry wall breaches; modification to the groundwater containment system; and/or active groundwater extraction and treatment.

The submittal to DTSC for the recommended contingency action would also include effectiveness evaluation criteria for the contingency action. S-W would implement the contingency action after approval by DTSC.

C.6.1 Active Groundwater Extraction and Treatment

Criteria for Rifkin Guard Wells

If verified arsenic concentrations in samples from any Rifkin Guard Well during evaluation of the contingency action exceed the criteria listed in Table C-3, S-W will provide written recommendations to DTSC to implement active groundwater extraction and treatment with disposal/reuse of treated water. The objective of the groundwater extraction contingency action, to address exceedance of the Rifkin Guard Well criteria, would be to prevent further migration of arsenic contaminated groundwater onto the former Rifkin property. For this action, further arsenic migration is defined as northerly groundwater movement across the alignment of the Rifkin Guard Wells.

The submittal to DTSC for active groundwater extraction would also include criteria for evaluating the effectiveness of the extraction. Consistent with existing DTSC procedures, S-W would implement active groundwater extraction and evaluate its effectiveness. This evaluation would include consideration of (1) terminating active groundwater extraction and returning to the original remedy (i.e., natural attenuation of arsenic in groundwater) if criteria listed in Table C-4 are met, or (2) implementation of additional contingency action, if criteria listed in Table C-4 are not met.

Criteria for Wells CDM-107 and CDM-108

If verified arsenic concentrations in samples from CDM-107 or CDM-108 during evaluation of the contingency action exceed the criteria listed in Table C-3, S-W will provide written recommendations to DTSC to implement active groundwater extraction and treatment with disposal/reuse of treated water. The objective of the groundwater extraction contingency action, to address exceedance of the CDM-107/108 criteria, would be to prevent further migration of arsenic contaminated groundwater through one or both of the slurry wall breaches along the Union Pacific Railroad property, as necessary, to maintain protection of Temescal Creek channel. Supporting information for the contingency action

criteria for arsenic listed in Table C-3 for CDM-107 and CDM-108 is presented in the Remedial Action Plan (RAP) (CDM, 2010).

The submittal to DTSC for active groundwater extraction would also include criteria for evaluating the effectiveness of the extraction. Consistent with existing DTSC procedures, S-W would implement active groundwater extraction and evaluate its effectiveness. This evaluation would include consideration of (1) terminating active groundwater extraction and returning to the original remedy (i.e., natural attenuation of arsenic in groundwater) if criteria listed in Table C-4 are met, or (2) implementation of additional contingency action if criteria listed in Table C-4 are not met.

Implementation of Active Groundwater Extraction

The objective of the active groundwater extraction contingency action would be to control further migration of arsenic impacted groundwater on the former Rifkin property or through the slurry wall breaches. A contingency action that includes groundwater extraction would be implemented within the area of the higher permeability backfill on the S-W property, and would be consistent with evaluation presented in the Remedial Action Plan (CDM, 2010) and/or subsequent DTSC-approved modifications. The uniform nature of this higher permeability backfill would facilitate enhanced hydraulic communication with surrounding native materials, backfill in the remainder of the Site, and the interceptor trench.

Using the groundwater model for the Unit A aquifer (A-zone) developed for the FS (CDM, 2009), as updated during preparation of the RDIP, a groundwater extraction scenario has been evaluated for conditions anticipated to be present after implementation of the preferred remedy. Based on the groundwater model simulation results, a single groundwater extraction well within the higher permeability backfill on the S-W property would be sufficient to simultaneously meet the objectives of contingency actions for both the former Rifkin property and the slurry wall breaches. Under this selected groundwater extraction scenario, a pumping rate of approximately 3.1 gallons per minute (gpm) from this well would be sufficient to maintain a hydraulic capture zone that extends to the Rifkin Guard Wells and the downgradient slurry wall breach nearest to the source area. The model indicates that of the two downgradient slurry wall breaches along the Union Pacific Railroad property, the one associated with well CDM-108 is the more likely to first have potential increases in COC concentrations that would trigger a need for contingency action.

The groundwater model simulation results include a presentation of the steady-state potentiometric surface contours and particle tracking showing groundwater movement in the A-zone that would develop due to pumping from this single groundwater extraction well within the high permeability backfill on the S-W property. The results demonstrate that this contingency groundwater extraction action would adequately provide control of migration of COCs in groundwater.

C.7 References

API, 2003. Groundwater Remediation Strategies Tool, Regulatory Analysis & Scientific Affairs Department, Publication Number 4730. December 2003.

CDM, 2010. Final Remedial Action Plan, Sherwin-Williams Company, Emeryville, California. Camp Dresser & McKee Inc. June 14, 2010.

CDM, 2009. Feasibility Study, Sherwin-Williams Company, Emeryville, California. Camp Dresser & McKee Inc. April 1, 2009.

LFR, 2006a. Groundwater Monitoring Plan Assessment, Sherwin-Williams Site, 1450 Sherwin Avenue, Emeryville, California. LFR Inc. June 28, 2006.

LFR, 2006b. Quality Assurance Project Plan, Sherwin-Williams Facility, 1450 Sherwin Avenue, Emeryville, California. LFR Inc. July 13, 2006.

Table C-1
Groundwater Well Construction Details and Monitoring Program
Sherwin-Williams Emeryville Operation and Maintenance Plan

Well Number	**Well Construction Details**										***Well Monitoring Program After Excavation/Backfill*** [1]				
	Date Constructed	***Top of Casing Elevation*** (feet NAVD88)	***Total Depth*** (feet bgs)	***Casing Material***	***Casing Diameter*** (inches)	***Screen Slot Size*** (inches)	***Screen Interval Depths*** Top (feet toc)	Bottom (feet toc)	***Screen Interval Elevations*** Top (feet NAVD88)	Bottom (feet NAVD88)	***Depth To Groundwater*** [2]	***Arsenic by EPA Method 6010B***	***Volatile Organic Compounds by EPA Method 8260B***	***Field Parameters*** [3]	***TPH-G by EPA Method 8260 AND TPH-D/MO by EPA Method 8015M with SGC***
Existing Wells															
Horton Street - City of Emeryville															
LF-12	11/2/1989	17.65	18	PVC	4	0.020	7.5	17.5	10.2	0.1	Monthly/Quarterly	Annually	Annually	Each Event	Annually
LF-13	11/2/1989	17.48	18	PVC	4	0.020	7.0	17.0	10.5	0.5	Well retained for possible future monitoring, if needed				
LF-27	12/22/1997	17.83	18	PVC	2	0.010	10.0	18.0	7.8	-0.2	Well retained for possible future monitoring, if needed				
LF-28	12/22/1997	17.09	18	PVC	2	0.010	6.5	18.0	10.6	-0.9	Monthly/Quarterly	Annually	Annually	Each Event	Annually
LF-29	12/23/1997	16.40	20	PVC	2	0.010	6.0	19.0	10.4	-2.6	Well retained for possible future monitoring, if needed				
LF-30	12/23/1997	15.86	19	PVC	2	0.010	6.0	18.5	9.9	-2.6	Well retained for possible future monitoring, if needed				
Former Rifkin Property - Novartis Vaccines and Diagnostics, Inc.															
RP-1[a]	7/26/1994	17.84	13	PVC	2	0.010	7.0	12.0	10.8	5.8	Monthly/Quarterly	Quarterly [4]	Annually	Each Event	--
RP-2[a]	7/25/1994	17.94	15	PVC	2	0.010	8.5	14.5	9.4	3.4	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
RP-3	7/26/1994	17.87	13	PVC	2	0.010	8.0	12.5	9.9	5.4	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
RP-4[a]	7/25/1994	17.83	17	PVC	2	0.010	7.0	17.0	10.8	0.8	Monthly/Quarterly	Quarterly [4]	Annually	Each Event	--
RP-5[a]	7/25/1994	17.74	15	PVC	2	0.010	7.0	15.0	10.7	2.7	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
LF-35	9/21/199	18.93	27	PVC	2	0.010	24.0	27.0	-5.1	-8.1	Monthly/Quarterly	Annually	Annually	Each Event	--
LF-36[a]	1/3/2000	18.87	16	PVC	2	0.020	7.0	16.0	11.9	2.9	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
LF-37	1/4/2000	18.54	16	PVC	2	0.020	7.0	16.0	11.5	2.5	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
LF-38	1/4/2000	18.51	27	PVC	2	0.020	20.0	27.0	-1.5	-8.5	Monthly/Quarterly	Annually	Annually	Each Event	--
LF-39	1/3/2000	18.97	26	PVC	2	0.020	18.0	26.0	1.0	-7.0	Monthly/Quarterly	Annually	Annually	Each Event	--
LF-40	1/4/2000	18.84	15	PVC	2	0.020	7.0	15.0	11.8	3.8	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
LF-41[a]	12/29/1999	18.24	15	PVC	2	0.020	7.0	15.0	11.2	3.2	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
EX-14	12/29/1999	18.74	16	SS	6	0.010	5.5	15.5	13.2	3.2	Well retained for possible future monitoring, if needed				
EX-15	12/29/1999	17.88	17	SS	6	0.010	7.0	17.0	10.9	0.9	Well retained for possible future monitoring, if needed				
MW-1	12/9/1994	16.48	19	PVC	2	0.010	7.0	17.0	9.5	-0.5	Well retained for possible future monitoring, if needed				
MW-2	12/8/1994	16.29	19	PVC	2	0.010	5.0	17.0	11.3	-0.7	Well retained for possible future monitoring, if needed				
MW-3	12/8/1994	17.30	20	PVC	2	0.010	6.5	19.5	10.8	-2.2	Monthly/Quarterly	Quarterly [4]	Annually	Each Event	--
Sherwin-Williams Property															
LF-18	2/5/1996	15.75	19	PVC	2	0.010	8.0	18.0	7.8	-2.3	Monthly/Quarterly	Annually	Annually	Each Event	--
LF-42	1/5/2000	17.29	16	PVC	2	0.020	7.0	15.0	10.3	2.3	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
Union Pacific Railroad Property															
LF-24	4/4/1996	12.92	17	PVC	2	0.010	7.0	17.0	5.9	-4.1	Annually	Annually	Annually	Each Event	--
LF-25	4/4/1996	14.01	18	PVC	2	0.010	8.0	18.0	6.0	-4.0	Annually	Annually	Annually	Each Event	--
Offsite Property - Madison Bay Street, LLC															
MD-5	4/4/2003	12.03	16	PVC	0.75	0.010	6.0	16.0	6.0	-4.0	Monthly/Quarterly	--	--	--	--

Table C-1
Groundwater Well Construction Details and Monitoring Program
Sherwin-Williams Emeryville Operation and Maintenance Plan

Well Number	Well Construction Details										*Well Monitoring Program After Excavation/Backfill* [1]				
	Date Constructed	*Top of Casing Elevation* (feet NAVD88)	*Total Depth* (feet bgs)	*Casing Material*	*Casing Diameter* (inches)	*Screen Slot Size* (inches)	*Screen Interval Depths* Top (feet toc)	Bottom (feet toc)	*Screen Interval Elevations* Top (feet NAVD88)	Bottom (feet NAVD88)	*Depth To Groundwater* [2]	*Arsenic by EPA Method 6010B*	*Volatile Organic Compounds by EPA Method 8260B*	*Field Parameters* [3]	*TPH-G by EPA Method 8260 AND TPH-D/MO by EPA Method 8015M with SGC*
New Wells															
Former Rifkin Property - Novartis Vaccines and Diagnostics, Inc.															
CDM-101	3/8/2012	18.97	21	PVC	2	0.010	10.7	20.7	8.3	-1.7	Monthly/Quarterly	Semi-Annually	Semi-Annually	Each Event	--
CDM-102	3/8/2012	17.61	20	PVC	2	0.010	10.5	20.5	8.1	-1.9	Monthly/Quarterly	Semi-Annually	Semi-Annually	Each Event	--
Sherwin-Williams Property															--
CDM-103	3/7/2012	20.56	20	PVC	2	0.010	12.8	22.8	7.8	-2.2	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
CDM-104	3/9/2012	18.60	18	PVC	2	0.010	10.8	20.8	7.8	-2.2	Monthly/Quarterly	Semi-Annually	Annually	Each Event	--
CDM-105	3/7/2012	15.83	15	PVC	2	0.010	7.6	17.6	8.2	-1.8	Monthly/Quarterly	Semi-Annually/Annually [5]	Annually	Each Event	--
CDM-106	3/7/2012	16.21	15.5	PVC	2	0.010	8.3	18.3	7.9	-2.1	Monthly/Quarterly	Semi-Annually/Annually [5]	Annually	Each Event	--
CDM-107	2/20/2012	17.38	16.5	PVC	2	0.010	9.5	19.5	7.9	-2.1	Monthly/Quarterly	Semi-Annually	Semi-Annually	Each Event	--
CDM-108	2/20/2012	17.71	17	PVC	2	0.010	9.6	19.6	8.1	-1.9	Monthly/Quarterly	Semi-Annually	Semi-Annually	Each Event	--
CDM-109	2/20/2012	15.44	15	PVC	2	0.010	7.1	17.1	8.4	-1.6	Monthly/Quarterly	Semi-Annually/Annually [5]	Annually	Each Event	--
CDM-110	3/12/2012	15.62	18	PVC	2	0.010	7.6	17.6	8.0	-2.0	Monthly/Quarterly	Semi-Annually/Annually [5]	Annually	Each Event	Annually
CDM-111	3/9/2012	18.14	17	PVC	2	0.010	10.3	20.3	7.8	-2.2	Monthly/Quarterly	Semi-Annually/Annually [5]	Annually	Each Event	Annually
CDM-112	3/8/2012	15.70	18	PVC	2	0.010	7.7	17.7	8.1	-2.0	Monthly/Quarterly	Annually	Annually	Each Event	--
CDM-113	3/8/2012	15.47	18	PVC	2	0.010	7.5	17.5	8.0	-2.0	Monthly/Quarterly	Annually	Annually	Each Event	--
CDM-114	3/12/2012	14.72	17.5	PVC	2	0.010	6.7	16.7	8.0	-2.0	Monthly/Quarterly	Annually	Annually	Each Event	Annually
New Piezometers															
Sherwin-Williams Property															--
PZ-101	3/9/2012	19.01	19	PVC	1	0.010	11.5	21.5	7.5	-2.5	Monthly/Quarterly	--	--	--	--
PZ-102	3/12/2012	16.64	19	PVC	1	0.010	8.6	18.6	8.0	-2.0	Monthly/Quarterly	--	--	--	--

Notes:

NADV88: North American Vertical Datum of 1988

bgs: below ground surface

toc: top of casing

PVC: polyvinyl chloride

SS: stainless steel

a - Designated Rifkin Guard Well.

1 - Monitoring program is only for the first four years after remedy implementation.

2 - Depth to groundwater measured monthly for first year and then quarterly for next three years; should there be a change in the rate of infiltration that affects groundwater flow conditions, monthly monitoring would be reinitiated for at least one year.

3 - Field parameters include: temperature, pH, turbidity, dissolved oxygen, oxidation-reduction potential, and specific conductivity.

4 - Frequency of monitoring for arsenic for this well will be quarterly as arsenic concentration for this well increased above its historical maximum detection during remedy implementation.

5 - Frequency of monitoring for arsenic for this well will be semi-annually for the first two years; if after two years arsenic concentration is stable to decreasing, frequency of monitoring will be modified to annually after DTSC concurrence; otherwise, it will remain semi-annually.

Table C-2

Remedy Effectiveness Evaluation Criteria

Sherwin-Williams Emeryville Operation and Maintenance Plan

Groundwater Quality Effectiveness Criteria [1]	
Well	**Remedy Effectiveness Evaluation Criteria**
Former Rifkin Property	
CDM-101	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing four years after remedy implementation, and arsenic is less than 5,000 ug/L four years after remedy implementation
CDM-102	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing four years after remedy implementation, and arsenic is less than 5,000 ug/L four years after remedy implementation
RP-1[a]	Arsenic concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
RP-2[a]	Arsenic concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
RP-4[a]	Arsenic concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
RP-5[a]	Arsenic concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
LF-36[a]	Arsenic concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
LF-41[a]	Arsenic concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
Sherwin-Williams Property	
LF-18	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
CDM-103	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
CDM-104	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
CDM-107	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
CDM-108	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
CDM-109	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
CDM-112	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
Union Pacific Property	
LF-24	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing
LF-25	COC concentrations are less than Site cleanup goals or their trends are statistically stable to decreasing

Groundwater Movement Effectiveness Criteria
1. Long-term groundwater flow patterns are consistent with projected design groundwater model conditions.
2. Long-term arsenic in groundwater mass flux at the Rifkin/S-W property line between CDM-101/CDM-102 and PZ-101/CDM-104 is westward, from the former Rifkin property to the S-W property.
3. Absence of long-term groundwater mounding at the Site.
4. Depths to groundwater at all wells are more than 3 feet below ground surface.

Notes:

COC: chemical of concern

ug/L: microgram per liter

a - Designated Rifkin Guard Well.

1 - Wells not presented do not have groundwater quality remedy effectiveness evaluation criteria.

Table C-3

Criteria for Implementing Active Groundwater Extraction

Sherwin-Williams Emeryville Operation and Maintenance Plan

Well	Criteria for Implementing Active Groundwater Extraction [1]	*Maximum Arsenic Concentration Detected from Well thru February 2012* [2]
Former Rifkin Property (Guard) Wells		
RP-1[a]	Increasing arsenic concentration trend with concentration greater than higher of 150 ug/L or 150% of the maximum arsenic concentration detected for the well prior to or during remedy implementation	140
RP-2[a]	Increasing arsenic concentration trend with concentration greater than higher of 75 ug/L or 150% of the maximum arsenic concentration detected for the well prior to or during remedy implementation	42
RP-4[a]	Increasing arsenic concentration trend with concentration greater than higher of 75 ug/L or 150% of the maximum arsenic concentration detected for the well prior to or during remedy implementation	25
RP-5[a]	Increasing arsenic concentration trend with concentration greater than higher of 75 ug/L or 150% of the maximum arsenic concentration detected for the well prior to or during remedy implementation	38
LF-36[a]	Increasing arsenic concentration trend with concentration greater than higher of 75 ug/L or 150% of the maximum arsenic concentration detected for the well prior to or during remedy implementation	65
LF-41[a]	Increasing arsenic concentration trend with concentration greater than higher of 150 ug/L or 150% of the maximum arsenic concentration detected for the well prior to or during remedy implementation	97
Sherwin-Williams Property Wells		
CDM-107	Increasing arsenic concentration trend with concentration greater than 250 ug/L	Not applicable [3]
CDM-108	Increasing arsenic concentration trend with concentration greater than 500 ug/L	Not applicable [3]

Notes:

COC: chemical of concern

ug/L: microgram per liter

a - Designated Rifkin Guard Well.

1 - Wells not presented do not have criteria for implementing active groundwater extraction.

2 - CDM Smith, 2012. Remedy Implementation Completion Report, Sherwin-Williams Company, Emeryville, California. July 25.

Table C-4

Criteria to Terminate Active Groundwater Extraction

Sherwin-Williams Emeryville Operation and Maintenance Plan

Well	*Criteria to Terminate Active Groundwater Extraction and Return to Monitored Natural Attenuation* [1]	*Maximum Arsenic Concentration Detected from Well thru April 2011* [2]
Former Rifkin Property		
RP-1[a]	Arsenic concentration less than higher of 100 ug/L or maximum arsenic concentration detected prior to or during remedy implementation	95
RP-2[a]	Arsenic concentration less than higher of 50 ug/L or maximum arsenic concentration detected prior to or during remedy implementation	42
RP-4[a]	Arsenic concentration less than higher of 50 ug/L or maximum arsenic concentration detected prior to or during remedy implementation	19
RP-5[a]	Arsenic concentration less than higher of 50 ug/L or maximum arsenic concentration detected prior to or during remedy implementation	38
LF-36[a]	Arsenic concentration less than higher of 65 ug/L or maximum arsenic concentration detected prior to or during remedy implementation	65
LF-41[a]	Arsenic concentration less than higher of 100 ug/L or maximum arsenic concentration detected prior to or during remedy implementation	97
Sherwin-Williams Property		
CDM-107	Arsenic concentration less than 250 ug/L	Not applicable [3]
CDM-108	Arsenic concentration less than 500 ug/L	Not applicable [3]

Notes:

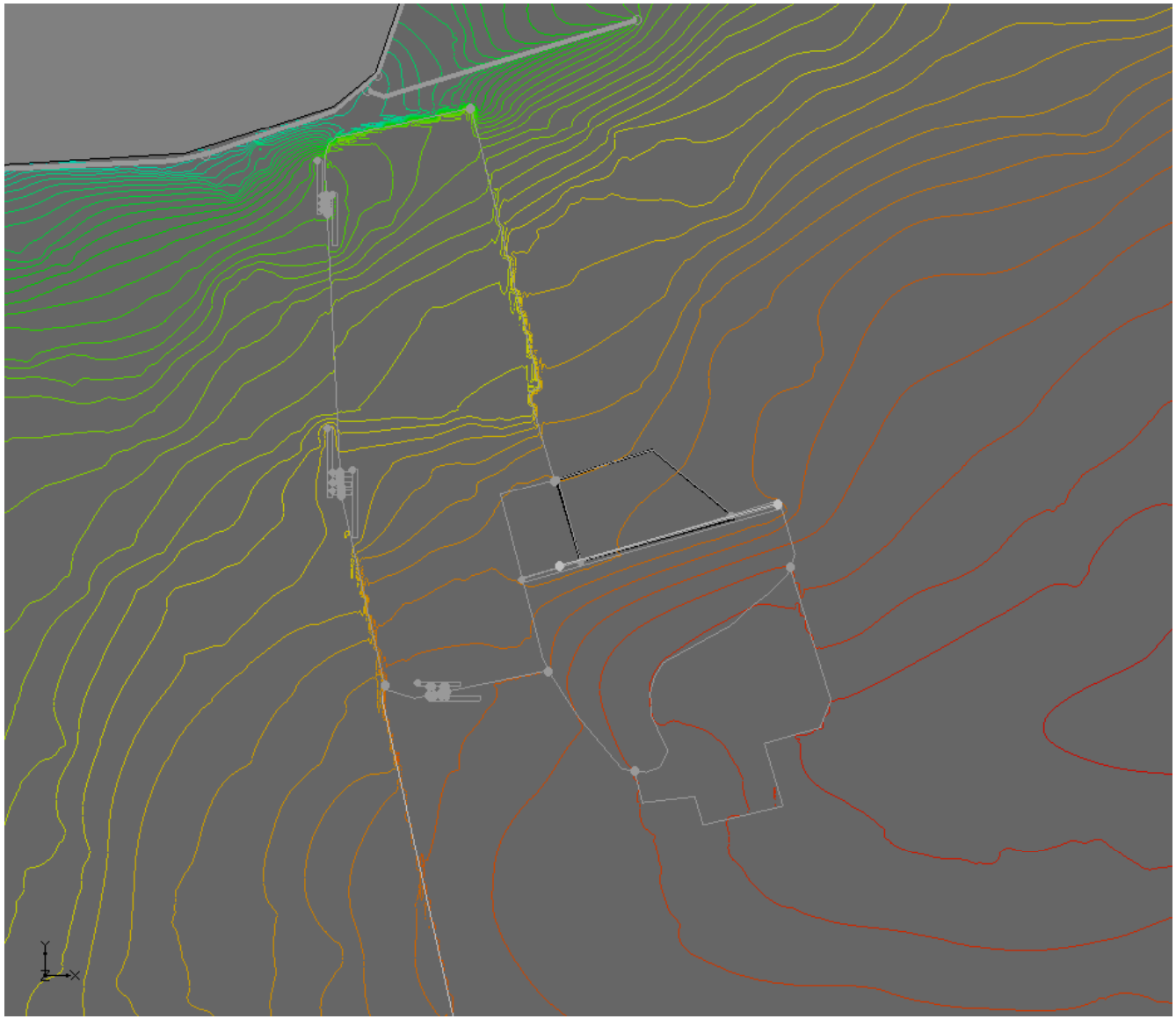
ug/L: microgram per liter

a - Designated Rifkin Guard Well.

1 - Wells not presented do not have criteria to terminate active groundwater extraction and return to monitored natural attenuation.

2 - LFR Inc. 2011. Combined Groundwater and NPDES Self-Monitoring Report, Sherwin-Williams Facility, 1450 Sherwin Avenue, Emeryville, California. April 29.

Projected Design Groundwater Model Conditions From Appendix B of 2009 Feasibility Study



See Figure 6-18 for Location and Description of Site Features for this Alternative

CDM

Figure 6-19
Alternative 6 Simulated Potentiometric Surface
Sherwin-Williams Company – Emeryville, California

From Appendix B of 2009 Feasibility Study



Figure 6-20
Alternative 6 Simulated Particle Tracks
Sherwin-Williams Company – Emeryville, California

From Appendix B of 2009 Feasibility Study

Attachment D

Soil Gas Evaluation Strategy

Attachment D

Soil Gas Evaluation

After completion of remediation implementation activities, S-W installed soil gas monitoring points at the Site to collect and analyze soil gas samples. This section provides the objective and methodology for sample collection. Table D-1 provides a summary of construction details of the installed soil gas monitoring points.

The monitoring points were installed at locations in proximity to previous soil gas sample locations at the Site, which were conducted in November and December 2006 and reported in CDM's January 30, 2007 report to DTSC. Attachment A, Drawing 3 of this Operation and Maintenance (O&M) Plan presents the locations for these monitoring points.

In order to have representative sample collection of steady-state conditions in the vadose zone after completion of backfill activities and evaluate potential seasonal variability, soil gas samples will be collected in June 2012 and December 2012.

Following the collection and analysis of soil gas samples from the December 2012 event, a data summary and evaluation report will be submitted to DTSC. The report will be submitted by the later of January 31, 2013 or within six weeks after receipt of all analytical reports from the laboratory. The report will contain summaries of the monitoring program, deviations, if any, from the strategy and/or methodology presented in this O&M Plan, and soil gas sample results. The report will evaluate if the results are above cleanup goals and, if needed, present recommendations for continued soil gas evaluation.

The results from the June 2012 event were provided to DTSC following this event, and without evaluation. The June 2012 results are included in Table D-2.

The O&M Plan will be amended, as needed, to include appropriate engineering controls that would be implemented as part of redevelopment if post-excavation sampling reveals that residual soil gas is present above indoor air protective levels. Engineering controls could include: increased building indoor air ventilation; sub-slab depressurization; and/or vapor barriers in combination with other controls.

Whether engineering controls are deemed necessary to address potential indoor vapor intrusion concerns, a long-term soil gas monitoring program may still be appropriate for continued evaluation.

D.1 Soil Gas Sample Collection and Analysis

Soil gas monitoring points were installed at 12 locations at the Site. These locations are in proximity to previous soil gas sample locations at the Site, see Attachment A, Drawing 3 of this O&M Plan.

D.2 Pre-Sampling Activities

Prior to installation of the soil gas monitoring points, installation permits were obtained from Alameda County Public Works Agency (ACPWA) and Underground Service Alert (USA) was contacted at least 72 hours prior to beginning fieldwork to determine the locations of any subsurface utilities. At potential

monitoring points outside of the excavation, S-W coordinated with S-W and Novartis personnel to assist in locating underground utilities.

D.3 Soil Gas Monitoring Point Installation

Methods to penetrate the subsurface for installation of soil gas monitoring points consisted of Concrete Coring (as necessary) and Direct Push. Overlying soil at portions of the Site may be paved asphalt and require coring prior to drilling.

The events for soil gas monitoring point installation were in the following order:

1. Used a concrete coring unit to penetrate the asphalt, where present, at the proposed locations.

2. Used a direct push rig to penetrate through soil with 1.5-inch outside diameter hardened steel rods to approximately 5 feet below ground surface (bgs), or the desired target depth depending on depth to groundwater. Retracted rods slightly to expose soil formation and set monitoring point. As the locations are to be within backfill from the remediation implementation or previous investigation areas, soil cores were not collected.

3. Attached a measured length of 1/8-inch outside diameter Nylaflow tubing to a soil gas sampling point. The point consisted of a six-inch stainless steel soil gas implant screen. The point was hung through the rods via the tubing and placed one foot above the bottom of the borehole. The point was surrounded with #2/12 sand (or equivalent) to two feet above the bottom of the borehole; with the point centered in the sand. As the rods were retracted, one foot of dry bentonite chips was placed above the sand, and then hydrated bentonite slurry placed to 0.5 foot of the surface. The bentonite sealed the point from the ground surface.

4. The monitoring point was completed with sand to the surface and a flush mounted vault.

The monitoring points were installed by a licensed driller: TEG, Inc. The completed monitoring points were allowed to equilibrate for at least 24 hours prior to sampling.

As stated above, the depth of the monitoring point placements was 4 feet bgs or shallower. DTSC guidelines specify 5 feet bgs as an appropriate depth to collect soil gas samples in order to minimize effects from atmospheric conditions, including changes in barometric pressure, temperature, and/or breakthrough of ambient air from the surface. Due to the shallow groundwater table (encountered at 4 to 7 feet bgs), S-W installed monitoring points at 5 feet bgs or shallower in order to minimize moisture content in the soil gas samples. No deeper soil gas samples will be collected. At locations where shallower groundwater was encountered, S-W installed monitoring points as shallow as 3 feet bgs, as necessary. S-W did not install monitoring points at locations with groundwater at or shallower than 4 feet bgs. Table D-1 provides a summary of construction details of the installed soil gas monitoring points.

D.4 Soil Gas Sampling Methodology

The soil gas sampling methodology is in accordance with the Remedial Design Implementation Plan (RDIP) (CDM Smith, 2012) and is consistent with applicable portions of the following guidance documents:

Advisory – Soil Gas Investigations. California Environmental Protection Agency, Department of Toxic Substances Control, Los Angeles Regional Water Quality Control Board, and San Francisco Regional Water Quality Control Board. April 2012.

Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance). California Environmental Protection Agency, Department of Toxic Substances Control, October 2011.

A schematic of the sampling train is shown in Figure D-1. Swagelock® fittings or equivalent will be used for all connections. After assembly, the sampling train will be tested for leaks by performing a vacuum shut-in test. The downhole valve will be closed and a test vacuum of at least 100 inches of water column (in-H2O) will be placed on the sampling train for at least one minute with a mechanical or hand pump, dedicated purge vacuum container, or equivalent. The test will be monitored using a vacuum gauge connected to the train. After the shut-in test, three volumes of air will be purged using a 200 milliliter per minute (mL/min) flow regulator, in order to minimize partitioning or short circuiting of soil gas flow paths, and monitored with a vacuum gauge connected to the train.

Helium gas will be used as a leak check compound to ensure that the bentonite seal is intact. After the shut-in test, a shroud will be placed over the monitoring point and shut-off valve. The atmosphere inside the shroud will be filled with helium. The shroud will have weather stripping along its base in order to maintain a constant leak check concentration in the atmosphere around the sampling location. The helium concentration within the shroud will be monitored using a portable helium detector.

The leak check analysis will be performed during the three volume purge test. After purging 1.5 volumes, the purge will be stopped, and a clean 50 cc disposable, syringe will be used to draw sample from a sample port in the line, see Figure D-1. The syringe sample will be pushed into the helium detector to test for helium. The presence of helium in the sample would be indicative of leak in the seal. If not detected, the purge will continue again to complete the remaining purge. After completing the three volume purge, one more sample will be drawn with a syringe and pushed into the helium detector to check for leak.

After completion of the two leak checks and three volume purge, soil gas will be collected in a 1-liter Summa canister using a flow regulator of less than 150 mL/min, in order to minimize partitioning or short circuiting of soil gas flow paths. Each Summa canister will consist of a stainless steel canister that will be under absolute vacuum (29 in. Hg). All canisters will be provided by and samples will be submitted to a certified air quality laboratory. All sample canisters will be purged and certified by the laboratory to be free of VOCs at the specified detection limits.

If the shut-in test cannot maintain a vacuum and/or helium is detected during purging, the seals will be checked and corrected if necessary and the test(s) repeated. If the problem(s) cannot be corrected, the monitoring point will be abandoned without sample collection and sealed, and a new point installed at a new location.

D.5 Sample Analysis

Soil gas samples will be analyzed, within 14 days of collection, at an analytical laboratory for VOCs by EPA Method TO-15. The samples will also be analyzed for helium by ASTM D-1946 (modified). Additionally, samples will be analyzed for oxygen, carbon dioxide, and methane by ASTM D-1946 (modified). Samples will be handled under standard chain of custody (COC) protocol at all times.

D.6 Quality Assurance and Quality Control

The Quality Assurance/Quality Control (QA/QC) plan for the soil gas evaluation was included with the RDIP in its Appendix C (CDM, Smith 2012). The plan provides methodology to manage overall quality control of sample collection, collection of original data recorded in field notebooks, sample identification tags, chain-of-custody records, data quality, equipment calibrations, and quality control tests. The plan also provides details on the project organization structure and identifies the duties and responsibilities of key personnel.

D.6.1 Field Samples

Field quality control/quality assurance (QA/QC) samples will be collected and analyzed to establish confidence in the sample collecting procedures. One duplicate sample will be collected over the each soil gas sampling event. This sample will be subject to the same sample analysis as the original sample. In addition a trip blank sample will be collected to ensure the integrity of sample canisters during shipping and handling. A trip blank sample will be a 1-liter Summa canister that will travel from the laboratory to the Site, will remain at the Site during each sampling event, and travel back to the laboratory for analysis. The trip blank canister will not be exposed to atmosphere. Equipment blanks will not be collected.

If field samples are found to have been impacted with helium after sample analysis, such samples will be considered to be invalid and require re-sampling at minimum, and may also require re-installation of the point.

D.6.2 Decontamination Procedures

All down-hole equipment will be decontaminated before and after each use. Decontamination will be accomplished by steam cleaning or washing in a solution of Alconox or equivalent non-phosphate detergent, followed by a double rinsing with clean water. Decontamination water will be containerized in 55-gallon drums, labeled, and retained at the Site until characterized for proper disposal.

D.7 Sample Labeling

Samples will be labeled with a unique identification name, date, time, location, and sampler's initials. The identification name will consist of the location name and sample date: Location Name – Sample Type – Sample Date.

D.8 Characterization and Disposal of Investigation Derived Waste

Soil cuttings and waste water will be containerized in separate 55-gallon drums, labeled, and held at a paved portion of the Site until characterized for proper disposal. Within 90 days from the generation of the waste, S-W will arrange for pickup and disposal.

D.9 Monitoring Point Sealing

After the completion of all soil gas sampling events, the monitoring points will be abandoned by pulling out the implant tubing. Since the boreholes are completed above the water table and contain bentonite seals, installation of additional subsurface seals is not anticipated. In accordance with ACPWA abandonment requirements, the vaults will be removed after abandonment and each borehole will be sealed at the surface with a mixture of Portland cement and bentonite slurry. The slurry will be

troweled flush with the surface, and as needed for selected locations, coated with a blackening material for blending with the asphalt.

D.10 References

CDM Smith, 2012. Remedy Implementation Completion Report, Sherwin-Williams Company, Emeryville, California. CDM Smith Inc. July 25, 2012.

Table D-1
Soil Gas Monitroing Point Construction Details
Sherwin-Williams Emeryville Operation and Maintenance Plan

Well Number	**Well Construction Details**					
	Date Constructed	***Total Depth*** (feet bgs)	***Tubing Material***	***Tubing Diameter*** (inches)	***Screen Interval Depths*** Top (feet toc)	Bottom (feet toc)
Former Rifkin Property - Novartis Vaccines and Diagnostics, Inc.						
SGMP-10	7/26/1994	5	Nyaflow	1/8	4.5	5.0
SCMP-11	7/25/1994	5	Nyaflow	1/8	4.5	5.0
SCMP-12	7/26/1994	5	Nyaflow	1/8	4.5	5.0
Sherwin-Williams Property						
SGMP-01	2/5/1996	3	Nyaflow	1/8	2.5	3.0
SGMP-02	1/5/2000	5	Nyaflow	1/8	4.5	5.0
SGMP-03	3/7/2012	4	Nyaflow	1/8	3.5	4.0
SGMP-04	3/7/2012	5	Nyaflow	1/8	4.5	5.0
SGMP-05	2/20/2012	5	Nyaflow	1/8	4.5	5.0
SGMP-06	2/20/2012	5	Nyaflow	1/8	4.5	5.0
SGMP-07	2/20/2012	3.5	Nyaflow	1/8	3.0	3.5
SGMP-08	3/12/2012	3.5	Nyaflow	1/8	3.0	3.5
SGMP-09	3/9/2012	3	Nyaflow	1/8	2.5	3.0

Notes:
bgs: below ground surface
toc: top of casing

Table D-2
Sherwin-Williams Emeryville Remediation Project
SOIL GAS SAMPLE RESULTS - June 6 and 7, 2012

Chemical	Unit	Action Level	Soil Gas Monitoring Point (SGMP)													Ambient Condition	Trip Blank
			SGMP-01	SGMP-02	SGMP-03	SGMP-04	SGMP-05	SGMP-06	SGMP-07	SGMP-08	SGMP-09	SGMP-10	SGMP-10 Duplicate	SGMP-11	SGMP-12		
Fixed Gases by ASTM-D1946																	
Helium	% v/v	5	<0.039	**0.38**	<0.038	<0.041	<0.041	<0.043	<0.040	**0.05**	**0.51**	<0.040	<0.042	<0.042	<0.036	<0.020	<0.020
Carbon Dioxide	% v/v	--	**0.015 J**	**7.9**	**25**	**7.1**	**7.3**	**8**	**18**	**0.07**	**0.071**	**18**	**18**	**13**	**24**	**0.046**	<0.010
Methane	% v/v	4.4 - 17	**0.00026 J**	**0.00052**	**40**	**0.047**	**0.38**	**3.8**	**12**	**0.34**	**0.00096**	**0.19**	**0.19**	**4.6**	**0.17**	**0.00023 J**	**0.00014 J**
Nitrogen	% v/v	--	**77**	**80**	**33**	**87**	**87**	**81**	**66**	**86**	**75**	**77**	**77**	**78**	**72**	**75**	**97**
Oxygen	% v/v	--	**19**	**7.1**	**0.94**	**1.7**	**1.2**	**2.2**	**1.1**	**10**	**20**	**1.7**	**1.3**	**1.3**	**1.4**	**22**	<0.20

Table D-2
Sherwin-Williams Emeryville Remediation Project
SOIL GAS SAMPLE RESULTS - June 6 and 7, 2012

Chemical	Unit	Action Level	Soil Gas Monitoring Point (SGMP)													Ambient Condition	Trip Blank
			SGMP-01	SGMP-02	SGMP-03	SGMP-04	SGMP-05	SGMP-06	SGMP-07	SGMP-08	SGMP-09	SGMP-10	SGMP-10 Duplicate	SGMP-11	SGMP-12		
Volatile Organic Compounds (VOCs) by TO-15 in ppm v/v																	
1,1,1-Trichloroethane	ppm v/v	179	<0.0003	**0.00028 J**	<0.0072	<0.0003	<0.0003	<0.08	<0.72	<0.022	<0.0003	<0.00076	<0.00078	<0.00066	<0.0017	<0.0003	<0.0003
1,1,2,2-Tetrachloroethane	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
1,1,2-Trichloro-1,2,2-trifluoroethane	ppm v/v	--	**0.00022 J**	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
1,1,2-Trichloroethane	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
1,1-Dichloroethane	ppm v/v	--	<0.0003	<0.0003	<0.0072	<0.0003	<0.0003	<0.08	<0.72	<0.022	<0.0003	<0.00076	<0.00078	<0.00066	<0.0017	<0.0003	<0.0003
1,1-Dichloroethene	ppm v/v	--	<0.0008	<0.0008	<0.019	<0.0008	<0.0008	<0.21	<1.9	<0.059	<0.0008	<0.002	<0.0021	<0.0018	<0.0045	<0.0008	<0.0008
1,2,4-Trichlorobenzene	ppm v/v	--	<0.0025	<0.0025	<0.06	<0.0025	<0.0025	<0.67	<6	<0.19	<0.0025	<0.0063	<0.0065	<0.0055	<0.014	<0.0025	<0.0025
1,2,4-Trimethylbenzene	ppm v/v	--	**0.00071 J**	**0.011**	<0.06	**0.011**	**0.00067 J**	**0.39 J**	<6	**0.034 J**	**0.0032**	**0.013**	**0.012**	**0.004 J**	**0.011 J**	<0.0025	<0.0025
1,2-Dibromoethane (EDB)	ppm v/v	--	<0.0008	<0.0008	<0.019	<0.0008	<0.0008	<0.21	<1.9	<0.059	<0.0008	<0.002	<0.0021	<0.0018	<0.0045	<0.0008	<0.0008
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
1,2-Dichlorobenzene	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
1,2-Dichloroethane	ppm v/v	0.012	<0.0008	<0.0008	<0.019	<0.0008	<0.0008	<0.21	<1.9	<0.059	<0.0008	<0.002	<0.0021	<0.0018	<0.0045	<0.0008	<0.0008
1,2-Dichloropropane	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
1,3,5-Trimethylbenzene	ppm v/v	--	<0.0004	**0.0045**	<0.0096	**0.004**	**0.00032 J**	**0.18**	<0.96	**0.023 J**	**0.001**	**0.0041**	**0.0039**	**0.0013**	**0.0038**	<0.0004	<0.0004
1,3-Dichlorobenzene	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
1,4-Dichlorobenzene	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
2-Butanone (MEK)	ppm v/v	--	**0.0037**	**0.0019**	<0.019	**0.0039**	**0.0027**	<0.21	<1.9	<0.059	**0.0069**	**0.0046**	**0.0046**	**0.0017 J**	<0.0045	**0.00065 J**	**0.00042 J**
2-Hexanone	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	**3.7**	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
4-Ethyltoluene	ppm v/v	--	**0.00041**	**0.0095**	<0.0096	**0.0084**	**0.00054**	**0.29**	<0.96	**0.026 J**	**0.0019**	**0.0087**	**0.0087**	**0.0029**	**0.0084**	<0.0004	<0.0004
4-Methyl-2-pentanone (MIBK)	ppm v/v	--	<0.0004	**0.0059**	<0.0096	**0.0097**	**0.0037**	<0.11	<0.96	<0.03	**0.0037**	**0.0072**	**0.0069**	**0.0024**	**0.0089**	<0.0004	<0.0004
Acetone	ppm v/v	--	**0.018**	**0.0092**	<0.019	**0.015**	**0.012**	<0.21	<1.9	**0.1**	**0.027**	**0.024**	**0.025**	**0.009**	**0.0085**	<0.0008	<0.0008
Benzene	ppm v/v	0.011	**0.0057**	**0.039**	**0.035**	**0.11**	**0.072**	**0.21**	<0.72	**0.013 J**	**0.018**	**0.14**	**0.14**	**0.042**	**0.20**	<0.0003	<0.0003
Benzyl chloride	ppm v/v	--	<0.0008	<0.0008	<0.019	<0.0008	<0.0008	<0.21	<1.9	<0.059	<0.0008	<0.002	<0.0021	<0.0018	<0.0045	<0.0008	<0.0008
Bromodichloromethane	ppm v/v	--	<0.0003	<0.0003	<0.0072	<0.0003	<0.0003	<0.08	<0.72	<0.022	**0.00023 J**	<0.00076	<0.00078	<0.00066	<0.0017	<0.0003	<0.0003
Bromoform	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
Bromomethane	ppm v/v	--	<0.0008	<0.0008	<0.019	<0.0008	<0.0008	<0.21	<1.9	<0.059	<0.0008	<0.002	<0.0021	<0.0018	<0.0045	<0.0008	<0.0008
Carbon disulfide	ppm v/v	--	**0.0018**	**0.0086**	<0.019	**0.0015**	**0.001**	<0.21	<1.9	**0.041 J**	**0.014**	**0.0046**	**0.0046**	**0.0032**	**0.0067**	<0.0008	<0.0008
Carbon tetrachloride	ppm v/v	0.0039	<0.0008	<0.0008	<0.019	<0.0008	<0.0008	<0.21	<1.9	<0.059	<0.0008	<0.002	<0.0021	<0.0018	<0.0045	<0.0008	<0.0008
Chlorobenzene	ppm v/v	--	<0.0003	<0.0003	<0.0072	<0.0003	<0.0003	**0.19**	<0.72	**0.02 J**	<0.0003	<0.00076	<0.00078	<0.00066	<0.0017	<0.0003	<0.0003
Chloroethane	ppm v/v	--	<0.0008	<0.0008	<0.019	<0.0008	<0.0008	<0.21	<1.9	<0.059	**0.00045 J**	<0.002	<0.0021	**0.0026**	<0.0045	**0.00073 J**	**<0.0008**
Chloroform	ppm v/v	--	**0.0013**	**0.00055**	<0.0072	**0.00019 J**	**0.00014 J**	<0.08	<0.72	<0.022	**0.11**	**0.00051 J**	**0.00053 J**	**0.00043 J**	<0.0017	<0.0003	<0.0003
Chloromethane	ppm v/v	--	**0.00031 J**	**0.00031 J**	<0.019	**0.00035 J**	**0.00046 J**	<0.21	<1.9	<0.059	**0.00041 J**	**0.00056 J**	**0.00064 J**	<0.0018	<0.0045	<0.0008	<0.0008
cis-1,2-Dichloroethene	ppm v/v	3.9	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	**0.1 J**	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
cis-1,3-Dichloropropene	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
Dibromochloromethane	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
Dichlorodifluoromethane	ppm v/v	--	**0.00057**	**0.00048**	<0.0096	**0.00056**	**0.00067**	<0.11	<0.96	<0.03	**0.00052**	**0.00075 J**	**0.00069 J**	**0.00069 J**	<0.0022	**0.00063**	**<0.0004**
Ethylbenzene	ppm v/v	0.095	**0.0005**	**0.0086**	**0.0054 J**	**0.0068**	**0.00068**	**2.6**	<0.96	**0.084**	**0.0018**	**0.0067**	**0.0069**	**0.0024**	**0.0071**	<0.0004	<0.0004
Hexachlorobutadiene	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
m,p-Xylene	ppm v/v	72	**0.0016**	**0.031**	**0.022**	**0.025**	**0.0022**	**4.1**	<1.9	**0.32**	**0.0061**	**0.027**	**0.028**	**0.0098**	**0.026**	<0.0008	<0.0008

Table D-2
Sherwin-Williams Emeryville Remediation Project
SOIL GAS SAMPLE RESULTS - June 6 and 7, 2012

Chemical	Unit	Action Level	Soil Gas Monitoring Point (SGMP)													Ambient Condition	Trip Blank
			SGMP-01	SGMP-02	SGMP-03	SGMP-04	SGMP-05	SGMP-06	SGMP-07	SGMP-08	SGMP-09	SGMP-10	SGMP-10 Duplicate	SGMP-11	SGMP-12		
Methylene chloride	ppm v/v	--	<0.0004	**0.0041**	<0.0096	**0.0019**	**0.00028 J**	<0.11	<0.96	<0.03	**0.0034**	**0.00068 J**	**0.00063 J**	**0.00064 J**	**0.0022**	<0.0004	<0.0004
Naphthalene	ppm v/v	0.0060	**0.003**	<0.002	<0.048	**1.6 J**	<0.002	<0.53	<4.8	<0.15	<0.002	<0.005	<0.0052	<0.0044	<0.011	NR	<0.002
o-Xylene	ppm v/v	71	**0.00042**	**0.0088**	<0.0096	**0.008**	**0.00078**	**0.075 J**	<0.96	**0.095**	**0.0019**	**0.0091**	**0.0093**	**0.0035**	**0.0087**	<0.0004	<0.0004
Styrene	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
Tetrachloroethene	ppm v/v	0.026	**0.0015**	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
Toluene	ppm v/v	35	**0.0022**	**0.023**	**0.0097**	**0.025**	**0.0037**	**0.1 J**	<0.96	**1.1**	**0.0091**	**0.026**	**0.027**	**0.008**	**0.027**	**0.00020 J**	**<0.0004**
trans-1,2-Dichloroethene	ppm v/v	7.9	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
trans-1,3-Dichloropropene	ppm v/v	--	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
Trichloroethene	ppm v/v	0.097	<0.0004	<0.0004	<0.0096	<0.0004	<0.0004	<0.11	<0.96	<0.03	<0.0004	<0.001	<0.001	<0.00088	<0.0022	<0.0004	<0.0004
Trichlorofluoromethane	ppm v/v	--	**0.002**	**0.0073**	<0.0096	**0.0019**	**0.0011**	<0.11	<0.96	<0.03	**0.00048**	**0.01**	**0.01**	**0.033**	**0.002 J**	**0.00031 J**	**<0.0004**
Vinyl acetate	ppm v/v	--	<0.0008	<0.0008	<0.019	<0.0008	<0.0008	<0.21	<1.9	<0.059	<0.0008	<0.002	<0.0021	<0.0018	<0.0045	<0.0008	<0.0008
Vinyl chloride	ppm v/v	0.0051	<0.0002	<0.0002	<0.0048	<0.0002	<0.0002	<0.053	<0.48	<0.015	<0.0002	<0.0005	<0.00052	**0.0021**	<0.0011	<0.0002	<0.0002

Table D-2
Sherwin-Williams Emeryville Remediation Project
SOIL GAS SAMPLE RESULTS - June 6 and 7, 2012

Chemical	Unit	Action Level	Soil Gas Monitoring Point (SGMP)													Ambient Condition	Trip Blank
			SGMP-01	SGMP-02	SGMP-03	SGMP-04	SGMP-05	SGMP-06	SGMP-07	SGMP-08	SGMP-09	SGMP-10	SGMP-10 Duplicate	SGMP-11	SGMP-12		
Volatile Organic Compounds (VOCs) by TO-15 in ug/m3																	
1,1,1-Trichloroethane	ug/m3	991000	<1.6	**1.5 J**	<39	<1.6	<1.6	<440	<3900	<120	<1.6	<4.1	<4.3	<3.6	<9.1	NR	<1.6
1,1,2,2-Tetrachloroethane	ug/m3	--	<2.7	<2.7	<66	<2.7	<2.7	<730	<6600	<200	<2.7	<6.9	<7.2	<6.1	<15	NR	<2.7
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/m3	--	**1.7 J**	<3.1	<74	<3.1	<3.1	<820	<7300	<230	<3.1	<7.7	<8.0	<6.8	<17	NR	<3.1
1,1,2-Trichloroethane	ug/m3	--	<2.2	<2.2	<52	<2.2	<2.2	<580	<5200	<160	<2.2	<5.5	<5.7	<4.8	<12	NR	<2.2
1,1-Dichloroethane	ug/m3	--	<1.2	<1.2	<29	<1.2	<1.2	<320	<2900	<90	<1.2	<3.1	<3.2	<2.7	<6.8	NR	<1.2
1,1-Dichloroethene	ug/m3	--	<3.2	<3.2	<76	<3.2	<3.2	<850	<7600	<230	<3.2	<8.0	<8.3	<7.0	<18	NR	<3.2
1,2,4-Trichlorobenzene	ug/m3	--	<19	<19	<450	<19	<19	<5000	<44000	<1400	<19	<47	<48	<41	<100	NR	<19
1,2,4-Trimethylbenzene	ug/m3	--	**3.5 J**	**56**	<290	**53**	**3.3 J**	**1900 J**	<29000	**170 J**	**16**	**63**	**61**	**20 J**	**55 J**	NR	<12
1,2-Dibromoethane (EDB)	ug/m3	--	<6.1	<6.1	<150	<6.1	<6.1	<1600	<15000	<450	<6.1	<15	<16	<14	<34	NR	<6.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ug/m3	--	<2.8	<2.8	<67	<2.8	<2.8	<750	<6700	<210	<2.8	<7.0	<7.3	<6.2	<16	NR	<2.8
1,2-Dichlorobenzene	ug/m3	--	<2.4	<2.4	<58	<2.4	<2.4	<640	<5700	<180	<2.4	<6.1	<6.3	<5.3	<13	NR	<2.4
1,2-Dichloroethane	ug/m3	49.6	<3.2	<3.2	<78	<3.2	<3.2	<860	<7700	<240	<3.2	<8.2	<8.5	<7.2	<18	NR	<3.2
1,2-Dichloropropane	ug/m3	--	<1.8	<1.8	<44	<1.8	<1.8	<490	<4400	<140	<1.8	<4.7	<4.8	<4.1	<10	NR	<1.8
1,3,5-Trimethylbenzene	ug/m3	--	<2.0	**22**	<47	**20**	**1.6 J**	**880**	<4700	**110 J**	**5.0**	**20**	**19**	**6.5**	**18**	NR	<2.0
1,3-Dichlorobenzene	ug/m3	--	<2.4	<2.4	<58	<2.4	<2.4	<640	<5700	<180	<2.4	<6.1	<6.3	<5.3	<13	NR	<2.4
1,4-Dichlorobenzene	ug/m3	--	<2.4	<2.4	<58	<2.4	<2.4	<640	<5700	<180	<2.4	<6.1	<6.3	<5.3	<13	NR	<2.4
2-Butanone (MEK)	ug/m3	--	**11**	**5.7**	<57	**11**	**7.9**	<630	<5600	<170	**20**	**14**	**14**	**5.0 J**	<13	NR	**1.2 J**
2-Hexanone	ug/m3	--	<1.6	<1.6	<39	<1.6	<1.6	<440	**15000**	<120	<1.6	<4.1	<4.3	<3.6	<9.1	NR	<1.6
4-Ethyltoluene	ug/m3	--	**2.0**	**47**	<47	**41**	**2.7**	**1400**	<4700	**130 J**	**9.3**	**43**	**43**	**14**	**42**	NR	<2.0
4-Methyl-2-pentanone (MIBK)	ug/m3	--	<1.6	**24**	<39	**40**	**15**	<440	<3900	<120	**15**	**30**	**28**	**9.9**	**36**	NR	<1.6
Acetone	ug/m3	--	**44**	**22**	<46	**36**	**29**	<510	<4500	**250**	**65**	**57**	**60**	**21**	**20**	NR	<1.9
Benzene	ug/m3	36.2	**18**	**120**	**110**	**350**	**230**	**660**	<2300	**40 J**	**57**	**440**	**460**	**130**	**620**	NR	<0.96
Benzyl chloride	ug/m3	--	<4.1	<4.1	<99	<4.1	<4.1	<1100	<9900	<310	<4.1	<10	<11	<9.2	<23	NR	<4.1
Bromodichloromethane	ug/m3	--	<2.0	<2.0	<48	<2.0	<2.0	<540	<4800	<150	**1.5 J**	<5.1	<5.2	<4.4	<11	NR	<2.0
Bromoform	ug/m3	--	<4.1	<4.1	<99	<4.1	<4.1	<1100	<9900	<310	<4.1	<10	<11	<9.1	<23	NR	<4.1
Bromomethane	ug/m3	--	<3.1	<3.1	<75	<3.1	<3.1	<830	<7400	<230	<3.1	<7.8	<8.1	<6.9	<17	NR	<3.1
Carbon disulfide	ug/m3	--	**5.7**	**27**	<60	**4.6**	**3.3**	<670	<6000	**130 J**	**44**	**14**	**14**	**10**	**21**	NR	<2.5
Carbon tetrachloride	ug/m3	25.1	<5.0	<5.0	<120	<5.0	<5.0	<1300	<12000	<370	<5.0	<13	<13	<11	<28	NR	<5.0
Chlorobenzene	ug/m3	--	<1.4	<1.4	<33	<1.4	<1.4	**870**	<3300	**94 J**	<1.4	<3.5	<3.6	<3.0	<7.7	NR	<1.4
Chloroethane	ug/m3	--	<2.1	<2.1	<51	<2.1	<2.1	<560	<5000	<160	**1.2 J**	<5.3	<5.5	**6.8**	<12	NR	<2.1
Chloroform	ug/m3	--	**6.4**	**2.7**	<35	**0.91 J**	**0.70 J**	<390	<3500	<110	**540**	**2.5 J**	**2.6 J**	**2.1 J**	<8.2	NR	<1.5
Chloromethane	ug/m3	--	**0.65 J**	**0.64 J**	<40	**0.73 J**	**0.94 J**	<440	<3900	<120	**0.85 J**	**1.2 J**	**1.3 J**	<3.7	<9.2	NR	<1.7
cis-1,2-Dichloroethene	ug/m3	15900	<1.6	<1.6	<38	<1.6	<1.6	**410 J**	<3800	<120	<1.6	<4.0	<4.1	<3.5	<8.8	NR	<1.6
cis-1,3-Dichloropropene	ug/m3	--	<1.8	<1.8	<44	<1.8	<1.8	<480	<4300	<130	<1.8	<4.6	<4.7	<4.0	<10	NR	<1.8
Dibromochloromethane	ug/m3	--	<3.4	<3.4	<82	<3.4	<3.4	<910	<8100	<250	<3.4	<8.6	<8.9	<7.5	<19	NR	<3.4
Dichlorodifluoromethane	ug/m3	--	**2.8**	**2.4**	<47	**2.7**	**3.3**	<530	<4700	<150	**2.6**	**3.7 J**	**3.4 J**	**3.4 J**	<11	NR	<2.0
Ethylbenzene	ug/m3	420	**2.2**	**37**	**24 J**	**29**	**2.9**	**11000**	<4200	**360**	**8.0**	**29**	**30**	**10**	**31**	NR	<1.7
Hexachlorobutadiene	ug/m3	--	<4.3	<4.3	<100	<4.3	<4.3	<1100	<10000	<320	<4.3	<11	<11	<9.4	<24	NR	<4.3
m,p-Xylene	ug/m3	317000	**6.7**	**140**	**96**	**110**	**9.7**	**18000**	<8300	**1400**	**26**	**120**	**120**	**43**	**110**	NR	<3.5

Table D-2
Sherwin-Williams Emeryville Remediation Project
SOIL GAS SAMPLE RESULTS - June 6 and 7, 2012

Chemical	Unit	Action Level	Soil Gas Monitoring Point (SGMP)													Ambient Condition	Trip Blank
			SGMP-01	SGMP-02	SGMP-03	SGMP-04	SGMP-05	SGMP-06	SGMP-07	SGMP-08	SGMP-09	SGMP-10	SGMP-10 Duplicate	SGMP-11	SGMP-12		
Methylene chloride	ug/m3	--	<1.4	**14**	<33	**6.8**	**0.98 J**	<370	<3300	<100	**12**	**2.4 J**	**2.2 J**	**2.2 J**	**7.6**	NR	<1.4
Naphthalene	ug/m3	31.9	**16**	<10	<250	**8.4 J**	<10	<2800	<25000	<780	<10	<26	<27	<23	<59	NR	<10
o-Xylene	ug/m3	315000	**1.8**	**38**	<42	**35**	**3.4**	**330 J**	<4200	**410**	**8.1**	**40**	**40**	**15**	**38**	NR	<1.7
Styrene	ug/m3	--	<1.7	<1.7	<41	<1.7	<1.7	<450	<4100	<130	<1.7	<4.3	<4.4	<3.8	<9.5	NR	<1.7
Tetrachloroethene	ug/m3	180	**9.9**	<2.7	<65	<2.7	<2.7	<720	<6500	<200	<2.7	<6.8	<7.1	<6.0	<15	NR	<2.7
Toluene	ug/m3	135000	**8.4**	**87**	**37**	**92**	**14**	**380 J**	<3600	**4100**	**34**	**99**	**100**	**30**	**100**	NR	<1.5
trans-1,2-Dichloroethene	ug/m3	31900	<1.6	<1.6	<38	<1.6	<1.6	<420	<3800	<120	<1.6	<4.0	<4.1	<3.5	<8.8	NR	<1.6
trans-1,3-Dichloropropene	ug/m3	--	<1.8	<1.8	<44	<1.8	<1.8	<480	<4300	<130	<1.8	<4.6	<4.7	<4.0	<10	NR	<1.8
Trichloroethene	ug/m3	528	<2.1	<2.1	<52	<2.1	<2.1	<570	<5100	<160	<2.1	<5.4	<5.6	<4.8	<12	NR	<2.1
Trichlorofluoromethane	ug/m3	--	**11**	**41**	<54	**10**	**6.2**	<600	<5400	<170	**2.7**	**57**	**58**	**180**	**11 J**	NR	<2.2
Vinyl acetate	ug/m3	--	<2.8	<2.8	<68	<2.8	<2.8	<750	<6700	<210	<2.8	<7.1	<7.4	<6.2	<16	NR	<2.8
Vinyl chloride	ug/m3	13.3	<0.51	<0.51	<12	<0.51	<0.51	<140	<1200	<38	<0.51	<1.3	<1.3	**5.5**	<2.9	NR	<0.51

Notes:

Samples collected on June 6 and 7, 2012.

Action Levels based on the following:

Lower and Upper Explosion Limit (LEL/UEL) for methane at 25 degrees Celsius.

Acceptable presence of helium (leak-test gas) without compromising sample integrity and representiveness of soil gas, per Cal/EPA Advisory - Active Soil Gas Investigation (April 2012).

California Human Health Screening Level (CHHSL) for VOCs in soil gas under residential use, where applicable, per Cal/EPA guidance document (January 2005, revised November 2009).

ppm = parts per million and v/v = volume over volume ratio

ug/m3 = micrograms per cubic meter

NR = not reported by laboratory

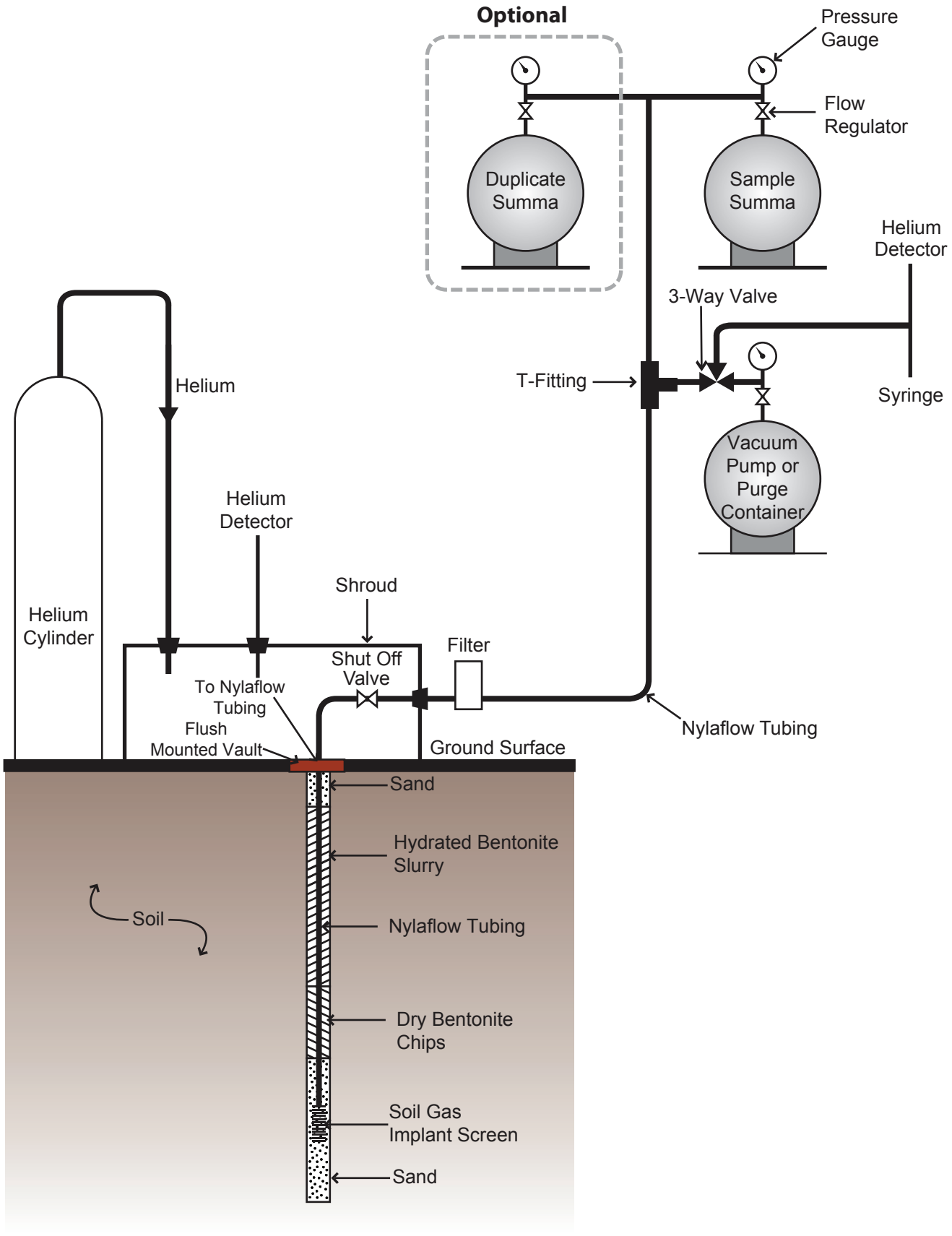
Bold indicates detection above method detection limit (MDL).

Detections below laboratory reporting limit (RL) presented with J flag preceding result.

Yellow highlight indicates detection above action level.

Grey highlight indicates reporting limit above action level for VOCs or methane detected above UEL.

Green highlight indicates detection above CHHSL under industrial/commercial use (0.039 ppm v/v, 122 ug/m3 for benzene and 0.32 ppm v/v, 1400 ug/m3 for ethylbenzene).



K:\GIS\13452_Sherwin-Williams\69712\OriginalData\Figure11-2_Soil Gas Sampling Schematic.ai 05/13/11 KAS

Figure D-1

Soil Gas Sampling Schematic

Sherwin-Williams Company - Emeryville, California

Attachment E

Health and Safety Plans

HEALTH AND SAFETY PLAN FORM *This document is for the exclusive* **CDM Smith**

CDM Smith Health and Safety Program *use of CDM Smith and its subcontractors* **PROJECT DOCUMENT #:**

PROJECT NAME	SW 1450 Sherwin	**PROJECT#**	13452-58958	**REGION**	NSG-COU
SITE ADDRESS	1450 Sherwin Street	**CLIENT ORGANIZATION**		The Sherwin Williams Company	
	Emeryville, CA	**CLIENT CONTACT**		Mr. Larry Mencin	
		CLIENT CONTACT PHONE #		(216) 566-1007	

( ) AMENDMENT TO EXISTING APPROVED H&SP?

( ) H&SP AMENDMENT NUMBER? **( ) DATE OF PREVIOUS H&SP APPROVAL**

OBJECTIVES OF FIELD WORK:
(e.g. collect surface soil samples):

1). Install and sample soil vapor wells with direct push
2). Sample and abandon soil vapor wells 3). Annual site visit

SITE TYPE: *Check as many as applicable*

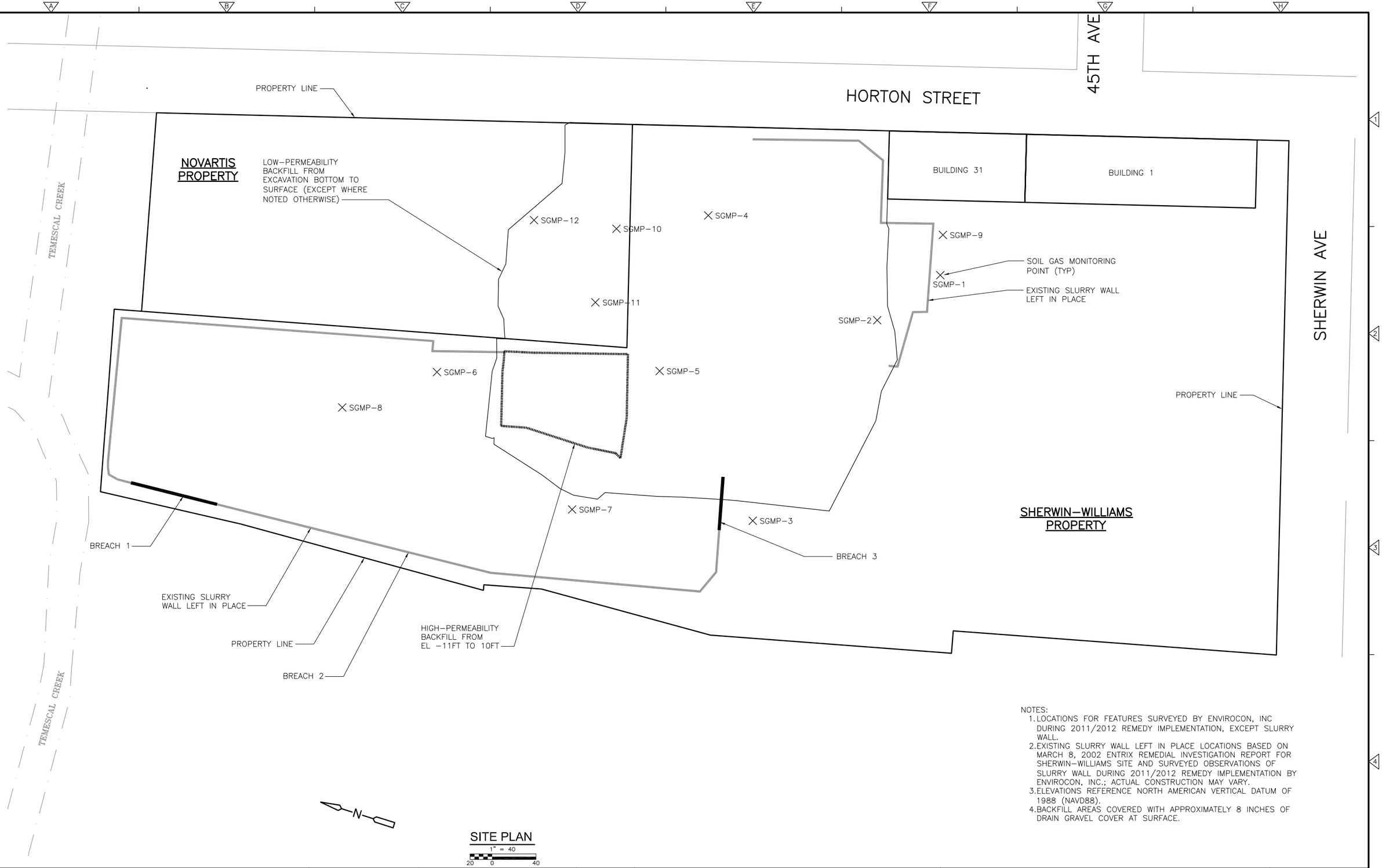
Active	()	Landfill	( )	Unknown	( )
Inactive	**(X)**	Uncontrolled	( )	Military	( )
Secure	**(X)**	Industrial	()	Other (specify)	
Unsecure	( )	Recovery	( )		
Enclosed space	( )	Well Field	( )		

All requirements described in the **CDM Health and Safety Manual** are incorporated in this health and safety plan by reference.

PERSONNEL AND RESPONSIBILITIES **NAMES OF WORK CREW MEMBERS**	**COMPANY or DIVISION**	**SUPERVISORY TRAINED?**	**PROJECT OR SITE RESPONSIBILITIES**	**Tasks On Site?**
Pawan Sharma	CDM Smith	C-S	Primary Site Technical Project Manager/Engineer Primary Site	1,2,3
Stefanie Mysel	CDM Smith	D	Site Geologist	1,2,3
Pawan Sharma	CDM Smith	C-S	Site Health and Safety Coordinator	1,2,3
Pawan Sharma	CDM Smith	C-S	Site Engineer	1.2.3

BACKGROUND REVIEW: (X) Complete ( ) Incomplete

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SITE PLAN
1" = 40
20 0 40

NOTES:
1. LOCATIONS FOR FEATURES SURVEYED BY ENVIROCON, INC DURING 2011/2012 REMEDY IMPLEMENTATION, EXCEPT SLURRY WALL.
2. EXISTING SLURRY WALL LEFT IN PLACE LOCATIONS BASED ON MARCH 8, 2002 ENTRIX REMEDIAL INVESTIGATION REPORT FOR SHERWIN-WILLIAMS SITE AND SURVEYED OBSERVATIONS OF SLURRY WALL DURING 2011/2012 REMEDY IMPLEMENTATION BY ENVIROCON, INC.; ACTUAL CONSTRUCTION MAY VARY.
3. ELEVATIONS REFERENCE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
4. BACKFILL AREAS COVERED WITH APPROXIMATELY 8 INCHES OF DRAIN GRAVEL COVER AT SURFACE.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: X
DRAWN BY: X
SHEET CHK'D BY: X
CROSS CHK'D BY: X
APPROVED BY:
DATE: MAY 2012

CDM Smith
100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596
Tel: (925) 933-2900

VERIFY SCALE
THIS BAR IS ONE INCH LONG AT FULL SCALE

SHERWIN-WILLIAMS COMPANY

SITE REMEDIATION
EMERYVILLE, CALIFORNIA

SOIL GAS MONITORING POINTS

PROJECT NO. 13452-81494
FILE NAME: sw as-built1a.dwg
SHEET NO.

HISTORY: *Summarize conditions that relate to hazard. Include citizen complaints, spills, previous investigations or agency actions, known injuries, etc.*

Sherwin-Williams began operations at the Site in 1919. Coating products were manufactured since operations began, but also included the production of lead-arsenate pesticides from the 1920s until 1948. Sherwin-Williams produced oil-based paints until 1987 and has since only produced water-based coating materials until 2009 when the facility was decommissioned. A slurry wall was installed around the source area of lead-arsenate contamination on the Sherwin-Williams property in 1980s. Groundwater extraction wells were installed within the slurry wall to prevent contaminated groundwater from migrating downgradient. Groundwater is treated at the on-site treatment facility and then discharged to Temescal Creek. Contamination from the upgradient former Shell Development property, underground storage tanks from the downgradient former Southern Pacific Railroad also contribute to groundwater and soil contamination at the Site. In 2011/2012, the agency approved remedial action was implemented at the site.

WASTE TYPES: (X) Liquid (X) Solid ( ) Sludge ( ) Gas ( ) Unknown ( ) Other, specify:

WASTE CHARACTERISTICS: *Check as many as applicable.*

( ) Corrosive () Flammable ( ) Radioactive

(X) Toxic **(X) Volatile** ( ) Reactive
( ) Inert Gas ( ) Unknown
( ) Other: _____

WORK ZONES:

The entire Site will be considered a work area and all PPE will be required with the fenced area. Specific work zones will be based on location of boring. When drilling, the exclusion zone (CRZ) is 1.5X the mast height of the drill rig. The contamination reduction zone is along the perimeter of the exclusion zone at the inside edge of the fenced work area. All protective equipment will be removed in the CRZ.

HAZARDS OF CONCERN: *Check as many as applicable.*

(X) Heat Stress CDM Guideline **(X) Noise** CDM Guideline
( ) Cold Stress CDM Guideline **(X) Inorganic Chemicals**
(X) Explosive/Flammable ( ) Organic Chemicals
( ) Oxygen Deficient ( ) Motorized Traffic
( ) Radiological **(X) Heavy Machinery**
(X) Biological ticks **(X) Slips & Falls** CDM Guideline

FACILITY'S PAST AND PRESENT DISPOSAL METHODS AND PRACTICES:

Soil produced during installation of wells will be containerized in 55-gallon drums. Soil will be characterized and disposed offsite.

This plan incorporates CDM's procedure for: *(Click on the relevant topics to download the hazard guideline. Delete irrelevant topics.)*

Housekeeping | Traffic and Work Zone Safety | Tools and Power Equipment
Working Around Heavy Equipment | Hazardous Waste Site Controls
Hazardous Waste Site Decontamination | Working Safely Around Drill Rigs

HEALTH AND SAFETY PLAN FORM	*This document is for the exclusive*	**CDM Smith**	
CDM Smith Health and Safety Program	*use of CDM Smith and its subcontractors*	**PROJECT DOCUMENT #:**	0

DESCRIPTION AND FEATURES: *Include principal operations and unusual features (containers, buildings, dikes, power lines, hillslopes, rivers, etc.)*

The site is occupied by two building associated with past operations of manufacturing paints, pigments, and pesticides. Subsequent to demolition activities that concluded in late November 2007 and cleanup activities that concluded in April 2012, the property is now covered by asphalt/concrete paved areas and gravel cover areas. Paved area are mainly foundations for several demolished buildings. The former Rifkin property is located along the western side of Horton Street, adjacent to the north and east of portions of the S-W property. The portion of the former Rifkin property included as part of the Site is currently covered by asphalt and serves as a parking lot.

SURROUNDING POPULATION: (X) Residential ( ) Industrial (X) Commercial ( ) Rural ( ) Urban OTHER:

HAZARDOUS MATERIAL SUMMARY: ***Highlight or bold waste types and estimate amounts by category.***

CHEMICALS: *Amount/Units:*	**SOLIDS:** *Amount/Units:*	**SLUDGES:** *Amount/Units:*	**SOLVENTS:** *Amount/Units:*	**OILS:** *Amount/Units:*	**OTHER:** *Amount/Units:*
Acids	Flyash	Paints	Ketones	**Oily Wastes**	Laboratory
Pickling Liquors	Mill or Mine Tailings	Pigments	Aromatics	**Gasoline**	Pharmaceutical
Caustics	Asbestos	Metals Sludges	Hydrocarbons	**Diesel Oil**	Hospital
Pesticides	Ferrous Smelter	POTW Sludge	Alcohols	Lubricants	Radiological
Dyes or Inks	Non-Ferrous Smelter	Distillation Bottoms	**Halogenated (chloro, bromo)**	Polynuclear Aromatics	Municipal
Cyanides	**Metals**	Aluminum	Esters	PCBs	Construction
Phenols	Dioxins		Ethers	Heating Oil	Munitions
Halogens					
Other - *specify*	Other - *specify*	Other - *specify*	Other - *specify*	Other - *specify*	Other - *specify*
	Perchlorate		**Non-halogenated**		**Arsenic**

HEALTH AND SAFETY PLAN FORM	*This document is for the exclusive*	CDM Smith	
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KNOWN CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION	PEL/TLV *ppm or mg/m3 (specify)*	IDLH *ppm or mg/m3 (specify)*	Warning Concentration *(in ppm)*	SYMPTOMS & EFFECTS OF ACUTE EXPOSURE	PHOTO IONIZATION POTENTIAL

PLEASE SEE ATTACHED WORD FILE FOR THIS INFORMATION

*** State of California Public Health goal**

NA = Not Available **NE = None Established** **U = Unknown**

Verify your access to an MSDS for each chemical you will use at the site.

Carc. = Carcinogenic

S = Soil SW = Surface Water T = Tailings W = Waste TK = Tanks SD = Sediment

A = Air GW = Ground Wate SL = Sludge D = Drums L = Lagoons OFF = Off-Site

KNOWN OR POTENTIAL CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION IN SHALLOW GROUNDWATER	HIGHEST OBSERVED CONCENTRATION IN SHALLOW SOIL	PEL/TLV ppm or mg/m^3 *(specify)*	IDLH ppm or mg/m^3 *(specify)*	SYMPTOMS/EFFECTS OF ACUTE EXPOSURE	Photo Ionization Potential (eV)
Chemicals of Concern most likely encountered in air as respirable dust and organic vapor						
Arsenic	820 mg/L	13,000 mg/kg	10 µg/m^3	5 mg/m^3	Nasal ulcers, fever, bronchitis, melanosis, peripheral neuropathy, dermatitis gastrointestinal disturbances, respiratory irritation	Dust
Lead	0.15 mg/L	500 mg/kg	50 µg/m^3	100 mg/m^3	Pallor, colic, insomnia, lassitude (weakness, exhaustion), constipation, abdominal pain, irritation of eyes	Dust
1,2,4-Trimethylbenzene	620 ug/L (0.620ppm)	0.95 mg/kg	25 ppm	NE	Eye, skin, nose & throat & respiratory system irritation, pneumonia; bronchitis; hypochromatic anemia; headache, drowsiness, lassitude, dizziness, nausea, incoordination; vomit, confusion	NA
1,3,5-Trimethylbenzene	190 ug/L (0.190ppm)	0.23	25 ppm	NE	Eye, skin, nose & throat & respiratory system irritation, pneumonia; bronchitis; hypochromatic anemia; headache, drowsiness, lassitude, dizziness, nausea, incoordination; vomit, confusion	NA
1,2 Dichloroethane (Ethylened dichloride)	240 ug/L (0.240ppm)	NA	50 ppm	26 ppm	Irritated skin, eyes, corneal opacity; nausea, vomit; dermatitis; CNS depression; liver, kidney, lung damage	11.05
Benzene	950 ug/L (0.950ppm)	0.02 mg/kg	0.5 ppm	500 ppm	Irritated skin, eyes, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; CNS depression; liver, kidney, lung damage	9.25
Ethylbenzene	9,800 ug/L (9.80ppm)	140 mg/kg	100 ppm	800 ppm	Irritated skin, eyes, mucous membrane; headache, dermatitis, narcosis, coma; CNS depression; liver, kidney, lung damage	9.25
Tetrachloroethene	45,000 ug/L (45.0ppm)	NA	25 ppm	150 ppm	Irritated eyes, nose, throat, skin, and respiratory system; nausea; incoordination, headache, drowsiness; skin erythema; flushed face & neck, dizziness	8.76

Toluene (skin)	330,000 ug/L (330ppm)	270 mg/kg	50 ppm	500 ppm	Irritated skin, eyes, nose; lassitude, confusion, euphoria, dizziness, headache; dilated pupils, lacrimation; anxiety, muscle fatigue, insomnia; paresthesia, dermatitis; CNS depression; liver, kidney, lung damage	8.82
Trichloroethene	8,200 ug/L (8.20ppm)	NA	50 ppm	1,000 ppm	Irritation in eyes, skin; lassitude, dizziness, tremor, nausea, vomit; dermatitis; cardiac arrhythmias, paresthesia; liver injury; vertigo, visual disturbance, headache, drowsiness	9.45
Vinyl Chloride *	17 ug/L (0.017ppm)	NA	1 ppm	NE	Lassitude;gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; frostbite (liquid), abdominal pain, CNS depression	10.00
Xylenes (total)	210,000 ug/L	580 mg/kg	100 ppm	900 ppm	Irritated skin, eyes, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomit, abdominal pain; dermatitis CNS depression; liver, kidney, lung damage	8.44
Other Chemicals of Concern at site						
Beryllium	0.01 mg/L	0.69 mg/kg	2 µg/m^3	4 mg/m^3	Respiratory symptoms, weakness, weight loss	Dust
Cadmium	0.42 mg/L	11 mg/kg	5 µg/m^3	9 mg/m^3	Pulmonary edema, tight chest, chills	Dust
Copper	2.10 mg/L	383 mg/kg	1 mg/m^3	NE	Nasal perforation, metal taste	Dust
Iron	1,200 mg/L	NA	5 mg/m^3	2,500 mg/m^3	Benign pneumoconiosis, cough	Dust
Manganese	88 mg/L	NA	0.2 mg/m^3	500 mg/m^3	"Dead face", dry throat, cough metal fume fever, pneumonia	Dust
Nickel	2.03 mg/L	110 mg/kg	1 mg/m^3	10 mg/m^3	Skin sensitivity, chest pain, "asthma"	Dust
Thallium	0.15 mg/L	0.87 mg/kg	100 µg/m^3	15 mg/m^3	Nausea, diarrhea, stomach pain	NA
Zinc	230 mg/L	53,000 mg/kg	5 mg/m^3	NE	Sweet metal taste, dry throat, cough, tight chest, chills	Dust
1,1,2,2-Tetrachloroethane	18 ug/L (0.018ppm)	NA	100 ppm	150 ppm	Irritated eyes, nose, throat, flushed face and neck, dizziness	9.32

1,2-Dichloropropane	270 ug/L (0.270ppm)	NA	75 ppm	400 ppm	Eye irritation, drowsiness, lightheadedness	10.87
2-Butanone	1,700 mg/L	NA	200 ppm	3,000 ppm	Irritated eyes, dizziness, vomiting	9.53
Acetone	2,500 mg/L	0.28 mg/kg	500 ppm	2,500 ppm	Irritated eyes, headache, dizziness	9.69
Carbon Tetrachloride	290 ug/L (0.290ppm)	NA	2 ppm	200 ppm	Central nervous system depression, nausea, liver damage	11.5
Chloroform	270 ug/L (0.270ppm)	NA	2 ppm	500 ppm	Mental dullness, headaches, anesthesia, dizziness	11.4
1,2-Dichloroethene (cis)	100 ug/L (0.100ppm)	NA	200 ppm	1,000 ppm	Irritated eyes, CNS depression	10
Methyl Tert Butyl Ether	22 ug/L (0.022ppm)	NA	40 ppm	NE	Drowsiness, eye irritation, incoordination, rapid breathing	<9.40
o-Xylenes	4,400 ug/L (4.40ppm)	NA	100 ppm	900 ppm	Eye, nose & throat irritation, drowsiness, nausea, incoordination	8.44
1,2 Dichloroethene (trans)	100 ug/L (0.100ppm)	NA	200 ppm	1000 ppm	Irritated skin, CNS depression; liver, kidney, lung damage	9.65
4-Methylphenol	1,000 ug/L (1.00ppm)	NA	5 ppm	250 ppm	Skin corrosive, eye irritant, muscle aches, dark urine	8.5
Acenaphthene	390 ug/L (0.390ppm)	NA	0.20 ppm	NE	Irritant to eyes, skin, throat; coughing, wheezing, vomiting	
Naphthalene	650 ug/L (0.650ppm)	10 mg/kg	10 ppm	250 ppm	Eye irritation, headache, confusion, excitement, nausea	8.12
TPH (diesel)	1,900 mg/L	71 mg/kg	300 ppm	NE	Vomiting, diarrhea, insomnia, dizziness, headache	NA
TPH (gasoline)	1,900 mg/L	300 mg/kg	300 ppm	NE	Vomiting, diarrhea, insomnia, dizziness, headache	NA

NA = Not Available
S = Soil
A = Air
L = Lagoon
* = Suspected Carcinogen

NE = None Established
SW = Surface Water
SL = Sludge
FL = Fly ash

U = Undetected
GW = Ground Water
D = Drums
T = Tailings

TK = Tanks
mg/L = milligram per liter
ug/L = microgram per liter

PEL = Permissible Exposure Limit
TLV = Threshold Limit Value
IDLH = Immediately Dangerous to Life and Health
mg/m^3 = milligram per cubic meter
ppm = parts per million

SPECIFIC TASK DESCRIPTIONS	Disturbing the Waste?	TASK - SPECIFIC HAZARDS	HAZARD & SCHEDULE
1 Install and sample soil vapor wells	**Intrusive** Non-intrusive	Noise, slips, trips, and falls, heavy equipment operation, mechanical injuries, heat stress, biological hazards, contact with contaminants	Low Hazard Spring
2 Sample and abandon soil vapor wells	**Intrusive** Non-intrusive	Noise, slips, trips, and falls, heavy equipment operation, mechanical injuries, heat stress, biological hazards, contact with contaminants	Low Hazard Fall
3 Annual Site visit	Intrusive **Non-intrusive**	Slips, trips, and falls, heat stress, biological hazards	Low Hazard TBD

SPECIALIZED TRAINING REQUIRED:	SPECIAL MEDICAL SURVEILLANCE REQUIREMENTS:
None	**None**

OVERALL HAZARD EVALUATION: ( ) High ( ) Medium (X) Low ( ) Unknown *(Where tasks have different hazards, evaluate each.)*

JUSTIFICATION: Appropriate work practices and monitoring to be used during intrusive activities. PPE will be upgraded if necessary.

FIRE/EXPLOSION POTENTIAL: ( ) High ( ) Medium (X) Low ( ) Unknown

PROTECTIVE EQUIPMENT: *Specify by task. Indicate type and/or material, as necessary. Group tasks if possible. Use copies of this sheet if needed.*

BLOCK A

TASKS: 1,2,3
LEVEL: D
(X) Primary ( ) Contingency

Respiratory: **(X) Not needed**
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
(X) Safety Glasses:
( ) Face Shield:
( ) Goggles:
(X) Hard Hat:
( ) Other:

Boots: ( ) Not needed
(X) Steel-Toe ( ) Steel Shank
( ) Rubber **(x) Leather**
( ) Overboots:

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall:
(X) Other: Work clothes

Gloves: ( ) Not needed
(X) Undergloves: Nitrile
( ) Gloves:
( ) Overgloves:

( ) Other: specify below

(X) Sun screen
(X) Hearing protection
(X) Safety Vest
( ) Flotation Device

BLOCK B

TASKS: 1,2,3
LEVEL: C
( ) Primary (X) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline:
(X) APR: Full or Half Face
(X) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
(X) Safety Glasses:
( ) Face Shield:
( ) Goggles:
(X) Hard Hat:
( ) Other:

Boots: ( ) Not needed
(X) Steel-Toe ( ) Steel Shank
( ) Rubber **(X) Leather**
( ) Overboots: Latex

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
(X) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
(X) Undergloves: Nitrile
( ) Gloves:
( ) Overgloves:

Other: specify below

(X) Sun screen
(X) Hearing protection
(X) Bug repellant
( ) Flotation Device

BLOCK C

TASKS: 1 - 2 - 3
LEVEL: LEAVE SITE
( ) Primary (X) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
( ) Hard Hat:
( ) Other:

Boots: ( ) Not needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots:

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
( ) Undergloves:
( ) Gloves:
( ) Overgloves:

Other: specify below

LEAVE SITE

BLOCK D

TASKS: 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10
LEVEL: A - B - C - D - Modified
( ) Primary ( ) Contingency

Respiratory: ( ) Not needed
( ) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
( ) Safety Glasses:
( ) Face Shield:
( ) Goggles:
( ) Hard Hat:
( ) Other:

Boots: ( ) Not needed
( ) Steel-Toe ( ) Steel Shank
( ) Rubber ( ) Leather
( ) Overboots:

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
( ) Tyvek Coverall
( ) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
( ) Undergloves:
( ) Gloves:
( ) Overgloves:

Other: specify below

( ) Tick Spray
( ) Flotation Device
( ) Hearing Protection
( ) Sun Screen

This health and safety plan form constitutes hazard analysis per 29 CFR 1910.132

HEALTH AND SAFETY PLAN FORM		*This document is for the exclusive*		**CDM Smith**	
CDM Smith Health and Safety Program		*use of CDM Smith and its subcontractors*		**PROJECT DOCUMENT #:**	0
MONITORING EQUIPMENT:		*Specify by task. Indicate type as necessary. Attach additional sheets if needed.*			
INSTRUMENT	**TASK**	**ACTION GUIDELINES**		**COMMENTS**	
Combustible		0-10% LEL	*No explosion hazard*	(X) Not Needed	
Gas Indicator	1-2-3-4-5-6-7-8	10-25% LEL	*Potential explosion hazard; notify SHSC*		
		>25% LEL	*Explosion hazard; interrupt task/evacuate*		
		21.0% O2	*Oxygen normal*		
		<21.0% O2	*Oxygen deficient; notify SHSC*		
		<19.5% O2	*Interrupt task/evacuate*		
Radiation		3 x Background:	*Notify HSM*	(X) Not Needed	
Survey Meter	1-2-3-4-5-6-7-8	>2mR/hr:	*Establish REZ*		
5 Gas Multi Gas		*Specify:*		**Needed**	
Detector	**1,2**	0-10% LEL	*No explosion hazard*	**Will be on site during soil vapor installation, sampling and abandonment.**	
__10.6___eV Lamp		10-25% LEL	*Potential explosion hazard; notify SHSC*		
Type ___MultiRae 2000_		>25% LEL	*Explosion hazard; interrupt task/evacuate*		
		21.0% O2	*Oxygen normal*		
		<21.0% O2	*Oxygen deficient; notify SHSC*		
		<19.5% O2	*Interrupt task/evacuate*		
		<1 ppm VOC	*Continue work in level D ppe*		
		>1 ppm VOC	*Stop work and determine if need to up grade ppe*		
Flame Ionization		*Specify:*		(X) Not Needed	
Detector	1-2-3-4-5-6-7-8				
Type_____					
Single Gas		*Specify:*		(X) Not Needed	
	1-2-3-4-5-6-7-8				
Type_____					
Type_____					
Respirable		*Specify:*		(X) Not Needed	
Dust Monitor	1-2-3-4-5-6-7-8				
Type_____					
Type_____					
Other		*Specify:*		( ) Not Needed	
Specify:	1-2-3-4-5-6-7-8				
Type_____					
Type_____					
Other		*Specify:*		**Needed**	
Specify: **DUST**	**1,2**		**Stop work if visible dust can't be controlled**	**Control all visible dust**	
Type_____					
Type_____					

DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, & SUPPORT ZONES AS PAGE TWO

Personnel Decontamination	**Sampling Equipment Decontamination**	**Heavy Equipment Decontamination**
Summarize below or attach diagram;	*Summarize below or attach diagram;*	*Summarize below or attach diagram;*
Team members will remove their protective clothing in the following order: # Equipment drop # Hard hat removal # Glove removal # Hand and face wash # Shower as soon as possible ( ) Not Needed	Decontamination of sampling equipment will consist of a soap /tap water wash, tap water rinse and deionized water rinse. ( ) Not Needed	Digging and Drilling equipment will be decontaminated by steam cleaner on the drill rig. ( ) Not Needed
Containment and Disposal Method	**Containment and Disposal Method**	**Containment and Disposal Method**
Wash water will not be contained.	Wash water will be contained in 55-gallon drum.	Residual drill cuttings and decon water will be contained in 55-gallon drums for characterization and offsite disposal.

HAZARDOUS MATERIALS TO BE BROUGHT ONSITE

Preservatives		*Decontamination*		*Calibration*	
( ) Hydrochloric Acid	( ) Zinc Acetate	(X) Alconox TM	( ) Hexane	( ) 100 ppm isobutylene	( ) Hydrogen Sulfide
( ) Nitric Acid	( ) Ascorbic Acid	( ) Liquinox TM	( ) Isopropanol	( ) Methane	( ) Carbon Monoxide
( ) Sulfuric Acid	( ) Acetic Acid	( ) Acetone	( ) Nitric Acid	( ) Pentane	( ) pH Standards
( ) Sodium Hydroxide	( ) Other:	( ) Methanol	( ) Other:	( ) Hydrogen	( ) Conductivity Std
		( ) Mineral Spirits		( ) Propane	( ) Other:

HEALTH AND SAFETY PLAN FORM *This document is for the exclusive* **CDM Smith**

CDM Smith Health and Safety Program *use of CDM Smith and its subcontractors* **PROJECT DOCUMENT #:** 0

EMERGENCY CONTACTS

Water Supply	N/A
Site Telephone Autodialer	510-420-7200
EPA Release Report #:	800 / 424 - 8802
CDM 24-Hour Emergency #:	CED 732 / 539 - 8128
Facility Management	
Other (specify) CAL-OSHA	N/A
CHEMTREC Emergency #:	800 / 424 - 9300

SAFETY NARRATIVE: *Summarize below*

CDM Smith shall ensure utility locates are performed prior to intrusive activities. Drilling and sampling personnel shall also be closely monitored for cleanliness duruing activities. If soil or water is observed on work clothing, the SSO will direct the workers to don Tyvek or similar disposable protective clothing.

Emergency Response Plan (ERP)

Prior to start of task activities, this plan will be discussed and signed by each person working at the Site. Site information, associated hazards, intended work and emergency procedures will be presented.

Two people will be present onsite during task activities. In the event of personnel injury, the uninjured person will direct emergency activities and implementation of the ERP.

In an event of a life threatening injury where there is insufficient time to wait for an ambulance, the field vehicle will be used to transport the injured personnel to the Kaiser Foundation Hospital (280 West Macarthur Boulevard, Oakland, CA).

If additional emergency personnel must be summoned to the Site the southeast corner of the site (entrance to building) will be used as the contact area.

A first aid kit will be available onsite for minor injuries, (i.e., scrapes, cuts, etc.) Call 911 for other emergencies.

Reporting of incidents to pertinent local, state, and federal agencies will be performed by appropriate CDM Smith representatives after report by field personnel. Review and follow up will be directed by said CDM Smith representatives.

No additional emergency or PPE will be kept at the Site for emergencies nor will emergency personnel require PPE during emergency response.

Emergency services will be contacted by cellular telephone.

Local Emergency Contacts

Pre-activity meetings with local officials and/or other local emergency and public safety agencies (e.g., fire, police, and local health officials) is not necessary. Coordination with these agencies will be carried out during emergencies only.

Contacting the local medical facility prior to commencement of work will not be necessary for remedial action activities. Map to hospital is attached. Assembly areas are not required as all personnel onsite will be together at all times.

Emergency decontamination of injured workers will not vary from normal decontamination procedures. Nitrile gloves will be removed. Hands and face may be washed once the injured worker has reached the emergency facility.

HEALTH AND SAFETY PLAN APPROVALS (H&S Mgr must sign each plan)

Prepared by	Stefanie Mysel	Date	5/23/2012
HSC Signature		Date	
HSM Signature		Date	5/29/12

EMERGENCY CONTACTS

EMERGENCY CONTACTS	NAME	PHONE
Health and Safety Manager	Paul Opem	(303) 383-2483
Project Manager	Pawan Sharma	(925) 296-8074
Site Safety Coordinator	Pawan Sharma	(925) 296-8074
Client Contact	Mr. Larry Mencin	(216) 566-1007
Site Contact	Luis Banaag	(510) 420-7200
Environmental Agency		
State Spill Number	California	(800) 852-7550
Fire Department		911
Police Department		911
State Police		911
Health Department		
Poison Control Center	Nationwide	800 / 222 - 1222
Occupational Physician	Dr. Jerry Berke	800 / 350-4511

MEDICAL EMERGENCY **PHONE**

Hospital Name:	Foundatio	(510) 752-1000
Hospital Address	280 West Macarthur Blvd, Oakland, CA 94611	
Name of Contact at Hospital:	N/A	
Name of 24-Hour Ambulance:	Emergency	911
Route to Hospital:	see attached map	

Head east on Sherwin St. to Horton Street. (161 feet), turn right on Horton St. (0.2 mi), turn left on 40th St. (0.8 mi), turn right on Market St. (0.2 mi), turn left at W. Macarthur Blvd. (0.9 mi), arrive at 280 W. Macarthur Blvd.

Distance to Hospital 2.1 miles (10 minutes)

16.12 Tools and Power Equipment

16.12.1 Hand Tools

CDM Smith employees who have a need to use basic hand tools should use the following work practices:

- All tools used on CDM Smith projects, regardless of ownership, shall be of an approved type and maintained in good condition. Tools are subject to inspection at any time. The project manager has the authority and responsibility to condemn unserviceable tools, regardless of ownership.
- Tag defective tools to prevent their use or removal from the job site.
- Use the proper tool for the job performed.
- Do not use hammers with metal handles, screwdrivers, knives with metal continuing through the handle, and metallic measuring tapes on or near energized electrical circuits or equipment.
- Do not throw tools from place to place or from person to person. Tools that must be raised or lowered from one elevation to another shall be placed in tool buckets or firmly attached to hand lines.
- Do not place tools unsecured on elevated places.
- Dress, repair, or replace all impact tools such as chisels, punches, drift pins, etc., that become mushroomed or cracked before further use.
- Use suitable holders or tongs, not the hands, to hold chisels, drills, punches, ground rods, or pipes that are struck by another employee.
- Do not use shims to make a wrench fit.
- Do not use wrenches with sprung or damaged jaws.
- Do not use pipe or other means to extend a wrench handle for added leverage unless the wrench was designed for such use.
- Use tools only for the purposes for which they have been designed.
- Store and handle tools with sharp edges so that they will not cause injury or damage. They shall not be carried in pockets.
- Use eye protection when using or working around impact type tools (e.g., hammer, chisel, ax, hatchet, etc.).
- Replace wooden handles that are loose, cracked, or splintered. The handle shall not be taped, glued, or lashed with wire.

- Keep all cutting tools such as saws, wood chisels, knives, or axes in suitable guards or in special compartments.

- When using such tools as screwdrivers and wrenches, avoid using your wrists in a bent, flexed, extended, or twisted position for long periods of time. Employees should maintain their wrists in a neutral or straight position.

- Do not leave tools lying around where they may cause a person to trip or stumble.

- When working on or above open grating, use a canvas or other suitable covering to cover the grating to prevent tools or parts from dropping to a lower level where others are present, or barricade or guard the danger area.

- Do not depend on the insulation on hand tools to protect users from shock.

16.12.2 Electric Tools

CDM Smith employees who have a need to use electric power tools should use the following work practices:

- The non-current carrying metal parts of portable electric tools such as drills, saws, and grinders shall be effectively grounded when connected to a power source unless the tool is an approved double-insulated type or the tool is connected to the power supply by means of an isolating transformer or other isolated power supply, such as a 24-volt DC system.

- All power tools shall be examined before use to ensure general serviceability and the presence of all applicable safety devices. The electric cord and components shall be given a thorough examination for cracks, exposed wires, or other defects.

- Power tools shall be used only within their capability and shall be operated in accordance with the manufacturers' instructions.

- The use of eye protection is required when using or working around power tools.

- Operators should take care to use appropriate hand positions on cutting tools such as saws, drills, or grinders to avoid hand injury.

- All tools shall be kept in good repair and disconnected from the power source while repairs are being made.

- Electrical tools shall not be used where there is a hazard of flammable vapors, gases, or dusts until that hazard is firmly under control.

- GFCI should be used with all electric power tools.

- All guards and safety interlocks with which the tools were purchased shall be in place and in working order.

- Any tool that is identified as defective should be tagged "not for use," and set aside for repair and/or discarded.
- Do not wear loose or frayed clothing while operating power tools and equipment. Hair should not stick out from hard hats.
- Do not use electrical cords to transport, suspend, hoist, or lower tools.
- Do not allow power cords to lie in water.
- Disconnect rotating tools from the power source before adjusting, servicing, or cleaning them. Follow the lockout procedure described in Section 16.5.
- Do not modify tools.

16.12.3 Pneumatic Tools

CDM Smith employees that use pneumatic power tools should use the following work practices:

- Compressed air and compressed air tools shall be used with caution.
- Pneumatic tools shall never be pointed at another person.
- Pneumatic hose connections should be secured by some positive means to prevent them from becoming accidentally disconnected. Chicago fittings have wire holes to allow such security.
- Pneumatic power tools shall be secured to the hose by some positive means to prevent the tool from becoming accidentally disconnected.
- Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled.
- Compressed air shall not be used for cleaning purposes except when reduced to less than 30 psi and then only with effective chip guarding and PPE.
- Compressed air shall not be used to blow dust or dirt from clothing (or skin).
- The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded.
- The use of hoses for hoisting or lowering tools shall not be permitted.
- All compressed air hoses exceeding 30 psi shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure or disengagement of a connection.

- Before making adjustments or changing air tools, the air shall be shut off at the air supply valve ahead of the hose. The hose shall be bled at the tool before breaking the connection. Disconnection at the quick-change connectors is one way to meet this goal.
- Eye protection is required when using or working around pneumatic tools.
- Use hearing protection if noise exposure is a concern (i.e., if it is too loud to conduct a normal conversation).
- Pneumatic tools shall be operated only by persons trained in their use.
- A pneumatic tool used where it may contact exposed live electrical parts shall have a nonconductive hose and an accumulator to collect moisture.
- Employees shall not use any part of their bodies to locate or attempt to stop an air leak.
- All guards and safety interlocks must be in place and functional.

16.12.4 Engine-Powered Tools

CDM Smith employees that use engine-powered tools should use the following work practices:

- Stop the engine and allow it to cool before refueling, servicing, or maintenance.
- Use care in refueling. Clean up any small spills of fuel or oil immediately.
- The use of eye protection is required when using or working around engine-powered tools.
- Use hearing protection if noise exposure is a concern (i.e., if it is too loud to conduct a normal conversation).
- If possible, disconnect the spark plug before performing an adjustment, maintenance, or service.
- Use tools in well ventilated areas to eliminate any accumulation of fumes.
- Do not use tools in a flammable or explosive atmosphere.
- Equip engines with spark-arresting mufflers.
- Avoid contact with hot engine components.
- All guards and safety interlocks should be in place and functional.

16.15 Working Around Heavy Equipment

Good work practices while working around heavy equipment include:

- Assume the operator cannot see you. The operator's vision may be blocked by blind spots. He or she is frequently concentrating on their work and equipment and may not notice a site visitor.
- If you must approach the operator, be sure you have made eye contact with the operator and they know you will be approaching them before approaching the equipment. Verbal contact, direct or by radio, is even better. Do not approach if the equipment is moving or in operation.
- Stay clear of pinch points and swing areas of equipment. At CDM Smith projects, these areas should be taped or barricaded off; however, when equipment moves frequently, you cannot count on other organizations to mark these zones.
- Do not walk near a moving piece of equipment. It could turn or rotate any minute. Modern construction equipment moves fast and in any direction.
- On a noisy site, you may not notice the equipment's back-up alarm. Keep aware of what is happening around you.
- Never walk under a load on a crane or hoist. Indeed, avoid the area under the hook or bucket.
- Do not cut across the path of equipment backing up.
- Wear your hardhat and safety glasses. The safety glasses protect your eyes from dust and debris and the hardhat provides protection for your head and makes you more visible on the site.
- On sites where there is frequent vehicle or construction equipment movement, wear high-visibility clothing.
- Maintain a clearance of at least 10 feet between any part of the machine or its load and any electrical line or apparatus carrying up to 50,000 volts. One foot of additional clearance is required for every additional 30,000 volts.

16.18 Safety Working Around Drill Rigs

The use of mechanical drill rigs to collect soil samples and install monitoring wells presents significant hazards to operators and helpers, as well as technicians and engineers who may work in proximity to such rigs. CDM Smith employees that manage or oversee drilling operations should be aware of the basic hazards of drilling equipment and operations and have an awareness of safe drilling work practices. The guidelines and work practices described below should be implemented on all projects where mechanical drill rigs are used.

16.18.1 Preparation

- Contract documentation with drillers contracted with CDM Smith should include CDM Smith's standard contract between "Engineer & Subcontractor for Drilling Services," and "Health and Safety Protocol for Subcontractors" available on the Office of General Council's page of contract forms at http://cdmweb/legalforms/inc.htm.

- Before drilling or other subsurface operations, a survey should be conducted to identify any overhead or underground utilities, unexploded ordnance, tanks, pipes, or other underground structures. The local agency or organization for utility location should be contacted to identify underground utilities. In some cases, ground penetrating radar or magnetometer studies may be needed to identify the location of underground obstructions.

- The work area for the drill rig and crew should be cleared of sticks, logs, brush, and trash. Inspect the area for any potential tripping hazards and remove them. If they cannot be removed, they should be identified with caution tape or cones.

- Before rig setup, the planned arrangement of equipment should be such that it does not present a dangerous condition. Take into account slopes of hills, mud, standing water, overhead power lines, etc.

- OSHA regulations require that any part of the rig must be at least 10 feet away from power lines under 50kV or less. For higher voltage lines, 1 foot of additional clearance is required for every additional 30,000 volts.

- If working in an area of moving vehicular traffic, appropriate traffic control systems should be in place. Contact local police or traffic control officer, before placing any traffic control equipment (Section 16.22).

- Define an exclusion zone around the drill rig that is at least 1.5 times the height of the mast. Only personnel necessary for the immediate task being performed should be inside the exclusion zone.

16.18.2 Drill Rig Inspection

- After the rig is set up, but before operation, the work area should be inspected for eye, bump, and tripping hazards.
- The driller should inspect the rig daily before operation of the rig. The inspection should include the following:
    - Condition of the vehicle. Brakes should work and tires should have adequate tread. It should have a back-up alarm. If it is driven over the road, it should have all necessary brake lights, headlights, horn, license plates, etc.
    - All welds should be solid, with no sign of visible cracks.
    - All gauges should be functional and legible.
    - All machine guards should be in place.
    - Emergency kill switches should be functional. All site personnel should be aware of the location and function of the kill switches. Have the driller review these with site personnel.
    - Cable and wire rope should be inspected for fraying, decay, "bird caging," broken strands, kinking, or flattening.
    - All hoses should be secure and in good shape. They should not be loose, bulging, or leaking.
    - High-pressure fittings should be secure and have whip checks (a pin or wire to prevent the hose whipping in the event of a failure of the connection).
    - High-pressure relief valves should be in working order.
    - Wire rope loops should be secure with at least two clamps.
    - The rig should have a fire extinguisher and first aid kit.
    - All tools should be clean and in good working condition. Hooks, eyes, pins, etc. should not be corroded or bent. Rod clamps should be in good condition.
    - If a cathead is used, it should be clean and free of burrs. The cathead rope should be in good condition and not be frayed or have excessive wear.
    - Back-up alarms should be functional.
    - Vehicles should have all lug nuts and they should all be tight.

16.18.3 Work Practices

- All personnel working around drilling operations should wear appropriate PPE including a hard hat, safety glasses, and hard-toed work boots.
- Drill crews should wear work gloves.
- On hazardous waste sites, additional PPE such as respirators, protective clothing, gloves, etc. may also be required.
- In areas where there is vehicular traffic, personnel should also wear high-visibility vests or clothing.
- Maintain an organized work area free from tripping hazards.
- Drill rods or other equipment should not be stored leaning up against equipment.
- Drill holes should be completed or secured before leaving the site for the day. Drill holes should not be left open at an unattended site.
- Boring locations should be placed to minimize the possibility of contacting underground utilities or structures. Clearance should be obtained from the site project manager before drilling begins.
- Do not move the rig with the mast in the upright position.
- Use a spotter when moving the rig from one location to another on the site.
- When sampling activities require working in proximity with heavy equipment or drill rigs, sampling personnel will stand clear of the equipment until sampling is required. They will notify the operator they are going to take a sample and must receive acknowledgment from the operator.
- Do not wear loose clothing such as hooded sweatshirts, parkas, or clothing with hanging drawstrings around drill rigs.
- Monitor weather conditions. Drilling operations should be terminated and the area near the drill rig evacuated during high winds and or storms with the potential for lightning strikes. The lead driller should be consulted to help assess if weather conditions are safe for drilling.
- Drill crew personnel should wear a personal fall arrest harness, connected to a secure tie-off point, when climbing the mast or working where fall exposures exceed 6 feet.
- Hearing protection should be worn during operations that produce significant noise exposures. (If you cannot hold a conversation using a normal voice with someone within 3 feet of you because of background noise, the use of personal hearing protection is recommended.)

16.21 Decontamination at Hazardous Waste Sites

Proper decontamination helps protect employees and prevents the contamination of uncontaminated areas. Decontamination protects all site personnel by minimizing the transfer of harmful materials into clean areas. It helps prevent mixing of incompatible chemicals and protects the community by preventing uncontrolled transportation of contaminants from the site.

16.21.1 Prevention of Contamination

To prevent contamination, crew members should:

- Follow procedures for proper dressing before entry into the exclusion zone. Proper dressing will minimize the potential for contaminants to bypass the PPE and escape decontamination.
- Protect monitoring and sampling instruments by bagging. Make openings in the bags for sample ports and sensors that must contact site materials, or cover equipment and tools with a strippable coating, which can be removed during decontamination.
- Encase any source of contaminants on the site with barriers (e.g., plastic sheeting or over packs).
- Stress work practices that minimize contact with hazardous substances. Use remote sampling, handling, and container-opening techniques.

16.21.2 Decontamination Equipment Selection

In selecting decontamination equipment, consider whether the equipment must be decontaminated for reuse or can be easily disposed. Recommended equipment for decontamination includes:

- Storage tanks or appropriate treatment systems
- Drains or pumps
- Long-handled brushes
- Wash solutions appropriate for the contaminants present
- Rinse solutions appropriate for the contaminants present
- Pressurized sprayers for washing and rinsing
- Curtains, enclosures, or spray booths
- Long-handled rods and shovels
- Containers to hold contaminants and contaminated soils
- Wash and rinse buckets
- Brooms
- Containers for the storage and disposal of contaminated material

16.21.3 Decontamination Design

Decontamination facilities should be located in the CRZ, i.e., the area between the exclusion zone (the contaminated area) and the support zone (the clean area), and described in the site HSP.

- Site-specific factors that affect the decontamination facility design must be considered. Typical factors include:
  - The chemical, physical, and toxicological properties of the wastes
  - The pathogenicity of infectious wastes
  - The amount, location, and containment of contaminants
  - The potential for and location of exposure based on assigned worker duties, activities, and functions
  - The potential for wastes to permeate, degrade, or penetrate materials used for personal protective clothing and equipment, vehicles, tools, buildings, and structures
  - The proximity of incompatible wastes
  - The movement of personnel and/or equipment among different zones
  - The emergencies that may arise
  - The methods available for protecting workers during decontamination
  - The impact of the decontamination process and compounds on worker H&S
- Decontamination Line
  - Decontamination should be an organized process by which levels of contamination are reduced.
  - The decontamination process consists of a series of steps performed in a specific sequence. For example, outer, more heavily contaminated items are decontaminated first, followed by the decontamination and removal of inner, less contaminated items.
  - Each step should be performed at separate stations to prevent cross contamination.
  - Decontamination stations should allow enough separation to prevent cross contamination and should be arranged in order of decreasing contamination.
  - Separate decontamination areas should be provided to isolate workers from different contamination zones containing incompatible wastes or decontamination processes.
  - Entry and exit points should be conspicuously marked. Preferably the entry to the CRZ from the exclusion zone should be separate from the entry to the exclusion zone from the CRZ.
  - Dress-out stations for entry to the CRZ should be separate from redressing areas for exit from the CRZ.
  - Personnel who wish to enter clean areas of the decontamination facility, such as locker rooms, must be appropriately decontaminated first.
  - Examples of decontamination lines and procedures for personnel wearing various levels of protection are provided in Exhibits 16A and B.

16.21.4 PPE for Decontamination Workers

A rule of thumb is that decontamination workers wear a level of protection one level below the level of protection worn in the exclusion zone. However, consideration should be given to the following when determining the level of protection for a given project.

- The nature of site contamination
- Degree of contamination expected on workers leaving the exclusion zone
- The results of wipe tests and onsite air monitoring

Some site-specific cases may require that decontamination personnel wear the same level of PPE as workers in the exclusion zone. Cases include:

- Workers using a steam jet may need a different type of respiratory protection than other decontamination personnel because of the high moisture content of the steam jets.

- Cleaning solutions used and wastes removed during decontamination may generate harmful vapors, requiring a different type of respiratory or clothing protection.

16.21.5 Decontamination Methods

All personnel, clothing, equipment, and samples leaving the contaminated area of a site should be decontaminated to remove any harmful chemicals, radioactive material, or infectious organisms that may have adhered to them. The extent of decontamination will vary depending on the nature of site activity, site contamination, and other factors.

- Decontamination methods available include:

    - Physical removal
    - Chemical detoxification or disinfections/sterilization
    - A combination of both physical and chemical methods

- The selected decontamination method should be reviewed for any safety and health hazards. If the selected method poses a direct health hazard, measures shall be taken to protect both the decontamination personnel and the workers to be decontaminated.

- Physical Removal

    - Physical methods using high pressure and/or heat should be used with caution.
    - Loose contaminants can be removed by using a soap and water rinse with a soft bristle brush to remove dust and vapors that cling to equipment and workers, or that are trapped in small openings, such as clothing or fabric weaving.

- Adhering contaminants can be removed by:

    - Scraping, brushing, and wiping.
    - Solidifying.
    - Freezing (using dry ice or ice water).
    - Adsorption or absorption (e.g., kitty litter or powdered lime).
    - Melting.

- Volatile liquid contaminants can be removed from PPE or equipment by evaporation followed by a water rinse. Evaporation may be expedited by the use of steam jets.

- Chemical Removal

  - Decontamination using chemicals should only be done if recommended by an industrial hygienist or other qualified professional.
  - Any chemical used in the decontamination process must be chemically compatible with the equipment or clothing being decontaminated.
  - Halogenated solvents should only be used for decontamination in extreme cases where other cleaning agents will not remove the contaminant.

- Chemical removal types include the following:

  - Surface contaminants can be dissolved in a solvent.
  - Solidification of liquid or gel contaminants can enhance their physical removal. Typical solidification processes are moisture removal using adsorbents such as grounded clay or powdered lime; and chemical reactions using polymerization chemicals and/or chemical reagents.

16.21.6 Personnel Decontamination

Different levels of personnel protection, as discussed in the PPE guidelines, may be used at any given site. The following is a description of the decontamination process for each level of protection.

- **Level D**

  - An area should be designated for the gross removal of dirt and mud from gloves and boot covers. Paper towels and buckets of rinse water can be made available for this purpose.
  - Typical decontamination steps for Level D operations are provided in Exhibit 16-B.
  - Soap and water should be used to wash hands and face before leaving the site.
  - Laundering of personal clothing should be completed as soon as possible once offsite.

- **Level C and B**

  - A decontamination line should be established.
  - Site-specific procedures should be outlined in the site HSP. The recommended procedure for this layout is listed in Exhibit 16-C.

- **Level A** - It is not anticipated CDM Smith will directly participate in Level A operations. If required, site-specific procedures will be developed in coordination with the division HSM.

16.21.7 Sampling and Monitoring Equipment Decontamination

Sampling equipment often becomes grossly contaminated. Often trowels or drum thieves (coliwassas) are dedicated to a particular site. These should be left in the exclusion zone and disposed of as contaminated waste at the end of site work. Sampling equipment such as split spoons or other equipment that is used to collect several samples must be cleaned and decontaminated between samples to prevent cross contamination. These items should be cleaned and decontaminated in accordance with the project operations or sampling

plan. Dirt and wash solutions from sampling equipment decontamination should be collected and disposed of as investigation-derived waste.

Once grossly contaminated, testing and monitoring instrumentation can be difficult to decontaminate without causing damage to the instrument. Care should be taken in the field to prevent gross contamination of field instruments by avoiding direct contact between the instrument and contaminated soils, water, or surfaces. In some cases it may be necessary to place instruments in plastic bags, leaving small openings for sampling ports, detectors, and exhaust ports. The plastic bags can then be removed as the instrument comes out of the exclusion zone. The outside of instruments can be wiped down with paper towels or brushed off with clean soft brushes.

16.21.8 Heavy Equipment Decontamination

Drill rigs, trucks, backhoes, and other heavy equipment can be difficult to decontaminate. The method generally used is to wash them with water under pressure and scrub accessible areas with soap and warm water. Hot water and steam systems can be effective but may increase air concentrations of contaminants, exposing decontamination workers. Particular care should be taken where equipment comes into direct contact with contaminated soils such as tires, buckets, or treads. In severe cases, tires may need to be replaced or parts sand blasted clean or disposed of. Equipment should be visually inspected to be sure it is free of any visible signs of contamination. In some cases, wipe tests or other methods may be needed to confirm equipment has been adequately decontaminated before leaving the site.

16.21.9 Decontamination Solutions, Disposable PPE, and Site Wastes

Potentially contaminated equipment, disposable PPE, respirator cartridges, disposable sampling equipment, brushes, buckets, waste decontamination solutions, etc. should be secured in drums and labeled. Disposal methods for these materials may depend on client requirements and/or results of site investigation data. The confirmed presence of hazardous materials on the site may require disposal of investigation-derived wastes as hazardous wastes.

Care should be taken during work and decontamination activities to minimize waste materials generated.

Exhibit 16-B
Minimum Measures For Level D Decontamination

Station 1 - Equipment Drop	Deposit equipment used on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather, a cool down station may be set up in this area.
Station 2 - Outer Garment, Boots, and Gloves Wash and Rinse	Scrub outer boots, outer gloves, and suit with decontamination solution or detergent/water. Rinse off using copious amounts of water.
Station 3 - Hard Hat, Outer Boot, and Glove Removal	Remove hard hat, outer boots, and gloves.
Station 4 - Boots, Gloves, and Outer Garment Removal	Remove boots, suit, and inner gloves and deposit in separate containers lined with plastic.
Station 5 - Field Wash	Wash hands and face.

Exhibit 16-C
Minimum Measures For Level B, And C Decontamination

Station 1 - Equipment Drop	Deposit equipment used on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather, a cool down station may be set up in this area.
Station 2 - Outer Garment, Hard Hat, Boots, and Gloves Wash and Rinse	Scrub outer boots, hard hat, outer gloves, and suit with decontamination solution or detergent/water. Rinse off using copious amounts of water.
Station 3 - Tank/Air Canister Change	If a worker leaves the exclusion zone to change an air tank, air canister, or mask, this is the last step in the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boots donned, and joints tapped. Worker returns to duty.
Station 4 - Outer Boots, and Glove Removal	Remove outer boots and gloves. Deposit in container with plastic liner.
Station 5 - SCBA/Respirator Removal	SCBA backpack and facepiece/respirator is removed (avoid touching face with fingers). SCBA or respirator is deposited on plastic sheets.
Station 6 - Inner Gloves and Outer Garment Removal	Remove suit and inner gloves and deposit in separate containers lined with plastic.
Station 7 - Field Wash	Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face.

16.22 Traffic and Work Zone Safety

These guidelines apply whenever CDM Smith employees or subcontractors work in areas exposed to vehicular traffic on public streets or highways.

- Where vehicular traffic hazards exist because of work at locations near public streets or roads, a system of traffic and work zone controls should be developed to mitigate the hazard. The system should meet the requirements of Part 6 of the Manual of Uniform Traffic Control Devices (MUTCD) published by the Federal Highway Administration, or the applicable state version of the MUTCD.

- In general, when the MUTCD allows the use of traffic safety direction devices, such as cones, CDM Smith will supplement those direction devices with a physical barrier, such as a truck.

- All traffic control systems on public roads must be coordinated with local traffic control officials as required by applicable law.

- Periodically evaluate effectiveness of temporary traffic control setups by walking or riding the job area looking for evidence of poor controls and near misses such as swerving traffic, motorists braking quickly, skid marks, blind spots, etc.

- Give motorists plenty of advanced warning of upcoming work zones.

- All employees working within designated work zones or near vehicular traffic should wear high-visibility clothing such as orange, yellow, or yellow-green shirts, jackets, or vests. During wet or inclement weather, similarly colored rainwear should be worn.

- During night work, between the hours of sunset and sunrise, high-visibility clothing should incorporate reflective striping or fabric and be visible at a distance of 1,000 feet. This clothing should meet ANSI standard #107 for High Visibility Safety Apparel.

- All employees working near traffic and vehicles must maintain situational awareness at all times. Stay mindful that warning signs and cones inform drivers to take action but that some drivers may not pay attention, and vehicles may still enter the work zone.

16.2 Housekeeping

These guidelines are for the establishment and administration of a clean and orderly work environment at field project sites. A continuous housekeeping program strongly tends to prevent accidents. A clean and orderly work environment can be achieved and maintained through ongoing housekeeping efforts undertaken by personnel at all levels. Project managers shall initiate participation in housekeeping activities and good work habits, not only at the end of a work assignment, but throughout the evolution of the project.

- To achieve these benefits, the team shall plan the location of equipment and storage facilities to allow the easy flow of personnel, equipment, materials, fire hazards, and to prevent the obstruction of evacuation, fire fighting, or rescue activities.

- Store materials in a manner that facilitates access of material handling equipment and personnel handling limitations. Lack of sufficient workspace and storage capacity leads to the potential for accidents and decreases efficiency.

- Avoid storage of flammable liquids, such as paints and thinners unless they are required for specific project needs. If needed, such storage shall be within a metal storage cabinet that has been labeled and approved for the storage of flammable liquids.

- Continuously maintain work areas in a neat and orderly manner.

- Containers should be provided for the collection of waste, trash, and other non-hazardous refuse. Investigation-derived waste and other waste materials that are potentially hazardous should be stored and labeled in accordance with project specific procedures that meet regulatory and client requirements.

- Deploy leads, hoses, and extension cords so they do not present tripping hazards, and are not subject to contact with moisture or physical stress. Where possible they should be hung overhead with non-conductive material and kept away from walkways, doors, stairs, and ladders.

- Protect protruding rebar and anchor bolts and conspicuously mark them.

- Clean small spills that create slip hazards and or flammability hazards immediately and not leave them unattended.

- Keep walkways, aisles, stairways, and passageways in a clear and unobstructed condition.

- Prohibit eating and drinking in work areas where there is potential exposure to toxic or hazardous materials. Smoking is limited to designated smoking areas where there is no such exposure.

16.20 Hazardous Waste Site Controls

Work sites designated as Hazardous Waste Sites must control access to the work area to only authorized personnel and conform to general work practices expected at hazardous waste site operations as required by the OSHA Standard for Hazardous Waste Operations, 29 CFR 1910.120. The following concepts should be reflected in the health and safety plan for the project.

16.20.1 Access Control

Controlled access to hazardous waste site work areas is required to protect personnel working on the site as well as to limit the potential for transporting contaminants off site. Depending on the size of the work site, hazards and contaminants present, and complexity of the work, access control may range from verbally cautioning non-authorized personnel to stay away from the work area, to a program including site security, signs, or formal sign in and sign out procedures. Details of site-specific access control procedures should be included in the site-specific health and safety plan. Some general work practices for access control are noted below:

For small-scale site investigations that are short-term projects (i.e. days not weeks or months), identify a work area to the work crew and keep persons not associated with the job site out of the work area. If the site is in an area where non-authorized persons are likely to be encountered, traffic cones, caution tape, and signs identifying the area as a controlled access area may be used.

For more extensive projects where work may be done for weeks or longer, the team the should deploy more extensive access controls. They should:

- Set up physical barriers and hire security personnel to prevent non-authorized persons from entering the work site.
- Keep the number of personnel and equipment on site to the minimum required to do the project effectively and safely.
- Establish work zones within the site,(see the next section- work zones).
- Establish controlled access points to be used by authorized personnel.
- Track the entry and exit of personnel through a check-in, checkout system.
- Establish a formal decontamination corridor from exclusion zones.

16.20.2 Work Zones

Field project managers, working under health and safety plans for hazardous waste operations are required to establish work zones to prevent or reduce the spread of site contaminants to non-contaminated areas on or off site. Movement between zones should be restricted to those that need access to a specific area, and entry and exit between zones should be through designated access control points. A description of the three work-zone system for hazardous wastes is provided below.

Exclusion Zone – The exclusion zone should include any area where contamination is known or suspected. Areas of air, water, or soil that are contaminated with hazardous

materials (biohazards, radioactive materials, chemicals) should be included in the exclusion zone. The zone should be well known to site workers. On smaller projects, this can be a verbal identification to site workers, such as "A 20-foot radius around the drill rig". On larger projects, or in areas that may be encountered by observers or the general public, the zone may need to be defined with caution tape, traffic cones or in some instances, fencing and barriers. The need will be site specific and the specific method should be identified in the site-specific health and safety plan. Some work practices that should be followed in the exclusion zone include:

- Employees in the exclusion zone must wear the PPE designated in the site health and safety plan for tasks executed within the zone.
- No eating, drinking, chewing gum or tobacco, smoking, application of cosmetics, including application of lip balm, sunscreen, or insect repellant is allowed in the exclusion zone.
- Sitting or kneeling in areas of high concentrations of contaminants should be avoided.
- If any PPE becomes defective, the employee should leave the work area via the designated egress area, decontaminate as needed, and replace the defective PPE before returning to work in the exclusion zone.
- Prescription drugs should not be used within the exclusion zone unless approved by CDM's medical consultant. The use of illegal drugs or consumption of alcohol is prohibited.
- When leaving the exclusion zone, employees should exit via the designated access/egress point(s) and follow decontamination procedures described in the site health and safety plan.

Contaminant Reduction Zone (CRZ)– A CRZ is established to provide a transition between the exclusion zone and the support zone. The CRZ is set up at the access control points of the exclusion zone and will vary in size depending on the complexity of activities that need to occur within the zone. For small site investigations, the CRZ may simply be a designated area near containers set up to collect used disposable PPE and some soap and water. For larger projects, the CRZ may include specific decontamination points and be staffed by personnel specifically designated to participate in the decontamination of personnel and equipment exiting the exclusion zone. Depending on the site contaminants, level of contamination, and decontamination procedures, personnel in the CRZ may be required to wear protective clothing, gloves, or respirators. The specific requirements will be outlined in the site health and safety plan. The CRZ should be placed in an area that is not contaminated at the boundary of the exclusion zone.

Support Zone – The support zone is established near the entrance to the site and is far enough from the exclusion zone and CRZ that specialized protective clothing or respirators are not used. The use of normal field PPE such as hard hats, safety glasses, and safety work boots is expected except for areas such as office trailers, break and lunch areas, or other areas designated as having no known or anticipated hazards. Operational support activities and equipment storage and maintenance areas are located

in the support zone. No equipment or personnel should go from the exclusion zone to the support zone without passing through the CRZ and being decontaminated in accordance with the site health and safety plan.

Mobile Work Zone – For those projects that involve brief periods of work in multiple locations, a specific area may be designated as the exclusion zone for the duration of the work performed in that area. The exclusion zone can be terminated (provided there are no ongoing hazards or potential exposures to contaminants) and moved to the next area of work. For example, during soil borings or well installation, the exclusion zone can be defined as, "1.5 times the mast height" of the drill rig. Once the boring has been closed, or well installed and secured, and all drill cuttings have been secured, the area can be opened up and a new exclusion zone established around the next boring location.

16.20.3 Considerations When Establishing Work Zones

Work zones should be large enough to perform tasks within the zone safely, with no exposure to hazards to personnel outside the zone, but they should also be small enough to be able to secure and control access. Some considerations in establishing work zones include:

- Physical and topographical features of the site.
- Dimensions of the contaminated area.
- Weather.
- Physical, chemical, and toxicological characteristics of contaminants and chemicals used in the zone.
- Potential for exposure to site contaminants.
- Known and estimated concentrations of contaminants.
- Air dispersion of contaminants.
- Fire and explosion potential.
- Planned operations and space needed to perform the work safely.
- Surrounding areas.
- Decontamination procedures.
- History of job site.

16.20.4 General Hazardous Waste Site Work Practices

- **Buddy System -** Work should be scheduled so that no person works unobserved within the exclusion zone at any time. Each worker within the exclusion zone should maintain visual contact with at least one other worker on the site. All site personnel should remain aware of each other and monitor each other's condition.

- **Eating, drinking, chewing gum or tobacco, and smoking** - are prohibited within the contaminant reduction and exclusion zones. (Exception for heat stress: Squirt bottles of water, Gatorade, or other fluids may be consumed via squirt bottles in the

contaminant reduction zone with the approval of the health and safety manager. Open bottles, cups, etc. should not be permitted.)

- Sitting or kneeling should be avoided in areas of known or suspected areas of contamination.
- Hands and face should be thoroughly washed when leaving the work area.
- Defective PPE should be repaired or replaced immediately.

Sections 5,6, 7, 9, and 11 of this manual are particularly in applicable to health and safety at hazardous waste sites.

Google maps

Directions to Kaiser Permanente Medical Center-Oakland: Hospital
280 West Macarthur Boulevard, Oakland, CA 94611 - (510) 752-1000
2.4 mi – about **9 mins**
Direction from Sherwin Williams Company Emeryville Site to Nearest Hospital - Kaiser Permanente Medical Center - Oakland - (510)752-1000

A 1450 Sherwin Ave, Emeryville, CA 94608

	1. Head **east** on **Sherwin St** toward **Horton St**	go 276 ft total 276 ft
	2. Turn **right** at **Horton St** About 1 min	go 0.2 mi total 0.2 mi
	3. Take the 2nd **left** onto **40th St** About 7 mins	go 1.9 mi total 2.1 mi
	4. Turn **right** at **Howe St**	go 0.2 mi total 2.3 mi
	5. Take the 1st **right** onto **W MacArthur Blvd**	go 364 ft total 2.4 mi

B Kaiser Permanente Medical Center-Oakland: Hospital
280 West Macarthur Boulevard, Oakland, CA 94611 - (510) 752-1000

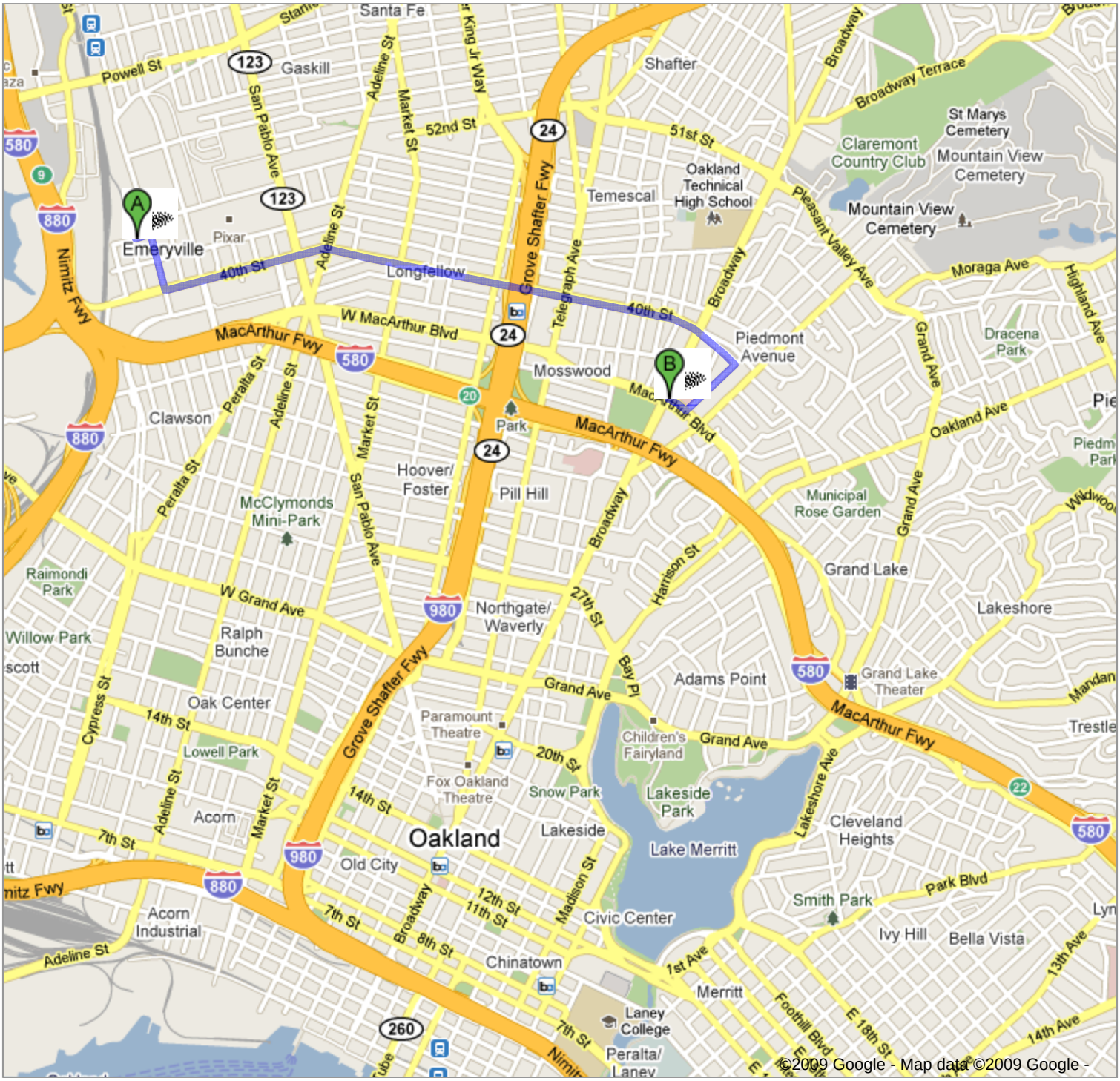
These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2009 , Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

Google maps

To see all the details that are visible on the screen,use the "Print" link next to the map.



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HEALTH AND SAFETY PLAN SIGNATURE FORM

CDM Smith Health and Safety Plan

All site personnel must sign this form indicating receipt of the H&SP. Keep this original on site. It becomes part of the permanent project files. Send a copy to the Health and Safety Manager (HSM).

SITE NAME/NUMBER: The Sherwin-Williams Company

DIVISION/LOCATION: Emeryville, CA

CERTIFICATION:

I understand, and agree to comply with, the provisions of the above referenced H&SP for work activities on this project. I agree to report any injuries, illnesses or exposure incidents to the site Health and Safety Coordinator (SHSC). I agree to inform the SHSC about any drugs (legal and illegal) that I take within three days of site work.

PRINTED NAME	SIGNATURE	DATE

Site Specific Health and Safety Plan

Revision 11 9/20/2012

Project Name: The Sherwin Williams Company
1450 Sherwin Avenue
Emeryville, California

Project Number: EM002616
Client Name: Sherwin Williams Company
Date: 11/19/2012
Revision: 2012 Update

Approvals:

HASP Developer: Erica Whiting

HASP Reviewer: Ron Goloubow

Project Manager: Lucas Goldstein

Emergency Information

Site Address: 1450 Sherwin Avenue
Emeryville, California

Emergency Phone Numbers:

Emergency (fire, police, ambulance)		911
Emergency (facility specific, if applicable):		
King Security (24 Hr onsite safety)		510-385-0459
Emergency Other (specify)		
Client Contact	Larry Mencin	216.566.1768
WorkCare (non-lifethreatening injury/illness)		1-800-455-6155
Project H&S	Lucas Goldstein	510.596.9535/510.541.6897
Task Manager	Erica Whiting	206.726.4743/303.903.3505
Project Manager	Lucas Goldstein	510.596.9535/510.541.6897
Corporate H&S Specialist	Alec MacAdam	248-994-2259
Corporate H&S Director	Rebecca Lindeman	408-834-0368

Hospital Name and Address: Alta Bates Hospital
2450 Ashby Avenue
Berkeley, California 94705

Hospital Phone Number: (510) 204-4444

Incident Notification Process

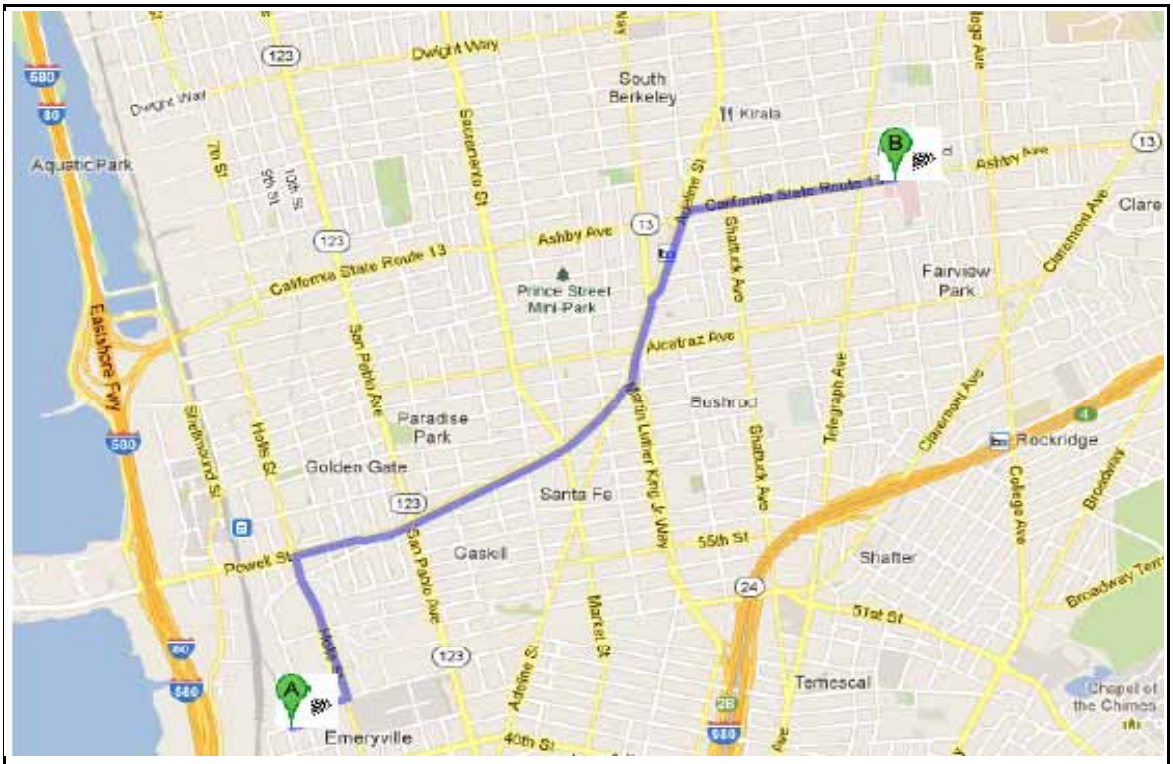
1 Dial 911/Facility Emergency Number/WorkCare as applicable
2 Contact PM/Supervisor — Lucas Goldstein
3 Contact Corporate H&S — Rebecca Lindeman
4 Contact Client — Larry Mencin

Complete below, as applicable, or clear cell contents:

Location of Assembly Area(s): On-site assembly area: Security Office at Sherwin Building

Nearest Storm Shelter: Onsite Sherwin Building

Route to the Hospital



1450 Sherwin St, Emeryville, CA 94608

	1. Head east on **Sherwin St** toward **Horton St**	go 279 ft total 279 ft
↰	2. Turn left onto **Horton St**	go 200 ft total 479 ft
↱	3. Take the 1st right onto **45th St**	go 0.1 mi total 0.2 mi
↰	4. Take the 1st left onto **Hollis St** About 2 mins	go 0.5 mi total 0.7 mi
↱	5. Turn right onto **Powell St** About 54 secs	go 0.3 mi total 1.0 mi
	6. Continue onto **Stanford Ave** About 3 mins	go 0.8 mi total 1.8 mi
↰	7. Turn left onto **Adeline St** About 2 mins	go 0.6 mi total 2.4 mi
↗	8. Slight right at **down to Adeleine** onto **Ashby Ave/California State Route 13** Destination will be on the right About 2 mins	go 0.6 mi total 3.0 mi

Alta Bates Medical Center
2450 Ashby Avenue, Berkeley, CA 94705

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2012 Google

General Information

Site Type (select all applicable where work will be conducted):

- ☐ Active
- ☐ Bridge
- ☐ Buildings
- ☐ Commercial
- ☐ Construction
- ☐ Government
- ☑ Inactive
- ☐ Industrial
- ☐ Landfill
- ☐ Marine
- ☐ Mining
- ☑ Parking Lot/Private Roadway
- ☑ Railroad
- ☐ Remote Area
- ☐ Residential
- ☐ Retail
- ☑ Roadway (public, inlcuing right-of-way)
- ☑ Secure
- ☐ Unknown
- ☐ Unsecured
- ☐ Utility
- ☐ Other (specify): _____

Surrounding Area and Topography (select one):

☑ Surrounding area and topography are presented in the project work plan
☐ Surrounding area and topography (*briefly describe*):
The area is relatively flat and paved for the most part. Urban setting.

Site Background (select one):

☑ Site background is presented in the project work plan
☐ Site background (*briefly describe)* :
This HSP is for routine periodic groundwater monitoring.

Project Tasks
The following tasks are identified for this project:

Examples: "Drilling/soil sampling", "Surveying", "General Inspections", "Construction Management/Inspections"

1 General Site Work
2 Groundwater Monitoring (water level measurement and collecting groundwater samples)
3
4
5

☐ Subcontractor H&S information is attached
☐ Utility clearance required.
☐ ARCADIS Standards apply to augment JSA *[list standard(s) below]*
☐ ARCADIS Field H&S Handbook sections apply *(list below)*
Comments:

Roles and Responsibilities

	Name	*Role*	*Additional Responsibilities (Describe)*
1	Lucas Goldstein	PM	
2	Erica Whiting	TM	
3	William Semel/Michael Daniels	Field Lead	
4	William Semel/Michael Daniels	SSO	
5			
6			

Training

All ARCADIS employees are required to have the following training:	*Selected ARCADIS employees are required to have the following additional training:*	Names or Numbers from above
☑ 40 hr HAZWOPER w current refresh.	☐ Not applicable	
☐	☑ First aid/CPR/BBP	Michael Daniels; at least one person who is at the site must have first aid training
☐ 24 hr HAZWOPER		
10 hr Construction	☐ 30 hr Construction	
☑ HazMat #1 (Ground/Air/MOT)	☐ 10 hr Construction	
☐ HazMat #4 (MOT)	☐ HazMat #1 (Gr./Air/MOT)	
☐ HazCom/Emergency Action Plan	☐ HazMat #4 (MOT)	
☑ H&S Orientation (classroom); or	☐ Confined space entrant	
☐ H&S Orientation (on-line)	☐ Confined space rescue	
☑ PPE	☐ Excavation CP	
☐ Respiratory protection	☐ Electrical (NFPA 70E)	
☐ MSHA	☐ Lockout/Tagout	
☑ Smith System (on-line)	☐ H&S Orientation (class)	
☐	☑ OTS/eRailsafe	Michael Daniels and any personnel working in railroad right of way.
☐ OTS/eRailsafe		
Client specific:	☐ Smith Sys. (hands on)	
	☐ Boating safety	
☑ Other: Online Flagger Training	☐ Other:	

Hazard Analysis

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Division
Environment

Business Unit
All Categories

Task 1: General Site Work

Hazardous Activity #1

General-Vehicle -motor vehicle operation (all types on roadways)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:
Primary Controls: TRACK Smith System (on line) Inspections

Secondary Controls: JSAs Admin. Controls

Hazardous Activity #2

Groundwater monitoring - water level measurements & collection of groundwater samples

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	L	Electrical	L
Environmental	L	Gravity	-	Mechanical	-	Motion	L
Personal Safety	L	Pressure	-	Radiation	-	Sound	L

Overall Unmitigated Risk: Low Mitigated Risk: Low if utilizing:
Primary Controls: TRACK Smith System (on line)
Secondary Controls: JSAs Admin. Controls

Hazardous Activity #3

Field-Ambient environment - exposure heat, cold, sun, weather, etc

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	L
Environmental	L	Gravity	H	Mechanical	-	Motion	L
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Medium if utilizing:
Primary Controls: TRACK PPE (see HASP "PPE" section) Field H&S Handbook

Secondary Controls: H&S Standards Engineering Controls Admin. Controls Specialized Equipment

Hazardous Activity #4

Field-Railroad - work in the vicinity of moving trains (non-rail yard inspection and field activities)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	-
Environmental	-	Gravity	M	Mechanical	H	Motion	H
Personal Safety	H	Pressure	-	Radiation	-	Sound	L

Overall Unmitigated Risk: High Mitigated Risk: Medium if utilizing:
Primary Controls: TRACK Client Training/Briefing On Track Safety Training Specialized Checklist/Forms eRailsafe PPE (see HASP "PPE" section)

Secondary Controls: JSAs HASP Job Briefing/Site Awareness Cont/Emerg. Planning Engineering Controls Admin. Controls PPE (see HASP "PPE" section) Specialized Equipment Inspections H&S Standards

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low.	4 - Medium.	8 - High	12 - High

Task 2: Groundwater Monitoring (water level measurement and collecting groundwater samples)

Hazardous Activity #1

Chemical -Carcinogens - exposure to these materials

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	L	Driving	-	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Low Mitigated Risk: Low if utilizing:

Primary Controls: TRACK HASP Engineering Controls PPE (see HASP "PPE" section)

Secondary Controls: Job Briefing/Site Awareness Hazcom Training MSDS (see also HASP Hazcom section) Client Training/Briefing Specialized Equipment

Hazardous Activity #2

Field-Measurement - water levels and well sounding

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	L	Driving	-	Electrical	-
Environmental	-	Gravity	L	Mechanical	-	Motion	M
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Low Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs PPE (see HASP "PPE" section)

Secondary Controls: Job Briefing/Site Awareness

Hazardous Activity #3

Field-Sampling - monitoring well sampling - manual (bailer, check valve)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	L	Driving	-	Electrical	-
Environmental	-	Gravity	L	Mechanical	-	Motion	M
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Low Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Engineering Controls Job Rotation PPE (see HASP "PPE" section)

Secondary Controls: Job Briefing/Site Awareness Admin. Controls

Hazardous Activity #4

Field-Sampling - sample cooler preparation

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	M	Driving	-	Electrical	-
Environmental	-	Gravity	M	Mechanical	L	Motion	L
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk: Medium Mitigated Risk: Low if utilizing:

Primary Controls: TRACK JSAs Engineering Controls PPE (see HASP "PPE" section) See HASP "Monitoring" section

Secondary Controls: Job Briefing/Site Awareness Admin. Controls Work Plan

Hazard Communication (HazCom)/Global Harmonization System (GHS)

☐ HAZCOM/GHS for this project is managed by the client or general contractor

*List the chemicals anticipated to be used by **ARCADIS** on this project per HazCom/GHS requirements.*
(Modify quantities as needed)

	Acids/Bases	Qty
☐	Not applicable	
☑	Hydrochloric acid	<500 ml
☑	Nitric acid	<500 ml
☐	Sulfuric acid	<500 ml
☐	Sodium hydroxide	<500 ml
☐	Zinc acetate	<500 ml
☐	Ascorbic acid	<500 ml
☐	Acetic acid	<500 ml
☐	Other:	
	_____	
	_____	
	_____	

	Decontamination	Qty
☐	Not applicable	
☑	Alconox	≤ 5 lbs
☐	Liquinox	≤ 1 gal
☐	Acetone	≤ 1 gal
☐	Methanol	≤ 1 gal
☐	Hexane	≤ 1 gal
☑	Isopropyl alcohol	≤ 4 gal
☐	Nitric acid	≤ 1 L
☐	Other:	
	_____	
	_____	
	_____	

	Calibration	Qty.
☐	Not applicable	
☐	Isobutylene/air	1 cyl
☐	Methane/air	1 cyl
☐	Pentane/air	1 cyl
☐	Hydrogen/air	1 cyl
☐	Propane/air	1 cyl
☐	Hydrogen sulfide/air	1 cyl
☐	Carbon monoxide/air	1 cyl
☑	pH standards (4,7,10)	≤ 1 gal
☑	Conductivity standards	≤ 1 gal
☑	Other:	
	ORP standard _____	

	Fuels	Qty.
☐	Not applicable	
☑	Gasoline	≤ 5 gal
☐	Diesel	≤ 5 gal
☐	Kerosene	≤ 5 gal
☐	Propane	1 cyl
☐	Other:	
	_____	

	Kits	Qty.
☐	Not applicable	
☐	Hach (specify): _____	1 kit
☐	DTECH (specify): _____	1 kit
☐	EPA 5035 Soil (specify kit): _____	1 kit
☐	Other:	
	_____	
	_____	

	Remediation	Qty.
☑	Not applicable	
☐	_____	
☐	_____	
☐	_____	
☐	_____	
☐	_____	

	Other:	Qty.
☑	Not applicable	
☐	Spray paint	≤ 6 cans
☐	WD-40	≤ 1 can
☐	Pipe cement	≤ 1 can
☐	Pipe primer	≤ 1 can
☐	Mineral spirits	≤ 1 gal

		Qty.
☐	_____	
☐	_____	
☐	_____	
☐	_____	
☐	_____	
☐	_____	

Material safety data sheets (MSDSs)/Safety Data Sheets (SDSs) must be available to field staff.
Indicate below how MSDS information will be provided:

☐ Not applicable
☐ Printed copy in company vehicle
☐ Printed copy in the project trailer/office
☑ Printed copy attached
☐ Electronic copy on field computer

☐ Contractor MSDSs/SDSs are not applicable
☐ Contractor MSDSs/SDSs are attached
☐ Contractor MSDSs/SDSs will be on site and located: _____

☐ Bulk quantities of the following materials will be stored: _____

Contact the project H&S contact for information in determining code and regulatory requirements associated with bulk storage of materials.

Monitoring

☑ Chemical air monitoring is not required for this project.

For projects requiring air monitoring, list the relevant constituents representing a hazard to site workers.

Constituent	Max. Conc.	Units	TWA	Units	STEL	Units	IDLH	Units	LEL/UEL (%)	VD Air=1	VP (mm Hg)	IP (eV)
None			9999	-	0	-	0	-	0	0	0	0
None			9999	-	0	-	0	-	0	0	0	0
None			9999	-	0	-	0	-	0	0	0	0
None			9999	-	0	-	0	-	0	0	0	0
None			9999	-	0	-	0	-	0	0	0	0
None			9999	-	0	-	0	-	0	0	0	0

Notes: TWAs are ACGIH 8 hr-TLVs unless noted.

p-ppm m-mg/m3
s- skin c-ceiling
r- resipirable i-inhalable

c2- ceiling (2 hr) se-sensitizer
"9999" - NA O-OSHA PEL
N-NIOSH 10 hr REL

"#N/A" -Constituent is not in database, manually enter information

Monitoring Equipment and General Protocols

Air monitoring is required for any task or activity where employees have potential exposure to vapors or particulates above the TWA. Action levels below are appropriate for most situations. Contact the project H&S contact for all stop work situations. Select monitoring frequency and instruments to be used.

Monitoring Frequency:

Indicator Tube/Chip Frequency: Indicator tube/chip monitoring not required

	Instrument	Action Levels			Actions
☐	Photoionization Detector		<	0.000	Continue work
		0.000	-	0.0	Sustained >5 min. continuous monitor, review eng. controls and PPE, proceed with caution
	Lamp (eV):		>	0.0	Sustained >5 min. stop work, contact SSO
☐	Flame Ionization Detector (FID)		<	0.0	Continue work
		0.0	-	0.0	Sustained >5 min. continuous monitor, review eng. controls and PPE, use caution
			>	0.0	Sustained >5 min. stop work, contact SSO
☐	LEL/O2 Meter	0-5% LEL			Continue work
		>5-10% LEL			Continuous monitor, review eng. controls, proceed with caution
		>10% LEL			Stop work, evacuate, contact SSO
		19.5%-23.5% O2			Normal, continue work
		<19.5% O2			O2 deficient, stop work, evacuate, cont. SSO
		>23.5% O2			O2 enriched, stop work, evacuate, contact SSO
☐	Indicator: ☐tube ☐hip	≤PEL/TLV			Continue work
		>PEL/TLV			Stop work, review eng. controls and PPE, contact SSO
	Compound(s):				
☐	Particulate Monitor (mists, aerosols, dusts in mg/m^3)		<	2.5	Continue work
		2.5	-	5.00	Use engineering controls, monitor continuously
			>	5.00	Stop work, review controls, contact SSO
☐	Other:	Specify:			Specify:

Personal Protective Equipment (PPE)

See JSA for the task being performed for PPE requirements *. If the work is not conducted under a JSA, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for* <u>*all tasks during field work*</u> *not covered by a JSA on this project:*

Level D or Level D Modified:

☑	Hard hat	☐	Snake chaps/guards	☐	Coveralls:	Specify Type:	
☑	Safety glasses	☐	Briar chaps	☐	Apron:		
☐	Safety goggles	☐	Chainsaw chaps	☐	Chem. resistant gloves:		
☐	Face shield	☐	Sturdy boot	☑	Gloves other:	nitrile	
☐	Hearing protection	☑	Steel toe boot	☐	Chemical boot:		
☐	Rain suit	☐	Metatarsal boot	☐	Boot other:		
☐	Other:			☑	Traffic vest:		
				☐	Life vest:		

Task specific PPE:

Comments:

Medical Surveillance (*check all that apply*)

☐ Medical Surveillance is not required for this project.
☑ HAZWOPER medical surveillance applies to all ARCADIS site workers on the project.
☐ HAZWOPER medical surveillance applies to all subcontractors on the project.
☐ HAZWOPER medical surveillance applies to all site workers on the project except:

☐ Other medical surveillance required (describe type and who is required to participate):

☐ Client drug and/or alcohol testing required.

Hazardous Materials Shipping and Transportation (*check all that apply*)

☐ Not applicable, no materials requiring a Shipping Determination will be transported or shipped
☐ A Shipping Determination has been reviewed and provided to field staff
☐ A Shipping Determination is attached
☑ All HazMat will be transported under Materials of Trade by ARCADIS
☐ Other (specify):

Roadway Work Zone Safety (*check all that apply*)

☐ Not applicable for this project
☐ All or portions of the work conducted under a TCP
☐ All or portions of the work conducted under a STAR Plan
☐ TCP or STAR Plan provided to field staff
☑ TCP or STAR Plan attached
☐ Other (specify):

ARCADIS Commercial Motor Vehicles (CMVs)

This section is applicable to ARCADIS operated vehicles only

☑ This project will **<u>not</u>** utilize CMV drivers
☐ This project will utilize CMV drivers

Site Control (*check all that apply*)

- [x] Not applicable for this project.
- [ ] Site control protocols are addressed in JSA or other supporting document (attach)
- [ ] Maintain an exclusion zone of _____ ft. around the active work area
- [ ] Site control is integrated into the STAR Plan or TCP for the project
- [ ] Level C site control - refer to Level C Supplement attached
- [ ] Other (specify):

Decontamination (*check all that apply*)

- [ ] Not applicable for this project.
- [ ] Decontamination protocols are addressed in JSA or other governing document (attach)
- [x] Level D work- wash hands and face prior to consuming food, drink or tobacco.
- [ ] Level D Modified work- remove coveralls and contain, wash hands and face prior to consuming food, drink or tobacco. Ensure footwear is clean of site contaminants
- [ ] Level C work - refer to the Level C supplement attached.
- [ ] Other (specify):

Sanitation *(check all that apply)*

- [x] Mobile operation with access to off-site restrooms and potable water
- [ ] Restroom facilities on site provided by client or other contractor
- [ ] Project to provide portable toilets (1 per 20 workers)
- [ ] Potable water available on site
- [ ] Project to provide potable water (assume 1 gal./person/day)
- [ ] Project requires running water (hot and cold, or tepid) with soap and paper towels

Safety Briefings (*check all that apply*)

- [x] Safety briefing required daily
- [ ] Safety briefing required twice a day
- [ ] Safety briefings required at the following frequency: _____
- [x] Subcontractors to participate in ARCADIS safety briefings
- [x] ARCADIS to participate in client/contractor safety briefings
- [ ] Other (specify):

Safety Equipment and Supplies

***Safety equipment/supply requirements are addressed in the JSA for the task being performed**. If work is not performed under a JSA, the following safety equipment is required to be present on site in good condition (Check all that apply):*

- [x] First aid kit
- [ ] Bloodborne pathogens kit
- [x] Fire extinguisher
- [ ] Eyewash (ANSI compliant)
- [x] Eyewash (bottle)
- [x] Drinking water
- [ ] Other: _____
- [x] Insect repellent
- [x] Sunscreen
- [ ] Air horn
- [x] Traffic cones
- [ ] 2-way radios
- [ ] Heat stress monitor

H&S Program (*check all that apply*)

- ☐ H&S metrics are provided on the account level, refer to account guidance
- ☑ TIP required at the following frequency on this project:
  Select One: _____ mhrs _____ time(s) _____ Define: 1 per quarter
- ☐ H&S Field Assessment required at the following frequency on this project:
  Select One: _____ mhrs _____ time(s) _____ Define: _____
- ☐ Other (specify):

List tasks anticipated for TIP activity:

TIP will be performed during groundwater
Groundwater monitoring activities

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

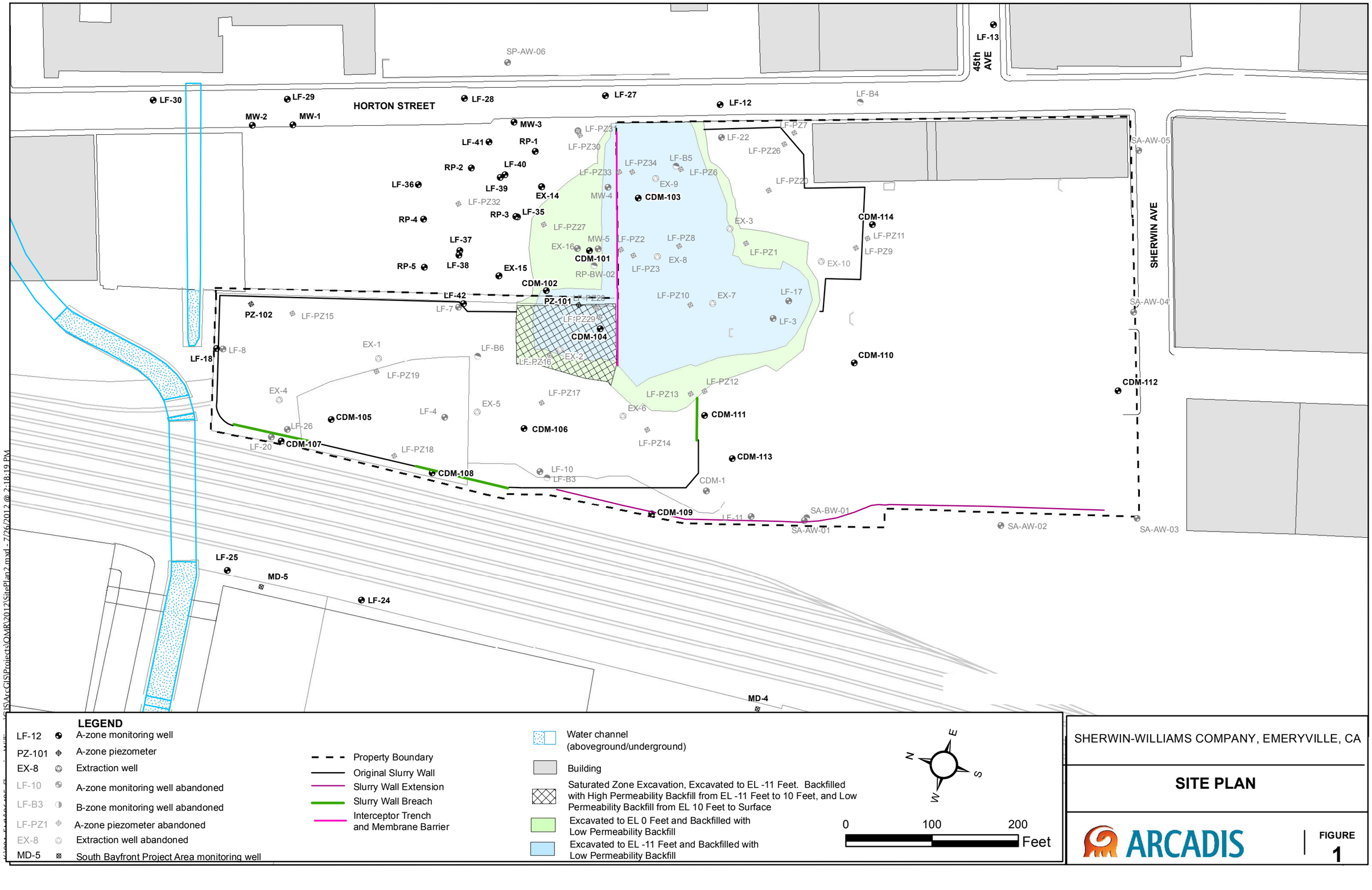
Printed Name	Signature	Date

Add additional sheets if necessary

- ☐ Subcontractor Acknowledgement Form attached

You have an absolute right to STOP WORK if unsafe conditions exist!

Attachments



SHERWIN-WILLIAMS COMPANY, EMERYVILLE, CA

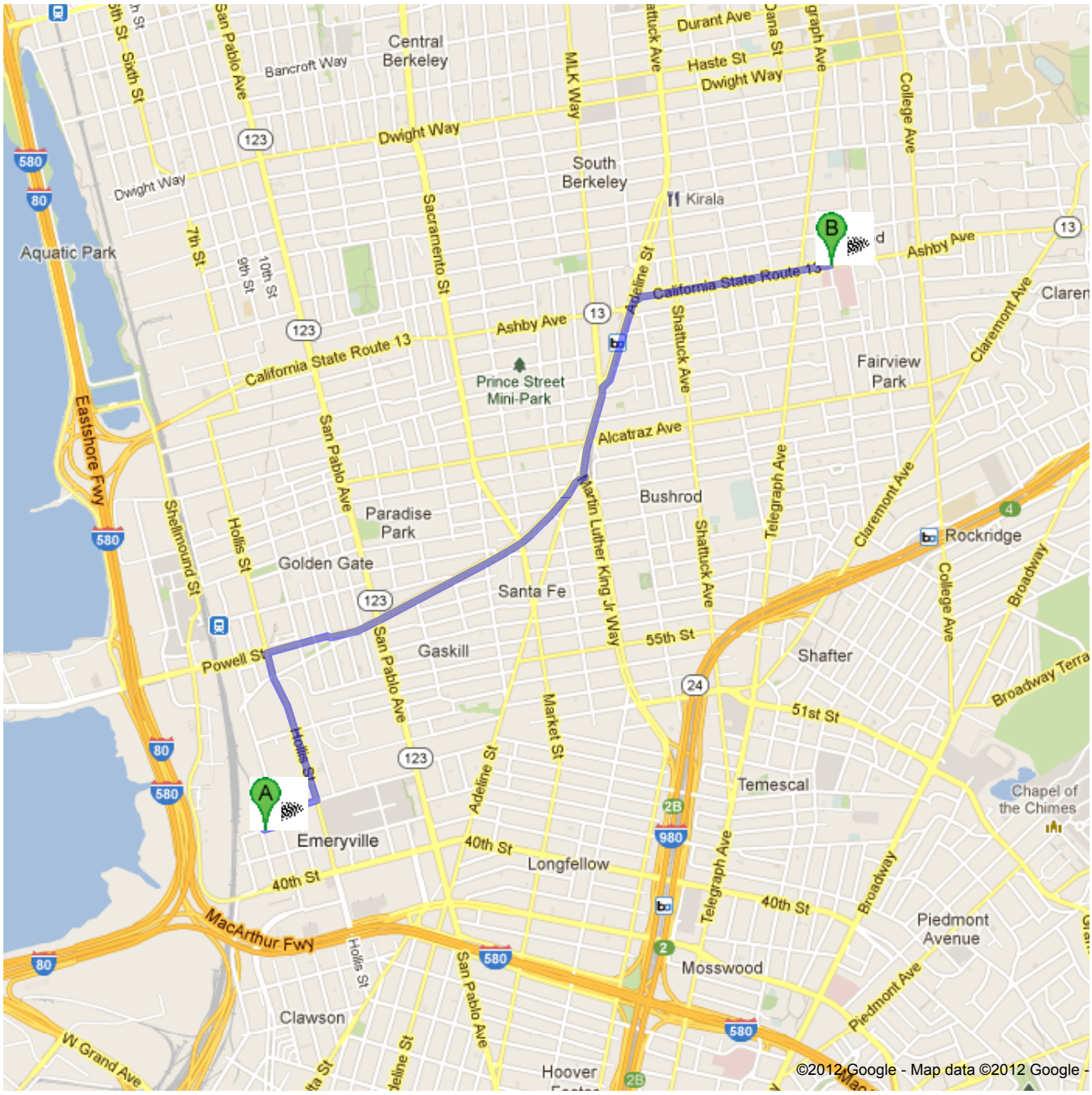
SITE PLAN

ARCADIS

FIGURE 1

K:\001_EMWQ\185_SherwinWilliams\GIS\ArcGIS\Projects\QMR\2012\SitePlan2.mxd - 7/26/2012 @ 2:18:19 PM

Directions to Alta Bates Medical Center
2450 Ashby Avenue, Berkeley, CA 94705
3.0 mi – about **10 mins**



1450 Sherwin St, Emeryville, CA 94608

1.	Head **east** on **Sherwin St** toward **Horton St**	go 279 ft total 279 ft
2.	Turn left onto **Horton St**	go 200 ft total 479 ft
3.	Take the 1st right onto **45th St**	go 0.1 mi total 0.2 mi
4.	Take the 1st left onto **Hollis St** About 2 mins	go 0.5 mi total 0.7 mi
5.	Turn right onto **Powell St** About 54 secs	go 0.3 mi total 1.0 mi
6.	Continue onto **Stanford Ave** About 3 mins	go 0.8 mi total 1.8 mi
7.	Turn left onto **Adeline St** About 2 mins	go 0.6 mi total 2.4 mi
8.	Slight right at **down to Adeleine** onto **Ashby Ave/California State Route 13** Destination will be on the right About 2 mins	go 0.6 mi total 3.0 mi

Alta Bates Medical Center
2450 Ashby Avenue, Berkeley, CA 94705

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2012 Google

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

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HASP Addendum Page

This form should be completed for new tasks associated with the project. The project manager and/or task manager should revise the Project Hazard Analysis Worksheet with the new task information and attach to this addendum sheet. JLAs should be developed for any new tasks and attached as well.

Review the addendum with all site staff, including subcontractors, during the daily tailgate briefing, and complete the tailgate briefing form as required. Attach a copy of the addendum to all copies of the HASP including the site copy, and log in the Addendum Log Table A-1 on the next page.

Addendum Number: 2012 Revision 1 Project Number: EM002616

Date of Changed Conditions: 11/19/12 Date of Addendum: 11/19/12

Description of Change that Results in Modifications to HASP:

Update to new ARCADIS template. Groundwater extraction and treatment system no longer in operation

Signed: _____ Project Manager

Signed: _____ Site Safety Officer

Signed: _____ H&S Plan Writer

Signed: _____ H&S Plan Reviewer

ARCADIS

TRACK

Project Health & Safety Pre-Planning Form

This form will assist a project or task manager in the proper, proactive planning for H&S on a project or job task level. It can be used during the proposal stage of a project and during the pre-planning after project award. This does not take the place of a project HASP but can be used to help determine the contents of the project HASP.

Project Name:		Project Number:	Project Location:
Sherwin Williams Periodic Groundwater monitoring		EM002616	Emeryville, CA
Date:	**Duration:**	**Completed by:**	**Assisted by** (consult others when completing this form)**:**
11/19/2012		Erica Whiting	
Client:		**Client Contact:**	**Subcontractor companies:**
Sherwin Williams		Larry Mencin	

T hink through the Tasks — TRACKing Project Planning

List the major jobs or activities for the project:

1 Water level measurements
2 collection of groundwater samples
3
4
5
6

T hink through the Tasks — Other Hazardous Activities

☐ Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations

If there are none, write "None" here:

If yes, describe them here:

How could they be controlled?

Prework Authorization - check activities to be conducted that may require permit issuance or completion of a checklist or similar before work begins:

		Doc #			Doc #			Doc #
X	Not applicable		☐	Working at Height		☐	Confined Space	
☐	Energy Isolation (LOTO)		☐	Excavation/Trenching		☐	Hot Work	
☐	Mechanical Lifting Ops		☐	Overhead & Buried Utilities		☐	Other (may be client required)	

Consider the following (to help with appropriately and adequately resourcing the project)

☐ What level of HASP will be needed?	☐ Any unique H&S issues?	☐ Understand client requirements?
☐ Have subcontractors been qualified?	☐ Level of H&S support needed?	☐ Will we use subcontractors?
☐ Lessons learned from other jobs?	☐ Training Requirements?	☐ Audits and assessments budgeted?
		☐ Travel-related Issues / International?

Comments:

R ecognize the hazards

A ssess the Risks

Low, **M**edium, **H**igh - Use the drop down menu in the box to identify & rank risks applicable to the project. Examples are provided.

L Gravity (i.e., ladder, scaffold, trips)	M Motion (i.e., traffic, moving water) medium	L Mechanical (i.e., augers, motors)
L Electrical (i.e., utilities, lightning)	L Pressure (i.e., gas cylinders, wells)	L Environment (i.e., heat, cold, ice)
L Chemical (i.e., fuel, acid, paint)	L Biological (i.e., ticks, poison ivy)	L Radiation (i.e., alpha, sun, laser)
L Sound (i.e., machinery, generators)	L Personal (i.e. alone, night, not fit)	M Driving (i.e. car, ATV, boat, dozer)

Continue TRACK Process on Page 2

Control the hazards

Check all and discuss those methods to control the hazards to be considered for the project: Review the Hazard Assessment and previous work similar to this project. Discuss any additional control processes that should be considered.

[ ] Elimination	[ ] Substitution	[ ] Isolation
[ ] Engineering controls	[ ] Worker Rotation	[X] Exposure Monitoring
[ ] General PPE Usage	[ ] Hearing Conservation	[ ] Respiratory Protection
[X] Personal Hygiene	[X] Exposure Guidelines	[X] Decon Procedures
[ ] Emergency Action Plan (EAP)	[X] Fall Protection	[ ] Work Zones/Site Control
[ ] JLA to be developed/used ***(specify)***	[ ] LPOs	[X] Traffic Control
[ ] Training (see below)	[ ] Utility Clearance	[ ] Site Monitors
[X] Medical Surveillance (see below)	[ ] Work/Rest Regimes	[ ] Other ***(specify)***

Control the hazards — Training Requirements and Needs

Check what training is required for completion of the project. Consider the hazards to be encountered and whether ARCADIS staff or subcontractor staff will do the work. The H&S Training matrix found on the Training Center site will assist in this.

[X] Smith Hands-On	[ ] Full LPS	[ ] Client-Specific
[X] 40 Hour HazWoper	[ ] 24 Hour HazWoper	[ ] HazWoper Site Supervisor
[ ] 10 Hour OSHA Construction	[ ] 30 Hour OSHA Construction	[ ] Respiratory Protection
[X] PPE	[ ] Hazard Communication	[ ] RCRA
[X] First Aid/CPR	[ ] DOT/IATA Haz Mat	[ ] MSHA
[X] FRA / Railroad / eRailsafe	[ ] Bloodborne Pathogen	[ ] Confined Space (Awareness or Entry)
[ ] Lockout/Tagout (Hazardous Energy)	[ ] Utility Clearance	[ ] Electrical / Arc Flash
[X] Fire Extinguisher	[ ] Heat and Cold Stress	[ ] Fall Protection
[ ] Noise / Hear Conservation	[ ] Forklifts	[ ] Asbestos
[ ] H2S	[ ] Boating and/or Water Safety	[ ] Lead
[ ] Cadmium or other toxic metals	[X] Benzene	[ ] SPCC
[ ] Process Safety Management	[ ] Radiation Safety	[ ] Troxler / Nuclear Density Gauges
[ ] Other (Specify)	[ ] Other (Specify)	[ ] Other (Specify)

Control the hazards — Medical Surveillance Requiremants and Needs

Check what medical surveillance is required for completion of the project. Consider the hazards to be encountered and whether ARCADIS staff or subcontractor staff will do the work. The H&S group and WorkCare can assist in this determination.

[X] HazWoper Medical Exam	[ ] Respirator-related exam if not	[ ] Client-Specific
[ ] Drug and Alcohol (client-required)	[ ] Hearing test	[ ] Vaccinations to travel
[ ] Hepatitis B if providing 1st Aid/CPR	[ ] Other (Specify)	[ ] Other (Specify)

Control the hazards — Additional Comments about controlling the hazards on this project

Post Project Activities Review - Review at end of project (Check those applicable and explain:)

- [ ] Lessons learned / best practices learned: _____
- [ ] Incidents that occurred : _____
- [ ] Stop Work interventions? _____
- [ ] Corrective/Preventive Actions needed for future work: _____
- [ ] Any other H&S issues: _____

Keep H&S 1st in all things — **Remember to Share any Lessons Learned through H&S Moments or Safety Shares**

ARCADIS

Document Control Number:TGM - _____

TGM + *project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year*

TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**
Client:		**Client Contact:**	**Subcontractor companies:**

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____ 3 _____ 5 _____

2 _____ 4 _____ 6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations ☐ If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Prework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

	Doc #		Doc #		Doc #
☐ Not applicable		☐ Working at Height		☐ Confined Space	
☐ Energy Isolation (LOTO)		☐ Excavation/Trenching		☐ Hot Work	
☐ Mechanical Lifting Ops		☐ Overhead & Buried Utilities		☐ Other permit	

Discuss following questions (for some review previous day's post activities). **Check if yes :**

☐ Incidents from day before to review?	☐ Lessons learned from the day before?	☐ Any Stop Work Interventions yesterday?
☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?	☐ If deviations, notify PM & client
☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?	☐ All equipment checked & OK?
☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?	☐ Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

☒	**STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (*See statements below*)				
☐	Elimination	☐	Substitution	☐	Isolation
☐	Engineering controls	☐	Administrative controls	☐	Monitoring
☐	General PPE Usage	☐	Hearing Conservation	☐	Respiratory Protection
☐	Personal Hygiene	☐	Exposure Guidelines	☐	Decon Procedures
☐	Emergency Action Plan (EAP)	☐	Fall Protection	☐	Work Zones/Site Control
☐	JLA to be developed/used ***(specify)***	☐	LPO conducted ***(specify job/JLA)***	☐	Traffic Control
☐		☐		☐	Other ***(specify)***
☐		☐		☐	

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign in Time	Initial & Sign out Time	I have read and understand the

Important Information and Numbers

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844.

In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756.

In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at

Visitor Name/Co - not involved in work

In	Out
In	Out
In	Out
In	Out

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB,** I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

- ☐ Lessons learned and best practices learned today: _____
- ☐ Incidents that occurred today: _____
- ☐ Any Stop Work interventions today? _____
- ☐ Corrective/Preventive Actions needed for future work: _____
- ☐ Any other H&S issues: _____

Keep H&S 1st in all things

WorkCare - 1.800.455.6155

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

_____

_____

Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

Subcontractor Acknowledgement: Receipt of HASP Signature Form

ARCADIS claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, ARCADIS does not guarantee the health and/or safety of any person entering this site. Strict adherence to the health and safety guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

Printed Name	Company	Signature	Date

Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and ARCADIS and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		

Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

_____

_____

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

_____

_____

List Trained Employee(s):

_____

_____

HAZARDOUS MATERIALS SHIPPING/TRANSPORTATION DETERMINATION FORM

Materials of Trade Template for use with the Standard HASP 8/10/2012

Date:	11/19/2012
Project Name:	Sherwin Williams
Project Number:	EM002616
Supplemental Information:	MSDS

Description of the Material to be Transported or Shipped:

Checked materials in the *HAZCOM* worksheet, *Monitoring* worksheet, *Safety Supplies and Equipment* section and *Level C Supplement* (if applicable) of the standard HASP for this project will be transported under the Materials of Trade Exception (49 CFR 143.6) in ARCADIS owned, leased or rented vehicles or vendor vehicles.

Special Instructions:

1) All containers will be maintained in an upright condition with lids or other openings secure. Containers will be protected against movement during transport and have adequate cushioning for protection
2) Cylinders will have valves removed during transport.
3) Batteries regardless of type or size, will have terminal protected and each battery will be protected from crushing, pressure or other condition that may affect the integrity of the battery.
4) Fire extinguishers will be mounted and secure in company owned or leased vehicles.

Limitations

1) No more than 440 pounds (combined gross weight) of materials subject to this shipping determination are permitted on a transport vehicle and individual container limits are specified in DOT Facts-108a and must not be exceeded. Gasoline, if transported, will be in metal safety cans no larger than 8 gallon capacity.
2) No more than 400 gallons of dilute Class 9 materials (<2% concentration) may be transported on a vehicle.
3) Materials that are radioactive or explosive are not eligible for MOT Exception and separate shipping determinations will be required for those materials.

References and Rationale for the Determination:

49 CFR 173.6 DOT Facts-108a
These materials are used in support of ARCADIS work.

Determination performed by: Erica Whiting

Determination QA/QC performed by: Ron Goloubow

Site Traffic Awareness and Response (STAR) Plan
Revision 1, 1/3/2011

1.0 General

Project Name:	Sherwin Williams Emeryville
Project Number:	EM002616
STAR Plan Developer Name:	Erica Whiting
Reviewed By:	Ron Goloubow
Duration of Work (hours or days):	8 hr days
Time Restrictions (describe below):	Daylight

Comments:

Day Light Savings time is in effect; Sunset is around 4:30 PM. Please plan accordingly.

2.0 Work Description

Modify the following statement as appropriate:
Site is a former paint factory and adjacent parking lot for local business. Groundwater monitoring including water level gauging and collection of groundwater samples will occur within site boundary, and adjacent Rifkin Parking lot where individuals may encounter moving cars in parking lot. Additionally, a few monitoring wells are on public streets.

☐ Work is planned on off site properties but not in the public right-of-way.

To facilitate identification of traffic controls to use, check all that apply to this project:

Short Duration Work (<1 hour)

- ☑ Water-level gauging and well sounding
- ☐ Surface soil sampling using manual methods
- ☐ Intermediate depth soil sampling using DPT
- ☑ Shallow monitor well purging and sampling
- ☐ Product recovery using manual methods
- ☐ Surveying
- ☐ Other (specify):

Intermediate Duration Work (1-8 hours)

- ☐ Intermediate/deep or > 2 in. diameter well sampling
- ☐ Slug testing and similar tests
- ☐ Deep handauger sampling (>20 ft depth)
- ☐ Manual soil sampling through concrete/asphalt
- ☐ Deep soil sampling using DPT (>40 ft depth)
- ☐ Soil sampling using other automated drilling method
- ☐ Other (specify):

Long Duration Work (>8 hours)

- ☐ Deep monitor well installation (>50 ft depth)
- ☐ Monitor wells with surface casing installation
- ☐ Intermediate depth monitor wells ≥ 4 in. diam.
- ☐ Long term product recovery using equipment
- ☐ Long term pump testing
- ☐ Other (specify):

Comments:

Traffic Type:
Check all that apply:

- ☑ Automobiles
- ☑ Straight truck
- ☑ Semi truck
- ☐ Forklifts
- ☑ Bicycles
- ☑ Pedestrian
- ☐ Construction equipment
- ☐ Other:

3.0 Traffic Control Layout

The following DOT Fact Sheets and/or configurations are applicable to this project:
Notes: DOT Fact Sheets have numbered scenarios, select the appropriate scenario(s) for the project and indicate duration [Short (S), Intermediate (I), Long (L)]. Manually revise diagrams, if needed to convey requirements.

			1	2	3	4	5	6	7	8	9	S	I	L
☐	DOT Facts-302a	Retail Gas Station/Small Business Parking Lot (<1 Hour)												
	☐ With Truck ☐ Without Truck		☐	☐	☐	☐	☐							
☐	DOT Facts-302b	Retail Gas Station/Small Business Parking Lot (1-8 Hours)	☐	☐	☐	☐								
☐	DOT Facts-302c	Retail Gas Station/Small Business (>8 Hours)	☐	☐	☐									
☐	DOT Facts-302e	Multi-business Parking Lot	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
☑	DOT Facts-302e	Facility Parking Area	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐

☐ Parking Garage (develop drawing for controls)
☐ Other (specify): _____
☐ Controls to the right will be used (copy and paste from STAR Select)

How will the above documents be communicated to field staff? (excludes STAR Select)

☐ The above documents are attached to this STAR Plan
☐ The above documents are appropriate without significant modification and are available to field staff in the

Field Guide for Roadway Work Zone Safety.

4.0 Required Traffic Control Devices and Phasing

Tasks on this project may be implemented both individually or concurrently. Selection and number of traffic control devices required will be dependent on the scope of work. In all cases, a minimum of 4 x42 inch channelizer cones with flags will be available on site for any field work. Based on recommendations in DOT Fact Sheet applicable to the work being performed, indicate any additional traffic control devices for the current project below.

Traffic control device help: DOT Facts-302d

Check all that apply:	Number:
☐ Channelizer cone (42 inch height, 10 lb base)	
☐ Channelizer cone (42 inch height, 30 lb base)	
☑ Traffic cones (≥ 18 inches tall)	6
☐ Barricade ☐ Type I ☐ Type II	
☐ Flags for cones	
☐ Lights (for night work)	
☐ Plastic fencing (rolls)	
☐ Caution tape (rolls)	
☐ Other (specify): _____	

Phasing:
1) Position truck as shield, if practical
2) Deploy traffic control devices
3) Affix flags, caution tape or fencing as prescribed in fact sheet
4) Unload project equipment
5) Commence work
6) SSO to maintain controls
7) Remove controls in opposite order

☐ Additional client requirements are attached

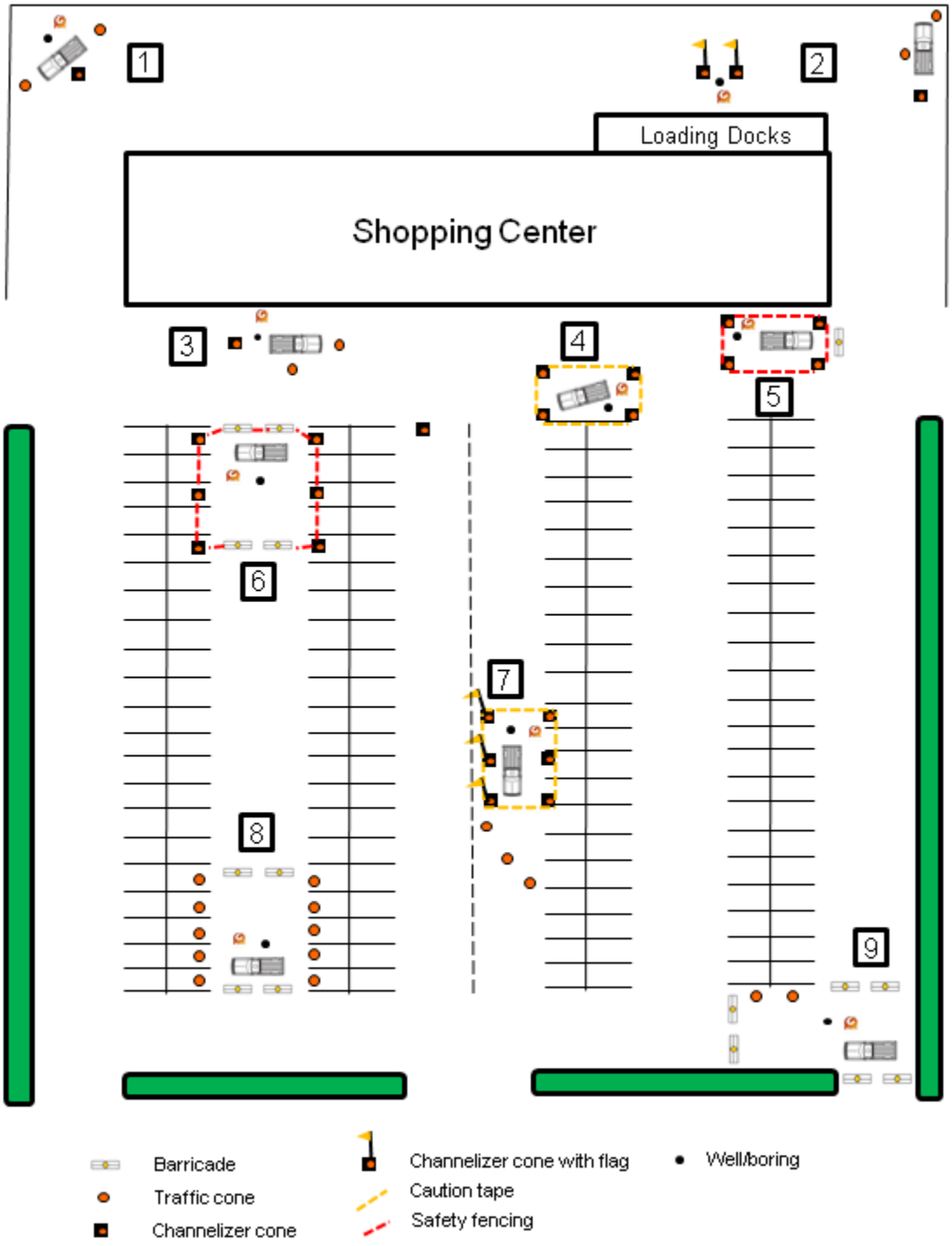
If vehicle equipped with high intensity strobe or rotating lights, the lights should be utilized during work. If the vehicle is not equipped with supplemental lighting devices, use vehicle flashers (be aware of battery drain when using any of the lighting devices).
Personal protective equipment required for this work is listed in the applicable project Job Loss Analysis (JLA) or project specific HASP. A Class II (minimum) high visibility vest is required.

5.0 Approvals

	Printed Name	Date	Signature
Plan Developer:	Erica Whiting	11/19/2012	
Plan Reviewer:	Ron Goloubow	11/25/2012	

DOT Facts-302e
Recommended Best Practices for Multiple Business and Large Facility Parking Areas

The following configurations should be considered for traffic protection in retail parking areas for multiple businesses (strip malls, etc) and large facility parking lots.



General Guidelines for Safety:

- **Use the vehicle as a shield when possible. Orient the rear of the ARCADIS vehicle away from site entrances and areas of increased backing or movement of other vehicles, when practical. Traffic cones used in scenarios above in conjunction with the parked vehicle should be consistent with the ARCADIS Cone and Spotter Program (see ARC HSGE-024 for more information)**
- **All channelizer cones shall be at least 42 inches in height**
- **Always work facing the area with greatest traffic movement and least protection**
- **Always assume vehicles will move in either direction (frontwards or backwards)**
- **Always use TRACK to predict traffic movement and stage vehicle and Control Zones in manner that offers protection without impairing site entrance or blocking access to loading docks when possible. STAR Plan requirements should be reviewed against HASP exclusion zone requirements for consistency.**
- **If there is a perceived drivable space or if there is an unused parking space, you must assume that someone will attempt to access or drive to/through the location. Plan, deploy and work accordingly. Block off parking spaces with cones during off hours to ensure no vehicles will occupy the planned work zone.**
- **Class II high visibility vest (minimum) to be worn at all times (refer to HASP or JLA for additional requirements, if any).**
- **Discuss with site operator or manager times of lower traffic volume and attempt to schedule work activity during traffic lulls. When working near dumpsters and loading docks find out when the dumpsters are emptied and avoid loading docks during planned delivery times.**
- **Warning lights shall be used for night work on both the channelizer drums and barricades, if used. Cones used during night work for taper purposes must have retroflective tape.**
- **Areas in green above may appear to be site property but may actually be within the roadway right-or way. Work performed in the right-of-way has additional requirements. See ARC DOT-301 for more information.**

Scenario Descriptions:

1) **Locations to the rear of strip malls and similar operations generally have low traffic volume and low pedestrian activities. Use the truck as a shield to the extent possible and deploy channelizer cone in direction of expected traffic exposure. This scenario may be used for short duration (< 1 hour) and intermediate duration (1-8 hours) daylight work activities. Since deliveries by larger vehicles are generally performed during night hours, long duration (>8 hours) and night time work should employ recommendations described in scenario #5 below, even in these low traffic areas.**
2) **Locations near loading docks involve large vehicle backing with limited visibility. Tight space and work zone proximity to other active operations may preclude the use of the vehicle as a shield in these areas. Work in these areas should use channelizer cones with flags to increase work zone awareness even if the vehicle is being used as a shield. When backing activities are occurring, work should be suspended and employees should leave the area until the backing operations are complete (leaving the traffic control devices in place).**
3) **Short duration work (<1 hour) in high traffic and pedestrian areas should use the vehicle as a shield with the front of the vehicle facing oncoming traffic. A channelizer cone should be deployed in the vicinity of the work zone near the ARCADIS employee's work area**
4) **Intermediate duration work (1-8 hours) in high traffic and pedestrian areas should use the vehicle as a shield with the front of the vehicle facing oncoming traffic. The work zone**

should be defined with channelizer cones (10 pound base weight recommended) and caution tape. Leave sufficient space to allow access to all areas of the vehicle.

5) **Long duration work (> 8 hours) and night work in high traffic and pedestrian areas should use the vehicle as a shield with the front of the vehicle facing oncoming traffic. Utilize standard orange plastic safety fencing and channelizing cones (30 pound base weight recommended) to delineate the work zone. Use of lighted barricades (Type I or II preferred) on the end facing oncoming traffic is recommended, if work is performed near site entrances.**
6) **Complete lane closure in areas of higher traffic and pedestrian flow should utilize barricades (Type I or II preferred) in sufficient number to clearly indicate the lanes are closed. Signs may be used in conjunction with the barricades to further communicate the closure. Channelizer cones should be used in conjunction with caution tape (intermediate duration) and safety fencing (long duration) closure. Place the vehicle as a shield in the area of highest exposure to traffic (at the lane entrance end as shown in the example above) and create adequate buffer zone on the end with lower traffic exposure.**
7) **Large parking areas may have a central thoroughfare leading to a red light at the city street. These areas may have increased traffic control, have wider lanes and traffic may drive in these areas at higher speeds. Work zones in these areas should use the vehicle as a shield with the front of the vehicle facing oncoming traffic. Channelizer cones should be used in conjunction with caution tape (intermediate duration) and safety fencing (long duration) lane closure. If parking spaces across the lanes are useable, use flags with the channelizer cones to increase awareness of the work zone to backing drivers. A taper, using standard traffic cones, may be used to help control traffic control through the area. If these locations have high volumes of traffic, consider using flaggers.**
8) **Work zones away from the active business area of the site and having low traffic and pedestrian flow may be configured using lesser requirements. Use barricades (Type I or II preferred) to close lanes and orient vehicle as a shield in the area of highest traffic exposure. Create a buffer between the work area and the area of lesser traffic exposure. Standard traffic cones may be used to delineate the work zone. Use of this scenario requires an understanding of traffic flow and patterns throughout the planned duration of the work activity. If conditions change, use of controls as described in scenario #6 should be used.**
9) **Complete lane closure involving an entrance should rely on barricades as the primary method of traffic control. Type I, II or III barricades should be used at the site entrance (Type III if the entrance has high traffic volume) for both intermediate and long duration work. Type I or II barricades are recommended for lane closures. Use the vehicle as a shield in the area of highest traffic exposure (usually the entrance). If vehicle or pedestrian traffic is persistent or heavy, controls using caution tape or safety fencing should be employed in conjunction with additional barricades or channelizer cones.**



Traffic Control Plan

Revision 1, January 6, 2011

1.0 General

Project Name:	Sherwin Williams
Project Number:	EM002616
TCP Developer Name:	Erica Whiting
Engineering Judgment (EJ) Review By[1]:	Ron Goloubow
Duration of Work (hours or days):	2 hours
Roadway Work Zone Start Point	Horton street and Sherwin Avenue
Roadway Work Zone End Point	Horton Street past Rifkin Lot
Posted Speed Limit (roadway)	25 mph
Number of Lanes (each direction)	1
Time Restrictions (describe below)[2]:	none

Comments:

1) Need help evaluating 3rd Party TCPs? 3rd Party TCP Evaluation Process

2) Coordinate with site operator on delivery times, dumpster emptying times, etc. to avoid problems.

2.0 Work Description

Modify the following statement as appropriate:

Work will include groundwater gauging and sampling at monitoring wells on 45th avenue, and horton street.

Check all that apply:

- ☐ Work is planned on off-site properties.
- ☐ TCP was developed by a 3rd party on behalf of and under contract to ARCADIS, see attached.
- ☐ Regulatory permit/authorization attached.

To facilitate identification of traffic controls to use, check all that apply to this project:

STAR Short Duration Work (<1 hour)	STAR Intermediate Duration Work (1-8 hours)
☑ Water-level gauging and well sounding	☐ Intermediate/deep or >2 in. diameter well sampling
☐ Surface soil sampling using manual methods	☐ Slug testing and similar tests
☐ Intermediate depth soil sampling using DPT	☐ Deep handauger sampling (>20 ft depth)
☑ Shallow monitor well purging and sampling	☐ Manual soil sampling through concrete/asphalt
☐ Product recovery using manual methods	☐ Deep soil sampling using DPT (>40 ft depth)
☐ Surveying	☐ Soil sampling using other automated drilling method
☐ Other (specify):	☐ Other (specify):

STAR Long Duration Work (>8 hours)

- ☐ Deep monitor well installation (>50 ft depth)
- ☐ Monitor wells with surface casing installation
- ☐ Intermediate depth monitor wells ≥ 4 inch diameter
- ☐ Long term product recovery using equipment
- ☐ Long term pump testing
- ☐ Other (specify):

Roadway Work Type (*check all that apply*):

- ☐ Off shoulder
- ☐ On shoulder
- ☐ Travel lane
- ☐ Other:
- ☐ Turn lane
- ☐ Intersection
- ☐ Sidewalk
- ☐ Mobile operation
- ☐ Road closure
- ☐ Bicycle lane
- ☐ See attached TCP

STAR (*check all that apply*):

- ☑ Automobiles
- ☑ Straight truck
- ☑ Semi truck
- ☐ Other:
- ☐ Forklifts
- ☑ Bicycles
- ☑ Pedestrian
- ☐ Construction equipment

3.0 Traffic Control Layout

The following are applicable to this project:

Notes: DOT Fact Sheets have numbered scenarios, select the appropriate scenario(s) for the project and indicate duration [Short (S), Intermediate (I), Long (L)]. Manually revise diagrams, if needed to convey requirements.

STAR

1 2 3 4 5 6 7 8 9 S I L

- ☐ DOT Facts-302a Retail Gas Station/Small Business Parking Lot (<1 Hour)
  - ☐ With truck ☐ Without truck
- ☐ DOT Facts-302b Retail Gas Station/Small Business Parking Lot (1-8 Hours)
- ☐ DOT Facts-302c Retail Gas Station/Small Business (>8 Hours)
- ☐ DOT Facts-302e Multi-business Parking Lot
- ☐ DOT Facts-302e Facility Parking Area
- ☐ Parking Garage (develop drawing for controls)
- ☐ Other (specify):
- ☐ Controls to the right will be used (copy/paste from STAR Select)

Roadway

- ☐ DOT Facts-301i Off Shoulder Work
- ☐ DOT Facts-301j On Shoulder Work
- ☐ DOT Facts-301k On Shoulder Mobile or Short Duration Work
- ☐ DOT Facts-301m On Shoulder Work with Minor Encroachment
- ☐ DOT Facts-301n Lane Closure, 2 Lane Road, with Flagger
- ☑ DOT Facts-301o Lane Closure, 2 Lane Low Volume Road
- ☐ DOT Facts-301p Temporary Road Closure
- ☐ DOT Facts-301r Work in Center of Low Volume Road
- ☐ DOT Facts-301t Lane Closure on Urban Minor Street
- ☐ NA Major Intersection, High Volume Road (attach drawing)
- ☐ NA Lane Closure, Urban High Volume Street (attach drawing)
- ☐ DOT Facts-301u Other Atypical Application (attach drawing)



How will the above documents be communicated to field staff?

- ☑ The above documents or modified documents are attached to this TCP, and/or
- ☐ The above documents are appropriate without significant modification and are available to field staff in the Field Guide for Roadway Work Zone Safety. (Read printing instructions)

4.0 Required Traffic Control Devices and Phasing

Modify statements as appropriate:

STAR Tasks:

Tasks on this project may be implemented both individually or concurrently. Selection and number of traffic control devices required will be dependent on the scope of work. In all cases, a minimum of 4 x 42 inch channelizer cones with flags will be available on site for any field work. Based on recommendations in DOT

Fact Sheet(s) applicable to the work being performed, indicate any additional traffic control devices for the current project below.

Roadway Tasks:

Regardless of TCP responsibility for this project, all ARCADIS vehicles in a RWZ will, at a minimum, have a functioning high intensity strobe or rotating orange light. All ARCADIS employees in the RWZ will wear, at a minimum, a retroflective high visibility vest meeting Class II or III requirements and other PPE required by JLA or HASP. ARCADIS employees will not enter a 3rd party RWZ if observed to be deficient or inconsistent with the ARCADIS RWZ Safety Program.

ARCADIS RWZ requirements stipulated in this TCP from above selected DOT Fact Sheet(s) or through attached document require the following traffic control devices to be present on site during work in the roadway or right-of-way:

Need sign help?	DOT Facts-301d	Need help determining cone needs:
Need channelizing device help?	DOT Facts-301e	ARCADIS Cone Calculator
Need Flagger help?	DOT Facts-301f	
View Flagger training requirements by state:	DOT Facts-301w	

Check all that apply:	*Wording or Pictogram*	*Number:*
☑ Warning signs	road work ahead	1
☐ Warning signs		
☐ Warning signs		
☐ Stop/Slow paddle		
☐ Red flag		
☐ Drums		
☑ Channelizer cone (42 inch height, 10 lb base)		4
☐ Channelizer cone (42 inch height, 30 lb base)		
☐ Traffic cones (≥ 18 inches tall)		
☐ Barricade ☐ Type I ☐ Type II		
☑ Flags for cones		4
☐ Lights (for night work)		
☐ Plastic fencing (rolls)		
☐ Caution tape (rolls)		
☐ Other (specify):		

STAR Phasing:

1) Position truck as shield, if practical
2) Deploy traffic control devices
3) Affix flags, caution tape or fencing as prescribed in fact sheet
4) Unload project equipment
5) Commence work
6) SSO to maintain controls
7) Remove controls in reverse order

TCP Phasing:

1) Deploy warning signs at first approach, if required
2) Deploy subsequent approach warning signs, if required
3) Deploy channeling devices, if required, starting with first approach
4) Deploy "End Road Work" signs, if required
5) Position vehicle as shield to the extent practical
6) Commence work, SSO or designated contractor to maintain devices
7) Remove devices in reverse order

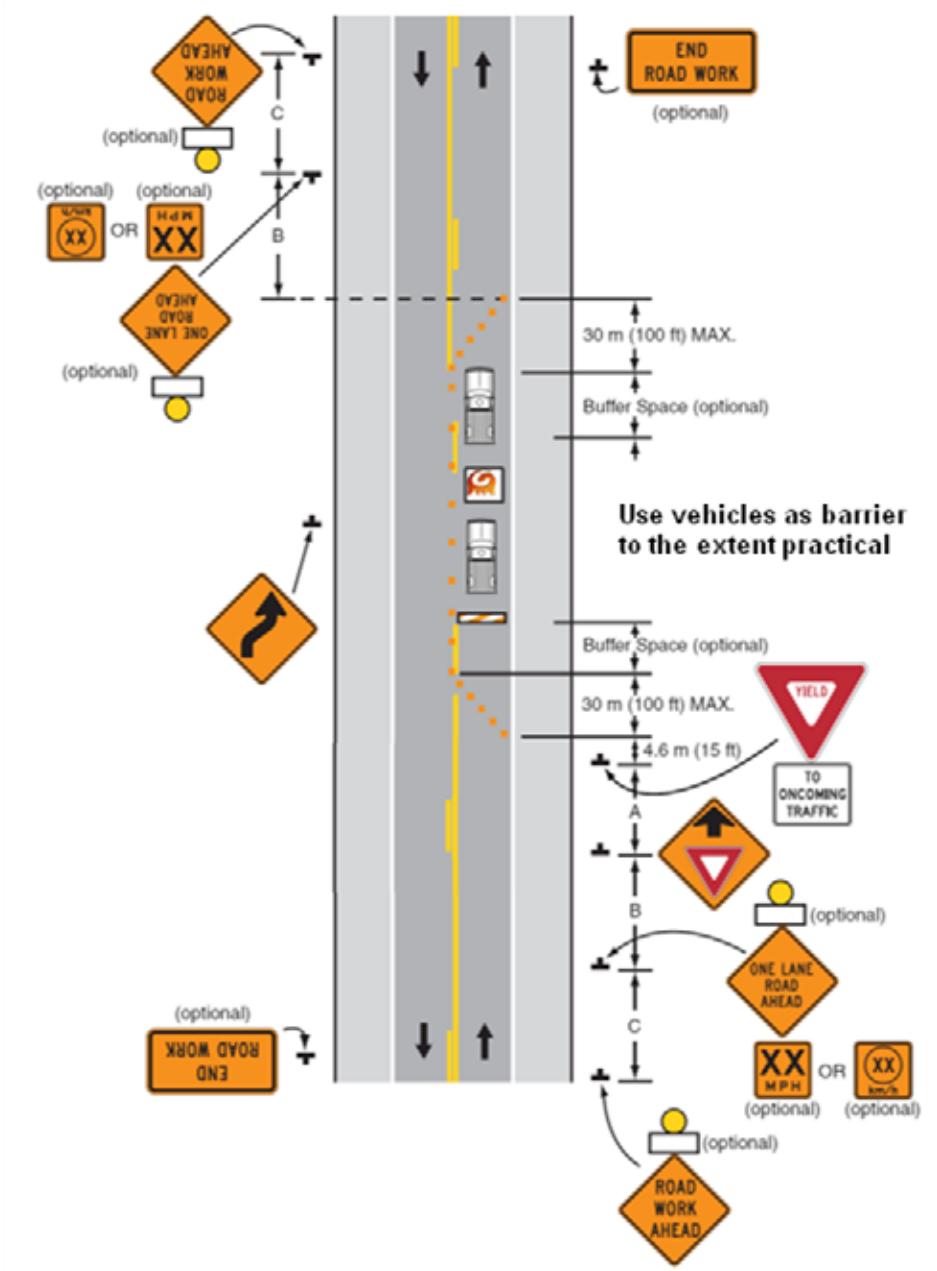
5.0 Approvals

	Printed Name	Date	Signature
Plan Developer:	Erica Whiting	11/19/2012	
Reviewer:	Ron Goloubow	11/25/2012	
☐ EJ signature on attached TCP			

You have the absolute right to stop work if unsafe conditions exist!

DOT Facts-301o
Lane Closure on Two-Lane Road with Low Traffic Volumes

The following configuration may be used for lane closure on two-lane roads with low traffic volumes:



Road Type	"A" (m/ft)	"B" (m/ft)	"C" (m/ft)
Urban (Low Speed)	30/100	30/100	30/100
Urban (High Speed)	100/350	100/350	100/350
Rural	150/500	150/500	150/500

Guidance:

G1. This RWZ application may be used as an alternate to the RWZ application shown in DOT Facts-301n (using flaggers) when the following conditions exist:

a. Vehicular traffic volume is such that sufficient gaps exist for vehicular traffic that must yield.

b. Road users from both directions are able to see approaching vehicular traffic through and beyond the work site and have sufficient visibility of approaching vehicles.

G2. The Type B flashing warning lights may be placed on the ROAD WORK AHEAD and the ONE LANE ROAD AHEAD signs whenever a night lane closure is necessary.



Job Safety Analysis

General

JSA ID		**Status**	(1) Intitial
Job Name	Environmental-Other	**Created Date**	11/19/2012
Task Description	Driving	**Completed Date**	
Template		**Auto Closed**	

Client / Project

Client	The Sherwin Williams Company
Project Number	EM002616
Project Name	Sherwin Williams Emeryville
PIC	Michael Paczkowski
Project Manager	Lucas Goldstein

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Erica Whiting			Lucas Goldstein	☑
HASP Reviewer	Ron Goloubow				☑
Quality Reviewer					☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Performing Pre-trip inspections	1	Cuts scrapes to hands and fingers checking engine fluids	Use Track to plan inspection activity in the engine compartment. Wear protective gloves if reaching in poorly illuminated areas of the engine	
		2	Pinch crush hazards to hands and fingers checking engine fluids or closing doors.	Identify and keep hands fingers away from pinch hazards from doors and vehicle hood or tailgate (if present).	
		3	Awkward body positions checking tires, spare tire, undercarriage, or engine compartment	Maintain neutral body positions and avoid awkward reaches under the vehicle or in engine compartment	
		4	Failure to inspect vehicle emergency equipment may result in extensive vehicle damage or delay treatment in the event of injury	Conduct equipment inspections by visibly inspecting fire extinguisher and first aid kit for cleanliness, in date items/tags, readiness for use.	
2	Vehicle loading and unloading	1	Object placement obstructing rear, side or blind spot view.	Avoid placing objects in a manner that obstructs your view, brake equipment down to a smaller more manageable size to keep low profile in vehicle, If hanging clothes in vehicle, place in manner that does not obstruct blind spots.	
		2	Unsecure objects causing pedal, steering or gear shift obstruction or injury during vehicle operation	Secure all loads in vehicle (both in the bed of trucks and in passenger cabin) to prevent unanticipated movement or shifting that could injure driver, passenger or affect safe operation of vehicle	
		3	Obstruction of vehicle safety equipment caused by object placement in vehicle	Keep emergency equipment clear and unobstructed to ensure ready availability.	
3	Vehicle operation	1	Failure to use Smith System “5-Keys” increases risk of accident	Use Smith System “5-Keys”. Maintain space cushion around vehicle, maintain 4 second rule and add (second for each additional hazard (wet loads, snow, etc) Brake gradual, keep eyes moving, check mirrors every 6-8 seconds, use turn signals, focus on relevant objects. Use early lane positioning when approaching turns.	

		2	Injury or death from failure to wear seatbelt	Always wear seatbelts even if driving short distances off of a public roadway.	
		3	Cell phone use increase risk of accident and injury	Avoid using cell phones in any capacity when operation a vehicle, check client for cell use on project sites and follow requirements. Follow all local laws	
		4	Use of radar detectors encourages speeding and resulting in increased risk for accident or injury	Use of radar detectors and similar devices is prohibited	
4	Routine maintenance	1	Pinch crush hazards to hands and fingers replacing engine fluids or closing doors/hood.	Inspect and identify pinch and crush hazards and keep hands/fingers clear when closing hood, tailgates, or doors.	
		2	Burn hazards to hand from checking/replacing fluids in engine compartment	When practical allow engine to cool prior to servicing or adding fluids. Use protective gloves.	
		3	Vehicle damage from improper fuse replacement	Never replace a fuse with higher amperage than the one being replaced. Only replace fuses of the being replaced	

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Traffic Control	Other	Roadway Emergency Kit	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**		
Employee: **Role** **Review Type** **Completed Date**		
Employee: **Role** **Review Type** **Completed Date**		

Job Safety Analysis

General

JSA ID		**Status**	(1) Intitial
Job Name	Environmental-Drum sampling/handling	**Created Date**	11/19/2012
Task Description	Drum Handling and Sampling	**Completed Date**	
Template		**Auto Closed**	

Client / Project

Client	The Sherwin Williams Company
Project Number	EM002616
Project Name	Sherwin Williams Emeryville
PIC	Michael Paczkowski
Project Manager	Lucas Goldstein

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Erica Whiting			Lucas Goldstein	☑
HASP Reviewer	Ron Goloubow				☑
Quality Reviewer					☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Inspect Drums for signs of Bulging, Leaking, Crystals, Temperature, and Odor	1	Exposure to chemicals stored in drum or container.	Read drum labels for information about contents. Review all relevant MSDSs about chemical contents. If labels are not attached, call PM or Local H&S Representative.	None
		2	Contents of the drum can cause fire/explosion hazard.	Use air monitoring meters to screen drums. % LEL and VOCs (PPM). If either of the values are above the action levels described in the HASP or MSDS then Stop Work, move away from the area, and reassess the situation. Call PM and H&S staff for support.	
2	Remove lids or bungs from Drums	1	Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	Wear appropriate work gloves. When removing ring from drum, fingers can get pinched between ring and drum. Keep fingers clear of this space. Select proper tool for task. If large amount of drums will be encountered, use a speed or drum wrench.	Employee H&S Field book, Section III Subpart II, page 104. Also Section III Subpart L, page 38.
		2	Rapid depressurization from empty or partially full drums can cause flying parts or volatile COCs releasing on staff.	Do not handle or open bulging drums (contact Corp H&S for assistance). Bleed any built up pressure by carefully loosening bung prior to removing ring. Keep face and arms away from bung opening when loosening. Slightly lift lid, insert end of air monitoring device to monitor air inside drum.	
		3	Use of mechanical tools to remove bolts from drum lids causes excessive noise.	Wear hearing protection.	
		4	Splashing can occur if filling drum, or collecting samples.	Wear eye and face protection. Pour liquids into drum slowly to minimize splashing.	
		5	When working with COCs that have fire/explosive properties, sparking or heat could cause fire/explosion.	Use brass or non Spark Hand Tools if such a hazard exists or is suspected.	
3	Sample Contents from Drums	1	Exposure to COCs can occur by contacting impacted contents.	Select proper dermal protection for task, at a minimum nitrile gloves should be worn. Wear appropriate eye face and body protection as outlined in the HASP.	

		2	Staff can be exposed to chemical vapors/fumes when sampling.	Conduct air monitoring as outlined in the HASP, and if required, select appropriate respiratory protection for the task.	
		3	Sharp edges and broken sample containers can cause lacerations.	Discard any broken sample ware or glass properly. Do not over tighten sample containers.	
		4	Chemical burns or skin irritation can occur from contact with sample preservatives.	Wear chemical protective gloves when collecting samples, or when handling damaged sample containers.	
4	Replace drum lids	1	Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	see step 2 above	
5	Moving and Storing Drums	1	Drum storage areas can be accessed by the general public, or may not be secure.	Calculate how many drums will be stored in new location. Ensure that drums are not easily accessed by the general public. Do not store such that drums impede pedestrian or vehicular traffic.	
		2	Muscle strain can occur when lifting/pulling/pushing drums.	Drums that are full can weigh as much as 800 lbs. Use a lift assist device whenever possible, and use a team lift approach. When moving soil drum generated by drilling, have drillers use their equipment to move the drums. Using dolly, slightly lift drum away from dolly to install forks under drum. Slowly let drum come back down and rest on dolly. Using hook on top of dolly, ensure it latches on top of drum bung.	
		3	Body parts can be pinched between lift device, or drum and the ground.	Be aware of hand and foot placement during drum staging. Do not hurry through task.	
		4	When moving, the drum can tip or the dolly could become unstable from uneven ground surface.	Plan travel route with drum prior to moving. With drum secure on dolly, have one employee pull back on dolly, and other employee slowly push back on drum toward dolly. Have second worker act as spotter for traffic, pedestrians, and any trip hazards along the way.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety goggles		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)		Required

Supplies

Type	Supply	Description	Required
Miscellaneous	Other	dolly	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**		
Employee: **Role** **Review Type** **Completed Date**		

Job Safety Analysis

General

JSA ID		**Status**	(1) Intitial
Job Name	Environmental-Other	**Created Date**	11/19/2012
Task Description	Mobilization / Demobilization	**Completed Date**	
Template		**Auto Closed**	

Client / Project

Client	The Sherwin Williams Company
Project Number	EM002616
Project Name	Sherwin Williams Emeryville
PIC	Michael Paczkowski
Project Manager	Lucas Goldstein

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Erica Whiting			Lucas Goldstein	☑
HASP Reviewer	Ron Goloubow				☑
Quality Reviewer					☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Verify all permits, forms, and trainings have been completed.	1	Administrative function - no hazards anticipated. Action is to ensure health and safety/regulatory compliance	Employees must have the following required training: OSHA 40-Hour HAZWOPER and refresher; First aid/CPR; medical clearance; DOT Hazardous Materials Shipping Training	
2	Mobilization to the Site	1	Collision, injury or death to occupants or other parties; Property damage	1. Secure all equipment in the vehicle prior to driving. 2. Obey all traffic laws and abide by posted speed limits. 3. Be aware of your surroundings and maintain a distance of 4 seconds behind the vehicle ahead. Add distance for adverse weather conditions. 4. Verify that all employees have accurate and understandable directions to the site. Use preprinted map or GPS. 5. Avoid driving when tired. Use cell phones for emergency contact. Do not use cell phones while driving. 6. Complete vehicle inspection checklist.	
		2	Weather Hazards/Road Conditions	Check local and destination forecasts and Road conditions for dates of travel	
3	Loading and unloading materials and equipment	1	Slips, trips, and falls; Lifting hazards and back strain.	Staff should use proper lifting techniques and to request assistance when lifting heavy equipment. Use dolly to transport equipment, if needed.	
		2	Pinch points/lacerations during equipment loading	Identify/avoid pinch points and sharp edges. Wear leather gloves to protect hands/fingers	
		3	Working near vehicles	Be mindful of traffic at all times. Use cones, barricades and signs as appropriate. Wear reflective traffic vests at all times.	
4	Working outdoors	1	Temperature-related illnesses (heat stress); Weather hazards.	Ensure all field staff drinks plenty of fluids; take breaks as needed to avoid overheating, frostbite, etc., dress appropriately for weather conditions. Check local weather forecasts daily, use sunscreen as appropriate, monitor changes in weather, shutdown operations if extreme weather conditions occur; postpone work if lightning is observed or expected.	

		2	Biological hazards (insects and plants)	1. Inspect area for hazardous plants and insects. 2. Apply insect repellent containing DEET during insect season. 3. Check for ticks throughout the day.	
5	Demobilization	1	Slips, trips, and falls; Loss of equipments/supplies from moving vehicle; lifting hazards	Keep all walkways clear of equipment and materials. Follow safe driving procedures (following distances, speed, headlights, safety belts, etc.). Do not use cell phone when driving. Properly secure all equipments and supplies before operating vehicle. Use proper lifting technique.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Required
Eye Protection	safety glasses		Required
Foot Protection	Other	Traffic Safety Vest	Required
	steel-toe boots		Required
Hand Protection	work gloves (specify type)		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	Other	Traffic cones and flags	Required
Personal	eye wash (specify type)		Required
	insect repellant		Required
	sunscreen		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**		
Employee: **Role** **Review Type** **Completed Date**		

Job Safety Analysis

General

JSA ID		**Status**	(1) Intitial
Job Name	Environmental-Other	**Created Date**	11/19/2012
Task Description	Packing coolers with groundwater samples	**Completed Date**	
Template		**Auto Closed**	

Client / Project

Client	The Sherwin Williams Company
Project Number	EM002616
Project Name	Sherwin Williams Emeryville
PIC	Michael Paczkowski
Project Manager	Lucas Goldstein

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Erica Whiting			Erica Whiting	☑
HASP Reviewer	Ron Goloubow				☑
Quality Reviewer					☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Place samples in cooler for shipment.	1	Contact with broken glass or groundwater if bottles break.	• Place sample containers in bubble wrap or bags provided by laboratory. • Line bottom of cooler with bubble wrap to prevent breakage. • Ensure that sample containers are packed securely in cooler, but do not use excess pressure to force sample containers to fit inside cooler if adequate space is not available. • Wear leather gloves over nitrile gloves to protect hands from glass and/or groundwater if bottles break.	
2	Add ice to sample coolers.	1	Exertion from handling bags of ice.	• Do not lift more than 50 pounds of ice. • Use knees to lift when picking bags of ice off of the ground. • Avoid over-reaching or overextenting your back when placing ice bags into cooler or onto vehicle.	
		2	Contact with ice	• Do not place hands directly on ice bags for extended periods of time. Take breaks as needed to prevent hands from becoming too cold. • Wear leather gloves to provide protection from direct contact with cold ice.	
		3	Slips, trips, fall hazards from packing materials.	• Keep a 10-foot radius clear of packing materials (ice, tape, coolers, etc.). • Keep work area dry - pour excess water/ice onto the ground away from the immediate work area.	
3	Seal cooler with packing tape and custody seal.	1	Contact with cutting devices.	• Use scissors to cut tape. • Wear cut-resistant gloves to protect hands when using cutting devices.	

		2	Exertion/muscle strain from lifting coolers	• Use proper lifting techniques - lift with legs, not back. • Avoid excess twists and turns while moving cooler from one place to another and while placing tape around the cooler. • If cooler weighs more than 50 pounts, use 2-person lift.	
4	Place coolers in vehicle for shipment.	1	• Exertion/muscle strain from lifting coolers.	• Use proper lifting techniques - lift with legs, not back. • Avoid excess twists and turns while moving cooler from one place. • If cooler weighs more than 50 pounts, use 2-person lift.	
		2	Contact with other coolers.	• Avoid getting fingers caught between coolers when moving them. • Wear leather gloves while handling coolers to provide extra hand protection from potential pinch points.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Recommended
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	Leather or cut-resistant	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	first aid kit		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**		
Employee: **Role** **Review Type** **Completed Date**		
Employee: **Role** **Review Type** **Completed Date**		

Job Safety Analysis

General

JSA ID		**Status**	(1) Intitial
Job Name	Environmental-Groundwater Sampling and	**Created Date**	11/19/2012
Task Description	Water level gauging and groundwater	**Completed Date**	
Template		**Auto Closed**	

Client / Project

Client	The Sherwin Williams Company
Project Number	EM002616
Project Name	Sherwin Williams Emeryville
PIC	Michael Paczkowski
Project Manager	Lucas Goldstein

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Erica Whiting			Lucas Goldstein	☑
HASP Reviewer	Ron Goloubow				☑
Quality Reviewer					☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Stage at pre-determined sampling location and set up work zone and sampling equipment	1	personnel could be hit by vehicluar traffic.	Set-up cones and establish work area. Position vehicle so that field crew is protected from site traffic. Unload as close to work area as safely possible.	
		2	Sampling equipment, tools and monitoring well covers can cause tripping hazard	Keep equipment picked up and use TRACK to assess and changes	
2	Open wells to equilibrate and gauge wells	1	When squatting down, personnel can be difficult to see by vehicular traffic.	Wear Class II traffic vest if wells are located proximal to vehicular traffic. Use tall cones and the buddy system if practicable.	
		2	Poisionous insects in well vaults i.e. black widdows and walking sticks can bite or spray acid.	Wear elbow length nitrile gloves when opening well vaults where insects are present.Wear proper PPE including safety glasses.	
		3	pinchpoints on well vault can pinch or lacerate fingers.	Use correct tools to open well vault/cap. Wear leather gloves when removing well vault lids, and chemical protective gloves while guaging. Wear proper PPE including safety boots, knee pads and safety glasses.	
		4	Lifting sampling equipment can cause muscle strain	Unload as close to work area as safely possible; use proper lifting and reaching techniques and body positioning; don't carry more than you can handle, and get help moving heavy or awkward objects.	
		5	Pressure can build up inside well causing cap to release under pressure	Keep head away from well cap when removing. If pressure relief valves are on well use prior to opening well	
3	Begin Purging Well and Collecting Parameter Measurements	1	Electrical shock can occur when connecting/disconnecting pump from the battery.	Make sure equipment is turned off when connecting/disconnecting. Wear leather gloves. Use GFCIs when using powered tools and pumps. Do not use in the rain or run electrical cords through wet areas.	
		2	purge water can spill or leak from equipment	Stop purging activities immediately, stop leakage and block any drainage grate with sorbent pads. Call PM to notify them of any reportable spill.	

		3	Water spilling on the ground can cause muddy/slippery conditions	Be careful walking in work area when using plastic around well to protect from spillage	
		4	lacerations can occur when cutting materials such as plastic tubing	When cutting tubing, use tubing cutter. No open fixed blades should ever be used. When possible wear work gloves, leather type.	
		5	purge water can splash into eyes	Pour water slowly into buckets/drums to minimize splashing. Wear safety glasses	
4	Collect GW or Free Product Sample	1	Working with bailer rope can cause rope burns on hands.	Slowly raise and lower the rope or string for the bailer. Wear appropriate gloves for the task.	
		2	sample containers could break or leak preservative	Discard any broken sampleware or glass properly. Do not overtighten sample containers. Wear chemical protective gloves	
5	Recovery of Free Product from well	1	exposure to free product	Additional chemical protection may be necessary based on the type of product. Additionally, safety goggles, a faceshield, or respiratory protection may be required. Verify in the HASP.	
6	Staging of Well Purge water and/or Free Product	1	Muscle strains can occur when moving purge water or drums	If using buckets, do not fill buckets up to the top. Always keep lid on buckets when traveling or moving them to another location. Only half fill buckets so when dumping the buckets weigh less. See drum handling JLA for movement of drums.	Drum handling JLA

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
	work gloves (specify type)	leather, and elbow or shoulder length	Recommended

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	alconox	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
Traffic Control	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**		
Employee: **Role** **Review Type** **Completed Date**		

Material Safety Data Sheet Collection
Genium Publishing Corp.
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Issue Date: 2000-07

Perchloroethylene
MSDS 313
TET2750

Section 1 - Chemical Product and Company Identification 54.1

Material Name: Perchloroethylene **CAS Number:** 127-18-4
Chemical Formula: C_2Cl_4
Structural Chemical Formula: $Cl_2C=CCl_2$
Synonyms: ANKILOSTIN; ANTISAL 1; ANTISOL 1; CARBON BICHLORIDE; CARBON DICHLORIDE; CZTEROCHLOROETYLEN; DIDAKENE; DILATIN PT; DOW-PER; ENT 1,860; EPA PESTICIDE CHEMICAL CODE 078501; ETHENE,TETRACHLORO-; ETHYLENE TETRACHLORIDE; ETHYLENE,TETRACHLORO-; FEDAL-UN; NEMA; PCE; PER; PERAWIN; PERC; PERCHLOORETHYLEEN,PER; PERCHLOR; PERCHLORAETHYLEN,PER; PERCHLORETHYLENE; PERCHLORETHYLENE,PER; PERCHLOROETHYLENE; PERCLENE; PERCLENE D; PERCLOROETILENE; PERCOSOLV; PERCOSOLVE; PERK; PERKLONE; PERSEC; TETLEN; TETRACAP; TETRACHLOORETHEEN; TETRACHLORAETHEN; TETRACHLORETHYLENE; TETRACHLOROETHENE; 1,1,2,2-TETRACHLOROETHYLENE; TETRACHLOROETHYLENE; TETRACLOROETENE; TETRAGUER; TETRALENO; TETRALEX; TETRAVEC; TETROGUER; TETROPIL
General Use: Used as a drycleaning solvent, a vapor-degreasing solvent; a drying agent for metals and certain other solids. Used also as a heat transfer medium and in the manufacture of fluorocarbons.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
perchloroethylene	127-18-4	100

OSHA PEL
TWA: 100 ppm; STEL: 200 ppm; from Table Z-2. Other Values: 300 mg/m^3; 5 min peak 3hr ppm.

OSHA PEL Vacated 1989 Limits
TWA: 25 ppm; 170 mg/m^3.

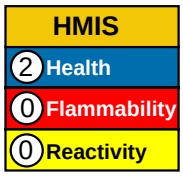
ACGIH TLV
TWA: 25 ppm; 170 mg/m^3; STEL: 100 ppm; 6850 mg/m^3.

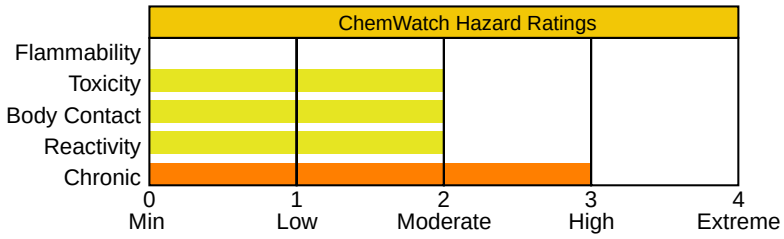
NIOSH REL
No data found.

IDLH Level
150 ppm.

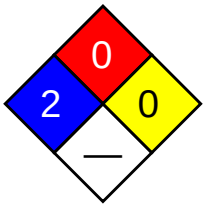
DFG (Germany) MAK
TWA: 50 ppm; 345 mg/m^3.

Section 3 - Hazards Identification









Fire Diamond

ANSI Signal Word
Caution

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; ether-like odor. Irritating to eyes/skin/respiratory tract. Also causes: headache, dizziness, CNS depression, incoordination, slurred speech. Chronic: liver/kidney damage; possible cancer hazard based on animal studies.

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Potential Health Effects

Primary Entry Routes: inhalation, skin contact, eye contact
Target Organs: liver, kidneys, eyes, upper respiratory system, skin, central nervous system (CNS)
Acute Effects

Inhalation: Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages. Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident.
A single organ alone is (almost) never involved.
The vapor is highly discomforting to the upper respiratory tract and lungs.
Inhalation hazard is increased at higher temperatures.
Anesthetic and narcotic effects (with dulling of senses and odor fatigue) are a consequence of exposure to chlorinated solvents.
Individual response varies widely; odor may not be considered objectionable at levels which quickly induce central nervous system effects.
High vapor concentrations may give a feeling of euphoria. This may result in reduced responses, followed by rapid onset of unconsciousness, possible respiratory arrest and death.
Accidental high level exposure has produced lightheadedness, unconsciousness and liver and kidney damage in workers. In at least two cases such exposures were fatal. Subjects exposed to 106 ppm in laboratory studies experienced slight eye irritation; dizziness and sleepiness were reported at 216 ppm; at exposures of 280 ppm or 600 ppm for 10 minutes there was a loss of motor coordination. In another study subjects exposed for 7 hours at 101 ppm complained of eye irritation and subjective symptoms such headache, drowsiness and sleepiness.

Eye: The liquid may produce eye discomfort and is capable of causing temporary impairment of vision and/or transient eye inflammation, ulceration Eye contact may cause lachrymation (tears) and burning sensation.
The vapor is highly discomforting to the eyes.
The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: The liquid is highly discomforting to the skin if exposure is prolonged and may cause drying of the skin, which may lead to dermatitis.
Toxic effects may result from skin absorption.
Absorption by skin may readily exceed vapor inhalation exposure.
Symptoms for skin absorption are the same as for inhalation.
Bare unprotected skin should not be exposed to this material.
The material may accentuate any pre-existing skin condition.
The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic).
This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis.
Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.
Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.
Industrial experience shows localized skin irritation. Prolonged dermal contact can cause chemical burns and blistering.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid is highly discomforting and toxic if swallowed and may be fatal if swallowed in large quantity.
Ingestion may result in nausea, abdominal irritation, pain and vomiting.
When used in the treatment of hookworm (4.5 to 6.5 gm orally) the only adverse effect is inebriation. Transient hepatotoxicity in patients given single oral doses of up to 5 mL have been recorded.

Carcinogenicity: NTP - Class 2B, Reasonably anticipated to be a carcinogen, sufficient evidence of carcinogenicity from studies in experimental animals; IARC - Group 2B, Possibly carcinogenic to humans; OSHA - Not listed; NIOSH - Listed as carcinogen; ACGIH - Class A3, Animal carcinogen; EPA - Not listed; MAK - Class B, Justifiably suspected of having carcinogenic potential.

Chronic Effects: Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.
Workers inhaling 232 to 385 ppm for 8 hours/day, 5 days/week for 2 to 6 years have shown abnormal hepatic function, including cirrhosis, with lightheadedness, headache, malaise and dizziness.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water.
Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

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Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.
Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.
Avoid giving milk or oils.
Avoid giving alcohol.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: Treat symptomatically.
Do not administer sympathomimetic drugs as they may cause ventricular arrhythmias.
For acute or short-term repeated exposures to perchloroethylene:
Tetrachloroethylene/perchlorethylene is well absorbed through the lungs with peak levels more important than duration in determining blood concentration.
Lungs excrete most of the absorbed tetrachloroethylene in an unchanged state; about 3% is converted by the liver to form trichloracetic acid and subsequently excreted by the kidney. Exhaled material has a biological half-life of 65 hours.
INHALATION:
The treatment of acute inhalation exposures is supportive with initial attention directed to evaluation/support of ventilation and circulation.
As with all hydrocarbons care must be taken to reduce the risk of aspiration by proper positioning and medical observation.
INGESTION:
1.The ingestion level at which emesis should be induced is difficult to predict in the absence of extensive human studies.
2.The role of charcoal and cathartics remains uncertain.

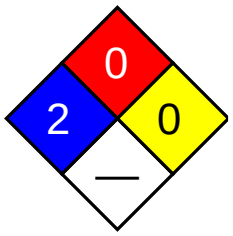
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker who has been exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Perchloroethylene in end-exhaled air	10 ppm	Prior to last shift of work-week	
Perchloroethylene in Blood	1 mg/L	Prior to last shift of work-week	
Trichloroacetic acid in urine	7 mg/L	End of work-week	NS,SQ

NS: Non-specific determinant; also seen after exposure to other materials
SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

Section 5 - Fire-Fighting Measures

Flash Point: Nonflammable
Autoignition Temperature: 490 °C
LEL: 1.8% v/v
UEL: 11.5% v/v at 740 mm Hg 160 °C
Extinguishing Media: Use extinguishing media suitable for surrounding area.
General Fire Hazards/Hazardous Combustion Products: Nonflammable liquid. However vapor will burn when in contact with high temperature flame. Ignition ceases on removal of flame.
May form a flammable/explosive mixture in an oxygen enriched atmosphere. Heating may cause expansion/vaporization with violent rupture of containers. Decomposes on heating and produces corrosive fumes of hydrochloric acid, carbon monoxide and small amounts of toxic phosgene.



Fire Diamond

Fire Incompatibility: Avoid mixing with strong alkalis or powdered metals, particularly zinc as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
Wear breathing apparatus plus protective gloves for fire only. Prevent, by any means available, spillage from entering drains or waterways.
Use fire fighting procedures suitable for surrounding area.
Do not approach containers suspected to be hot.

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Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.
Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: Clean up all spills immediately.
Wear protective neoprene gloves and chemical goggles.
If risk of overexposure exists, wear NIOSH-approved respirator.
Wipe up and absorb small quantities with vermiculite or other absorbent material.
DO NOT discharge into sewer or waterways.
Place spilled material in clean, dry, sealable, labeled container.
Large Spills: Minor hazard. Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Contain spill with sand, earth or vermiculite.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist. Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
DO NOT allow material to contact humans, exposed food or food utensils.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling. Work clothes should be laundered separately.
Launder contaminated clothing before reuse.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Recommended Storage Methods: Check that containers are clearly labeled. Glass container.
Heavy gauge metal packages/heavy gauge metal drums.
Avoid storage with zinc, galvanized or diecast metal (including bungs).
DO NOT use aluminum or galvanized containers.
Packaging as recommended by manufacturer.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear. Use in a well-ventilated area.
Local exhaust ventilation may be required for safe working, i.e., to keep exposures below required standards; otherwise, PPE is required.
If inhalation risk exists, wear NIOSH-approved organic-vapor respirator or air supplied breathing apparatus.
Personal Protective Clothing/Equipment
Eyes: Chemical goggles. Full face shield.
Hands/Feet: Neoprene gloves; Viton gloves.
PVA gloves.
PVC gloves.
Protective footwear.
Respiratory Protection:
Exposure Range >100 to <150 ppm: Supplied Air, Constant Flow/Pressure Demand, Half Mask
Exposure Range 150 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Note: poor warning properties
Other: Overalls. Eyewash unit. Ensure there is ready access to an emergency shower.

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Glove Selection Index:

PE/EVAL/PE	A
VITON/CHLOROBUTYL	A
VITON/NITRILE	A
VITON	A
PVA	A
CPE	A
NITRILE	B
TEFLON	B
NITRILE+PVC	C
SARANEX-23 2-PLY	C
SARANEX-23	C
PVC	C
BUTYL	C
NEOPRENE	C

A: Best selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless liquid, with a chloroform-like odor. Extremely stable, resists hydrolysis. Miscible with alcohol, ether and oils.

Physical State: Liquid
Vapor Pressure (kPa): 2.11 at 22 °C
Vapor Density (Air=1): 5.83
Formula Weight: 165.82
Specific Gravity (H_2O=1, at 4 °C): 1.63 at 15 °C
Water Solubility: 0.02% by weight
Evaporation Rate: 0.09 Ether=1

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point Range: 121 °C (250 °F) at 760 mm Hg
Freezing/Melting Point Range: -19 °C (-2.2 °F)
Volatile Component (% Vol): 100

Section 10 - Stability and Reactivity

Stability/Polymerization: Product is considered stable and hazardous polymerization will not occur.
Storage Incompatibilities: Avoid reaction with oxidizing agents. Segregate from strong alkalis.
Haloalkenes are highly reactive. Some of the more lightly substituted lower members are highly flammable; many members of the group are peroxidizable and polymerizable.
The presenceof 0.5% trichloroethylene as an impurity caused generation of dichloroacetylene during unheated drying over solid sodium hydroxide.
Subsequent fractional distillation produced an explosion.

Section 11 - Toxicological Information

Unless otherwise specified data extracted from RTECS - Registry of Toxic Effects of Chemical Substances

TOXICITY
Oral (rat) LD_{50}: 2629 mg/kg
Inhalation (man) LD_{Lo}: 2857 mg/kg
Inhalation (human) TC_{Lo}: 96 ppm/7 hrs
Inhalation (man) TC_{Lo}: 280 ppm/2 hrs
Inhalation (man) TC_{Lo}: 600 ppm/10 min
Inhalation (rat) LC_{Lo}: 34200 mg/m^3/8 hr

IRRITATION
Skin (rabbit): 810 mg/24h -SEVERE
Eye (rabbit): 162 mg -mild

See NIOSH, *RTECS* KX 3850000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If it is released to soil, it will be subject to evaporation into the atmosphere and to leaching to the groundwater. Biodegradation may be an important process in anaerobic soils based on laboratory tests with methanogenic columns. Slow biodegradation may occur in groundwater where acclimated populations of microorganisms exist. If released to water, it will be subject to rapid volatilization with estimated half-lives ranging from <1 day to several weeks. It will not be expected to significantly biodegrade, bioconcentrate in aquatic organisms or significantly adsorb to sediment. It will not be expected to significantly hydrolyze in soil or water under normal environmental conditions. If released to the atmosphere, it will exist mainly in the gas-phase and it will be subject to photooxidation with estimates of degradation time scales ranging from an approximate half-life of 2 months to complete degradation in an hour. Some in the atmosphere may be subject to washout in rain based on the solubility in water.

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Ecotoxicity: LC_{50} Tanytarsus dissimilis (midge) 30, 840 ug/l/48 hr, static bioassay; LC_{50} Poecilia reticulata (guppy) 18 ppm/7 days /Conditions of bioassay not specified; LC_{50} Daphnia magna (water flea) 18 mg/l/48 hr, static bioassay, at 22 °C; LC_{50} Salmo gairdneri (rainbow trout) 5 mg/l/96 hr, static bioassay at 12 °C
Henry's Law Constant: 2.87 $x10^{-2}$
BCF: fathead minnow 38.9
Biochemical Oxygen Demand (BOD): none
Octanol/Water Partition Coefficient: log K_{ow} = 3.40
Soil Sorption Partition Coefficient: K_{oc} = 209

Section 13 - Disposal Considerations

Disposal: Reclaim solvent at an approved site.
Allow absorbed spillage to evaporate in an open top container, away from habitation.
Incinerate residue at an approved site.
Used containers should be left upside down with bungs out.
Return containers to drum reconditioner or recycler.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Shipping Name: TETRACHLOROETHYLENE
Additional Shipping Information: PERCHLOROETHYLENE
Hazard Class: 6.1(b)
ID No.: 1897
Packing Group: III
Label: Harmful[6]

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Listed U210 Toxic Waste
CERCLA 40 CFR 302.4: Listed per RCRA Section 3001; per CWA Section 307(a) 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Research Date: .....1999-11 **Review Date:** 2000-07

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Issue Date: 2000-07

Trichloroethylene
MSDS 312
TRI2710

Section 1 - Chemical Product and Company Identification 54.1

Material Name: Trichloroethylene **CAS Number:** 79-01-6
Chemical Formula: C_2HCl_3
Structural Chemical Formula: $ClCH=CCl_2$
Synonyms: ACETYLENE TRICHLORIDE; ALGYLEN; ANAMENTH; BENZINOL; BLACOSOLV; BLANCOSOLV; CECOLENE; CHLORILEN; 1-CHLORO-2,2-DICHLOROETHYLENE; CHLORYLEA; CHLORYLEA,CHORYLEN,CIRCOSOLV,CRAWHASPOL,DOW-TRI,DUKERON,PER-A-CLOR,TRIAD,TRIAL,TRI-PLUS M,VITRAN; CHLORYLEN; CHORYLEN; CIRCOSOLV; CRAWHASPOL; DENSINFLUAT; 1,1-DICHLORO-2-CHLOROETHYLENE; DOW-TRI; DUKERON; EPA PESTICIDE CHEMICAL CODE 081202; ETHENE,TRICHLORO-; ETHINYL TRICHLORIDE; ETHYLENE TRICHLORIDE; ETHYLENE,TRICHLORO-; FLECK-FLIP; FLOCK FLIP; FLUATE; GEMALGENE; GERMALGENE; LANADIN; LETHURIN; NARCOGEN; NARKOGEN; NARKOSOID; NIALK; NSC 389; PERM-A-CHLOR; PERM-A-CLOR; PETZINOL; PHILEX; TCE; THRETHYLEN; THRETHYLENE; TRETHYLENE; TRI; TRIAD; TRIAL; TRIASOL; TRICHLOORETHEEN; TRICHLOORETHYLEEN,TRI; TRICHLORAETHEN; TRICHLORAETHYLEN,TRI; TRICHLORAN; TRICHLOREN; TRICHLORETHENE; TRICHLORETHYLENE; TRICHLORETHYLENE,TRI; TRICHLOROETHENE; 1,1,2-TRICHLOROETHYLENE; TRICHLOROETHYLENE; TRICHLOROETHYLENE; 1,2,2-TRICHLOROETHYLENE; TRI-CLENE; TRICLENE; TRICLORETENE; TRICLOROETILENE; TRIELENE; TRIELIN; TRIELINA; TRIELINE; TRIKLONE; TRILEN; TRILENE; TRILINE; TRIMAR; TRIOL; TRI-PLUS; TRI-PLUS M; VESTROL; VITRAN; WESTROSOL
General Use: Mainly used for vapor degreasing; solvent in textile and electronics industries; for adhesives, lubricants and consumer products (such as spot removers and rug cleaners).
Until recently, it was used to make hop extracts for beer, decaffeinated coffee and spice extracts.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
trichloroethylene	79-01-6	> 99

OSHA PEL
TWA: 100 ppm; STEL: 200 ppm; from Table Z-2. Other Values: 300 mg/m^3; 5 min peak 2hr ppm.

OSHA PEL Vacated 1989 Limits
TWA: 50 ppm; 270 mg/m^3; STEL: 200 ppm; 1080 mg/m^3.

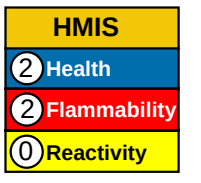
ACGIH TLV
TWA: 50 ppm; 269 mg/m^3; STEL: 100 ppm; 5370 mg/m^3.

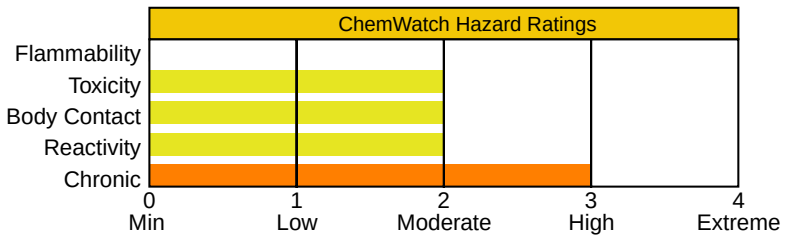
NIOSH REL
No data found.

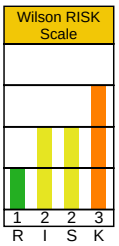
IDLH Level
1000 ppm.

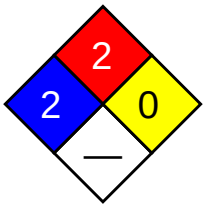
DFG (Germany) MAK
TWA: 50 ppm; 270 mg/m^3.

Section 3 - Hazards Identification









Fire Diamond

ANSI Signal Word
Warning!


Flammable

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☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear, colorless liquid; sweet odor. Irritating to eyes/skin/respiratory tract. Inhalation: irregular heart beat, drunkenness. Chronic: heart, liver and kidney damage, dermatitis. Birth defects and cancer may occur based on animal studies. Flammable.

Potential Health Effects

Primary Entry Routes: inhalation, skin contact, eye contact, ingestion (rarely)

Target Organs: respiratory system, central nervous system (CNS), peripheral nervous system, cardiovascular system, liver, kidneys, skin

Acute Effects

Inhalation: The vapor is mildly discomforting to the upper respiratory tract.
Inhalation hazard is increased at higher temperatures.
Anesthetics and narcotic effects (with dulling of senses and odor fatigue) are a consequence of exposure to chlorinated solvents.
Individual response varies widely; odor may not be considered objectionable at levels which quickly induce central nervous system effects.
High vapor concentrations may give a feeling of euphoria. This may result in reduced responses, followed by rapid onset of unconsciousness, possible respiratory arrest and death.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Evidence of acute human toxicity comes mainly from the use of TCE as an anesthetic, Tachypnea and ventricular arrhythmias are experienced at inhaled concentrations exceeding 15000 ppm. Systemic toxicity is low following anesthesia. Occasional hepatotoxicity (liver dysfunction) has been reported; this is probably due to the breakdown of TCE to dichloroacetylene and phosgene by soda-lime present in some anesthetic devices. The effects of TCE appear to be enhanced in some individuals by simultaneous exposure to caffeine, ethanol and other drugs. "Degreasers Flush" describes a reddening of facial, neck, and back skin and is seen after intake of substantial quantities of ethanol by certain individuals after exposures to TCE.

Eye: The liquid is highly discomforting to the eyes and is capable of causing pain and severe conjunctivitis.
Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.
The vapor is discomforting to the eyes.
The material may produce moderate eye irritation leading to inflammation.
Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: The liquid is discomforting to the skin and may cause drying of the skin, which may lead to dermatitis.
Toxic effects may result from skin absorption.
Bare unprotected skin should not be exposed to this material. The material may accentuate any pre-existing skin condition.
The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic).
This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis.
Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.
Repeated exposures may produce severe ulceration.
Localized application may produce pustular eruptions, pruritus and erythema. A permeability coefficient of 1.6×10^{-2} cm/hr has been calculated by the US EPA. Percutaneous absorption is unlikely to contribute significantly to total body burdens unless dermatitis is present.

Ingestion: The liquid is highly discomforting and toxic if swallowed.
Ingestion may result in nausea, abdominal irritation, pain and vomiting.
Considered an unlikely route of entry in commercial/industrial environments.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Listed as carcinogen; ACGIH - Class A5, Not suspected as a human carcinogen; EPA - Not listed; MAK - Class B, Justifiably suspected of having carcinogenic potential.

Chronic Effects: Sensitive humans may experience anesthetic effects from short exposures.
Chronic effects of exposure include fatigue, headache, irritability, vomiting, skin flush and intolerance to alcohol.
Liver, kidney, heart and neurological damage may also result from chronic overexposure.
Alcohol intake may increase the toxic effects of the material.
A variety of disturbances have been seen among workers exposed at concentrations ranging from 1 to 335 ppm. These disturbances increased with the length of exposure (to 5 years or more) and where more prominent when exposures exceeded 40 ppm. Increased complaints of alcohol intolerance, tremors, giddiness and anxiety were amongst symptoms recorded. Variation in effects in different occupational settings may be due to different physical workloads.

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There appeared to be no increase in the expected rates of congenital defects in children born to women exposed to TCE over a 13 year period.
Epidemiological studies consistently fail to show a link between cancers and TCE exposure. This is significant because of the tens of thousands of exposed workers monitored.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If available, administer medical oxygen by trained personnel.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.
Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water.
Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.
Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.
Avoid giving milk or oils.
Avoid giving alcohol.
After first aid, get appropriate in-plant, paramedic, or community medical support.
Note to Physicians: Treat symptomatically.
Do not administer sympathomimetic drugs as they may cause ventricular arrhythmias.
Following acute or short-term continued exposures to trichloroethylene:
1.Trichloroethylene concentration in expired air correlates with exposure. 8 hours exposure to 100 ppm produces levels of 25 ppm immediately and 1 ppm 16 hours after exposures.
2.Most mild exposure respond to removal from the source and supportive care.
Serious toxicity most often results from hypoxemia or cardiac dysrhythmias so that oxygen, intubation, intravenous lines and cardiac monitoring should be started initially as the clinical situation dictates.
3.Ipecac syrup should be give to alert patients who ingest more than a minor amount and present within 2 hours.
4.The efficacy of activated charcoal and cathartics is unclear.
5.The metabolites, trichloracetic acid, trichlorethanol and to a lesser degree, chloral hydrate, may be detected in the urine up to 16 days postexposure.

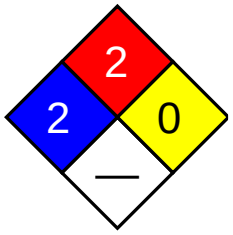
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Trichloroacetic acid in urine	10 mg/gm creatinine	End of work-week	NS
Trichloroacetic acid AND Trichloroethanol in urine	300 mg/mg creatinine	End of shift at end of work-week	NS
Free Trichloroethanol in blood	4 mg/L	End of shift at end of work-week	NS
Trichloroethylene in end-exhaled air			SQ
Trichloroethylene in blood			SQ

NS: Non-specific determinant; also seen after exposure to other materials
SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

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Section 5 - Fire-Fighting Measures



Fire Diamond

Flash Point: 32.222 °C Closed Cup
Autoignition Temperature: 420 °C
LEL: 8% v/v
UEL: 10.5% v/v
Extinguishing Media: Water spray or fog; foam, dry chemical powder, or BCF (where regulations permit).
Carbon dioxide.
General Fire Hazards/Hazardous Combustion Products: Vapor will burn when in contact with high temperature flame.
May form a flammable/explosive mixture in an oxygen enriched atmosphere. Heating may cause expansion/vaporization with violent rupture of containers. Decomposes on heating and produces corrosive fumes of hydrochloric acid, carbon monoxide and small amounts of toxic phosgene.
Fire Incompatibility: Avoid reaction with strong oxidizing agents (particularly oxygen in gas or liquid form and nitrogen dioxide), strong bases, sodium and sodium-potassium alloys. Powdered metals; magnesium, zinc and aluminum.
Contact with water may result in the slow formation of hydrochloric acid.
Attacks natural rubber.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb spill with sand, earth, inert material or vermiculite.
Wipe up. Place in a suitable labeled container for waste disposal.
Large Spills: Clear area of personnel and move upwind.
Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
Increase ventilation.
No smoking or bare lights within area.
Stop leak if safe to do so.
Contain and absorb spill with sand, earth, inert material or vermiculite.
Collect and seal in labeled drums for disposal.
If contamination of drains or waterways occurs, advise emergency services.
After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of overexposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
DO NOT allow material to contact humans, exposed food or food utensils.
Avoid smoking, bare lights or ignition sources. When handling, DO NOT eat, drink or smoke. Avoid contact with incompatible materials.
Keep containers securely sealed when not in used. Avoid physical damage to containers. Always wash hands with soap and water after handling. Working clothes should be laundered separately.
Launder contaminated clothing before reuse.
Observe manufacturer's storing/handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Recommended Storage Methods: Inhibited grades may be stored in metal drums.
DO NOT use aluminum or galvanized containers. Check that containers are clearly labeled and free from leaks.
Packaging as recommended by manufacturer.

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Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Local exhaust ventilation usually required.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection. NIOSH-approved self contained breathing apparatus (SCBA) may be required in some situations.
Provide adequate ventilation in warehouse or closed storage area.

Personal Protective Clothing/Equipment

Eyes: Safety glasses with side shields; chemical goggles. Full face shield.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: PVA gloves. Polyethylene gloves.
Viton gloves.
PVC boots.

Respiratory Protection:
Exposure Range >100 to <1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Half Mask
Exposure Range 1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Note: odor threshold unknown

Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream.

Glove Selection Index:

PE/EVAL/PE	A
PVA	A
TEFLON	A
VITON	B
VITON/NEOPRENE	C
VITON/NITRILE	C
HYPALON	C
NEOPRENE	C
PVC	C
NITRILE	C

A: Best selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless liquid with a sweetish, chloroform-like odor, miscible with most organic solvents.

Physical State: Liquid
Vapor Pressure (kPa): 7.87 at 20 °C
Vapor Density (Air=1): 4.54
Formula Weight: 131.38
Specific Gravity (H_2O=1, at 4 °C): 1.47 at 15 °C
Water Solubility: < 1 mg/mL at 21 °C
pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point Range: 87 °C (189 °F)
Freezing/Melting Point Range: -73 °C (-99.4 °F)
Volatile Component (% Vol): 100

Section 10 - Stability and Reactivity

Stability/Polymerization: Decomposes in the presence of moisture to produce corrosive acid.
Product is considered stable under normal handling conditions. Hazardous polymerization will not occur.

Storage Incompatibilities: Avoid storage with strong oxidizers (particularly oxygen in gas or liquid form and nitrogen dioxide), strong bases, acetone, sodium/sodium-potassium alloys, magnesium, zinc and aluminum.
Avoid contact with water as the slow formation of hydrochloric acid results.
Attacks natural rubber.
Haloalkenes are highly reactive. Some of the more lightly substituted lower members are highly flammable; many members of the group are peroxidizable and polymerizable.

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Section 11 - Toxicological Information

Unless otherwise specified data extracted from RTECS - Registry of Toxic Effects of Chemical Substances

TOXICITY
Oral (human) LD_{Lo}: 7000 mg/kg
Oral (man) TD_{Lo}: 2143 mg/kg
Oral (rat) LD_{50}: 5650 mg/kg
Inhalation (man) LC_{Lo}: 2900 ppm
Inhalation (human) TD_{Lo}: 812 mg/kg
Inhalation (human) TC_{Lo}: 6900 mg/m^3/10 m
Inhalation (man) TC_{Lo}: 2900 ppm
Inhalation (man) TC_{Lo}: 110 ppm/8h
Inhalation (man) TC_{Lo}: 160 ppm/83 m

IRRITATION
Skin (rabbit): 500 mg/24h - SEVERE
Eye (rabbit): 20 mg/24h - SEVERE

See NIOSH, *RTECS* KX 4550000, for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.

Ecotoxicity: LC_{50} Sheepshead minnow 20 mg/l/96 hr. /Conditions of bioassay not specified; LC_{50} Mexican axolotl (3-4 wk after hatching) 48 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Clawed toad (3-4 wk after hatching) 45 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Pimephales promelas (fathead minnow) 40.7 mg/l/96 hr (95% confidence limits 31.4-71.8 mg/l) /Flow-through test; EC_{10} Pimephales promelas (fathead minnow) 15.2 mg/l/24 hr; 16.9 mg/l/48 hr; 15.5 mg/l/72 hr; 13.7 mg/l/96 hr; Toxic effect for all concentrations specified: loss of equilibrium. /Flow-through bioassay; Toxicity Threshold (Cell Multiplication Inhibition Test) Scenedesmus quadricauda(green algae) >1000 mg/l /Time not specified, conditions of bioassay not specified; Toxicity Threshold (Cell Multiplication Inhibition Test) Pseudomonas putida (bacteria) 65 mg/l ; LC_{50} Grass shrimp 2 mg/l/96 hr. /Conditions of bioassay not specified

Henry's Law Constant: 1 x10^{-2}

BCF: bluegill 17 to 39

Biochemical Oxygen Demand (BOD): 0%, 20 days

Octanol/Water Partition Coefficient: log K_{ow} = 2.29

Soil Sorption Partition Coefficient: K_{oc} = 2.0

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible. Consult manufacturer for recycling options.
Follow applicable federal, state, and local regulations.
Reclaim solvent at an approved site.
Evaporate or incinerate residue at an approved site.
Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Transportation Data (49 CFR 172.101):

Shipping Name: TRICHLOROETHYLENE **Additional Shipping Information:**
Hazard Class: 6.1(b)
ID No.: 1710
Packing Group: III
Label: Harmful[6]

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U228 Toxic Waste
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4); per RCRA Section 3001; per CWA Section 307(a) 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Research Date: .....1999-11 **Review Date:** 2000-07

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Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Toluene
CAS Number: 108-88-3
Chemical Formula: C_7H_8
Structural Chemical Formula: $C_6H_5CH_3$
EINECS Number: 203-625-9
ACX Number: X1001512-0
Synonyms: ANTISAL 1A; BENZENE,METHYL-; CP 25; METHACIDE; METHANE,PHENYL-; METHYL BENZENE; METHYL BENZOL; METHYLBENZENE; METHYLBENZOL; PHENYL METHANE; PHENYLMETHANE; TOLUEEN; TOLUEN; TOLUENE; TOLUENO; TOLUOL; TOLUOLO; TOLU-SOL
General Use: Used as a solvent for paint, resins, lacquers inks & adhesives. Component of solvent blends and thinners; in gasoline and aviation fuel. Used in the manufacture of chemicals, dyes, explosives, benzoic acid.
Some grades of toluene may contain traces of xylene and benzene.
Odor threshold: 2 ppm approx. Odor is not a reliable warning property due to olfactory fatigue.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
toluene	108-88-3	> 99.5

OSHA PEL
TWA: 200 ppm; Ceiling: 300 ppm; 500 ppm, 10-minute maximum peak.

ACGIH TLV
TWA: 50 ppm; skin.

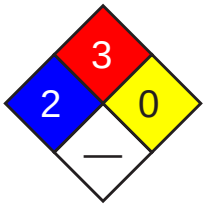
EU OEL
TWA: 192 mg/m^3 (50 ppm); STEL: 384 mg/m^3 (100 ppm).

NIOSH REL
TWA: 100 ppm (375 mg/m^3); STEL: 150 ppm (560 mg/m^3).

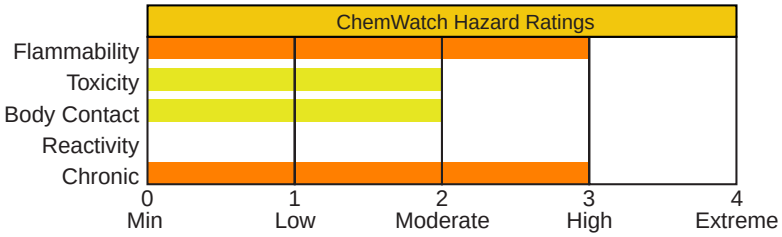
IDLH Level
500 ppm.

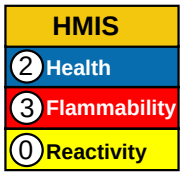
DFG (Germany) MAK
TWA: 50 ppm; PEAK: 200 ppm; skin.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Danger!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; sickly, sweet odor. Irritating to eyes/skin/respiratory tract. Other Acute Effects: weakness, headache, dizziness, confusion, insomnia. Chronic Effects: liver/kidney damage, may cause birth defects. Flammable.

Potential Health Effects

Target Organs: Skin, liver, kidneys, central nervous system.
Primary Entry Routes: Inhalation, skin contact/absorbtion.
Acute Effects
Inhalation: The vapor is highly discomforting to the upper respiratory tract. Inhalation hazard is increased at higher temperatures.

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Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Central nervous system (CNS) depression may include nonspecific discomfort, symptoms of giddiness, headache, dizziness, nausea, anesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness.
Serious poisonings may result in respiratory depression and may be fatal.

Eye: The liquid produces a high level of eye discomfort and is capable of causing pain and severe conjunctivitis.
Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.
The vapor is discomforting to the eyes if exposure is prolonged.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: The liquid may produce skin discomfort following prolonged contact.
Defatting and/or drying of the skin may lead to dermatitis and it is absorbed by skin.
Toxic effects may result from skin absorption.
Open cuts, abraded or irritated skin should not be exposed to this material.
The material may accentuate any pre-existing skin condition.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A4, Not classifiable as a human carcinogen; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Chronic toluene habituation occurs following intentional abuse (glue-sniffing) or from occupational exposure. Ataxia, incoordination and tremors of the hands and feet (as a consequence of diffuse cerebral atrophy), headache, abnormal speech, transient memory loss, convulsions, coma, drowsiness, reduced color perception, frank blindness, nystagmus (rapid, involuntary eye-movements), decreased hearing leading to deafness and mild dementia have all been associated with chronic abuse.
Peripheral nerve damage, encephalopathy, giant axonopathy, electrolyte disturbances in the cerebrospinal fluid and abnormal computer tomographic (CT) scans are common amongst toluene addicts. Although toluene abuse has been linked with kidney disease, this does not commonly appear in cases of occupational toluene exposures. Cardiac and hematological toxicity are however associated with chronic toluene exposure. Cardiac arrhythmia, multifocal and premature ventricular contractions and supraventricular tachycardia are present in 20% of patients who abused toluene-containing paints.
Previous suggestions that chronic toluene inhalation produced human peripheral neuropathy have largely been discounted. However central nervous system (CNS) depression is well documented where blood toluene levels exceed 2.2 mg%. Toluene abusers can achieve transient circulating concentrations of 6.5 mg%. Amongst workers exposed for a median time of 29 years to toluene no subacute effects on neurasthenic complaints and pyschometric test results could be established.
The prenatal toxicity of very high toluene concentrations has been documented for several animal species and man. Malformations indicative of specific teratogenicity have not generally been found. The toxicity described in the literature takes the form of embryo death or delayed fetal growth and delayed skeletal system development. Permanent damage of children has been seen only when mothers had suffered from chronic intoxication as a result of "sniffing".

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

See DOT ERG

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

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Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.
After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Following acute or short-term repeated exposures to toluene:
1. Toluene is absorbed across to alveolar barrier, the blood/air mixture being 11.2/15.6 (at 37 °C) The order of toluene, in expired breath, is of the order of 18 ppm following sustained exposure to 100 ppm.
The tissue/blood proportion is 1/3 except in adipose where the proportion is 8/10.
2.Metabolism by microsomal mono-oxygenation, results in the production of hippuric acid. This may be detected in the urine in amounts between 0.5 and 2.5 g/24hr which represents, on average 0.8 gm/gm of creatinine.
The biological half life of hippuric acid is in the order of 1-2 hours.
3.Primary threat to life from ingestion and/or inhalation is respiratory failure.
4.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
5.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
6.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
7.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
8.Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients.
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

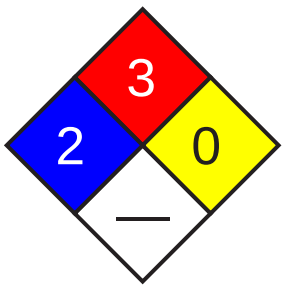
Determinant	Index	Sampling Time	Comments
Hippuric acid in urine	2.5 gm/gm creatinine	End of shift Last 4 hrs of shift	B,NS
Toluene in venous blood	1 mg/L	End of shift	SQ
Toluene in end-exhaled air		End of shift	SQ

NS: Non-specific determinant; also observed after exposure to other material
SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.
B: Background levels occur in specimens collected from subjects NOT exposed.

Section 5 - Fire-Fighting Measures

Flash Point: 4 °C Closed Cup
Autoignition Temperature: 480 °C
LEL: 1.2% v/v
UEL: 7.1% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are highly flammable.
Severe fire hazard when exposed to heat, flame and/or oxidizers.
Vapor forms an explosive mixture with air.
Severe explosion hazard, in the form of vapor, when exposed to flame or spark. Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion/decomposition with violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO) and carbon dioxide (CO_2).

See DOT ERG



Fire Diamond

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Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.
Nitric acid with toluene, produces nitrated compounds which are explosive.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
Fight fire from a safe distance, with adequate cover.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control the fire and cool adjacent area. Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protective location.
If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

See DOT ERG

Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights, heat or ignition sources.
When handling, DO NOT eat, drink or smoke.
Vapor may ignite on pumping or pouring due to static electricity.
DO NOT use plastic buckets. Ground and secure metal containers when dispensing or pouring product. Use spark-free tools when handling.
Avoid contact with incompatible materials.
Keep containers securely sealed. Avoid physical damage to containers.
Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Metal can; Metal drum; Metal safety cans. Packing as supplied by manufacturer.
Plastic containers may only be used if approved for flammable liquid.
Check that containers are clearly labeled and free from leaks.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area; local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
General exhaust is adequate under normal operating conditions.
Local exhaust ventilation may be required in special circumstances.
If risk of overexposure exists, wear NIOSH-approved respirator. Correct fit is essential to ensure adequate protection.
Provide adequate ventilation in warehouses and enclosed storage areas.

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In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields; chemical goggles. Full face shield.
DO NOT wear contact lenses. Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Wear chemical protective gloves, eg. PVC. Wear safety footwear.

Respiratory Protection:

Exposure Range >200 to <500 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range 500 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black

Other: Overalls. Barrier cream. Eyewash unit.

Glove Selection Index:

PE/EVAL/PE ..... Best selection
VITON/CHLOROBUTYL ..... Best selection
VITON ..... Best selection
PVA ..... Best selection
TEFLON ..... Satisfactory; may degrade after 4 hours continuous immersion
SARANEX-23 2-PLY..... Poor to dangerous choice for other than short-term immersion
CPE ..... Poor to dangerous choice for other than short-term immersion
VITON/NEOPRENE ..... Poor to dangerous choice for other than short-term immersion
SARANEX-23 ..... Poor to dangerous choice for other than short-term immersion
NEOPRENE/NATURAL..... Poor to dangerous choice for other than short-term immersion
NITRILE+PVC ..... Poor to dangerous choice for other than short-term immersion
NITRILE ..... Poor to dangerous choice for other than short-term immersion
BUTYL ..... Poor to dangerous choice for other than short-term immersion
PVC..... Poor to dangerous choice for other than short-term immersion
NEOPRENE..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear highly flammable liquid with a strong aromatic odor; floats on water. Mixes with most organic solvents.

Physical State: Liquid
Odor Threshold: 2.14 ppm
Vapor Pressure (kPa): 2.93 at 20 °C
Vapor Density (Air=1): 3.2
Formula Weight: 92.14
Specific Gravity (H_2O=1, at 4 °C): 0.87 at 20 °C
Evaporation Rate: 2.4 (BuAc=1)

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 111 °C (232 °F) at 760 mm Hg
Freezing/Melting Point: -95 °C (-139 °F)
Volatile Component (% Vol): 100
Water Solubility: < 1 mg/mL at 18 °C

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Segregate from strong oxidizers.

Section 11 - Toxicological Information

Toxicity

Oral (human) LD_{Lo}: 50 mg/kg
Oral (rat) LD_{50}: 636 mg/kg
Inhalation (human) TC_{Lo}: 100 ppm
Inhalation (man) TC_{Lo}: 200 ppm
Inhalation (rat) LC_{50}: > 26700 ppm/1h
Dermal (rabbit) LD_{50}: 12124 mg/kg
Reproductive effector in rats

Irritation

Skin (rabbit): 20 mg/24h-moderate
Skin (rabbit): 500 mg - moderate
Eye (rabbit): 0.87 mg - mild
Eye (rabbit): 2 mg/24h - SEVERE
Eye (rabbit): 100 mg/30sec - mild

See *RTECS* XS 5250000, for additional data.

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Section 12 - Ecological Information

Environmental Fate: If released to soil, it will be lost by evaporation from near-surface soil and by leaching to the groundwater. Biodegradation occurs both in soil and groundwater, but it is apt to be slow especially at high concentrations, which may be toxic to microorganisms. The presence of acclimated microbial populations may allow rapid biodegradation. It will not significantly hydrolyze in soil or water under normal environmental conditions. If released into water, its concentration will decrease due to evaporation and biodegradation. This removal can be rapid or take several weeks, depending on temperature, mixing conditions, and acclimation of microorganisms. It will not significantly adsorb to sediment or bioconcentrate in aquatic organisms. If released to the atmosphere, it will degrade by reaction with photochemically produced hydroxyl radicals (half-life 3 hr to slightly over 1 day) or be washed out in rain. It will not be subject to direct photolysis.

Ecotoxicity: LC_{50} Aedes aegypti-4th instar (mosquito larvae) 22 mg/l /Conditions of bioassay not specified; LC_{50} Cyprinodon variegatus (sheepshead minnow) 277-485 mg/l 96 hr /Conditions of bioassay not specified; LC_{50} Calandra granaria (grain weevil) 210 mg/l /in air; LC_{50} Cancer magister (crab larvae stage I) 28 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Crangon franciscorum (shrimp) 4.3 ppm 96 hr /Conditions of bioassay not specified; LC_{50} Artemia salina (brine shrimp) 33 mg/l 24 hr /Conditions of bioassay not specified; LC_{50} Morone saxatilis (striped bass) 7.3 mg/l 96 hr /Conditions of bioassay not specified; LC_{50} Pimephales promelas (fathead minnows) 55-72 mg/l (embryos), 25-36 mg/l (1-day posthatch protolarvae), and 26-31 mg/l (30-day-old minnows)/ 96 hour /Conditions of bioassay not specified

Henry's Law Constant: 0.0067

BCF: eels 13.2

Biochemical Oxygen Demand (BOD): 0%, 5 days

Octanol/Water Partition Coefficient: log K_{ow} = 2.69

Soil Sorption Partition Coefficient: K_{oc} = silty loam 37

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):



Shipping Name and Description: Toluene
ID: UN1294
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U220 Toxic Waste

CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001, per CWA Section 307(a) 1000 lb (453.5 kg)

SARA 40 CFR 372.65: Listed

SARA EHS 40 CFR 355: Not listed

TSCA: Listed

Section 16 - Other Information

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Material Safety Data Sheet Collection
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1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Xylene **CAS Number:** 1330-20-7
Chemical Formula: C_8H_{10}
Structural Chemical Formula: $C_6H_4(CH_3)_2$
EINECS Number: 215-535-7
ACX Number: X1001166-8
Synonyms: BENZENE,DIMETHYL-; COMPONENT 1 (83%): XYLENES; COMPONENT 2 (17%): ETHYL BENZENE; DIMETHYLBENZENE; DIMETHYLBENZENES; EPA PESTICIDE CHEMICAL CODE 086802; KSYLEN; METHYL TOLUENE; METHYLTOLUENE; VIOLET 3; XILOLI; XYLENE; XYLENEN; XYLOL; XYLOLE
General Use: A strong solvent for general use in the manufacture of paints, varnishes, lacquers, thinners, inks, rubber, pesticides, herbicides and paint strippers.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
xylene	1330-20-7	> 95

OSHA PEL
TWA: 100 ppm; 435 mg/m^3.

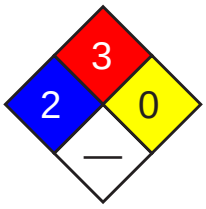
NIOSH REL
TWA: 100 ppm, 435 mg/m^3; STEL: 150 ppm, 655 mg/m^3.

DFG (Germany) MAK
TWA: 100 ppm; PEAK: 200 ppm; skin.

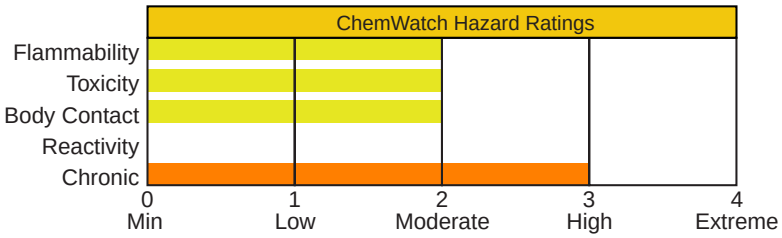
ACGIH TLV
TWA: 100 ppm; STEL: 150 ppm.

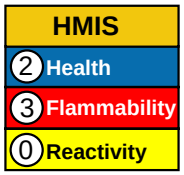
EU OEL
TWA: 50 ppm; STEL: 100 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear, sweet smelling liquid. Irritating to eyes/skin/respiratory tract. Other Acute Effects: dizziness, nausea, drowsiness. Chronic Effects: dermatitis, kidney/liver/peripheral nerve damage. May cause birth defects (animal data). Flammable.

Potential Health Effects

Target Organs: central nervous system (CNS), eyes, gastrointestinal (GI) tract, liver, kidneys, skin
Primary Entry Routes: inhalation, skin absorption (slight), eye contact, ingestion
Acute Effects
Inhalation: Xylene is a central nervous system depressant. The vapor is discomforting to the upper respiratory tract and may be harmful if inhaled.
Inhalation hazard is increased at higher temperatures.
Toxic effects are increased by consumption of alcohol.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.

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If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Headache, fatigue, lassitude, irritability and gastrointestinal disturbances (e.g., nausea, anorexia and flatulence) are the most common symptoms of xylene overexposure. Injury to the heart, liver, kidneys and nervous system has also been noted among workers. Transient memory loss, renal impairment, temporary confusion and some evidence of disturbance of liver function was reported in three workers overcome by gross exposure to xylene (10000 ppm). One worker died and autopsy revealed pulmonary congestion, edema, and focal alveolar hemorrhage.
Volunteers inhaling xylene at 100 ppm for 5 to 6 hours showed changes in manual coordination, reaction time and slight ataxia. Tolerance developed during the workweek but was lost over the weekend. Physical exercise may antagonize this effect. Xylene body burden in humans exposed to 100 or 200 ppm xylene in air depends on the amount of body fat with 4% to 8% of total absorbed xylene accumulating in human adipose tissues.

Eye: The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is highly discomforting to the eyes.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Corneal changes have been reported in furniture polishers exposed to xylene.

Skin: The liquid is highly discomforting to the skin and may cause drying of the skin, which may lead to dermatitis and it is absorbed by the skin.
Toxic effects may result from skin absorption.
Open cuts, abraded or irritated skin should not be exposed to this material.
The material may accentuate any pre-existing skin condition.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.
Small excess risks of spontaneous abortion and congenital malformation was reported amongst women exposed to xylene in the first trimester of pregnancy. In all cases however the women had also been exposed to other substances.
Evaluation of workers chronically exposed to xylene has demonstrated a lack of genotoxicity. Exposure to xylene has been associated with increased risks of hemopoietic malignancies but, again simultaneous exposure to other substances (including benzene) complicate the picture. A long-term gavage study of mixed xylenes (containing 17% ethyl benzene) found no evidence of carcinogenic activity in rats and mice of either sex.
Exposure to the material for prolonged periods may cause physical defects in the developing embryo (teratogenesis).

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If available, administer medical oxygen by trained personnel.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.



Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to xylene:
1.Gastrointestinal absorption is significant with ingestions.

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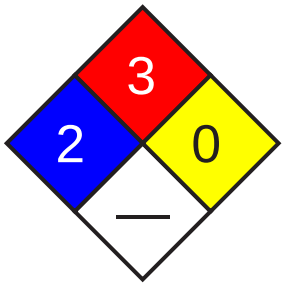
For ingestions exceeding 1-2 mL (xylene)/kg, intubation and lavage with cuffed endotracheal tube is recommended. The use of charcoal and cathartics is equivocal.
2.Pulmonary absorption is rapid with about 60-65% retained at rest.
3.Primary threat to life from ingestion and/or inhalation is respiratory failure.
4.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
5.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
6.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
7.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
BIOLOGICAL EXPOSURE INDEX - BEI
These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Methylhippuric acids in urine	1.5 gm/gm creatinine	End of shift	
	2 mg/min	Last 4 hrs of shift.	

Section 5 - Fire-Fighting Measures

Flash Point: 25.6 °C
Autoignition Temperature: 241 °C
LEL: 1.0% v/v
UEL: 7.0% v/v
Extinguishing Media: Alcohol stable foam; dry chemical powder; carbon dioxide.
Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are flammable.
Moderate fire hazard when exposed to heat or flame.
Vapor forms an explosive mixture with air.
Moderate explosion hazard when exposed to heat or flame.
Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion or decomposition leading to violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).
Other combustion products include carbon dioxide (CO_2).
Fire Incompatibility: Avoid contamination with strong oxidizing agents as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

See DOT ERG



Fire Diamond

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.
Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.

See DOT ERG

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Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of overexposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights or ignition sources.
Avoid generation of static electricity. DO NOT use plastic buckets.
Ground all lines and equipment. Use spark-free tools when handling.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.
Plastic containers may only be used if approved for flammable liquids.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear.
General exhaust is adequate under normal operating conditions.
Local exhaust ventilation may be required in specific circumstances.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.
Personal Protective Clothing/Equipment:
Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.
Hands/Feet: Barrier cream with polyethylene gloves; Butyl rubber gloves or Neoprene gloves or PVC gloves.
Safety footwear.
Do NOT use this product to clean the skin.
Other: Overalls. Impervious protective clothing.
Eyewash unit.
Ensure there is ready access to an emergency shower.
Glove Selection Index:

PE/EVAL/PE	Best selection
PVA	Best selection
VITON	Best selection
TEFLON	Best selection
PVDC/PE/PVDC	Poor to dangerous choice for other than short-term immersion
NATURAL+NEOPRENE	Poor to dangerous choice for other than short-term immersion
NEOPRENE/NATURAL	Poor to dangerous choice for other than short-term immersion
NITRILE+PVC	Poor to dangerous choice for other than short-term immersion
HYPALON	Poor to dangerous choice for other than short-term immersion
NAT+NEOPR+NITRILE	Poor to dangerous choice for other than short-term immersion
BUTYL	Poor to dangerous choice for other than short-term immersion
BUTYL/NEOPRENE	Poor to dangerous choice for other than short-term immersion

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NITRILE..... Poor to dangerous choice for other than short-term immersion
NEOPRENE..... Poor to dangerous choice for other than short-term immersion
PVC..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear colorless flammable liquid with a strong aromatic odor; floats on water. Mixes with most organic solvents.

Physical State: Liquid
Odor Threshold: 5.00 x10^{-5} ppm
Vapor Pressure (kPa): 0.5 at 15 °C
Vapor Density (Air=1): 3.66 at 15 °C
Formula Weight: 106.18
Specific Gravity (H_2O=1, at 4 °C): 0.87 at 15 °C
Evaporation Rate: 0.7 Bu Ac=1

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 137 °C (279 °F) to 140 °C (284 °F)
Freezing/Melting Point: -47 °C (-53 °F)
Volatile Component (% Vol): 100
Water Solubility: Practically insoluble in water

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid storage with oxidizers.

Section 11 - Toxicological Information

Toxicity

Oral (human) LD_{Lo}: 50 mg/kg
Oral (rat) LD_{50}: 4300 mg/kg
Inhalation (human) TC_{Lo}: 200 ppm
Inhalation (man) LC_{Lo}: 10000 ppm/6h
Inhalation (rat) LC_{50}: 5000 ppm/4h
Reproductive effector in rats

Irritation

Skin (rabbit):500 mg/24h moderate
Eye (human): 200 ppm irritant
Eye (rabbit): 87 mg mild
Eye (rabbit): 5 mg/24h SEVERE

See *RTECS* ZE 2100000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Most of the xylenes are released into the atmosphere where they may photochemically degrade by reaction with hydroxyl radicals (half-life 1-18 hr). The dominant removal process in water is volatilization. Xylenes are moderately mobile in soil and may leach into groundwater where they are known to persist for several years, despite some evidence that they biodegrade in both soil and groundwater. Bioconcentration is not expected to be significant.

Ecotoxicity: LC_{50} Rainbow trout 13.5 mg/l/96 hr /Conditions of bioassay not specified; LD_{50} Goldfish 13 mg/l/24 hr /Conditions of bioassay not specified

Henry's Law Constant: 0.22

BCF: estimated at 2.14 to 2.20

Octanol/Water Partition Coefficient: log K_{ow} = 3.12 to 3.20

Soil Sorption Partition Coefficient: K_{OC} = 48 to 68

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

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Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**



Shipping Name and Description: Xylenes
ID: UN1307
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: III - Minor Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: B1, IB3, T2, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 203 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 60 L **Cargo aircraft only:** 220 L
Vessel Stowage: **Location:** A **Other:**



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U239 Ignitable Waste
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001 100 lb (45.35 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Arsenic **CAS Number:** 7440-38-2
Chemical Formula: As
Structural Chemical Formula: As_4
EINECS Number: 231-148-6
ACX Number: X1002785-7
Synonyms: ARSEN; ARSENIA; ARSENIC; ARSENIC-75; ARSENIC BLACK; ARSENICALS; COLLOIDAL ARSENIC; GRAY ARSENIC; GREY ARSENIC; METALLIC ARSENIC
General Use: In metallurgy for hardening copper, lead alloys. In the manufacture of certain types of glass.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
Arsenic		>98

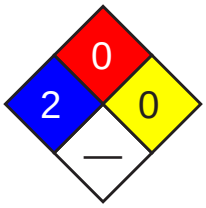
OSHA PEL
TWA: 0.01 mg/m^3.

NIOSH REL
Ceiling: 0.002 mg/m^3 (15-minute).

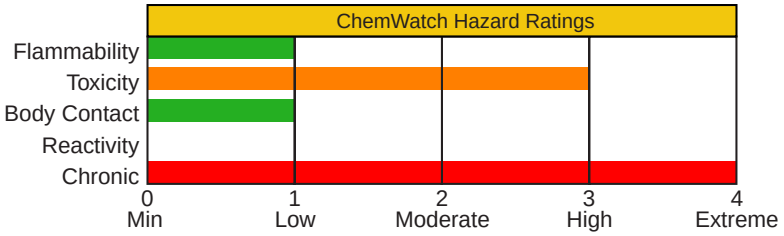
ACGIH TLV
TWA: 0.01 mg/m^3.

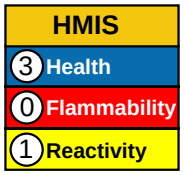
IDLH Level
5 mg/m^3 (as As).

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆
Brittle, crystalline, silvery-black metal. Irritating to eyes/skin/respiratory tract. Chronic Effects: damage to blood-forming organs, nervous/cardiovascular systems effects. Cancer hazard. Powder is flammable.

Potential Health Effects

Target Organs: liver, kidneys, skin, lungs, lymphatic system
Primary Entry Routes: inhalation, ingestion of dust and fumes, skin absorption
Acute Effects

Inhalation: The dust is toxic and discomforting to the upper respiratory tract and lungs.
Acute inhalation exposure can cause cough, chest pain, shortness of breath, dizziness, headache, pulmonary edema and extreme general weakness.
Prolonged or repeated exposure can cause perforation of the nasal septum.
High exposures can cause poor appetite, nausea, vomiting and muscle cramps. Heart effects with abnormal EKG can also occur with very high exposures.

Eye: The dust may produce eye discomfort causing smarting, pain and redness.

Skin: The material is moderately discomforting to the skin and may be harmful.
Exposure may result in abnormal redness (caused by capillary congestion), burning, itching, swelling, skin eruptions and dermatitis.
Toxic effects may result from skin absorption.
Repeated skin contact can cause thickened skin and/or patchy areas of darkening and loss of pigment. Some persons develop white lines on the nails.

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Ingestion: The solid/dust is discomforting to the gastrointestinal tract and is toxic and may be fatal if swallowed. Symptoms of acute poisoning by ingestion, which develop within 4 hours include epigastric pain, vomiting and watery diarrhea. Blood may appear in vomitus and stools. If amount ingested is sufficiently high, shock may develop, followed by death within 24 hours.
Considered an unlikely route of entry in commercial/industrial environments.

Carcinogenicity: NTP - Class 1, Known to be a carcinogen; IARC - Group 1, Carcinogenic to humans; OSHA - Listed as a carcinogen; NIOSH - Listed as carcinogen; ACGIH - Class A1, Confirmed human carcinogen; EPA - Class A, Human carcinogen; MAK - Class A1, Capable of inducing malignant tumors as shown by experience with humans.

Chronic Effects: Symptoms of chronic poisoning by inhalation include weight loss, nausea and diarrhea alternating with constipation, pigmentation and eruption of the skin, loss of hair, peripheral neuritis, blood disorders (anemia), striations on fingernails and toenails.
Long-term exposure can cause an ulcer or hole in the `bone' dividing the inner nose. Hoarseness and sore eyes also occur.
High or repeated exposure can cause nerve damage with `pins and needles', burning, numbness, and later weakness of arms and legs. Repeated exposure can also damage the liver, causing narrowing of the blood vessels, or interfere with the bone marrow's ability to make red blood cells.
Many cases of skin cancer have been reported among people exposed to arsenic through medical treatment with inorganic trivalent arsenic compounds. In some instances skin cancers have occurred in combination with other cancers, such as liver angiosarcoma, intestinal and urinary bladder carcinomas and meningioma. Epidemiological studies of cancer after medical treatment have shown an excess of skin cancers but no clear association with other cancers has been shown. An association between environmental exposure to arsenic through drinking water and skin cancer has been observed and confirmed. Epidemiological studies in areas where drinking water contained 0.35-1.14 mg/l arsenic elevated risks for cancers of the bladder, kidney, skin, liver, lung and colon in both men and women. Occupational exposure to inorganic arsenic, especially in mining and copper smelting, has consistently been associated with an increased risk of cancer. An almost tenfold increase in the incidence of lung cancer was found in workers most heavily exposed to arsenic and relatively clear dose-response relationships have been obtained with regard to cumulative exposure. Other smelter worker populations have been shown to have consistent increases in lung cancer incidence, as well as increases of about 20% in the incidence of gastrointestinal cancer and of 30% for renal cancer and hematolymphatic malignancies.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air. Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

See DOT ERG

Eye Contact: Immediately hold the eyes open and wash continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids. Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Quickly but gently, wipe material off skin with a dry, clean cloth.
Immediately remove all contaminated clothing, including footwear.
Wash affected areas with water (and soap if available) for at least 15 minutes. Transport to hospital or doctor.

Ingestion: Contact a Poison Control Center.
If swallowed, and if more than 15 minutes from a hospital, induce vomiting, preferably using Ipecac Syrup APF.
Note: DO NOT INDUCE VOMITING in an unconscious person

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short term repeated exposures to arsenic, soluble compounds:
Treat as per arsenic poisoning.
1. Acute skin lesions such as contact dermatitis usually do not require other treatment than removal from exposure.
2. If more severe symptoms of the respiratory system, the skin or the gastrointestinal tract occur, British Anti-Lewisite (BAL, dimercaprol) may be given. Prompt administration in such cases is vital; to obtain maximum benefit such treatment should be administered within 4 hours of poisoning.
3. In addition, general treatment such as prevention of further absorption from the gastrointestinal tract are mandatory.
4. General supportive therapy such as maintenance of respiration and circulation, maintenance of water and electrolyte balance and control of nervous system effects, as well as elimination of absorbed poison through dialysis and exchange transfusion, may be used if feasible.
5. Dimercaprol is given by deep intramuscular injection as a 5% solution in peanut oil (or a 10% solution with benzyl-benzoate in vegetable oil). It is usually given in a dose of 3 mg/kg, 4-hourly, for the first two days, or twice daily for up to seven days.
6. BAL Therapy is effective for hematological manifestations of chronic arsenic poisoning but not for neurological symptoms. Watch for side effects (e.g. urticaria, burning sensation in the lips, mouth and throat, fever, conjunctivitis etc).
7. Some relief results from administration of diphenhydramine (Benadryl) (1.5 mg/kg intramuscularly or by mouth every 6 hour).

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BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

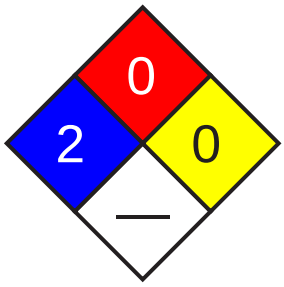
Determinant	Index	Sampling Time	Comments
Inorganic arsenic metabolites in urine	50 ug/g creatinine	End of workweek	B

B: Background levels occur in specimens collected from subjects NOT exposed

Consult specific documentation.

Section 5 - Fire-Fighting Measures

See DOT ERG



Fire Diamond

Flash Point: Noncombustible solid

Extinguishing Media: Use fire fighting procedures suitable for surrounding area.

General Fire Hazards/Hazardous Combustion Products: Solid which exhibits difficult combustion or is difficult to ignite.

Avoid generating dust, particularly clouds of dust in a confined or unventilated space.

Dust may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion.

Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport. Build-up of electrostatic charge may be prevented by bonding and grounding.

Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Decomposes on heating and produces toxic fumes of arsenic oxides (AsO_x).

Fire Incompatibility: Avoid contact with acids, oxidizing agents, halogens.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.

Wear breathing apparatus plus protective gloves for fire only. Prevent, by any means available, spillage from entering drains or waterways.

Use fire fighting procedures suitable for surrounding area.

Do not approach containers suspected to be hot.

Cool fire exposed containers with water spray from a protected location.

If safe to do so, remove containers from path of fire.

Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

See DOT ERG

Small Spills: Clean up all spills immediately. Wear protective clothing, impervious gloves and safety glasses. Increase ventilation.

Use a vacuum or a wet method to reduce dust during clean-up. DO NOT dry sweep.

Place in suitable containers for disposal.

Wash area down with large quantity of water and prevent runoff into drains.

Large Spills: POLLUTANT -contain spillage. Clear area of personnel and move upwind.

Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.

If contamination of drains or waterways occurs, advise emergency services.

Shut off all possible sources of ignition and increase ventilation.

Stop leak if safe to do so.

Contain spill with sand, earth or vermiculite.

Use dry clean up procedures and avoid generating dust.

Collect recoverable product into labeled containers for recycling. Collect residues and seal in labeled drums for disposal.

Wash area down with large quantity of water and prevent runoff into drains.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Use good occupational work practice.

Avoid contact with skin and eyes.

Avoid generating and breathing dust.

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Use in a well-ventilated area.
Wear protective clothing when risk of exposure occurs.
Avoid sources of heat. Avoid contact with incompatible materials. Avoid physical damage to containers.
Keep containers securely sealed when not in use.
When handling, DO NOT eat, drink or smoke.
Wash hands with soap and water after handling.
Work clothes should be laundered separately: NOT at home.

Recommended Storage Methods: Glass container. Plastic drum. Polyethylene or polypropylene container. Steel drum. Metal drum.
Check that containers are clearly labeled.

Storage Requirements: Observe manufacturer's storing and handling recommendations.
Store in a cool, dry place. Store in a well-ventilated area. Store away from sources of heat or ignition/bare lights. Avoid storage at temperatures higher than 60 °C. Store away from incompatible materials. Store away from foodstuff containers.
Protect containers against physical damage.
Keep containers securely sealed.
Check regularly for spills and leaks.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: General exhaust is adequate under normal operating conditions.
Local exhaust ventilation may be required.
Use ventilated helmet or air-line hood to provide clean air at the breathing zone.
If risk of overexposure exists, wear NIOSH approved respirator. Correct fit is essential to obtain adequate protection.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses. Chemical goggles.
Full face shield.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Impervious, gauntlet length gloves; Rubber gloves. Neoprene gloves.
Rubber boots.

Respiratory Protection:
Exposure Range >0.01 to 0.1 mg/m^3: Air Purifying, Negative Pressure, Half Mask
Exposure Range >0.1 to 1 mg/m^3: Air Purifying, Negative Pressure, Full Face
Exposure Range >1 to <5 mg/m^3: Supplied Air, Constant Flow/Pressure Demand, Full Face
Exposure Range 5 to unlimited mg/m^3: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: magenta (P100)

Other: Overalls. PVC apron. PVC protective suit may be required if exposure severe.
Eyewash unit. Ensure there is ready access to a safety shower.
* Preplacement and periodic medical examinations are essential for workers exposed to arsenic. Preplacement physical examinations should give particular attention to allergic and chronic skin lesions, eye disease, psoriasis, chronic eczematous dermatitis, hyperpigmentation of the skin, keratosis and warts, baseline weight, baseline blood and hemoglobin counts, baseline urinary arsenic determinations.
Annual physical examinations should give attention to general health, weight, skin condition, and any evidence of excessive exposure or absorption of arsenic.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Grey, shiny, brittle, metallic-looking rhombohedral crystals. Can be heated to burn in air with a bluish flame, giving off an odor of garlic and dense white fumes of arsenic trioxide. Loses its luster on exposure to air. Converted by nitric acid or hot sulfuric acid into arsenous or arsenic acid.

Brinell hardness: 147
Mohs' scale: 3.5

Physical State: Divided solid
Vapor Pressure (kPa): Not applicable
Vapor Density (Air=1): Not applicable
Formula Weight: 74.92
Specific Gravity (H_2O=1, at 4 °C): 5.73
Evaporation Rate: Not applicable
pH: Not applicable
pH (1% Solution): Not applicable
Boiling Point: Sublimes
Freezing/Melting Point: 817 °C (1502.6 °F) at 28 atm
Volatile Component (% Vol): Not applicable
Water Solubility: Insoluble

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Contact with acids liberates toxic gases. Presence of heat source and ignition source.
Product is considered stable under normal handling conditions. Hazardous polymerization will not occur.

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Storage Incompatibilities: Segregate from oxidizing agents, halogens.
Contact with acids produces toxic fumes.

Section 11 - Toxicological Information

Toxicity
Oral (man) TD_{Lo}: 7857 mg/kg/55 years
Oral (rat) LD_{50}: 763 mg/kg
Tumorigenic - Carcinogenic by RTECS criteria.

Irritation
Nil reported

See *RTECS* CG 0525000, for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.
Ecotoxicity: Food chain concentration potential: Bioaccumulated by fresh water and marine aquatic organisms
BCF: bioaccumulated by aquatic organisms
Biochemical Oxygen Demand (BOD): none

Section 13 - Disposal Considerations

Disposal: Follow all federal, state, and local regulations.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):



Shipping Name and Description: Arsenic
ID: UN1558
Hazard Class: 6.1 - Poisonous materials
Packing Group: II - Medium Danger
Symbols:
Label Codes: 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: IB8, IP2, IP4
Packaging: **Exceptions:** None **Non-bulk:** 212 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 25 kg **Cargo aircraft only:** 100 kg
Vessel Stowage: **Location:** A **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Listed
CERCLA 40 CFR 302.4: Listed per CWA Section 307(a), per CAA Section 112 1 lb (0.454 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Benzene **CAS Number:** 71-43-2
Chemical Formula: C_6H_6
Structural Chemical Formula: C_6H_6
EINECS Number: 200-753-7
ACX Number: X1001488-9
Synonyms: Benzene; BENZENE; (6)ANNULENE; BENZEEN; BENZEN; BENZIN; BENZINE; BENZOL; BENZOL 90; BENZOLE; BENZOLENE; BENZOLO; BICARBURET OF HYDROGEN; CARBON OIL; COAL NAPHTHA; CYCLOHEXATRIENE; EPA PESTICIDE CHEMICAL CODE 008801; FENZEN; MINERAL NAPHTHA; MOTOR BENZOL; NITRATION BENZENE; PHENE; PHENYL HYDRIDE; POLYSTREAM; PYROBENZOL; PYROBENZOLE
General Use: Manufacture of chemicals including styrene, dyes, and many other organic chemicals. Has been used in artificial leather, linoleum, oil cloth, airplane dopes, lacquers; as solvent for waxes, resins, oils etc.
May also be a minor component of gasoline, petrol.
Exposure should be minimized by use in closed systems.
Handling procedures and control measures should be evaluated for exposure before commencement of use in plant operations.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
benzene	71-43-2	99.9

OSHA PEL
TWA: 1 ppm; STEL: 5 ppm.

NIOSH REL
TWA: 0.1 ppm; STEL: 1 ppm.

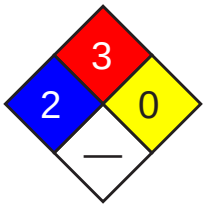
DFG (Germany) MAK
Skin.

ACGIH TLV
TWA: 0.5 ppm; STEL: 2.5 ppm; skin.

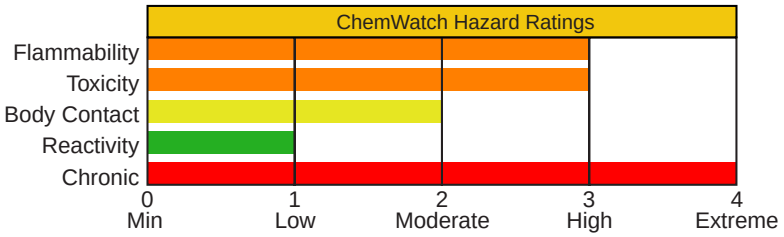
IDLH Level
500 ppm.

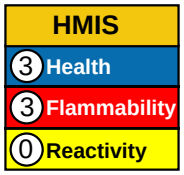
EU OEL
TWA: 1 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Danger!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; sweet odor. Irritating to eyes/skin/respiratory tract. Toxic. Other Acute Effects: headache, dizziness, drowsiness. Absorbed through skin. Chronic Effects: dermatitis, leukemia, bone marrow damage. Carcinogen. Reproductive effects. Flammable.

Potential Health Effects

Target Organs: blood, central nervous system (CNS), bone marrow, eyes, upper respiratory system, skin
Primary Entry Routes: inhalation, skin contact
Acute Effects
Inhalation: The vapor is discomforting to the upper respiratory tract and lungs and may be harmful if inhaled.

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If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
Inhalation hazard is increased at higher temperatures.
The symptoms of acute exposure to high vapor concentrations include confusion, dizziness, tightening of the leg muscles and pressure over the forehead followed by a period of excitement. If exposure continues the casualty quickly becomes stupefied and lapses into a coma with narcosis.
Effects of inhalation may include nausea, vomiting headache, dizziness, drowsiness, weakness, sometimes preceded by brief periods of exhilaration, or euphoria, irritability, malaise, confusion, ataxia, staggering, weak and rapid pulse, chest pain and tightness with breathlessness, pallor, cyanosis of the lips and fingertips and tinnitus. Severe exposures may produce blurred vision, shallow, rapid breathing, delirium, cardiac arrhythmias, unconsciousness, deep anesthesia, paralysis and coma characterized by motor restlessness, tremors and hyperreflexia (occasionally preceded by convulsions). Polyneuritis and persistent nausea, anorexia, muscular weakness, headache, drowsiness, insomnia and agitation may also occur. Two-three weeks after the exposure, nervous irritability, breathlessness and unsteady gait may still persist; cardiac distress and an unusual dicoloration of the skin may be evident for up to four weeks.
Hemotoxicity is not normally a feature of acute exposures although anemia, thrombocytopenia, petechial hemorrhage, and spontaneous internal bleeding have been reported. Fatal exposures may result from asphyxia, central nervous system depression, cardiac and respiratory failure and circulatory collapse; sudden ventricular fibrillation may also be fatal.
Death may be sudden or may be delayed for 24 hours. Central nervous system, respiratory or hemorrhagic complications may occur up to five days after the exposure and may be lethal; pathological findings include respiratory inflammation with edema, and lung hemorrhage, renal congestion, cerebral edema and extensive petechial hemorrhage in the brain, pleurae, pericardium, urinary tract, mucous membrane and skin.
Exposure to toxic levels has also produced chromosome damage.

Eye: The liquid is highly discomforting to the eyes, may be harmful following absorption and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is moderately discomforting to the eyes.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: The liquid may produce skin discomfort following prolonged contact.
Defatting and/or drying of the skin may lead to dermatitis. Open cuts, abraded or irritated skin should not be exposed to this material.
Toxic effects may result from skin absorption.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

Ingestion: The liquid is discomforting to the gastrointestinal tract and may be harmful if swallowed.
Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Class 1, Known to be a carcinogen; IARC - Group 1, Carcinogenic to humans; OSHA - Listed as a carcinogen; NIOSH - Listed as carcinogen; ACGIH - Class A2, Suspected human carcinogen; EPA - Class A, Human carcinogen; MAK - Class A1, Capable of inducing malignant tumors as shown by experience with humans.

Chronic Effects: Liquid is an irritant and may cause burning and blistering of skin on prolonged exposure.
Chronic exposure may cause headache, fatigue, loss of appetite and lassitude with incipient blood effects including anemia and blood changes.
Benzene is a myelotoxicant known to suppress bone-marrow cell proliferation and to induce hematologic disorders in humans and animals.
Signs of benzene-induced aplastic anemia include suppression off leukocytes (leukopenia), red cells (anemia), platelets (thromocytopenia) or all three cell types (pancytopenia). Classic symptoms include weakness, purpura, and hemorrhage. The most significant toxic effect is insidious and often irreversible injury to the blood forming tissue. Leukemia may develop.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

See DOT ERG

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.

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Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to petroleum distillates or related hydrocarbons:

1.Primary threat to life from pure petroleum distillate ingestion and/or inhalation is respiratory failure.

2.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.

3.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.

4.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.

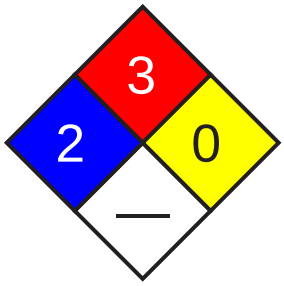
5.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.

6.Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. Consider complete blood count. Evaluate history of exposure.

Section 5 - Fire-Fighting Measures

Flash Point: -11 °C Closed Cup
Autoignition Temperature: 562 °C
LEL: 1.3% v/v
UEL: 7.1% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.

See DOT ERG



Fire Diamond

General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are highly flammable.
Severe fire hazard when exposed to heat, flame and/or oxidizers.
Vapor forms an explosive mixture with air.
Severe explosion hazard, in the form of vapor, when exposed to flame or spark. Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion/decomposition with violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).

Fire Incompatibility: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
Fight fire from a safe distance, with adequate cover.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.
Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

See DOT ERG

Large Spills: Pollutant - contain spillage. Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.

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May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights, heat or ignition sources.
When handling, DO NOT eat, drink or smoke.
Vapor may ignite on pumping or pouring due to static electricity.
DO NOT use plastic buckets. Ground and secure metal containers when dispensing or pouring product. Use spark-free tools when handling.
Avoid contact with incompatible materials.
Keep containers securely sealed. Avoid physical damage to containers.
Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.

Storage Requirements: Store in original containers in approved flame-proof area.
No smoking, bare lights, heat or ignition sources.
DO NOT store in pits, depressions, basements or areas where vapors may be trapped. Keep containers securely sealed.
Store away from incompatible materials in a cool, dry well ventilated area.
Protect containers against physical damage and check regularly for leaks.
Observe manufacturer's storing and handling recommendations.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area. Local exhaust ventilation usually required.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection. NIOSH-approved self contained breathing apparatus (SCBA) may be required in some situations.
Provide adequate ventilation in warehouse or closed storage area.

Personal Protective Clothing/Equipment:

Eyes: Chemical goggles. Full face shield.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Nitrile gloves; Neoprene gloves.
Safety footwear.
Do NOT use this product to clean the skin.

Respiratory Protection:
Exposure Range >1 to 10 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range >10 to 100 ppm: Air Purifying, Negative Pressure, Full Face
Exposure Range >100 to 1000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face
Exposure Range >1000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black
Note: must change cartridge at beginning of each shift

Other: Overalls. Eyewash unit. Barrier cream. Skin cleansing cream.

Glove Selection Index:
PE/EVAL/PE ..... Best selection
PVA ..... Best selection
TEFLON ..... Best selection

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VITON ..... Best selection
VITON/NEOPRENE ..... Best selection
NITRILE+PVC ..... Poor to dangerous choice for other than short-term immersion
BUTYL ..... Poor to dangerous choice for other than short-term immersion
NITRILE ..... Poor to dangerous choice for other than short-term immersion
NEOPRENE ..... Poor to dangerous choice for other than short-term immersion
PVC ..... Poor to dangerous choice for other than short-term immersion
NATURAL RUBBER ..... Poor to dangerous choice for other than short-term immersion
BUTYL/NEOPRENE ..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear, highly flammable liquid; floats on water. Characteristic aromatic odor. Highly volatile. Mixes with alcohol, chloroform, ether, carbon disulfide, carbon tetrachloride, glacial acetic acid, acetone and oils.

Physical State: Liquid
Odor Threshold: 4.68 ppm
Vapor Pressure (kPa): 9.95 at 20 °C
Vapor Density (Air=1): 2.77
Formula Weight: 78.12
Specific Gravity (H_2O=1, at 4 °C): 0.879 at 20 °C
Evaporation Rate: Fast

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 80.1 °C (176 °F)
Freezing/Melting Point: 5.5 °C (41.9 °F)
Volatile Component (% Vol): 100
Water Solubility: 0.18 g/100 g of water at 25 °C

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid reaction with oxidizing agents.

Section 11 - Toxicological Information

Toxicity
Oral (man) LD_{Lo}: 50 mg/kg
Oral (rat) LD_{50}: 930 mg/kg
Inhalation (rat) LC_{50}: 10000 ppm/7h
Inhalation (human) LC_{Lo}: 2000 ppm/5m
Inhalation (man) TC_{Lo}: 150 ppm/1y - I
Inhalation (human) TC_{Lo}: 100 ppm
Reproductive effector in rats

Irritation
Skin (rabbit): 20 mg/24 hr - mod
Eye (rabbit): 2 mg/24 hr - SEVERE

See *RTECS* CY 1400000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil, it will be subject to rapid volatilization near the surface and that which does not evaporate will be highly to very highly mobile in the soil and may leach to groundwater. It may be subject to biodegradation based on reported biodegradation of 24% and 47% of the initial 20 ppm in a base-rich para-brownish soil in 1 and 10 weeks, respectively. It may be subject to biodegradation in shallow, aerobic groundwaters, but probably not under anaerobic conditions. If released to water, it will be subject to rapid volatilization; the half-life for evaporation in a wind-wave tank with a moderate wind speed of 7.09 m/sec was 5.23 hours; the estimated half-life for volatilization from a model river one meter deep flowing 1 m/sec with a wind velocity of 3 m/sec is estimated to be 2.7 hours at 20 °C. It will not be expected to significantly adsorb to sediment, bioconcentrate in aquatic organisms or hydrolyze. It may be subject to biodegradation based on a reported biodegradation half-life of 16 days in an aerobic river die-away test. In a marine ecosystem biodegradation occurred in 2 days after an acclimation period of 2 days and 2 weeks in the summer and spring, respectively, whereas no degradation occurred in winter. According to one experiment, it has a half-life of 17 days due to photodegradation which could contribute to removal in situations of cold water, poor nutrients, or other conditions less conductive to microbial degradation. If released to the atmosphere, it will exist predominantly in the vapor phase. Gas-phase will not be subject to direct photolysis but it will react with photochemically produced hydroxyl radicals with a half-life of 13.4 days calculated using an experimental rate constant for the reaction. The reaction time in polluted atmospheres which contain nitrogen oxides or sulfur dioxide is accelerated with the half-life being reported as 4-6 hours. Products of photooxidation include phenol, nitrophenols, nitrobenzene, formic acid, and peroxyacetyl nitrate. It is fairly soluble in water and is removed from the atmosphere in rain.

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Ecotoxicity: LC_{50} Clawed toad (3-4 wk after hatching) 190 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Morone saxatilis (bass) 5.8 to 10.9 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Poecilia reticulata (guppy) 63 ppm/14 days /Conditions of bioassay not specified; LC_{50} Salmo trutta (brown trout yearlings) 12 mg/l/1 hr (static bioassay); LD_{50} Lepomis macrochirus (bluegill sunfish) 20 mg/l/24 to 48 hr /Conditions of bioassay not specified; LC_{100} Tetrahymena pyriformis (ciliate) 12.8 mmole/l/24 hr /Conditions of bioassay not specified; LC_{50} Cancer magister (crab larvae) stage 1, 108 ppm/96 hr /Conditions of bioassay not specified; LC_{50} Crangon franciscorum (shrimp) 20 ppm/96 hr /Conditions of bioassay not specified

Henry's Law Constant: 5.3×10^{-3}

BCF: eels 3.5

Biochemical Oxygen Demand (BOD): 1.2 lb/lb, 10 days

Octanol/Water Partition Coefficient: log K_{ow} = 2.13

Soil Sorption Partition Coefficient: K_{oc} = woodburn silt loam 31 to 143

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):



Shipping Name and Description: Benzene
ID: UN1114
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:** 40

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Listed U019 Toxic Waste, Ignitable Waste
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per RCRA Section 3001, per CWA Section 307(a), per CAA Section 112 10 lb (4.535 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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Material Safety Data Sheet Collection
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(518) 842-4111

cis-Acetylene Dichloride
DIC4550

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: cis-Acetylene Dichloride **CAS Number:** 156-59-2
Chemical Formula: $C_2H_2Cl_2$
Structural Chemical Formula: CHCl=CHCl
EINECS Number: 205-859-7
ACX Number: X1007815-0
Synonyms: ACETALYNE DICHLORIDE; CIS-ACETYLENE DICHLORIDE; CIS-1,2-DICHLORETHYLENE; CIS-1,2-DICHLOROETHENE; (Z)-1,2-DICHLOROETHYLENE; 1,2-CIS-DICHLOROETHYLENE; CIS-1,2-DICHLOROETHYLENE; CIS-DICHLOROETHYLENE; ETHENE,1,2-DICHLORO-,(Z)-; ETHYLENE,1,2-DICHLORO-,(Z)-
General Use: solvent for waxes, resins, fats, phenol, camphor, acetyl cellulose, organic materials and heat-sensitive substances such as caffeine; in rubber manufacture, as a refrigerant, as an additive to dye and lacquer solutions, in retarding fermentation, in organic synthesis, in medicines, in dye extraction, in chlorination reactions and in the manufacture of artificial pearls; a constituent of perfumes and thermoplastics

Section 2 - Composition / Information on Ingredients

Name	CAS	%
cis-acetylene dichloride	156-59-2	>98

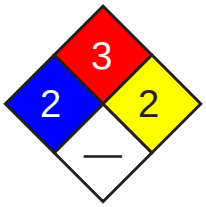
OSHA PEL
TWA: 200 ppm; 790 mg/m^3.

NIOSH REL

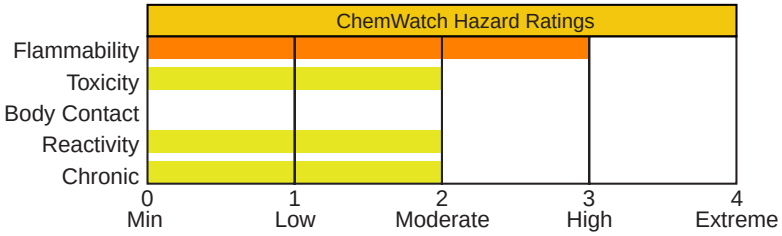
DFG (Germany) MAK
TWA: 200 ppm; PEAK: 400 ppm.

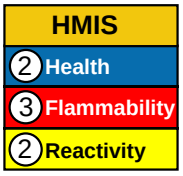
ACGIH TLV
TWA: 200 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; sweetish odor. Irritating to eyes/skin/respiratory tract. Harmful. Other Acute Effects: narcotic effect. Flammable.

Potential Health Effects

Target Organs: eyes, skin, respiratory system, nervous system, liver, kidneys
Primary Entry Routes: inhalation of vapor, skin/eye contact

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Acute Effects

Inhalation: There is a single report of an industrial poisoning, a fatality caused by the inhalation of a vapor in a small enclosure. Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages. Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved. Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction. In severe acute exposures there is always a danger of death from respiratory failure or cardiac arrest due to a tendency to make the heart more susceptible to catecholamines (adrenalin). The most important effects of exposure are narcosis and irritation of the central nervous system. Liver responses may occur after repeated narcotic doses and involves fatty liver degeneration. Vapor exposure may produce central nervous system depression or in milder exposures, nausea, vomiting, weakness, tremor and epigastric cramps. Recovery is usually rapid.

Eye: The vapor when concentrated has pronounced eye irritation effect; this gives some warning of high vapor concentrations. If eye irritation occurs seek to reduce exposure with available control measures, or evacuate area. Exposure to the trans isomer at 2200 ppm caused burning of the eyes, vertigo, nausea. Reversible corneal clouding has been described in exposures to acetylene dichloride.

Skin: The liquid may produce skin discomfort following prolonged contact. Defatting and/ or drying of the skin may lead to dermatitis.

Ingestion: The liquid is discomforting to the gastrointestinal tract and toxic if swallowed. Considered an unlikely route of entry in commercial/industrial environments.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: The material may accumulate in the human body and progressively cause tissue damage.

Section 4 - First Aid Measures

See DOT ERG

Inhalation: • If fumes or combustion products are inhaled, remove to fresh air.
• Lay patient down. Keep warm and rested.
• If breathing is shallow or has stopped, ensure clear airway and apply resuscitation, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
• Transport to hospital or doctor.

Eye Contact: • Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water.
• Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
• Transport to hospital or doctor without delay.
• Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: • Immediately remove all contaminated clothing, including footwear (after rinsing with water).
• Wash affected areas thoroughly with water (and soap if available).
• Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center. Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

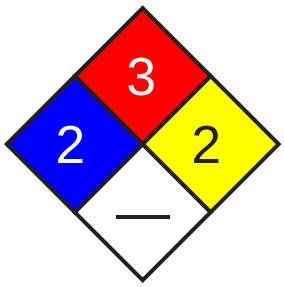
Note to Physicians: Treatment should follow that practiced in carbon tetrachloride exposures:
• Acute exposures to carbon tetrachloride present, initially, with CNS depression followed by hepatic and renal dysfunction.
• Respiratory depression and cardiac dysrhythmias are an immediate threat to life.
• Since a major fraction of absorbed carbon tetrachloride is exhaled in first hour, good tidal volumes should be maintained in severely poisoned patients; hyperventilation may be an additional therapeutic modality.
• Ipecac syrup, lavage, activated charcoal or catharsis may all be used in the first 4 hours.
• Since reactive metabolites may cause hepatorenal toxicity, administration of N-acetyl-L-cysteine may reduce complications. Experience with this therapy is limited.

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Section 5 - Fire-Fighting Measures

Flash Point: 2.2 to 3.9 °C Closed Cup
Autoignition Temperature: 460 °C
LEL: 9.7% v/v
UEL: 12.8% v/v
Extinguishing Media: Foam. Dry chemical powder. BCF (where regulations permit). Carbon dioxide. Water spray or fog - Large fires only.

See DOT ERG



Fire Diamond

General Fire Hazards/Hazardous Combustion Products: • Liquid and vapor are highly flammable.
• Severe fire hazard when exposed to heat, flame and/or oxidizers.
• Vapor forms an explosive mixture with air.
• Severe explosion hazard, in the form of vapor, when exposed to flame or spark.
• Vapor may travel a considerable distance to source of ignition.
• Heating may cause expansion/decomposition with violent rupture of containers.
• On combustion, may emit toxic fumes of carbon monoxide (CO). Other combustion products include hydrogen chloride and phosgene.
Fire Incompatibility: Avoid contamination with oxidizing agents i.e., nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.
Fire-Fighting Instructions: • Contact fire department and tell them location and nature of hazard.
• May be violently or explosively reactive.
• Wear breathing apparatus plus protective gloves.
• Prevent, by any means available, spillage from entering drains or waterways.
• Consider evacuation (or protect in place).
• Fight fire from a safe distance, with adequate cover.
• If safe, switch off electrical equipment until vapor fire hazard removed.
• Use water delivered as a fine spray to control the fire and cool adjacent area.
• Avoid spraying water onto liquid pools.
• Do not approach containers suspected to be hot.
• Cool fire-exposed containers with water spray from a protected location.
• If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures

See DOT ERG

Small Spills: • Remove all ignition sources.
• Clean up all spills immediately.
• Avoid breathing vapors and contact with skin and eyes.
• Control personal contact by using protective equipment.
• Contain and absorb small quantities with vermiculite or other absorbent material.
• Wipe up.
• Collect residues in a flammable waste container.
Large Spills: • Clear area of personnel and move upwind.
• Contact fire department and tell them location and nature of hazard.
• May be violently or explosively reactive.
• Wear breathing apparatus plus protective gloves.
• Prevent, by any means available, spillage from entering drains or waterways.
• No smoking, bare lights or ignition sources.
• Increase ventilation.
• Stop leak if safe to do so.
• Water spray or fog may be used to disperse/absorb vapor.
• Contain spill with sand, earth or vermiculite.
• Use only spark-free shovels and explosion proof equipment.
• Collect recoverable product into labeled containers for recycling.
• Absorb remaining product with sand, earth or vermiculite.
• Collect solid residues and seal in labeled drums for disposal.
• Wash area and prevent runoff into drains.
• If contamination of drains or waterways occurs, advise emergency services.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: • Avoid all personal contact, including inhalation.
• Wear protective clothing when risk of exposure occurs.
• Use in a well-ventilated area.
• Prevent concentration in hollows and sumps.

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• DO NOT enter confined spaces until atmosphere has been checked.
• Avoid smoking, bare lights or ignition sources.
• Avoid contact with incompatible materials.
• When handling, DO NOT eat, drink or smoke.
• Keep containers securely sealed when not in use.
• Avoid physical damage to containers.
• Always wash hands with soap and water after handling.
• Work clothes should be laundered separately.
• Follow good occupational work practices.
• Observe manufacturer's storage and handling recommendations.
• Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Check that containers are clearly labeled. Packaging as recommended by manufacturer. DO NOT use aluminum or galvanized containers.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Local exhaust ventilation usually required. If risk of overexposure exists, wear NIOSH-approved respirator. Provide adequate ventilation in warehouse or closed storage area.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields or, as required, chemical goggles. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Butyl rubber gloves. Neoprene gloves.

Respiratory Protection: Respirator protection may be required. Consult your supervisor.

Other: • Overalls.
• Barrier cream.
• Eyewash unit.

Glove Selection Index:

VITON ..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless liquid with pleasant chloroform-like odor.

Physical State: colorless liquid
Odor Threshold: 0.085 ppm
Vapor Pressure (kPa): 200 mm Hg at 25 °C
Vapor Density (Air=1): 3.34
Formula Weight: 96.94
Specific Gravity (H_2O=1, at 4 °C): 1.2837 at 20 °C/4 °C
Boiling Point: 60.3 °C (141 °F) at 760 mm Hg
Freezing/Melting Point: -80.5 °C (-112.9 °F)
Water Solubility: 1 to 5 mg/mL at 16 °C

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.

Storage Incompatibilities: Avoid reaction with oxidizing agents. Acetylene dichloride in contact with solid caustic alkalies or their concentrated solutions will form chloracetylene which ignites in air. Haloalkenes are highly reactive.

Section 11 - Toxicological Information

Toxicity

Inhalation (mouse) LC_{Lo}: 65000 mg/m^3/2 hr

Rat liver cell mutagen in vitro

Irritation

Nil reported

See *RTECS* KV9420000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released on soil, it should evaporate and/or leach into the groundwater where very slow biodegradation should occur. If released into water, it will be lost mainly through volatilization (half life 3 hr in a model river). Biodegradation, adsorption to sediment, and bioconcentration in aquatic organisms should not be significant. In the atmosphere it will be lost by reaction with photochemically produced hydroxyl radicals (half life 8 days) and scavenged by rain. Because it is relatively long lived in the atmosphere, considerable dispersal from source areas should occur.

Ecotoxicity: LC_{50} Lepomis machrochirus (bluegill) 135,000 ug/l/96 hr in a static unmeasured bioassay

Henry's Law Constant: estimated at 0.00337

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BCF: calculated at 15
Octanol/Water Partition Coefficient: log K_{ow} = 1.86
Soil Sorption Partition Coefficient: K_{oc} = 49

Section 13 - Disposal Considerations

Disposal: • Consult manufacturer for recycling options and recycle where possible.
• Follow applicable local, state, and federal regulations.
• Incinerate residue at an approved site.
• Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):



Shipping Name and Description: 1,2-Dichloroethylene
ID: UN1150
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T7, TP2
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Not listed
SARA 40 CFR 372.65: Not listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Ethylbenzene **CAS Number:** 100-41-4
Chemical Formula: C_8H_{10}
Structural Chemical Formula: $C_6H_5 \bullet C_2H_5$
EINECS Number: 202-849-4
ACX Number: X1003016-1
Synonyms: AETHYLBENZOL; BENZENE,ETHYL-; EB; ETHYL BENZENE; ETHYLBENZEEN; ETHYLBENZENE; ETHYLBENZOL; ETILBENZENE; ETYLOBENZEN; PHENYLETHANE
General Use: Used in the manufacture of cellulose acetate, styrene and synthetic rubber; solvent or diluent; component of automotive and aviation gasoline.
Component of many petroleum hydrocarbon solvents, thinners.
The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
ethylbenzene	100-41-4	>95

OSHA PEL
TWA: 100 ppm; 435 mg/m^3.

ACGIH TLV
TWA: 100 ppm; STEL: 125 ppm.

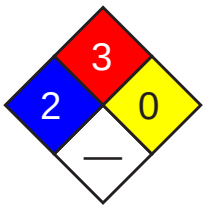
EU OEL
TWA: 100 ppm; STEL: 200 ppm.

NIOSH REL
TWA: 100 ppm (435 mg/m^3); STEL: 125 ppm (545 mg/m^3).

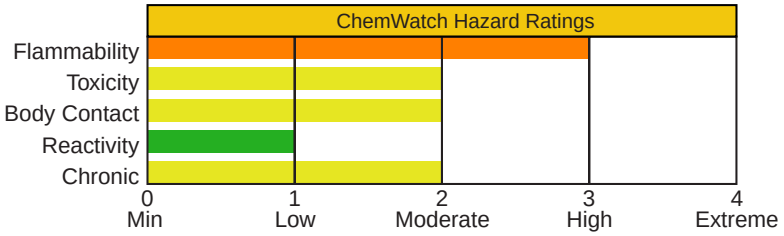
IDLH Level
800 ppm (10% LEL).

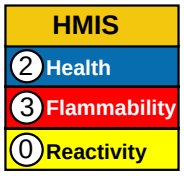
DFG (Germany) MAK
Skin.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; pungent odor. Irritating to eyes/skin/respiratory tract. Other Acute Effects: chest constriction, vertigo, narcosis, cramps, respiratory paralysis. Chronic Effects: fatigue, sleepiness, headache, blood disorders, lymphocytosis. Flammable.

Potential Health Effects

Target Organs: eyes, respiratory system, skin, central nervous system (CNS), blood
Primary Entry Routes: inhalation, skin contact, eye contact
Acute Effects
Inhalation: The vapor is discomforting to the upper respiratory tract.
Inhalation hazard is increased at higher temperatures.
Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.

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If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death.
Inhalation of vapor may aggravate a pre-existing respiratory condition such as asthma, bronchitis, emphysema.
When humans were exposed to the 100 and 200 ppm for 8 hours about 45-65% is retained in the body. Only traces of unchanged ethyl benzene are excreted in expired air following termination of inhalation exposure.
Humans exposed to concentrations of 23-85 ppm excreted most of the retained dose in the urine (mainly as metabolites).
Guinea pigs that died from exposure had intense congestion of the lungs and generalized visceral hyperemia. Rats exposed for three days at 8700 mg/m^3 (2000 ppm) showed changes in the levels of dopamine and noradrenaline in various parts of the brain.

Eye: The liquid is highly discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/or other transient eye damage/ulceration.
The vapor is discomforting to the eyes.
The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Two drops of the material in to the conjunctival sac produced only slight irritation of the conjunctival membrane but no corneal injury.

Skin: The liquid is discomforting to the skin if exposure is prolonged and is capable of causing skin reactions which may lead to dermatitis.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.
The mean rate of absorption of liquid ethyl benzene applied to 17.3 cm2 area of the forearm of seven volunteers for 10-15 minutes was determined to be 38 mg/cm2/hr. Immersion of the whole hand in aqueous solutions of ethyl benzene (112-156 mg/l) for 1 hour yielded mean absorption rates of 118 and 215.7 ug/cm2/hr. The rate of absorption is thus greater than that of aniline, benzene, nitrobenzene, carbon disulfide and styrene.
Repeated application of the undiluted product to the abdominal area of rabbits (10-20 applications over 2-4 weeks) resulted in erythema, edema and superficial necrosis. The material did not appear to be absorbed through the skin in sufficient quantity to produce outward signs of toxicity.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid may produce considerable gastrointestinal discomfort and may be harmful or toxic if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Class D, Not classifiable as to human carcinogenicity; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following.
Industrial workers exposed to a maximum level of ethyl benzene of 0.06 mg/l (14 ppm) reported headaches and irritability and tired quickly. Functional nervous system disturbances were found in some workers employed for over 7 years whilst other workers had enlarged livers.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

See DOT ERG

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water).
Wash affected areas thoroughly with water (and soap if available).
Seek medical attention in event of irritation.

Ingestion: Rinse mouth out with plenty of water. DO NOT induce vomiting.
Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
Give water (or milk) to rinse out mouth. Then provide liquid slowly and as much as casualty can comfortably drink.
Transport to hospital or doctor without delay.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to petroleum distillates or related hydrocarbons:

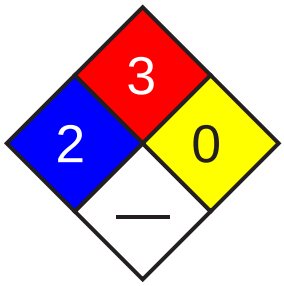
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1. Primary threat to life from pure petroleum distillate ingestion and/or inhalation is respiratory failure.
2.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
3.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance
4.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
5.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
6.Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients.

Section 5 - Fire-Fighting Measures

Flash Point: 12.8 °C Closed Cup
Autoignition Temperature: 432 °C
LEL: 1.6% v/v
UEL: 7% v/v
Extinguishing Media: Foam, dry chemical powder, BCF (where regulations permit), carbon dioxide.
Water spray or fog - Large fires only.
General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are flammable.
Moderate fire hazard when exposed to heat or flame.
Vapor forms an explosive mixture with air.
Moderate explosion hazard when exposed to heat or flame.
Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion or decomposition leading to violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).
May emit clouds of acrid smoke.

See DOT ERG



Fire Diamond

Fire Incompatibility: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

See DOT ERG

Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.

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Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist. Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights, heat or ignition sources.
When handling, DO NOT eat, drink or smoke.
Vapor may ignite on pumping or pouring due to static electricity.
DO NOT use plastic buckets. Ground and secure metal containers when dispensing or pouring product. Use spark-free tools when handling.
Avoid contact with incompatible materials.
Keep containers securely sealed. Avoid physical damage to containers.
Always wash hands with soap and water after handling.
Work clothes should be laundered separately.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
Recommended Storage Methods: Metal can; metal drum. Packing as recommended by manufacturer.
Check all containers are clearly labeled and free from leaks.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear. Use in a well-ventilated area.
General exhaust is adequate under normal operating conditions.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
Personal Protective Clothing/Equipment:
Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.
Hands/Feet: Barrier cream with polyethylene gloves or Nitrile gloves.
Protective footwear.
Respiratory Protection:
Exposure Range >100 to <800 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range 800 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black
Other: Overalls. Eyewash unit.
Glove Selection Index:
VITON ..... Best selection
TEFLON ..... Best selection

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear highly flammable liquid; floats on water. Aromatic solvent odor. Soluble in alcohol, benzene, carbon tetrachloride and ether.

Physical State: Liquid
Odor Threshold: 8.7 to 870.0 mg/m^3
Vapor Pressure (kPa): 1.333 at 25.9 °C
Vapor Density (Air=1): 3.66
Formula Weight: 106.17
Specific Gravity (H_2O=1, at 4 °C): 0.8670 at 20 °C
Evaporation Rate: Fast

pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 136.2 °C (277 °F) at 760 mm Hg
Freezing/Melting Point: -95 °C (-139 °F)
Volatile Component (% Vol): 100
Water Solubility: 0.01% by weight

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid storage with oxidizers.

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Section 11 - Toxicological Information

Toxicity

Oral (rat) LD_{50}: 3500 mg/kg
Inhalation (human) TC_{Lo}: 100 ppm/8h
Inhalation (rat) LC_{Lo}: 4000 ppm/4h
Intraperitoneal (mouse) LD_{50}: 2642 mg/kg~
Dermal (rabbit) LD_{50}: 17800 mg/kg~
Liver changes, utheral tract, effects on fertility, specific developmental abnormalities (musculoskeletal system) recorded.
NOTE: Substance has been shown to be mutagenic in various assays, or belongs to a family of chemicals producing damage or change to cellular DNA.

Irritation

Skin (rabbit): 15 mg/24h mild
Eye (rabbit): 500 mg - SEVERE

See *RTECS* DA 0700000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to the atmosphere, it exist predominantly in the vapor phase based on its vapor pressure where it will photochemically degrade by reaction with hydroxyl radicals (half-life 0.5 to 2 days) and partially return to earth in rain. It will not be subject to direct photolysis. Releases into water will decrease in concentration by evaporation and biodegradation. The time for this decrease and the primary loss processes will depend on the season, and the turbulence and microbial populations in the particular body of water. Representative half-lives are several days to 2 weeks. Some may be adsorbed by sediment but significant bioconcentration in fish is not expected to occur based upon its octanol/water partition coefficient. It is only adsorbed moderately by soil. It will not significantly hydrolyze in water or soil.

Ecotoxicity: LC_{50} Cyprinodon variegatus (sheepshead minnow) 275 mg/l 96 hr in a static unmeasured bioassay; LC_{50} Pimephales promelas (fathead minnow) 12.1 mg/l/96 hr (confidence limit 11.5 - 12.7 mg/l), flow-through bioassay with measured concentrations, 26.1 °C, dissolved oxygen 7.0 mg/l, hardness 45.6 mg/l calcium carbonate, alkalinity 43.0 mg/l; Toxicity threshold (cell multiplication inhibition test): Pseudomonas putida (bacteria) 12 mg/l ; LC_{50} Palaemonetes pugio (grass shrimp, adult) 14,400 ug/l/24 hr in a static unmeasured bioassay; LC_{50} Palaemonetes pugio (grass shrimp, larva) 10,200 ug/l/24 hr in a static unmeasured bioassay; Toxicity threshold (cell multiplication inhibition test): Microcystis aeruginosa (algae) 33 mg/l; Scenedesmus quadricauda (green algae) > 160 mg/l

Henry's Law Constant: 8.44×10^{-3}

BCF: goldfish 1.9

Biochemical Oxygen Demand (BOD): theoretical 2.8%, 5 days

Octanol/Water Partition Coefficient: log $K_{ow} = 3.15$

Soil Sorption Partition Coefficient: $K_{oc} = 164$

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible.
Follow applicable federal, state, and local regulations.
Incinerate residue at an approved site.
Recycle containers where possible, or dispose of in an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):



Shipping Name and Description: Ethylbenzene
ID: UN1175
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

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Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4), per CWA Section 307(a) 1000 lb (453.5 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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Issue Date: 2006-06

Unleaded Petrol
AUT5000

Section 1 - Chemical Product and Company Identification 61

Material Name: Unleaded Petrol **CAS Number:** 8006-61-9
Chemical Formula: Mixture of hydrocarbons
EINECS Number: 232-349-1
ACX Number: X1003056-5
Synonyms: AUTOMOTIVE GASOLINE, LEAD-FREE; GASOLINE; MOTOR FUEL; MOTOR SPIRITS; NATURAL GASOLINE; PETROL; UNLEADED PETROL
General Use: Lead free motor fuel for internal combustion engines, 2-stroke and 4-stroke.

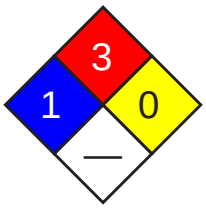
Section 2 - Composition / Information on Ingredients

Name	CAS	%
gasoline	8006-61-9	>90
benzene	71-43-2	5 max.

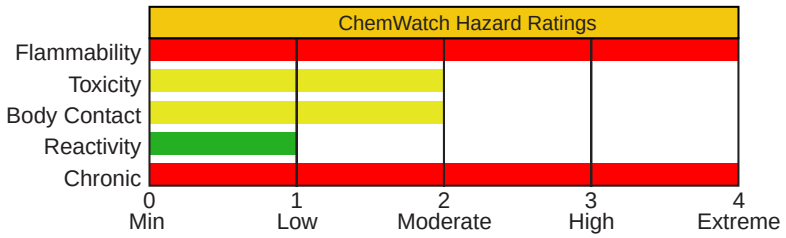
OSHA PEL **NIOSH REL**

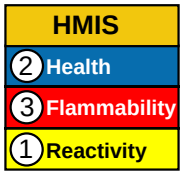
ACGIH TLV
TWA: 300 ppm, 890 mg/m^3;
STEL: 500 ppm, 1480 mg/m^3.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Danger!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear liquid; distinctive odor. Irritating to eyes/skin/respiratory tract. Other Acute Effects: dizziness, drunkenness, unconsciousness. Chronic Effects: dermatitis. Possible cancer hazard. Flammable.

Potential Health Effects

Target Organs: skin, eye, respiratory system, central nervous system (CNS)
Primary Entry Routes: inhalation, ingestion, skin contact

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Acute Effects

Inhalation: The vapor is discomforting to the upper respiratory tract and may be harmful if exposure is prolonged. Inhalation hazard is increased at higher temperatures. Acute effects from inhalation of high concentrations of vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination. If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death. WARNING: Intentional misuse by concentrating/inhaling contents may be lethal. High inhaled concentrations of mixed hydrocarbons may produce narcosis characterized by nausea, vomiting and lightheadedness. Inhalation of aerosols may produce severe pulmonary edema, pneumonitis and pulmonary hemorrhage. Inhalation of petroleum hydrocarbons consisting substantially of low molecular weight species may produce irritation of mucous membranes, incoordination, giddiness, nausea, vertigo, confusion, headache, appetite loss, drowziness, tremors and anesthetic stupor. Massive exposures may produce central nervous system depression with sudden collapse and deep coma; fatalities have been recorded. Irritation of the brain and/or apneic anoxia may produce convulsions. Although recovery following overexposure is generally complete, cerebral micro- hemorrhage of focal post-inflammatory scarring may produce eleptiform seizures some months after the exposure. Pulmonary episodes may include chemical pneumonitis with edema and hemorrhage. The lighter hydrocarbons may produce kidney and neurotoxic effects. Liquid paraffins may produce anesthesia and depressant actions leading to weakness, dizziness, slow and shallow respiration, unconsciousness, convulsions and death. C_{5-7} paraffins may also produce polyneuropathy. Aromatic hydrocarbons accumulate in lipid-rich tissues (typically the brain, spinal cord and peripheral nerves) and may produce functional impairment manifested by nonspecific symptoms such as nausea, weakness, fatigue, vertigo; severe exposures may produce inebriation or unconsciousness. Many of the petroleum hydrocarbons are cardiac sensitizers and may cause ventricular fibrillations.

Eye: The liquid may produce eye discomfort and is capable of causing temporary impairment of vision and/or transient eye inflammation, ulceration. The vapor is discomforting to the eyes. Petroleum hydrocarbons may produce pain after direct contact with the eyes. Slight, but transient, disturbances of the corneal epithelium may also result. The aromatic fraction may produce irritation and lachrymation. The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

Skin: The material is moderately discomforting to the skin if exposure is prolonged. The material contains a component that may be absorbed through the skin and may cause drying of the skin, which may lead to dermatitis from repeated exposures over long periods. Toxic effects may result from skin absorption. Open cuts, abraded or irritated skin should not be exposed to this material. The material may accentuate any pre-existing dermatitis condition.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments. The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis. Ingestion of petroleum hydrocarbons may produce irritation of the pharynx, esophagus, stomach and small intestine with edema and mucosal ulceration. Resulting symptoms include a burning sensation in the mouth and throat. Large amounts may produce narcosis with nausea and vomiting, weakness or dizziness, slow and shallow respiration, swelling of the abdomen, unconsciousness and convulsions. Myocardial injury may produce arrhythmias, ventricular fibrillation and electrocardiographic changes. Central nervous system depression may also occur. Light aromatic hydrocarbons produce a warm, sharp, tingling sensation on contact with taste buds and may anesthetize the tongue. Aspiration into the lungs may produce coughing, gagging, and a chemical pneumonitis with pulmonary edema and hemorrhage.

Carcinogenicity: NTP - Not listed; IARC - Group 2B, Possibly carcinogenic to humans; OSHA - Not listed; NIOSH - Listed as carcinogen; ACGIH - Class A3, Animal carcinogen; EPA - Not listed; MAK - Not listed.

Chronic Effects: Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes. Prolonged or continuous skin contact with the liquid may cause defatting with drying, cracking, irritation and dermatitis following. Chronic poisoning may occur from vapor inhalation or skin absorption. The most significant toxic effect is insidious and irreversible injury to the blood-forming tissue by benzene. Leukemia may develop. Chronic exposure may cause headache, fatigue, loss of appetite and lassitude with incipient blood effects including anemia and blood changes. Gasoline "sniffing" has caused severe nerve damage. Repeated or prolonged exposure to mixed hydrocarbons may produce narcosis with dizziness, weakness, irritability, concentration and/or memory loss, tremor in the fingers and tongue, vertigo, olfactory disorders, constriction of visual field, paresthesias of the extremities, weight loss and anemia and degenerative changes in the liver and kidney. Chronic exposure by petroleum workers to the lighter hydrocarbons has been associated with visual disturbances, damage to the central nervous system, peripheral neuropathies (including numbness and paresthesias), psychological and neurophysiological deficits, bone marrow toxicities (including hypoplasia, possibly due to benzene) and hepatic and renal involvement. Chronic dermal exposure to petroleum hydrocarbons may result in defatting which produces localized dermatoses. Surface cracking and erosion may also increase susceptibility to infection by microorganisms.

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Section 4 - First Aid Measures

Inhalation: Remove to fresh air. Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital, or doctor.

See DOT ERG

Eye Contact: Immediately hold the eyes open and wash continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids. Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately remove all contaminated clothing, including footwear (after rinsing with water). Wash affected areas thoroughly with water (and soap if available). Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center. If swallowed, do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

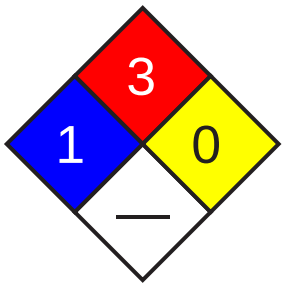
1. Primary threat to life from pure petroleum distillate ingestion and/or inhalation is respiratory failure.
2. Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
3. Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
4. A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
5. Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
6. Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients.

Section 5 - Fire-Fighting Measures

Flash Point: -43 °C
Autoignition Temperature: 280 °C
LEL: 1.4% v/v
UEL: 7.6% v/v

See DOT ERG

Extinguishing Media: Foam. Dry chemical powder.
Bromochlorodifluoromethane (BCF) (where regulations permit). Carbon dioxide.



Fire Diamond

General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are highly flammable. Severe fire hazard when exposed to heat, flame and/or oxidizers. Vapor forms an explosive mixture with air. Severe explosion hazard, in the form of vapor, when exposed to flame or spark. Vapor may travel a considerable distance to source of ignition. Heating may cause expansion/decomposition with violent rupture of containers. On combustion, may emit toxic fumes of carbon monoxide (CO).

Fire Incompatibility: Avoid contamination with oxidizing agents, i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc., as ignition may result.

Fire-Fighting Instructions: Alert fire department and tell them location and nature of hazard. May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or water ways. If safe, switch off electrical equipment until vapour fire hazard removed. Use water delivered as a fine spray to control fire and cool adjacent area. Avoid spraying water onto liquid pools. Do not approach containers suspected to be hot. Cool fire exposed containers with water spray from a protected location. If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures

Small Spills: Remove all ignition sources. Clean up all spills immediately. Avoid breathing vapors and contact with skin and eyes. Control personal contact by using protective equipment. Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.

See DOT ERG

Large Spills: Clear area of personnel and move upwind. Alert fire department and tell them location and nature of hazard. May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or water ways. No smoking, naked lights or ignition sources. Increase ventilation. Stop leak if safe to do so.
Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite. Use only

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spark-free shovels and explosion proof equipment. Collect recoverable product into labeled containers for recycling. Absorb remaining product with sand, earth or vermiculite. Collect solid residues and seal in labelled drums for disposal. Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist. Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps. DO NOT enter confined spaces until atmosphere has been checked. Avoid smoking, bare lights, heat or ignition sources. When handling, DO NOT eat, drink or smoke. Vapor may ignite on pumping or pouring due to static electricity. DO NOT use plastic buckets. Ground and secure metal containers when dispensing or pouring product. Use spark-free tools when handling. Avoid contact with incompatible materials. Keep containers securely sealed. Avoid physical damage to containers. Always wash hands with soap and water after handling. Work clothes should be laundered separately. Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

Recommended Storage Methods: Metal can, metal drum. Packing as recommended by manufacturer. Check all containers are clearly labeled and free from leaks.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: CARE: Use of a quantity of this material in confined space or poorly ventilated area, where rapid build-up of concentrated atmosphere may occur, could require increased ventilation and/or protective gear. Use in a well-ventilated area. If inhalation risk of overexposure exists, wear a NIOSH approved organic-vapor respirator. Correct respirator fit is essential to obtain adequate protection. In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus. Provide adequate ventilation in warehouse or closed storage areas.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Barrier cream with polyethylene gloves or PVC gloves. Safety footwear. Do NOT use this product to clean the skin.

Respiratory Protection:

Exposure Range >300 to 1000 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range >1000 to 15,000 ppm: Air Purifying, Negative Pressure, Full Face
Exposure Range >15,000 to 300,000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face
Exposure Range >300,000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: black

Other: Overalls. Ensure that there is ready access to eye wash unit. Ensure there is ready access to an emergency shower.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Purple, highly flammable, volatile liquid with characteristic sharp odor. Floats on water. Consists of a complex mixture of hydrocarbons with small amounts of residual benzene from the refining operations.

Physical State: Liquid
Odor Threshold: 0.005 ppm
Vapor Pressure (kPa): 53.33 at 20 °C
Vapor Density (Air=1): > 2
Formula Weight: Not applicable.
Specific Gravity (H_2O=1, at 4 °C): 0.72-0.735 at 15 °C
Evaporation Rate: Fast
pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: 38.89 °C (102 °F)
Freezing/Melting Point: Not available
Volatile Component (% Vol): 100
Decomposition Temperature (°C): Not available.
Water Solubility: Insoluble

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Presence of incompatible materials. Product is considered stable. Hazardous polymerization will not occur.

Storage Incompatibilities: Avoid storage with oxidizers.

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Section 11 - Toxicological Information

Toxicity
Oral (rat) LD_{50}: 18800 mg/kg

Irritation
Skin (rabbit): 500 mg/24h mild

Section 12 - Ecological Information

Environmental Fate: No data found.
Ecotoxicity: No data found.
Biochemical Oxygen Demand (BOD): 8%, 5 days

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible. Follow all applicable federal, state, and local laws. Incinerate residue at an approved site. Recycle containers where possible, or dispose of in an authorized landfil.
BEWARE: Empty solvent, paint, lacquer and flammable liquid drums present a severe explosion hazard if cut by flame torch or welded. Even when thoroughly cleaned or reconditioned, the drum seams may retain sufficient solvent to generate an explosive atmosphere in the drum.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):



Shipping Name and Description: Gasoline
ID: UN1203
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: 139, B33, B101, T8
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** E **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Not listed
SARA 40 CFR 372.65: Not listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

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Material Safety Data Sheet Collection
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Issue Date: 2006-06

Hydrochloric Acid
HYD2200

Section 1 - Chemical Product and Company Identification 61

Material Name: Hydrochloric Acid **CAS Number:** 7647-01-0
Chemical Formula: ClH
Structural Chemical Formula: HCl
EINECS Number: 231-595-7
ACX Number: X1002202-3
Synonyms: 4-D BOWL SANITIZER; ACIDE CHLORHYDRIQUE; ACIDO CLORHIDRICO; ACIDO CLORIDRICO; ANHYDROUS HYDROCHLORIC ACID; ANHYDROUS HYDROGEN CHLORIDE; AQUEOUS HYDROGEN CHLORIDE; BOWL CLEANER; CHLOORWATERSTOF; CHLOROHYDRIC ACID; CHLOROWODOR; CHLORURE D'HYDROGENE; CHLORURE D'HYDROGENE ANHYDRE; CHLORURO DE HIDROGENO; CHLORWASSERSTOFF; CLORURO DE HIDROGENO ANHIDRO; EMULSION BOWL CLEANER; EPA PESTICIDE CHEMICAL CODE 045901; HYDROCHLORIC ACID; HYDROCHLORIC ACID GAS; HYDROCHLORIDE; HYDROGEN CHLORIDE; HYDROGEN CHLORIDE (HCL); HYGEIA CREME MAGIC BOWL CLEANER; MURIATIC ACID; MURIATIC ACID); NOW SOUTH SAFTI-SOL BRAND CONCENTRATED BOWL CLEANSE WITHMAGIC ACTIO; PERCLEEN BOWL AND URINAL CLEANER; SPIRITS OF SALT; VARLEY'S OCEAN BLUE SCENTED TOILET BOWL CLEANER; VARLEY POLY-PAK BOWL CREME; WHITE EMULSION BOWL CLEANER; WUEST BOWL CLEANER SUPER CONCENTRATED
General Use: Hydrogen chloride is used to produce pharmaceutical hydrochlorides; vinyl chloride from acetylene; alkyl chlorides from olefins and arsenious chloride from arsenious oxide; electronic grade for etching semiconductor crystals. Used in the chlorination of rubber; in organic reactions involving isomerization, polymerization and alkylation; as a catalyst and condensing agent; for making chlorine where economical; in the separation of cotton from wool and cotton de-linting; as flux in the babbitt type of metal alloy; etching semi-conductor crystals.
Hydrochloric acid is used for pickling and heavy duty cleaning of metal parts; rust and scale removal. The production of chlorides; neutralizing bases; a laboratory reagent. For hydrolyzing starch and proteins in preparations for food. As a catalyst and solvent in organic synthesis. As "spirits of salts" for cleaning of lime and masonry from new brickwork. As flux or flux component for soldering; manufacture of "killed spirits".

Section 2 - Composition / Information on Ingredients

Name	CAS	%
hydrogen chloride	7647-01-0	> 99.0

OSHA PEL
Ceiling: 5 ppm, 7 mg/m^3.

NIOSH REL
Ceiling: 5 ppm (7 mg/m^3).

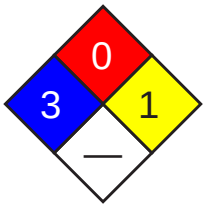
DFG (Germany) MAK
TWA: 5 ppm; PEAK: 5 ppm.

ACGIH TLV
Ceiling: 2 ppm.

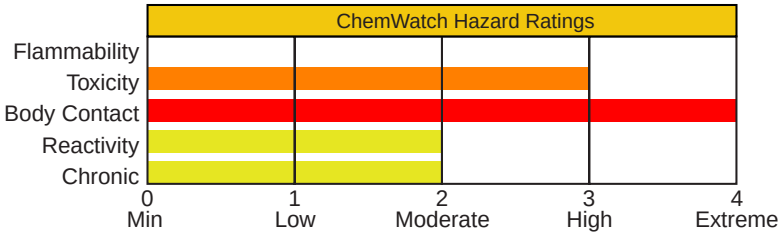
IDLH Level
50 ppm.

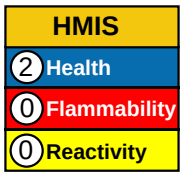
EU OEL
TWA: 5 ppm; STEL: 10 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Danger!


Corrosive Compressed Gas

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless gas; characteristic suffocating, pungent odor. Corrosive. Stored as compressed gas which may cause frostbite. Chronic Effects: erosion of teeth.

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Potential Health Effects

Target Organs: eyes, skin, respiratory system, liver (in animals)
Primary Entry Routes: inhalation, skin contact, eye contact
Acute Effects

Inhalation: The vapor is extremely discomforting to the upper respiratory tract, may cause severe mucous membrane damage and may be harmful if inhaled.
Inhalation of quantities of liquid mist may be extremely hazardous, even lethal due to spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary edema.
A single severe exposure may cause coughing and choking; bleeding of nose, inflammation and occasionally ulceration of the nose, throat and larynx. Fluid on the lungs followed by generalized lung damage may follow.
Breathing of vapor may aggravate asthma and inflammatory or fibrotic pulmonary disease.
High concentrations cause necrosis of the tracheal and bronchial epithelium, pulmonary edema, atelectasis and emphysema and damage to the pulmonary blood vessels and liver.
Inhalation hazard is increased at higher temperatures.
The vapor from heated material is extremely discomforting to the upper respiratory tract and lungs if inhaled.
Continued severe exposure can result in pulmonary edema and corrosion of tissues in the nose and throat.

Eye: Hydrogen Chloride: The vapor is extremely discomforting to the eyes and is capable of causing pain and severe conjunctivitis. Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.
The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.
Hydrochloric Acid: Eye contact is extremely painful and may cause rapid corneal damage. The liquid is extremely corrosive to the eyes and is capable of causing severe damage with loss of sight.
The vapor is highly discomforting and may be corrosive to the eyes. The vapor from heated material is extremely discomforting to the eyes.

Skin: The material is corrosive to the skin and may cause chemical burns.
Toxic effects may result from skin absorption. Bare unprotected skin should not be exposed to this material. The material may accentuate any pre-existing skin condition.
The vapor is discomforting to the skin.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The liquid is extremely corrosive if swallowed and is capable of causing burns to mouth, throat, esophagus, with extreme discomfort, pain and may be fatal if swallowed in quantity. Ingestion may result in nausea, abdominal irritation, pain and vomiting.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Chronic Effects: Chronic exposure may cause discoloration or erosion of the teeth, bleeding of the nose and gums; and ulceration of the nasal mucous membranes.
Repeated exposures of animals to concentrations of about 34 ppm produced no immediate toxic effects.
Workers exposed to hydrochloric acid suffered from gastritis and a number of cases of chronic bronchitis have also been reported.
Repeated or prolonged exposure to dilute solutions may cause dermatitis. Repeated exposure to low vapor concentrations can cause skin tenderness, bleeding of the nose and gums, chronic bronchitis, gastritis.

Section 4 - First Aid Measures



Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor.

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately flush body and clothes with large amounts of water, using safety shower if available.
Quickly remove all contaminated clothing, including footwear.
Wash affected areas with water (and soap if available) for at least 15 minutes. Transport to hospital or doctor.

Ingestion: Contact a Poison Control Center. Rinse mouth out with plenty of water. Do NOT induce vomiting. Give a glass of water.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to strong acids:
1.Airway problems may arise from laryngeal edema and inhalation exposure.
Treat with 100% oxygen initially.
2.Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.

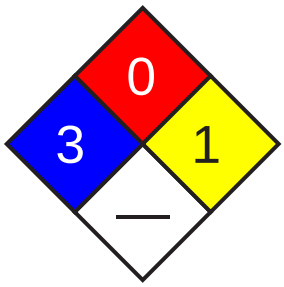
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3. Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
4.Strong acids produce a coagulation necrosis characterized by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.
INGESTION:
1.Immediate dilution (milk or water) within 30 minutes post-ingestion is recommended.
2.Do not attempt to neutralize the acid since exothermic reaction may extend the corrosive injury.
3.Be careful to avoid further vomiting since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
4.Charcoal has no place in acid management.
5.Some authors suggest the use of lavage within 1 hour of ingestion.
SKIN:
1.Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
2.Deep second-degree burns may benefit from topical silver sulfadiazine.
EYE:
1.Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. Do not use neutralizing agents or any other additives. Several liters of saline are required.
2.Cycloplegic drops (1% cyclopentolate for short-term use or 5% homatropine for longer term use), antibiotic drops, vasoconstrictive agents, or artificial tears may be indicated dependent on the severity of the injury.
3.Steroid eye drops should only be administered with the approval of a consulting ophthalmologist.

Section 5 - Fire-Fighting Measures

Flash Point: Nonflammable
Autoignition Temperature: Not applicable
LEL: Not applicable
UEL: Not applicable
Extinguishing Media: Water spray or fog; foam; Bromochlorodifluoromethane (BCF) (where regulations permit); Dry agent; Carbon dioxide.

See DOT ERG



Fire Diamond

General Fire Hazards/Hazardous Combustion Products: Noncombustible liquid. Will not burn, but heat produces highly toxic fumes/vapors.
Heating may cause expansion or decomposition leading to violent rupture of containers. Decomposes on heating and produces toxic fumes of hydrogen chloride. Decomposition may produce toxic fumes of chlorine.
Reacts with metals producing flammable/explosive hydrogen gas. Contact with moisture or water may generate heat causing ignition. Reacts vigorously with alkalis. Moderate fire hazard when in contact with reducing agents.
Fire Incompatibility: Reacts with metals producing flammable/explosive hydrogen gas.
Avoid reactions with metals, metal oxides, hydroxides, amines, carbonates, alkaline materials, acetic anhydride, cyanides, sulphides, sulphites, phosphides, acetylides, borides, carbides, silicides, vinyl acetate, formaldehyde and potassium permanganate, unsaturated organics, metal acetylides, sulphuric acid.
Note: Compatibility with plastics should be confirmed prior to use.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation. Cool fire-exposed containers with water spray from a protected location. If safe to do so, remove containers from path of fire. Equipment should be thoroughly decontaminated after use. Water spray or fog may be used to disperse vapor. Do not approach cylinders suspected to be hot. If safe to do so, stop flow of gas.

Section 6 - Accidental Release Measures

Small Spills: DO NOT touch the spill material. Clean up all spills immediately. Wear fully protective PVC clothing and breathing apparatus. Contain and absorb spill with sand, earth, inert material or vermiculite. Use soda ash or slaked lime to neutralize. Collect residues and place in labeled plastic containers with vented lids. Clear area of personnel and move upwind. Avoid breathing vapors and contact with skin and eyes. Do not exert excessive pressure on valve; do not attempt to operate damaged valve. Water spray or fog may be used to disperse vapor.

See DOT ERG

Large Spills: Contact fire department and tell them location and nature of hazard. Clear area of personnel and move upwind. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation. Stop leak if safe to do so. Remove leaking cylinders to a safe place if possible. Release pressure under safe, controlled conditions by opening the valve. Do not exert excessive pressure on valve; do not attempt to operate damaged valve. Shut off all possible sources of ignition and increase ventilation. Water spray or fog may be used to disperse vapor. Use soda ash or slaked lime to neutralize.
Collect and seal in labeled drums for disposal. Wash spill area with large quantities of water. If contamination of

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drains or waterways occurs, advise emergency services. After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and reusing. DO NOT touch the spill material. Contain and absorb spill with sand, earth, inert material or vermiculite.
DO NOT USE WATER OR NEUTRALIZING AGENTS INDISCRIMINATELY ON LARGE SPILLS.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist and vapor, breathing vapors and contact with skin and eyes.
Avoid physical damage to containers. Use in a well-ventilated area. Wear protective clothing and gloves when handling containers. Handle and open container with care.
WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material. When handling, DO NOT eat, drink or smoke. Always wash hands with soap and water after handling. Work clothes should be laundered separately. Use good occupational work practices. Observe manufacturer's storing and handling recommendations.
Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Local exhaust ventilation may be required for safe working, i.e. to keep exposures below required standards; otherwise, PPE is required.
Keep dry. Reacts violently with water.
Transport containers on a trolley. Avoid sources of heat. DO NOT transfer gas from one cylinder to another.

Recommended Storage Methods: Packaging as recommended by manufacturer. Check that containers are clearly labeled.
Cylinder. Ensure the use of equipment rated for cylinder pressure. Ensure the use of compatible materials of construction. Valve protection cap to be in place until cylinder is secured, connected. Cylinder must be properly secured either in use or in storage. Cylinder valve must be closed when not in use or when empty. Segregate full from empty cylinders. WARNING: Suckback into cylinder may result in rupture. Use back-flow preventive device in piping.
Hydrochloric acid: Packs of 2.5 litres or less require a child-resistant closure. Glass container or Plastic carboy or Polylined drum.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: If risk of overexposure exists, wear air supplied breathing apparatus. Provide adequate ventilation in warehouse or closed storage areas. Use in a well-ventilated area. Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
If risk of inhalation or overexposure exists, wear NIOSH-approved respirator or work in fume hood. Hydrogen chloride vapors will not be adequately absorbed by organic vapor respirators.

Personal Protective Clothing/Equipment:

Eyes: Chemical goggles. Full face shield.
DO NOT wear contact lenses. Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Neoprene gloves; rubber gloves. Nitrile gloves.
Safety footwear. Rubber boots.
Hydrochloric acid: Barrier cream and Neoprene gloves or Elbow length PVC gloves. Nitrile gloves.
PVC boots or PVC safety gumboots.

Respiratory Protection:
Exposure Range >5 to <50 ppm: Air Purifying, Negative Pressure, Half Mask
Exposure Range 50 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Cartridge Color: white

Other: Ensure there is ready access to a safety shower; Eyewash unit.
Acid-resistant overalls. Full protective suit. Operators should be trained in procedures for safe use of this material.

Glove Selection Index:

BUTYL	Best selection
BUTYL/NEOPRENE	Best selection
HYPALON	Best selection
NEOPRENE	Best selection
NEOPRENE/NATURAL	Best selection
NITRILE+PVC	Best selection
PE/EVAL/PE	Best selection
SARANEX-23	Best selection
VITON/NEOPRENE	Best selection
PVC	Best selection

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NITRILE ..... Best selection
NATURAL RUBBER..... Satisfactory; may degrade after 4 hours continuous immersion
NATURAL+NEOPRENE..... Satisfactory; may degrade after 4 hours continuous immersion
NAT+NEOPR+NITRILE ..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Hydrogen chloride: Colorless, corrosive gas. Pungent suffocating odor. White fumes in moist air. Soluble in methanol, ethanol, ether and benzene.
Hydrochloric acid: Clear to light yellow (orange tint for inhibited grades) fuming corrosive liquid with sharp, suffocating odor.

Physical State: Hydrogen chloride: Compressed gas; Hydrochloric acid: Liquid
Odor Threshold: 0.26 to 0.3 ppm
Vapor Pressure (kPa): < 24.8 at 25 °C
Vapor Density (Air=1): 1.268 at 20 °C
Formula Weight: 36.461
Specific Gravity (H_2O=1, at 4 °C): < 1.19 at 20 °C
Evaporation Rate: Slow

pH: Hydrochloric acid: < 1
Boiling Point: -85 °C (-121 °F)
Freezing/Melting Point: -114.44 °C (-173.992 °F)
Volatile Component (% Vol): 100
Decomposition Temperature (°C): Not applicable
Water Solubility: 56.1 g/100 cc hot water at 60 °C

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Decomposes in the presence of moisture to produce corrosive acid. May generate sufficient heat to ignite combustible materials. Presence of heat source and direct sunlight (ultra-violet radiation). Product is considered stable under normal handling conditions. Hazardous polymerization will not occur.
Storage Incompatibilities: Hydrogen chloride: Segregate from most common metals and their alloys, alkalis, unsaturated organics, fluorine, metal carbides, metal acetylides, potassium permanganate and sulfuric acid. Compatibility with plastics should be confirmed prior to use.
Hydrochloric acid: Segregate from alkalies, oxidizing agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates. Avoid storage with metals, metal oxides, hydroxides, amines, carbonates, alkaline materials, acetic anhydride, cyanides, sulphides, sulphites, phosphides, acetylides, borides, carbides, silicides, vinyl acetate, formaldehyde and potassium permanganate. Reacts with zinc, brass, galvanized iron, aluminum, copper and copper alloys.

Section 11 - Toxicological Information

Toxicity
Inhalation (human) LC_{Lo}: 1300 ppm/30 m
Inhalation (human) LC_{Lo}: 3000 ppm/5 m
Inhalation (rat) LC_{50}: 3124 ppm/60 m
Inhalation (rat) LC_{50}: 4701 ppm/30 m
Oral (rat) LD_{50}: 900 mg/kg

Irritation
Eye (rabbit): 5 mg/30 s - mild

See *RTECS* MW 4025000, for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.
Ecotoxicity: TL_m Gambusia affinis (mosquito fish) 282 ppm/96 hr (fresh water) /Conditions of bioassay not specified; Lethal Lepomis macrochirus (bluegill sunfish) 3.6 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Cockle 330 to 1,000 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Carassius auratus (goldfish) 178 mg/l (1 to 2 hr survival time) /Conditions of bioassay not specified; LC_{50} Shore crab 240 mg/l/48 hr /Conditions of bioassay not specified; LC_{50} Shrimp 100 to 330 ppm/48 hr (salt water) /Conditions of bioassay not specified; LC_{100} Trout 10 mg/l 24 hr /Conditions of bioassay not specified
Biochemical Oxygen Demand (BOD): none

Section 13 - Disposal Considerations

Disposal: Recycle wherever possible. Consult manufacturer for recycling options. Treat and neutralize at an effluent treatment plant. Bury residue in an authorized landfill. Decontaminate empty containers with a lime slurry. Return empty containers to supplier or bury empty containers at an authorized landfill.
Return empty cylinders to supplier.

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Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Hydrogen chloride, anhydrous
ID: UN1050
Hazard Class: 2.3 - Poisonous gas
Packing Group:
Symbols:
Label Codes: 2.3 - Poison Gas, 8 - Corrosive
Special Provisions: 3
Packaging: **Exceptions:** None **Non-bulk:** 304 **Bulk:** None
Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** Forbidden
Vessel Stowage: **Location:** D **Other:** 40



Shipping Name and Description: Hydrochloric acid
ID: UN1789
Hazard Class: 8 - Corrosive material
Packing Group: II - Medium Danger
Symbols:
Label Codes: 8 - Corrosive
Special Provisions: A3, A6, B3, B15, IB2, N41, T8, TP2, TP12
Packaging: **Exceptions:** 154 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 1 L **Cargo aircraft only:** 30 L
Vessel Stowage: **Location:** C **Other:**



Shipping Name and Description: Hydrochloric acid
ID: UN1789
Hazard Class: 8 - Corrosive material
Packing Group: III - Minor Danger
Symbols:
Label Codes: 8 - Corrosive
Special Provisions: IB3, T4, TP1, TP12
Packaging: **Exceptions:** 154 **Non-bulk:** 203 **Bulk:** 241
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** C **Other:**



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4) 5000 lb (2268 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Listed
RQ: 5000 lb
TPQ: 500 lb
TSCA: Listed

Section 16 - Other Information

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Material Safety Data Sheet Collection
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Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Isobutene
CAS Number: 115-11-7
Chemical Formula: C_4H_8
Structural Chemical Formula: $(CH_3)_2C=CH_2$
EINECS Number: 204-066-3
ACX Number: X1003822-9
Synonyms: Isobutene; ISOBUTYLENE; ASYM-DIMETHYLETHYLENE; GAMMA-BUTYLENE; 1,1-DIMETHYLETHYLENE; ISO-BUTENE; ISOBUTENE; ISOPROPYLIDENEMETHYLENE; LIQUEFIED PETROLEUM GAS; 2-METHYL-1-PROPENE; 2-METHYLPROPENE; 2-METHYLPROPYLENE; 1-PROPENE,2-METHYL-; PROPENE,2-METHYL-; UNSYM. DIMETHYLETHYLENE
General Use: Production of butene polymers used as adhesives, tackifiers, oil additives.
Butyl rubbers, copolymer resins with butadiene, acrylates and methacrylates.
Also to produce anti-oxidants for foods, food supplements, plastics and in production of isooctane and high-octane aviation gasoline.
Used in closed pressurized systems, fitted with safety relief valve.
Vented gas is flammable, denser than air and will spread. Vent path must not contain ignition sources, pilot lights, bare flames.

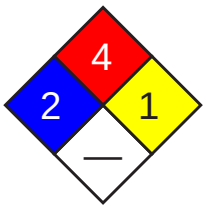
Section 2 - Composition / Information on Ingredients

Name	CAS	%
isobutene	115-11-7	>99

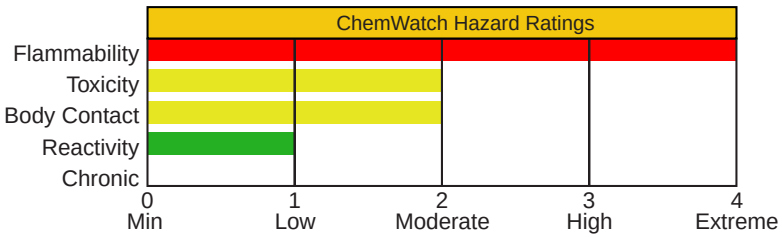
OSHA PEL **NIOSH REL**

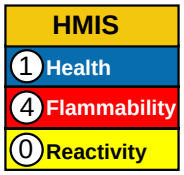
ACGIH TLV

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Danger!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless gas. Acute Effects: Simple asphyxiant which can displace available oxygen; initial symptoms: rapid respiration, air hunger, diminished mental alertness, impaired muscular coordination. Can form explosive mixtures in air. Flammable.

Potential Health Effects

Target Organs: None reported
Primary Entry Routes: inhalation
Acute Effects
Inhalation: The gas is a simple asphyxiant (precludes access to oxygen) and is harmful if exposure is prolonged and inhalation may cause loss of consciousness.

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Acute effects from inhalation of high concentrations of gas / vapor are pulmonary irritation, including coughing, with nausea; central nervous system depression - characterized by headache and dizziness, increased reaction time, fatigue and loss of coordination.
If exposure to highly concentrated atmosphere of gas is prolonged this may lead to narcosis, unconsciousness, even coma, and unless resuscitated, death.
Iso-butene is a simple asphyxiant and may have a narcotic action.
Material is highly volatile and may quickly form concentrated atmosphere in confined or unventilated area. Vapor is heavier than air and may displace and replace air in breathing zone, acting as a simple asphyxiant. This may happen with little warning of overexposure.
Hydrocarbons may sensitize the heart to adrenalin and other circulatory catecholamines; as a result cardiac arrhythmias and ventricular fibrillation may occur. Abrupt collapse may produce traumatic injury.
Central nervous system (CNS) depression may be evident early. Symptoms of moderate poisoning may include giddiness, headache, dizziness and nausea.
Serious poisonings may result in respiratory depression and may be fatal.
The paraffin gases C1-4 are practically non-toxic below their lower flammability limits (18000-50000 ppm). Above this level, incidental effects include CNS depression and irritation but these are reversible upon cessation of the exposure. The C3 and iso-C5 hydrocarbons show increasing narcotic properties; branching of the chain also enhances the effect.
The C4 hydrocarbons appear to be more highly neurotoxic than the C3 and C5 members. Several fatalities due to voluntary inhalation of butane have been reported, possibly due to central, respiratory and circulatory effects resulting from anesthesia, laryngeal edema, chemical pneumonia or the combined effects of cardiac toxicity and increased sympathomimetic effects.
Inhalation of petroleum gases may produce narcosis, due in part to olefinic impurities. Displacement of oxygen in the air may cyanosis.
If present in sufficient quantity these gases may reduce the oxygen level to below 18% producing asphyxiation.
Symptoms include rapid respiration, mental dullness, lack of coordination, poor judgement, nausea and vomiting.
The onset of cyanosis may lead to unconsciousness and death.

Eye: The liquid is highly discomforting and may cause severe cold burns and is capable of causing pain and severe conjunctivitis.
Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.
The gas is regarded as non-irritating to the eyes.

Skin: Vaporizing liquid causes rapid cooling and contact may cause cold burns, frostbite.The liquid is discomforting to the skin and may rapidly cause severe cold burns.
Bare unprotected skin should not be exposed to this material.
There is no evidence of skin absorption but contact may cause frostbite,

Ingestion: Overexposure is unlikely in this form.
Considered an unlikely route of entry in commercial/industrial environments.
The liquid is highly discomforting if swallowed and may cause severe cold burns.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Chronic Effects: Chronic overexposure may produce dermatitis.

Section 4 - First Aid Measures

Inhalation: Avoid becoming a casualty and remove to fresh air.
Lay patient down. If breathing is shallow or has stopped, ensure clear airway and apply resuscitation.
If available, medical oxygen should be administered by trained personnel.
Transport to hospital or doctor, without delay.

See DOT ERG

Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: In case of cold burns (frost-bite): Bathe the affected area immediately in cold water for 10 to 15 minutes, immersing if possible and without rubbing.
Do not apply hot water or radiant heat. Apply a clean, dry dressing.
Transport to hospital or doctor.

Ingestion: Contact a Poison Control Center. DO NOT induce vomiting. Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. Give water (or milk) to rinse out mouth. Then provide liquid slowly and as much as casualty can comfortably drink. Transport to hospital or doctor without delay.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to petroleum distillates or related hydrocarbons:
1.Primary threat to life from pure petroleum distillate ingestion and/or inhalation is respiratory failure.

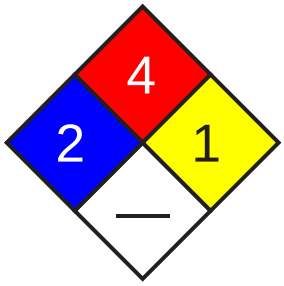
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2.Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO_2 <50 mm Hg or pCO_2 >50 mm Hg) should be intubated.
3.Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
4.A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
5.Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines.
Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
6.Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients.

Section 5 - Fire-Fighting Measures

Flash Point: -76.111 °C
Autoignition Temperature: 465 °C
LEL: 1.8% v/v
UEL: 9.6% v/v
Extinguishing Media: Water spray or fog; dry chemical powder.
Carbon dioxide.
Foam.

See DOT ERG



Fire Diamond

General Fire Hazards/Hazardous Combustion Products: Flammable gas. Liquid and vapor are highly flammable.
Dangerous hazard when exposed to heat, flame and oxidizers.
Gas may form explosive mixtures with air over a wide area.
Decomposes on heating and produces toxic fumes of carbon monoxide (CO) and carbon dioxide (CO_2).
Fire Incompatibility: Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.
Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
Do not extinguish burning gas. If safe to do so, stop flow of gas.
If flow of gas cannot be stopped, leave gas to burn.
Cool fire-exposed containers with water spray from a protected location.
Do not approach cylinders suspected to be hot.
If safe to do so, remove containers from path of fire.
Fight fire from a safe distance, with adequate cover.

Section 6 - Accidental Release Measures

Small Spills: Avoid breathing vapor and any contact with liquid or gas. Protective equipment including respirator should be used. Do NOT enter confined spaces where gas may have accumulated. Shut of all sources of possible ignition and increase ventilation. Clear area of personnel. Stop leak only if safe to so do. Remove leaking cylinders to safe place. Release pressure under safe controlled conditions by opening valve. Keep area clear of personnel until gas has dispersed.

See DOT ERG

Large Spills: DO NOT touch the spill material. Shut off all possible sources of ignition and increase ventilation. Restrict access to area. Clear area of personnel and move upwind.
May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
Avoid spraying water onto liquid pools.
Use extreme caution to avoid a violent reaction.
Stop leak if safe to do so.
DO NOT enter confined places where gas may have collected. Remove leaking cylinders to a safe place. Fit vent pipes. Release pressure under safe, controlled conditions by opening valve. Burn issuing gas at vent pipes.
Do not exert excessive pressure on valve; do not attempt to operate damaged valve.
Keep area clear of personnel until gas has dispersed
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Use good occupational work practices. Use in a well-ventilated area.

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Obtain a work permit before attempting any repairs.
Do not attempt repair work on lines, vessels under pressure.
Atmospheres must be tested and O.K. before work resumes after leakage.
Wear protective clothing and gloves when handling containers.
No smoking, bare lights, heat or ignition sources.
Use spark-free tools when handling. Ground all lines and equipment.
Prevent concentration in hollows and sumps. DO NOT enter confined spaces until atmosphere has been checked.
Gas may travel a considerable distance to source of ignition.
Vapor may ignite on pumping or pouring due to static electricity.
Avoid physical damage to containers.
DO NOT transfer gas from one cylinder to another.
Natural gases contain a contaminant, radon-222, a naturally occurring radioactive gas. During subsequent processing, radon tends to concentrate in liquified petroleum streams and in product streams having similar boiling points.
Industry experience indicates that the commercial product may contain small amounts of radon-222 and its radioactive decay products (radon daughters). The actual concentration of radon-222 and radioactive daughters in process equipment (IE lines, filters, pumps and reactor units) may reach significant levels and produce potentially damaging levels of gamma radiation. A potential external radiation hazard exists at or near any pipe, valve or vessel containing a radon enriched stream or containing internal deposits of radioactive material. Field studies, however, have not shown that conditions exist that expose the worker to cumulative exposures in excess of general population limits. Equipment containing gamma-emitting decay products should be presumed to be internally contaminated with alpha- emitting decay products which may be hazardous if inhaled or ingested.
During maintenance operations that require the opening of contaminated process equipment, the flow of gas should be stopped and a four hour delay enforced to allow gamma-radiation to drop to background levels. Protective equipment (including high efficiency particulate respirators (P3) suitable for radionucleotides or supplied air) should be worn by personnel entering a vessel or working on contaminated process equipment to prevent skin contamination or inhalation of any residue containing alpha-radiation.
Airborne contamination may be minimized by handling scale and/or contaminated materials in a wet state.

Recommended Storage Methods: Packaging as recommended by manufacturer.
Check that containers are clearly labeled.
Cylinder fitted with valve protector cap.
Ensure the use of equipment rated for cylinder pressure.
Ensure the use of compatible materials of construction.
Cylinder valve must be closed when not in use or when empty.
Cylinder must be properly secured either in use or in storage.
WARNING: Suckback into cylinder may result in rupture.
Use back-flow preventive device in piping.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated areaIf gas concentrations are high: or If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
Used in closed pressurized systems; fitted with temperature and pressure safety relief valves which are vented to allow safe dispersal.
Provide adequate ventilation in warehouse or closed storage areas.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields; or as required, chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Protective gloves eg. leather gloves or gloves with leather facing. Neoprene rubber gloves.
Safety footwear.

Other: Operators should be trained in correct use & maintenance of respirators Ensure that there is ready access to breathing apparatus.
Protective overalls, closely fitted at neck and wrist. Eye-wash unit.
IN CONFINED SPACES:
1. Non-sparking protective boots.
2. Static-free clothing.
3. Ensure availability of lifeline.
Staff should be trained in all aspects of rescue work.
Ensure there is ready access to an emergency shower.

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Section 9 - Physical and Chemical Properties

Appearance/General Info: Easily liquified flammable gas or colorless highly volatile liquid. Packed as liquid under pressure and remains liquid only under pressure. Sudden release of pressure or leakage may result in rapid vaporization with generation of large volume of highly flammable / explosive gas. Strong gasoline odor. Floats and boils on water giving a flammable / explosive, visible cloud. Soluble in alcohol, ether, benzene and sulphuric acid.

Physical State: Liquefied gas
Odor Threshold: 1.3 to 3.0 mg/m^3
Vapor Pressure (kPa): 182 kPa at 10 °C
Vapor Density (Air=1): 2.01
Formula Weight: 56.11
Specific Gravity (H_2O=1, at 4 °C): 0.59
Evaporation Rate: Very rapid
pH: Not applicable
pH (1% Solution): Not applicable.
Boiling Point: -6.9 °C (20 °F)
Freezing/Melting Point: -140.35 °C (-220.63 °F)
Volatile Component (% Vol): 100
Water Solubility: Practically insoluble in water

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Product is considered stable. Hazardous polymerization will not occur.
Storage Incompatibilities: Avoid contact with oxidizing agents.

The interaction of alkenes and alkynes with nitrogen oxides and oxygen may produce explosive addition products; these may form at very low temperatures and explode on heating to higher temperatures (the addition products from 1,3-butadiene and cyclopentadiene form rapidly at -150 °C and ignite or explode on warming to -35 to -15 C). These derivatives ("pseudo- nitrosites") were formerly used to characterize terpene hydrocarbons.

Exposure to air must be kept to a minimum so as to limit the build-up of peroxides which will concentrate in bottoms if the product is distilled.

The product must not be distilled to dryness if the peroxide concentration is substantially above 10 ppm (as active oxygen) since explosive decomposition may occur. Distillate must be immediately inhibited to prevent peroxide formation. The effectiveness of the antioxidant is limited once the peroxide levels exceed 10 ppm as active oxygen. Addition of more inhibitor at this point is generally ineffective.

Prior to distillation it is recommended that the product should be washed with aqueous ferrous ammonium sulfate to destroy peroxides; the washed product should be immediately re-inhibited.

A range of exothermic decomposition energies for double bonds is given as 40-90 kJ/mol. The relationship between energy of decomposition and processing hazards has been the subject of discussion; it is suggested that values of energy released per unit of mass, rather than on a molar basis (J/g) be used in the assessment. For example, in "open vessel processes" (with man-hole size openings, in an industrial setting), substances with exothermic decomposition energies below 500 J/g are unlikely to present a danger, whilst those in "closed vessel processes" (opening is a safety valve or bursting disk) present some danger where the decomposition energy exceeds 150 J/g.

Avoid reactions with oxidizing agents, organic acids, inorganic acids halogenated compounds, polymerizable esters, oxygen, cyanohydrins and molten sulphur.

Section 11 - Toxicological Information

Toxicity
Inhalation (rat) LC_{50}: 620000 mg/m^3/4h

Irritation
Nil reported

See *RTECS* UD 0890000, for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.
Ecotoxicity: No data found.
BCF: no food chain concentration potential
Biochemical Oxygen Demand (BOD): none

Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options.
Discharge to burning flare. Return empty cylinders to supplier.

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Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Isobutylene *see also* Petroleum gases, liquefied
ID: UN1055
Hazard Class: 2.1 - Flammable gas
Packing Group:
Symbols:
Label Codes: 2.1 - Flammable Gas
Special Provisions: 19, T50
Packaging: **Exceptions:** 306 **Non-bulk:** 304 **Bulk:** 314, 315
Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** 150 kg
Vessel Stowage: **Location:** E **Other:** 40



Shipping Name and Description: Petroleum gases, liquefied *or* Liquefied petroleum gas
ID: UN1075
Hazard Class: 2.1 - Flammable gas
Packing Group:
Symbols:
Label Codes: 2.1 - Flammable Gas
Special Provisions: T50
Packaging: **Exceptions:** 306 **Non-bulk:** 304 **Bulk:** 314, 315
Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** 150 kg
Vessel Stowage: **Location:** E **Other:**



Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Not listed
SARA 40 CFR 372.65: Not listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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Isopropyl Alcohol
ISO5300

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Isopropyl Alcohol **CAS Number:** 67-63-0
Chemical Formula: C_3H_8O
Structural Chemical Formula: $(CH_3)_2CHOH$
EINECS Number: 200-661-7
ACX Number: X1001458-1
Synonyms: ALCOJEL; ALCOOL ISOPROPILICO; ALCOOL ISOPROPYLIQUE; ALCOSOLVE; ALCOSOLVE 2; AVANTIN; AVANTINE; CHROMAR; COMBI-SCHUTZ; (COMPONENT OF) HIBISTAT; DIMETHYL CARBINOL; DIMETHYLCARBINOL; EPA PESTICIDE CHEMICAL CODE 047501; HARTOSOL; 2-HYDROXYPROPANE; IMSOL A; IPA; ISOHOL; ISOPROPANOL; ISOPROPYL ALCOHOL; ISO-PROPYLALKOHOL; LUTOSOL; 1-METHYLETHANOL; 1-METHYLETHYL ALCOHOL; PETROHOL; PRO; 2-PROPANOL; I-PROPANOL; N-PROPAN-2-OL; PROPAN-2-OL; PROPOL; 2-PROPYL ALCOHOL; I-PROPYL ALCOHOL; SEC-PROPYL ALCOHOL; I-PROPYLALKOHOL; SECONDARY PROPYL ALCOHOL; SPECTRAR; STERISOL HAND DISINFECTANT; TAKINEOCOL; VISCO 1152
Derivation: Treating propylene with sulfuric acid and then hydrolyzing or direct hydration of propylene using superheated steam. Most commonly available as rubbing alcohol (70% IPA).
General Use: As a solvent for gums, shellac, and essential oils, chemical intermediate, dehydrating agent, vehicle for germicidal compounds, de-icing agent for liquid fuels; for denaturing ethyl alcohol, preserving pathological specimens; in extraction of alkaloids, quick-drying inks and oils, and an ingredient of skin lotions, cosmetics, window cleaner, liquid soaps, and pharmaceuticals.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
Isopropyl alcohol	67-63-0	100% vol.

Most commonly sold as 70% isopropyl alcohol (rubbing alcohol).

OSHA PEL
TWA: 400 ppm; 980 mg/m^3.

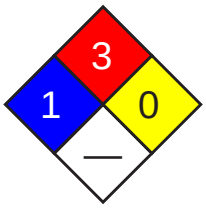
NIOSH REL
TWA: 400 ppm (980 mg/m^3); STEL: 500 ppm (1225 mg/m^3).

DFG (Germany) MAK
TWA: 200 ppm; PEAK: 400 ppm.

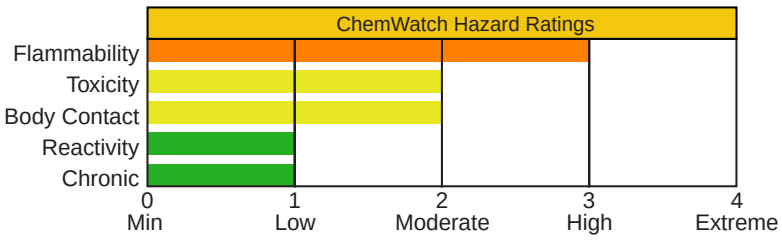
ACGIH TLV
TWA: 200 ppm; STEL: 400 ppm.

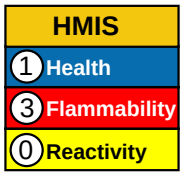
IDLH Level
2000 ppm (10% LEL).

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word
Warning!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Volatile liquid. Irritating to eyes/respiratory tract. Other Acute Effects: CNS depression, possible dermatitis, systemic toxicity. Flammable

Potential Health Effects

Target Organs: Eyes, skin, respiratory system.
Primary Entry Routes: Inhalation, ingestion, skin contact/absorption.

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Acute Effects

Inhalation: Vapor inhalation is irritating to the respiratory tract and can cause central nervous system depression at high concentrations. Volunteers exposed to 400 ppm for 3 to 5 min experienced mild eye and respiratory irritation. At 800 ppm, irritation was not severe, but most people found the air uncomfortable to breathe.

Eye: Exposure to the vapor or direct contact with the liquid causes irritation and possible corneal burns.

Skin: Some irritation may occur after prolonged exposure.

Ingestion: Accidental ingestions have provided the most information on isopropyl alcohol toxicity. Symptoms include nausea and vomiting, headache, facial flushing, dizziness, lowered blood pressure, mental depression, hallucinations and distorted perceptions, difficulty breathing, respiratory depression, stupor, unconsciousness, and coma. Kidney insufficiency including oliguria (reduced urine excretion), anuria (absent urine excretion), nitrogen retention, and edema (fluid build-up in tissues) may occur. One post-mortem examination in a case of heavy ingestion showed extensive hemorrhagic tracheobronchitis, broncho pneumonia, and hemorrhagic pulmonary edema. Death can occur in 24 to 36 h post-ingestion due to respiratory paralysis.

Carcinogenicity: NTP - Not listed; IARC - Group 3, Not classifiable as to carcinogenicity to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Medical Conditions Aggravated by Long-Term Exposure: Dermatitis or respiratory or kidney disorders.

Chronic Effects: Repeated skin contact can cause drying of skin and delayed hypersensitivity reactions in some individuals.

Section 4 - First Aid Measures

See DOT ERG

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water until transported to an emergency medical facility. Consult a physician immediately.

Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water to dilute. Vomiting may be contraindicated because of the rapid onset of central nervous system depression. Gastric lavage is preferred.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Diagnostic test: acetone in urine. Isopropyl alcohol is oxidized in the body to acetone where it is excreted by the lungs or kidneys. Some acetone may be further metabolized to acetate, formate, and finally carbon dioxide. Probable oral lethal dose is 240 mL.

Section 5 - Fire-Fighting Measures

See DOT ERG

Flash Point: 53 °F (12 °C), Closed Cup

Burning Rate: 2.3 mm/min.

Autoignition Temperature: 750°F (399°C)

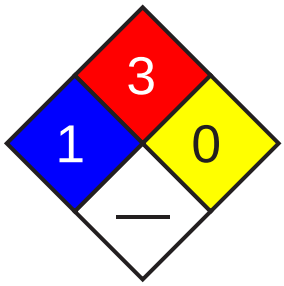
LEL: 2 % v/v

UEL: 12.7 % v/v at 200 °F

Flammability Classification: Class 1B Flammable Liquid

Extinguishing Media: Carbon dioxide, dry chemical, water *spray* (solid streams can spread fire), alcohol- resistant foam, or fog.

General Fire Hazards/Hazardous Combustion Products: Carbon oxides and acrid smoke. Container may explode in heat of fire. Vapors may travel to an ignition source and flash back. Isopropyl alcohol poses an explosion hazard indoors, outdoors, and in sewers.



Fire Diamond

Fire-Fighting Instructions: If possible without risk, move container from fire area. Apply cooling water to container side until well after fire is out. Stay away from ends of tanks. For massive fire in cargo area, use monitor nozzles or unmanned hose holders; if impossible, withdraw and let fire burn. Withdraw immediately if you hear a rising sound from venting safety device or notice any tank discoloration due to fire. *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode. Structural firefighters' protective clothing provides only limited protection.

Section 6 - Accidental Release Measures

See DOT ERG

Spill/Leak Procedures: Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Shut off ignition sources. Cleanup personnel should protect against vapor inhalation and skin/eye contact. Water spray may reduce vapor, but may not prevent ignition in closed spaces.

Small Spills: Take up with earth, sand, vermiculite, or other absorbent, noncombustible material and place in suitable containers.

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Large Spills: For large spills, dike far ahead of liquid spill for later disposal. Do not release into sewers or waterways.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Use non-sparking tools to open containers.
Never eat, drink, or smoke in work areas. Practice good personal hygiene after using isopropyl alcohol, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in a cool, dry, well-ventilated area away from heat, ignition sources, and incompatibles (Sec 10). Install electrical equipment of Class 1, Group D.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: To prevent static sparks, electrically ground and bond all equipment used with and around IPA. Provide general or local exhaust ventilation systems to maintain airborne levels below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred since it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Consider preplacement and periodic medical exams of exposed workers with emphasis on the skin, kidneys, and respiratory system. Be extra cautious when using IPA concurrently with carbon tetrachloride because animal studies have shown it enhances carbon tetrachloride's toxicity.

Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Nitrile rubber (breakthrough time > 8 hr), Neoprene and Teflon (breakthrough time > 4 hr) are suitable materials for PPE. Do not use PVA, PVC or natural rubber (breakthrough time < 1 hr). Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Because contact lens use in industry is controversial, establish your own policy.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For < 1000 ppm, use any powered, air purifying respirator with organic vapor cartridges or any chemical cartridge respirator with a full facepiece and organic vapor cartridge(s). For < 10,000 ppm, use any supplied-air respirator (SAR) operated in continuous-flow mode. For < 12,000 ppm, use any air- purifying, full facepiece respirator (gas mask) with a chin-style, front-or back-mounted organic vapor canister or any SCBA or SAR with a full facepiece. For emergency or entrance into unknown concentrations, use any SCBA or SAR (with auxiliary SCBA) with a full facepiece and operated in pressure-demand or other positive-pressure mode. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove isopropyl alcohol from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless with a slight odor and bitter taste.

Physical State: Liquid
Odor Threshold: 7.84 to 490 mg/m^3
Vapor Pressure (kPa): 44 mm Hg at 25 °F (77 °C)
Formula Weight: 60.09
Density: 0.78505 at 68°F (20 °C)
Refractive Index: 1.375 at 68 °F (20 °C)
Boiling Point: 180.5 °F (82.5 °C)
Freezing/Melting Point: -129.1 °F (-89.5 °C)
Viscosity: 2.1 cP at 77 °F (25 °C)
Surface Tension: 20.8 dyne/cm at 77 °F (25 °C)
Ionization Potential (eV): 10.10 eV
Critical Temperature: 455 °F (235 °C)
Critical Pressure: 47 atm
Water Solubility: > 10 %
Other Solubilities: Soluble in alcohol, ether, chloroform, and benzene. Insoluble in salt solutions.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Isopropyl alcohol is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization does not occur. Exposure to heat, ignition sources, and incompatibles.

Storage Incompatibilities: Include acetaldehyde, chlorine, ethylene oxide, acids and isocyanates, hydrogen + palladium, nitroform, oleum, phosgene, potassium *t*-butoxide, oxygen (forms unstable peroxides), trinitromethane, barium perchlorate, tetrafluoroborate, chromium trioxide, sodium dichromate + sulfuric acid, aluminum, aluminum triisopropoxide, and oxidizers. Will attack some forms of plastic, rubber, and coatings.

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Hazardous Decomposition Products: Thermal oxidative decomposition of isopropyl alcohol can produce carbon oxides and acrid smoke.

Section 11 - Toxicological Information

Acute Oral Effects:

Rat, oral, LD_{50}: 5045 mg/kg caused a change in righting reflex, and somnolence (general depressed activity).

Human, oral, TD_{Lo}: 223 mg/kg caused hallucinations, distorted perceptions, lowered blood pressure, and a change in pulse rate.

Human, oral, LD_{Lo}: 3570 mg/kg caused coma, respiratory depression, nausea, and vomiting.

Irritation Effects:

Rabbit, eye: 100 mg caused severe irritation.

Rabbit, skin: 500 mg caused mild irritation.

Other Effects:

Rat, inhalation: 3500 ppm/7 hr given from 1 to 19 days of pregnancy caused fetotoxicity.

See *RTECS* NT8050000, for additional data.

Section 12 - Ecological Information

Environmental Fate: On soil, IPA will volatilize or leach into groundwater. Biodegradation is possible but rates are not found in available literature. It will volatilize (est. half-life = 5.4 days) or biodegrade in water. It is not expected to bioconcentrate in fish. In the air, it reacts with photochemically produced hydroxyl radicals with a half-life of one to several days. Because it is soluble, removal by rain, snow or other precipitation is possible.

Ecotoxicity: Guppies (*Poecilia reticulata*) LC_{50} = 7,060 ppm/7 days; fathead minnow (*Pimephales promelas*) LC_{50} = 11,830 mg/L/1 hr. BOD = 133 %/5 days.

Octanol/Water Partition Coefficient: log K_{ow} = 0.05

Section 13 - Disposal Considerations

Disposal: Microbial degradation is possible by oxidizing isopropyl alcohol to acetone by members of the genus *Desulfovibrio*. Spray waste into incinerator (permit-approved facilities only) equipped with an afterburner and scrubber. Isopropyl alcohol can be settled out of water spills by salting with sodium chloride. Note: Salt may harm aquatic life, so weigh the benefits against possible harm before application. Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations. Triple rinse containers.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):



Shipping Name and Description: Isopropanol *or* Isopropyl alcohol
ID: UN1219
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T4, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** B **Other:**

Section 15 - Regulatory Information

EPA Regulations:

RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Not listed
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Methyl tert-Butyl Ether
BUT5410

Section 1 - Chemical Product and Company Identification 61

Material Name: Methyl tert-Butyl Ether **CAS Number:** 1634-04-4
Chemical Formula: $C_5H_{12}O$
Structural Chemical Formula: $(CH_3)_3COCH_3(CH_3)_3COCH_3$
EINECS Number: 216-653-1
ACX Number: X1001502-4
Synonyms: T-BUTYL METHYL ETHER; TERT-BUTYL METHYL ETHER; ETHER,TERT-BUTYL METHYL; 2-METHOXY-2-METHYL PROPANE; 2-METHOXY-2-METHYLPROPANE; METHYL TERT-BUTYL ETHER; METHYL 1,1-DIMETHYLETHYL ETHER; METHYL-TERT-BUTYL ETHER; METHYL TERTIARY BUTYL ETHER; 2-METHYL-2-METHOXYPROPANE; MTBE; PROPANE,2-METHOXY-2-METHYL-; PROPANE,2-METHOXY-2-METHYL-(9CI)
General Use: Octane booster for unleaded petrol (up to 7% by volume), manufacture of isobutene; solvent for a number of applications, including pesticide analysis.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
methyl tert-butyl ether	1634-04-4	>95
commercial material may contain C_5 hydrocarbons <5%		

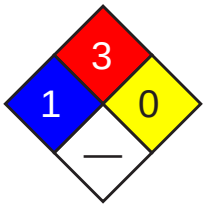
OSHA PEL

NIOSH REL

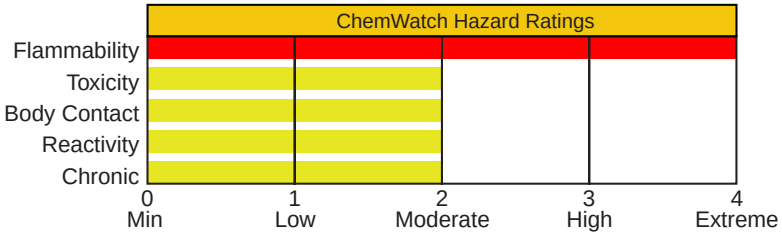
DFG (Germany) MAK
TWA: 50 ppm; PEAK: 75 ppm.

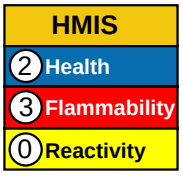
ACGIH TLV
TWA: 50 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Danger!


Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear, colorless liquid; slight hydrocarbon/mint or terpene-like odor. Irritating to eyes/skin/respiratory tract. Other Acute Effects: CNS and respiratory depression, aspiration pneumonitis. Chronic Effects: nasal/tracheal inflammation. Flammable.

Potential Health Effects

Target Organs: upper respiratory system, central nervous system (CNS)
Primary Entry Routes: inhalation, ingestion
Acute Effects

Inhalation: The vapor is harmful and discomforting to the upper respiratory tract. Acute effects from inhalation of high vapor concentrations may be chest and nasal irritation with coughing, sneezing, headache and even nausea. If exposure to highly concentrated vapor atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma, and unless resuscitated, death. Inhalation of the lower alkyl ethers may produce intoxication, blurred vision, headache, dizziness, excitation, pharyngitis, and irritation of the nose and throat. Convulsions, respiratory distress or paralysis, asphyxia, pneumonitis, and unconsciousness are all serious manifestations of poisoning; liver and kidney damage may occur. Fatalities have been reported. Ethers produce narcosis following inhalation.

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Rats exposed to 8000 ppm for 6 hours showed changes in motor activity with the pattern and time course of effects being indicative of transient central nervous system depression. Transient increases in motor activity, on the other hand, were observed in male rats exposed at 800 and 4000 ppm. This finding may reflect an exposure-related stimulant effect or an exaggerated response following recovery from an anesthetic effect. Rats exposed to 1000 ppm, 6 hours/day, 5 days/week for 9 exposures showed lachrymation, conjunctival swelling and corneal changes. A reduced reaction to auditory stimuli was noted at 3000 ppm. There were no other macroscopic pathology findings other than chronic inflammatory changes in the nasal mucosa and trachea.

Eye: The liquid is extremely discomforting to the eyes.
Eye contact with alkyl ethers (vapors or liquid) may produce irritation, redness and lachrymation.

Skin: The liquid is discomforting to the skin and is capable of causing skin reactions which may lead to dermatitis. Bare unprotected skin should not be exposed to this material. Considered to be harmful if it is absorbed by the skin. Alkyl ethers may defat and dehydrate the skin producing dermatoses.
Absorption may produce headache, dizziness, and central nervous system depression.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments. The liquid is extremely discomforting and may be fatal if swallowed. Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis. Ingestion of alkyl ethers may produce symptoms to those produced following inhalation.

Carcinogenicity: NTP - Not listed; IARC - Group 2B, Possibly carcinogenic to humans; OSHA - Not listed; NIOSH - Not listed; ACGIH - Class A3, Animal carcinogen; EPA - Not listed; MAK - Not listed.

Chronic Effects: Prolonged or repeated exposure may cause kidney damage.
Rats exposed to 800, 4000 or 8000 ppm, 6 hours/day, 5 days/week, for 13 weeks showed statistically significant increases in the mean absolute and relative weights of liver, kidneys, and adrenal gland in the two higher exposure groups, while mild hematological changes were seen in all animals.
Chronic exposure to alkyl ethers may result in loss of appetite, excessive thirst, fatigue, and weight loss.

Section 4 - First Aid Measures

See DOT ERG

Inhalation: Remove to fresh air. Lay patient down. Keep warm and rested. If available, administer medical oxygen by trained personnel. If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor without delay.

Eye Contact: Immediately hold the eyes open and wash continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids. Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: Immediately flush body and clothes with large amounts of water, using safety shower if available. Quickly remove all contaminated clothing, including footwear. Wash affected areas with water (and soap if available) for at least 15 minutes. Transport to hospital or doctor.

Ingestion: DO NOT induce vomiting.
Observe the patient carefully. Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. Give water (or milk) to rinse out mouth. Then provide liquid slowly and as much as casualty can comfortably drink. Transport to hospital or doctor without delay.

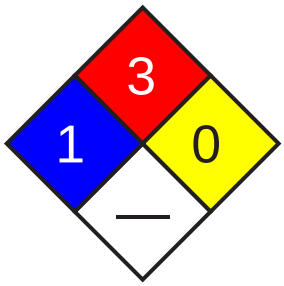
After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Treat symptomatically.

Section 5 - Fire-Fighting Measures

See DOT ERG

Flash Point: -26 °C Closed Cup
Autoignition Temperature: 435 °C
LEL: 1.5% v/v
Extinguishing Media: Foam. Dry chemical powder. BCF (where regulations permit). Carbon dioxide.
Water spray or fog - Large fires only.



Fire Diamond

General Fire Hazards/Hazardous Combustion Products: Liquid and vapor are highly flammable. Severe fire hazard when exposed to heat, flame and/or oxidizers. Vapor forms an explosive mixture with air.
Severe explosion hazard, in the form of vapor, when exposed to flame or spark. Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion/decomposition with violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO). May emit poisonous fumes.

Fire Incompatibility: Avoid contact with oxidizing agents and strong acids.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
Fight fire from a safe distance, with adequate cover.

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If safe, switch off electrical equipment until vapor fire hazard removed.
Use water delivered as a fine spray to control the fire and cool adjacent area. Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot. Cool fire exposed containers with water spray from a protective location. If safe to do so, remove containers from path of fire.

Section 6 - Accidental Release Measures



Small Spills: Remove all ignition sources. Clean up all spills immediately.
Avoid breathing vapors and contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb small quantities with vermiculite or other absorbent material. Wipe up. Collect residues in a flammable waste container.
Large Spills: Clear area of personnel and move upwind.
Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear breathing apparatus plus protective gloves. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
No smoking, bare lights or ignition sources. Increase ventilation.
Stop leak if safe to do so. Water spray or fog may be used to disperse/absorb vapor. Contain spill with sand, earth or vermiculite.
Use only spark-free shovels and explosion proof equipment.
Collect recoverable product into labeled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect solid residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains.
If contamination of drains or waterways occurs, advise emergency services.
Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Do not allow clothing wet with material to stay in contact with skin.
Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps.
DO NOT enter confined spaces until atmosphere has been checked.
Avoid smoking, bare lights, heat or ignition sources. When handling, DO NOT eat, drink or smoke.
Vapor may ignite on pumping or pouring due to static electricity.
Ground and secure containers when dispensing or pouring product. Use spark-free tools when handling.
Avoid contact with incompatible materials.
Keep containers securely sealed. Avoid physical damage to containers.
Always wash hands with soap and water after handling. Work clothes should be laundered separately.
Use good occupational work practice. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.
Recommended Storage Methods: Metal can; Metal drum; Metal safety cans. Packing as supplied by manufacturer.
Plastic containers may only be used if approved for flammable liquid.
Check that containers are clearly labeled and free from leaks.
Storage Requirements: Store below 38 deg. C.
Rotate all stock to prevent aging. Use on FIFO (First In-First Out) basis.
Store in original containers in approved flame-proof area.
No smoking, bare lights, heat or ignition sources.
DO NOT store in pits, depressions, basements or areas where vapors may be trapped. Keep containers securely sealed.
Store away from incompatible materials in a cool, dry well ventilated area.
Protect containers against physical damage and check regularly for leaks.
Observe manufacturer's storing and handling recommendations.
Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area.
General exhaust is adequate under normal operating conditions.
Local exhaust ventilation may be required in specific circumstances.
If risk of overexposure exists, wear NIOSH approved respirator.
Correct fit is essential to obtain adequate protection.
Provide adequate ventilation in warehouse or closed storage areas.
Ground and secure containers when dispensing or pouring.
Avoid generation of static electricity. Ground all lines and equipment.

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Vapor may ignite on pumping or pouring due to static electricity. Ground and secure containers when dispensing or pouring product.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses. Safety glasses with side shields. Chemical goggles.
Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Nitrile gloves Safety footwear.

Respiratory Protection:

Exposure Range >40 to 2000 ppm: Supplied Air, Constant Flow/Pressure Demand, Half Mask
Exposure Range >2000 to 40,000 ppm: Supplied Air, Constant Flow/Pressure Demand, Full Face
Exposure Range >40,000 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face
Note: odor threshold unknown

Other: Eyewash unit. Ensure there is ready access to a safety shower.
Impervious apron.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless, highly volatile, highly flammable liquid; ethereal odor.

Physical State: Liquid
Vapor Pressure (kPa): 27.5 at 20 °C
Vapor Density (Air=1): 3.1
Formula Weight: 88.15
Specific Gravity (H_2O=1, at 4 °C): 0.74
Evaporation Rate: Fast
pH: Not applicable

pH (1% Solution): Not applicable
Boiling Point: 55.2 °C (131 °F)
Freezing/Melting Point: -109 °C (-164.2 °F)
Volatile Component (% Vol): 100
Water Solubility: Solubility of water in methyl-tbutyl ether 2 g/100 g

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: WARNING: Long standing in contact with air and light may result in the formation of potentially explosive peroxides.
Product is considered stable. Hazardous polymerization will not occur.

Storage Incompatibilities: May form explosive peroxides on standing or following concentration by distillation. Review of stocks and testing for peroxide content by given tested procedures at 3-monthly intervals is recommended, together with safe disposal of peroxidic samples.
[Peroxide containing residues can often be rendered innocuous by pouring into an excess of sodium carbonate solution] Avoid storage with oxidizers and strong acids.

Section 11 - Toxicological Information

Toxicity

Oral (rat) LD_{50}: 4000 mg/kg
Inhalation (rat) LC_{50}: 23576 ppm/4 H

Irritation

Nil reported

See *RTECS* KN5250000, for additional data.

Section 12 - Ecological Information

Environmental Fate: If released to soil, it will be subject to volatilization. It will be expected to exhibit very high mobility in soil and, therefore, it may leach to groundwater. It will not be expected to hydrolyze in soil. If released to water, it will not be expected to significantly adsorb to sediment or suspended particulate matter, bioconcentrate in aquatic organisms, hydrolyze, directly photolyze, or photooxidize via reaction with photochemically produced hydroxyl radicals in the water, based upon estimated physical-chemical properties or analogies to other structurally related aliphatic ethers. In surface water it will be subject to rapid volatilization with estimated half-lives of 4.1 hr and 2.0 days for volatilization from a river one meter deep flowing 1 m/sec with a wind velocity of 3 m/sec and a model pond, respectively. It may be resistant to biodegradation in environmental media based upon screening test data from a study using activated sludge inocula. Many ethers are known to be resistant to biodegradation. If released to the atmosphere, it will be expected to exist almost entirely in the vapor phase based on its vapor pressure. It will be susceptible to photooxidation via vapor phase reaction with photochemically produced hydroxyl radicals with an estimated half-life of 5.6 days for this process. Direct photolysis will not be an important removal process since aliphatic ethers do not adsorb light at wavelengths >290 nm.

Ecotoxicity: No data found.
Henry's Law Constant: 5.87×10^{-4}
BCF: carp 1.5
Soil Sorption Partition Coefficient: K_{OC} = estimated at 11.2

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Section 13 - Disposal Considerations

Disposal: Consult manufacturer for recycling options and recycle where possible. Follow applicable federal, state, and local regulations. Incinerate residue at an approved site. Recycle containers where possible, or dispose of in an authorized landfill.
BEWARE: Empty solvent, paint, lacquer and flammable liquid drums present a severe explosion hazard if cut by flame torch or welded. Even when thoroughly cleaned or reconditioned the drum seams may retain sufficient solvent to generate an explosive atmosphere in the drum.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):



Shipping Name and Description: Methyl tert-butyl ether
ID: UN2398
Hazard Class: 3 - Flammable and combustible liquid
Packing Group: II - Medium Danger
Symbols:
Label Codes: 3 - Flammable Liquid
Special Provisions: IB2, T7, TP1
Packaging: **Exceptions:** 150 **Non-bulk:** 202 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** 5 L **Cargo aircraft only:** 60 L
Vessel Stowage: **Location:** E **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CAA Section 112 1000 lb (453.5 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Not listed
TSCA: Listed

Section 16 - Other Information

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Material Safety Data Sheet Collection
Genium group inc.
1171 RiverFront Center, Amsterdam, NY 12010
(518) 842-4111

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification 61

Material Name: Nitric Acid **CAS Number:** 7697-37-2
Chemical Formula: HNO_3
Structural Chemical Formula: HNO_3
EINECS Number: 231-714-2
ACX Number: X1002177-5
Synonyms: ACIDE NITRIQUE; ACIDO NITRICO; AQUA FORTIS; AZOTIC ACID; AZOTOWY KWAS; ENGRAVER'S ACID; ENGRAVERS ACID; HYDROGEN NITRATE; KYSELINA DUSICNE; NITAL; NITRIC ACID; NITRIC ACID OTHER THAN RED FUMING WITH >70% NITRIC ACID; NITRIC ACID OTHER THAN RED FUMING WITH NOT >70% NITRICACID; NITROUS FUMES; NITRYL HYDROXIDE; RED FUMING NITRIC ACID (RFNA); SALPETERSAURE; SALPETERZUUROPLOSSINGEN; WHITE FUMING NITRIC ACID (WFNA)
General Use: Manufacture of organic and inorganic nitrates and nitro compounds for fertilizers, dye intermediates and many organic chemicals.
Used for etching and cleaning metals.
Operators should be trained in procedures for safe use of this material.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
nitric acid	7697-37-2	>95

OSHA PEL
TWA: 2 ppm; 5 mg/m^3.

ACGIH TLV
TWA: 2 ppm; STEL: 4 ppm.

EU OEL
STEL: 2.6 mg/m^3 (1 ppm).

NIOSH REL
TWA: 2 ppm (5 mg/m^3); STEL: 4 ppm (10 mg/m^3).

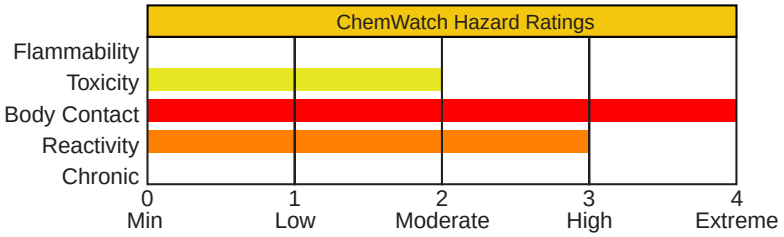
IDLH Level
25 ppm.

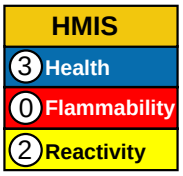
DFG (Germany) MAK
TWA: 2 ppm; PEAK: 2 ppm.

Section 3 - Hazards Identification



Fire Diamond





ANSI Signal Word

Danger!


Corrosive

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Clear to yellow fuming liquid; acrid, suffocating odor. Corrosive. Other Acute Effects: lung damage. Chronic Effects: tooth erosion, bronchitis. Strong oxidizer.

Potential Health Effects

Target Organs: eyes, skin, respiratory system, teeth
Primary Entry Routes: inhalation, ingestion, skin contact, eye contact
Acute Effects
Inhalation: The vapor is extremely discomforting and corrosive to the upper respiratory tract and lungs and the material presents a hazard from a single acute exposure or from repeated exposures over long periods.
Inhalation hazard is increased at higher temperatures.
Reactions may occur following a single acute exposure or may only appear after repeated exposures.

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Reactions may not occur on exposure but response may be delayed with symptoms only appearing many hours later.
The material may produce respiratory tract irritation which produces an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system. Unlike most organs the lung can respond to a chemical insult or agent by first trying to remove or neutralize the irritant and then repairing the damage. The repair process, which initially developed to protect mammalian lungs from foreign matter and antigens, may however, cause further damage the lungs when activated by hazardous chemicals. The result is often the impairment of gas exchange, the primary function of the lungs.
Inhalation of nitric acid mist or fumes at 2 to 25 ppm over an 8 hour period may cause pulmonary irritation and symptoms of lung damage.
Only several minutes of exposure to concentrated atmosphere i.e. 200 ppm may cause severe pulmonary damage and even fatality. Death may be delayed for several days.
Exposure to nitric acid fumes (with concurrent inhalation of nitrogen dioxide and nitric oxide) may elicit prompt irritation of the upper respiratory tract leading to coughing, gagging, chest pain, dyspnea, cyanosis if concentrations are sufficiently high and duration of exposure sufficiently long, pulmonary edema.

Eye: The liquid is extremely corrosive to the eyes and contact may cause rapid tissue destruction and is capable of causing severe damage with loss of sight.
The vapor is extremely discomforting to the eyes and is capable of causing pain and severe conjunctivitis.
Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated.
The material may produce moderate eye irritation leading to inflammation.
Repeated or prolonged exposure to irritants may produce conjunctivitis.
Eye contact with concentrated acid may give no pain, whilst diluted solution causes intense pain and both can cause permanent eye damage or blindness. Burns may result in shrinkage of the eyeball, symblepharon (adhesions between tarsal and bulbar conjunctivae), permanent corneal opacification, and visual impairment leading to blindness.

Skin: The liquid is extremely corrosive to the skin and contact may cause tissue destruction with severe burns.
Bare unprotected skin should not be exposed to this material.
The vapor is highly discomforting to the skin.
The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterized by skin redness (erythema) and swelling (edema) which may progress to vesiculation, scaling and thickening of the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.
Skin contact causes yellow discoloration of the skin, blisters and scars that may not heal. The skin may be stained bright-yellow or yellowish brown due to the formation of xanthoproteic acid. Dilute solutions may harden the epithelium without producing overt corrosion.

Ingestion: Considered an unlikely route of entry in commercial/industrial environments.
The material is extremely corrosive if swallowed and is capable of causing burns to mouth, throat, esophagus, with extreme discomfort, pain and may be fatal.
Even a small amount causes severe corrosion of the stomach, burning pain, vomiting and shock, possibly causing non-healing scarring of the gastrointestinal tract and stomach. Death may be delayed 12 hours to 14 days or to several months. Such late fatalities are attributed to a chemical lobular pneumonitis secondary to aspiration. Survivors show stricture of the gastric mucosa and subsequent pernicious anemia.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Chronic Effects: Prolonged or repeated overexposure to low concentrations of vapor may cause chronic bronchitis, corrosion of teeth, even chemical pneumonitis.

Section 4 - First Aid Measures

Inhalation: Remove to fresh air.
Lay patient down. Keep warm and rested.
If available, administer medical oxygen by trained personnel.
If breathing is shallow or has stopped, ensure clear airway and apply resuscitation. Transport to hospital or doctor, without delay.



Eye Contact: Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water. Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
Transport to hospital or doctor without delay. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Immediately transport to hospital or doctor. DO NOT delay.

Skin Contact: Immediately flush body and clothes with large amounts of water, using safety shower if available.
Quickly remove all contaminated clothing, including footwear.
Wash affected areas with water (and soap if available) for at least 15 minutes. Transport to hospital or doctor. DO NOT delay.

Ingestion: Contact a Poison Control Center.
Do NOT induce vomiting. Give a glass of water.
Immediately transport to hospital or doctor. DO NOT delay.

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After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: For acute or short-term repeated exposures to strong acids:

1.Airway problems may arise from laryngeal edema and inhalation exposure.
Treat with 100% oxygen initially.
2.Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling.
3. Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
4.Strong acids produce a coagulation necrosis characterized by formation of a coagulum (eschar) as a result of the desiccating action of the acid on proteins in specific tissues.

INGESTION:

1.Immediate dilution (milk or water) within 30 minutes post-ingestion is recommended.
2.Do not attempt to neutralize the acid since exothermic reaction may extend the corrosive injury.
3.Be careful to avoid further vomiting since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
4.Charcoal has no place in acid management.
5.Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

1.Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
2.Deep second-degree burns may benefit from topical silver sulfadiazine.

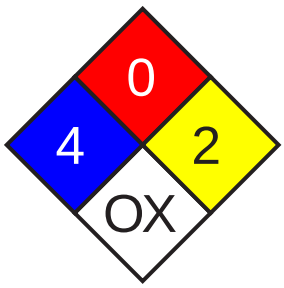
EYE:

1.Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. Do not use neutralizing agents or any other additives. Several liters of saline are required.
2.Cycloplegic drops (1% cyclopentolate for short-term use or 5% homatropine for longer term use), antibiotic drops, vasoconstrictive agents, or artificial tears may be indicated dependent on the severity of the injury.
3.Steroid eye drops should only be administered with the approval of a consulting ophthalmologist.

Section 5 - Fire-Fighting Measures

Flash Point: Nonflammable
Autoignition Temperature: Not applicable
LEL: Not applicable
UEL: Not applicable
Extinguishing Media: Water spray or fog; foam, dry chemical powder, or BCF (where regulations permit).
Carbon dioxide.





Fire Diamond

General Fire Hazards/Hazardous Combustion Products: Will not burn but increases intensity of fire.
Heating may cause expansion or decomposition leading to violent rupture of containers.
Heat affected containers remain hazardous.
Contact with combustibles such as wood, paper, oil or finely divided metal may cause ignition, combustion or violent decomposition.
May emit irritating, poisonous or corrosive fumes.
Decomposes on heating and produces toxic fumes of nitrogen oxides (NO_x) and nitric acid.

Fire Incompatibility: Oxidizing agents as a class are not necessarily combustible themselves, but can increase the risk and intensity of fire in many other substances.
Reacts vigorously with water and alkali.
Avoid reaction with organic materials/compounds, powdered metals, reducing agents and hydrogen sulfide (H_2S) as ignition may result.
Reacts with metals producing flammable/explosive hydrogen gas.

Fire-Fighting Instructions: Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
Fight fire from a safe distance, with adequate cover.
Extinguishers should be used only by trained personnel.
Use water delivered as a fine spray to control fire and cool adjacent area.
Avoid spraying water onto liquid pools.
Do not approach containers suspected to be hot.
Cool fire-exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.
If fire gets out of control withdraw personnel and warn against entry.
Equipment should be thoroughly decontaminated after use.

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Section 6 - Accidental Release Measures

Small Spills: Dangerous levels of nitrogen oxides may form during spills of nitric acid.
Wear fully protective PVC clothing and breathing apparatus.
Clean up all spills immediately. No smoking, bare lights, ignition sources.
Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result.
Avoid breathing dust or vapors and all contact with skin and eyes.
Control personal contact by using protective equipment.
Contain and absorb spill with dry sand, earth, inert material or vermiculite. DO NOT use sawdust as fire may result.
Scoop up solid residues and seal in labeled drums for disposal.
Neutralize/decontaminate area.
Use soda ash or slaked lime to neutralize.

See DOT ERG

Large Spills: DO NOT touch the spill material. Restrict access to area.
Clear area of personnel and move upwind. Contact fire department and tell them location and nature of hazard.
May be violently or explosively reactive. Wear full body protective clothing with breathing apparatus. Prevent, by any means available, spillage from entering drains or waterways. Consider evacuation.
No smoking, flames or ignition sources. Increase ventilation.
Contain spill with sand, earth or other clean, inert materials.
NEVER use organic absorbents such as sawdust, paper, cloth; as fire may result. Avoid any contamination by organic matter.
Use spark-free and explosion-proof equipment.
Collect any recoverable product into labeled containers for possible recycling. DO NOT mix fresh with recovered material.
Collect residues and seal in labeled drums for disposal.
Wash area and prevent runoff into drains. Decontaminate equipment and launder all protective clothing before storage and reuse.
If contamination of drains or waterways occurs advise emergency services.
DO NOT USE WATER OR NEUTRALIZING AGENTS INDISCRIMINATELY ON LARGE SPILLS.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid generating and breathing mist. Do not allow clothing wet with material to stay in contact with skin.
Avoid all personal contact, including inhalation.
Wear protective clothing when risk of exposure occurs.
Use in a well-ventilated area.
WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
Avoid smoking, bare lights or ignition sources.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Keep containers securely sealed when not in use. Avoid physical damage to containers. Always wash hands with soap and water after handling. Work clothes should be laundered separately.
Launder contaminated clothing before reuse.
Use good occupational work practices. Observe manufacturer's storing and handling recommendations. Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Recommended Storage Methods: Stainless steel drum. Check that containers are clearly labeled.
Packaging as recommended by manufacturer.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: Use in a well-ventilated area.
Local exhaust ventilation may be required for safe working, i. e. , to keep exposures below required standards; otherwise, PPE is required.
If risk of overexposure exists, wear NIOSH-approved respirator.
Correct fit is essential to obtain adequate protection.
In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.

Personal Protective Clothing/Equipment:

Eyes: Chemical goggles. Full face shield.
DO NOT wear contact lenses. Contact lenses pose a special hazard; soft contact lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Bare unprotected skin should not be exposed to this material. Impervious, gauntlet length gloves i.e., butyl rubber gloves or Neoprene rubber gloves or wear chemical protective gloves, e.g. PVC.

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Wear safety footwear or safety gumboots, e.g. Rubber.

Respiratory Protection:

Exposure Range >2 to <25 ppm: Supplied Air, Constant Flow/Pressure Demand, Half Mask

Exposure Range 25 to unlimited ppm: Self-contained Breathing Apparatus, Pressure Demand, Full Face

Other: Operators should be trained in procedures for safe use of this material.

Acid-resistant overalls or Rubber apron or PVC apron.

Ensure there is ready access to an emergency shower.

Ensure that there is ready access to eye wash unit.

Ensure that there is ready access to breathing apparatus.

Glove Selection Index:

BUTYL ..... Best selection
HYPALON ..... Best selection
NEOPRENE..... Best selection
NEOPRENE/NATURAL..... Best selection
PE/EVAL/PE ..... Best selection
SARANEX-23 ..... Best selection
NATURAL RUBBER..... Satisfactory; may degrade after 4 hours continuous immersion
NATURAL+NEOPRENE..... Satisfactory; may degrade after 4 hours continuous immersion
PVC..... Poor to dangerous choice for other than short-term immersion
NITRILE+PVC..... Poor to dangerous choice for other than short-term immersion

Section 9 - Physical and Chemical Properties

Appearance/General Info: Clear, colorless to slightly yellow liquid. Sharp strong odor.
CAUTION: exothermic dilution hazard.
HIGHLY CORROSIVE. Corrosive to most metals. Powerful oxidizing agent.
Darkens to brownish color on aging and exposure to light.

Physical State: Liquid
Odor Threshold: 0.75 to 2.50 mg/m^3
Vapor Pressure (kPa): 8.26
Vapor Density (Air=1): 1.5
Formula Weight: 63.02
Specific Gravity (H_2O=1, at 4 °C): 1.3-1.42
pH: < 1

pH (1% Solution): 1
Boiling Point: 83 °C (181 °F) at 760 mm Hg
Freezing/Melting Point: -42 °C (-43.6 °F)
Volatile Component (% Vol): 100 (nominal)
Decomposition Temperature (°C): Not applicable
Water Solubility: Soluble in all proportions

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Presence of heat source and direct sunlight. Storage in unsealed containers. Hazardous polymerization will not occur.

Storage Incompatibilities: Segregate from reducing agents, finely divided combustible materials, combustible materials, sawdust, metals and powdered metals.

Avoid contamination of water, foodstuffs, feed or seed.

Segregate from alkalies, oxidizing agents and chemicals readily decomposed by acids, i.e. cyanides, sulfides, carbonates.

Section 11 - Toxicological Information

Toxicity

Oral (human) LD_{Lo}: 430 mg/kg
Inhalation (rat) LC_{50}: 2500 ppm/1 hr
Unreported (man) LD_{Lo}: 110 mg/kg

Irritation

Nil reported

See *RTECS* QU 5775000, for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.

Ecotoxicity: LC_{50} Starfish 100-300 mg/l/48 hr /Aerated water conditions; LC_{50} Shore crab 180 mg/l/48 hr /Static, aerated water conditions; LC_{50} Cockle 330-1000 mg/l/48 hr /Aerated water conditions

BCF: no food chain concentration potential

Biochemical Oxygen Demand (BOD): none

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Section 13 - Disposal Considerations

Disposal: Recycle wherever possible. Special hazards may exist - specialist advice may be required.
Consult manufacturer for recycling options.
Follow applicable federal, state, and local regulations.
Treat and neutralize at an approved treatment plant.
Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.
Puncture containers to prevent reuse and bury at an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Nitric acid *other than red fuming, with more than 70 percent nitric acid*



ID: UN2031
Hazard Class: 8 - Corrosive material
Packing Group: I - Great Danger
Symbols:
Label Codes: 8 - Corrosive, 5.1 - Oxidizer
Special Provisions: B47, B53, T10, TP2, TP12, TP13
Packaging: **Exceptions:** None **Non-bulk:** 158 **Bulk:** 243
Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** 2.5 L
Vessel Stowage: **Location:** D **Other:** 44, 66, 89, 90, 110, 111

Shipping Name and Description: Nitric acid *other than red fuming, with not more than 70 percent nitric acid*



ID: UN2031
Hazard Class: 8 - Corrosive material
Packing Group: II - Medium Danger
Symbols:
Label Codes: 8 - Corrosive
Special Provisions: B2, B47, B53, IB2, T8, TP2, TP12
Packaging: **Exceptions:** None **Non-bulk:** 158 **Bulk:** 242
Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** 30 L
Vessel Stowage: **Location:** D **Other:**

Shipping Name and Description: Nitric acid, red fuming



ID: UN2032
Hazard Class: 8 - Corrosive material
Packing Group: I - Great Danger
Symbols: + - Override definitions
Label Codes: 8 - Corrosive, 5.1 - Oxidizer, 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*
Special Provisions: 2, B9, B32, B74, T20, TP2, TP12, TP13, TP38, TP45
Packaging: **Exceptions:** None **Non-bulk:** 227 **Bulk:** 244
Quantity Limitations: **Passenger aircraft/rail:** Forbidden **Cargo aircraft only:** Forbidden
Vessel Stowage: **Location:** D **Other:**

Section 15 - Regulatory Information

EPA Regulations:
RCRA 40 CFR: Not listed
CERCLA 40 CFR 302.4: Listed per CWA Section 311(b)(4) 1000 lb (453.5 kg)
SARA 40 CFR 372.65: Listed
SARA EHS 40 CFR 355: Listed
RQ: 1000 lb
TPQ: 1000 lb
TSCA: Listed

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Section 16 - Other Information

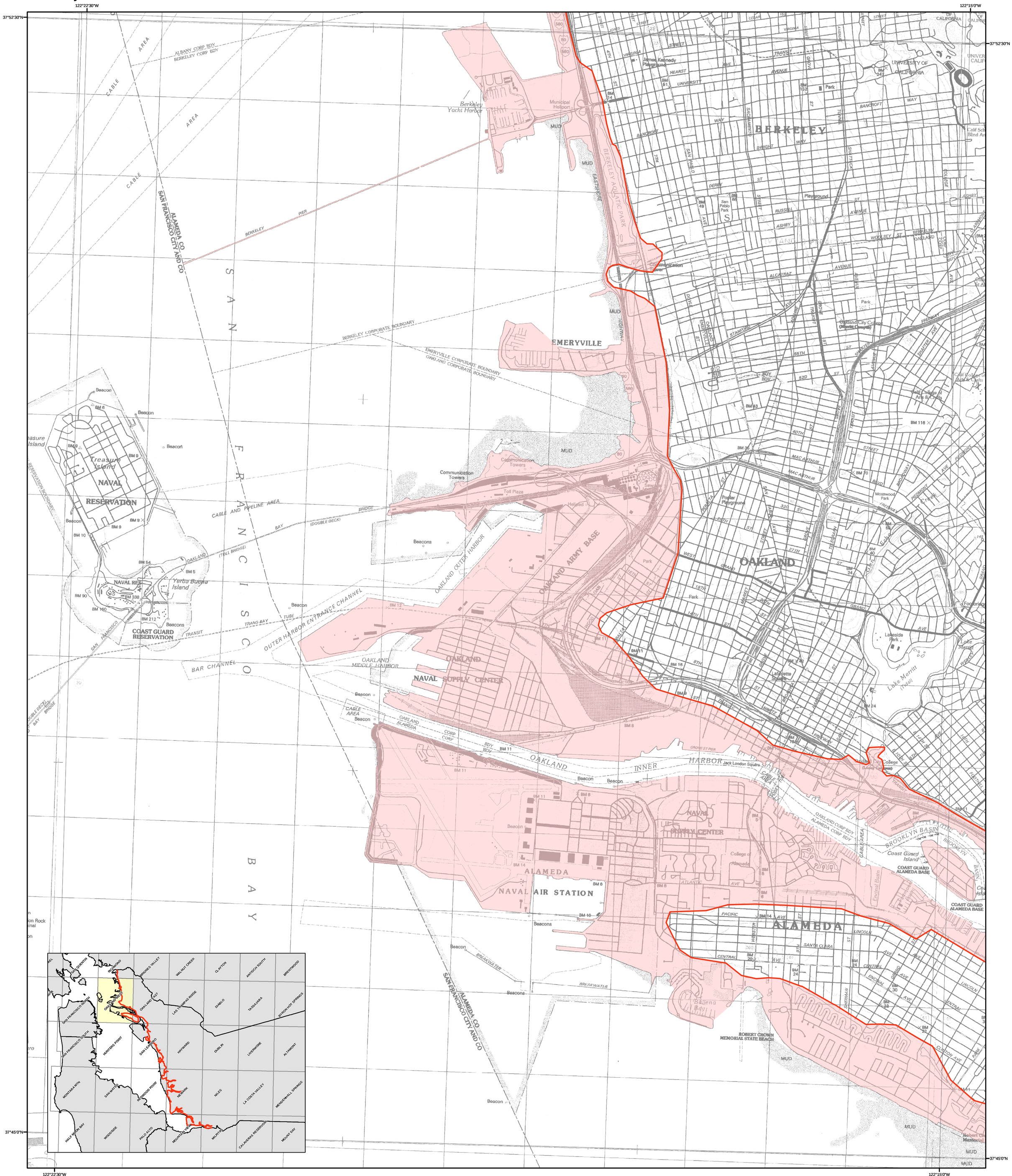
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California Emergency Management Agency
California Geological Survey
University of Southern California

Tsunami Inundation Map for Emergency Planning
Oakland West Quadrangle

State of California
County of Alameda



METHOD OF PREPARATION

Initial tsunami modeling was performed by the University of Southern California (USC) Tsunami Research Center funded through the California Emergency Management Agency (CalEMA) by the National Tsunami Hazard Mitigation Program. The tsunami modeling process utilized the MOST (Method of Splitting Tsunamis) computational program (Version 0), which allows for wave evolution over a variable bathymetry and topography used for the inundation mapping (Titov and Gonzalez, 1997; Titov and Synolakis, 1998).

The bathymetric/topographic data that were used in the tsunami models consist of a series of nested grids. Near-shore grids with a 3 arc-second (75- to 90-meters) resolution or higher, were adjusted to "Mean High Water" sea-level conditions, representing a conservative sea level for the intended use of the tsunami modeling and mapping.

A suite of tsunami source events was selected for modeling, representing realistic local and distant earthquakes and hypothetical extreme undersea, near-shore landslides (Table 1). Local tsunami sources that were considered include offshore reverse-thrust faults, restraining bends on strike-slip fault zones and large submarine landslides capable of significant seafloor displacement and tsunami generation. Distant tsunami sources that were considered include great subduction zone events that are known to have occurred historically (1960 Chile and 1964 Alaska earthquakes) and others which can occur around the Pacific Ocean "Ring of Fire."

In order to enhance the result from the 75- to 90-meter inundation grid data, a method was developed utilizing higher-resolution digital topographic data (3- to 10-meters resolution) that better defines the location of the maximum inundation line (U.S. Geological Survey, 1993; Intermap, 2003; NOAA, 2004). The location of the enhanced inundation line was determined by using digital imagery and terrain data on a GIS platform with consideration given to historic inundation information (Lander, et al., 1993). This information was verified, where possible, by field work coordinated with local county personnel.

The accuracy of the inundation line shown on these maps is subject to limitations in the accuracy and completeness of available terrain and tsunami source information, and the current understanding of tsunami generation and propagation phenomena as expressed in the models. Thus, although an attempt has been made to identify a credible upper bound to inundation at any location along the coastline, it remains possible that actual inundation could be greater in a major tsunami event.

This map does not represent inundation from a single scenario event. It was created by combining inundation results for an ensemble of source events affecting a given region (Table 1). For this reason, all of the inundation region in a particular area will not likely be inundated during a single tsunami event.

References:

Intermap Technologies, Inc., 2003, Intermap product handbook and quick start guide: Intermap NEXTmap document on 5-meter resolution data, 112 p.

Lander, J.F., Lockridge, P.A., and Kozuch, M.J., 1993, Tsunamis Affecting the West Coast of the United States 1806-1992: National Geophysical Data Center Key to Geophysical Record Documentation No. 29, NOAA, NESDIS, NGDC, 242 p.

National Atmospheric and Oceanic Administration (NOAA), 2004, Interferometric Synthetic Aperture Radar (IfSAR) Digital Elevation Models from GeoSAR platform (EarthData): 3-meter resolution data.

Titov, V.V., and Gonzalez, F.I., 1997, Implementation and Testing of the Method of Tsunami Splitting (MOST): NOAA Technical Memorandum ERL PMEL – 112, 11 p.

Titov, V.V., and Synolakis, C.E., 1998, Numerical modeling of tidal wave runup: Journal of Waterways, Port, Coastal and Ocean Engineering, ASCE, 124 (4), pp 157-171.

U.S. Geological Survey, 1993, Digital Elevation Models: National Mapping Program, Technical Instructions, Data Users Guide 5, 48 p.

TSUNAMI INUNDATION MAP FOR EMERGENCY PLANNING

State of California ~ County of Alameda
OAKLAND WEST QUADRANGLE

July 31, 2009

SCALE 1:24,000

0.5 0.25 0 0.5 1 Miles

1,000 500 0 1,000 2,000 3,000 4,000 5,000 Feet

0.5 0.25 0 0.5 1 Kilometers

Table 1: Tsunami sources modeled for the Alameda County coastline.

Sources (M = moment magnitude used in modeled event)		Area of Inundation Map Coverage and Sources Used
		San Francisco Bay
Local sources	Point Reyes Thrust Fault	X
	Rodgers Creek-Hayward Faults	X
	San Gregorio Fault	X
Distant Sources	Cascadia Subduction Zone-full rupture (M9.0)	X
	Central Aleutians Subduction Zone #1 (M8.9)	X
	Central Aleutians Subduction Zone #2 (M8.9)	X
	Central Aleutians Subduction Zone #3 (M9.2)	X
	Chile North Subduction Zone (M9.4)	X
	1960 Chile Earthquake (M9.3)	X
	1964 Alaska Earthquake (M9.2)	X
	Japan Subduction Zone #2 (M8.8)	X
	Kuril Islands Subduction Zone #2 (M8.8)	X
	Kuril Islands Subduction Zone #3 (M8.8)	X
	Kuril Islands Subduction Zone #4 (M8.8)	X
	Marianas Subduction Zone (M8.6)	X

Cal EMA CALIFORNIA EMERGENCY MANAGEMENT AGENCY

CGS CALIFORNIA GEOLOGICAL SURVEY

USC UNIVERSITY OF SOUTHERN CALIFORNIA

MAP EXPLANATION

Tsunami Inundation Line

Tsunami Inundation Area

PURPOSE OF THIS MAP

This tsunami inundation map was prepared to assist cities and counties in identifying their tsunami hazard. It is intended for local jurisdictional, coastal evacuation planning uses only. This map, and the information presented herein, is not a legal document and does not meet disclosure requirements for real estate transactions nor for any other regulatory purpose.

The inundation map has been compiled with best currently available scientific information. The inundation line represents the maximum considered tsunami runup from a number of extreme, yet realistic, tsunami sources. Tsunamis are rare events; due to a lack of known occurrences in the historical record, this map includes no information about the probability of any tsunami affecting any area within a specific period of time.

Please refer to the following websites for additional information on the construction and/or intended use of the tsunami inundation map:

State of California Emergency Management Agency, Earthquake and Tsunami Program:
http://www.oes.ca.gov/WebPage/oeswebsite.nsf/Content/B1EC51BA215931768825741F005E8D80?OpenDocument

University of Southern California – Tsunami Research Center:
http://www.usc.edu/dept/tsunamis/2005/index.php

State of California Geological Survey Tsunami Information:
http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/index.htm

National Oceanic and Atmospheric Agency Center for Tsunami Research (MOST model):
http://nctr.pmel.noaa.gov/time/background/models.html

MAP BASE

Topographic base maps prepared by U.S. Geological Survey as part of the 7.5-minute Quadrangle Map Series (originally 1:24,000 scale). Tsunami inundation line boundaries may reflect updated digital orthophotographic and topographic data that can differ significantly from contours shown on the base map.

DISCLAIMER

The California Emergency Management Agency (CalEMA), the University of Southern California (USC), and the California Geological Survey (CGS) make no representation or warranties regarding the accuracy of this inundation map nor the data from which the map was derived. Neither the State of California nor USC shall be liable under any circumstances for any direct, indirect, special, incidental or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map.

STATE OF CALIFORNIA

The Resources Agency

Department of Water Resources

Division of Safety of Dams

STATUTES AND REGULATIONS

PERTAINING TO

SUPERVISION OF

DAMS AND RESERVOIRS

FOREWARD

Since August 14, 1929, the State of California has supervised dams to prevent failure, to safeguard life, and to protect property. The legislation was a result of the failure of St. Francis Dam in March of 1928. Legislation enacted in 1965 revised the Statutes to include off-stream storage reservoirs as a result of the failure of Baldwin Hills Reservoir in December 1963.

Dams and reservoirs are defined in the California Water Code Sections 6002, 6003, and 6004. Certain exemptions are included in Sections 6004 and 6025. All dams under these definitions are subject to State supervision unless they are owned and operated by the United States. A careful reading of all the California Water Code sections and the California Code of Regulations sections included herein is strongly recommended for those who are regulated by these provisions. The schedule of fees is periodically adjusted in accordance with Section 6307 of the Water Code. The current fee structure is listed on the Division website under “Fees.”

This document contains Parts 1 and 2 of Division 3, Dams and Reservoirs, of the California Water Code (Statutes), Chapter 1 of Division 2, Title 23 Waters, of the California Code of Regulations (Regulations adopted by the Department of Water Resources), and an outline of Current Practices of the Department in Supervision of Dams and Reservoirs.

NOTICE

This compendium of laws governing dams and reservoirs has been compiled by the Department of Water Resources, Division of Safety of Dams, for convenient reference only and is not represented to be the official version of the statutes or the regulations. Notes, text, and history of repealed sections are not included in this reprint.

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CALIFORNIA WATER CODE
Division 3. Dams and Reservoirs

DIVISION 3. DAMS AND RESERVOIRS

PART 1. SUPERVISION OF DAMS AND RESERVOIRS

Chapter 1. Definitions

6000. Unless the context otherwise requires, the definitions in this chapter govern the construction of this part.

6002. “Dam” means any artificial barrier, together with appurtenant works, which does or may impound or divert water, and which either (a) is or will be 25 feet or more in height from the natural bed of the stream or watercourse at the downstream toe of the barrier, as determined by the department, or from the lowest elevation of the outside limit of the barrier, as determined by the department, if it is not across a stream channel or watercourse, to the maximum possible water storage elevation or (b) has or will have an impounding capacity of 50 acre-feet or more.

6003. Any such barrier which is or will be not in excess of 6 feet in height, regardless of storage capacity, or which has or will have a storage capacity not in excess of 15 acre-feet, regardless of height, shall not be considered a dam.

6004. a) No obstruction in a canal used to raise or lower water therein or divert water therefrom, no levee, including but not limited to a levee on the bed of a natural lake the primary purpose of which levee is to control floodwaters, no railroad fill or structure, and no road or highway fill or structure, no circular tank constructed of steel or concrete, or both, no tank elevated above the ground, and no barrier which is not across a stream channel, watercourse, or natural drainage area and which has the principal purpose of impounding water for agricultural use shall be considered a dam.

b) No obstruction in the channel of astream or watercourse which is 15 feet or less in height from the lowest elevation of the obstruction and which has the single purpose of spreading water within the bed of the stream or watercourse upstream from the obstruction for percolation underground shall be considered a dam.

c) The levee of an island adjacent to tidal waters in the Sacramento-San Joaquin Delta, as defined in Section 12220, even when used to impound water, shall not be considered a dam and the impoundment shall not be considered a reservoir if the maximum possible water storage elevation of the impounded water does not

exceed four feet above mean sea level, as established by the United Stated Geological Survey 1929 datum.

d) No noncircular tank, constructed of steel or concrete, or both, that is constructed in a county of the third class by a public agency, under the supervision of a civil engineer registered in the state, that does not exceed 75 acre-feet in capacity or 30 feet in height, and no barrier that is not across a stream channel, watercourse, or natural drainage area and that has the principal use as a sewage sludge drying facility shall be considered a dam.

6004.5. "Reservoir" means any reservoir which contains or will contain the water impounded by a dam.

6005. "Owner" includes any of the following who own, control, operate, maintain, manage, or propose to construct a dam or reservoir:

(a) The State and its departments, institutions, agencies, and political subdivisions.

(b) Every municipal or quasi-municipal corporation.

(c) Every public utility.

(d) Every district.

(e) Every person.

(f) The duly authorized agents, lessees, or trustees of any of the foregoing.

(g) Receivers or trustees appointed by any court for any of the foregoing.

"Owner" does not include the United States.

6006. "Alterations", "repairs", or either of them, mean only such alterations or repairs as may affect the safety of the dam or reservoir.

6007. "Enlargement" means any change in or addition to an existing dam or reservoir, which raises or may raise the water storage elevation of the water impounded by the dam or reservoir.

6008. Water storage elevation means that elevation of water surface which could be obtained by the existing dam or reservoir, as previously operated, were there no outflow and were the reservoir full of water.

Chapter 2. General Provisions

6025. It is the intent of the Legislature by this part to provide for the regulation and supervision of dams and reservoirs exclusively by the State.

6025.5 a) Notwithstanding any other provision, subject to subdivision (b), the requirements for state regulation and supervision of safety of dams, as contained in this division, shall not be applicable to waste water treatment and storage ponds constructed as a part of a waste water control facility.

b) This section applies to those ponds specified in subdivision (a) only after the governing body of the city, county, district, or other agency which operates the waste water control facility adopts a resolution which (1) finds that the ponds have been constructed and operated to standards adequate to protect life and property, and (2) provides that the city, county, district, or other agency shall supervise and regulate the design, construction, operation, enlargement, replacement, and removal of the ponds after the effective date of the resolution.

c) This section applies only to ponds specified in subdivision (a) which (1) have a maximum height of 15 feet or less and a maximum storage capacity of 1,500 acre-feet or less, (2) have been designed by, and constructed under the supervision of, a registered civil engineer, and (3) are not across a stream channel or watercourse.

6025.6 a) An owner of a structure defined as a dam pursuant to Section 6002, but excluded from that definition pursuant to subdivision (d) of Section 6004 or otherwise exempted from the requirements of this chapter pursuant to Section 6025.5, shall comply with the requirements of Section 8589.5 of the Government Code and shall employ a civil engineer who is registered in the state to supervise the structure for the protection of life and property for the full operating life of the structure.

b) (1) The civil engineer supervising a dam pursuant to subdivision (a) shall take into consideration, in determining whether or not a dam constitutes, or would constitute, a danger to life or property, the possibility that the dam might be endangered by seepage, earth movement, or other conditions that exist, or might occur, in any area in the vicinity of the dam.

(2) If the civil engineer determines that a dam under his or her supervision constitutes, or would constitute, a danger to life

or property, the civil engineer shall notify the owner of the dam and recommend appropriate action.

c) The owner shall submit to the department the name, business address, and telephone number of each supervising civil engineer.

d) The department shall submit the information provided pursuant to subdivision (c) to the Office of Emergency Services on or before January 1, 1995, and on or before each January 1 thereafter. Any change in the information shall be submitted to the department on or before July 1 of each year.

6026. No city or county has authority, by ordinance enacted by the legislative body thereof or adopted by the people under the initiative power, or otherwise, to regulate, supervise, or provide for the regulation or supervision of any dams or reservoirs in this state, or the construction, maintenance, or operation thereof, nor to limit the size of any dam or reservoir or the amount of water which may be stored therein. This part shall not prevent a city or county from adopting ordinances regulating, supervising, or providing for the regulation or supervision of dams and reservoirs that (a) are not within the state's jurisdiction, or (b) are not subject to regulation by another public agency or body.

6027. Whenever supervision of safety of design or construction of a proposed or existing dam or reservoir is exercised by the United States or any of its agencies pursuant to a jurisdiction superior to that of the state, and the requirements made under authority of such jurisdiction are so contradictory with requirements made by the department under this part that a compliance cannot be made which will meet both federal and state requirements, then the state requirements shall be modified by the department sufficiently to make possible compliance with both federal and state requirements.

6028. No action shall be brought against the state or the department or its agents or employees for the recovery of damages caused by the partial or total failure of any dam or reservoir or through the operation of any dam or reservoir upon the ground that such defendant is liable by virtue of any of the following:

(a) The approval of the dam or reservoir.

(b) The issuance or enforcement of orders relative to maintenance or operation of the dam or reservoir.

(c) Control and regulation of the dam or reservoir.

(d) Measures taken to protect against failure during an emergency.

6029. Nothing in this part shall be construed to relieve an owner or operator of a dam or reservoir of the legal duties, obligations, or liabilities incident to the ownership or operation of the dam or reservoir.

6030. The findings and orders of the department and the certificate of approval of any dam or reservoir issued by the department are final and conclusive and binding upon all state agencies, regulatory or otherwise, as to the safety of design, construction, maintenance, and operation of any dam or reservoir.

6031. Nothing in this part shall be construed to deprive any owner of such recourse to the courts as he may be entitled to under the laws of this State.

Chapter 3. Administrative Provisions

6052. The department shall employ such clerical, engineering, and other assistants as are necessary for carrying on the work of dam and reservoir supervision in accordance with this part.

6053. The department may employ consultants.

6054. When the safety and technical considerations pertaining to a certificate of approval, dam, reservoir, or plans and specifications require it, or when requested in writing to do so by the owner, the department shall appoint a consulting board of two or more consultants to report to the department on the safety features involved.

6055. The cost and expense of a consulting board if appointed on the request of an owner shall be paid by the owner.

6056. The department shall retain a board of three consultants who shall make an independent report to the director upon the issuance, modification, or renewal of any certificate of approval for any dam owned by the department.

Chapter 4. Powers of the Department

Article 1. Powers in General

6075. The department, under the police power of the state, shall supervise the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs for the protection of life and property as provided in this part.

6076. All dams and reservoirs in the state are under the jurisdiction of the department.

6077. It is unlawful to construct, enlarge, repair, alter, remove, maintain, or operate any dam or reservoir except upon approval of the department as provided in this part.

6078. The department shall adopt and revise from time to time such rules and regulations and issue such general orders as may be necessary for carrying out, but not inconsistent with, the provisions of this part.

6079. In carrying out the provisions of this part the department may cooperate with the United States or any of its agencies.

6080. In making any investigations or inspections required or authorized by this part the department or its representatives may enter upon private property as may be necessary.

6081. In determining whether or not a dam or reservoir or proposed dam or reservoir constitutes or would constitute a danger to life or property, the department shall take into consideration the possibility that the dam or reservoir might be endangered by seepage, earth movement, or other conditions which exist or which might occur in any area in the vicinity of the dam or reservoir. Whenever the department deems that any such condition endangers a dam or reservoir, it shall order the owner to take such action as the department determines to be necessary to remove the resultant danger to life and property.

Article 2. Maintenance and Operation

6100. Supervision over the maintenance and operation of dams and reservoirs insofar as necessary to safeguard life and property from injury by reason of the failure thereof is vested in the department.

6101. The department may require owners to keep records of, and to report on, maintenance, operation, staffing, and engineering and geologic investigations and shall issue such rules and regulations and orders as necessary to secure maintenance and operation and to require staffing and engineering and geologic investigations which will safeguard life and property. In addition, the owner of a dam or reservoir or his agent shall fully and promptly advise the department of any sudden or unprecedented flood or unusual or alarming circumstance or occurrence affecting the dam or reservoir.

6102. The department, from time to time, shall make inspections of dams and reservoirs at state expense for the purpose of determining their safety but shall require owners to perform at their expense such work as necessary to disclose information sufficient to enable the department to determine conditions of dams and reservoirs in regard to their safety and to perform at their expense other work necessary to secure maintenance and operation which will safeguard life and property.

Article 3. Emergency Work

6110. The department shall immediately employ any remedial means necessary to protect life and property if either:

(a) The condition of any dam or reservoir is so dangerous to the safety of life or property as not to permit time for the issuance and enforcement of an order relative to maintenance or operation.

(b) Passing or imminent floods threaten the safety of any dam or reservoir.

6111. In applying the remedial means provided for in this article, the department may in emergency do any of the following:

(a) Lower the water level by releasing water from the reservoir.

(b) Completely empty the reservoir.

(c) Take such other steps as may be essential to safeguard life and property.

6112. The department shall continue in full charge and control of such dam or reservoir, or both, and its appurtenances until they are rendered safe or the emergency occasioning the action has ceased.

6113. The cost and expenses of the remedial means provided in this article, including cost of any work done to render a dam or reservoir of its appurtenances safe, shall be recoverable by the state from the owner by action brought by the department in the superior court of the county wherein the dam or reservoir or any part thereof is situated.

Article 4. Investigations and Studies

6120. For the purpose of enabling it to make decisions as compatible with economy and public safety as possible the department

shall make or cause to be made such investigations and shall gather or cause to be gathered such data as may be needed for a proper review and study of the various features of the design and construction of dams, reservoirs, and appurtenances.

6121. The department shall also make or cause to be made such watershed investigations and studies as may facilitate its decisions.

Article 5. Action and Procedure To Restrain Violations

6150. The department may commence an action or proceeding under this article, either by mandamus or injunction, for the purpose of stopping or preventing violations or threatened violations.

6151. An action or proceeding under this article may be commenced whenever any owner or any person acting as a director, officer, agent, or employee of any owner, or any contractor or agent or employee of such contractor is:

(a) Failing or omitting or about to fail or omit to do anything required of him by this part or by any approval, order, rule, regulation, or requirement of the department under the authority of this part; or

(b) Doing or permitting anything or about to do or permit anything to be done in violation of or contrary to this part or any approval, order, rule, regulation, or requirement of the department under this part.

6152. Any action or proceeding under this article shall be commenced in the superior court in and for the county in which (a) the cause or some part thereof arose, (b) the owner or person complained of has its principal place of business or (c) the person complained of resides.

6153. Any action or proceeding under this article shall be brought by petition in the superior court, alleging the violation or threatened violation complained of, and praying for appropriate relief by way of mandamus or injunction.

6154. The court shall specify a time, not exceeding 20 days after the service of the copy of the petition, within which the owner or person complained of shall answer the petition, and in the meantime the owner or person may be restrained.

6155. In case of default in answer or after answer the court shall immediately inquire into the facts and circumstances of the case.

6156. The court may join such parties as it deems necessary or proper in order to make its judgment, order, or writ effective.

6157. The final judgment in such action or proceeding shall either dismiss the action or proceeding or direct that the writ of mandamus or injunction issue or be made permanent as prayed for in the petition, or in such modified or other form as will afford appropriate relief.

Chapter 5. Applications

Article 1. New Dams and Reservoirs or Enlargements of Dams and Reservoirs

6200. Construction of any new dam or reservoir or the enlargement of any dam or reservoir shall not be commenced until the owner has applied for and obtained from the department written approval of plans and specifications.

6201. A separate application for each dam or reservoir shall be filed with the department upon forms to be provided by it, except that only one application need be filed for a dam and the reservoir which will contain the water impounded by the dam.

6202. The application shall give the following information:

(a) The name and address of the owner.

(b) The location, type, size, and height of the proposed dam or reservoir and appurtenant works.

(c) The storage capacity of the reservoir.

(d) Such other pertinent information as the department requires.

(e) As accurately as may be readily obtained,the area of the drainage basin, rainfall and streamflow records and floodflow records and estimates.

6203. The department may also require the following:

(a) Data concerning subsoil and foundation conditions and the materials entering into construction of the dam or reservoir.

(b) Investigations of, and reports on, subsurface conditions, involving such matters as exploratory pits, trenches and adits, drilling, coring, geophysical surveys, tests to determine leakage rates, and physical tests to measure in place the properties and behavior of foundation materials at the dam or reservoir site.

(c) Investigations of, and reports on, the geology of the dam or reservoir site and its vicinity, possible geologic hazards, availability and quality of construction materials, and other pertinent features.

(d) Such other appropriate information as may be necessary in a given instance.

6204. In instances wherein the physical conditions involved and the size of the dam or reservoir are such as to render the above requirements as to drainage areas, rainfall, streamflow, floodflow, and drilling or prospecting of site unnecessary, the department may waive the requirements.

6205. The application shall set forth the purpose for which the impounded or diverted water is to be used.

6206. The application shall be accompanied by maps and plans and specifications of such character and size and setting forth such pertinent details and dimensions as the department requires.

The maps and plans and specifications shall be a part of the application.

Article 2. Repairs, Alterations or Removals

6225. Before commencing the repair, alteration, or removal of a dam or reservoir, including the alteration or removal of a dam or reservoir so that it no longer constitutes a dam or reservoir as defined in this part, the owner shall secure the written approval of the department, except as provided in this article.

6226. The application shall give such pertinent information or data concerning the dam or reservoir, or both, as may be required by the department and such information as to other matters appropriate to a thorough consideration of the safety of such a change as may be required by the department.

6227. The application shall state the proposed time of commencement and of completion of construction.

6228. The application shall give the name and address of applicant, shall adequately detail, with appropriate references to the existing dam or reservoir, the changes which it is proposed to effect, and shall be accompanied by maps and plans and specifications which shall be a part of the application and which shall be of such character and size and set forth such pertinent details and dimensions as the department may require. The department may waive any of the requirements of this section if found by it unnecessary.

6229. In case of an emergency where repairs are necessary to safeguard life and property, repairs may be started immediately, but the department shall be notified at once of proposed repairs and of work under way.

6230. The proposed repairs and work shall be made to conform to such orders as the department issues.

Article 3. Dams Constructed Prior to August 14, 1929

6250. Unless application for approval of the dam has heretofore been made, every owner of a dam completed prior to August 14, 1929 shall, immediately after the effective date of this part, file an application for the approval of such dam.

6251. A separate application shall be made for each dam and shall be filed with the department upon forms to be supplied by it and shall supply such appropriate information concerning the dam as the department requires.

6252. The department shall give notice to file to owners who have failed to do so as required by this article, and a failure to file within 30 days after such notice shall be punishable as provided in this part.

6253. The notice provided for in this article may be given by registered mail and a return receipt signed by the owner shall constitute prima facie evidence of service.

Article 4. Approval of Applications

6260. Upon receipt of any application other than an application provided for in Article 3 of this chapter the department shall give its consideration thereto and shall approve or disapprove the same within the time provided in this article.

6261. A defective application made in a bona fide attempt to conform to the law and rules and regulations of the department shall not be rejected but notice of defect shall be sent to the applicant by ordinary and registered mail.

6262. If within 30 days of the date of mailing the notice the applicant does not file an amended and perfected application, the application shall be rejected and canceled unless for good cause shown the department allows the applicant further time.

6263. No application shall be approved in less than 10 days from its receipt but all applications shall be approved or disapproved as soon as practicable after the receipt of all data and information found necessary by the department.

6264. Approvals may be granted under terms, conditions, and limitations necessary to safeguard life and property.

6265. Actual construction shall be commenced within one year after date of approval, otherwise the approval becomes void.

6266. The department may, upon written application and for good cause shown, extend the time for commencing construction.

6267. Notice shall be given to the department at least 10 days before construction is to be commenced and such other notices shall be given to the department as it may require.

Chapter 6. Fees

6300. (a) The application for a new dam or reservoir or enlargement shall set forth the estimated cost, as defined in this article, of the dam or reservoir or enlargement and shall be accompanied by a filing fee based upon the estimated cost and according to the following schedule:

(1) For the first three hundred thousand dollars ($300,000), a fee of 3 percent of the estimated cost.

(2) For the next seven hundred thousand dollars ($700,000), a fee of 2 percent.

(3) For the next one million dollars ($1,000,000) a fee of 1 ½ percent.

(4) For the next one million dollars ($1,000,000), a fee of 1 ¼ percent.

(5) For the next two million dollars ($2,000,000), a fee of 1 percent.

(6) For the next two million dollars ($2,000,000), a fee of three-fourths of 1 percent.

(7) For all costs in excess of seven million dollars ($7,000,000), a fee of one-half of 1 percent.

(b) In no case, however, shall the minimum fee be less than three hundred dollars ($300).

6301. One filing fee only shall be collected for an enlargement to be effected by flashboards, sandbags, earthen levees, gates, or other works, devices, or obstructions which are, from time to time, to be removed and replaced or opened and shut and thereby operated so as to vary the surface elevation of the impounded water.

6302. For the purposes of this part, the estimated cost of the dam or reservoir or enlargement involved shall include the following:

(a) The cost of all labor and materials entering into the construction of the dam and appurtenant works or reservoir.

(b) The cost of preliminary investigations and surveys.

(c) The cost of the construction plant properly chargeable to the cost of the dam or reservoir.

(d) Any and all other items entering directly into the cost of the dam or reservoir.

6303. The costs of right-of-way, detached powerhouses, electrical generating machinery, and roads and railroads affording access to the dam or reservoir shall not be included among the items used in the determination of cost.

6304. An application shall not be considered by the department until the filing fee is received.

6305. In the event the actual cost exceeds the estimated cost by more than 15 percent, a further fee shall be required by the department before final approval and shall be 115 percent of the amount by which the original fee is less than it would have been had the cost it was based upon been the same as the actual cost. No further fee shall be required, however if such fee is to be computed at less than twenty dollars ($20).

6306. Applications for dams found by the department to have been less than 90 percent constructed on August 14, 1929, shall be accompanied by fees as much
less than provided for dams commenced after that date as the percentage of construction found by the department to have been completed on that date.

6307. (a) (1) The department shall adopt, by regulation, a schedule of fees to cover the department's costs in carrying out the supervision of dam safety.

(2) The revenue generated by the fees imposed under this section shall be adjusted periodically for cost-of-living increases. If the director determines that the revenue collected during the preceding fiscal year was greater or less than the cost to operate the program, the director shall adjust the fees to compensate for the overcollection or undercollection of revenue. The department shall provide a schedule of fees to the Legislature and to every dam owner that has a permit or has applied for a permit, when any adjustment is made to the fees under this section.

(b) (1) An annual fee shall be paid on or before January 31, 2004, July 1, 2004, and on or before July 1 of each succeeding year, based upon a fixed rate and height of the dam, including all enlargements thereto, substantially completed by or in operation on June 30, 2003, and on June 30 of each succeeding year. The fees collected on December 31, 2003, will be credited toward the fees due January 31, 2004. The annual fee shall be four hundred dollars ($400) per dam, plus one hundred ten dollars ($110) per foot of height. This fee shall be periodically adjusted, as described in subdivision (a).

(2) A penalty plus interest, as set forth in Section 6428 of the Water Code, shall be imposed for fees received after July 1 in any year, except that for the year 2003, the penalty plus interest shall be imposed for any fees received after January 31, 2004.

(c) For the purposes of this section, “height of the dam” means the vertical distance, to the nearest foot, from the natural bed of the stream or watercourse at the downstream toe of the barrier, as determined by the department, or from the lowest elevation of the outside limit of the barrier, as determined by the department, if it is not across a stream channel or watercourse, to the maximum possible water storage elevation.

(d) Notwithstanding subdivision (b), the department shall limit the total annual fee per dam to not more than seventy-five ($75) if both of the following apply:

(1) The dam has a storage capacity of not more than 100 acre-feet.

(2) The governing body of a private school or the governing board of a public school certifies that the dam is used as a subject of study by its students.

(e)(1) Notwithstanding subdivision (b), the department shall limit the total annual fee for dams or reservoirs located on farms or ranch properties to one hundred fifty dollars ($150) per dam, and sixteen dollars ($16) per foot of height.

(2) For purposes of this subdivision, “farm” has the same meaning as defined in Section 52262 of the Food and Agricultural Code.

(f)(1) Privately owned dams with less than 100 acre-feet of storage capacity shall be assessed an annual fee in accordance with paragraph (1) of subdivision (e).

(2) As used in this subdivision, “privately owned” does not include dams owned by municipalities, water districts or companies, irrigation districts, private, investor owned or publicly owned utilities, or public agencies.

6308. All fees, penalties, interest, fines, or charges collected by the department under this division shall be deposited in the Dam Safety Fund, which is hereby established in the State Treasury. The money in that fund shall be available to the department, upon appropriation by the Legislature, for the administration of the dam safety program.

6309. The fees provided for in this chapter shall be required of any “owner”, as defined in Section 6005.

Chapter 7. Inspection and Approval

Article 1. New or Enlarged Dams and Reservoir

6350. Immediately upon completion of a new dam or reservoir or enlargement of a dam or reservoir, the owner shall give a notice of completion to the department and as soon thereafter as possible shall file with the department supplementary drawings or descriptive matter showing or describing the dam or reservoir as actually constructed, including the following:

(a) A record of all grout holes and grouting.

(b) A record of permanent location points and bench marks.

(c) A record of tests of concrete or other material used in the construction of the dam or reservoir.

(d) Any other items which may be of permanent value and have a bearing on the safety and permanency of the dam or reservoir.

6351. In connection with the enlargement of a dam or reservoir, the supplementary drawings and descriptive matter need apply only to the new work.

6352. As soon as possible after giving notice of completion, the owner shall file an affidavit with the department stating the actual cost of the dam or reservoir in such detail as the department requires to determine whether a further fee is due. In the event the owner of a new or enlarged dam or reservoir, because of loss of records, recent change of ownership, or other causes beyond his control, is unable to report the actual cost of construction or enlargement, he shall file an affidavit to this effect, stating the reasons therefore, within 30 days after receiving a written request therefore from the department. The department shall then make its own appraisal of the cost of construction or enlargement and determine what further fee, if any, is required. Upon making a determination that a further fee is required, the department shall notify the owner by certified mail of the amount of such fee within 15 days and shall notify the owner that he may appear within 60 days thereafter before an authorized representative of the department to protest the amount of the fee, in whole or in part, determined by the department to be required, and the sufficiency of the appraisal upon which such determination was based.

6354. As soon as practicable the completed dam or reservoir shall be inspected by the department.

6355. A certificate of approval shall be issued upon a finding that the dam or reservoir is safe to impound water within the limitations prescribed in the certificate. Upon written request by an owner for a certificate of approval, the department shall issue the certificate if it finds that the dam or reservoir is safe to impound water within the limitations prescribed in the certificate. Pending issuance of a certificate of approval by the department, the owner of the dam or reservoir shall not, through action or inaction, cause the dam or reservoir to impound water.

Article 1.5. Certificates of Approval

6357. Each certificate of approval issued by the department under this part may contain such terms and conditions as the department may prescribe.

6357.1 The department may revoke any certificate of approval whenever it determines that the dam or reservoir constitutes a danger to life and property. Whenever it deems such action necessary to safeguard life and property, the department may also amend the terms and conditions of any such certificate by issuing a new certificate containing the revised terms and conditions.

6357.2 The owner of a dam or reservoir for which a certificate of approval has been issued shall not, through action or inaction, cause the dam or reservoir to impound water after the certificate terminates unless a new certificate is issued for the dam or reservoir. A new certificate shall be issued upon a finding by the department that the dam or reservoir is safe to impound water within the limits prescribed in the certificate.

6357.3 With respect to each certificate of approval or written consent for use of a dam which has been issued by the department or a predecessor of the department and which is in effect prior to the effective date of this article, the department shall, within one year from such effective date, issue a new certificate of approval, which shall supersede the previous certificate or written consent for use, or shall revoke the existing certificate or written consent for use if it finds that the dam or reservoir is not safe to impound water.

6357.4 Before any certificate of approval is revoked by the department, the department shall hold a hearing. Written notice of the time and place of the hearing shall be mailed, at least 20 days prior to the date set for the hearing, to the holder of the certificate. Any interested persons may appear at the hearing and

present their views and objections to the proposed action. Any petition for a writ of mandate to inquire into the validity of action of the department revoking a certificate of approval shall be commenced within 30 days after service of notice of the revocation on the holder of the certificate.

Article 2. Repaired or Altered Dams and Reservoirs

6360. Immediately upon completion of the repair or alteration of any dam or reservoir, the owner shall give notice of completion to the department and as soon thereafter as possible shall file with it supplementary drawings or descriptive matter showing or describing the dam or reservoir as actually repaired or altered together with such maps, data, records, and information pertaining to the dam or reservoir as repaired or altered as the department requires.

6362. As soon as practicable the dam or reservoir as repaired or altered shall be inspected by the department.

6363. A certificate of approval shall be issued upon a finding that the dam or reservoir is safe to impound water within the limitations prescribed in the certificate. Pending issuance of a new certificate of approval, the owner of the dam or reservoir shall not, through action or inaction, cause the dam or reservoir to impound water beyond the limitations prescribed in the existing certificate.

6364. The certificate of approval shall supersede any previous certificate of approval issued for the dam or reservoir so repaired or altered.

Article 3. Removal of Dams and Reservoirs

6370. Upon completion of the removal of a dam or reservoir such evidence as to the manner in which the work was performed and as to the conditions obtaining after the removal as the department requires shall be filed with the department.

6371. This evidence shall show that a sufficient portion of the dam has been removed to permit the safe passage of floods down the watercourse across which the dam was located.

6372. Before final approval of the removal of a dam or reservoir is issued, the department shall inspect the work and determine that all danger to life and property has been eliminated.

Article 4. Dams Completed Prior to August 14, 1929

6380. The department shall make inspections at State expense of all dams in the State completed prior to August 14, 1929.

6381. The department shall require owners to perform at their expense such work or tests as necessary to disclose information sufficient to enable the department to determine whether to issue certificates of approval or to issue orders directing further work at the owners' expense necessary to safeguard life and property.

6382. If, upon inspection or upon completion to the satisfaction of the department of all work that may be ordered, the department finds that the dam is safe to the full extent for which use is or will be made, a certificate of approval shall be issued.

Article 5. Complaints as to Unsafe Conditions

6390. Upon receipt of a written complaint alleging that the person or property of the complainant is endangered by the construction, maintenance, or operation of any dam or reservoir the department shall cause an inspection to be made unless the data, records, and inspection reports on file with it are found adequate to enable a determination whether or not the complaint is meritorious.

6391. If the complainant insists upon an inspection and deposits with the department a sum estimated by it to be sufficient to cover costs of an inspection, the department shall cause an inspection to be made despite its finding as to the sufficiency of its records to determine the alleged danger.

6392. If it is found that an unsafe condition exists, the department shall take such action as is necessary to render or cause the condition to be rendered safe and any money deposited to secure an inspection shall be returned.

6393. If, after an inspection is made on account of a complaint, the complaint is found by the department to have been without merit, any money deposited therefore shall be payable into the State Treasury.

Article 6. Inspection During Progress of Work

6400. During the construction, enlargement, repair, alteration, or removal of any dam or reservoir the department shall make continuous or periodical inspections at state expense for the purpose

of securing conformity with the approved plans and specifications but shall require the owner to perform at his expense such work or tests as necessary to disclose information sufficient to enable the department to determine that conformity with the approved plans and specifications is being secured.

6401. If, after any inspections, investigations, or examinations, or at any time as the work progresses, or at any time prior to issuance of a certificate of approval it is found by the department that amendments, modifications, or changes are necessary to insure safety, the department may order the owner to revise the plans and specifications.

6402. If conditions are revealed which will not permit the construction of a safe dam or reservoir the approval may be revoked.

6403. In the event that conditions imposed may be waived or made less burdensome without sacrificing a proper margin of safety, the department may authorize an owner to revise the plans and specifications accordingly.

6404. If at any time during construction, enlargement, repair, or alterations of any dam or reservoir the department finds that the work is not being done in accordance with the provisions of the approval and the approved plans and specifications or in accordance with the approval and revised plans and specifications, it shall give a written notice and order by registered mail or by personal service to the owner.

6405. The notice and order shall state the particulars in which the approval and approved plans and specifications or the approval and approved plans and specifications as revised are not being or have not been complied with shall order the immediate compliance with the approval and approved plans and specifications or with the approval and approved revised plans and specifications as the case may be.

6406. The department may order that no further work be done until such compliance has been effected and approved by the department.

6407. A failure to comply with the approval and approved plans and specifications as originally approved or as revised shall render the approval subject to
revocation by the department, if compliance is not made in accordance therewith after notice and order from the department as provided in this article.

Chapter 8. Offenses and Punishment

6425. Every person who violates any of the provisions of this part or of any approval, order, rule, regulation, or requirement of the department is guilty of a misdemeanor and punishable by a fine of not more than two thousand dollars ($2,000) or by imprisonment in the county jail not exceeding six months, or both. In the event of a continuing violation each day that the violation continues constitutes a separate and distinct offense.

6426. Any person who willfully obstructs, hinders, or prevents the department or its agents or employees from performing the duties imposed by this part or who willfully resists the exercise of the control and supervision conferred by this part upon the department or its agents or employees is guilty of a misdemeanor and punishable as provided in this article.

6427. Any owner or any person acting as a director, officer, agent, or employee of an owner, or any contractor or agent or employee of a contractor who engages in the construction, enlargement, repair, alteration, maintenance, or removal of any dam or reservoir, who knowingly does work or permits work to be executed on the dam or reservoir without an approval or in violation of or contrary to any approval as provided for in this part, or any inspector, agent, or employee of the department who has knowledge of such work being done and who fails to immediately notify the department thereof is guilty of a misdemeanor and punishable as provided in this article.

6428. Any owner who fails to pay any annual fee or any part of any annual fee required to be paid pursuant to Section 6307 within the time required shall pay a penalty of 10 percent of the annual fee or part of the annual fee, plus interest at the rate of one-half of 1 percent per month, or fraction thereof, from the date on which the annual fee or the part of the annual fee became due and payable to the state until the date of payment.

Chapter 9. Dams Under Construction Prior to August 14, 1929

6450. Any dam which the department finds was not 90 percent constructed on August 14, 1929 shall be subject to the same provisions as a dam commenced after that date.

6451. Construction work on such a dam may proceed, if an application for approval thereof is filed, until an order from the department is received approving the dam or specifying how its construction must be made or altered to render it safe. After

receipt of an order directing the construction of such a dam, work thereafter must be in accordance with the order.

6452. Dams found to be 90 percent or more constructed on August 14, 1929, shall be subject to the same supervision as dams which were completed prior to that date.

Chapter 10. Dams and Reservoirs Under State Supervision Through1965 Revisions of Part 1

Article 1. Dams and Reservoirs Completed Before 1965 Revisions

6455. Every owner of a dam or reservoir that falls within the definition of a dam or reservoir in this part by virtue of the amendment of Section 6002 or the addition of Section 6004.5 at the 1965 Regular Session of the Legislature and that was completed prior to September 17, 1965, shall immediately file an application with the department for the approval of such dam or reservoir; provided that this Chapter 10 shall not apply to any reservoir which contains the water impounded by a dam for which a certificate of approval is in effect on September 17, 1965.

6456. A separate application shall be made for each dam or reservoir and shall be filed with the department upon forms to be supplied by it and shall include or be accompanied by such appropriate information concerning the dam or reservoir as the department requires.

6457. The department shall give notice to file an application to owners of such dams or reservoirs who have failed to do so as required by this article, and a failure to file within 30 days after such notice shall be punishable as provided in this part.

6458. The notice provided for in this article may be given by registered or certified mail and a return receipt signed by the owner shall constitute prima facie evidence of service.

6459. The department shall make inspections of such dams or reservoirs at state expense.

6460. The department shall require owners of such dams or reservoirs to perform at their expense such work or tests as necessary to disclose information sufficient to enable the department to determine whether to issue certificates of approval or to issue orders directing further work at the owner's expense necessary to safeguard life and property. For this purpose, the department may

require an owner to lower the water level of, or to empty, the reservoir.

6461. If, upon inspection or upon completion to the satisfaction of the department of all work that may be ordered, the department finds that the dam or reservoir is safe to impound water, a certificate of approval shall be issued. The owner of the dam or reservoir shall not, through action or inaction, cause the dam or reservoir to impound water following receipt by the owner of a written notice from the department that a certificate will not be issued because the dam or reservoir will not safely impound water. Before such notice is given by the department, the department shall hold a hearing. Written notice of the time and place of the hearing shall be mailed, at least 20 days prior to the date set for the hearing, to the owner of the dam or reservoir. Any interested persons may appear at the hearing and present their views and objections to the proposed action. Any petition for a writ of mandate to inquire into the validity of the action of the department shall be commenced within 30 days after receipt by the owner of a written notice from the department that a certificate of approval will not be issued.

Article 2. Dams and Reservoirs Under Construction Before 1965 Revisions

6465. Any dam or reservoir that falls within the definition of a dam or reservoir in this part by virtue of the amendment of Section 6002 or the addition of Section 6004.5 at the 1965 Regular Session of the Legislature and which the department finds was under construction and not 90 percent constructed on September 17, 1965, shall, except as provided in Section 6466, be subject to the same provisions in this part as a dam or reservoir commenced after that date. Every owner of such a dam or reservoir shall file an application with the department for the department's written approval of the plans and specifications of the dam or reservoir. Where an application for approval of the plans and specifications for a dam is pending before the department on September 17, 1965, such application shall be deemed to also constitute an application for approval of the plans and specifications of the reservoir which will contain the water impounded by the dam.

6466. Construction work on such a dam or reservoir may proceed, provided an application for approval of the plans and specifications therefore is filed, until a certificate of approval is received by the owner from the department approving the dam or reservoir or an order is received by the owner from the department specifying how the construction must be performed to render the dam or reservoir safe. After receipt of an order specifying how construction of a dam or

reservoir must be performed, work thereafter must be in accordance with the order.

6467. Such dams or reservoirs as are 90 percent or more constructed on September 17, 1965, shall be subject to the same supervision as dams or reservoirs which were completed prior thereto.

Article 3. Fees for Dams or Reservoirs Under Construction Before 1965 Revisions

6470. The owners of completed dams or reservoirs and dams or reservoirs that are 90 percent or more constructed that are made subject to the provisions of this part by the amendment of Section 6002 or the addition of Section 6004.5 at the 1965 Regular Session of the Legislature shall not be required to pay a fee in relation to applications filed with the department for approval of their dams or reservoirs. Applications for the approval of dams or reservoirs that are made subject to this part by said amendment or addition that are found by the department to have been less than 90 percent constructed on September 17, 1965, shall be accompanied by fees as much less than provided for dams or reservoirs commenced after that date as the percentage of construction found by the department to have been completed on that date.

PART 2. FISHWAYS OVER DAMS

6500. Whenever an application for approval of plans and specifications for a new dam, or for the enlargement of any dam, in any stream in this State, is filed pursuant to Part 1 of this division, a copy of the application shall be filed with the Fish and Game Commission as required by the Fish and Game Code.

6501. The provisions for the installation of fishways over or around dams and for the protection and preservation of fish in streams obstructed by dams are contained in Chapter 3 (commencing with Section 5900), Part 1, Division 6 of the Fish and Game Code.

CALIFORNIA CODE OF REGULATIONS

Title 23. Waters

Division 2. Department of Water Resources

Chapter 1. Dams and Reservoirs

Article 1. General Provisions

301. Definitions.

As used in this subchapter, the terms “dam”, “reservoir”, “owner”, “alteration”, enlargement”, and “water storage elevation” shall have the meanings given in Sections 6002 and 6004.5 through 6008 of the Water Code.

NOTE: Authority cited: Section 6078, Water Code. Reference: Sections 6002-6008, Water Code.

302. Purpose and Effect of Regulations.

The regulations in this subchapter are not intended to limit the authority of the department to act under the police power of the state to the extent authorized by law, when necessary to protect life and property from a dam or reservoir which constitutes, or which may constitute a danger to life and property, and they shall not be interpreted as depriving the department of such authority.

NOTE: Authority cited: Section 6078, Water Code. Reference: Sections 6075, 6081, and 6110, Water Code.

303. Evidence of Water Rights.

(a) The department will not issue a written approval to commence construction or enlargement of a dam or reservoir until the applicant or owner demonstrates evidence of adequate water rights in accordance with the requirements of this section.

(b) The applicant or owner shall provide the department with either:

(1) A copy of an entitlement to the use of water issued by the State Water Resources Control Board pursuant to Division 2, Part 2 (commencing with Section 1200) of the Water Code; or

(2) If the right to divert or use water does not depend on an entitlement identified in subsection (1) above, a statement of the legal basis of the right.

(c) The applicant or owner shall also provide the department with either:

(1) Evidence that a statement of water diversion and use has been filed with the State Water Resources Control Board pursuant to Division 3, Part 1, Chapter 5 (commencing with Section 5100) of the Water Code, or

(2) A statement either establishing that a statement of water diversion and use is not legally required, or showing good cause for not filing one.

(d) The department shall obtain a written statement from the staff of the State Water Resources Control Board stating whether the water right is adequate for the proposed dam and reservoir.

(e) If a right to divert or use water is based upon a claim of riparian rights, or rights to appropriate water established prior to 1914, and such claim is disputed by the State Water Resources Control Board, the department shall not withhold approval to commence construction solely upon the basis of such a dispute, provided that it is satisfied with the evidence of a water right provided pursuant to subsection (b) above.

(f) In the event that the State Water Resources Control Board has initiated proceedings to determine whether to authorize use of water, and no decision has been issued, written approval to commence construction or enlargement shall not be withheld pursuant to this section after the 120th day following either the date that the matter is submitted to the Board for decision after hearing or, if no hearing is held, the date on which the protest period closes.

NOTE: Authority cited: Section 6078, Water Code. Reference: Sections 1052, 6075, 6202(d), 6205, and 6264, Water Code.

304. Civil Engineering Plans and Specifications.

Plans and specifications which are submitted to the department shall be prepared by, or under the direction of, a civil engineer who is registered pursuant to California law and authenticated by him as provided in the Business and Professions Code, or be prepared by such other person as may be permitted under the provisions of said code to prepare such plans and specifications, in which case satisfactory evidence of such other person's right to

so act shall be submitted to the department when the plans and specifications are submitted.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6206 Water Code; and Sections 6371, 6374-6375, Business and Professions Code.

305. Civil Engineering Supervision of Construction.

The work of construction, enlargement, repair, alteration or removal of a dam or reservoir shall be under the responsible charge of a civil engineer who is registered pursuant to California law or of such other person as may be permitted under the provisions of the Business and Professions Code to assume responsible charge of such work.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6206, Water Code; Sections 6731, 6374-6375, Business and Professions Code.

Article 2. Applications for Construction, Enlargement, Repair, Alteration, Removal of Dams or Reservoirs

310. Applications for Construction or Enlargement.

(a) This section shall apply to applications for the department's approval of plans and specifications for the construction or enlargement of dams and reservoirs.

(b) Applications for construction or enlargement of a dam and reservoir shall be made on printed forms provided by the department. The department shall also provide written instructions for completing the application.

(c) The amount of information required will depend on factors such as the size of the proposed dam and reservoir, potential hazards, hydrology of the watershed, complexity of the site and proximity to active faults.

(d) Plans, maps, specifications and other information required for an application shall be provided in sufficient clarity and detail to be readily interpreted and studied, and to permit an adequate evaluation of the safety of the proposed work.

(e) The department may require the filing of any information, in addition to that specified in this section which, in its opinion, it considers necessary to determine the safety of the dam and reservoir.

(f) In addition to the information required by the Water Code Sections 6201-6206, and subsections (b)-(e), an application shall also include the following:

(1) Evidence of water rights, as required by Section 303.

(2) Information necessary to enable the department to comply with the requirements of the California Environmental Quality Act (Public Resources Code Sections 21000-21174). This information shall be either:

(a) A copy of the environmental impact report (EIR) or negative declaration prepared by a lead agency, or evidence that a lead agency is preparing or will prepare environmental documentation, or

(b) Data and information necessary for the department to act as a lead agency to prepare environmental documentation, where it is required by law to do so.

(3) Where the department acts as a responsible agency, the lead agency's EIR or negative declaration must be submitted to the State Clearinghouse.

(4) The fee as required by Water Code Section 6300, as made specific by Section 314 of this subchapter.

NOTE: Authority cited: Section 6078, Water Code. Reference: Sections 6200-6206, Water Code; and Sections 21002.1(d) and 21083, Public Resources Code.

311. Criteria for Determining Completeness.

(a) Applications will be considered complete when the department has received the completed, signed application form, the information and fee required in Water Code Sections 6201 and 6206 and Section 310(d)-(f), and the fee required by Sections 6300-6302 of the Water Code.

(b) The department on its own motion may waive any information required for a complete application, including but not limited to the requirements of Section 303 where it determines that it has sufficient information to commence and complete a review within applicable time limits, and that all requirements for issuance of an approval will be met within such time limits.

(c) The requirements published by the department pursuant to Section 310 shall set forth the procedures that the department will follow to review an application.

(d) Failure to comply with a request for information pursuant to such procedures within a reasonable time and in a reasonably responsive manner shall be cause for the department to disapprove the application.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 65941, Government Code.

312. Standard Terms

(a) The following are standard terms and conditions included in any approval of a dam safety application:

(1) Construction work shall be started within one year from date of approval.

(2) No foundations or abutments shall be covered by the material of the dam until the Department has been given an opportunity to inspect and approve the same.

(b) General Safety Requirement. In addition to the above terms and conditions, the law requires that a dam shall at all times be designed, constructed, operated and maintained so that it shall not or would not constitute a danger to life or property, and the Department may, at any time, exercise any discretion with which it is vested, or take any action necessary to prevent such danger.

NOTE: Authority cited: Section 6078, Water Code. Reference: Sections 6075, 6260-6267, Water Code.

313. Automatic Approval of Applications.

Applications approved in accordance with Government Code Section 65956 shall contain the terms and conditions set forth in Section 311. Such approvals may be revoked or modified at any time and under any conditions which would apply to any other approval granted under Division 3, Part 1 of the Water Code.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 65956, Government Code; and Sections 6260-6267, Water Code.

314. Filing Fee.

(a) Amount of Fee. The estimated cost of the dam and reservoir or enlargement as specified in Section 6302 of the Water Code shall include engineering, geologic, surveying, construction supervision, and administrative costs.

NOTE: Authority cited: Section 21082, Public Resources Code; Section 6078, Water Code. Reference Section: 21089 Public Resources Code; Sections 6301-6305, Water Code.

Article 3. Annual Fee.

315. Annual Fee.

(a) Determination of Amount. The department shall determine the amount of the fee in accordance with Section 6307 of the Water Code. Each owner shall be informed of the amount of the fee by April 30 of each year.

(b) Penalty for Delinquent Payment of Annual Fee. An owner who fails to pay any part of any annual fee on or before July 1, as required by Section 6307 of the Water Code, shall be penalized in accordance with Section 6428 of the Water Code.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 161, Water Code; and Sections 6307 and 6428, Water Code.

316. Inoperative Dams.

A dam will not be considered to be substantially completed or in operation for annual fee purposes, where the department determined that it has been rendered inoperative on other than a temporary basis. In making its determination the department will consider the following circumstances, among others, with respect to the dam:

(a) Alteration of the outlet facilities to assure maximum possible uncontrolled water release through the outlet works.

(b) Absence of water impounding capability under reasonably foreseeable conditions, taking into account the size of the drainage area.

(c) Absence of benefit from the dam and reservoir to the owner or others.

The Department may determine that a dam is no longer inoperative when investigation reveals that conditions which rendered the dam inoperative on other than a temporary basis have changed. In this event the dam will be considered substantially completed or in operation on the date such determination is made, and the annual fee shall be charged on a pro rata basis.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6307, Water Code.

Article 4. Small Dams Review Board

320. Small Dams Review Board.

In the Department there shall be a Small Dams Review Board consisting of a chairperson who shall be the Division Chief, Division of Design and Construction; a qualified engineer or geologist appointed by the Division Chief, Division of Safety of Dams; and, for each review, a consulting engineer who would be agreed upon by the Department and the dam owner.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6054, Water Code.

321. Scope of Review

(a) The Board shall be convened upon the request of any owner of a small dam or proposed small dam to review any decision or order of the department respecting any technical standard, study requested, engineering requirement or other technical matter required by the department where the owner disputes the basis for such requirement, the need for such requirement, or the facts found by the department.

(b) No review shall be undertaken if, in the opinion of the department, there exists an immediate hazard to life or property. This subsection shall not be construed to bar a Small Dams Review Board proceeding after, in the judgment of the department, an immediate hazard to life and property no longer exists.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6054, Water Code.

322. Small Dam Defined.

“Small Dam” means any dam less than 25 feet in height with a reservoir storage less than 2,000 acre-feet.

NOTE: Authority cited: Section 6078, Water Code. Reference: Sections 6054 and 6055, Water Code.

323. Time to Request Board Review; Filing Fee.

(a) The owner must request board review within 60 days of the disputed departmental action. The request must be made to the Division Chief, Division of Safety of Dams, and must state the facts and circum-stances on which such owner bases his grievance.

(b) The owner shall remit, at the time the grievance is filed the amount of $250 to partially defray the cost and expense of the Board.

(c) If the Board meets for more than one day, the department shall bill the owner for its additional costs incurred for subsequent days.

NOTE: Authority cited: Section 6078, Water Code. Reference: Sections 6054 and 6055, Water Code.

324. Time and Conduct of Review.

The Board shall review the owner's grievance promptly after such grievance is filed. The review shall be conducted in an informal manner. The Board shall consider all relevant information and data presented by the owner, his engineer, or any other person.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6054, Water Code.

325. Findings of the Board.

Based upon information and data secured during the review, the Board shall refer its findings to the Division Chief, Division of Safety of Dams, regarding the matter which led to the grievance. Decisions made by the Division Chief shall be final.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6054, Water Code.

Article 5. Dams Owned by the Department of Water Resources

330. Consulting Board.

Pursuant to Section 6056 of the Water Code, the department shall retain a board of three consultants to report to the Director on the safety of dams owned by the department.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6056, Water Code.

331. Scope of Review.

The consulting board shall make independent findings with regard to conditions which may affect the safety of the dam and reservoir as specified in Section 6081 of the Water Code, and the board shall also make independent findings that the dam is safe to impound water, as specified in Section 6355 of the Water Code.

NOTE: Authority cited: Section 6078, Water Code. Reference: Sections 6056, 6081, 6355, Water Code.

332. Actions for Which Board is Retained.

(a) The department shall retain a consulting board:

(1) To review the adequacy of the design of a dam and reservoir the department proposes to construct, or

(2) To review the safety of the completed construction and the terms and conditions to be included

in a certificate of approval for any dam owned by the department as issued, renewed or modified, no later than six months following any such action.

(b) Where a board is retained to review the adequacy of the design of a dam and reservoir, it shall report its findings to the Director prior to the approval of an application to construct or enlarge the dam.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6056, Water Code.

333. Periodic Review.

In addition to the times specified in Section 332, the department shall retain a review board at least once every five years to review the operational performance of department owned dams. The Federal Power Commission's five year independent review may be substituted if it is comparable to the review required by this article.

NOTE: Authority cited: Section 6078, Water Code. Reference: Section 6056, Water Code.

CURRENT PRACTICES
OF THE
DEPARTMENT OF WATER RESOURCES
IN
SUPERVISION OF DAMS AND RESERVOIRS

Introduction

The following is provided to help the reader comply with the requirements of the foregoing sections of the Water Code (WC) and the California Code of Regulations (CCR). Current practices of the Department of Water Resources in supervision of dams and reservoirs in State jurisdiction are given. Information required for applications is outlined. (CCR 310)

Division of Safety of Dams

Responsibility for supervision of dams and reservoirs is assigned to the department and delegated to the Division of Safety of Dams (DSOD).

Dams and Reservoirs in State Jurisdiction

Water Code Sections 6000 to 6004.5 and 6025.5 identify dams and reservoirs that are in State jurisdiction. Note that dams and reservoirs owned by the United States are not subject to State jurisdiction except as otherwise provided by federal law.

The Division will review the physical description on request of existing or proposed impoundments and determine if they are or will be in State jurisdiction. Plans for proposed impoundments are usually required before determinations can be made.

Proposed Dams and Reservoirs

The Division of Safety of Dams inspects sites, reviews preliminary plans, and comments on firm proposals for proposed dams and reservoirs. It attempts to inspect representative field exploration, unique laboratory testing, etc., for proposed facilities. However, any comments based on preliminary plans and data are not binding on the Division's later consideration of applications.

In matters relating to the California Environmental Quality Act (CEQA), the Department of Water Resources is the lead or responsible agency for dams and reservoirs. Environmental consideration for dams and reservoirs not directly related to safety is assigned to the Department's four districts. Usually, the Division of Safety of Dams makes preliminary reviews of dam and reservoir proposals, as discussed above, before environmental documentation is prepared. Other water related concerns are handled by the appropriate district.

Procedure for Construction or Enlargement of Dams and Reservoirs

1. If adequate water rights are not already held, file an application for water rights with the State Water Resources Control Board, Division of Water Rights, 901 P Street, Sacramento, California 95814. Evidence of water rights is required before a construction or enlargement application can be approved. (CCR 303)

2. Pre-application meetings are not required by the statutes or regulations. Practice, however, has shown that early involvement

of DSOD in projects is most beneficial for aggressive project schedules. CEQA scoping meetings, early site visits to view exploration, preliminary design discussions, project schedule reviews, and submittal of preliminary 60 percent plans, specifications, and geologic data are recommended to expedite review leading to final approval.

3. File application for construction or enlargement of dam. (CCR 310) Include:

   (a) Application forms (DWR 3) in duplicate to Department of Water Resources, Division of Safety of Dams, P.O. Box 942836, Sacramento, California 94236-0001, (2200 X Street, Suite 200), plus one copy to the Fish and Game Commission in-care of the State Department of Fish and Game, 12th Floor, Resources Building, 1416 Ninth Street, Sacramento, California 95814, if the dam is in a stream. (WC 6500) Sign all copies.

   (b) Plans prepared by registered civil engineer pursuant to California law. (CCR 304) Such plans shall be filed in duplicate in the form of paper prints. Unsigned, nearly complete, prints should be submitted.

   (c) Specifications in duplicate. Nearly complete specifications should be submitted.

   (d) Filing Fee. (WC 6300-6309 and CCR 314). The Current fee structure is listed on the Division Website under "Fees."

   (e) Certain additional information may be desirable, or may be required, depending upon the magnitude of the project. Such added information may include soils data, logs of borings or other exploratory data, geologic reports, hydrologic data, structural and hydraulic design notes, etc.

   (f) Information to enable the department to comply with the California Environmental Quality Act and regulations. This information is as appropriate:

      (1) A copy of the final adopted environmental impact report or initial study--negative declaration prepared by a lead agency, or

      (2) Data and information necessary for the department to act as lead agency to prepare the environmental documentation.

The environmental documentation in either case must be submitted to the State Clearinghouse for processing as required by State law.

4. Within 30 days after receipt of an application, the Division informs the applicant that the application is complete or of the information necessary to make it complete.

5. After review of plans, specifications, etc., and inspection of the site, changes in the plans and specifications, and any supplemental data necessary for approval, will be identified.

6. Submit signed drawings in triplicate and final specifications in duplicate for application approval when review comments are resolved.

7. All civil engineering work is to bear the seal or stamp of the responsible civil engineer and shall be signed across the face with the expiration of the certificate shown on or adjacent to the seal. Civil engineering work includes plans, specifications, reports, and documents which are prepared under the Civil Engineering Practice Act.

8. Notify the Division when construction is to begin and keep DSOD field engineers informed as to the status of construction work at all times. Inspections are made during construction as deemed necessary. No foundations or abutments shall be covered until the DSOD field engineer has inspected and approved them.

9. Upon completion of construction, notify the Division by letter. Final inspections are made as soon as practicable after notice is received.

10. As soon as possible after completion of the dam and final inspection by the division's field engineer, file the following:

    (a) Affidavit of cost of construction. Attach breakdown of costs, including engineering.

    (b) Additional filing fee if final cost exceeds estimated cost by more than 15 percent.

    (c) As-constructed plans, if required, in the form of paper prints.

11. A Certificate of Approval will be issued upon a finding that the dam and reservoir are safe to impound water within the limitations prescribed in the certificate. Impoundment of water must not commence until this certificate is issued.

<u>Procedure for Repair or Alteration of Dams or Reservoirs</u>

The procedure is the same as for construction or enlargement except for the following:

1. Evidence of water rights is not required.

2. Use application form DWR 4.

3. Plans and specifications may not be required for minor repair work.

4. Repair and maintenance qualify for an exemption under the California Environmental Quality Act.

5. Only two sets of signed plans are required for application approval.

6. The Certificate of Approval is only modified when the alteration or repair lowers the approved water surface elevation.

Procedure for Removal of Dams and Reservoirs

The procedure is the same as for construction or enlargement except for the following:

1. Evidence of water rights is not required.

2. Use application form DWR 5.

3. Only two sets of signed plans are required for application approval.

4. The Certificate of Approval, if any, is returned to the Department.

LAKE TEMESCAL

Query executed Friday at 15:49:13

General Information								
Name		**Station ID**	**DWR Number**		**Owner**			**Year Completed**
Lake Temescal			29-000		East Bay Reg Park Dist			1869
Location Information								
County	**Latitude**	**Longitude**	**Crest Elevation**	**Baseline/Meridian**	**Section**	**Township**	**Range**	**Stream**
Alameda	37.848	122.23	436.00 ft	MD	18	1S	3W	Temescal Creek
Dam Characteristics								
Dam Type	**Parapet Type**	**Crest Length**	**Total Freeboard**	**Height**	**Material Volume**	**Parapet Height**	**Crest Width**	**Operating Freeboard**
ERTH	No	650 ft	14.50 ft	116 ft	262,292 cu yd		40 ft	0 ft
Reservoir Characteristics								
Storage Capcity			**Drainage Area**			**Reservoir Area**		**Usage**
200 acre-ft			2.7 sq mi			15 acre		STO, MUN

Steve Nemeth, Water Supply Forecasting.

Landslides, Floods, and Marine Effects of the Storm of January 3–5, 1982, in the San Francisco Bay Region, California

U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1434

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Landslides, Floods, and Marine Effects of the Storm of January 3–5, 1982, in the San Francisco Bay Region, California

STEPHEN D. ELLEN *and* GERALD F. WIECZOREK, *Editors*

U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1434



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UNITS

Metric (Système International [SI]) units are the main units of measurement in this volume. Rainfall is reported principally in millimeters, but conversion to inches is provided in the text as an aid to readers in the United States. Conversion of other units is facilitated by the table below.

CONVERSION FACTORS

To convert from	*to*	*multiply by*
	LENGTH	
millimeters (mm)	inches	0.039370
meters (m)	feet	3.2808
kilometers (km)	miles	0.62137
	AREA	
square meters (m^2)	square feet	10.764
hectares (ha)	acres	2.4710
square kilometers (km^2)	square miles	0.38610
	VOLUME	
cubic meters (m^3)	cubic feet	35.315
cubic meters (m^3)	cubic yards	1.3080
cubic meters (m^3)	acre-feet	0.00081071
liters (L)	U.S. gallons	0.26417
	VELOCITY	
meters per second (m/s)	feet per second	3.2808
kilometers per hour (km/h)	miles per hour	0.62137
	FLOW	
cubic meters per second (m^3/s)	cubic feet per second	35.315
	FLOW PER UNIT AREA	
cubic meters per second per square kilometer [(m^3/s)/km^2]	cubic feet per second per square mile	91.465
	MASS	
megagrams (Mg)	tons (2,000 lb mass)	1.1023
	MASS PER UNIT AREA	
megagrams per square kilometer (Mg/km^2)	tons per square mile	2.8550
	DENSITY	
kilograms per cubic meter (kg/m^3)	pounds per cubic foot	0.062428
grams per cubic centimeter (g/cm^3)	pounds per cubic inch	0.036127
	FORCE PER UNIT AREA	
kilopascals (kPa)	pounds force per square inch (psi)	0.14504

LANDSLIDES, FLOODS, AND MARINE EFFECTS OF THE STORM OF JANUARY 3–5, 1982, IN THE SAN FRANCISCO BAY REGION, CALIFORNIA

INTRODUCTION

By Stephen D. Ellen, Gerald F. Wieczorek, William M. Brown III, and Darrell G. Herd, U.S. Geological Survey

A catastrophic rainstorm in central California on January 3–5, 1982, dropped as much as half the mean annual precipitation within a period of about 32 hours, triggering landslides[1] and floods throughout 10 counties in the vicinity of the San Francisco Bay (fig. 1). More than 18,000 of the slides induced by the storm transformed into debris flows that swept down hillslopes or drainages with little warning. Debris flows damaged at least 100 homes, killed 14 residents, and carried a 15th victim into a creek. Shortly after rainfall ceased, more than 459,000 m^3 of earth and rock slid from a mountainside above the community of Love Creek in Santa Cruz County, burying 10 people in their homes (Cotton and Cochrane, 1982). Throughout the bay region, thousands of people vacated homes in hazardous areas, entire communities were isolated as roads were blocked, public water systems were destroyed, and power and telephone services were disrupted. Altogether, the storm damaged 6,300 homes, 1,500 businesses, and tens of kilometers of roads, bridges, and communication lines. Preliminary rough estimates of total storm damage, compiled for emergency purposes within 2 weeks of the storm, exceeded $280 million (U.S. Federal Emergency Management Agency, 1982, p. 9–10). Carefully documented direct costs from landslides exceeded $66 million (chap. 11); total costs from landslides certainly were greater and probably constituted a much larger proportion of the total storm damage than suggested by these disparate figures. Landslides accounted for 25 of the 33 deaths attributed to the storm (fig. 2).

The most abundant destructive landslides were debris flows,[2] which elsewhere have been called debris avalanches, mudflows, or mudslides. Before the storm, debris flows had been recognized locally in the San Francisco Bay region (Smith and Hart, 1982, p. 150), but their potential for widespread and devastating impact was not fully appreciated, partly because they had occurred only locally in the years since population spread into susceptible steep terrain. Evaluations of landslide hazard in the bay region had largely overlooked these relatively small, shallow landslides and focused, instead, on the larger, deeper, generally slower moving landslides that have produced distinctive features and perennial damage over much of the region (for example, Nilsen and others, 1979). Thus, the scientific and planning communities, as well as the general population, were not prepared for the sudden and devastating impact of debris flows during the storm.

As the magnitude of the disaster became apparent, geologists and engineers from consulting firms, local governments, colleges, universities, the U.S. Soil Conservation Service, the California Division of Mines and Geology, and the U.S. Geological Survey began examining evidence left by the storm. The region was reconnoitered by automobile, helicopter, and light airplane, aerial photographs were flown, eyewitnesses were interviewed, and the features left by landslides and floods were mapped and sampled. Documentation and analysis of the storm events benefitted from the large number of investigators and from public interest in the phenomena.

The contributions in this volume represent the fruit of these studies. The various chapters address most of the significant aspects of the storm and its effects. Excellent overviews of the storm are provided elsewhere (Griggs, 1982; Santa Cruz Sentinel, 1982; Smith and Hart, 1982; Brown and others, 1984).

The sequence of chapters begins with a historical setting of the storm by Brown, then proceeds through discussions of rainfall, debris flows, flooding, and marine effects. Rainfall is discussed in several chapters. Mark and Newman describe storm rainfall and prestorm seasonal rainfall on the basis of observations from as many as 750 stations throughout the region, and they determine the rainfall amounts that show significant correlation with damaging landslides. Cannon and Ellen use hourly records from recording gages and known times of nearby debris

[1] In this volume, "landslide" is used as a general term for various mass-movement processes, including debris flow. The principal classes of landslides caused by the storm were slides and flows, as these terms were defined by Varnes (1978).

[2] In almost all documented cases, debris flows caused by the storm began as shallow slides, so movement involved both sliding and flow. For simplicity, we generally use the term "debris flow" for this complex movement.

flows to define the hourly rainfall conditions that triggered debris flows. Cannon compares rainfall records from the storm with records from other major storms in the region to define threshold storm-rainfall conditions for abundant debris-flow activity. Wieczorek and Sarmiento relate rainfall in a study area to the occurrence of debris flows and to measured ground-water levels over an 8-year period spanning the storm.

Debris flows resulting from the storm are described by Ellen, who examines the mechanics of shallow slides and analyzes the transformation from slide to flow. Distribution of debris flows is documented on inch-to-the-mile maps of most of the bay region, the areas shown in figure 2 as having an appreciable concentration of debris flows. Distribution in Marin County is analyzed by Ellen and others; distribution in the rest of the bay

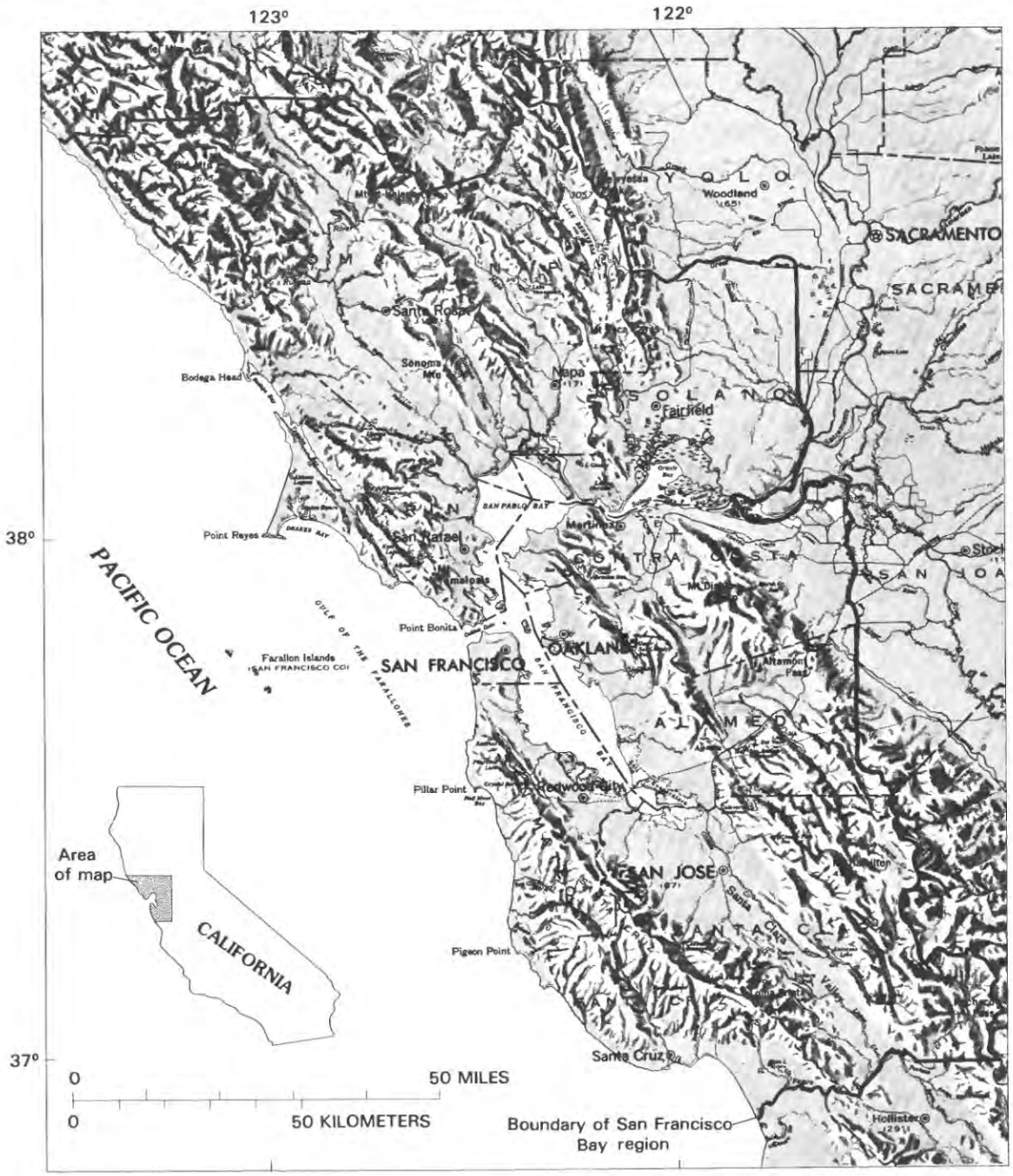


FIGURE 1.—Shaded relief map showing the 10 counties in the San Francisco Bay region, Calif.

region is discussed by Wieczorek and others. Howard and others provide detailed descriptions of debris flows and other landslides that occurred in the city of Pacifica. Smith describes a method for mapping susceptibility to debris flows and checks his method against the distribution of debris flows in a small part of San Mateo County. Costs of landslide damage from the storm are compiled by Creasey. The Love Creek landslide is described elsewhere (Cotton and Cochrane, 1982).

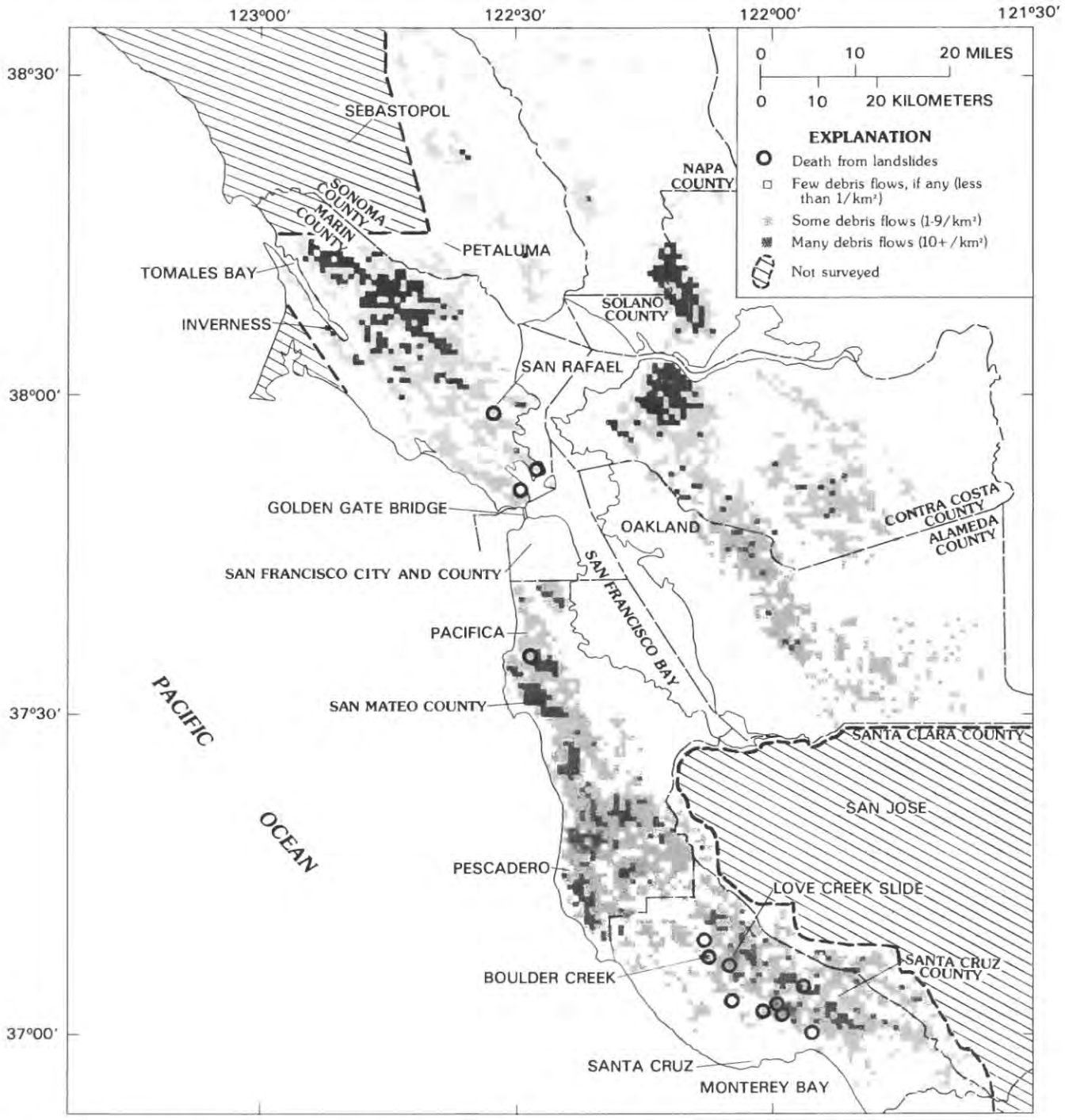


FIGURE 2.—San Francisco Bay region, showing distribution of mapped debris flows and locations of deaths caused by landslides in the January 3–5, 1982, storm.

Flooding is addressed by several studies in the Santa Cruz Mountains. Griggs describes the impacts of flooding on the San Lorenzo River, Soquel Creek, and Aptos Creek, and discusses the implications for flood-hazard mapping. Blodgett and Poeschel describe areal variations in rainfall, floodflow, and recurrence intervals, and they compare the flood with other historical floods, notably that of December 1955. Nolan and Marron describe sediment transport and the response of stream channels to the combination of floodflow and landslide processes.

Discussion of marine effects completes our portrayal of the storm. An ephemeral delta created by the storm at the mouth of Aptos Creek in Monterey Bay is described by Richmond. Anima and others describe the sediment generated by the storm in Tomales Bay and changes in this sediment during the months after the storm.

In summary, the authors of this volume document the effects of an exceptional rainstorm and analyze the physical processes involved. Their studies elucidate the processes of landsliding and flooding that operated during the storm, and thereby provide basic information toward predicting hazards from future storms. The chapters are technical, but interesting and useful information can be gleaned by the general reader or public official.

TERMINOLOGY

In this volume, "landslide" is used as a general term encompassing various mass-movement processes, including debris flow. The principal classes of landslides caused by the storm were slides and flows, and these terms, as well as most specific landslide terms, are here used in the sense defined by Varnes (1978).

The principal landslides caused by the storm were rapid flows that developed from shallow slides. Such landslides have been called by various names, including debris avalanche (Sharpe, 1938), soil slip-debris flow (Campbell, 1975), flow slide (Hutchinson, 1968), soil avalanche (Wentworth, 1943; Keefer, 1984), and disintegrating soil slip (Kesseli, 1943). For convenience, in this volume these complex landslides generally are referred to simply as debris flows.

This broad usage of the term "debris flow" involves two simplifications. First, the landslides that involved both sliding and flow are called simply flows, even though both sliding and flow are critical to the process, sliding determining the timing and location of initiation, flow determining the path and rate of movement. A more complete term for the complex movement is soil slide/debris flow[3] or, as we prefer, soil slip/debris flow (Campbell, 1975), and these or similar combined terms are used where the distinction between slide and flow is useful, particularly in chapter 6.

The second simplification is that the flows designated "debris flows" include mudflows, debris avalanches, and debris torrents. Mudflows (Varnes, 1978) are included because many flows in the storm involved predominantly fine-grained soils rather than the predominantly coarse materials designated debris. Debris avalanches (Sharpe, 1938; Varnes, 1978) are included because the velocity of many, if not most, flows in the storm exceeded 3 m/s (10 km/h).[4] Debris torrents (Swanston and Swanson, 1976) are included because some flows during the storm involved abundant coarse organic debris and entrained much additional material from stream channels. Our inclusion of mudflows, debris avalanches, and debris torrents under the term "debris flow" is justified by the rheologic similarity of these processes (Costa, 1984; Johnson, 1984; Pierson and Costa, 1984).

"Soil" is used here in the engineering sense of unconsolidated earth material. A cover of soil, called soil cover, soil mantle, or regolith, blankets bedrock in hillside terrain of the region and was the source of most debris flows in the storm.

[3]Varnes (1978) used a hyphen or dash to join such compound terms, as in soil slip-debris flow, but in this volume we use a slant (or solidus) because use of the hyphen is confusing—it appears to join the middle two words of the four-word term, rather than separating the two elements of the complex landslide. The slant is appropriate for this function because it is an accepted punctuation mark for distinguishing separate elements of a compound term where a hyphen would lead to confusion.

[4]The velocity that distinguishes debris avalanche from debris flow, according to Varnes (1978).

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1. HISTORICAL SETTING OF THE STORM: PERSPECTIVES ON POPULATION, DEVELOPMENT, AND DAMAGING RAINSTORMS IN THE SAN FRANCISCO BAY REGION

By WILLIAM M. BROWN III,
U.S. GEOLOGICAL SURVEY

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INTRODUCTION

Many severe rainstorms and winter seasons of heavy rainfall have been observed in central coastal California (fig. 1.1) since the European colonization of the area in the late 1700's. Perceptions of the severity of these storms and seasons have varied greatly, depending on the numbers of people affected, the economic base for computing property losses, and the areal extent of reliable observations of the amount and intensity of precipitation and the flow of rivers. The most severe winter in terms of precipitation probably was that of 1861–62 (Waananen and others, 1977, p. 8). The storms of that season apparently were regional and pervasive, and flooding of great magnitude occurred in the San Francisco Bay region (fig. 1.2) and throughout the rest of California in response to frequent heavy rains in coastal areas and runoff from a massive snowpack in the Sierra Nevada. Frequent, major flood-producing seasons occurred in central coastal California between 1879 and 1915, a period that was followed by 22 years of less damaging or nondamaging precipitation seasons, except for the wet winter of 1926–27 (table 1.1). From 1937 to 1982, the bay region was struck by damaging rainstorms at a rate of about once every 3 years.

Table 1.1 lists the periods of heavy rain that have resulted in major flooding and other damage in coastal California since 1861. Table 1.1 also shows the approximate geographic extent of damage due to rainstorms, measured in those coastal counties where severe flooding or other major damage was reported during the indicated period. Since the early 1950's, when the Governor of California was given legislative authority to proclaim states of emergency or disaster and to request Federal disaster assistance, proclamations related to rainstorms and floods were entered on 40 occasions for coastal California. During this period, part or all of the San Francisco Bay region was declared a State or Federal disaster area 18 times.

REGIONAL AND LOCALIZED STORMS

The disastrous events listed in table 1.1 resulted primarily from two appreciably different and extreme rainfall patterns (Weaver, 1962, p. 1). One pattern is a series of regional storms wherein the terrain is saturated by persistent rainfall over periods of several weeks. The other pattern is a localized storm of high precipitation intensity, wherein rainfall lasts for a few hours to a few days and may or may not fall on presaturated ground. Both patterns may cause severe flooding. The regional storms tend to result in high volumes of flow on the main stems of major rivers as tributary inflow collects from many

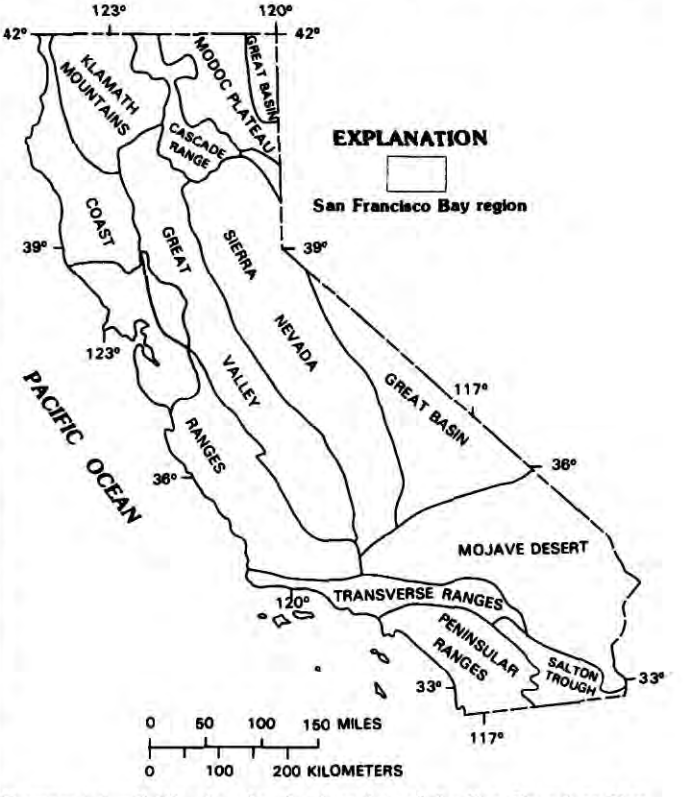


FIGURE 1.1.—California, showing location of the San Francisco Bay region and outlines of principal physiographic regions. Modified from Bailey (1966).

thousands of square kilometers of drainage area. Localized storms tend to generate floodflows on smaller streams but lack the areal extent and duration to cause flooding of major rivers. Generally, rainfall patterns between these two extremes lack combinations of precipitation intensity, duration, or areal extent sufficient to cause flooding of either large or small streams.

Regional storms characteristically move over the North Pacific Ocean onto about one-half to two-thirds of the Pacific coastline between British Columbia, Canada, and Baja California, Mexico. Examples of such storms are those that occur commonly during California's rainy season of October to May each year. When regional storms persist and follow one another along the same general path, heavy flooding may result throughout major river basins in Washington, Oregon, California, and adjacent States. Such flooding has occurred frequently in historical time, notably during the recent major flood seasons of 1955–56, 1964–65, 1968–69, 1977–78, and 1979–80. The storms of December 1955–January 1956 caused what were at the time record streamflows in the west third of Nevada, the north two-thirds of California, western Oregon, a third of western Idaho, and minor parts of Washington (Hofmann and Rantz, 1963, p. A1). Most of those streamflows were exceeded during the December 1964–January 1965 floods that affected most of Oregon, southernmost Washington, northern California, western Idaho, and westernmost Nevada and Montana (Rantz and Moore, 1965, p. 3). The January–February 1969 storms caused record flooding throughout southern California (Waananen, 1969), and storm sequences during December 1977–March 1978 and January–February 1980 (Brooks, 1982a, b) hit central and southern California and carried heavy flooding eastward into southern Nevada and central and southern Arizona (Wahl and others, 1980; Aldridge, 1982).



FIGURE 1.2.—San Francisco Bay region, showing locations of the 10 counties in the vicinity.

The 1955–56 storms are significant in the context of this volume in that they affected the entire San Francisco Bay region, whereas the 1964–65 storms primarily hit areas to the north of San Francisco, and the 1979–80 storms flooded areas mostly to the south of there (fig. 1.2). Thus, the 1955–56 floodflows hold the distinction of being generally the greatest of the 20th century over the San Francisco Bay region, except in isolated places in Alameda County in 1962 and in Santa Clara County in 1911 (Waananen and others, 1977, p. 8). Hofmann and Rantz (1963, p. A1) described the 1955–56 storms as follows:

> The floods were caused by a series of storms from December 15 to January 27; three occurring between December 15 and 27 and three more from January 2 to 27. In all but a few areas the storm of December 21–24 was the most severe. The storms all reflected the effect of the combination of a moist, unstable airmass, strong west-southwest winds, and mountain ranges oriented nearly at right angles to the flow of air. The unusual feature of the storms was the persistence of the strong flow of moist air. The major storm of December 21–24 was accompanied by high temperature and high wind velocities. As a result, a considerable amount of the snow which had accumulated at higher altitudes was melted. This snowmelt, added to the heavy precipitation at low altitudes, caused record-breaking runoff in the streams draining the Sierra Nevada, in Idaho, and in Washington. The coastal areas of northern California and southern Oregon had measurable rainfall on 39 of the 44-day period between December 15 and January 28. At several stations the recorded precipitation for the months of December and January exceeded 60 inches.

In contrast, localized storms impinge upon much smaller segments of the Pacific coastline and release continuous, very intense rains lasting for several hours to a maximum of about 4 days. Weaver (1962, p. 29–35), Rantz and Harris (1963), Brown (1984), and Monteverdi (1984) described five of the severest of such storms that affected the San Francisco Bay region between 1950 and 1982 and had similar rainfall intensities, duration, and areal extent. These storms occurred during November 16–20, 1950, October 11–13, 1962, January 29–February 1, 1963, January 20–21, 1967, and January 3–5, 1982. Each of these storms struck the Pacific coast in California between Monterey County on the south and Mendocino County on the north, and produced flooding and other damage mostly confined to the San Francisco Bay region but extending into central California and western Nevada as some of the storms

moved eastward. All of these storms were isolated events, in that they were not preceded or followed in close proximity by similar storms and so did not continue their effects over extended periods like the regional storms. For example, the November 1950 storm followed light rainfall on November 13–16 that was preceded by nearly 2 weeks of dry weather. The October 1962 storm was the first storm after California's normal, 6-month summer drought. The January–February 1963 storm produced the first major rain after that, terminating what at the time was one of the worst winter droughts for California and Nevada in 100 years (Rantz and Harris, 1963, p. 3). The January 1967 storm followed a month-long drought. Only the January 1982 storm among the five was preceded by substantial rainfall, most of which occurred during regional storms of moderate rainfall intensity during the previous 2 months (Smith and Hart, 1982, p. 139).

Each of these five storms had maximum rainfall intensities that exceeded 6.4 mm/h (0.25 in/h) continuously for at least 24 hours at some stations. The duration of such rainfall ranged from about 24 hours for the November 1950 storm to about 47 hours for the October 1962 storm. In contrast, the heaviest pulse of the December 1955–January 1956 regional storms during December 21–23, 1955, produced a more irregular sequence consisting of bursts of intense rainfall lasting for a few hours, followed by several hours of rainfall of much lesser intensity (Weaver, 1962, p. 24–28).

EFFECTS OF REGIONAL AND LOCALIZED STORMS

Whereas the flood effects of regional and localized storms historically have been readily noticed and documented, other specific effects, such as landslides, have been less clearly and comprehensively identified. Rainfall and streamflow have been monitored systematically in the San Francisco Bay region for more than 130 years, and inferences from early Spanish and Russian records provide a fairly thorough rainfall and flooding history for most of California, beginning in the late 1700's (Lynch, 1931; Waananen and others, 1977, p. 7; Goodridge, 1984). Coverage of landslides, however, has been spotty by comparison, and only in recent years have efforts been devoted to accounting for landslides on a regional scale. Nevertheless, detailed records of isolated events, as well as general observations (as in newspaper accounts), form a basis for suggesting the incidence of slope failures. For example, Smith and Hart (1982, p. 150) claimed:

> Debris avalanches, debris flows, and associated storm-triggered landslides have caused most of the deaths and much of the structural damage attributed to landsliding in California. The landslides of January 3–5, 1982, were not at all unusual for California. Similar landslides have occurred in southern California during the 1915–16, 1933–34, 1937–38, 1951–52, 1961–62, 1968–69, 1977–78, and 1979–80 rainfall seasons (Weber, 1979). In the San Francisco Bay region, similar landslides occurred during the winters of 1905–06, 1906–07, 1949–50, 1955–56, 1961–62, 1962–63, 1964–65, 1967–68, 1969–70, 1972–73, 1974–75, and 1977–78 (Lawson, 1908; Rice and others, 1976; Radbruch and Weiler, 1963; and T. C. Smith, unpublished data; Smith (oral commun., 1985) indicated that inclusion of the 1967–68 rainfall season for the San Francisco Bay region was an error, and that the 1966–67 season having the massive storm of January 1967 is the correct entry).

These references cite a general occurrence of landslides and distinguish among types in some instances, although none provides estimates of their numbers or areal extent. Nevertheless, all the regional and localized storms described in the previous section, as well as many earlier storms, caused damaging landslides in addition to flooding.

The landslides mostly consisted of two major types, described herein in general terms of depth to failure surface, velocity of downslope movement, and initiating mechanism. One type includes deep-seated, slow-moving failures, such as slumps and earth flows. These failures generally are initiated after extended periods of intermittent to continuous, moderately intense rainfall such as might be expected from a succession of regional storms. The failures generally occur in response to lengthy, gradual increases in ground saturation, and failure takes place after long periods of rainfall or during ground-water rise occurring weeks to months after the rain has ceased. The other type includes shallow, fast-moving slides and flows, such as debris flows, that occur during persistent, intense rainfall. These failures occur almost solely while the rain is falling and under certain specific conditions of antecedent ground saturation and rainfall intensity and duration (Wieczorek, 1982; see chaps. 3–6).

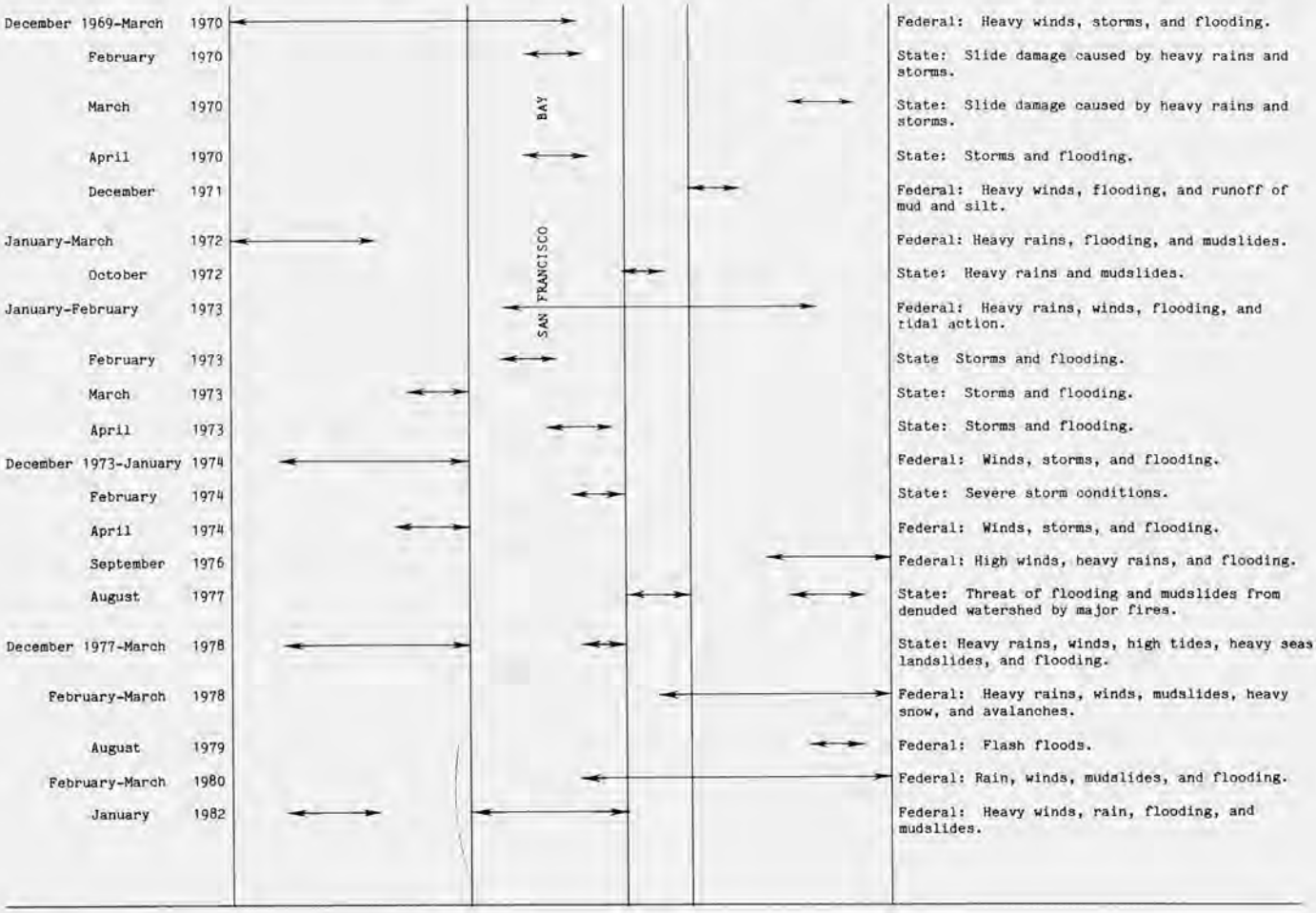
Both the patterns of rainfall from localized storms and intense bursts of rainfall within regional storms have been observed to generate debris flows. Localized storms are fully discussed in the other chapters of this volume, and regional storms are exemplified by at least two of the storms discussed above. Campbell (1975) noted for storms in southern California during January 18–26, 1969, that periods of debris-flow activity were confined to two intervals of sustained heavy rainfall, each lasting about 9 hours and separated by about 3 days. The activity persisted only during intense rainfall, and ceased when the amount of rainfall diminished. A similar situation apparently occurred, but was not so precisely documented, in the San Francisco Bay region during December 1955 and January 1956. During December 21–23, two 6- to 8-hour bursts of heavy rainfall separated by 12 hours followed a week of moderate to heavy rain. S.J. Rice (oral commun., 1982) observed debris flows in Marin County at these times, and again during a downpour on January 18 that was part of the regional storm sequence which began 35 days earlier.

TABLE 1.1.—*Approximate areas of the Coast, Transverse, and Peninsular Ranges affected by damaging rainstorms, 1861-1982*

[State proclamations of emergency or disaster, and Federal disaster declarations, are available only for the period 1954-82. State and Federal emergency and disaster proclamations and declarations typically describe the specific event by using such terms as "severe storms, heavy rains, flooding, mudslides, landslides," and combinations of these and other terms. Federal disaster declarations designate the type of event differently from the original State proclamations. Terminology in this table is extracted from a compilation by the California Office of Emergency Services and reflects the State Governor's original proclamation. Arrows denote approximate geographic extent of storm damage in coastal California during the indicated period; ?, no data available. Data compiled from Rantz (1964), Young and Cruff (1967), Waananen and others (1977), Kahrl (1978), California Office of Emergency Services (written commun., 1982), and Federal Emergency Management Agency (written commun., 1982)]

Approximate dates of severe rainstorms	Northern Coast Ranges (California-Oregon State line to Sonoma County	Central Coast Ranges (Sonoma County to Santa Barbara County)	Transverse and Peninsular Ranges (Santa Barbara County to United States-Mexican border)	Type of disaster proclamation or declaration
December 1861-January 1862	←	←	←	
? 1879	? ←	→ REGION		
January-February 1881	? ←	→		
January-February 1890		? ←	→ ?	
February 1891			← →	
? 1895	? ←	→		
January 1907	←	→ BAY	→	
March 1911	←	→		
February 1914	←		← →	
February 1915	←	→		
January 1916		SAN FRANCISCO	← →	
February 1927	←		→	
December 1937-March 1938	←		→	
February 1940	←	→		
April 1941		←	→	
January 1943	←		→	
December 1951-January 1952	←		→	
January 1953	←	→		
February 1954			← →	Federal: Fire, flooding, and erosion.
December 1955-January 1956	←		→	Federal: Flooding.
February 1958	←	→		State: Storm and flood damage.
April 1958	←		→	Federal: Storm and flood damage.
January 1959			← →	State: Potential flood damage and landslides as result of fires.
February 1962			← →	Federal: Flood and rainstorms.
October 1962		← →		Federal: Flood and rainstorms.
January-February 1963		← →		Federal: Flood and rainstorms.
February 1963	←		→	State: Abnormally heavy and continuous rainfall
February 1964	← →			State: Abnormally heavy and continuous rainfall
April 1964			← →	State: Excessively high winds; subsequent heavy rains and runoff of mud and silt.
December 1964-February 1965	←	→		Federal: Abnormally heavy and continuous rainfall and windstorm.
January 1965			← →	State: Flooding and hill slide caused by heavy rains.
June 1965			← →	State: Slide damage.
November-December 1965			←	→ Federal: Abnormally heavy and continuous rainfall.
January 1966	← →	→ REGION		Federal: Abnormally heavy and continuous rainfall.
December 1966		← →		State: Earth slides.
December 1966			←	→ Federal: Abnormally heavy and continuous rainfall.
January 1967		←	→	
January-March 1969	←		→	Federal: Storm, flooding, and other conditions.

TABLE 1.1.—*Approximate areas of the Coast, Transverse, and Peninsular Ranges affected by damaging rainstorms, 1861-1982*—Continued



Of particular interest are the data of Weaver (1962, p. 28), showing that during the December 21–23, 1955, storm, peak 6-hour rainfall bursts struck most of northern and central California simultaneously. These data suggest that rainfall and ground-moisture conditions sufficient for initiating rapid slope failures were probably widespread, although no comprehensive documentation is available of the number, type, and areal extent of slope failures associated with the 1955–56 storms.

POPULATION, DEVELOPMENT, AND LANDSLIDE DAMAGE

Population in the 10 San Francisco Bay region counties is listed in table 1.2 for 1940–80, with estimates for 1990. These dates are chosen to represent the period of the region's fastest growth and its coincidence with the onset of frequent storm-related disasters listed in table 1.1. Taking the Spanish discovery of the San Francisco Bay in 1769 as the beginning of European settlement of the region (Watkins, 1973, p. 35–40), the data show population growth from 1940–60 exceeding that of 1769–1940, and continued expansion at a slightly lesser rate from 1960 to 1980. By 1990, the projected population will exceed 6 million people, or about 300 people per square kilometer. Such growth implies attendant increases in the numbers of houses, transportation arteries, utilities, public buildings, and other construction. Between 1970 and 1980, for example, the net increase in housing units alone was 46,550 per year—almost half a million additional units for the decade (table 1.3). These units and associated construction typically are accommodated spatially in new, multiple-unit structures within existing built-up areas and by expansion onto lightly developed or undeveloped terrain.

Before the 1950's, most development took place on gently sloping lowlands, and nearly all the hillsides and uplands were undeveloped or used only for timber harvesting, orchards, and grazing (Brown and Kockelman,

TABLE 1.2.—*San Francisco Bay region population, by county, 1940–90*

[Data from Western Economic Research Co. (1982)]

County	1940	1950	1960	1970	1980	1990
Alameda	513,011	740,315	908,209	1,071,446	1,105,379	1,151,500
Contra Costa	100,450	298,984	409,030	556,116	657,252	796,400
Marin	52,907	85,619	146,820	208,652	222,952	231,800
Napa	28,503	46,603	65,890	79,140	99,199	106,100
San Francisco	634,536	775,357	740,316	715,674	678,974	660,600
San Mateo	111,782	235,659	444,387	557,361	588,164	629,800
Santa Clara	174,949	290,547	642,315	1,065,313	1,295,071	1,497,200
Santa Cruz	45,057	66,534	84,219	123,790	188,141	224,100
Solano	49,118	104,833	134,597	171,989	235,203	340,000
Sonoma	69,052	103,405	147,375	204,885	299,827	385,700
Total	1,779,365	2,747,856	3,723,158	4,754,366	5,370,162	6,023,200

TABLE 1.3.—*San Francisco Bay region housing units, by county, 1970–80*

[Data from U.S. Bureau of the Census (written commun., 1982)]

County	1970	1980	Difference
Alameda	378,833	444,607	+65,774
Contra Costa	177,732	252,226	+74,494
Marin	72,000	92,903	+20,903
Napa	26,838	40,052	+13,214
San Francisco	310,402	316,609	+6,207
San Mateo	191,077	233,494	+42,417
Santa Clara	336,873	473,817	+136,944
Santa Cruz	52,006	80,863	+28,857
Solano	53,762	84,270	+30,508
Sonoma	78,060	124,233	+46,173
Total	1,677,583	2,143,074	+465,491

1983, p. 3, 31). Since the 1950's, however, significant development on hillsides has created sprawling suburban landscapes susceptible to various natural and induced hillslope processes. Indeed, such development has been a prime force in creating or adding to problems of slope stability (Nilsen and Turner, 1975; Nilsen and others, 1976b). With that development came landslide disasters of sufficient frequency to call attention to a regional landslide problem, and to stimulate better record keeping of landslide occurrence. Nilsen and others (1976a, p. 6), for example, noted that although the oldest records of property damage by landslides in Alameda County date from 1940, most of the data are from the period 1958–71, when more accurate records were kept. The situation is similar throughout other San Francisco Bay region counties, and it was not until the 1970's that the regional scope of the landslide problem was widely recognized and attempts were made to document regional losses (Nilsen and others, 1979, p. 3–10, 16–19).

The late-appearing awareness of the landslide problem resulted in even later attempts to confront it, if, indeed, it was considered at all in new development. Whereas some communities and counties considered landslide hazards in revising building codes and grading ordinances, most of the San Francisco Bay region entered the 1980's with few or no considerations of slope stability mandated for hillside building. This situation is not surprising, considering the numerous financial, political, and other problems communities face in responding to geologic situations whose process and recurrence are difficult for them to understand. With respect to the specific hazard of debris flows, for example, little information of use for planning was available anywhere in the region before the storm of January 1982, and utilization of that information remains mostly in the research stage today.

LESSONS OF JANUARY 1982

The preceding discussion briefly illustrates some of the complexities in understanding the January 1982 storm in comparison with previous storms and in the context of spreading hillside development. These complexities are summarized here in an attempt to focus on the need for reanalysis of past events and on the prospects for future studies.

1. Whereas some level of presaturation of the soil mantle is a necessary condition for debris-flow occurrence (see chap. 5), that level can be attained during the course of a single storm irrespective of soil mantle saturation conditions at the onset of the storm. Radbruch and Weiler (1963, p. 16–17) stated, for example, for Contra Costa County:

> In October 1962, 13.82 inches of rainfall was recorded at Saint Mary's College during four days from October 10 through 14, with 8.40 inches recorded during the 24 hours ending at 5:00 P.M. on

October 13 (State Climatologist, U.S. Weather Bureau, oral communication, January 2, 1963). The rain was the first of the winter rainy season, and fell on ground that had dried during the summer. Most of the landslides that formed during the above four days of rain were mudflows, consisting of saturated soil that moved on the underlying bedrock surface. The soil did not move as a single mass, but flowed out of small pockets in a semi-liquid state, leaving a train of debris extending down the hillside for as much as several hundred feet. The debris consisted of thin mud containing pieces of turf and subangular to rounded pieces of soil. These landslides are the type described by Kesseli (1943) as "disintegrating soil slips."

Radbruch and Weiler made no further statements as to the abundance of these landslides, and it is unclear from their observations how the events of the 1962 storm compare with those of the 1982 storm. Cannon (see chap. 4) and Mark and Newman (see chap. 2) suggest that the abundance of debris flows is related to a level of soil mantle saturation determined by antecedent seasonal rainfall, measured from the beginning of the rainy season up to the beginning of a debris-flow producing storm. In the case of the 1981–82 rainfall sequence, soil-mantle saturation was high at the onset of the January 3–5 storm and thereby contributed to debris flows in apparently greater abundance and wider distribution than observed in 1962. Nevertheless, observations like those of Radbruch and Weiler, and the frequency of rainfall intensity, duration, and extent observed for storms discussed in this chapter, suggest that conditions for the local occurrence of debris flows are common. A dry soil mantle does not guarantee that debris flows will not occur during the next storm.

2. Whereas 2-day rainfall totals for specific parts of the San Francisco Bay region in January 1982 exceeded the "100 year" recurrence frequency, frequencies of 5 to 50 years were common for many areas where debris flows occurred (table 1.4). Recurrence intervals for floodflows of streams were generally in the range 4–40 years (see chap. 13). Furthermore, the rainfall intensity and duration at which debris-flow episodes began in 1982 fell far short of the "100 year" values eventually reached in some areas (see chap. 3). These factors suggest that significant local rainfall variations occur within a "100 year" storm and that storms of lesser frequency are also sufficient to cause significant debris-flow activity. The recurrence interval of a given storm parameter, such as 2-day rainfall, is an insufficient measure of debris-flow-generating capability. A better measure would be a combinatorial factor that includes a component of antecedent soil mantle saturation with individual storm factors (see chaps. 4, 5).
3. Great uncertainty exists about the effects of earlier storms because of the paucity of data on specific types of landslides. The first documentation of the regional occurrence of debris flows as a unique process in the San Francisco Bay region came after the January 1982 storm. Thus, only limited opportunities exist for comparing the effects of that storm with those of others until the earlier storms are comparably analyzed (see chap. 4). A primary candidate for study is the December 1955–January 1956 storm sequence because of the availability of rainfall and photographic data, and many general and specific observations of debris flows then. Work in progress by C.M. Wentworth (written commun., 1984) suggests that abundant debris-flow scars on Montara Mountain, San Mateo County, resulted from the 1955-56 storms, but data from other areas are needed to determine the areal extent and relative abundance of debris flows during those events.
4. Confusion about storm effects results from ambiguities and inconsistencies in the terminology used to describe disasters. Table 1.1 lists the terminology applied to California storm disasters; it is apparent that no consistent distinctions among the types of landslides exist. Neither is the disaster declaration necessarily complete as to effects. For example, the Federal disaster declaration for 1955–56 specifies only floods and makes no mention of landslides as a disaster component. Whether landslides were not a problem or, more likely, were considered a part of the overall flooding is unclear in the disaster proclamation. Although floods and landslides are generally concurrent events, observers in the past have commonly emphasized only the flood aspects.
5. Population growth and development in the San Francisco Bay region have outpaced the recognition and accommodation of landslide hazards, and the development itself has created hazardous situations where none existed previously. The status of development today, and its trends for the near future, are such that the frequency of landslide problems will probably increase until sweeping changes in the regulations on hillside development are enacted on a regional basis. Such changes almost certainly will come, as they have for other heavily populated regions in unstable, hilly terrain (U.S. Geological Survey, 1982, p. 1). Meanwhile, the composite interactions of population growth, hillside development, and recurrence of damaging storms should be more thoroughly assessed.

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TABLE 1.4.—*Storm rainfall and estimated recurrence intervals at selected rainfall-measurement stations in the San Francisco Bay region*

[Water year is the 12-month period ending September 30 of the indicated year. Data from Goodridge (1982, p. 1)]

Rainfall-measurement station	Location	January 1982		Previous 2-day maximum	
		Maximum rainfall over 2 days (mm)	Estimated recurrence interval (yr)	Rainfall (mm)	Water year
Occidental	Southwestern Sonoma County.	231	5	302	1978
Graton	South-central Sonoma County.	187	5	240	1967
Sonoma	Southeastern Sonoma County.	201	25	194	1963
Alpine Dam	Southwestern Marin County.	345	100	293	1963
Kent Lake	do	380	40	339	1967
Lagunitas Lake	do	313	50	292	1963
Pilarcitos	North-central San Mateo County.	207	5	451	1872
San Andreas Lake	do	200	25	236	1963
San Francisco Airport.	Northeastern San Mateo County.	160	50	152	1967
Half Moon Bay	Western San Mateo County.	205	100+	197	1963
Ben Lomond	Central Santa Cruz County.	409	25	422	1963
Santa Cruz	South-central Santa Cruz County.	240	100+	202	1956

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2. RAINFALL TOTALS BEFORE AND DURING THE STORM: DISTRIBUTION AND CORRELATION WITH DAMAGING LANDSLIDES

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ABSTRACT

Analysis of the relation between rainfall totals and damaging landslides (predominantly debris flows) for the January 3–5, 1982, storm in the San Francisco Bay region indicates a significant relative increase in the density of damaging landslides in areas that had seasonal prestorm rainfall of at least 300 to 400 mm (12–16 in.) and storm rainfall of about 250 mm (10 in.), and that received 30 percent of mean annual precipitation during the storm.

INTRODUCTION

The importance of collecting adequate rainfall and landslide data was recognized simultaneously with the realization of the magnitude of the January 3–5, 1982, storm. Research teams were assembled to collect data on rainfall, landslides (see "Introduction" to volume for landslide terminology), and economic losses due to landslides throughout the San Francisco Bay region.

The immediate goal was to understand the relation between rainfall totals and debris flows that occurred during this storm, and the long-term goal was to incorporate this relation into a multiparameter statistical model of susceptibility to debris flows in the bay region. Only the results of the rainfall/debris-flow study for the storm are reported here. Our approach to understanding the relation between rainfall and debris flows was to compare the rainfall at damaging-landslide localities with the regional storm and prestorm rainfall. From these data, we obtained a landslide-density ratio, which measures the relative increase or decrease in the areal density of damaging landslides from the storm average as a function of rainfall.

PREVIOUS WORK

Other workers have also examined the relations between rainfall and debris flows or other landslides. Campbell's (1975) work on debris flows in the Santa Monica Mountains in southern California, and Nilsen and others' (1976) work on landslides during storms in the San Francisco Bay region, suggest that critical levels of rainfall intensity and prestorm rainfall must be reached before slopes fail. Preliminary intensity values of 6 mm (0.25 in.) of rain per hour with at least 250 mm (10 in.) of prestorm rainfall were noted for the Los Angeles area, whereas prestorm values of 250 to 380 mm (10–15 in.) and storm totals of 150 to 200 mm (6–8 in.) were recognized for the San Francisco Bay region (using data from Contra Costa County for the 1968–69 and 1972–73 rainy seasons).

A study of debris flows in northwestern Italy (Govi and Sorzana, 1980) indicated the importance of normalized rainfall (the ratio of storm rainfall to mean annual precipitation) in the triggering of debris flows. For dry antecedent conditions, a "catastrophic stage" was reported at normalized rainfall of 28 to 38 percent.

Wieczorek and Sarmiento (see chap. 5) analyze the triggering of debris flows in a small area near La Honda, Calif., as a function of rainfall intensity-duration and antecedent conditions, using data on 17 storms since 1977. Cannon and Ellen (1983; see chap. 3) relate the triggering of abundant debris flows during the January 3–5, 1982, storm to rainfall intensity and mean annual precipitation. Wieczorek and others (see chap. 8) relate the abundance of debris flows to normalized rainfall in the bay region.

Acknowledgments.—We are grateful to the hundreds of private citizens and public officials who shared their rainfall data and made our study possible. C.R. Northcut and B.R. Hamachi deserve special thanks for their major effort in assembling and plotting the rainfall data. Many other U.S. Geological Survey (USGS) colleagues assisted us in the inventory of damaging landslides and in collecting rainfall data.

DATA COLLECTION

Because there are only about 50 U.S. National Weather Service (NWS) stations in the 10 bay-region counties, the USGS team launched an intensive effort to contact State and local agencies that might have rain gages. As a result,

data were collected from the Alameda County Flood Control and Water Conservation District; the California Departments of Forestry, Transportation, and Parks and Recreation; the East Bay Infiltration/Inflow Study and Municipal Utility District; the Marin County Flood Control and Water Conservation District, and Municipal Water District; the San Francisco Water Department; and the Santa Clara Valley Water District.

Immediately after the storm, the NWS launched a media appeal for data on storm totals from private rain-gage operators. The response, from more than 500 individuals, was impressive. The data made available by NWS officials were rechecked and carefully plotted. Data were deleted if the addresses could not be located. Anomalous values were checked by contacting rain-gage owners and requesting additional information on the location and surroundings of the gage; gages with obvious problems were deleted. After plotting the initial NWS, State, county, and local data, we sent teams into areas of sparse data to locate additional rain gages.

The final compilation (Mark and others, 1983) contains 759 entries for the January 3-5, 1982, storm and 434 entries of prestorm totals from July 1, 1981, through January 2, 1982. Even though the official rainfall year began July 1, measurable rain in most of the bay region did not occur until September 24-25, 1981. Significant rainfall accumulated from storms on October 7 and 27-29, November 11-17 and 21-18, and December 17-21. Rain fell almost every day in parts of central coastal California from December 27, 1981, through the January 3-5, 1982, storm.

Ideally, to assess the relation of storm and prestorm rainfall to debris-flow occurrence, a complete inventory of debris flows should be used. Because no such inventory was available, we used the damaging-landslide inventory (see chap. 11) as a representative sample (1,255 points). This inventory was largely of debris flows but included other landslide types—hence the use of the general term "landslide." Use of the damaging-landslide inventory introduces some bias toward populated areas, and landslides in rural areas are underrepresented.

COMPUTATIONAL METHODS

The prestorm- and storm-rainfall and damaging-landslide data sets were digitized to utilize computer techniques in contouring and analyzing the data. Because the density of these data varied greatly over the region (pls. 1, 2) and because rainfall information was needed but not generally available at each landslide site, the rainfall data had to be gridded. This procedure created generalized regional models of both prestorm and storm rainfall that were used in all subsequent analyses. These models do not explicitly include topography, and so orographic rainfall may not be adequately modeled in areas with no data points.

The Surface Gridding Library (Dynamic Graphics, Inc., 1978; Mark and Newman, 1981) was used to generate the prestorm and storm grids with 2.5-km spacing. This spacing utilized 66 percent of the storm data points, with an average absolute deviation of all the original values from their grid-extrapolated values of 14 mm (0.6 in.), which is 2.6 percent of the total storm-rainfall range. The prestorm grid utilized 78 percent of the data points, with an average absolute deviation of all the data points from their grid-extrapolated values of 27 mm (1.1 in.), which is 2.1 percent of the prestorm-rainfall range. The grids were not extrapolated beyond the data points.

Mean-annual-precipitation contours from the isohyetal map of the San Francisco Bay region (Rantz, 1971a) were digitized and gridded. Normalized prestorm and storm grids were prepared by dividing the rainfall grids by the mean-annual-precipitation grid on a point-by-point basis. All the contour maps (pls. 1, 2; figs. 2.1-2.3) were generated by computer, using the Surface Display Library software (Dynamic Graphics, Inc., 1975; Mark and Newman, 1981). Generalized polygons bounding the regions with a slope of more than 5 percent were digitized (shaded areas, fig. 2.1). The area outside the polygons was omitted from the analysis so as to avoid biasing the regional rainfall distribution by including major flatland areas in which debris flows generally do not occur. The polygons include 70 percent of the land area and more than 95 percent of the digitized landslide points.

ANALYSIS

The following analysis was performed for each of the four grids (prestorm rainfall, storm rainfall, normalized prestorm rainfall, and normalized storm rainfall):

1. Each set of grid points within the greater-than-5-percent-slope polygons was used as a sample of the rainfall distribution over the region.
2. Rainfall values at each landslide point were computed from the grid by interpolation to generate a sample of rainfall distribution at landslides.
3. The cumulative distribution of both regional rainfall and rainfall at damaging-landslide sites was calculated as a percentage of sample points exceeding some rainfall value, and the curves were plotted (fig. 2.4).
4. The corresponding distributions were compared by preparing histograms (fig. 2.5) and then taking histogram ratios, that is, the percentage of landslides in a given rainfall interval divided by the percentage of grid points in the same interval (fig. 2.6). These distributions were also compared in both dimensions (prestorm and storm) simultaneously (fig. 2.7).

RESULTS

The pairs of cumulative curves (fig. 2.4) differ in the rainfall distributions at grid points and at landslides. In three of the four plots (figs. 2.4*A*, 2.4*C*, 2.4*D*), significant rightward shifts of the landslide-sample curves indicate that for a given cumulative percentage of localities, heavier rainfall is associated with landslides. In the fourth plot (fig. 2.4*B*), near-identity of the curves indicates that the distribution of this variable does not differ between grid and landslide points. The curves can also be used to calculate the fraction of the region or of landslides that

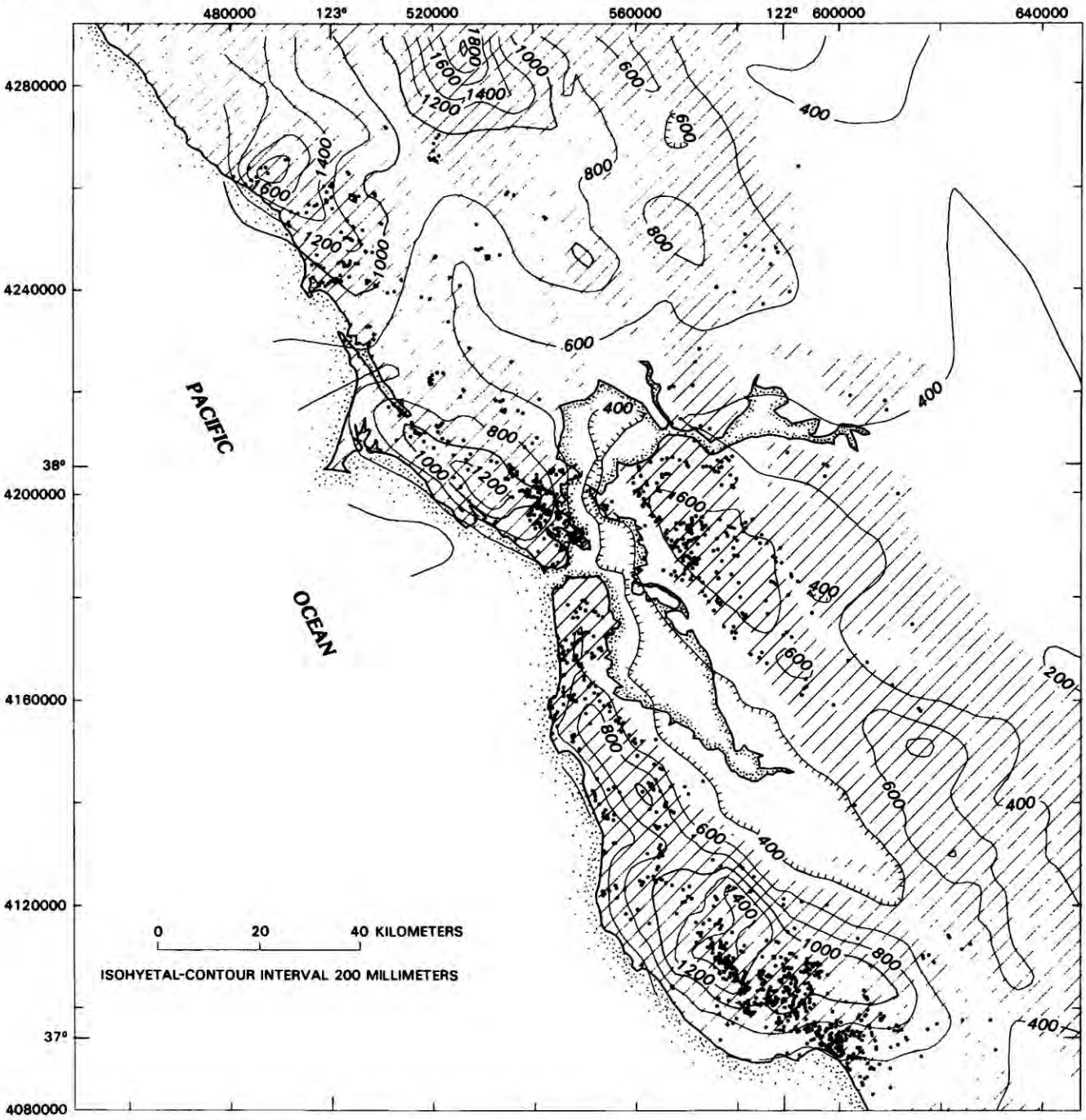


FIGURE 2.1.—Contour map of mean annual precipitation (in millimeters) in the San Francisco Bay region (Rantz, 1971a), showing sites of damaging landslides (dots) (see chap. 11). Line-patterned areas have slopes greater than 5 percent. Hachures indicate closed depressions in rainfall surface. Universal Transverse Mercator grid, zone 10, North American datum 1927, shown in meters.

received less (or more) than a given amount of rainfall. For example, in figure 2.4*C*, 50 percent of the damaging landslides occurred in localities receiving less than 250 mm (10 in.) of storm rainfall, whereas about 85 percent of the region received that much rainfall or less.

The probability of each total-rainfall interval (for example, 100–200 mm) at landslide points divided by the probability in that same interval at random points over the region measures the relative enhancement (with respect to the regional storm average) of landslides for that

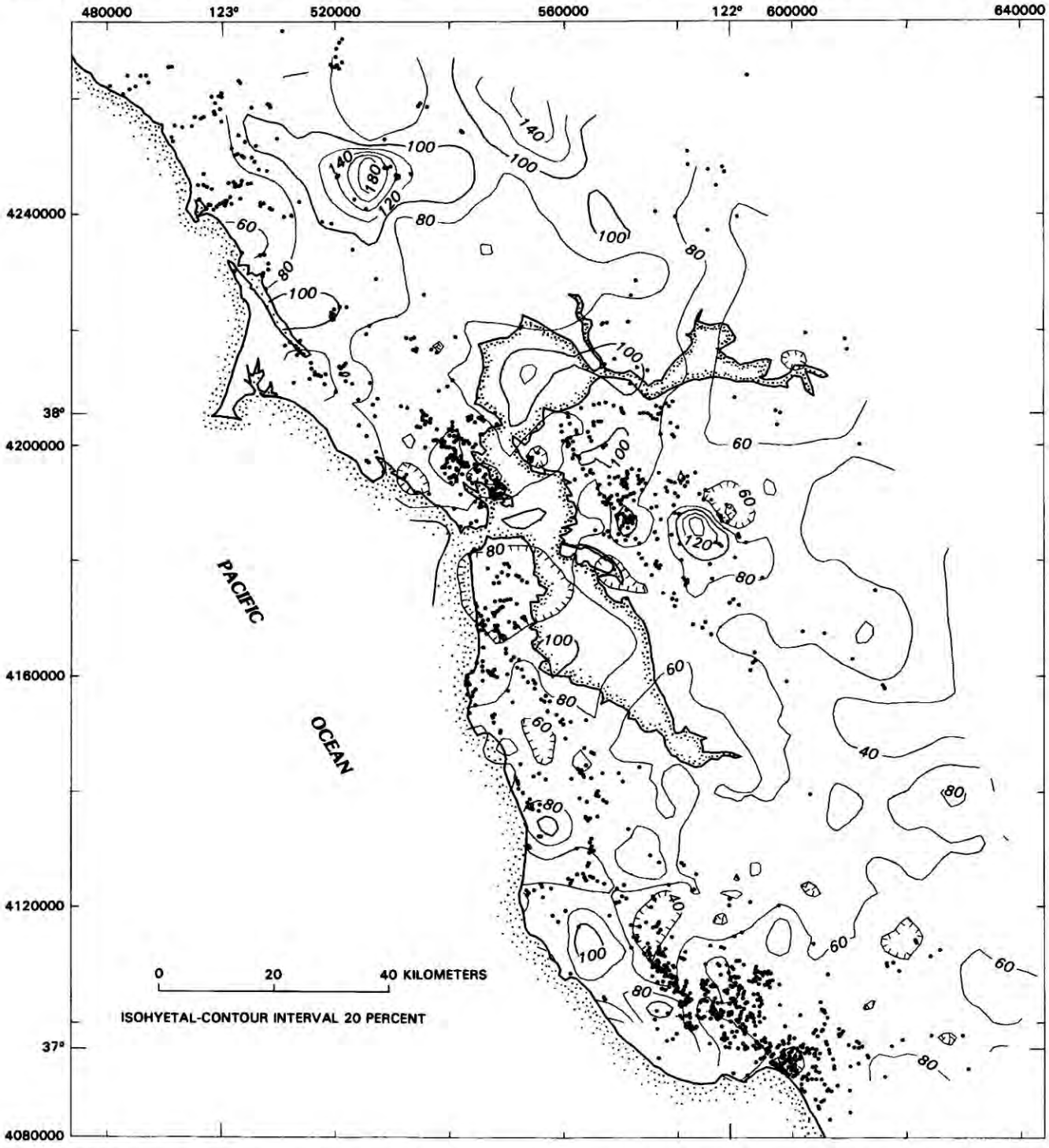


FIGURE 2.2.—Contour map of prestorm (July 1, 1981–Jan. 3, 1982) rainfall normalized with respect to mean annual precipitation in the San Francisco Bay region, showing sites of damaging landslides (dots) (see chap. 11). Hachures indicate closed depressions in rainfall surface. Universal Transverse Mercator grid, zone 10, North American datum 1927, shown in meters.

amount of rainfall. Prestorm and storm histograms (fig. 2.5) compare the rainfall sampled over the bay region with the rainfall sampled at damaging-landslide localities. The plots of storm rainfall versus landslide density (fig. 2.6) suggest that the density of landslides increased sharply where rainfall was more than about 250 mm (10 in.) (fig. 2.6*A*) and where normalized storm rainfall (fig. 2.6*B*) was more than about 30 percent of mean annual precipitation. The plot of prestorm rainfall versus landslide density (fig. 2.6*A*) suggests that a minimum of 300 to 400 mm (12–16 in.) of prestorm rainfall was required before an appreciable number of damaging land-

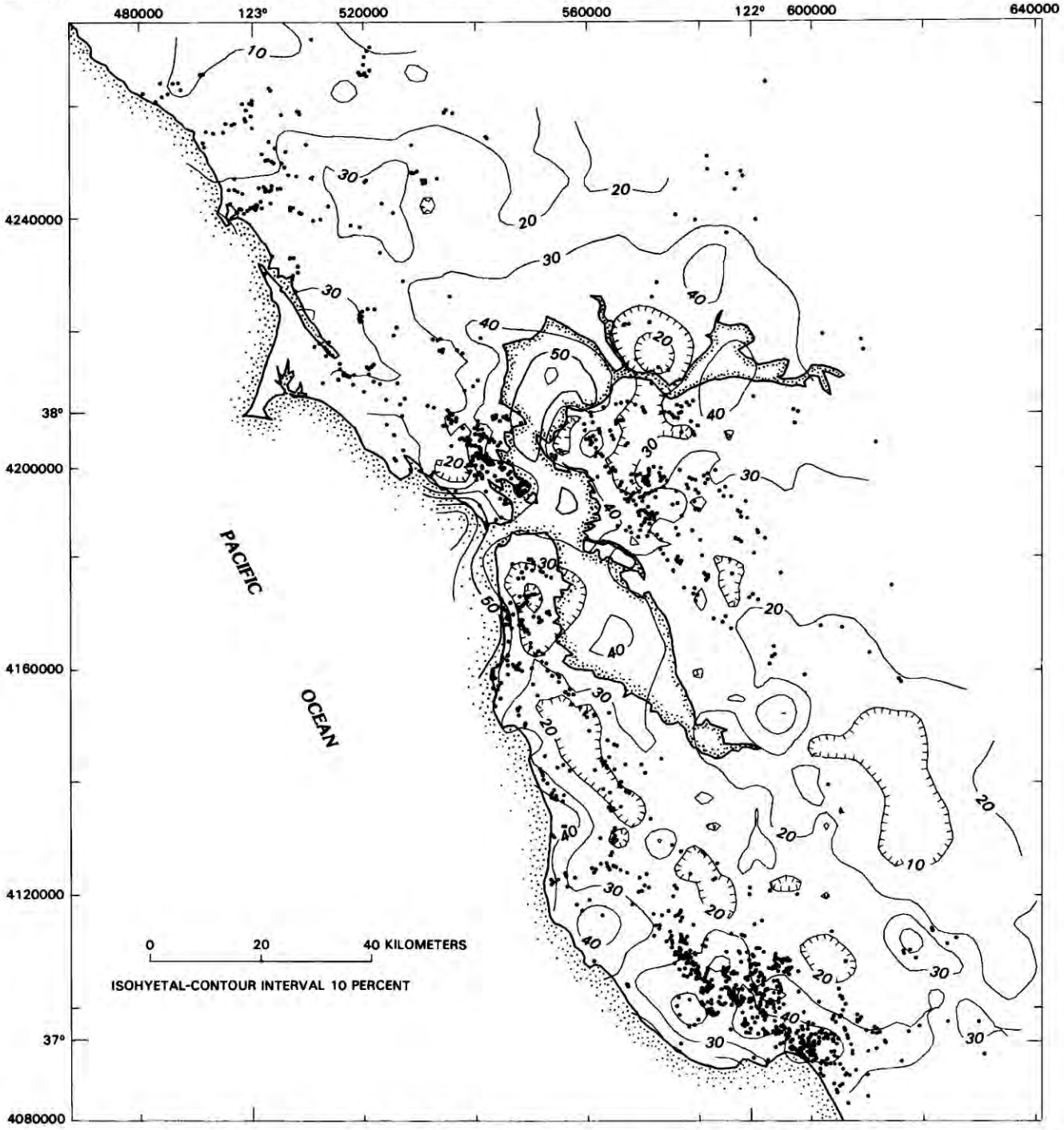


FIGURE 2.3.—Contour map of storm rainfall normalized with respect to mean annual precipitation in the San Francisco Bay region, showing sites of damaging landslides (dots) (see chap. 11). Hachures indicate closed depressions in rainfall surface. Universal Transverse Mercator grid, zone 10, North American datum 1927, shown in meters.

slides occurred; further increase had little apparent effect. However, the plot of normalized prestorm rainfall versus landslide density (fig. 2.6*B*) shows no discernible pattern.

The plots of storm versus prestorm rainfall (fig. 2.7) indicate additional complexity in the landslide/rainfall relation. Homogeneous regions on these plots are shown bounded by polygons that generally correspond to specific areas of the San Francisco Bay region (fig. 2.8). The area of polygon 1 has high prestorm and storm rainfall, and the highest landslide-density ratio of 5.9. This area encompasses some of the mountainous areas of Santa Cruz and Marin Counties. A total of 13.8 percent of the landslide sample had rainfall in this category, in contrast to 2.3 percent of the random sample.

The area of polygon 2 has midrange prestorm and storm rainfall, and a landslide-density ratio of 2.9. This area covers the remaining parts of Santa Cruz, southern Marin, southern San Mateo, and southwestern Sonoma Counties. A total of 44.1 percent of the landslide sample had rainfall in this category, in contrast to 15.0 percent of the random sample.

The area of polygon 3 has lower midrange prestorm and low storm rainfall, and a landslide-density ratio of 1. Landslides with rainfall in this category occurred in southern Sonoma, southern Napa, southern Solano, San Francisco, northwestern San Mateo, western Contra Costa, Alameda, and Santa Clara Counties. Almost identical percentages of the landslide and random samples (31.9 and 32.0 percent, respectively) had rainfall in this category.

The area of polygon 4 has midrange to high prestorm rainfall and low to midrange storm rainfall, and a landslide-density ratio of 0.4. This area includes central Sonoma, central Napa, and small parts of Alameda, Contra Costa, Santa Clara, and San Mateo Counties. Only

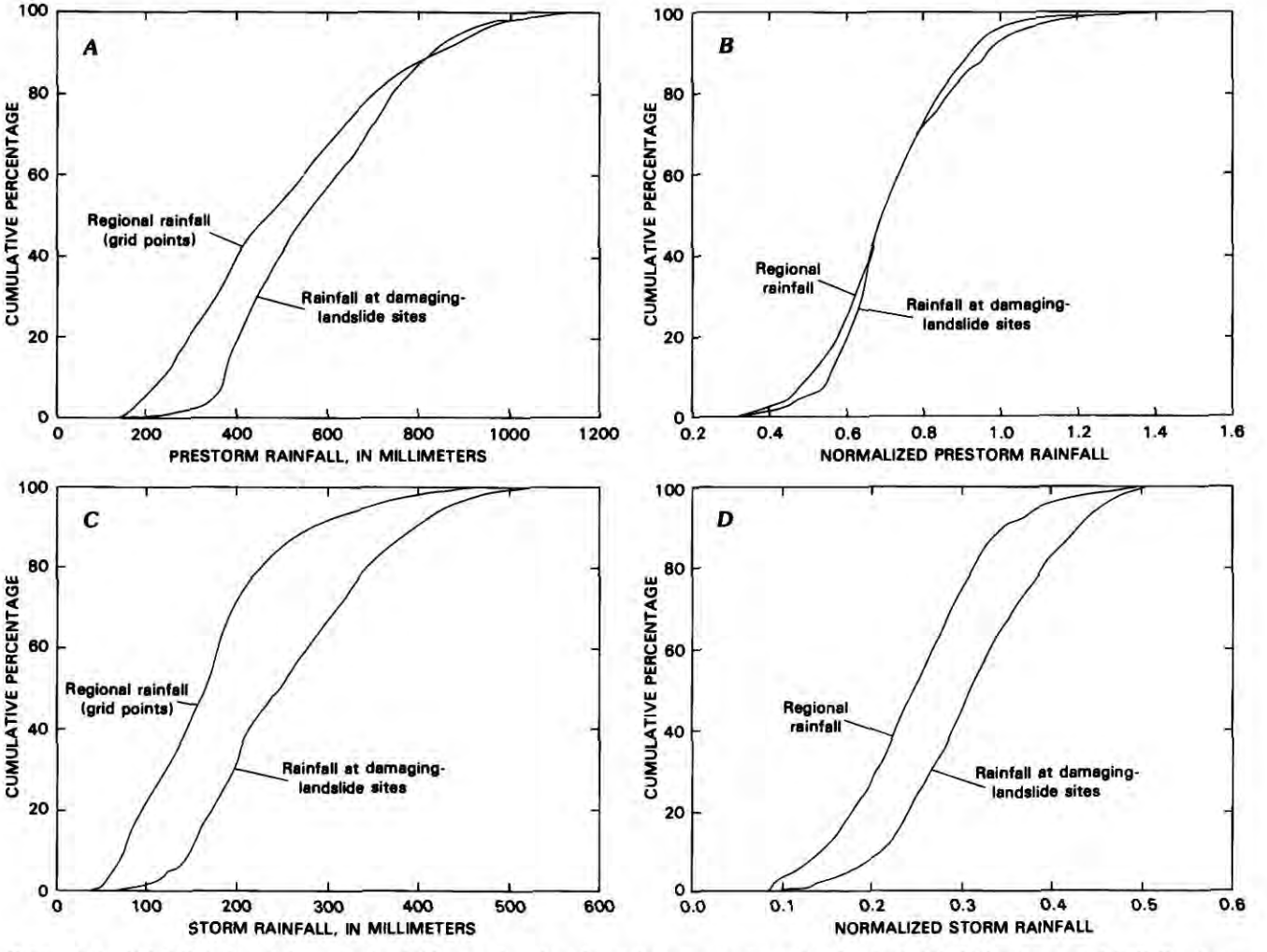


FIGURE 2.4.—Rainfall at sites of damaging landslides as a function of cumulative percentage of regional rainfall. *A*, Prestorm rainfall. *B*, Prestorm rainfall normalized with respect to mean annual precipitation. *C*, Storm rainfall. *D*, Storm rainfall normalized with respect to mean annual precipitation.

5.8 percent of the landslide sample had rainfall in this category, in contrast to 13.3 percent of the random sample.

The area of polygon 5 has the lowest values of both prestorm and storm rainfall, and the lowest landslide-density ratio of 0.1. This area encompasses the Diablo Range in southern Solano, eastern Contra Costa, eastern Alameda, and eastern Santa Clara Counties. A total of 4.5 percent of the landslide sample had rainfall in this category, in contrast to 37.3 percent of the random sample.

The main trend (polygons 1, 2, 3, 5) is consistent with the ratio plots. Polygon 4, however, represents an area (largely on the north edge of the storm) that has midrange to high prestorm and low to midrange storm rainfall, and a lower landslide-density ratio (0.4) than polygon 3 (1.0), which has lowest prestorm but comparable storm rainfall. This result may reflect the bias introduced by using only damaging landslides in the sample. The northern bay region dominating polygon 4 is relatively sparsely populated, and so landslides that would have caused damage if these areas were more highly developed were not included in the sample.

Several points must be considered in evaluating these results.

1. Prestorm, storm, and mean annual precipitation are

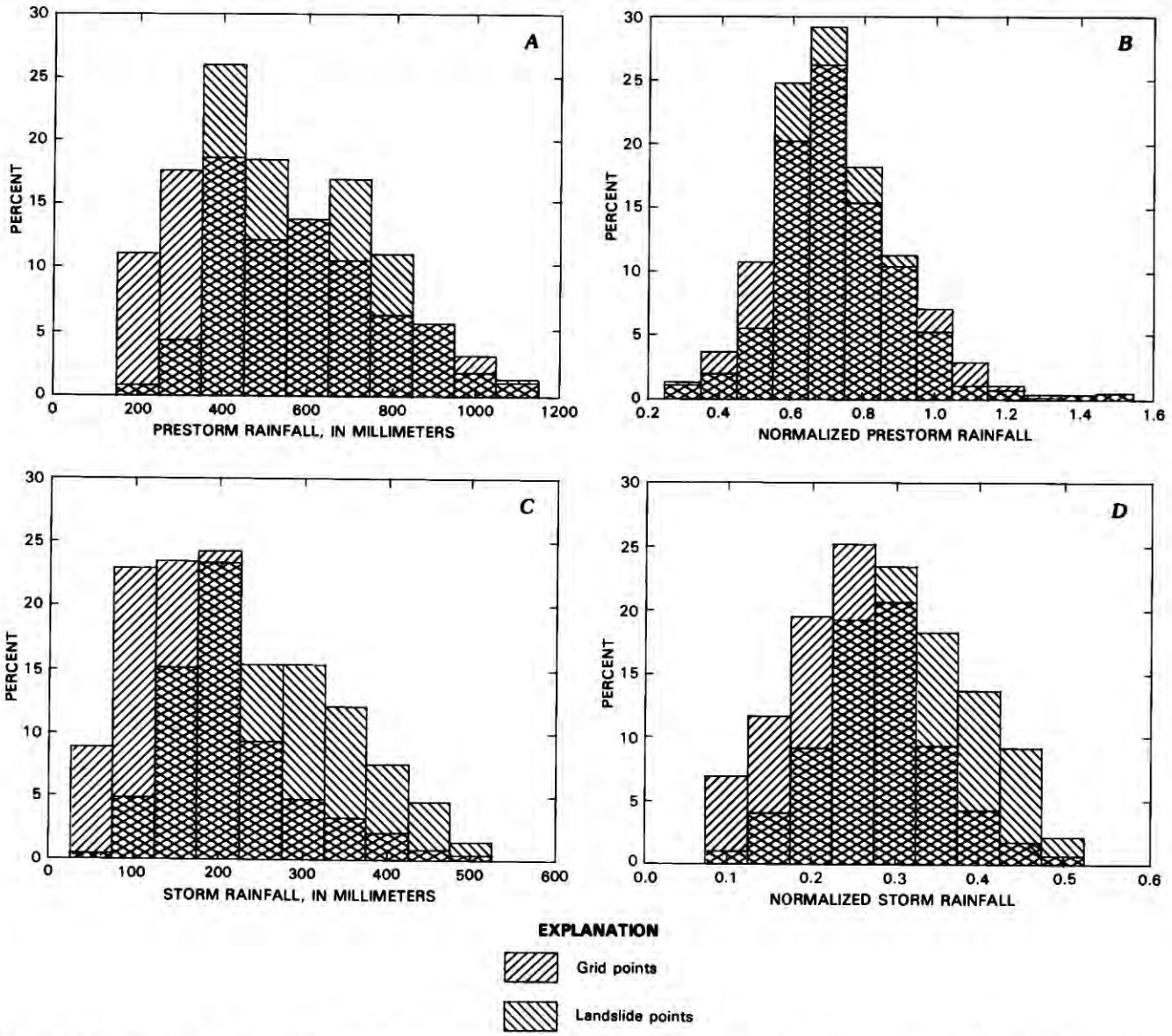


FIGURE 2.5.—Percentage of regional rainfall at grid points in comparison with prestorm rainfall or with storm rainfall at sites of damaging landslides. *A*, Prestorm rainfall. *B*, Normalized prestorm rainfall. *C*, Storm rainfall. *D*, Normalized storm rainfall.

positively correlated to varying degrees (prestorm with mean annual precipitation, 0.81; storm with mean annual precipitation, 0.52; storm with prestorm rainfall, 0.61).

2. The landslide sample is biased toward developed areas.
3. Landslides depend on many other factors besides rainfall; some of these factors, such as slope, may correlate with orographic rainfall.
4. In a particular storm, total storm rainfall may correlate with rainfall intensity (Rantz, 1971b), and so the relations between landslides and total rainfall could be due to variations in rainfall intensity (Cannon and Ellen, 1983). For a sample of 15 stations, the correlation between peak 3-hour intensity and total storm rainfall was 0.7.
5. It cannot be determined, on the basis of one storm, whether some or all of the curves will be reproducible in other storms. Duration of the storm may also be an important factor. Additional data from other storms, whether or not they generate landslides, are needed.

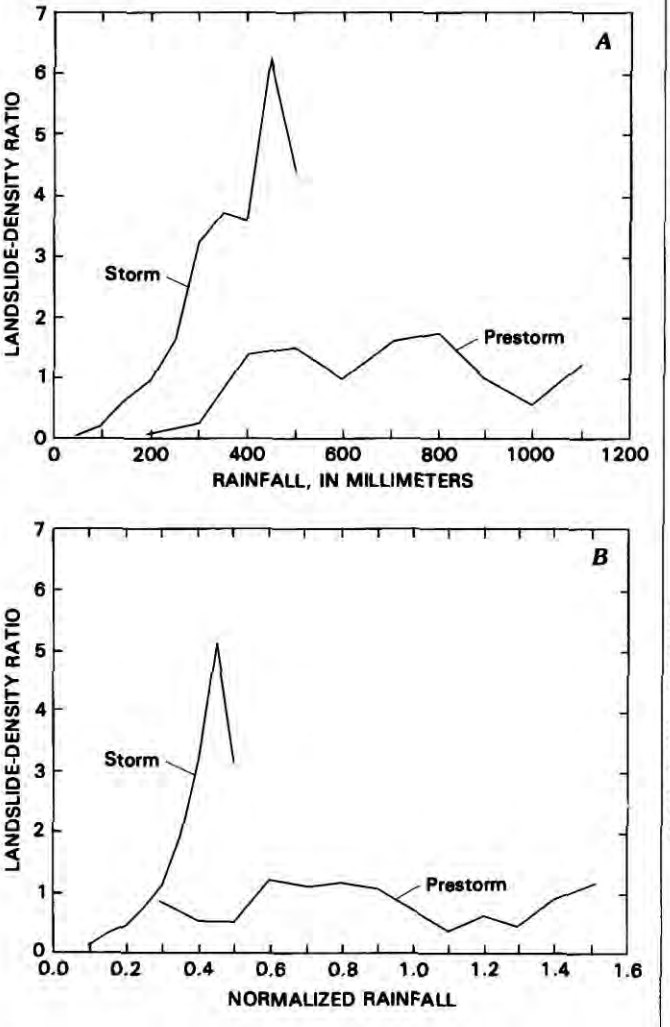


FIGURE 2.6.—Landslide-density-ratio plots showing relative density of damaging landslides as a function of rainfall, that is, ratios of histograms in figure 2.5. *A*, Ratios of prestorm and storm rainfall at sites of damaging landslides to prestorm and storm regional rainfall. *B*, Ratios of normalized prestorm and normalized storm rainfall at sites of damaging landslides to normalized prestorm and storm regional rainfall.

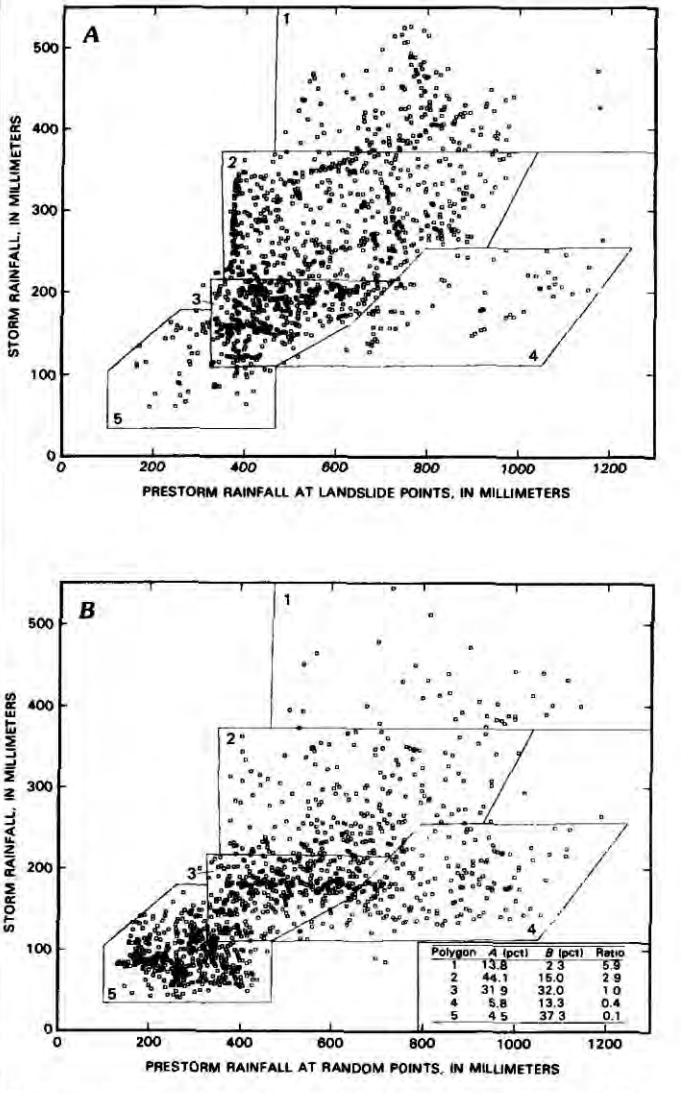


FIGURE 2.7.—Two-dimensional-ratio plots of prestorm and storm rainfall at sites of damaging landslides (*A*) and at an equal number of randomly selected points interpolated from rainfall grids (*B*). Polygons were arbitrarily drawn around areas of approximately homogeneous point density (see fig. 2.8 for areal distribution of polygons). Inset table in figure 2.7*B* lists percentages of landslide/rainfall and random-rainfall points that fall within comparable polygons, and their ratios (landslide-density ratios).

CONCLUSIONS

Our analysis of rainfall and landslide data from the January 3–5, 1982, storm indicates a direct relation between damaging landslides and both storm and normalized storm rainfall. There appear to be thresholds with respect to landslide density at about 250 mm (10 in.) of storm rainfall and at 30 percent of mean annual precipitation. Above these thresholds, the landslide probability increases significantly. The relation of landslides to prestorm seasonal rainfall displays a threshold at 300 to 400 mm (12–16 in.) but no significant increase in landslide probability above this value.

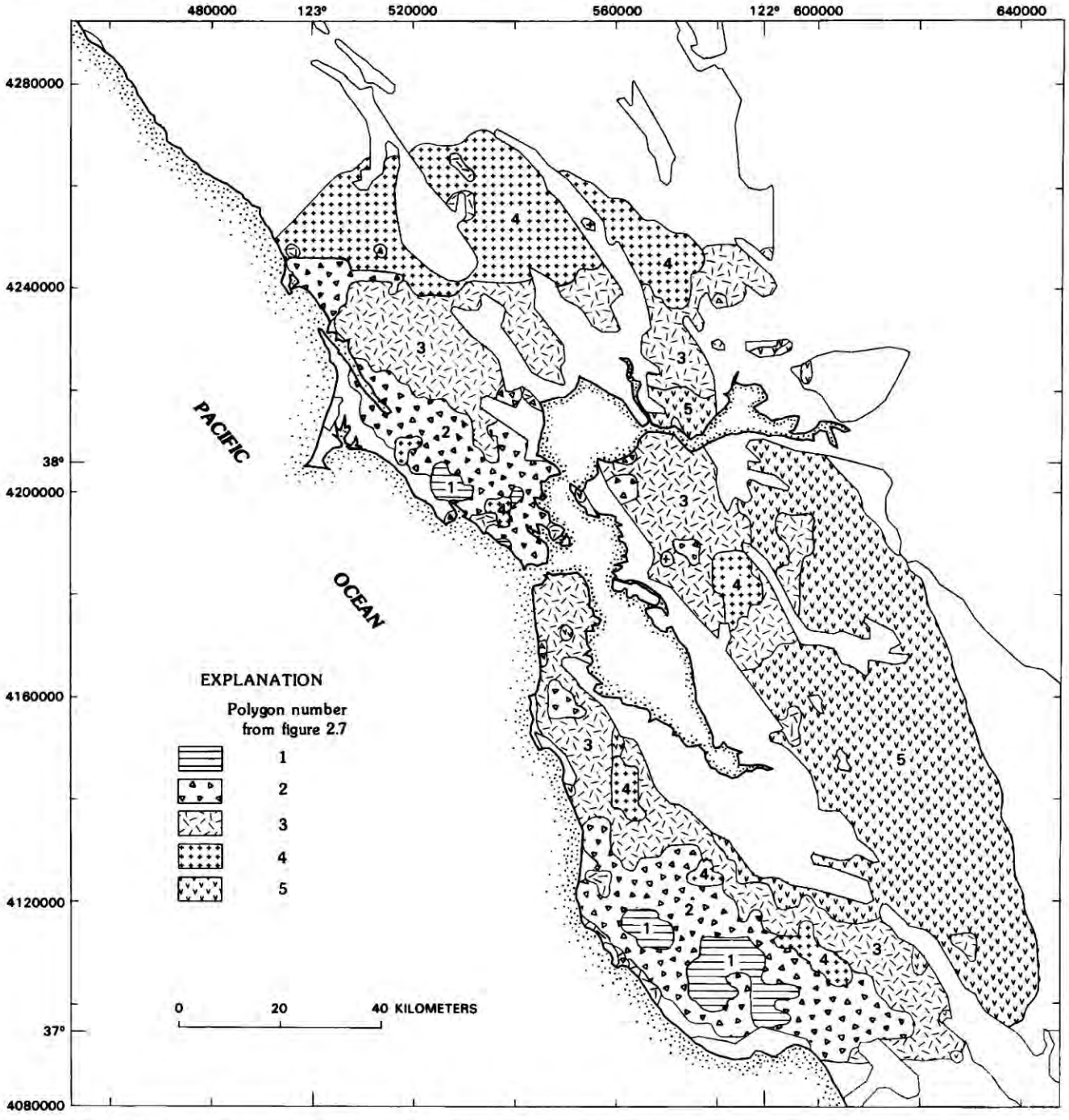


FIGURE 2.8.—San Francisco Bay region, showing areal distribution of polygonal fields in figure 2.7. Numbers correspond to polygon numbers. Areas with slopes of less than 5 percent and areas with no data are blank. Universal Transverse Mercator grid, zone 10, North America datum 1927, shown in meters.

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3. RAINFALL THAT RESULTED IN ABUNDANT DEBRIS-FLOW ACTIVITY DURING THE STORM

By Susan H. Cannon and Stephen D. Ellen,
U.S. Geological Survey

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ABSTRACT

We have determined the rainfall conditions that led to abundant debris-flow activity on natural hillslopes during the storm by comparing the known times of debris flows with the hourly records from nearby continuously recording rain gages. These rainfall conditions are described in terms of a prestorm seasonal-rainfall total and the duration of a range of rainfall intensities, for areas of different mean annual precipitation (MAP). In areas that receive more than 660 mm (26 in.) of MAP, abundant debris-flow activity followed 500 to 760 mm (20–30 in.) of prestorm seasonal rainfall and 8 hours of intense storm rainfall with intensities ranging from 10 to 20 mm/h (0.4–0.8 in/h). The onset of abundant debris-flow activity during the storm occurred after storm-rainfall totals had exceeded common values.

In areas that receive less that 660 mm (26 in.) of MAP, abundant debris-flow activity followed 381 to 483 mm (15–19 in.) of prestorm seasonal rainfall and 17 hours of intense storm rainfall with intensities ranging from 2.5 to 6.4 mm/h (0.1–0.25 in/h). The onset of abundant debris-flow activity during the storm occurred as storm-rainfall totals began to exceed common values.

INTRODUCTION

Intense and sustained rainfall during the January 3–5, 1982, storm triggered abundant fast-moving landslides throughout the San Francisco Bay region. The shallow empty scars left by these landslides marked the places from which material initially slid, and then flowed down slopes or channels as muddy slurries, generally at high velocities. We call these landslides debris flows (see "Introduction" to this volume for landslide terminology).

PURPOSE AND APPROACH

Our purpose is to document the rainfall conditions that triggered abundant debris flows during the storm.[1] We tabulate the hourly storm rainfall leading up to the onset of abundant debris-flow activity by comparing the known times of debris flows with the hourly storm-rainfall records from nearby continuously recording rain gages. The rainfall measured in this manner is that which actually contributed to the debris flow, in contrast to the storm total, which includes rain that fell after the debris flow mobilized. We then compare the frequency of recurrence of such rainfall with information on past debris-flow activity to check our findings.

PREVIOUS WORK

The role of rainfall in the initiation of debris flows has been studied in many parts of the world, using a variety of criteria. In Italy, Govi and Sorzana (1980) described the relation between widespread debris-flow activity and annual rainfall, 24-hour storm-rainfall totals, and prestorm moisture conditions. In New Zealand, Eyles (1979) correlated the occurrence of debris flows with 24-hour storm-rainfall totals and 4-month prestorm rainfall. Lumb (1975) described 24-hour maximium rainfall for the day of the event and cumulative rainfall over the previous 15 days as significant for debris-flow initiation in Hong Kong. Caine (1980) used a compilation of rainfall intensities associated with durations ranging from 1 minute to 90 days to derive a threshold equation for the rainfall conditions required for debris-flow activity.

Additional studies have been made in the San Francisco Bay region. Rice and others (1976, p. 46) concluded that 102 mm (4 in.) or more of rainfall in less than 10 hours is necessary to initiate debris-flow activity in Marin County. Nilsen and Turner (1975) suggested that 178 mm (7 in.) of storm rainfall, preceded by at least 254 mm (10 in.) of seasonal rainfall without an intervening dry period, describes a threshold for landslide activity in Contra Costa County; their work, however, does not distinguish debris flows from slower moving landslides.

More detailed information was used in southern California by Campbell (1975), who compared the times of

[1]The term "abundant" is used here to denote a wide areal distribution of large numbers of debris flows.

occurrence of debris flows with the rainfall records from continuously recording rain gages. His procedure, which we follow in this report, relates the occurrences of particular debris flows to the hourly intensities of rainfall leading up to failure.

ACKNOWLEDGMENTS

We appreciate the efforts of the individuals and agencies who provided rainfall records for this study, including Bill Baker of Ben Lomond, John Monteverdi of the San Francisco State University, the Alameda County Flood Control District, Camp Dresser and McKee, Inc., the U.S. National Weather Service, the East Bay Municipal Utilities District, the Marin County Flood Control District, the U.S. Geological Survey, the San Mateo County Department of Public Works, the Santa Clara Valley Water District, and the Santa Cruz County Department of Public Works.

Earl Hart of the California Division of Mines and Geology, Steve Singer of the U.S. Soil Conservation Service in Santa Cruz County, Joel Baldwin of Howard-Donley Associates, Gerald Weber of Cordex, Rick Holtenhoff of Applied Earth Consultants, and Mark Foxx of the University of California, Santa Cruz, provided data on the times of debris-flow occurrence. Carol Creasey, Bette Hamachi, Darrell Herd, Robert Mark, Catherine McMasters, Evelyn Newman, Carol Northcut, Steven Reneau, Howard Wilshire, and Gerald Wieczorek also provided data for this study.

METHODS

DATA COLLECTION

To relate debris-flow activity to storm rainfall, we sought both continuous rainfall records and information on the times of debris flows throughout the San Francisco Bay region. Times of occurrence and locations of debris flows were documented through a search of newspaper accounts and through interviews of eyewitnesses and property owners by personnel of the U.S. Geological Survey, the California Division of Mines and Geology, the U.S. Soil Conservation Service in Santa Cruz County, and other agencies. A debris flow initially qualified for the study if its time of occurrence was known within 1 hour, if its location could be determined within 0.4 km, and if it was not reported to be associated with stream erosion or with manmade alterations of hillsides. The locations of debris flows that satisfied these criteria were then compared to the locations of continuously recording rain gages that operated during the storm. We considered rain-gage data to be representative of rainfall conditions at a particular debris-flow site if the gage was within approximately 5 km of the site and was within the same drainage basin, or otherwise lacked major changes in intervening topography. Only those debris flows that satisfied all these criteria were included in this study. For these 27 debris flows, we know with some certainty the hourly storm rainfall that led to debris-flow activity from natural hillslopes. This information is shown in figure 3.1 by plots of cumulative storm rainfall on which are superimposed dots representing the times of nearby debris flows.

SUBDIVISION OF THE STORM

Very diverse storm rainfall triggered debris flows in different parts of the bay region (fig. 3.1). For example, debris flows near Ben Lomond, in Santa Cruz County, were triggered by a rainfall event very different in magnitude and pattern from that which triggered debris flows near San Bruno Mountain, in San Mateo County.

To characterize the varying storm-rainfall conditions that resulted in debris-flow activity in different parts of the bay region, we found it useful to divide the storm records. We divided the rain-gage records into two groups (shading, fig. 3.1) on the basis of storm-rainfall totals and the similarity of storm-rainfall patterns. The rain-gage records in the upper division show high storm-rainfall totals and rainfall at sustained high intensities. The rain-gage records in the lower division show lower storm-rainfall totals and a sustained period of rainfall at low intensities followed by a burst of high-intensity rainfall near the end of the storm.

By subdividing the storm in this manner, we can describe more precisely the rainfall conditions that led to debris-flow activity, and we can tentatively apply these conditions to different parts of the study area on the basis of the relation suggested by Rantz (1971) between MAP and the storm rainfall at a given site. Rantz reported that the rainfall total to be expected from a storm of given duration at a particular site in the San Francisco Bay region varies directly with the MAP at that site. According to Rantz, this relation applies to stations that receive more than 500 mm (20 in.) of MAP and for rainfall of more than 2 hours duration.

Work by Govi and Sorzana (1980) suggested that for some conditions, the storm-rainfall totals that accompany debris-flow activity also correlate with MAP. Our data show a linear relation between the storm rainfall up to the time of failure and MAP (fig. 3.2).

The work of Rantz (1971), combined with the relation suggested by Govi and Sorzana (1980) and plotted in figure 3.2, suggests that both storm-rainfall totals and the storm rainfall necessary to trigger debris flows might be expected to vary with MAP. Therefore, we associate the upper shaded part of the storm record in figure 3.1 with areas of high MAP (more than 660 mm/yr [26 in/yr]), and the lower shaded part with areas of low MAP (less than

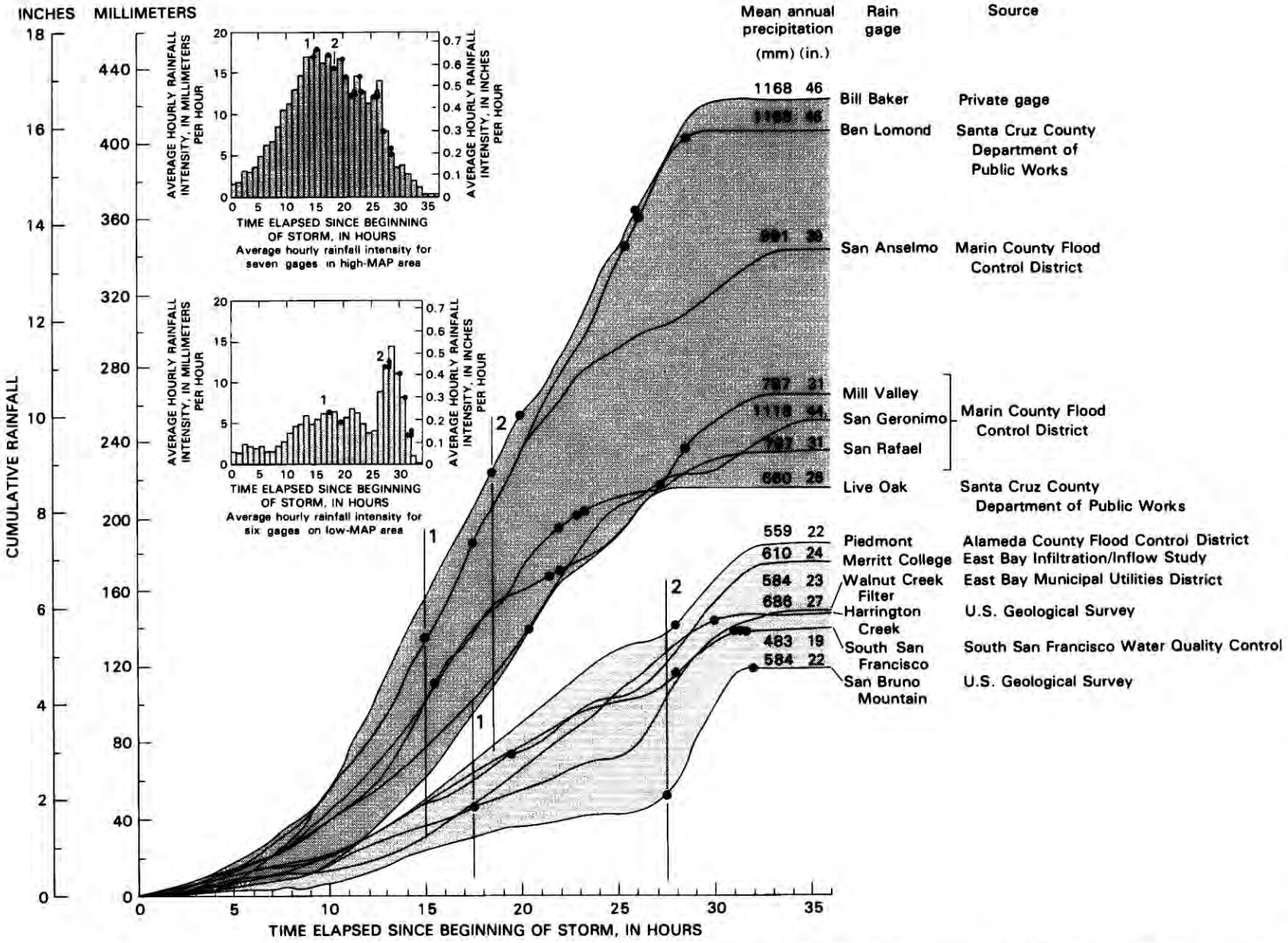


FIGURE 3.1.—Cumulative storm rainfall for 13 continuously recording rain gages used in this study, showing relations between storm rainfall and debris flows in the January 3–5, 1982, storm. Dots denote known times of debris flows near these gages; lines 1 and 2 denote onset of debris-flow activity and onset of abundant debris-flow activity, respectively. Mean annual precipitation (MAP) for each gage (in millimeters) is from Rantz (1971). Shading delineates grouping of storm records on the basis of the similarity of hourly rainfall-intensity patterns and of storm-rainfall totals. Bar graphs show average hourly intensities of storm rainfall for high- and low-MAP areas.

660 mm/yr [26 in/yr]).[2] Using the MAP map of Rantz (1971), we can tentatively apply these conditions to different parts of the study area. Figure 3.3 shows the areas of high and low MAP, generalized from Rantz (1971).

The rainfall necessary to trigger debris flows can be expected to vary with MAP because abundant debris-flow activity apparently occurs during extraordinary events, when rainfall at a particular site exceeds the commonly occurring conditions. Because commonly occurring rainfall conditions vary with MAP throughout the bay region (Rantz, 1971), the uncommonly heavy rainfall necessary to trigger abundant debris flows should be reflected by MAP as well.

RESULTS

STORM RAINFALL AND THE ONSET OF DEBRIS-FLOW ACTIVITY

The times of debris flows are plotted in figure 3.1 against the progression of storm rainfall at each of the continuously recording rain gages. The slopes of these plots indicate the intensity of rainfall at the gages; the slopes of the heavy lines that bound the shaded areas define the range in rainfall intensities for each MAP area. The bar graphs show the average hourly rainfall intensities of the storm for each of the two MAP areas.

The dots in figure 3.1 denote the times of occurrence of the debris flows that we included in this study. The line at 1 on the cumulative-rainfall plots indicates the first known time of debris-flow activity in each MAP area. The line at 2 represents what we define as the onset of abundant debris-flow activity; 80 percent of the debris flows included in this study within a given MAP area occurred after the time indicated by line 2.

All the storm records show debris flows occurring during or immediately after a period of increased rainfall intensity that started at about hour 10 of the storm. We distinguish this period of increased intensity as intense storm rainfall.

At the high-MAP rain gages, the onset of abundant debris-flow activity occurred after 18.5 hours of storm rainfall; of this period, the last 8 hours was intense storm rainfall with intensities of from 10 to 20 mm/h (0.4–0.8 in/h). At the low-MAP rain gages, the onset of abundant debris-flow activity occurred after 27.5 hours of storm rainfall; of this period, the last 17 hours was intense storm rainfall with intensities of from 2.5 to 6.4 mm/h (0.1–0.25 in/h). We note that the threshold described here applies specifically to an abundant, widespread distribution of debris flows; scattered occurrences of debris flows can certainly be expected before this threshold is reached.

[2]An exception to this generalization is the Harrington Creek rain gage. Although this gage was shown by Rantz (1971) as receiving an MAP of 686 mm/yr (27 in/yr), we included it in the low-MAP group because its storm record resembles that of the others in this group.

PRESTORM SEASONAL RAINFALL

Although most researchers agree that prestorm seasonal rainfall is an important factor in the rainfall conditions that trigger debris flows, there is little agreement as to the time period significant for the buildup of antecedent soil-moisture conditions. Lumb (1975), Eyles (1979), and Govi and Sorzana (1980) reported rainfall totals for time periods ranging from 2 to 45 days before a storm as contributing to the soil-moisture conditions that lead to debris flows. Because of this uncertainty, we simply describe the prestorm seasonal-rainfall totals at the start of the January 1982 storm.

The prestorm seasonal rainfall for water year 1981–82 ranged from 508 to 813 mm (20–32 in.) in areas of high MAP and from 380 to 480 mm (15–19 in.) in areas of low MAP. Work by Campbell (1975) in southern California and by Wieczorek and Sarmiento (see chap. 5) suggests that 254 to 381 mm (10–15 in.) of seasonal rainfall is sufficient to establish the soil-moisture conditions conducive to debris-flow activity, should an intense storm occur.[3] Seasonal rainfall had exceeded these amounts by the beginning of the storm throughout the study area.

RECURRENCE OF STORM-RAINFALL CONDITIONS

Some perspective can be gained on the events of the January 1982 storm by comparing the history of debris-flow activity in the bay region with the recurrence intervals for rainfall totals from the storm. Examination of historical records for the San Francisco Bay region

[3]Note that scattered distributions of debris flows can occur before these prestorm conditions are met (see chap. 4).

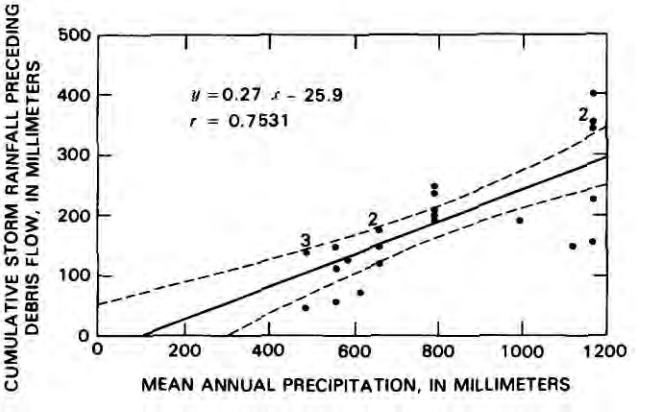


FIGURE 3.2.—Cumulative storm rainfall preceding debris flows as a function of mean annual precipitation (MAP). Numbers adjacent to dots indicate the number of values at that position. Regression equation: cumulative storm rainfall = (0.27 × MAP) – 25.9. Dashed lines delineate the 95-percent-confidence interval. Significance testing of the correlation coefficient (r) yields $F = 31.4436$ and $F_{0.05} = 4.24$, with $v = 25$.

revealed no other storm that had resulted in debris flows of such abundance and broad areal extent (see chap. 4). Thus, the debris flows that occurred during the January 1982 storm must have been induced by aspects of the rainfall that are unique or, at least, uncommon during the last century in the bay region.

Rainfall-recurrence intervals can be used to indicate when, during the storm, rainfall totals became uncommon. Tables 3.1 and 3.2 list the recurrence intervals, calculated from the data of Rantz (1971), for rainfall totaled over several selected durations, starting at the beginning of the storm. We note that this use of rainfall recurrence

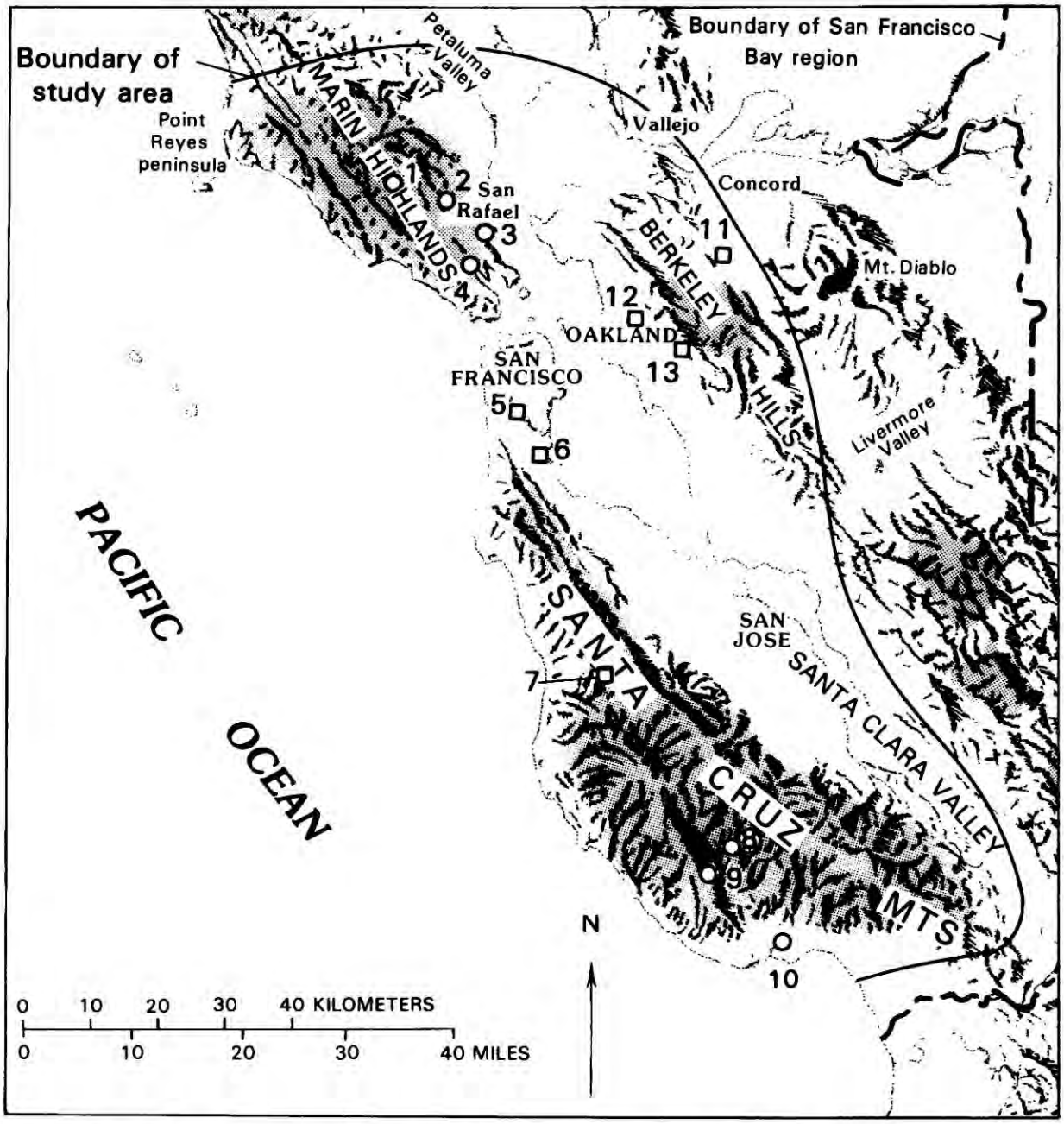


FIGURE 3.3.—San Francisco Bay region, showing boundary of study area. Shaded areas, high mean annual precipitation (MAP) (more than 660 mm/yr [26 in/yr]); unshaded areas, low MAP (less than 660 mm/yr [26 in/yr]). MAP data generalized from Rantz (1971). Squares, locations of rain gages used in low-MAP areas; circles, locations of rain gages used in high-MAP areas. Rain gages: 1, San Geronimo; 2, San Anselmo; 3, San Rafael; 4, Mill Valley; 5, San Bruno Mountain; 6, South San Francisco; 7, Harrington Creek; 8, Ben Lomond; 9, Bill Baker; 10, Live Oak; 11, Walnut Creek Filter; 12, Piedmont; 13, Merritt College.

TABLE 3.1.—*Recurrence intervals for 12-, 18-, and 24-hour rainfall totals measured from the beginning of the January 3–5, 1982, storm in areas of high mean annual precipitation (MAP)*

Station	MAP (mm)	12-hour rainfall		18-hour rainfall		24-hour rainfall	
		Total (mm)	Recurrence interval (years)	Total (mm)	Recurrence interval (years)	Total (mm)	Recurrence interval (years)
Mill Valley----	787	53.3	1	109.2	10	166.4	49
San Geronimo---	1,118	32.3	1	104.6	2	191.0	20
San Rafael-----	787	66.0	2	149.9	100	201.9	>100
San Anselmo----	991	82.6	2	196.8	>100	283.2	>100
Live Oak-------	660	55.9	2	149.9	>100	184.1	>100
Ben Lomond-----	1,168	97.8	3	217.2	>100	327.8	>100
Bill Baker-----	1,168	102.9	4	220.2	>100	315.2	>100

TABLE 3.2.—*Recurrence intervals for 27-, 30-, and 36-hour rainfall totals measured from the beginning of the January 3–5, 1982, storm in areas of low mean annual precipitation (MAP)*

Station	MAP (mm)	27-hour rainfall		30-hour rainfall		36-hour rainfall	
		Total (mm)	Recurrence interval (years)	Total (mm)	Recurrence interval (years)	Total (mm)	Recurrence interval (years)
Walnut Creek----------	584	109.5	13	138.2	30	149.6	44
Harrington Creek------	686	126.7	14	146.6	21	149.1	18
San Bruno Mountain----	584	32.3	2	101.3	8	121.2	14
South San Francisco---	483	99.1	23	135.9	>100	141.0	>100
Piedmont--------------	559	135.9	35	167.6	>100	187.5	>100
Merritt College-------	610	118.6	16	160.0	71	176.3	100

differs from that of Wieczorek and Sarmiento (see chap. 5), who report the recurrence intervals of maximum rainfall totals for selected durations.

For the high-MAP group of gages (table 3.1), the 1- to 4-year recurrence intervals for the first 12 hours of the storm indicate that storms with these rainfall totals within a 12-hour period pass through the bay region frequently. The 18- and 24-hour totals, however, occur less frequently; five of the seven rain-gage stations show recurrence intervals of 100 years or longer. Thus, between hours 12 and 18 of the storm, the amount of storm rainfall changed from common to rare. The onset of abundant debris-flow activity at hour 18.5 (fig. 3.1) occurred after the storm rainfall had exceeded common totals.

For the low-MAP group of gages (table 3.2), recurrence intervals are less consistent between stations, and changes in recurrence interval are not so abrupt as those for the high-MAP gages. For this low-MAP group, abundant debris-flow activity began at hour 27.5. The 27-hour January 3–5, 1982, storm totals show fairly short recurrence intervals (2–35 years) in comparison with the 30- and 36-hour totals (8–100 years). Although the onset of abundant debris-flow activity apparently occurred as the storm rainfall began to exceed common totals, the relation here is less clearly defined than for the high-MAP gages.

Long recurrence intervals of storm-rainfall totals throughout the bay region confirm that the broad areal extent of the storm was uncommon.

SUMMARY

The abundance and broad areal extent of debris flows during the January 3–5, 1982, storm were an unusual occurrence in the San Francisco Bay region. In areas with more than 660 mm (26 in.) of MAP, comparison of the known times of debris flows on natural hillslopes with the hourly storm records of nearby continuously recording rain gages indicates that the onset of abundant debris-flow activity occurred at hour 18.5 of the storm. Rainfall-recurrence intervals indicate that storm-rainfall totals became uncommon between hours 12 and 18 of the storm, and so abundant debris-flow activity began after storm rainfall had exceeded common values. Abundant debris-flow activity followed 8 hours of intense storm rainfall with intensities ranging from 10 to 20 mm/h (0.4–0.8 in/h). In this MAP area, the prestorm seasonal rainfall had reached 508 to 813 mm (20–32 in.), well beyond the 254 to 381 mm (10–15 in.) considered sufficient to establish soil-moisture conditions that will lead to debris-flow activity, should an intense storm occur.

In areas with less than 660 mm (26 in.) of MAP, comparison of the known times of debris flows with the hourly storm records indicates that the onset of abundant debris-flow activity occurred after 27.5 hours of storm rainfall. Recurrence intervals indicate that the 27-hour rainfall totals occur frequently in comparison with the 30- and 36-hour totals, although the contrast is not so clearly defined as in the previous case. In these areas, the onset of abundant debris-flow activity followed 17 hours of intense storm rainfall with intensities ranging from 2.5 to 6.4 mm/h (0.1–0.25 in/h). The prestorm-seasonal rainfall had reached 380 to 480 mm (15–19 in.).

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4. REGIONAL RAINFALL-THRESHOLD CONDITIONS FOR ABUNDANT DEBRIS-FLOW ACTIVITY

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ABSTRACT

Rainfall-threshold conditions that led to abundant debris-flow activity are determined by comparing the normalized intensities and durations of bursts of storm rainfall, segments of bursts, and within-storm averages from six storms in the San Francisco Bay region. Normalization is by the mean annual precipitation (MAP) at the rain-gage station from which the rainfall was measured. The threshold line is described by the equation $D = 46.1 - 3.6 \times 10^3 \mathrm{In} + 7.4 \times 10^4 \mathrm{In}^2$, where D is the duration (in hours) and In is the normalized intensity (per hour). A comparison of the threshold with the rainfall measured up to known times of debris flows generally supports the position of the threshold line but indicates that the threshold is less reliable when applied to areas of low MAP. This comparison also indicates that in storms consisting of a series of isolated bursts of high-intensity rainfall, the within-storm average is a better measure of the rainfall necessary to initiate debris-flow activity than is the isolated burst.

PURPOSE

After the January 3–5, 1982, storm, concern arose regarding the conditions under which similar damage by debris flow could be expected in the future. In response to such concern, this study was designed to define the threshold storm-rainfall intensities and durations that have resulted in abundant[1] debris flows in the San Francisco Bay region. The threshold is defined by comparing the rainfall conditions during storms that triggered abundant debris flows with those during major storms that did not produce abundant debris flows. This comparison defines the range of rainfall conditions that have accompanied abundant debris-flow activity in the historical past. Abundant debris-flow activity can be expected to accompany similar conditions in the future.

Acknowledgments.—Many individuals and agencies provided rainfall records for this study, including the East Bay Infiltration/Inflow Study, East Bay Municipal Utilities District, Marin County Flood Control District, Marin Municipal Water District, Santa Cruz Department of Public Works, and U.S. National Weather Service. I am indebted to S.D. Ellen for guidance and editorial advice on this project, and to R.K. Mark for computer expertise.

PREVIOUS WORK

Rainfall thresholds for debris-flow activity in the San Francisco Bay region have been described by different workers in various ways. Smith and Hart (1982) suggested that 127 to 152 mm (5–6 in.) of rainfall within a 12- to 24-hour period is generally required for significant debris-flow activity in at least some parts of the bay region. Mark and Newman (see chap. 2) show that approximately 254 mm (10 in.) of storm rainfall correlated with a significant increase in the number of damaging landslides in the bay region during the January 1982 storm. Cannon and Ellen (see chap. 3) use hourly storm-rainfall records combined with known times of debris flows to determine rainfall conditions during the January 1982 storm that led to abundant debris-flow activity in areas of high and low mean annual precipitation (MAP). Cannon and Ellen (1985) compared hourly rainfall records of storms to calculate rainfall thresholds for abundant debris-flow activity in areas of high and low MAP in the bay region.

Other rainfall thresholds for debris-flow activity have been suggested for local areas in the bay region. Wieczorek and Sarmiento (see chap. 5) examined rainfall records from 22 storms to determine an intensity-duration threshold for scattered occurrences of debris flows in part of San Mateo County. Rice and others (1976) suggested that 102 mm (4 in.) of rainfall in less than 10 hours will lead to debris-flow activity in Marin County. Nilsen and Turner (1975) proposed that 178 mm (7 in.) of storm rainfall, preceded by 254 mm (10 in.) of seasonal rainfall without an intervening dry period, resulted in movement of various landslide types in Contra Costa County.

[1]The term "abundant" is used here to indicate an areal concentration of debris flows similar to that seen after the January 3–5, 1982, storm.

APPROACH

Campbell (1975, p. 20) described two rainfall conditions that result in debris flows: "* * * an initial period of enough rainfall to bring the full thickness of the soil mantle to field capacity * * *, followed by rainfall intense enough to exceed the infiltration rate of the parent material underlying the soil mantle, and lasting long enough to establish a perched ground-water table of sufficient * * * thickness * * * to cause failure." To quantify such rainfall conditions, I measured prestorm-seasonal-rainfall totals and the intensity and duration of several storm-rainfall parameters from the hourly records of six storms in the San Francisco Bay region. Comparison of these parameters for different storms defines the rainfall conditions that have accompanied abundant debris-flow activity in this region.

PRESTORM SEASONAL RAINFALL

Prestorm seasonal rainfall, measured from the beginning of the water year (October 1) up to the day of a given storm, is used as a measure of the rainfall available to bring the soil mantle in Campbell's (1975) model to field capacity. Work by Campbell in southern California and by Wieczorek and Sarmiento (see chap. 5) in part of San Mateo County suggests that 254 to 381 mm (10–15 in.) of prestorm seasonal rainfall is sufficient to establish the soil-moisture conditions conducive to abundant debris-flow activity, should an intense storm occur. In a study of the various landslide types in Contra Costa County, Nilsen and others (1976) reached similar conclusions. Mark and Newman (see chap. 2) show a significant relative increase in the areal abundance of storm-generated damaging landslides, including debris flows, following the January 1982 storm in those parts of the bay region that received 305 to 406 mm (12–16 in.) of prestorm seasonal rainfall. On the basis of these studies, only storms preceded by at least 254 mm (10 in.) of seasonal rainfall were included in this analysis.

Timing of prestorm seasonal rainfall appears to influence the occurrence of various landslide types, as suggested by Nilsen and Turner (1975), who indicated that dry periods preceding storms had important effects on landslides in Contra Costa County. For example, the bay-region storm of January 20–21, 1967, which was preceded by a 40-day dry period, did not trigger abundant debris flows, although this storm had rainfall totals and storm duration similar to those of the January 1982 storm (J.P. Monteverdi, written commun., 1982). These two storms also had similar prestorm-seasonal-rainfall totals. The major difference between these storms thus appears to be the rainfall during the 40 days preceding each storm, and the absence of abundant debris flows during the 1967 storm may be attributed to its prestorm dry period. Therefore, this study includes only storms with measurable rainfall [2.5 mm (0.1 in.)] in the 40 days immediately preceding the storm.

MEASURES OF STORM RAINFALL

The intensity and duration of three storm-rainfall parameters (burst, segment, and within-storm average) were measured from the records of recording rain gages (fig. 4.1). Bursts and segments of bursts describe the periods of intense storm rainfall within a storm, as called for by Campbell's (1975) model. Segments distinguish periods of different rainfall rates within a burst. Within-storm averages, which include periods of both high- and low-intensity rainfall, quantify the occurrence of cycles of intense rainfall followed by periods of quiescence.

Because the particular aspects of storm rainfall that result in debris flows are not well understood, the intensity and duration of all three parameters were measured from hourly storm-rainfall records. Comparison of the values of these parameters for different storms, combined with documentation of debris flows in these storms, should define storm-rainfall conditions that have produced abundant debris flows throughout the bay region.

NORMALIZATION OF RAINFALL DATA

Because different rainfall conditions have triggered debris flows in different parts of the bay region, the rainfall intensities for the parameters measured were normalized by dividing by the MAP of the gages at which the intensities were measured. Normalization incorporates the relation between MAP and the amount of rain expected from a given storm at a specific site (see chap. 3; Rantz, 1971), and aids in characterizing the varied rainfall conditions that resulted in debris flows during the January 1982 storm.

STORMS CONSIDERED

Bursts, segments, and within-storm averages were measured from the hourly records of storms in the bay region that occurred during December 21–24 of 1955, December 21–23 of 1964, January 16 of 1973, January 13–14 of 1978, January 3–5 of 1982, and January 26–27 of 1983. Prestorm seasonal totals were measured from the records preceding these storms. These storms were selected because: (1) they satisfy the criteria for prestorm seasonal rainfall discussed above, (2) they are represented by the complete network of hourly rainfall records that covers the bay region, and (3) they either were declared emergencies or disasters at State or Federal levels or were mentioned in the U.S. National Oceanic and Atmo-

spheric Administration yearly summaries as causing damage by flooding or landsliding (see chap. 1). Although these reports do not distinguish debris flows from other kinds of landslides and do not mention the extent of landsliding or damage, they do indicate significant high-precipitation storms. Other major storms have occurred in the bay region, but absence of a complete rain-gage network that documents these storms requires the assumption that the six storms used in this study are representative of the range of possible high-intensity, long-duration storms that occur.

To distinguish storms that triggered abundant debris flows from those that resulted principally in flooding or other types of landslides, I used personal observations, newspaper accounts, and historical aerial photographs. W.M. Brown III, G.F. Wieczorek, and D.G. Herd of the U.S. Geological Survey, S.J. Rice and T.C. Smith of the California Division of Mines and Geology, Ed Barnes of the San Mateo Department of Public Works, personnel from the California Department of Transportation, and personnel from the Santa Cruz Department of Public Works provided information on the effects of storms in

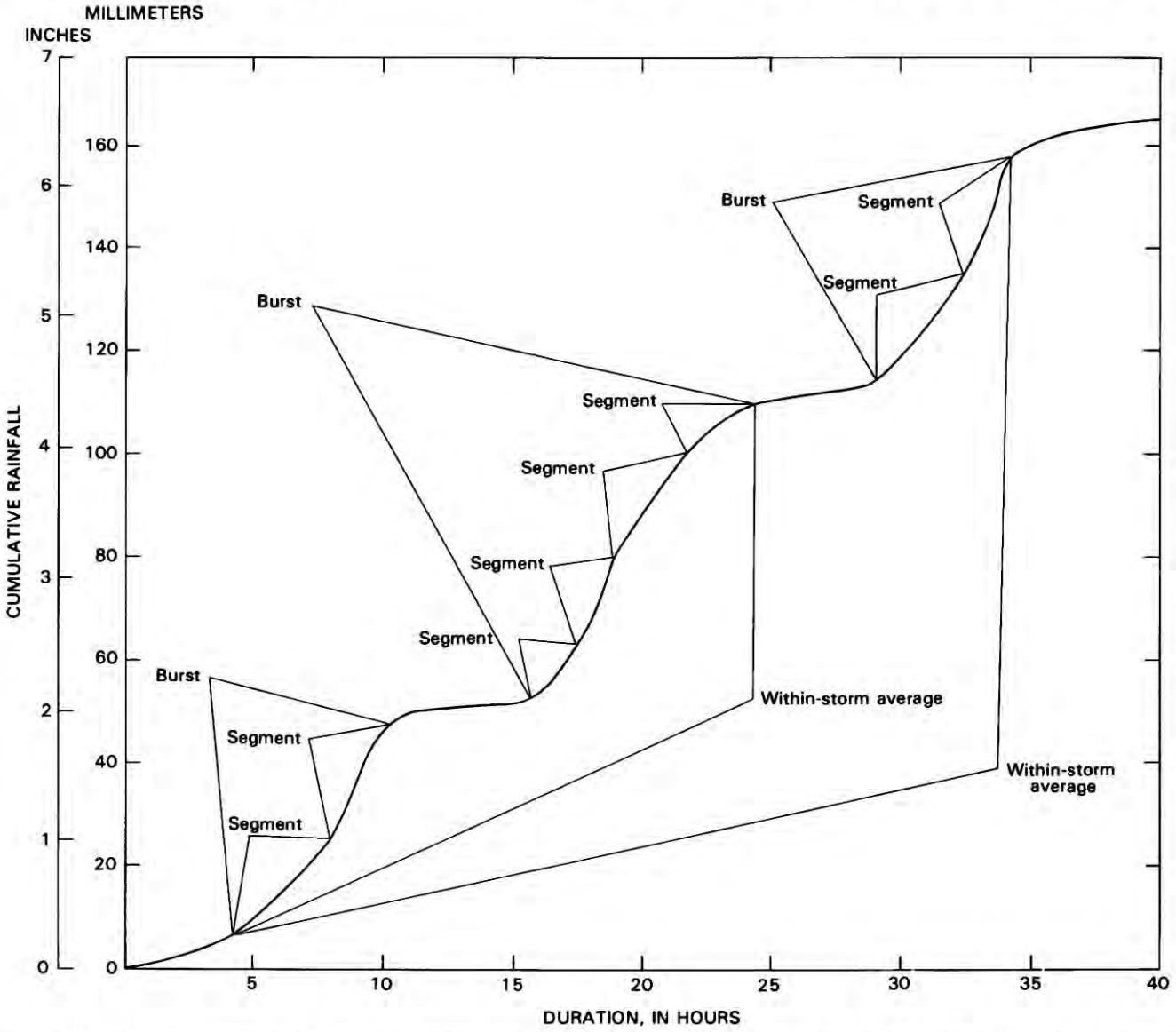


FIGURE 4.1.—Schematic example of an hourly cumulative rain-gage record, showing rainfall parameters measured for this study. Bursts are defined as periods of intense rainfall during the storm, and segments as periods of uniform intensity within bursts. Both bursts and segments are measured from changes in slope of rain-gage trace; an initial rainfall rate of at least 2.5 mm/h (0.10 in/h) was required for an event to qualify as a burst. Within-storm averages are measured from the onset of intense storm rainfall to the end of each burst and thus include periods of low-intensity rainfall.

the bay region. For each of the storm periods considered, past issues of the San Francisco *Chronicle*, the Mill Valley *Record*, the *Independent Journal* (a Marin County newspaper), the Half Moon Bay *Review*, and the *Peninsula Times-Tribune*, where available, were reviewed for information. Sample aerial photographs of the bay region were examined for the effects of these storms. The scarcity of information documenting both the location and quantity of debris flows in each storm (see chap. 1) required reviewing the information from the various sources simply to determine whether debris flows had occurred in abundance.

Examination of these various historical records for the period 1955–83 indicated that, although some debris flows occurred in several of these storms, only the January 1982 storm is documented as triggering abundant debris flows throughout the bay region.[2] Thus, the storm-rainfall conditions unique to that storm include those conditions that led to regionwide abundant debris-flow activity.

RAIN-GAGE NETWORK

Rainfall conditions of the six storms are quantified by measuring intensity and duration for the storm-rainfall parameters from records from a network of continuously recording rain gages located throughout the study area (fig. 4.2). This network consists of 14 principal gages and 7 substitute gages. Where a record from a principal gage is missing or incomplete, a record from a nearby gage of similar elevation, slope aspect, and MAP was substituted where possible. The gages used for each storm are listed in table 4.1.

RESULTS

Comparison of the values of the normalized storm-rainfall parameters measured for the six storms defines the rainfall-threshold conditions that have accompanied abundant debris-flow activity in the bay region during the historical past for which sufficient records were available. Values of the normalized parameters and the position of the threshold line are shown in figure 4.3. This threshold was constructed by drawing a line that best separates the rainfall conditions unique to the January 1982 storm from more commonly occurring storm-rainfall conditions.

The threshold line is described by the equation

$$D = 46.1 - 3.6 \times 10^3 \mathrm{In} + 7.4 \times 10^4 \mathrm{In}^2,$$

where D is the duration (in hours) and In is the normalized intensity (per hour). Values that plot to the right of and above the threshold line generally have accompanied abundant debris-flow activity in the past. Given sufficient prestorm seasonal rainfall, these values of storm rainfall can be expected to result in abundant debris-flow activity in the future.[3]

Note that some values from storms other than the January 1982 storm plot well above the threshold; these values were all measured from the records of gages operating during the December 1955 storm, and these values might well have accompanied debris-flow activity, although adequate documentation of such an occurrence has not been found (see chap.1).

DISCUSSION

The rainfall conditions that led to known times of debris flow during the January 1982 storm (see chap. 3) provide a check on the position of the threshold line, because these rainfall values contributed directly to specific debris flows. For each of these debris flows, figure 4.3 shows values of rainfall measured up to the known time of failure. Most of these values represent both storm averages and bursts, which are the same in many cases for the January storm. However, the values that fall at 1- and 2-h duration are for bursts of rainfall that occurred late in the storm. Except for these low-duration values, most of the values of rainfall measured up to the time of failure fall above the threshold line, and this comparison generally supports the position of this line. Note that some of the values measured up to the known times of debris flows lie below the threshold line in figure 4.3. It is reasonable to expect some values to fall below the threshold line because it defines conditions for abundant debris-flow activity rather than for incipient debris-flow activity. The fact that six of the seven values, however, are from gages that receive less than 635 mm (25 in.) of MAP suggests that normalization introduces inconsistencies in areas of low MAP. This suggestion is consistent with Rantz's (1971) observation that the relation between MAP and storm rainfall is less well defined in areas of less than 508 mm (20 in.) of MAP. Therefore, the threshold line in figure 4.3 appears to be less reliable when applied to areas of low MAP.

The values that fall at 1- and 2-h duration and well below the threshold line are bursts of rainfall that occurred late in the storm (see chap. 3). The within-storm average measures of rainfall preceding failure that include these bursts, however, fall closer to the threshold line. This relation suggests that for this threshold line, the within-storm

[2]Brown (see chap. 1) mentions that although no comprehensive documentation of the occurrence of abundant debris flows was found for the December 21–24, 1955, storm, meteorologic conditions indicate that abundant debris-flow activity was possible.

[3]Some debris flows can be expected to occur before rainfall has attained the threshold calculated here for abundant debris-flow activity. A threshold for incipient debris-flow activity at a study area near La Honda is discussed by Wieczorek and Sarmiento (see chap. 5).

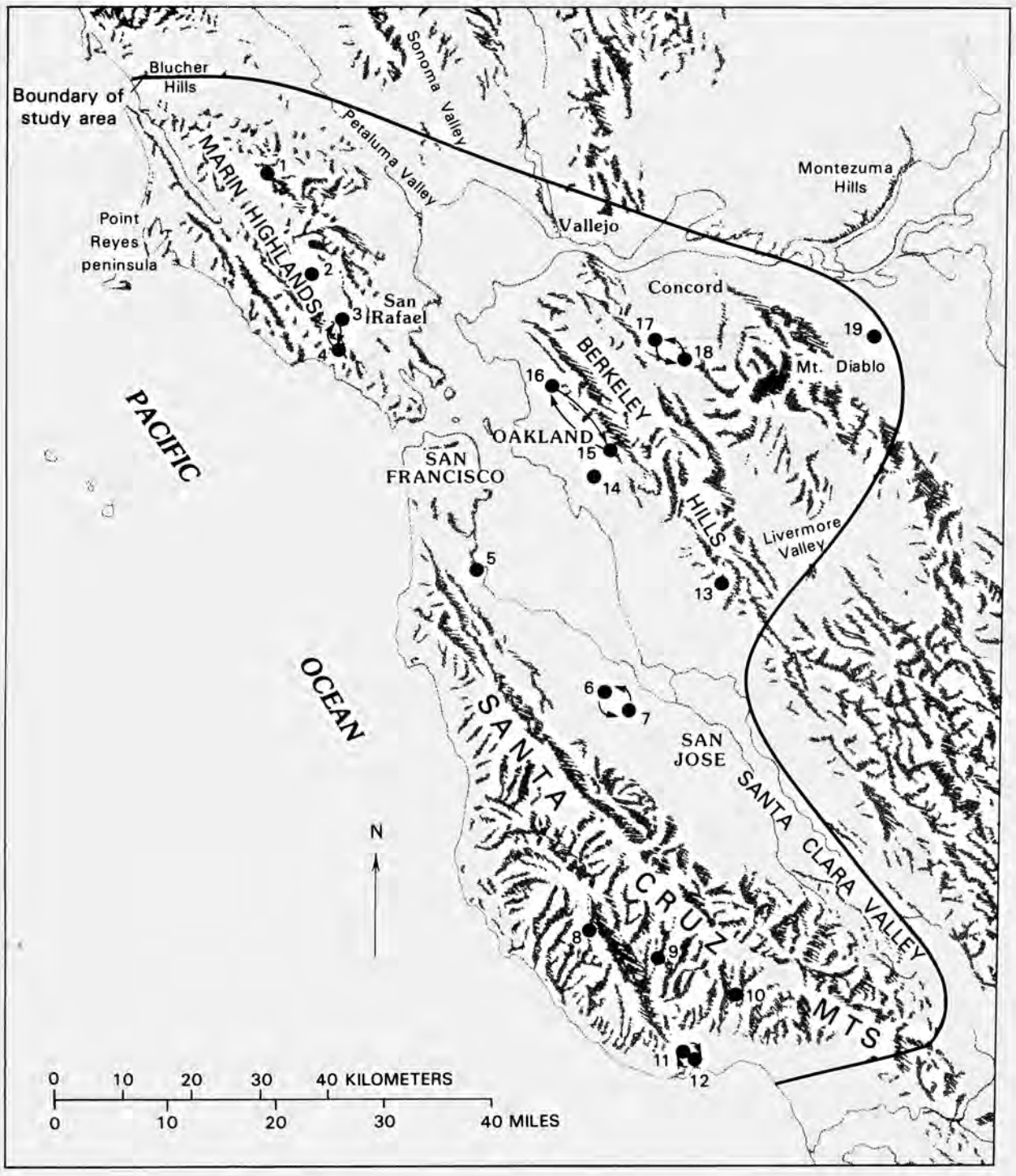


FIGURE 4.2.—San Francisco Bay region, showing boundary of study area and locations of rain gages used in this study (dots). Arrows between gages indicate that records from these gages were substituted for each other. Rain gages: 1, Novato; 2, San Geronimo and Woodacre; 3, Lake Lagunitas; 4, Mount Tamalpais; 5, San Francisco WSO AP and San Francisco WB AP; 6, Oak Grove; 7, Palo Alto; 8, Boulder Creek; 9, Ben Lomond; 10, Soquel; 11, Santa Cruz; 12, Live Oak; 13, Upper San Leandro Filter; 14, Hayward; 15, Merritt College; 16, Berkeley; 17, Walnut Creek East Bay Municipal Utilities District; 18, Walnut Creek National Weather Service; 19, Brentwood.

TABLE 4.1.—*Recording rain gages at which rainfall parameters were measured for each storm*

[Dash, no record available]

Storm / Location	Rain gage	Dec. 21-24, 1955	Dec. 21-23, 1964	Jan. 16, 1973	Jan. 13-14, 1978	Jan. 3-5, 1982	Jan. 26-27, 1983
Northern Marin County.	Novato[1]	X	X	X	X	X	X
Central Marin County.	San Geronimo[1]	---	---	X	X	X	---
	Woodacre[1]	---	X	---	---	---	X
Southern Marin County.	*Lake Lagunitas*[2]	---	---	---	---	---	X
	Mount Tamalpais[3]	X	X	X	X	---	---
San Francisco International Airport.	SF WSO AP[3]	X	---	X	X	X	---
	SF WB AP[3]	---	X	---	---	---	X
Central Peninsula.	*Oak Grove*[3]	---	---	---	X	X	X
	Palo Alto[3]	X	X	X	---	---	---
Northern Santa Cruz County.	Boulder Creek[3]	X	X	X	X	X	X
Central Santa *Cruz County.*	Ben Lomond[4]	---	X	X	X	X	X
Eastern Santa Cruz County.	Soquel[4]	---	X	X	X	X	X
City of Santa Cruz.	Santa Cruz[4]	---	X	X	---	---	---
	Live Oak[4]	---	---	---	X	X	X
East Bay South----	Upper San Leandro Filter[3].	X	X	X	---	X	---
East Bay Central.	Hayward[3]	X	X	X	X	X	X
East Bay North----	*Merritt College*[5]	---	---	---	---	---	X
	Berkeley[3]	X	X	X	X	X	---
City of Walnut Creek.	Walnut Creek[6]	---	---	X	---	---	X
	Walnut Creek[3]	X	X	---	X	X	---
City of Brentwood.	Brentwood[3]	X	X	X	X	X	X

[1]Marin County Flood Control District.
[2]Marin Municipal Water District.
[3]U.S. National Weather Service.
[4]Santa Cruz Department of Public Works.
[5]East Bay Infiltration/Inflow Study.
[6]East Bay Municipal Utilities District.

average is a better measure of the rainfall that will lead to the onset of debris-flow activity than is an isolated burst of high-intensity rainfall.

LIMITATIONS

Although the rainfall threshold proposed here can be used as an approximate guide to abundant debris-flow activity, several uncertainties prevent its precise use. First, the exact role of prestorm rainfall in the initiation of debris flows is unclear. The model by Campbell (1975) suggests that abundant prestorm rainfall shortly before a major storm could both decrease the amount of prestorm precipitation necessary to create the soil-moisture conditions conducive to debris-flow activity, and lower the storm-rainfall threshold for debris-flow activity; however, the threshold in this study does not account for such variation.

Second, the threshold developed here is based on a single storm that produced abundant debris flows, but debris flows might also be produced in abundance by storms with different characteristics, particularly storms of longer duration than those used in this study. Some

rainfall values from such storms would plot beyond the end of the threshold line in figure 4.3, and so this threshold cannot predict the consequences of such storms.

Third, records are insufficient to determine the specific aspects of storm rainfall that most strongly influence the initiation of debris flows. For this analysis, some likely factors were chosen—prestorm seasonal rainfall, and the intensity and duration of storm rainfall—but other aspects of storm rainfall may also have played significant roles. For example, the conceptual model by Campbell (1975) suggests that the occurrence of bursts of high-intensity rainfall late in the storm may favor the initiation of debris flows more than the occurrence of a similar burst early in the storm, but such variations are not adequately quantified in this study.

Most of these uncertainties arise because only a few storms have provided useful records of rainfall and abundant debris-flow activity. To reduce these uncertainties, we need records of more storms capable of triggering debris flows. Until future storms provide such records, the threshold developed here should be used only as an approximate guide for the onset of abundant debris-flow activity, rather than as a reliable predictor.

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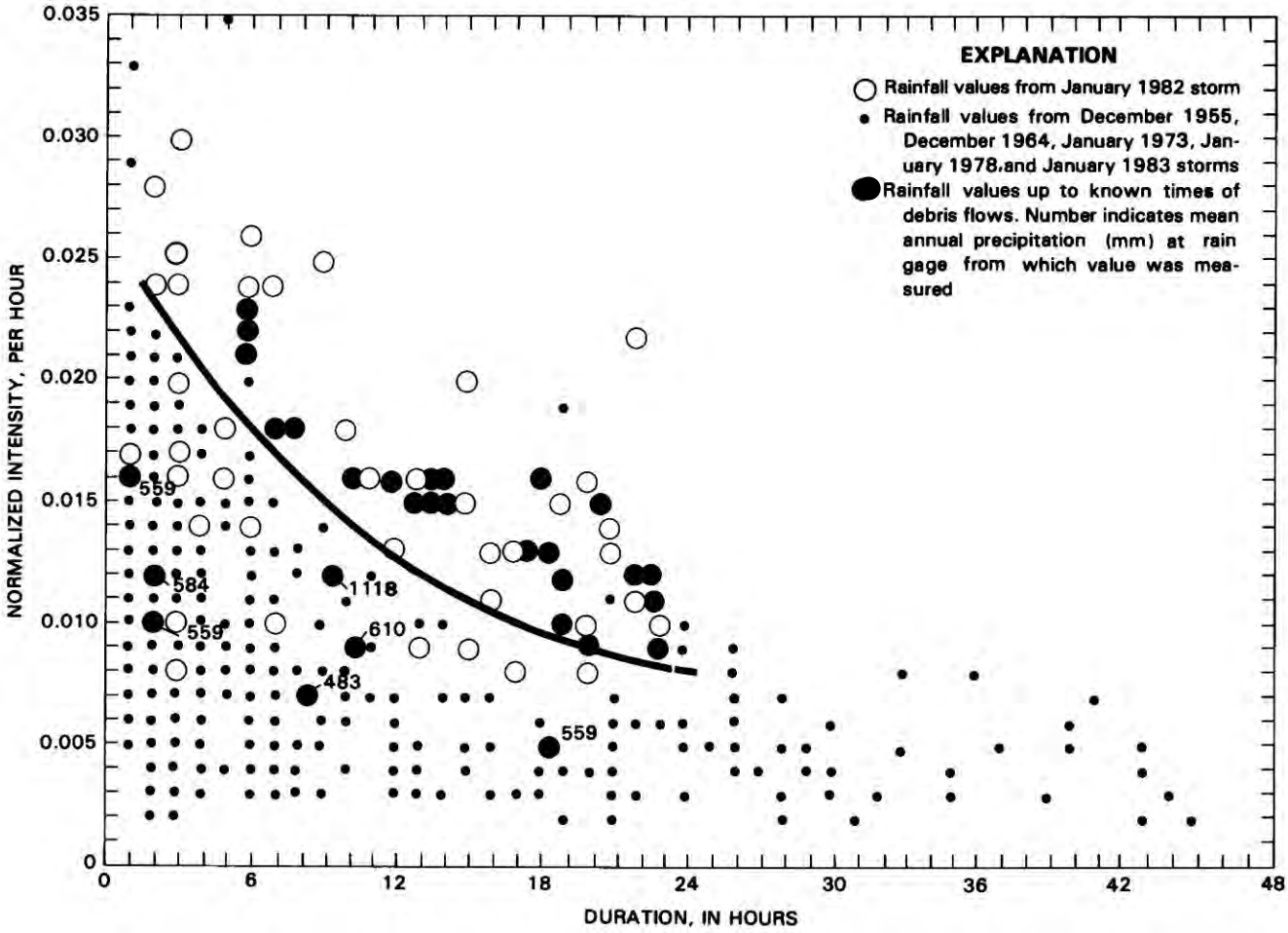


FIGURE 4.3.—Relations among normalized values of storm-rainfall parameters measured from hourly records of six storms in the San Francisco Bay region. Although more than one value may exist at a given point in the plot, only one symbol is shown at that point. Where values measured in the January 1982 storm are identical to those measured in other storms, the symbol for the other storm is shown because the purpose is to show rainfall conditions unique to the January 1982 storm. Threshold line (dashed where uncertain) separates values measured from records of the January 1982 storm from those measured from records of other storms and thus delineates the storm-rainfall conditions that accompanied abundant debris-flow activity.

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5. RAINFALL, PIEZOMETRIC LEVELS, AND DEBRIS FLOWS NEAR LA HONDA, CALIFORNIA, IN STORMS BETWEEN 1975 AND 1983

By GERALD F. WIECZOREK and JOHN SARMIENTO,
U.S. GEOLOGICAL SURVEY

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ABSTRACT

Debris flows are a significant geologic hazard in the San Francisco Bay region, as demonstrated by the January 3–5, 1982, storm. We measured rainfall and pore-water pressures and noted debris flows between 1975 and 1983 within a 10-km^2 area near La Honda, Calif., to examine the significance of prestorm seasonal rainfall, the duration of high-intensity rainfall, and the generation of high pore-water pressures for triggering debris flows. From a sample of 22 intense storms during this period, a threshold of 280 mm (11.0 in.) of prestorm rainfall was necessary for subsequent storms to trigger debris flows. For storms that occurred after this prestorm threshold had been achieved, the combination of storm intensity and duration controlled the triggering of debris flows.

To permit a more precise determination of the temporal distribution of high-intensity rainfall, we propose a new measure, intensity-duration (ID), which defines the duration that rainfall equals or exceeds a particular intensity. For example, $ID_{5.0} = 3$ h signifies an intensity equaling or exceeding 5.0 mm/h (0.2 in/h) for 3 hours. For 22 intense storms, we determined $ID_{2.5}$, $ID_{5.0}$, $ID_{6.5}$, $ID_{7.5}$, and $ID_{10.2}$ values from records of continuously recording rain gages in the area. We identified a value of $ID_{5.0}$ equal to or greater than 3 h as the most significant single index of storm ID which characterized the 10 storms that triggered debris flows in the area. We also developed a general equation for a threshold of rainfall duration and intensity necessary to trigger debris flows.

We measured perched high piezometric levels in shallow regolith over highly weathered bedrock immediately after intense storms in proximity to debris flows. The amount of piezometric rise after a storm depended on the prestorm rainfall as well as the intensity and duration of the storm.

Of the 10 storms that triggered debris flows, 8 storms caused less than 1 debris flow per square kilometer. On the basis of a recurrence analysis, a storm triggering less than one debris flow per square kilometer could be expected, on the average, at least every 2 years. Such storms as the January 3–5, 1982, storm, which triggered approximately seven debris flows per square kilometer and had a recurrence interval of 60 years in this area, indicate that although isolated debris flows can be expected regularly in the area, abundant debris flows will be much less frequent.

INTRODUCTION

The association of high-intensity rainfall with debris flows (see "Introduction" to this volume for landslide terminology) has been documented in Japan (Fukuoka, 1980), New Zealand (Selby, 1976; Pierson, 1980) and Brazil (Jones, 1973), as well as in many other places worldwide (Caine, 1980). In the Santa Monica Mountains of southern California, Campbell (1975) found that prestorm seasonal rainfall exceeding 267 mm (10.5 in.), in combination with intensities exceeding 6.4 mm/h (0.25 in/h), were necessary to trigger debris flows.

Temporarily high pore-water pressures during intense storms have been measured and related to debris flows. Within small drainages of forested hillslopes in Oregon, Pierson (1977, 1980) measured piezometric response to storms in very permeable shallow regolith over bedrock and found that the height and timing of the piezometric rise are controlled by a combination of antecedent soil moisture and rainfall intensity. In thin till regolith of coastal Alaska, Sidle and Swanston (1982) measured high piezometric levels near a debris slide during and shortly after several intense storms.

We have measured rainfall and piezometric levels and observed debris flows in a small study area to determine the importance of prestorm rainfall, the duration of high-intensity rainfall, and temporary piezometric levels in triggering debris flows. We compared the characteristics of the January 3–5, 1982, storm and other storms in the San Francisco Bay region between 1975 and 1983 that resulted in debris flows. From these comparisons, we have developed minimum thresholds for triggering debris flows, based on prestorm rainfall and storm intensity and duration, for this study area in northern California.

Acknowledgments.—Michael Bennett, Philip McLaughlin, and Randall Jibson performed the various laboratory tests and aided with the field observations cited in this study. Access to the study area was graciously provided by the landowner, Rudy Driscoll, his agent, George M. Shawback, and the farmers of the property, Fred and Henry Cunha. In particular, the many worthwhile discussions with Fred and his son Bill provided a valuable historical perspective and a keen insight concerning the slope processes active in this area.

STUDY AREA

Our study was conducted within a 10-km^2 area in the La Honda and Harrington Creek watersheds northwest of the town of La Honda in the Santa Cruz Mountains, San Mateo County, Calif. (fig. 5.1). The study area ranges in elevation from 60 to 360 m and contains both gently sloping areas (less than 30 percent slope), where grasses, chaparral, and oaks predominate, and steep canyons (greater than 50 percent slope), where various conifers and redwoods are concentrated. The study area was logged for redwood between 1868 and 1906 (Stanger, 1967). It has also been subject to wildfires, grazing by cattle, and periodic removal of brush for pasture areas since at least the turn of the 20th century. Thus, the distribution of vegetation, as well as the species present in the area, may have changed during historical time. However, the effects of these historical changes in land use on the slope stability have not yet been evaluated in this area.

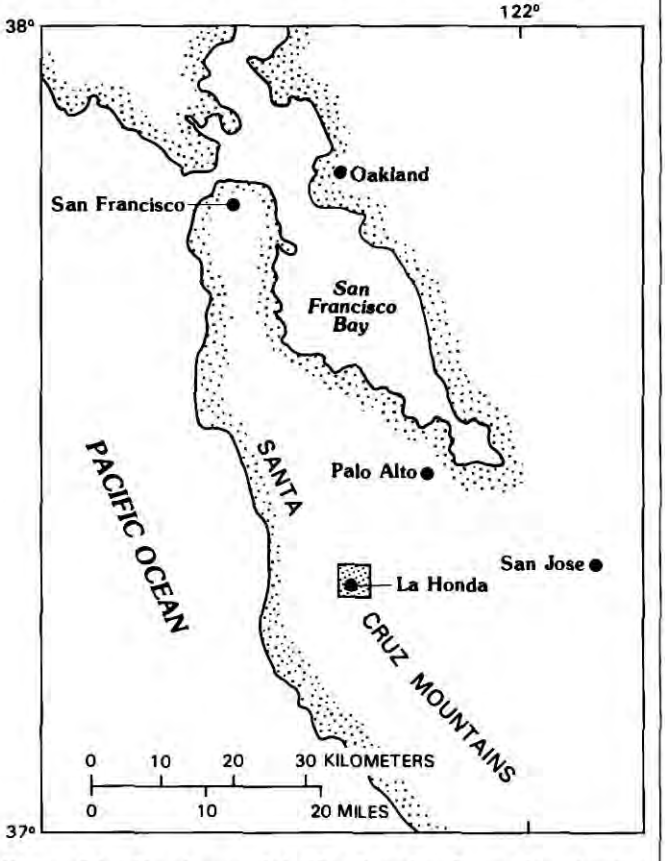


FIGURE 5.1.—Sketch map of the San Francisco Bay region, showing approximate location of study area (shaded) in the Santa Cruz Mountains.

The study area receives an average of 762 mm/yr (30 in/yr) of seasonal rainfall (Rantz, 1971), measured between July 1 and June 30, mostly between October and May. We supplemented daily-precipitation records for La Honda from the U.S. National Oceanic and Atmospheric Administration (NOAA) with continuous hourly records for La Honda available from the San Mateo County Department of Public Works and with continuous onsite monitoring begun in 1975.

Bedrock geology, weathering characteristics of bedrock, and thickness and characteristics of soils derived from bedrock all influence slope stability in this area (Wieczorek, 1982). The bedrock geology of the area (pl. 3) consists of three Tertiary bedrock units, from oldest to youngest: (1) the Lambert Shale and San Lorenzo Formation, undivided; (2) the Mindego Basalt and other volcanic rocks; and (3) the Tahana Member of the Purisima Formation (Brabb, 1980). Residual soils developed on all three bedrock units consist of moderately plastic clayey silt; however, they differ in their characteristic thicknesses (Wieczorek, 1982).

The Mindego Basalt consists mainly of basaltic volcanic rock. This unit weathers shallowly; slightly weathered or fresh rock[1] is common beneath the residual soil at depths of 1.5 to 5 m. Both debris slides and debris flows are common within the shallow regolith on steep slopes underlain by Mindego Basalt, whereas deeper types of slope movement are less common. The regular, well-defined drainage system developed on Mindego Basalt (fig. 5.2) provides abundant channels for debris flows. Large fan-shaped deposits below many short gullies (Wieczorek, 1982) suggest that debris flows have been a significant geomorphic process. Because the volume of such deposits far exceeds that of any individual debris flow observed during this study, such deposits probably accumulated from successive debris-flow episodes.

The undivided Lambert Shale and San Lorenzo Formation consists primarily of mudstone, siltstone, and shale; the Tahana Member of the Purisima Formation consists of very fine grained sandstone and siltstone (Brabb, 1980).

[1]The degree of bedrock weathering has been classified by the terms "fresh," "slightly weathered," "moderately weathered," "highly weathered," "completely weathered," or "residual soil," according to the system adopted by the Geological Society Engineering Group Working Party (1972).

Bedrock of all these units weathers deeply; moderately weathered rock occurs to depths of 10 m beneath residual soils. Within the moderately weathered bedrock of these units, deep-seated slumps and earth flows are common. Shallow debris slides and debris flows are less common and are limited to slopes oversteepened by previous deep-seated failure (scarps) or by streambank erosion (Wieczorek, 1982).

METHODS AND INSTRUMENTATION

We measured rainfall and piezometric levels[2] and observed debris flows within the study area beginning in 1975. These measurements and observations provide climatologic and hydrologic data for comparing storms and their effects.

A tipping-bucket, continuously recording rain gage was installed in October 1975 near Harrington Creek (1, fig. 5.3). This gage recorded rainfall continuously to the nearest 0.25 mm (0.01 in.) with an accuracy of 1 percent for intensities as great as 76 mm/h (3.0 in/h). The chart from this gage can be read to determine rainfall totals or intensities for periods as short as 5 minutes. When the Harrington Creek gage malfunctioned, we used data from either the continuous gage at Weeks Creek (3, fig. 5.3) or the gage at the San Mateo County Yard in La Honda (2, fig. 5.3). The La Honda gage, however, is less precise because it records only to the nearest 2.5 mm (0.1 in.) at hourly increments. During one storm (Jan. 13–14, 1978), none of these gages was operating, and so hourly intensity was estimated from continuous records from other stations having comparable storm totals. In addition to these continuous gages, two Forestry rain buckets and a fencepost gage (1, 4, 5, fig. 5.3) were used to measure

[2]Measurements of water levels in a plastic tube connected to the porous stone piezometer are referenced to the depth of water in the tube below the ground surface. These measurements are termed "piezometric levels" rather than "ground-water levels." During periods of nonsteady flow and in places where the flow does not parallel the ground surface, the piezometric level from a piezometer sealed at a particular depth may not equal the water level in an open or perforated well.

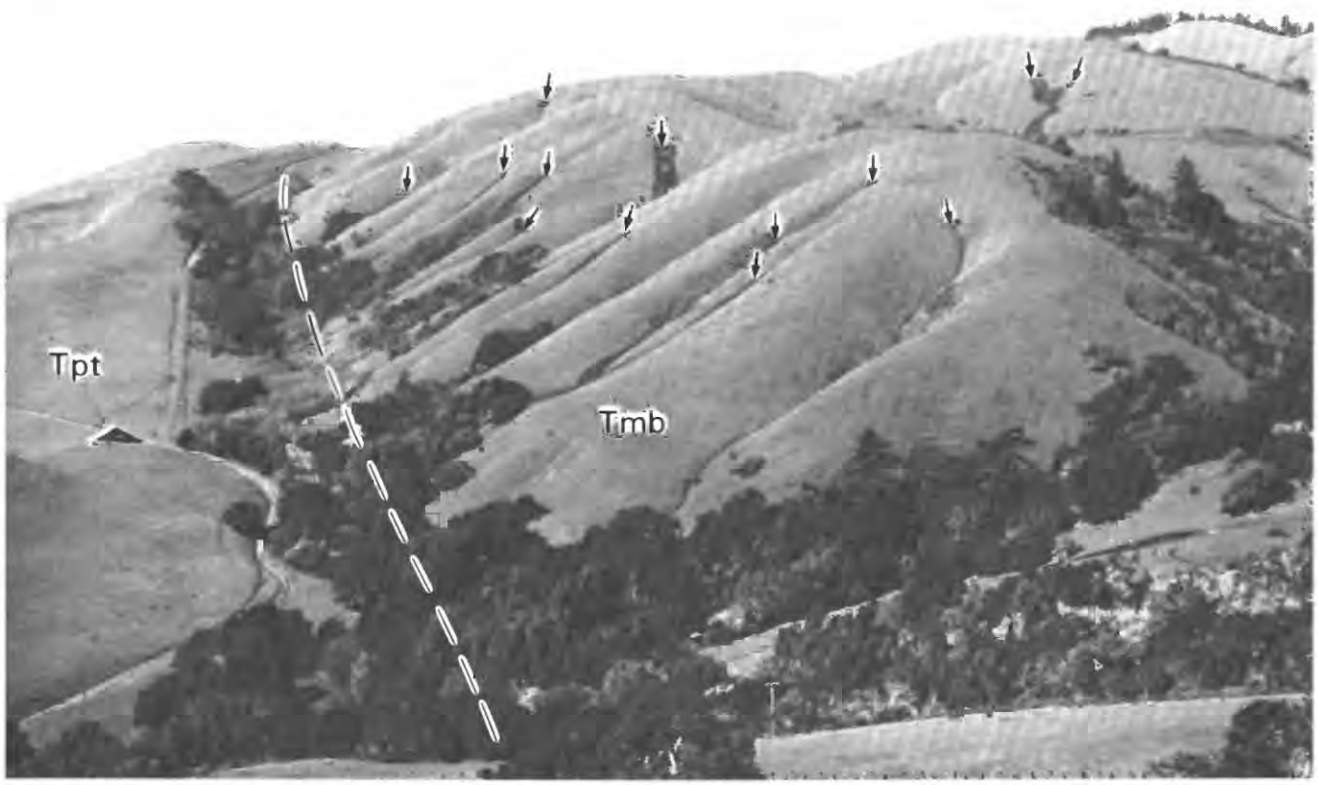


FIGURE 5.2.—Regular, dissected drainage pattern developed on steep slopes underlain by the Mindego Basalt (Tmb) provides pathways for debris flows. Arrows denote scars from debris flows triggered by the January 3–5, 1982, storm. Irregular drainage pattern to left is developed on slopes underlain by the Tahana Member of the Purisima Formation (Tpt).

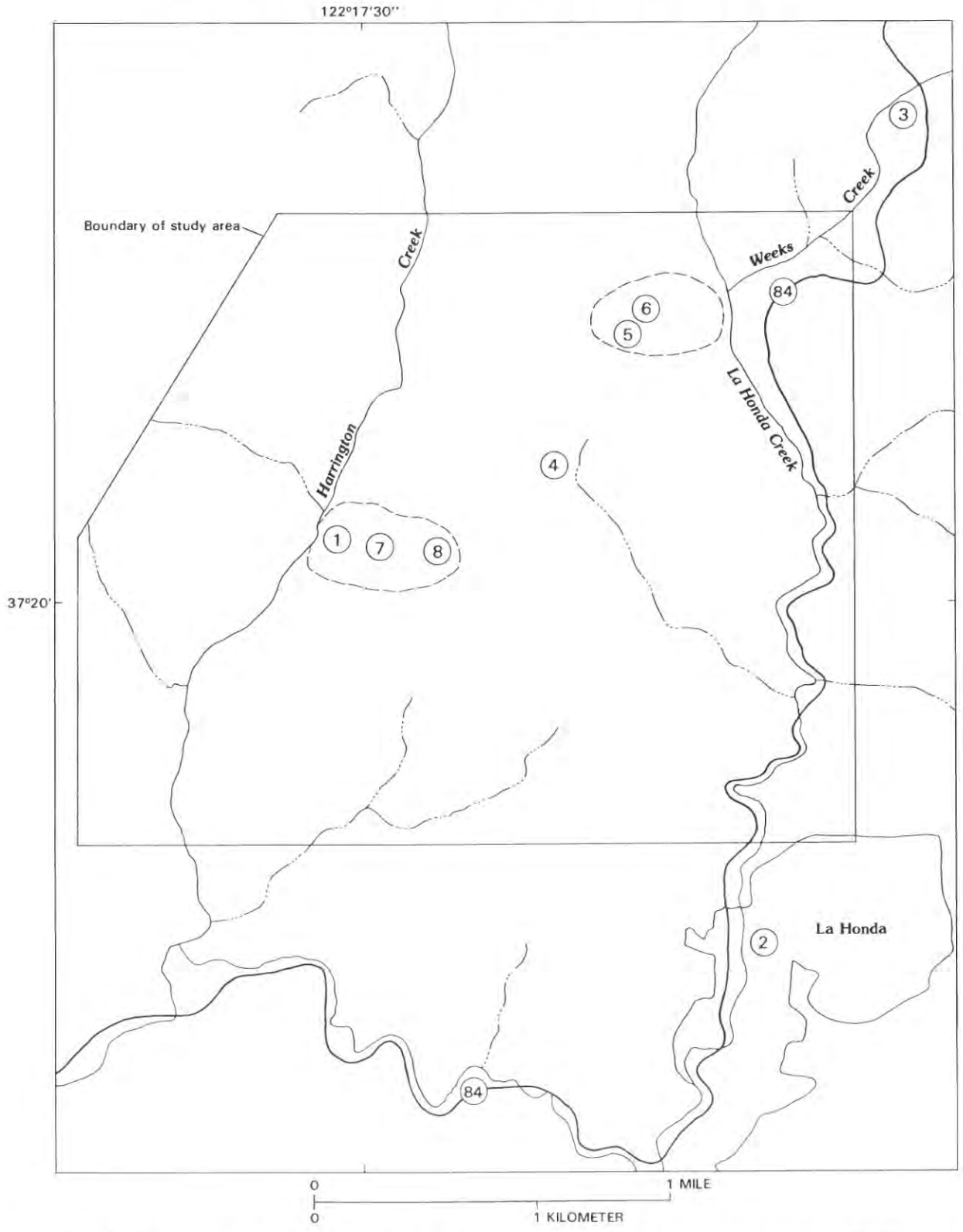


FIGURE 5.3.—Study area, showing locations of rain gages, piezometers, and instrumented slopes. 1, continuously recording rain gage (also a Forestry bucket rain gage) at Harrington Creek; 2, continuously recording rain gage at San Mateo County Yard, La Honda; 3, continuously recording rain gage at Weeks Creek; 4, fencepost rain gage; 5, Forestry bucket rain gage; 6–8, Casagrande porous-stone piezometers. Dashed ovals enclose hillslopes instrumented with piezometers; solid line denotes boundary of study area (approx 10 km^2). Planimetric base from La Honda 1:24,000-scale quadrangle.

local variation in storm totals, which was found to be minimal within the study area. This close distribution of three continuous rain gages and three storm-total gages within and near the 10-km^2 study area was sufficient to accurately represent storm totals and intensities for the purposes of comparison with debris flows within the study area.

Several piezometers (6–8, fig. 5.3) were installed at depths of less than 5 m to measure temporary piezometric levels that develop during and immediately after intense storms. These piezometers remained dry during most of the year but showed rapid piezometric rise after intense storms. We observed these levels to drop rapidly within hours to days after each storm; for example, two measurements taken within hours of each other 1 day after the December 20–22, 1982, storm showed the piezometric level to be dropping at a rate of 4.8 cm/h. Because these piezometers record neither peak nor continuous readings, we do not know the peak levels attained or their precise times. Our measurements were taken as soon as possible after each storm to document as well as possible the high piezometric levels attained. Therefore, these spot piezometric measurements should be used only as general indicators of high pore-water pressures and would be inadequate for a detailed stability analysis of the slope at the time of failure.

Instrumentation was inadequate in the study area to determine the delay between peak intensity during a storm and peak piezometric level. Because of the low relative permeability of the clayey-silt regolith in the study area, the delay time required for peak piezometric response of shallow aquifers after a storm is probably longer than the 4- to 18-hour delay observed in more permeable soils in Oregon (Pierson, 1977). Improvements in continuous monitoring of shallow ground-water levels and for recording peak levels have recently been developed by Pierson (1980) and Sidle and Swanston (1982); these procedures should provide more precise information on the temporal relation between high-intensity rainfall and peak piezometric levels.

DEBRIS FLOWS IN THE STUDY AREA

DESCRIPTION OF DEBRIS FLOWS: 1975–80

Five debris flows (1–5, pl. 3) were observed in the study area after high-intensity storms between 1975 and 1980. These flows initiated as shallow (max 1.5 m deep) slides, either rotational or translational, that involved only regolith or a combination of regolith and completely weathered bedrock. The translational slides involved slabs of regolith and incorporated rock fragments sliding over a planar surface of intact weathered rock inclined at an angle of at least 26° (fig. 5.4). The rotational slides occurred on concave hillslopes steeper than 20° (fig. 5.5) that commonly had more deeply developed soil profiles. Characteristics and properties of these flows are listed in tables 5.1 and 5.2.

DESCRIPTION OF DEBRIS FLOWS: DECEMBER 29, 1981

The storm of December 29, 1981, triggered five debris flows in the study area, all of which were small in volume (less than 10 m^3) and had relatively short runout distances (less than 20 m). Only the largest of these debris flows (6) is identified on plate 3; the others are omitted because of their diminutive size and because they occurred in areas where other larger flows were subsequently mapped.

Soil moisture was probably high immediately before this storm because of heavy rainfall during the preceding months, particularly during November and December 1981 (fig. 5.6). The prestorm seasonal rainfall (July 1–Dec. 28, 1981) at Harrington Creek was 396 mm (15.60 in.), significantly above the to-date seasonal average (1954–81) for La Honda of 278 mm (10.94 in.). Rainfall of 80 mm (3.13 in.) during the 15 days preceding this storm probably put the regolith in a nearly saturated condition by the beginning of the storm.

Although 24-hour rainfall total of 55 mm (2.15 in.) for the December 29, 1981, storm was not unusually high in comparison with other storms (table 5.2), the steady, moderately intense rainfall equal to or exceeding 5.0 mm/h (0.20 in/h) for a 6-hour period (fig. 5.7*A*) was unusual.

DESCRIPTION OF DEBRIS FLOWS: THE JANUARY 3–5, 1982, STORM

Rain began falling in the La Honda area at approximately 6 p.m. P.s.t. January 3, 1982, and continued for 38 hours until 8 a.m. January 5, by which time 153 mm (6.04 in.) had fallen. The continuous record of this storm from the Harrington Creek gage (fig. 5.7*B*) illustrates that the intensity was relatively steady during the 11-hour period between 5 a.m. and 4 p.m. January 4, when intensities consistently ranged from 5.1 to 8.1 mm/h (0.20–0.32 in/h). During the later part of the storm, between 4 and 10 p.m. January 4, intensities increased slightly to between 5.8 and 10.7 mm/h (0.23–0.42 in/h). The few documented times of debris flows in the La Honda vicinity occurred during this 6-hour period, the most intense part of the storm.

Numerous (74) debris flows (fig. 5.8) and less numerous (15) other landslides—slumps and block slides—were mapped (see pl. 3) in the field 1 day after the storm and from aerial photographs taken during the week after the storm. The volumes of these flows were generally large and were estimated to range as large as several hundred cubic meters. Runouts of some flows exceeded 100 m. Commonly, the thickness of material involved in the initial failure at the debris-flow scar ranged from 0.5 m to slightly more than 1 m.

DESCRIPTION OF DEBRIS FLOWS: DECEMBER 1982–MARCH 1983

Five storms during the unusually wet 1982–83 rainfall season triggered 26 debris flows in the study area (see pl. 3). Most of these debris flows occurred during the storms of January 22–23 and January 26, 1983. Seasonal rainfall before the January 22–23 storm of 495 mm (19.48 in.) was above average and, in combination with rainfall of 41 mm (1.60 in.) during the week before this storm, created ideal soil-moisture conditions for triggering debris flows.

Debris flows occurring during the 1982–83 season initiated similarly to those described previously for the other storms, that is, as shallow slides involving thin slabs of regolith. Volumes of individual flows ranged from 2 to 30 m^3, with runout distances of from 6.5 to 64 m.

CHARACTERISTICS AND PROPERTIES OF DEBRIS FLOWS: 1975–83

From field examination and sampling of the debris-flow-source areas (scarps and base, fig. 5.9) and deposits, we characterized the debris flows that occurred in this area near La Honda between 1975 and 1983. Descriptions and measurements of the source and runout areas for selected debris flows are listed in table 5.1, and geotechnical properties of selected debris flows, including grain-size distribution, Atterberg limits, and field water contents, are listed in table 5.2. Profiles of two typical debris flows illustrating the terms utilized in tables 5.1 and 5.2, in relation to measurements and sampling locations on debris flows, are shown in figure 5.9. In general, most debris flows initiated as slabs of regolith sliding along planar bedrock surfaces inclined at 26°–45°. After translational movements of as little as 1 m, these slabs mobilized into flows that commonly left lateral levees bounding a well-defined central channel (fig. 5.10*A*). Deposition typically occurred on slopes of 9°–22°, where the flow front was typically from 0.1 to 0.3 m thick.

Measurements of natural water content from the deposits of four debris flows sampled within the day after a particular storm indicate that the material in these deposits was within ±6 percent water content of the liquid



FIGURE 5.4.—Debris flow from the January 26, 1983, storm (13, table 5.1) that originated as a translational slide of soil over a planar bedrock surface. Debris-flow scar is approximately 4 m wide, 8 m long, and from 23 to 40 cm deep on a uniform slope of between 35° and 38°.

limit (table 5.2). Natural water content of the intact material from the scarps and base of three of these debris flows was approximately 11 percent less than the liquid limit, a value suggesting that water was absorbed during the process of debris-flow mobilization and (or) transport (see section entitled "Mobilization," chap. 6). Mobilization of intact sliding slabs of regolith into flows by the incorporation of water has been postulated (Johnson and Rahn, 1970; Rodine, 1975) to be a significant mechanism of debris-flow generation on hillsides. Mobilization of an intact slab into a flow while undergoing small displacement was described by Rogers and Selby (1980).

We observed cracks adjacent to and upslope of many of the debris-flow scars in the study area, similar to those shown in figure 5.10*B*, after the January 3–5, 1982, storm. These cracks provide a route by which water from overland surface flow can enter the slope materials, further saturate the slope, reduce material strength, and contribute to the initiation of debris flows. During the January 3–5, 1982, storm in another part of the Santa Cruz Mountains, an eyewitness (Gary Greene, written commun., 1982) reported narrow cracks developing on a chaparral-covered slope on which overland surface flow was occurring. For as long as 2 minutes, the cracks continued to open with water flowing in, until the slope mobilized suddenly as a rapid debris flow.

FACTORS AFFECTING THE INITIATION OF DEBRIS FLOWS

EFFECTS OF VEGETATION

We observed in the field and from aerial photographs that more debris flows began on grass-covered slopes than in brush-covered and forested areas. Because slopes in the study area are estimated to be covered approximately as much by grass as by brush and trees, these grass-covered slopes appear to have been more susceptible to debris flow. Root strength may contribute to this apparent difference in debris-flow susceptibility. In several different laboratory soil profiles, roots of grasses have been found to provide most strength to the surficial soil mass above 0.3 m but only negligible strength below 0.45 m, whereas



FIGURE 5.5.—Debris flow of February 13, 1979 (4, table 5.1), that originated as a rotational slide within a topographic depression. Note scars of previous debris flows.

TABLE 5.1.—*Characteristics of selected debris flows*

Debris flow (pl. 3)	Description of initial failure and source of debris flow	Date of storm	Volume of initial slide (m^3)	Maximum thickness (m)		Slope angle		Runout distance (m)
				Initial slide	Flow deposits	Initial failure	Flow termination	
1	Translational sliding of topsoil along planar siltstone bedrock surface below planar grassy slope.	1/13-14/78	4.0	0.61	---	26°-28°	---	30
2	Three coalescing slumps in black topsoil below concave grassy slope (no bedrock observed).	1/13-14/78	16.0	.50	---	24°-28°	---	70
3	Slump in saturated uniform black topsoil below concave grassy slope (no bedrock observed).	1/13-14/78	6.6	.91	.21	25°	22°	45
4	Slump through black topsoil into gray siltstone below large concave grassy slope.	2/13/79	200.0	1.50	.61	20°	---	75
5	Translational sliding of black topsoil along planar surface within area of brush and trees.	2/18/80	18.0	.91	---	38°	---	90
6	Translational sliding of black clayey silt along planar yellow siltstone bedrock surface below planar grassy slope.	12/29/81	4.2	.52	.15	32°	17°	8
7	do----------	1/3-5/82	9.1	.64	.40	29°	18°	21
8	do----------	1/3-5/82	6.3	.50	.09	29°	10°	45
9	Translational sliding of black topsoil and weathered pebbly siltstone over planar siltstone bedrock surface below planar grassy slope.	12/20-22/82	1.5	.35	.30	---	---	7
10	Translational sliding of brown soil over planar surface of completely weathered shale below concave grassy slope.	12/20-22/82	4.2	.70	.24	45°	9°	6
11	Slump in black topsoil below planar grassy slope (no bedrock observed).	1/22-23/83	10.5	.50	.37	26°	11°	8
12	Slump in uniform black topsoil below planar grassy slope (no bedrock observed).	1/22-23/83	5.2	.61	.37	40°	14°	9
13	Three translational slides of brown soil over surface of weathered gray sandstone below planar grassy slope, merging within channel into a single debris flow path.	1/26/83	30.0	.50	.09	35°-47°	17°	64
14	Large translational slide of black topsoil that generated debris flow along one lateral margin of slide below planar grassy slope (no bedrock observed).	2/25-3/2/83	37.0	.61	.21	28°	---	37

roots of brush and trees develop maximum strengths at deeper levels, generally below 0.3 m (Waldron, 1977; Waldron and Dakessian, 1981). Especially in coarse soils, the cohesion provided by roots may contribute most resistance against shallow sliding because of the small contribution of frictional strength, owing to low confining pressures at shallow depths. Because the depth of most observed failures ranged from 0.5 to 1.0 m, as indicated by the initial slab thickness in table 5.1, grass-covered slopes with generally shallower roots could be expected to provide far less resistance to failure than slopes covered with brush and trees with generally deeper root systems. In fact, in the debris-flow scars we examined in grass-covered areas, the fact that the roots did not extend below the failure plane confirmed that roots contribute negligible strength at the depths significant to the initial failure

TABLE 5.2.—*Physical properties of debris-flow materials*

Debris flow	Particle-size distribution (percent)			Plasticity index	Liquid limit	Field water content (pct)
	Sand and gravel	Silt	Clay			
6						
Deposit---	5	64	31	26	58	---
Base------	15	70	15	---	---	---
Scar------	7	62	31	---	---	---
7						
Deposit---	5	67	28	19	51	---
Base------	7	65	28	---	---	---
Scar------	7	65	28	---	---	---
8						
Deposit---	7	63	30	28	58	---
Scar------	8	60	32	---	---	---
Base------	5	53	42	---	---	---
9						
Deposit---	6	72	22	25	57	52
Scar------	3	63	34	---	---	46
10						
Deposit---	11	56	33	21-30	60-69	58
Scar------	17	59	24	---	---	---
11						
Deposit---	18	59	23	29	61	55
Scar------	10	49	41	---	---	50
12						
Deposit---	14	64	22	15	43	50
Base------	14	63	23	---	---	39
13						
Deposit---	27	52	21	20	46	---
Scar------	63	28	9	---	---	---

of debris flows. Thus, the root strength and depth of various vegetation may contribute to the differences in susceptibility of hillsides to debris flows.

EFFECTS OF HIGH PIEZOMETRIC LEVELS

We measured piezometric levels in shallow piezometers after many of these intense storms. Fortuitously, we were able to measure piezometric levels near several debris flows (6–8, pl. 3) that occurred on December 29, 1981, and January 3–5, 1982. Piezometric levels were within 0.36 m of the ground surface on December 30 (approx 18 hours after the storm ended) and within 0.25 m on January 6 (approx 26 hours after the storm ended). The locations of the piezometers and the depths to the piezometric surface in relation to the debris flows are shown in figure 5.9.

Although neither continuous nor maximum-stage measurements were obtained, these data document that relatively high piezometric levels developed with respect to the thickness of the initial slab that failed. If ground-water flow remained strictly parallel to the slope surface, these piezometric levels would have extended about halfway between the failure surface and the top of the slab, significantly reducing the resistance of the slab to sliding. However, because we do not know the actual ground-water-flow configuration between the piezometer and the debris flows, pore-water pressures may have been either greater or less than those estimated by assuming ground-water flow parallel to the slope surface.

After the intense storm of January 13–14, 1978, an artesian pore-water pressure of +0.38 m above the ground surface was measured at a piezometer installed in a swale (6, fig. 5.3). Convergence of three-dimensional subsurface flow from steep upslope concave depressions into flatter areas can be expected to cause nonparallel ground-water flow and upward flow gradients that result in artesian conditions. We measured artesian pore-water pressures of 0.41 m at a piezometer on a more nearly planar slope (7, fig. 5.3) after the storm of March 12–13, 1983; these measurements indicate that exceptionally high pore-water pressures can also develop in topography other than concave depressions.

STORMS CAPABLE OF TRIGGERING DEBRIS FLOWS

To determine the storm characteristics significant for triggering debris flows in the study area, we compiled meteorologic data (table 5.3) for those storms between 1975 and 1983 that triggered debris flows. For comparison, we compiled similar data on other storms during this same period that did not result in debris flows. We used several measures of both prestorm and storm rainfall for all these storms, and then compared the effect of each of these measures on the triggering of debris flows.

During this examination, we developed a new measure, intensity-duration (ID), which defines the duration (in hours) that rainfall intensity (in millimeters per hour) equals or exceeds a particular value. For example, an $ID_{5.0}$ of 3 h signifies that an intensity of at least 5.0 mm/h (0.20 in/h) lasted 3 hours. This measure permits a more precise determination of the effect of the time distribution of rainfall on the triggering of debris flows.

The ID values listed in table 5.3 were compiled from data from the continuously recording rain gages at Harrington Creek and La Honda County Yard, with exceptions as noted. Although both gages measured similar rainfall totals in the storms, we selected the data from Harrington Creek when both sets of data were available, because of its proximity to the observed debris flows as well as the greater precision of that gage. For periods when the Harrington Creek gage malfunctioned, data from La Honda were used.

Values of $ID_{2.5}$, $ID_{5.0}$, $ID_{6.5}$, $ID_{7.5}$, and $ID_{10.2}$ for 22 intense storms between 1975 and 1983 are listed in table 5.3. As noted, rainfall intensity during this period seldom exceeded 12.7 mm/h (0.50 in/h), and intensities ex-

ceeding 10.2 mm/h (0.40 in/h) seldom lasted longer than 2 hours. In other parts of the Santa Cruz Mountains, particularly farther south in Santa Cruz County, intensities typically exceed 25 mm/h (1.0 in/h) several times seasonally, and such intensities occasionally last several hours. Because of such contrasts in rainfall intensity within various parts of the Santa Cruz Mountains, our discussion of threshold prestorm rainfall and storm intensity and duration significant for the triggering of debris flows applies only to the study area.

EFFECT OF PRESTORM RAINFALL

The data listed in table 5.3 also show the importance of prestorm seasonal rainfall in generating debris flows. We divided the storms into three groups, based on the prestorm seasonal rainfall and the ability of the storms to trigger debris flows. The storms in group 1 (1–10), which occurred after a seasonal rainfall of 280 mm (11.0 in.), triggered debris flows; the storms in group 2 (11–17), which occurred before 280 mm (11.0 in.) of seasonal rain-

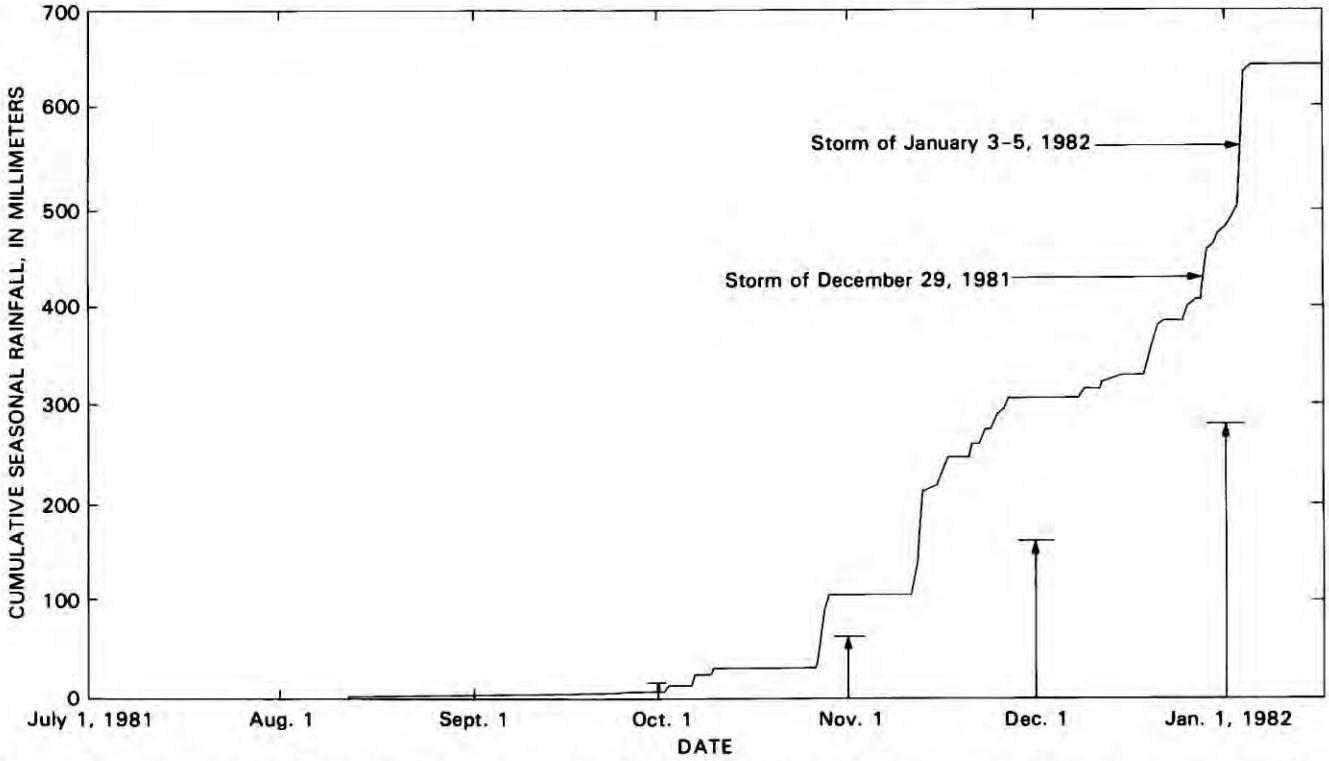


FIGURE 5.6.—Daily cumulative rainfall from July 1, 1981, to January 15, 1982, at Harrington Creek, in comparison with averages of monthly cumulative rainfall (arrows) for La Honda for 1954–81.

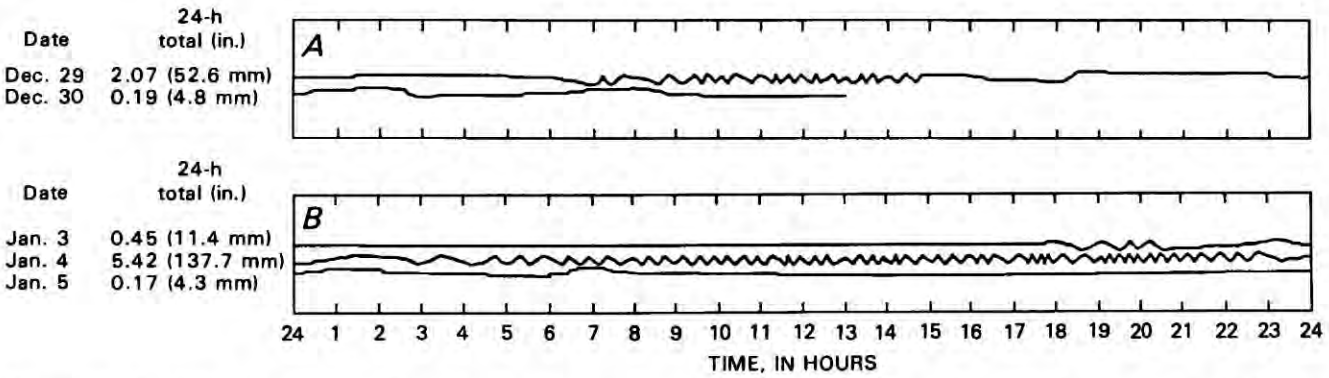


FIGURE 5.7.—Rainfall hydrographs from Harrington Creek gage. *A*, December 29–30, 1981. *B*, January 3–5, 1982. Each peak represents 2.5 mm (0.1 in.), and each individual step 0.25 mm (0.01 in.), of rainfall; each horizontal trace represents 1 d (24 h). ID values listed in table 5.3 were calculated from these hydrographs.

fall, triggered no debris flows; and the storms in group 3 (18–22), which occurred after a seasonal rainfall of 280 mm (11.0 in.), triggered no debris flows. The importance of prestorm seasonal rainfall can be seen by comparing the rainfall characteristics and effects between groups 1 and 2. Even though the storms in group 2 had storm totals, 24-hour maximums, 1-hour intensities, and ID values exceeding those for most of the storms in group 1 (1–4, 6–10), the storms in group 2 did not trigger debris flows, apparently because of insufficient prestorm seasonal rainfall. Prestorm seasonal rainfall of 280 mm (11.0 in.) was identified as a threshold.

Rainfall during the 2-, 7-, 15-, and 30-day periods preceding each storm is compiled in table 5.4. These values were not so distinctive as prestorm seasonal rainfall for distinguishing storms capable of triggering debris flows. At least 12.7 mm (0.50 in.), generally from 38 to 152 mm (1.5–6.0 in.), of rain fell during the 15-day periods before storms that triggered debris flows. Rainfall during the 7- and 15-day periods before storms 1, 5, and 8, which caused the greatest number of debris flows, was significantly higher than for other storms, an observation suggesting that rainfall during the 1- or 2-week period preceding an intense storm may be significant in addition to the prestorm seasonal rainfall.

The average of the values listed in table 5.4 for groups 1, 2, and 3 indicates that rainfall during the 15- and 30-day periods preceding a storm for group 1 doubled that for group 2, yet was below that for group 3, a result suggesting insignificance for these periods of antecedent rainfall. A comparison of the average rainfall for the 2- and 7-day periods preceding a storm shows that the average for group 1 exceeds the averages for groups 2 and 3, a result suggesting possible significance for rainfall during the week preceding a storm. Nonetheless, conclusions based on these averages for such a small number of samples should be preliminary and subject to further verification. Additional data are needed to further establish the amount of prestorm rainfall that is significant during these periods before storms and to establish the effect



FIGURE 5.8.—*Numerous debris flows triggered near La Honda by the January 3–5, 1982, storm.* Arrows indicate debris-flow scars. Same hillslope as in figure 5.5.

of week-long dry periods on soil-moisture conditions and the ability of storms to trigger debris flows.

By the time of the January 3-5, 1982, storm, seasonal rainfall of 460 mm (18.9 in.) had far exceeded the prestorm threshold of 280 mm (11.0 in.) (see fig. 5.6). In addition, rainfall within 7- and 15-day periods preceding the storm was extremely heavy—86 mm (3.4 in.) and 155 mm (6.1 in.), respectively. That soils were nearly or completely saturated early in this storm in the La Honda area is also suggested by calculations from the U.S. National Weather Service's Sacramento Streamflow Model, which determined complete saturation of the mountainous San Lorenzo River drainage of Santa Cruz County by 9:00 a.m. P.s.t. January 4, 1982 (R.J.C. Burnash, oral commun., 1982).

The rise in piezometric level after intense storms was also observed to depend on whether the prestorm seasonal-rainfall threshold had been achieved; the data listed in table 5.5 show that piezometric levels after the storms in group 2 (11–17) remained generally below those after the storms in group 1 (1–10) and group 3 (18–22) (except for storm 8, for which there is a possible error in piezometric measurement). These data further show that storms 18 through 22, which occurred after the prestorm threshold had been reached, resulted in relatively high piezometric levels, even though ID values, particularly $ID_{5.0}$, were not so high as those for storms 1 through 10, a relation indicating the importance of soil-moisture storage and downslope flow, even within a shallow hydrologic regime.

EFFECT OF STORM INTENSITY-DURATION

By comparing the ID values for the different storms in groups 1 and 3 (table 5.3), an intensity-duration threshold was identified for storms that triggered at least one debris flow within the study area. On a plot of values of continuous duration at different levels of intensity for the storms in groups 1 and 3, this threshold is evident in figure 5.11*A*, separating the storms that triggered debris flows (circles) from those that did not (dots). Each storm is represented by a family of circles, with a value corresponding to a duration of each particular intensity. The two circles that lie to the left of the threshold are minimums, and the error in measurement associated with these values spans the threshold and confirms the trend.

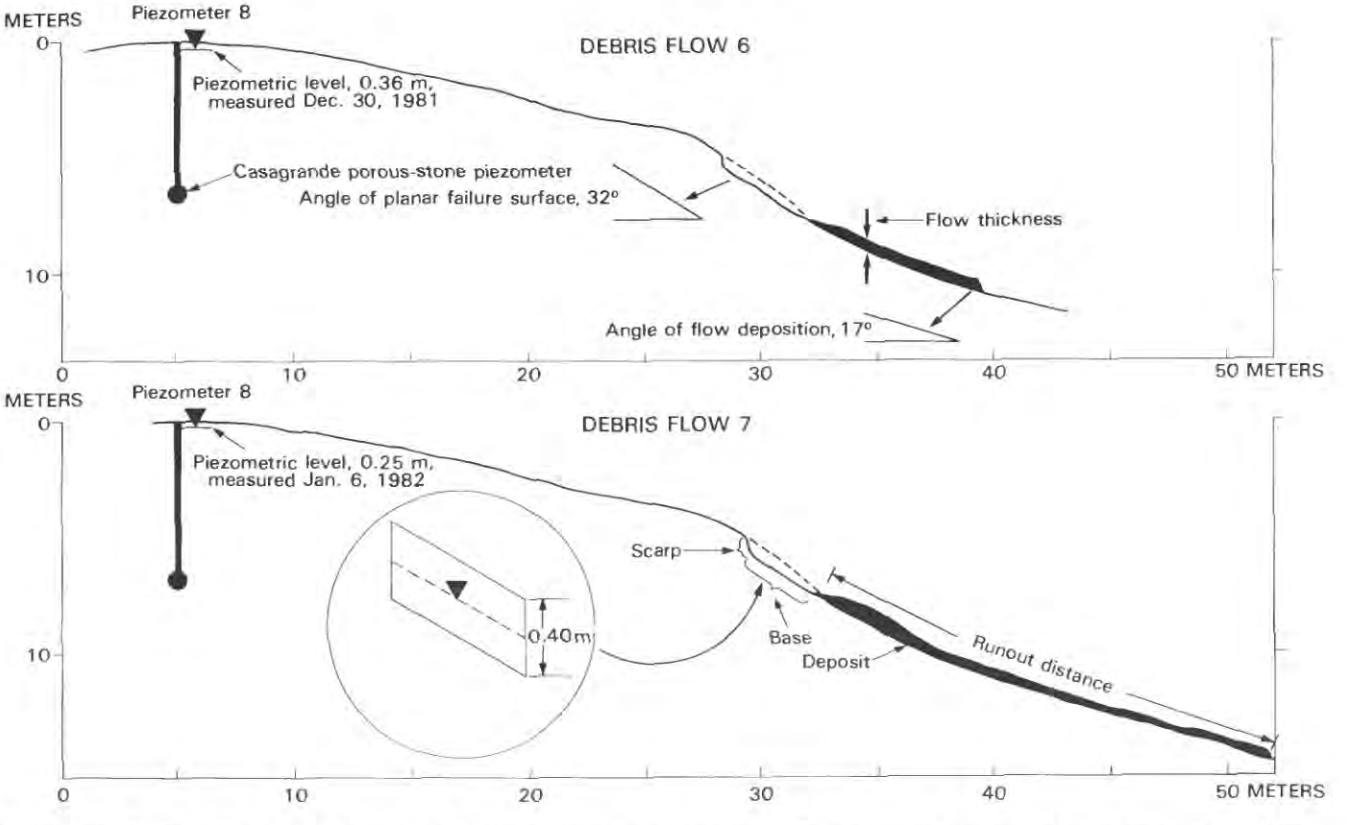


FIGURE 5.9.—Profiles of debris flows 6 and 7 (pl. 3), showing location of piezometer (8, fig. 5.3). Inset shows level of ground water within failure slab equivalent to piezometric level measured nearby on January 6, 1982; actual maximum level in slab is unknown.



FIGURE 5.10.—Debris flow 3 (pl. 3) triggered January 13–14, 1978, by slumping in regolith within a topographic depression. *A*, Lateral levees bounding channel about midway along debris flow. *B*, Slump and scar at head of debris flow. *C*, Entire debris flow, showing locations of closeups in figures 5.10*A* and 5.10*B*.

Below an intensity of approximately 2.5 mm/h (0.10 in/h), the threshold in figure 5.11*A* is not particularly well constrained. Physically, the independence of duration and intensity on triggering debris flows below this low intensity may correspond to the ability of soils on steep slopes to drain under low rates of rainfall infiltration without appreciable buildup of pore-water pressure. For higher intensities, the data are not sufficiently accurate to extend the threshold for durations of less than 1 hour. High-intensity rainfall of short duration may not be so significant for triggering debris flows in the low-permeability, cohesive soils of this area as in other areas of more highly permeable, cohesionless soils, where pore pressures can rapidly respond to high-intensity rainfall (Sidle and Swanston, 1982).

The intensity-duration threshold is best defined within the range of intensities from 5.0 to 10 mm/h (0.20–0.40 in/h). If this threshold is considered as asymptotic at its extremes, then the relation between duration and intensity to trigger debris flows can be expressed by the equation

$$D = 9.0/(I - 1.7),$$

where D is the continuous duration of rainfall (in hours) equal to or exceeding an intensity I (in millimeters per hour) (R.C. Wilson, written commun., 1985).

The effect of antecedent rainfall is again demonstrated in figure 5.11*B*, where duration and intensity for storms with less than 280 mm (11.0 in.) of prestorm seasonal rainfall (group 2, table 5.3) are plotted. The triangles (representing storms in group 2 of table 5.3) are distributed on both sides of the intensity-duration threshold line. Significantly higher intensities and longer durations, above the threshold in some of these storms that nonetheless did not trigger debris flows, confirm the strong influence of antecedent rainfall on the ability to trigger debris flows within the range of storm intensity and duration observed.



FIGURE 5.10.—Continued

SIGNIFICANCE OF THE JANUARY 3–5, 1982, STORM

The rainfall characteristics of the January 3–5, 1982, storm, in comparison with those of other storms that resulted in debris flows, indicate that this storm was exceptional from a recurrence standpoint. All the ID values for the January 3–5, 1982, storm generally exceeded those for the other storms listed in table 5.3.

We evaluated the January 3–5, 1982, storm, using the depth-duration-frequency analysis developed by Rantz (1971) for areas within the San Francisco Bay region. Using depth-frequency curves for the 760-mm (30 in.) average seasonal rainfall of the La Honda study area, storm-recurrence intervals R_c (in years) were evaluated for the maximum 1-, 2-, 3-, 6-, 12-, 18-, and 24-hour rainfall totals measured at Harrington Creek. As listed in table 5.6, the unusual aspect of the rainfall during the January 3–5, 1982, storm was the total rainfall for the 18-hour period, which had a recurrence interval of 60 years. Interestingly, the January 26, 1983, storm, which was responsible for the second highest number of debris flows, had an R_c of 7 years for the maximum 6-hour-period rainfall total. Tabulation of the recurrence intervals for the other storms indicates that isolated, less abundant debris flows could be expected to occur at least every 2 years.

This threshold is notably less than that identified for abundant debris flows in the San Francisco Bay region (see chap. 4) and that proposed by Caine (1980) for debris flows reported worldwide. However, because the threshold for the study area is based on storms that caused as few as one debris flow in the 10-km^2 area, this difference is not too surprising. We characterized isolated debris flows as less than 1 per square kilometer, and abundant as greater than 1 per square kilometer, following the general procedure of Govi and Sorzana (1980) for calibrating the intensity of debris-flow effects. Within the study area, the number of debris flows generally increased with increasing ID values. We have developed preliminary

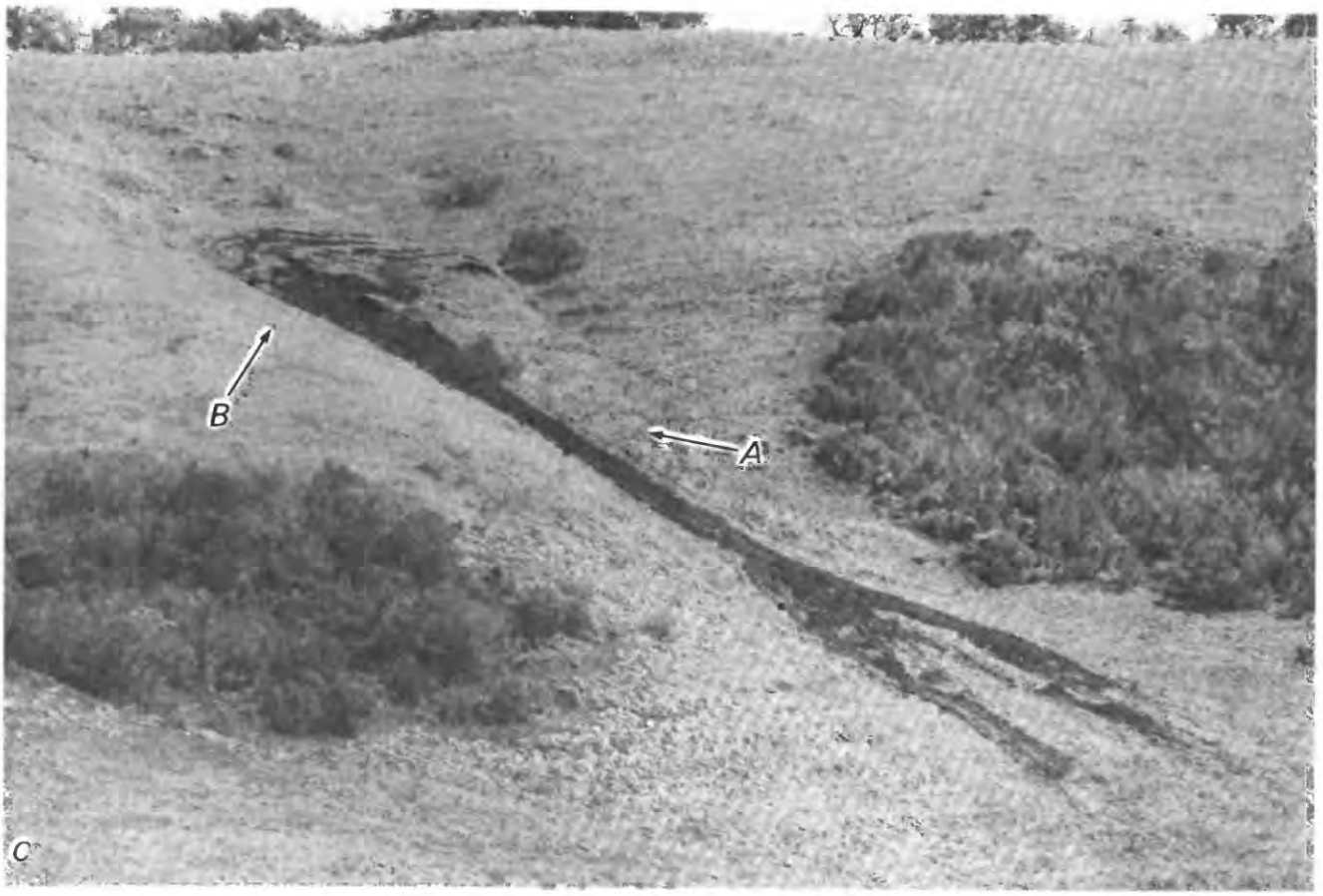


FIGURE 5.10.—Continued

TABLE 5.3.—*Storm-rainfall characteristics related to debris flows in the study area, 1975–83*

[Data for storm 1 averaged from U.S. National Oceanic and Atmospheric Administration continuously recording rain gages at Berkeley and San Francisco Weather Station offices. Data for storms 2, 3, and 14 from continuously recording rain gage at La Honda-San Mateo County Yard (2.5-mm [0.1 in.] hourly readings). Data for storm 10 from continuously recording rain gage at Weeks Creek (2.5-mm [0.1 in.] hourly readings). Data for all other storms from continuously recording rain gage at Harrington Creek (0.25-mm [0.01 in.] continuous readings)]

Storm	Date	Prestorm seasonal rainfall (mm)	Storm total (mm)	Max 24 h (mm)	Max 1 h (mm)	$ID_{2.5}$ (h)	$ID_{5.0}$ (h)	$ID_{6.5}$ (h)	$ID_{7.5}$ (h)	$ID_{10.2}$ (h)	Number of debris flows
				Group 1							
1	1/13-14/78	388	70.1	61.0	8.1	4	3	2	2	0	3
2	2/13/79	282	55.9	55.9	10.2	9	3	1-2	1	1	1
3	2/18/80	492	45.7	45.7	10.2	7	3	2-3	2	1	1
4	12/29/81	396	57.4	54.6	8.1	6.7	6.3	5.5	2.4	0	5
5	1/3-5/82	480	153.4	137.7	10.7	19.2	16.5	13.8	4.3	1.7	74
6	12/20-22/82	351	104.1	64.8	10.9	3.8	3.3	3.2	2.8	1.3	2
7	1/22-23/83	495	98.3	58.7	14.2	6.4	3.1	2.2	2.1	1.3	8
8	1/26/83	601	77.5	76.2	24.4	6.1	5.0	4.8	4.5	2.0	13
9	2/25-3/2/83	873	154.9	62.2	10.9	3.5	3.1	2.3	2.1	1.2	1
10	3/12-13/83	1,059	55.9	55.9	10.2	6	5	3-4	3	1	2
				Group 2							
11	3/15-16/77	264	51.6	51.6	6.4	8.7	3.1	1.0	0	0	0
12	1/7-11/79	90	103.9	47.0	15.2	5.5	2.0	1.6	1.6	1.6	0
13	1/14-15/79	197	68.8	68.8	14.0	5.5	3.4	1.6	1.6	1.3	0
14	12/23-24/79	231	127.0	116.8	20.3	10	4	3	3	2	0
15	1/26-29/81	165	122.7	71.4	10.9	5.2	3.5	2.5	1.2	1.0	0
16	11/18/82	168	81.3	81.3	10.2	9.3	7.4	5.5	5.3	1.0	0
17	11/27-30/82	256	81.5	35.6	12.7	4.9	2.4	2.3	2.1	1.4	0
				Group 3							
18	3/12-13/81	376	60.4	60.4	11.9	7.9	2.2	2.0	1.7	1.0	0
19	2/13-17/82	724	127.8	72.9	8.9	8.1	2.7	1.5	1.0	0	0
20	3/28-4/3/82	949	139.9	63.2	8.9	7.0	2.4	1.7	1.5	0	0
21	4/10-11/82	1,096	59.7	50.8	6.9	3.8	1.7	1.2	0	0	0
22	2/5-8/83	708	100.8	50.5	8.9	2.4	1.7	1.6	1.2	0	0

criteria (table 5.7) for storms that would induce isolated as well as abundant debris flows.

CONCLUSIONS

For the La Honda study area, both prestorm rainfall and the duration of high-intensity rainfall determine whether a storm will trigger debris flows. Once a prestorm seasonal threshold of 280 mm (11.0 in.) is exceeded, high-intensity storms are capable of generating debris flows. We quantified the duration of high-intensity rainfall, using a measure termed ID, the duration over which rainfall equals or exceeds a particular intensity. We determined a general equation for a threshold for triggering at least one debris flow within the area that is best defined for $ID_{5.0}$ to $ID_{10.0}$. An $ID_{5.0}$ value of 3 hours or more represents the most significant single index of those storms that caused debris flows in contrast to those that did not.

High piezometric levels in shallow regolith and highly weathered bedrock, generated during and immediately after intense storms, triggered translational and rotational slides that mobilized into debris flows. The piezometric rise after a storm depended on prestorm rainfall as well as ID value. These observations compared well with the limited previous piezometric measurements obtained near debris flows (Sidle and Swanston, 1982), as well as with previously witnessed initiations of debris flows (Rogers and Selby, 1980).

The significance of the January 3–5, 1982, storm from a mass-wasting perspective is conveyed by the large number of debris flows within this area in comparison with the number of flows observed after other storms. From a meteorologic viewpoint, the significance of this storm was indicated by a 60-year recurrence of the 18-hour max-

TABLE 5.4.—*Rainfall during the 2-, 7-, 15-, and 30-d periods preceding storms*

Storm	Date	Prestorm rainfall (mm)				Prestorm seasonal rainfall (mm)
		2 d	7 d	15 d	30 d	
			Group 1			
1	1/13-14/78	1.8	53.6	120.9	246.9	388
2	2/13/79	.0	.0	12.9	88.9	282
3	2/18/80	22.9	71.1	71.1	71.1	492
4	12/29/81	2.8	18.3	79.5	95.8	396
5	1/3-5/82	15.2	86.4	154.7	179.3	480
6	12/20-22/82	.0	10.2	13.5	98.0	351
7	1/22-23/83	.5	41.1	41.1	86.1	495
8	1/26/83	7.6	106.4	147.1	147.1	601
9	2/25-3/2/83	5.0	32.2	63.5	272.0	873
10	3/12-13/83	.0	20.6	185.4	248.9	1,059
	Average--------	5.6±7.7	44.0±34.9	89.0±60.4	153.4±77.8	---
			Group 2			
11	3/15-16/77	2.8	9.1	9.4	43.7	264
12	1/7-11/79	2.3	2.8	2.8	16.3	90
13	1/14-15/79	1.8	103.9	106.9	120.4	197
14	12/23-24/79	.0	19.3	19.3	25.1	231
15	1/26-29/81	.0	55.4	58.9	86.9	165
16	11/18/82	.0	20.3	25.4	118.1	168
17	11/27-30/82	.0	3.0	84.3	132.6	256
	Average--------	1.0±1.3	30.5±37.0	43.9±40.1	77.6±48.7	---
			Group 3			
18	3/12-13/81	0.0	0.0	43.4	65.8	376
19	2/13-17/82	.0	.0	.0	90.7	724
20	3/28-4/3/82	3.0	10.4	53.3	97.8	949
21	4/10-11/82	.0	19.1	150.1	201.7	1,096
22	2/5-8/83	22.9	43.4	213.9	254.5	708
	Average--------	5.2±10.0	14.6±18.0	92.1±87.4	142.1±81.6	---

imum rainfall, whereas the other storms that caused debris flows generally had a less than 2-year recurrence. Therefore, although a few isolated debris flows can be expected on a more or less regular yearly basis, most slope modification from widespread and abundant debris flows appears to occur far less frequently—only during such long-duration, high-intensity storms as that of January 3–5, 1982.

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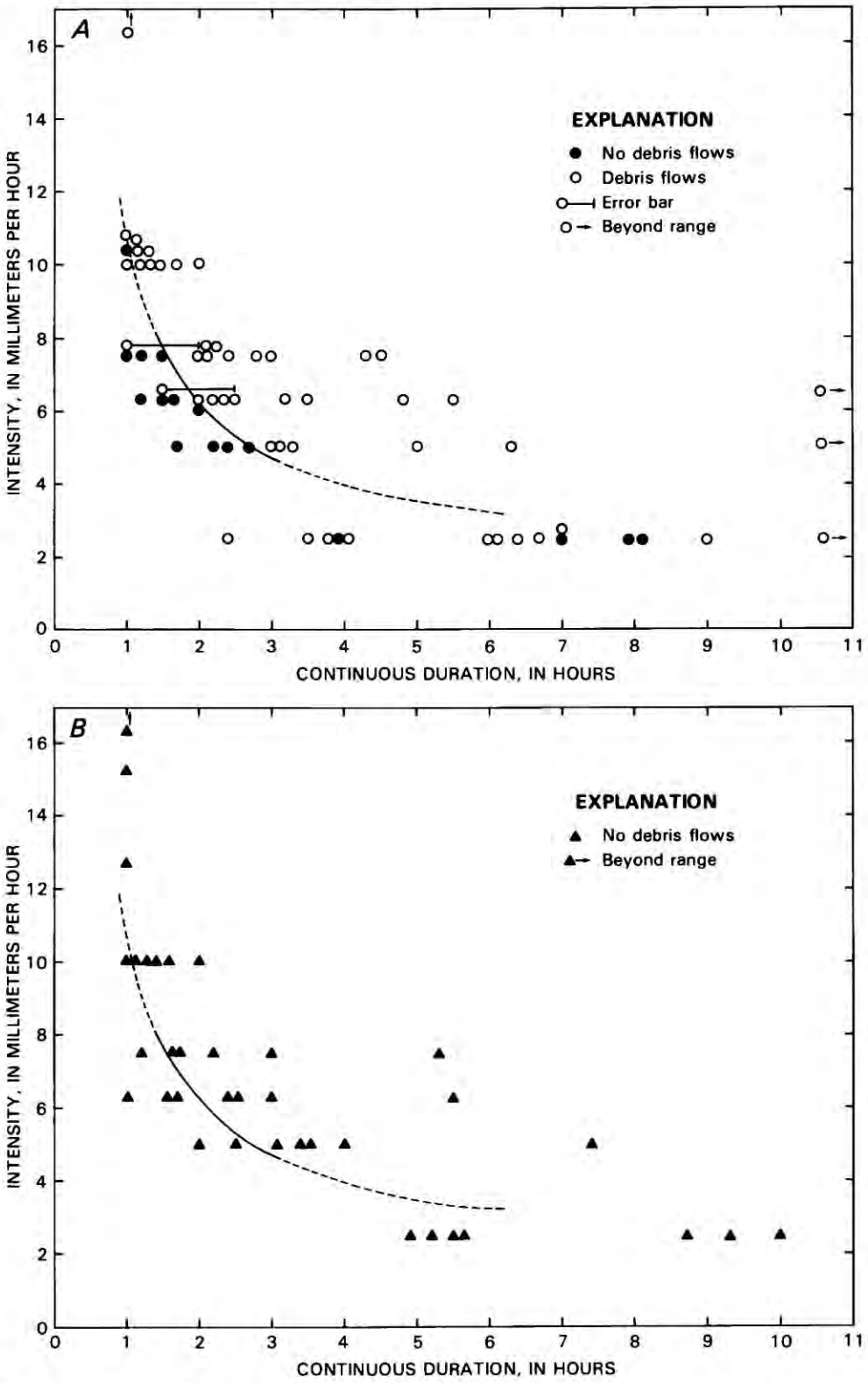


FIGURE 5.11.—Relations among rainfall intensity-duration from records of 22 storms in the study area from data listed in table 5.3. *A*, Values from storms that occurred after a prestorm seasonal threshold of 280 mm (11 in.). Solid line represents intensity-duration threshold that delineates storm-rainfall conditions which resulted in debris flows; line is dashed where threshold is less certain. *B*, Values from storms that occurred before a prestorm rainfall of 280 mm (11 in.) had been reached. Threshold line from figure 5.11*A* is shown for comparison.

TABLE 5.5.—*Piezometric levels measured after storms*

[Plus sign indicates pore-water pressure above ground surface, commonly referred to as artesian. All other piezometric levels indicate depth beneath ground surface]

Storm	Date	Prestorm seasonal rainfall (mm)	$ID_{5.0}$ (h)	Depth to piezometric level (m)		Time of measurement after storm (d)
				(8, fig. 5.3)	(7, fig. 5.3)	
			Group 1			
1	1/13-14/78	388	3	0.94	0.42	5
2	2/13/79	382	3	.51	.10	10
3	2/18/80	492	3	---	---	---
4	12/29/81	396	6.3	.36	.51	1
5	1/3-5/82	480	16.5	.25	.43	1.5
6	12/20-22/82	351	3.3	2.03	.03	1
7	1/22-23/83	495	3.1	.86	.03	1.5
8	1/26/83	601	5.0	4.38(?)	.38	2
9	2/25-3/2/83	873	3.1	.53	+.10	1
10	3/12-13/83	1,059	5	2.36	+.41	2
			Group 2			
11	3/15-16/77	264	3.1	dry	4.43	5
12	1/7-11/79	90	2.0	2.76	.88	1
13	1/14-15/79	197	3.4	5.82	.84	7
14	12/23-24/79	231	4	5.08	1.78	5
15	1/26-29/81	165	3.5	5.79	1.42	5
16	11/18/82	168	7.4	4.67	---	1
17	11/27-30/82	256	2.4	4.85	---	3
			Group 3			
18	3/12-13/81	376	2.2	---	---	---
19	2/13-17/82	724	2.7	.38	.15	1
20	3/28-4/3/82	949	2.4	.59	.19	4
21	4/10-11/82	1,096	1.7	.76	.33	9
22	2/5-8/83	708	1.7	2.76	.03	2

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TABLE 5.6.—*Recurrence intervals of maximum rainfall during 6-, 18-, and 24-h periods for storms that caused debris flows in the study area*

[For each storm, recurrence intervals (R_c) are for maximum rainfall during each period, as determined by the method of Rantz (1971). Those R_c values listed as 2 may actually be somewhat less than 2]

Period----------		6 h		18 h		24 h	
Storm	Date	Maximum rainfall (mm)	R_c (yr)	Maximum rainfall (mm)	R_c (yr)	Maximum rainfall (mm)	R_c (yr)
1	1/13-14/78	26.2	2	36.8	2	61.0	2
2	2/13/79	25.4	2	50.8	2	55.9	2
3	2/18/80	38.1	2	45.7	2	45.7	2
4	12/29/81	40.6	2	52.1	2	54.6	2
5	1/3-5/82	51.3	3.4	129.5	60	137.7	18
6	12/20-22/82	30.5	2	52.1	2	64.8	2
7	1/22-23/83	39.4	2	58.7	2	58.7	2
8	1/26/83	59.4	7.0	63.5	2	76.2	2
9	2/25-3/2/83	26.7	2	48.8	2	62.2	2
10	3/12-13/83	38.1	2	48.3	2	55.9	2

TABLE 5.7.—*Intensity-duration and prestorm seasonal rainfall thresholds for storms that triggered isolated and abundant debris flows near La Honda, Calif.*

[The size of individual debris flows falls within a fairly narrow range (10–100 m^2). Because individual debris-flow areas are small in relation to the monitored field area, the magnitude of the effects from individual storms is expressed in terms of the number of flows per square kilometer, according to the procedure of Govi and Sorzana (1980)]

	Minimum prestorm seasonal rainfall (mm)	$ID_{5.0}$ (h)	$ID_{7.5}$ (h)	$\underline{R}_c$ (yr)
Isolated debris flows (less than 1/km^2), storms 1-4, 6, 7, 9, 10.	280	3-6	2	2
Abundant debris flows (more than 1/km^2), storms 5, 8.	381	5-16	4-14	7-60

6. DESCRIPTION AND MECHANICS OF SOIL SLIP/DEBRIS FLOWS IN THE STORM

By Stephen D. Ellen,
U.S. Geological Survey;
with contributions by
Mitchell A. Algus, Susan H. Cannon, Robert W. Fleming,
Philip C. Lahr, David M. Peterson, and Steven L. Reneau

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ABSTRACT

Almost all documented debris flows triggered by the storm of January 3–5, 1982, in the San Francisco Bay region developed from shallow slides (soil slips). These soil slip/debris flows ranged from small events that traveled about 10 m, to soil slip/debris torrents that traveled down major canyons for more than a kilometer. Elements common to these phenomena were their typical occurrence during intense storm rainfall, flow as slurry, generally rapid movement, and sudden impact.

Typical soil slips originated in the soil mantle on steep (26°–40°) hillslopes and left empty scars, 1 to 3 m deep and 5 to 15 m across. Leading downslope from these scars were debris-flow trails marked by flattened or stripped vegetation and by remnants of the flow material, particularly along the trail margins. Soil that mobilized as debris flows ranged from nonplastic sandy soil (SM of the Unified Soil Classification [USC] system) to moderately plastic soil (MH and CL of the USC system) containing as much as 35 percent clay-size (less than 2 μm) particles. Most soil slips mobilized completely as debris flows, leaving scars empty of failed material, but some mobilized only partially. Many soil slips and debris flows, especially in areas of brush and woodland, were interrelated as parts of complexes that included numerous scars.

The development of soil slip/debris flows consisted of several phases: movement of water to sites of failure, initial failure by sliding, mobilization of the sliding mass as a flowing slurry, and flow of the slurry. Failure at susceptible sites generally required both concurrent intense rainfall and concentration of water in the landscape. Mobilization occurred by both contractive and dilative means, and these can be predicted by using steady-state soil testing or the ratio of saturated water content to liquid limit. The resulting debris flows were facilitated by channels and affected by vegetation in the path, which influenced their capacity to augment themselves by triggering auxiliary soil slips.

INTRODUCTION

The rainstorm of January 3–5, 1982, in the San Francisco Bay region triggered thousands of shallow landslides that flowed rapidly downslope as debris flows (see "Introduction" to this volume for landslide terminology). This storm left abundant evidence of the mechanics of these landslides and provided an incentive to understand them, so that damage can be anticipated and avoided in the future.

This chapter describes these landslides and analyzes the mechanics of their development. Descriptions are based on field observations and limited soil testing during 1982. The analysis uses simple, approximate models intended to clarify the process, rather than sophisticated models designed for precise prediction.

TERMINOLOGY

Use of terms in this chapter generally follows the usage described in the "Introduction" to this volume. Debris flows of the storm typically originated in *soil*, a term used here in the engineering sense of unconsolidated earth material. Soil is called *granular* where it consists dominantly of sand and silt and thus is noncohesive to slightly cohesive. A thin cover of soil, here called *soil mantle*, blankets bedrock in hillside terrain of the region. The soil mantle typically ranges in thickness from about 0.3 to 3 m, thickening toward draws; it includes both residual and transported (colluvial) soil and typically consists of both debris (soil containing a significant proportion of coarse fragments) and earth (soil lacking any significant proportion of coarse fragments). Both earth and debris were significant components of debris flows in the storm. In addition, *organic debris*, such as logs and bushes, was a common component and, in places, constituted much of the transported material.

The debris flows typically originated as *soil slips*, shallow slides in the soil mantle that left empty scars on hillslopes (fig. 6.1). Leading downslope from the scars were trails of soil, organic debris, and stripped or flattened vegetation left by the process of *debris flow* (Johnson, 1970; Varnes, 1978). Scars and trails thus marked the sources from which material slid and the paths along which it flowed down hillslopes or channels as muddy slurries, commonly at high velocities. In this chapter, such complex landslides are designated by combined terms, such as *soil slip/debris flow* (after Campbell, 1975), because such terms distinguish the principal parts of the process by which debris flows develop from slides of the soil mantle. Thus, the term "debris flow" in this chapter designates only the flow part of the complex process. "Debris flow" includes mudflow, debris avalanche, and debris torrent, as discussed in the "Introduction" to this volume, because these processes are considered mechanically similar (Johnson, 1984, p. 257; Pierson and Costa, 1984).

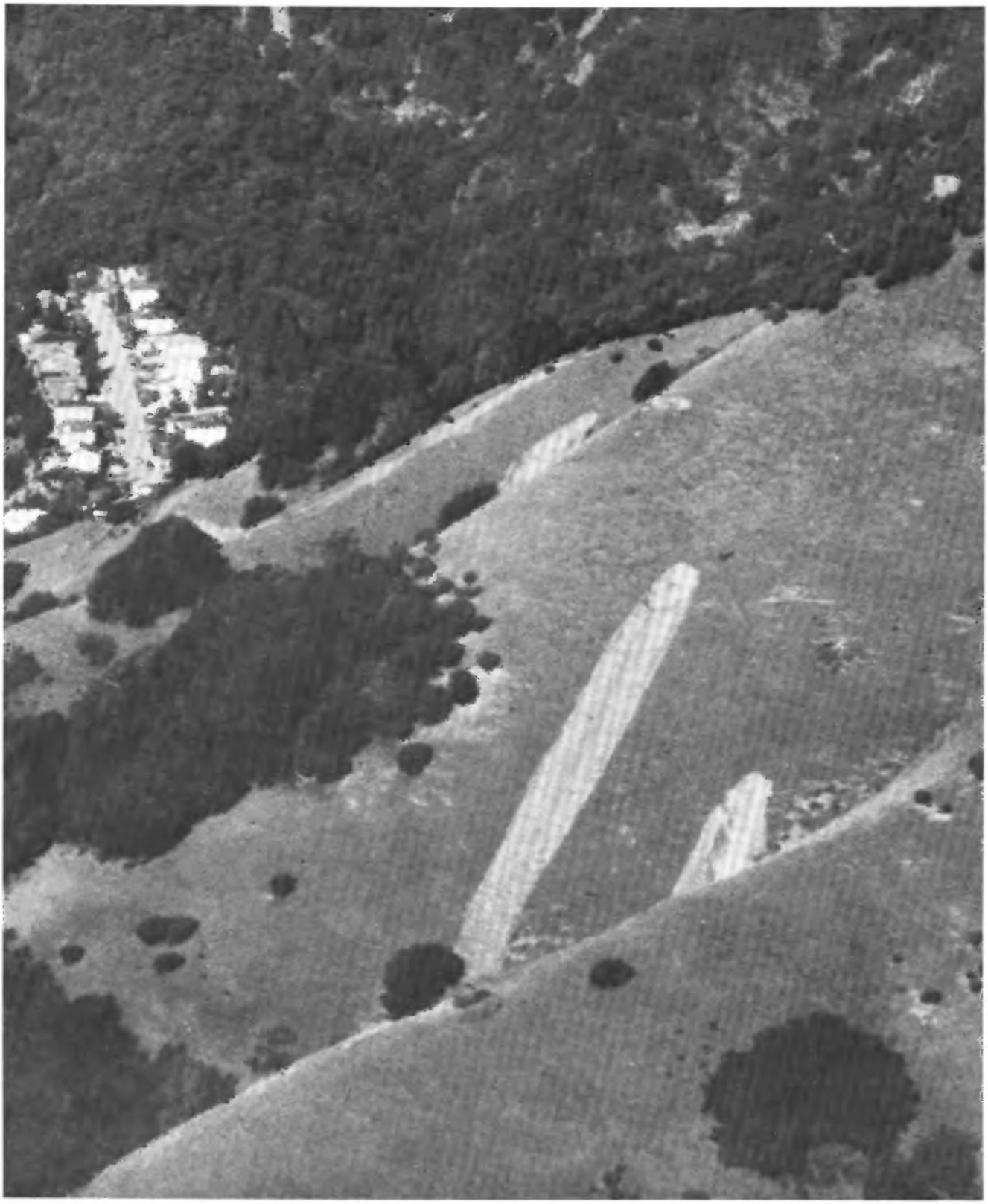


FIGURE 6.1.—Typical scars and trails of soil slip/debris flows on a hillslope near San Rafael, Marin County. Soil-slip scar near center is about 5 m wide.

ACKNOWLEDGMENTS

During the storm, soil slip/debris flows caught the attention of many observers, almost all laypeople. Careful descriptions provided by eyewitnesses were important to the analysis that follows.

The discussion here is based on the observations and ideas provided by the team of earth scientists who studied features left by the storm. Significant contributions came from personnel of the California Division of Mines and Geology, particularly C.W. Davenport, E.W. Hart, S.J. Rice, and T.C. Smith; from J.E. Baldwin II of Howard-Donley Associates, Inc.; from P.C. Lahr of the California Polytechnic State University, San Luis Obispo; and from C.S. Alger, M.A. Algus, S.H. Cannon, R.W. Fleming, E.L. Harp, D.G. Herd, D.K. Keefer, D.M. Peterson, S.L. Reneau, C.M. Wentworth, G.F. Wieczorek, H.G. Wilshire, and R.C. Wilson of the U.S. Geological Survey. In addition to authoring sections of this chapter, Reneau and Cannon mapped the landslide features shown on plate 4, and Cannon assisted in the case studies not attributed to other authors. H.J. Lee clarified theoretical relations concerning mobilization of debris flows.

DESCRIPTION OF SOIL SLIP/DEBRIS FLOWS IN THE STORM

Nearly all documented debris flows that resulted from the storm were soil slip/debris flows.[1] Typical configurations of soil-slip scars and debris-flow trails are shown on plates 4 and 6 and in figure 6.1. Some trails extended only several meters downslope, some down sidehill channels to gentle ground, and some down major canyons for considerable distances. Figure 6.2 shows the range in scale of these phenomena.

CASE STUDIES

The variety of soil slip/debris flows is illustrated by case studies of five events in Marin County. These studies show the range in scale and complexity of the phenomena, document their impact on society, and describe other noteworthy aspects of their behavior. Locations of the case studies are shown by number on plate 5; detailed maps and profiles of most of the case studies are shown on plate 4. Additional case studies are reported in chapters 8 and 9.

[1]The sole documented exception resulted from failure of a road embankment crossing Fall Creek in San Mateo County (see chap. 8). A plugged culvert at the base of the embankment ponded water, which led to the failure and resulting debris flow.

THREE PEAKS (CASE STUDY 1, PLS. 5, 6)

By Stephen D. Ellen and David M. Peterson

At about noon on January 4, a soil slip/debris flow near Three Peaks moved approximately 120 m down a steep brush-covered hillslope and across a dirt road, then turned sharply (approx 90°) and traveled about 300 m farther down a canyon of gentle gradient. The soil-slip scar developed in granular soil mantle overlying sandstone of the Franciscan assemblage.

The movement of the debris flow from its inception near the top of the steep hillslope to its sharp turn at the foot was witnessed by Dan Adams (oral commun., 1982), whose view of the event was similar to that shown in figure 6.3. He heard a roar (above the sound of the motorcycle he was riding) and saw a single pulse of soil and organic debris, including abundant pieces of brush, move at about 40 km/h down the hillslope and across the road. No soil-slip scars or debris-flow trails were evident on the hillslope before the pulse, and nothing followed except a trickle of water. The debris flow left no mud on the road. Adams estimated the height of the front to be about 3 m when it reached the road; he estimated the length of the slug of flowing material to be about one-fourth the combined length of the scar and trail above the road. The front showed a rolling or tumbling motion as material high in the front advanced faster than material near the ground surface. The front was higher than the rest of the flow and appeared to impede the progress of the flow somewhat. He likened the rest of the flow to a rushing creek.

The major soil-slip scar (near top, fig. 6.3) bottoms at a depth of about 1 m in a light-colored lower layer of the soil mantle. A large auxiliary scar, which extends from this major scar down the right half of the flow trail (as viewed), bottoms within a dark upper layer of the soil mantle at a depth of about 0.5 m. Comparison of these scar depths to the 3-m thickness observed at the front of the flow indicates that the flow thickened considerably in its course down to the road. In contrast, a cross section of the debris-flow trail well downcanyon (beyond view in fig. 6.3) measured only one-fifth the estimated cross section at the road, a relation indicating that the flow had strung out in its passage down the gently sloping canyon.

The principal significance of this event is that all the scars (major scar, large auxiliary scar, and scars from uprooted trees) were observed to form during a single pulse of short duration. Thus, the soil slips within the trail apparently were triggered instantaneously by passage of the debris flow from the major scar.

Adams also witnessed another debris flow advancing at about walking speed down a gently sloping channel near the site described above.

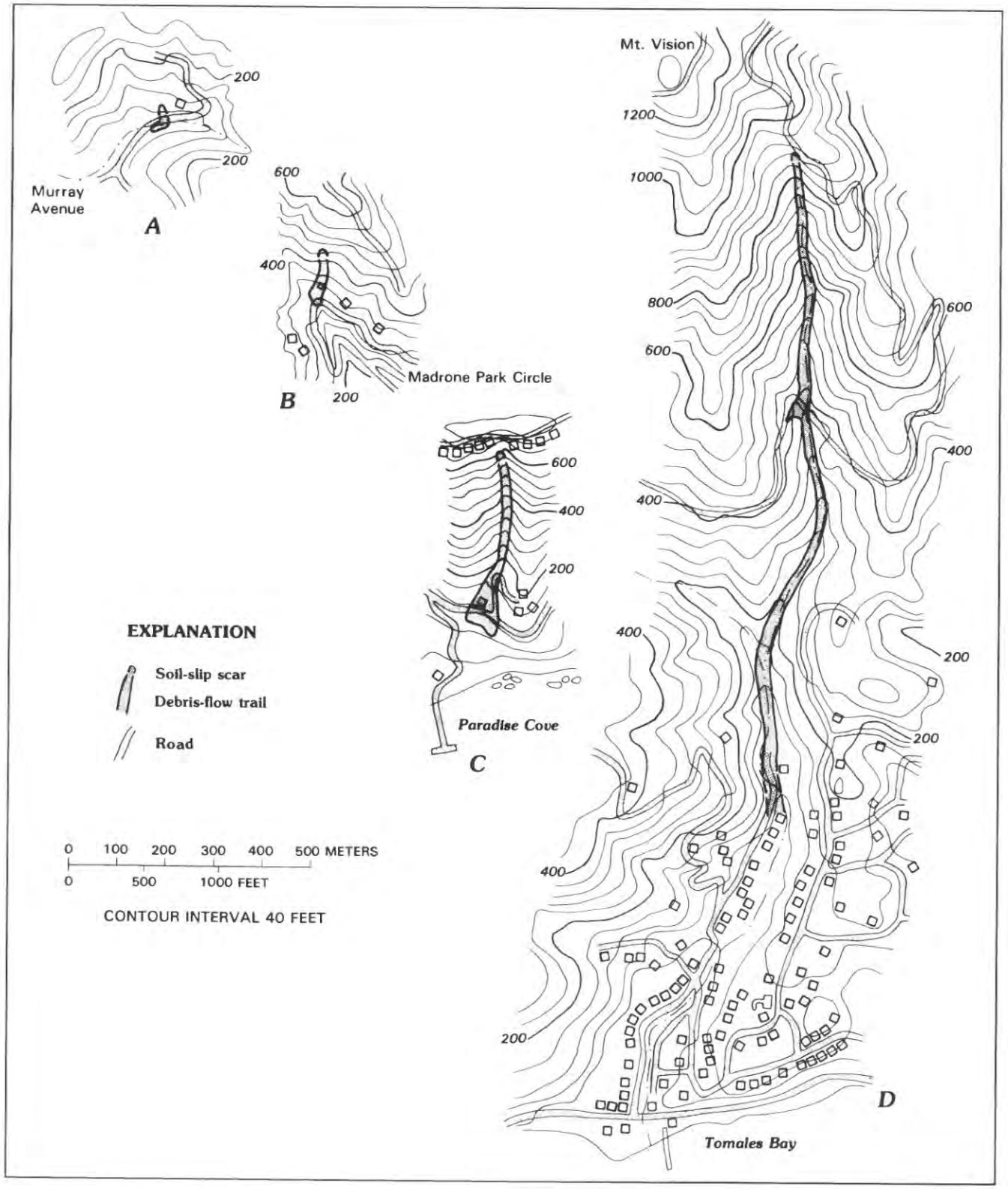


FIGURE 6.2.—Range in scale of damaging soil slip/debris flows triggered by the storm. *A*, Murray Park. *B*, Homestead Valley. *C*, Tiburon Ridge. *D*, First Valley, Inverness. All examples are in woodland.

MURRAY PARK (CASE STUDY 2, PL. 5)

On the afternoon of January 4, a soil slip/debris flow originating only several meters away broke through a 25-cm-thick reinforced-concrete wall that formed both the rear foundation of a small house and the rear wall of its basement garage (fig. 6.4; Leary, 1982; S.J. Rice, oral commun., 1982). Most of the house, which was unoccupied at the time, was pushed about 10 m to a position across Murray Avenue (pl. 4; fig. 6.2). The house was subsequently moved by another debris flow traveling down the valley parallel to Murray Avenue.

This soil slip/debris flow is noteworthy because it exhibited considerable power, yet had almost no space for acceleration before impact. At house level, a walkway about 1 m wide had separated the steep cut slope from the rear wall of the house; below floor level, the concrete wall of the basement garage had been flush against the hill. The sliding or flowing mass thus had 1 m or less of free space to accelerate before reaching the house and breaking the wall. This behavior suggests that at least some soil slip/debris flows lost strength abruptly at the very start of downslope travel.

The soil-slip scar developed on a wooded 31° hillslope that lacked detectable channels. The base of this hillslope had been steepened to make room for the house. The soil slip involved granular colluvium and an underlying highly permeable rubble, in turn overlying sandstone of the Franciscan assemblage. There is evidence of piping near this permeable rubble at the head of the scar. The position of the landslide on what appears to be a uniform hillslope may have resulted from colluvial fill in a bedrock depression without surface expression (Dietrich and Dunne, 1978), or from the presence of the house, either through damming of ground water by the concrete wall (which appears to truncate the permeable rubble zone) or through decreased stability caused by the cut slope.

HOMESTEAD VALLEY (CASE STUDY 3, PL. 5)

At about 9:15 p.m. P.s.t. January 4, a soil slip/debris flow originated approximately 60 m upslope from a house



FIGURE 6.3.—Scars and upper part of trail of soil slip/debris flow near Three Peaks; rest of trail extends a short distance downslope below road, then turns abruptly to right down a canyon. Major light-colored soil-slip scar extends from crown downward to break in slope (upper third of view). Trail within view consists of two parts. On right side of photograph, a shallow (0.5 m) scar extends from major scar to road and from edge of trail to about midway across trail; muddy deposit coats brush along lower edge of trail. On left side, most vegetation has been stripped, trees have been plucked (leaving small scars, such as at left center), and a small tree at edge of trail has been bent over.

on Madrone Park Circle in Homestead Valley (pl. 4; fig. 6.2; Kearney, 1982; S.J. Rice, oral commun., 1982). The house, occupied since 1962, was built on stilts and was served by a small tramway because of the steep (37°) slope. The debris flow moved toward the house down a shallow draw in the wooded hillslope, incorporating vegetation and soil and leaving mud plastered as high as 2 m on trees within the path (fig. 6.5). "A waterfall of mud," as the occupants described it, struck the house and sent it tumbling or flying down the hillslope (fig. 6.6). Pieces of the house sheared the top from a power pole and broke overhanging limbs of trees (fig. 6.6). The house came to rest in the canyon bottom at the base of the hillslope, about 45 m from its foundation. Two women were trapped in the wreckage until rescued; both sustained nonfatal injuries. The shattered house, along with other material carried by the debris flow, dammed the canyon bottom and thus blocked further progress of the debris flow, which might otherwise have damaged at least several other houses immediately downcanyon.

The soil slip/debris flow originated on a 30° slope and traveled down slopes of 25° to greater than 35°, incorporating much material from its path. The soil-slip scar is in granular colluvium that overlies sandstone of the Franciscan assemblage; soil-test data are listed in table 6.1. Vegetated subdued soil-slip scars are present near the head of the subtle draw that channeled the debris flow to the housesite. This event is described in more detail by Reneau and Dietrich (1987b).

TIBURON RIDGE (CASE STUDY 4, PL. 5)

At about 2:00 p.m. P.s.t. January 4, a soil slip/debris flow developed on a 36° slope at the head of a canyon on the forested east side of Tiburon Ridge above Paradise Cove (pl. 4; fig. 6.2; S.J. Rice, oral commun., 1982; Smith and Hart, 1982, p. 146). The material traveled 300 m down the steep canyon, incorporating trees, forest-floor vegetation, and soil from much of its path. The debris flow leaped from a small waterfall (approx 1.5 m high) in the canyon bottom, leaving delicate ferns on the vertical face undisturbed. Trees along the debris-flow path show mud-splash marks as high as 4 m above the margin of the path, which lies approximately 6 m above the present canyon bottom.

Following closely behind a pulse of muddy water, the debris flow emerged from the canyon mouth. A young man who narrowly escaped the flow estimated its veloc-



FIGURE 6.4.—Soil-slip scar behind site of destroyed house in Murray Park. Broken concrete wall of basement garage is at left center.

ity at 80 km/h, but this estimate is probably exaggerated. The debris flow struck a house in its path, moved it 20 m from its foundation, and killed its owner. The debris flow then continued across Paradise Drive and through the parking lot of Paradise Cove County Park. Most of the material appears to have stopped while descending a 26° slope in the park, but some, possibly waterborne, reached the San Francisco Bay.

Almost all the material involved was granular soil overlying metasandstone of the Franciscan assemblage; soil-test data are listed in table 6.1. Subdued soil-slip scars from previous events are present near the head of the canyon, and probable deposits from previous debris flows are present near the mouth of the canyon (pl. 4).

The path of the debris flow includes several discrete scars, in addition to large areas where soil was removed from the canyon bottom (pl. 4). Relations between these scars and lateral deposits suggest that the major scars developed in a sequence that progressed downcanyon. The time interval between these failures is unknown; they may all have contributed to a single event triggered by the major flow, as at Three Peaks, or they could have produced a sequence of discrete debris-flow events. The apparent downcanyon progression suggests that most scars contributed to a single major event (see subsection below entitled "Triggering Mechanisms Within Complexes").



FIGURE 6.5.—View down debris-flow trail in Homestead Valley toward destroyed house (center). Note debris plastered 2 m high against tree at right (top of debris indicated by arrow) and loose branch hanging from tree at center.

The pulse of muddy water that immediately preceded the debris flow may have resulted from a discrete failure early in the sequence of events, but more likely it was a wave of water pushed ahead of the debris flow. A similar pulse of water apparently occurred at Slide Mountain, Nev., immediately before the debris flow or hyperconcentrated flood of May 30, 1983 (P.A. Glancy, oral commun., 1983).

INVERNESS AREA (CASE STUDY 5, PL. 5)

By STEVEN L. RENEAU

Much of the storm damage in the steep and heavily forested area near Inverness resulted from brief high-energy surges of logs and sediment, or debris torrents, that traveled down many of the main canyons on January 4 (fig. 6.7). Debris torrents are a type of debris flow, probably grading to hyperconcentrated streamflow, that consists of slurries and near-slurries of soil and coarse organic debris that can travel as far as several kilometers down canyons, commonly entraining much additional material from the streambed and streambanks (Swanston and Swanson, 1976; Swanson and Lienkaemper, 1978). A debris torrent that emerged from the narrow canyon above Dream Farm was described by a witness as a wall of logs as high as a building, dropping in height rapidly as the valley floor widened, and passing by within seconds. Another debris torrent destroyed two houses at Redwood Avenue and knocked a third off its pilings, carrying it 30 m to the edge of Tomales Bay. Buildings were also destroyed by debris torrents at Dream Farm and in First and Second Valleys.

All the canyons known to have been affected by debris torrents retained distinctive features absent in the other canyons; these features are illustrated on the detailed map of First Valley (pl. 4). The most conspicuous feature is erosion of the soil mantle and removal of nearly all the vegetation from a swath commonly 15 to 20 m wide (fig. 6.8); small scarps in the soil are abundant, and bedrock is commonly exposed. The few trees that remain are plastered with mud to a height of 1 to 2 m on the upstream side. In many places, the canyon bottoms are freshly scoured to bedrock; at one locality above Redwood Avenue, an estimated 6 m of material was eroded.

These canyons are also marked by persistent, commonly narrow belts outside of the heavily eroded swaths, in which the vegetation has been flattened, oriented down-

canyon. The forest litter has been removed here, or the vegetation has been plastered with mud. Piles of organic debris and muddy deposits are present locally.

Debris torrents have several possible origins. In the Pacific Northwest, landslides from adjacent hillslopes dominate as a triggering mechanism, although some originate by mobilization of organic debris in channels (Swanson and Lienkaemper, 1978). Failure of temporary landslide dams is another possible mechanism. On Inverness Ridge, all the debris-torrent paths observed in this study originated from shallow landslide scars, commonly in the headwater regions of drainage basins, and so these debris torrents could be called soil slip/debris torrents. Beginning as soil slip/debris flows, the slurries were apparently diluted by floodwater, and their organic-debris content was increased manyfold by stripping of vegetation during travel of a kilometer or more down the canyons.

Few debris torrents reached the base of Inverness Ridge and Tomales Bay. The debris torrent at Redwood Avenue continued across Sir Francis Drake Boulevard and into the bay because the canyon remains narrow to the base of the ridge. At Dream Farm, a pulse continued across the highway as a wave 0.3 m high, but most of the logs were left against thick groves of alders upstream from the highway. In First, Second, and Third Valleys, stripping of vegetation and erosion of the soil mantle decreased well upstream from the bay, where the valley floors widen and the stream gradients drop. Many of the fresh logjams that remained in the canyons after the storm are terminal deposits of debris torrents that stopped either where the logs themselves blocked the channel or where the logs were held behind groves of trees.

Most of the debris torrents occurred within a brief timespan (fig. 6.7), according to the times provided by eyewitnesses (J. Bauer, E. Clerico, M. Coronado, D. Engler, T. Haney, G. Kohler, K. Kohler, T. Moses, and B. O'Neil, oral communs., 1982). The general concurrence in timing suggests that the debris torrents were triggered by a period of exceptionally intense rainfall. One resident of Second Valley reported that the surge there occurred 10 to 15 minutes after an exceptionally heavy 15-minute downpour. A rain gage at the Nicasio Dam, 9 km to the east, recorded the most intense rainfall between 11:00 a.m. and noon; this record provides supporting evidence that the debris torrents accompanied a period of unusually intense rainfall.



FIGURE 6.6.—Remains of Homestead Valley house resting in canyon bottom, about 45 m from its foundation (at right). Debris-flow trail in foreground. Note impact marks on tree trunk and branches (arrows).

TABLE 6.1.—*Engineering test data on soils related to soil slip/debris flows of the storm*

[Soils that flowed are noted in descriptions. All percentages by weight. C, cohesion; Ø, angle of internal friction; LL, liquid limit; PI, plasticity index; USC, Unified Soil Classification system. Sources of data: DK, D.K. Keefer and R.W. Jibson; EH, E.L. Harp; GW, G.F. Wieczorek; JB, J.E. Baldwin II of Howard-Donley and Associates; PL, Lahr (1982); RF, R.W. Fleming and M.A. Algus; SE, S.D. Ellen; SR, S.L. Reneau and Alan Kropp and Associates. Do., ditto]

Location	Sample	Source	Description	Bedrock unit	Grain size (percent)					Strength		Dry density (g/cm^3)	Saturated water content (percent)	Natural water content (percent)	Atterberg limits (percent water)		USC designation
					Gravel	Sand	Silt	Clay (<2μm)	Silt and clay	C (kPa)	Ø (°)				LL	PI	
Alameda County																	
Davilla Hill earth-flow complex, Eden Canyon.	DK-DHS 82 flow	DK	Deposit of debris flow from margin of active earth-flow complex.	Orinda Formation-----	5	9	61	25	--	--	--	--	--	--	--	--	--
Do----------	DK-DHS 82 scarp	DK	Soil from soil-slip scar of same debris flow, flowed.	do----------	2	14	57	27	--	--	--	--	--	--	--	--	--
Marin County																	
Homestead Valley (case study, this chap.).	SR-1	SR	Dark top layer of soil in soil-slip scar of Homestead Valley debris flow, from 0.5-m depth, flowed.	Franciscan sandstone.	2	44	--	--	54	--	--	1.30	40	--	24	4	CL-ML or OL
Do----------	SR-2	SR	Lower layer of soil in soil-slip scar of same debris flow, from 1.1-m depth, flowed.	do----------	2	48	--	--	50	--	--	1.75	20	--	20	2	ML
Tiburon Ridge (case study, this chap.).	DK-292	DK	Deposit of debris flow upslope from destroyed house.	Franciscan metasandstone.	2	40	49	9	--	--	--	--	--	--	--	--	--
Do----------	DK-293	DK	do----------	do----------	7	40	45	8	--	--	--	--	--	--	--	--	--
Do----------	DK-294	DK	do----------	do----------	5	39	38	18	--	--	--	--	--	--	--	--	--
Do----------	DK-295	DK	do----------	do----------	9	42	39	10	--	--	--	--	--	--	--	--	SM or SC
Reed (case study, this chap.).	1DS	PL	Dark topsoil in soil-slip scar of debris flow 1, from 0.6-m depth, flowed.	do----------	4	42	42	12	--	--	--	--	--	--	27	2	ML or OL
Do----------	1LS	PL	Tan subsoil in soil-slip scar of debris flow 1, from 1.2-m depth, flowed.	do----------	17	43	30	10	--	--	--	1.57	26	--	21	--	SM
Do----------	1LD	PL	Tan soil in deposit of debris flow 1.	do----------	17	43	30	10	--	--	--	1.72	21	--	--	--	SM
Do----------	2DS	PL	Dark topsoil in soil-slip scar of debris flow 2, from 0.6-m depth, flowed.	do----------	2	36	45	17	--	--	--	1.22	45	--	27	6	CL-ML or OL
Do----------	2DD	PL	Dark soil in deposit of debris flow 2.	do----------	2	36	45	17	--	--	--	1.61	25	--	--	--	CL-ML or OL
Do----------	2LS	PL	Tan subsoil in soil-slip scar of debris flow 2, from 1.8-m depth, flowed.	do----------	3	47	35	15	--	--	--	1.70	22	--	18	1	SM
Do----------	2LD	PL	Tan soil in deposit of debris flow 2.	do----------	3	47	35	15	--	--	--	1.69	22	--	--	--	SM

Do----------	3DS	PL	Dark topsoil in soil-slip scar of debris flow 3, from 0.6-m depth, flowed.	do----------	24	31	33	12	--	--	--	1.47	31	--	26	1	SM
Do----------	3DD	PL	Dark soil in deposit of debris flow 3.	do----------	24	31	33	12	--	--	--	1.41	34	--	--	--	SM
Do----------	3LS	PL	Tan subsoil in soil-slip scar of debris flow 3, from 1.0-m depth, flowed.	do----------	20	24	48	8	--	--	--	2.00	13	--	24	2	ML
Do----------	3LD	PL	Tan soil in deposit of debris flow 3.	do----------	20	24	48	8	--	--	--	1.63	24	--	--	--	ML
Do----------	4DS	PL	Dark topsoil in soil-slip scar of debris flow 4, from 0.5-m depth, flowed.	do----------	4	44	41	11	--	--	--	1.52	28	--	25	3	ML or OL
Do----------	5	PL	Clayey soil in earth slide (landslide 5); small parts flowed slowly.	Franciscan sheared rock.	2	22	50	26	--	--	--	--	--	--	44	21	CL
Do----------	SQ-15A	SE	Dark surficial soil in soil-slip scar of landslide 6, flowed.	Franciscan sandstone or metasandstone within melange.	0	35	51	14	--	--	--	--	--	--	--	--	--
Do----------	SQ-15B	SE	Brown subsoil from base of soil-slip scar in landslide 6, did not flow.	do----------	1	33	47	19	--	--	--	--	--	--	20	5	CL-ML
Immediately NE. of Reed case study (this chap.).	SQ-9	SE	Deposit from debris flow down 33° cut slope.	Franciscan sheared rock.	7	23	35	35	--	--	--	--	--	--	--	--	--
Salmon Creek (case study, this chap.).	SP-1,4	RF	Dark top layer of soil in scar of Salmon Creek landslide, from ground surface to 0.6-m depth, flowed.	Franciscan sandstone.	0	52	32	16	--	--	--	1.40	34	--	20	3	SM or SC
Do----------	SP-2,5	RF	Brown subsoil in scar of Salmon Creek landslide, from 0.6- to 0.9-m depth, flowed.	do----------	0	57	29	14	--	--	--	1.87	16	--	--	--	SM or SC
Do----------	SP-3,6	RF	Tan lower layer of soil in scar of Salmon Creek landslide, from 0.9- to 2.5-m depth, flowed.	do----------	0	56	32	12	--	$^{1}32$	$^{1}32$	1.77	19	--	23	4	SM-SC
Along Salmon Creek, E. of case study (this chap.).	WLS-1	RF	Dark top layer of soil from soil-slip scar in forest, flowed.	do----------	--	--	--	--	--	--	--	1.24	43	--	--	--	--
Do----------	WLS-2	RF	do----------	do----------	--	--	--	--	--	--	--	1.03	60	--	--	--	--
Shell Beach, Tomales Bay State Park.	DK-Shell Beach 1A	DK	Soil at base of soil-slip scar above debris-flow complex, flowed.	Granitic rock or overlying terrace deposits.	2	60	25	13	--	--	--	--	--	--	--	--	SM or SC
Hicks Valley Road, 600 m E. of dam.	SG-9A	SE	Dark surficial soil, flowed from nose of active earth slide.	Franciscan metagreenstone.	35	41	14	10	--	--	--	--	--	--	--	--	SM or SC
Do----------	SG-9B	SE	Orange-red subsoil, flowed from nose of same active earth slide.	do----------	43	41	7	9	--	--	--	--	--	--	--	--	GM or GC
Near Hicks Mountain, S. of Cheese Factory.	P-16A	SE	Dark surficial soil in soil-slip scar, flowed.	Franciscan sandstone.	0	48	36	16	--	--	--	--	--	--	28	--	--

TABLE 6.1.—*Engineering test data on soils related to soil slip/debris flows of the storm*—Continued

Location	Sample	Source	Description	Bedrock unit	Grain size (percent)					Strength		Dry density (g/cm^3)	Saturated water content (percent)	Natural water content (percent)	Atterberg limits (percent water)		USC designation
					Gravel	Sand	Silt	Clay (<2μm)	Silt and clay	C (kPa)	ϕ (°)				LL	PI	
Marin County--Continued																	
Do	P-16B	SE	Red-brown subsoil in same scar, did not flow.	do	2	52	29	17	--	--	--	--	--	--	--	--	SM or SC
Barnabe Mountain.	B-86A	SE	Brown surficial soil, flowed from slump/earth flow that mobililized downslope as slow-moving debris flow.	Franciscan greenstone.	5	14	56	25	--	--	--	--	--	--	45	20	CL
Do	B-86B	SE	Red subsoil, flowed as slow-moving debris flow, from about 1.3-m depth in scar of same slump/earth flow.	do	17	23	[2]35	[2]25	--	--	--	--	--	--	--	--	--
Do	B-86C	SE	Slow-moving debris-flow deposit from same landslide, plastered on tree.	do	11	18	[2]41	[2]30	--	--	--	--	--	--	42	10	ML
Do	B-88	SE	Dark surficial soil from soil-slip scar, flowed.	do	15	10	42	33	--	--	--	--	--	--	45	13	ML
San Mateo County																	
La Honda test area (see chap. 5).	S-1	GW	Deposit of debris flow 6----	Tahana Member of the Purisima Formation.	--	[3]5	64	31	--	--	--	--	--	--	58	26	MH
Do	S-3	GW	Soil in soil-slip scar of debris flow 6.	do	--	[3]7	62	31	--	--	--	--	--	--	--	--	--
Do	S-4	GW	Deposit of debris flow 7----	do	--	[3]5	67	28	--	--	--	--	--	--	51	19	MH
Do	S-6	GW	Soil in soil-slip scar of debris flow 7.	do	--	[3]7	65	28	--	--	--	--	--	--	--	--	--
Do	S-7	GW	Deposit of debris flow 8----	do	--	[3]7	63	30	--	--	--	--	--	--	58	28	CH-MH
Do	S-8	GW	Soil in soil-slip scar of debris flow 8.	do	--	[3]8	60	32	--	--	--	--	--	--	--	--	--
Do	df9-flow	GW	Deposit of debris flow 9----	do	--	[3]6	72	22	--	--	--	--	--	52	57	25	MH
Do	df9-scar	GW	Soil in soil-slip scar of debris flow 9.	do	--	[3]3	63	34	--	--	--	--	--	46	--	--	--
Do	df10-flow	GW	Deposit of debris flow 10---	Lambert Shale and San Lorenzo Formation, undivided.	--	[3]11	56	33	--	--	--	--	--	58	60-69	21-30	MH
Do	df10-scar	GW	Soil in soil-slip scar of debris flow 10.	do	--	[3]17	59	24	--	--	--	--	--	--	--	--	--
Pacifica (see chap. 9).	EE-2	JB	Soil from soil-slip scar of debris flow at Big Bend site, from 0.9-m depth.	Franciscan greenstone.	10	41	--	--	49	[4]9.7	[4]28	1.76	19	20	42	20	SC
Do	FF-1	JB	Soil from soil-slip scar of debris flow at Woodlawn site, from 3.1-m depth.	do	7	53	--	--	40	[4]12.0	[4]37	1.63	24	19	35	16	SC

Do----------	JJ-2	JB	Soil from soil-slip scar of debris flow at Yosemite site, from 0.9-m depth.	Franciscan greenstone and sandstone(?).	1	58	--	--	41	[4]3.4	[4]47	1.54	28	27	33	14	SC
Do----------	JJ-3	JB	Soil from soil-slip scar of debris flow at Yosemite site, from 1.5-m depth.	do----------	2	55	25	18	--	[4]12.5	[4]36	1.94	14	10	18	3	SM
Do----------	AA-1	JB	Deposit of debris flow at Oddstad site, from 1.2-m depth.	Franciscan sandstone.	--	--	--	--	--	[4]9.6	[4]37	1.62	24	24	--	--	--
Do----------	AA-2A	JB	Slip surface of soil slip at Oddstad site, from 4.6-m depth.	do----------	3	57	25	15	--	[4]23.9	[4]39	1.65	23	22	36	16	SC
Do----------	AA-5A	JB	Soil in soil-slip scar of debris flow at Oddstad site, from 2.4-m depth.	do----------	4	39	29	28	--	[4]18.2	[4]26	1.57	26	24	30	5	ML
Do----------	AA-9	JB	Soil in soil-slip scar of debris flow at Oddstad site, from 1.2-m depth.	do----------	0	42	--	--	58	--	--	--	--	--	39	20	CL
Oddstad Boulevard, Pacifica (case study, chap. 9).	Oddstad	EH	Deposit of debris flow------	Franciscan sandstone, probably with greenstone or limestone.	8	25	42	25	--	--	--	--	--	--	--	--	--
Valdez Way, Pacifica (see chap. 9).	Valdez	EH	do----------	Unnamed sandstone, shale, and conglomerate of Paleocene age near Point San Pedro.	0	18	66	16	--	--	--	--	--	--	--	--	--
Thornton Beach State Park, near Daly City.	DK-Tb1	DK	Very slightly cemented, well-sorted, well-rounded sand forming sea cliff, flowed.	Merced Formation-----	1	93	3	3	--	--	--	--	--	--	--	--	SP-SM or SP-SC
Butano Road, near Gazos Creek.	DK-131	DK	Surficial dark-gray soil in debris-flow deposit, flowed.	Purisima Formation.	0	16	60	24	--	--	--	--	--	--	--	--	--
Do----------	DK-132	DK	Light-gray subsoil in same debris-flow deposit, generally did not flow.	do----------	0	13	55	32	--	--	--	--	--	--	--	--	--
Elkus 4-H Ranch, Purisima Canyon (case study, chap. 8).	DK-4H colluvium	DK	Deposit of slow-moving, plastic debris flow.	do----------	2	46	38	14	--	--	--	--	--	--	--	--	--
Do----------	4H1	EH	Deposit near toe of same slow-moving, plastic debris flow.	do----------	0	14	72	14	--	--	--	--	--	--	--	--	--
Do----------	4H2	EH	do----------	do----------	0	5	76	19	--	--	--	--	--	--	--	--	--
Do----------	4H3	EH	do----------	do----------	32	38	22	8	--	--	--	--	--	--	--	--	SM or SC
				Santa Cruz County													
Old San Jose Road, near Sugarloaf Mountain.	S-1	EH	Deposit of debris flow------	Purisima Formation and Butano Sandstone.	0	83	--	--	17	--	--	--	--	--	--	--	SM or SC
Hubbard Gulch-----	HUB	EH	do----------	Monterey Formation.	5	25	46	24	--	--	--	--	--	--	--	--	--
Mount Cross Camp.	Mount Cross	EH	do----------	do----------	4	34	43	19	--	--	--	--	--	--	--	--	--

[1]Best estimate of peak strength from several drained triaxial tests.
[2]Estimated.
[3]Sand plus gravel.
[4]Determined by direct shear.

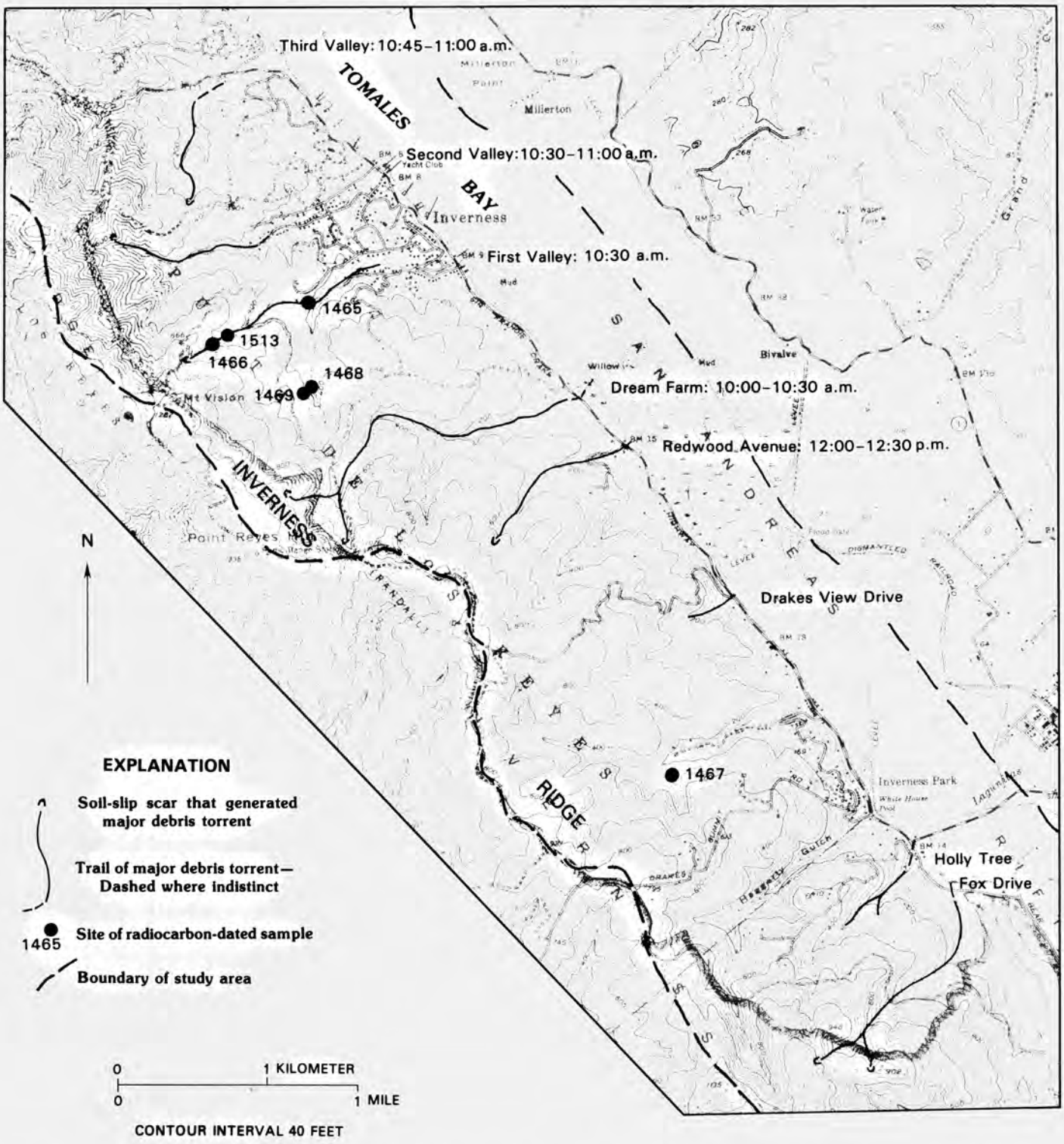


FIGURE 6.7.—Index map of Inverness, Calif., area, showing locations of soil slip/debris torrents and other major soil slip/debris flows located in the field, times of debris torrents during morning and early afternoon of January 4, and locations of radiocarbon-dated samples (see subsection entitled "Radiocarbon Sites near Inverness" in chap. 7). Upper parts of many canyons were not checked in the field, and mapping is probably incomplete. Base from U.S. Geological Survey, scale 1:24,000, Drakes Bay, 1953 (photorevised 1971), and Inverness, 1954 (photorevised 1971).

FIRST VALLEY

The soil slip/debris torrent in the north fork of First Valley was chosen for more detailed study. The general topographic setting is shown in figures 6.2 and 6.7, and a detailed map and longitudinal profile of the debris-torrent path are shown in plate 4. The principal soil-slip scar is at about 300-m elevation, near the top of the drainage basin, in a thick Bishop-pine forest (fig. 6.9). From there, the debris flow/debris torrent traveled about 1.3 km, dropping more than 280 m, before it reached the uppermost houses in the canyon. Shortly above the confluence with the southern branch of First Valley, 0.2 km upstream from houses, the valley floor widens, and the stream gradient drops from 6° to 4°. Here, the energy of the flow decreased, and trees were effective in deflecting the force of the debris torrent away from most buildings (fig. 6.10). Where a dirt road crosses the canyon 0.56 km downstream from the head scar, the flow ran up the road for 65 m and left a large deposit of sediment and organic debris; with this exception, no significant subaerial deposits were produced by this flow.

Scarps in the soil mantle are common along the path. In many places, these scarps are small and arcuate, apparently owing to the uprooting of trees; in places, the scarps are accompanied by partially toppled trees or by large broken roots. In other places, the scarps mark the boundary of areas where thin soils were completely eroded to bedrock (fig. 6.11). Upstream from a 10-m-high waterfall, gullies as deep as 3.5 m are incised into colluvium in the path. Collectively, these erosional features represent a substantial increase in the volume of sediment carried by the flow. On the basis of scarp-height measurements and the detailed planform map (pl. 4), the total volume of eroded soil is estimated to be about 5,000 m^3, an order of magnitude greater than the 300 m^3 soil-slip scar at the head.

Along the lower reaches of the path, short soil-slip scars on adjacent slopes are common; no consistency in timing in relation to the debris torrent could be found. A debris flow from one of these soil slips crossed the main debris-torrent path and ran directly up the opposite slope, rising 10 m in elevation. The maximum velocity of this flow can



FIGURE 6.8.—Path of debris torrent upstream from Redwood Avenue in Inverness. Path is smooth surface stripped of vegetation; flow traveled from right to left. Note scarp in left foreground truncating soil mantle. Deep gully has been cut by a small tributary. View southward. Photograph by D.G. Herd.

be calculated from a conservation of momentum equation,

$$u = (2gh)^{1/2},$$

where u is the velocity, h is the rise in elevation, and g is the acceleration due to gravity. This equation is derived by relating the kinetic energy of the flow to its potential energy, and provides a maximum velocity of 14 m/s for the flow.

Details of the soil-slip scar at the head of the path (fig. 6.9) are of particular interest. The scar is 2.0 to 2.5 m deep, 11 m wide, and 20 m long. The failure plane is within colluvial soil derived from granitic bedrock, near the boundary between an upper red soil horizon and a lower yellow gravel-rich colluvium. Water was observed flowing from coarse gravel at the southeast base of the scarp. The headwall scarp encroaches 0.5 m into the surface of a dirt road at a point where a culvert collecting runoff from the road drained onto a broad swale. The roadcut here shows that the swale is underlain by a thick colluvial deposit in a bedrock depression (Dietrich and Dunne, 1978).

Immediately below the headscarp, three distinct deposits from the storm were identified, all from soil slips that mobilized as debris flows (pl. 4). The outermost deposit (A) is red and matches the upper soil horizon; a younger deposit (B) is orange and includes abundant roadfill; the youngest deposit (C) is yellow and is probably composed entirely of roadfill. Deposit C apparently was less fluid then the others and stayed within the center of the path; it probably resulted from failure of the west edge of the headscarp.

Key relations are displayed between deposits A and B. At one place near the edge of the path, a tree was clearly toppled by the debris flow represented by deposit A; farther downcanyon, a scarp near the path's edge is plastered by deposit B. This and other evidence indicate that the debris flow that cleared the path of trees, created the scarps, and generated the log surge is represented by deposit A; this event involved primarily the natural soil and not the roadfill. A second debris flow, represented by deposit B, did involve roadfill but was not responsible



FIGURE 6.9.—Soil-slip scar and head of debris-flow trail in thick Bishop-pine forest, north fork of First Valley, Inverness Ridge. Scar, which is as much as 2.5 m deep, occupies most of lower half of view; dirt road into which scar encroached is in immediate foreground, and debris-flow trail lies in upper half of view. Scar occupies axis of a subtle colluvium-filled swale. View downslope. Photograph by C.M. Wentworth.

for the log surge. Thus, the primary slope failure probably resulted not from the presence of the roadfill but from the concentration of water provided by the culvert.

SINGLE SOIL SLIP/DEBRIS FLOWS

Typical features of single soil slip/debris flows are shown in figure 6.12. Most of the material that flowed, corresponding to most of the volume missing from the scar, typically traveled far from the scar and ended up as deposits along the debris-flow trail or as fan deposits, stream deposits, or deposits on the floors of bays or the ocean.

The typical configuration of scar and trail (fig. 6.12) gives a sense of the behavior of the typical soil slip as it moved from the scar. The lateral deposits, which consisted largely of remolded soil that had behaved as a slurry, typically led from the scar near its widest point, where it initially narrows downslope (figs. 6.1, 6.13). This relation indicates that at least some material (that remaining as lateral deposits) was fluid as it left the scar, but that during initial movement the mass had enough strength to force its widest parts up onto the ground surface, rather than contracting laterally to flow from the narrower lip of the scar.

Debris-flow trails commonly led down swales or channels and typically were elevated on the outside of bends in the channels, a relation suggesting considerable velocity (figs. 6.11, 6.14). Trails differed, depending on the vegetative cover. Grass-covered hillslopes typically displayed trails of flattened grass, with varyingly abundant patches of deposit, between continuous or discontinuous lateral deposits, or levees, of remolded soil and clumps of sod (figs. 6.13, 6.15). The flattened blades of grass pointed downslope parallel to the trail, recording the direction of movement. Debris-flow trails on wooded and brush-covered hillslopes, as in the preceding case studies, typically were cleared of forest duff and were partly bounded by lateral deposits (fig. 6.8); bushes and clumps of ferns in some places were removed from the path but in other places remained stretched downslope under a plaster of muddy deposit. Within some trails, such trees



FIGURE 6.10.—Pile of debris at north edge of debris-torrent path in First Valley, Inverness. Single Douglas-fir (1.3 m diam) immediately upstream of house blocked the logs and deflected the debris torrent, so that only the house's deck was destroyed. Immediately upstream, a filter house of the Inverness Water Co., located in center of path, was destroyed. Downstream, large trees were abundant enough to deflect the logs and prevent major damage to buildings. Photograph by S.L. Reneau.

as oak and madrone remained in place; other trails contained partly uprooted trees lying downslope, or small subsidiary scars with broken roots remaining from trees torn away (fig. 6.3). Trees that remained within debris-flow trails were plastered with muddy deposits to observed heights of as much as 2 m above the ground (pl. 4; fig. 6.5), and splashed with muddy deposits to observed heights of as much as 4 m above the path margin. Many trees showed abrasions higher up resulting from the impact of trees that moved with the debris flow. Particularly in woodland and brush-covered areas, many debris-flow trails contained elongate scars where soil had been removed (pl. 4).

SIZE AND FORM

Soil-slip scars ranged in width from 1 to as much as 60 m; most were from 5 to 15 m across. Scars ranged in depth from about 0.5 to 3 m or more, measured normal to the hillslope; most were 1 to 2 m deep. Thus, the typical soil slip had a breadth-to-thickness ratio of from 3 to 15. Some soil slips left broad sheetlike scars (fig. 6.13), and others narrow pockets (fig. 6.15). Reneau and Dietrich (1987a) have described and analyzed the sizes of scars left by the storm in a study area in Marin County.

SLOPES OF FAILURE AND FLOW

Slopes at soil-slip scars that developed in the storm are compared in figure 6.16 with those of pre-1982 soil-slip scars in the bay region, as well as with slopes at soil slips described from other places. The approximate slopes at soil-slip scars in Marin County are shown in figures 7.3 and 7.6. Almost all soil slip/debris flows in the storm originated on slopes steeper than 20°, most on slopes steeper than 26°, but one originated on a slope of 14° (C.M. Wentworth, oral commun., 1982; see section entitled "Grant Road" in chap. 8).

Debris flows moved down slopes ranging from nearly horizontal to steeper than slopes of failure. In places, debris flows moved upslope for short distances (see Inverness area case study above).



FIGURE 6.11.—Path of debris torrent in north fork of First Valley, Inverness Ridge, showing removal of vegetation and soil mantle. Note that path margin is much higher on right side, owing to banking around a sharp curve. Kneeling man in center for scale. Photograph by C.M. Wentworth.

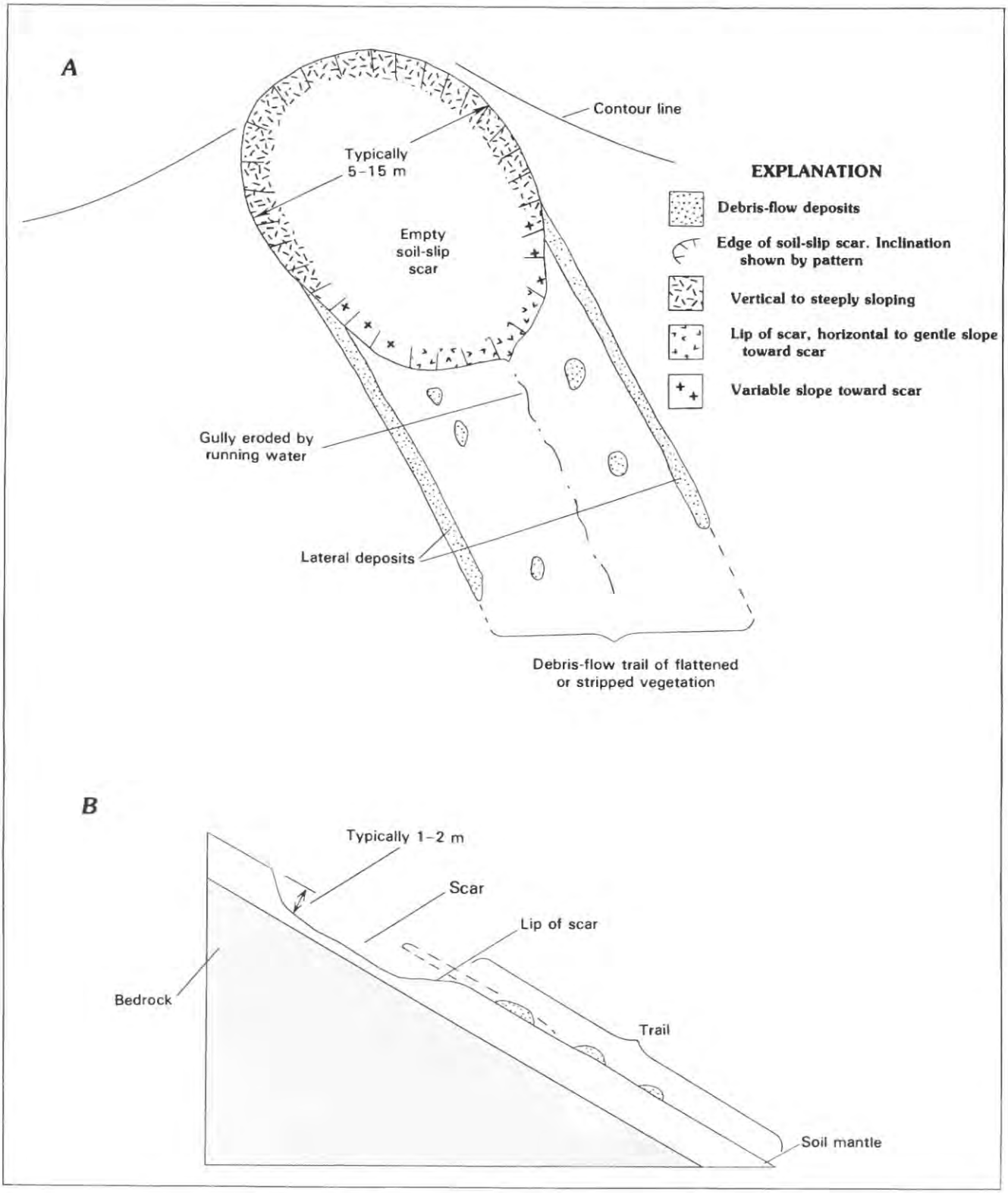


FIGURE 6.12.—Schematic map (*A*) and downslope cross section (*B*) showing typical features remaining from a single soil slip/debris flow. In figure 6.12*B*, dashed lines show position of lateral deposits projected into plane of cross section at center of scar and trail. Slope of ground surface is shown as 30°, a typical value.

SOILS INVOLVED

Soils involved in soil slip/debris flows varied broadly in texture and plasticity, as described in table 6.1. Most of the samples in table 6.1 are fine-grained soils. About 90 percent of the samples are classified as earth rather than debris, according to Varnes (1978, p. 24).

Soil textures ranged from nearly clean sand to clayey silt, as indicated by size analyses of 50 samples from table 6.1 that flowed as debris flows during the storm (fig. 6.17). Content of clay-size particles (less than 2 μm) ranges upward from 3 percent, but 98 percent of the samples have clay contents of 8 percent or more. The upper limit of clay content in these samples is 35 percent; an upper limit of 45 percent clay (of undefined size) is reported in chapter 9.

The upper limit of clay content is reduced if we consider only fast-moving debris flows originating from hillslopes in long-term equilibrium. This restricted sample is obtained by excluding debris flows that were anomalously slow moving (velocities of meters per minute rather than meters per second; see section entitled "Elkus Ranch" in chap. 8) and debris flows from cut slopes, from scarps of deep-seated landslides, and from the margins of active slow-moving shallow slides, all of which are distinguished in figure 6.17. The upper bound of clay content for 93 percent of this restricted sample is 25 percent.

Data on soil plasticity are less abundant than those on soil texture, in part because many soils had such a low plasticity that the Atterberg tests which describe plasticity were not considered worthwhile. Figure 6.18 shows fine-grained soils from table 6.1 that flowed in the storm plotted on the plasticity chart of the Unified Soil Classification (USC) system. Most samples plot as ML or OL (inorganic silty soils and organic soils of low liquid limit), but some plot as MH or OH (inorganic silty soils and organic soils of high liquid limit), and three plot as CL (inorganic clay of low liquid limit). Two of these three CL soils showed evidence of uncommonly slow flow, a reasonable consequence of their plasticity. Thus, debris flows involved soils with a broad range in plasticity, from nonplastic and slightly plastic granular soils to silts and clays of moderate plasticity. The only common type of soil mantle not significantly involved was highly plastic clay (CH of the USC system).



FIGURE 6.13.—Soil slip/debris flow on the Tiburon Peninsula, Marin County. Broad tabular soil-slip scar at left (upslope from dashed line) leads downslope to debris-flow trail of flattened grass that includes scattered remnants of muddy deposit and clumps of sod. Slide mass climbed over steep downslope corner of scar (shadowed, at right center) and left lateral deposits leading from widest part of scar.

DEGREE OF MOBILIZATION

Most soil slip/debris flows mobilized entirely and left scars empty of failed material. Others mobilized from only the flanks or toe of a slide, resulting in empty scars on parts of a larger slab that shifted only slightly (figs. 6.19, 6.35). Degree of mobilization varied in another respect: Some soils became extremely fluid and flowed far, leaving little deposit; others became barely fluid, flowed only short distances, and left abundant thick deposits in and near the scar (see figs. 6.32–6.35; see Reed and Salmon Creek case studies below).

COMPLEXES OF SOIL SLIP/DEBRIS FLOWS

Many debris-flow trails, especially in woodland or brush, involved more than one soil-slip scar (pl. 4). Each such soil slip was related to others as part of a complex. If the soil slips coincided in time, the major debris flow from such a complex could be considerably larger than from a single scar. Complexes ranged in scale from small features like those in figure 6.20 to major complexes, as at First Valley in Inverness.

In most of the complexes shown in plate 4, almost all scars lie within the path of the major pulse. In complexes like the one at Tiburon Ridge, extensive parts of the lowermost canyon walls were stripped of soil, resulting in abundant elongate scars along the drainage channel.

SUMMARY

Soil slip/debris flows triggered by the storm ranged from small isolated events on hillsides, as at Murray Park, to major complexes, as at First Valley, that affected entire canyons as flood phenomena. In virtually all cases, these events originated as soil slips, flowed largely as slurries, and impacted the landscape and its occupants as pulses or surges that generally moved rapidly and arrived suddenly.

Individual soil slips varied in size, form, and degree of mobilization as debris flows; most occurred on slopes steeper than 26°. The soils that flowed ranged broadly in texture and plasticity but did not include clayey soils of high plasticity. Debris torrents and many of the larger debris flows resulted from complexes involving numerous soil-slip scars that typically lay within the path of the major pulse.



FIGURE 6.14.—View downslope along soil slip/debris flow near Barnabe Mountain, Marin County. Debris-flow trail leading downslope from empty scar climbs right side of its path in making a turn. Knapsack in foreground for scale.

MECHANICS OF SOIL SLIP/DEBRIS FLOW

The development of soil slip/debris flows is analyzed here as a sequence of phases: (1) movement of water to the site of failure, (2) failure of the soil mantle by sliding, (3) mobilization of the soil slip as a debris flow, and (4) travel of the debris flow.

MOVEMENT OF WATER TO SITES OF FAILURE

Previous investigations have documented that slope failure is commonly the consequence of high water levels (and resulting high pore-water pressures) in slope-forming materials (for example, Terzaghi, 1950). Thus, the means by which water moves to various parts of the landscape are principal controls on the distribution and timing of soil slip/debris flows. Movement of water in and on hillslopes was measured only locally during the storm (see chap. 5), and so the discussion here is limited to aspects of the movement and concentration of water that are reflected in the distribution and timing of soil slip/debris flows.



FIGURE 6.15.—Trail of debris flow over grassland, leading from pocket-shaped scar, on the Tiburon Peninsula, Marin County. Note lateral deposit bounding trail, flattened old grass marking trail, and deposits within trail. Young grass standing upright in trail has grown since the event.

RAINFALL AND DYNAMIC BALANCE

Accumulations of water in the soil mantle of hillsides are generally perched above less permeable bedrock or soil, and the level of soil saturation is determined by a dynamic balance between the rate of infiltration and the rate of seepage from the soil mantle (Campbell, 1975). For water level to rise, the rate of addition of water to the perched water table must exceed the rate of exit. In places where direct rainfall is the principal source of water, the rainfall intensity must exceed some critical value. Under these circumstances, the soil slip leading to a debris flow would have to occur during or shortly after intense rainfall.

Observations in the bay region during the storm document the association between soil slip/debris flows and concurrent intense rainfall. Almost all the soil slip/debris flows plotted in figure 3.1 occurred during reasonably intense rainfall; the several exceptions, plotted on records from the San Bruno and SSF-WQC gages, occurred within about an hour of the end of storm rainfall. A more noteworthy exception was the event at Hurricane Gulch near Sausalito (Smith and Hart, 1982, p. 148–149), which occurred 22 hours after rainfall had ended.

Local differences in the intensity of rainfall appear to have influenced the distribution of soil slips. Evidence of this comes particularly from the Montara Mountain area of San Mateo County, where detailed mapping of soil-slip scars shows significant differences between the January 1982 storm and the storm of December 1955 (Wentworth, 1986). South of Montara Mountain, an elongate patch about 0.5 by 2 km, which was indistinguishable in the 1955 pattern of abundant soil slips throughout the steep granitic terrain, emerged in 1982 as an island devoid of soil slips in an otherwise similar pattern of abundant soil slips. Similarly, the Franciscan terrane in the nearby Pacifica area, which was almost completely spared in 1955, produced many soil slips in 1982. Such comparison between storms, especially in areas of uniform materials and topography like Montara Mountain, is essential for determining the influence of local variations in rainfall, which in most places may be masked by the heterogeneity of materials and terrain.

CONCENTRATION OF WATER

Water levels capable of triggering soil slips in the storm generally were not attained by direct rainfall alone, as evidenced by the fact that the great majority of susceptible hillslopes did not fail when subjected to heavy rainfall. The areal distribution of soil-slip scars shows patterns suggesting that local concentration of water, both from the storm and from prestorm rainfall, played a major role in triggering failures (see chap. 7, especially section entitled "Local Topographic Setting").

Water can be concentrated in the landscape by several means, some of which are illustrated in figure 6.21. Surface flow is concentrated by the topography. Flow within the soil mantle is concentrated by the form of the bedrock surface, as well as by the topography, by breaks in slope, and by differences in soil mantle. Water can enter bedrock, concentrate, and reemerge into the soil mantle. Finally, flow can be affected by manmade modifications. Evidence for these various water-concentration mechanisms is discussed further in chapter 7.

SURFACE FLOW AND THROUGHFLOW

Water on the ground surface in hillside terrain concentrates in the concave parts of hillslopes (see chaps. 9, 10). Because surface flow of water is rapid, concentration in the subsurface by such means may be delayed only by the time required for seepage of water into the soil at the site of concentration. For the granular soils typically involved in soil slips during the storm, saturation of the soil mantle by this means could occur within a matter of hours (on the basis of a thickness of 1–2 m and an estimated permeability of 10^{-3} to 10^{-2} cm/s).

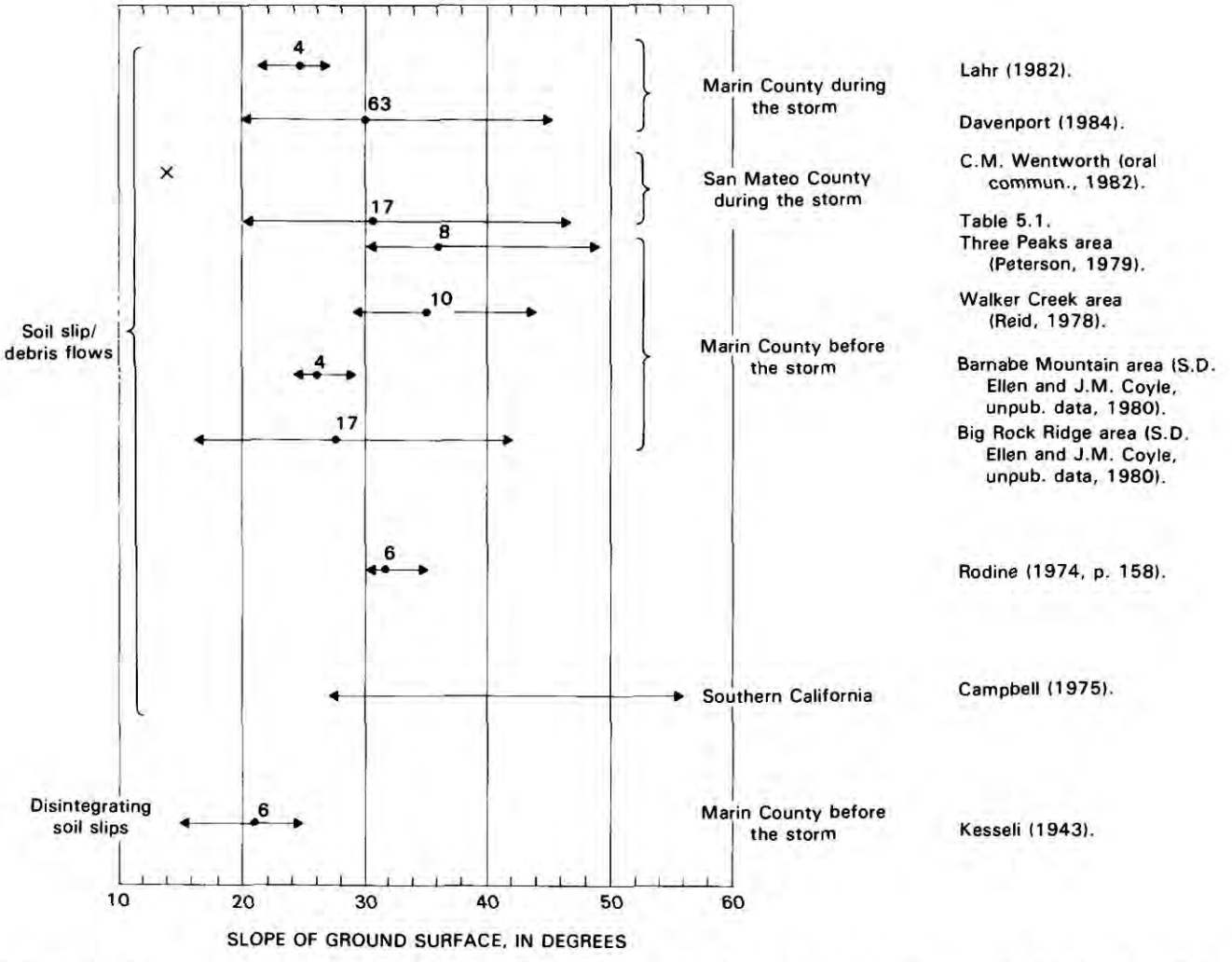
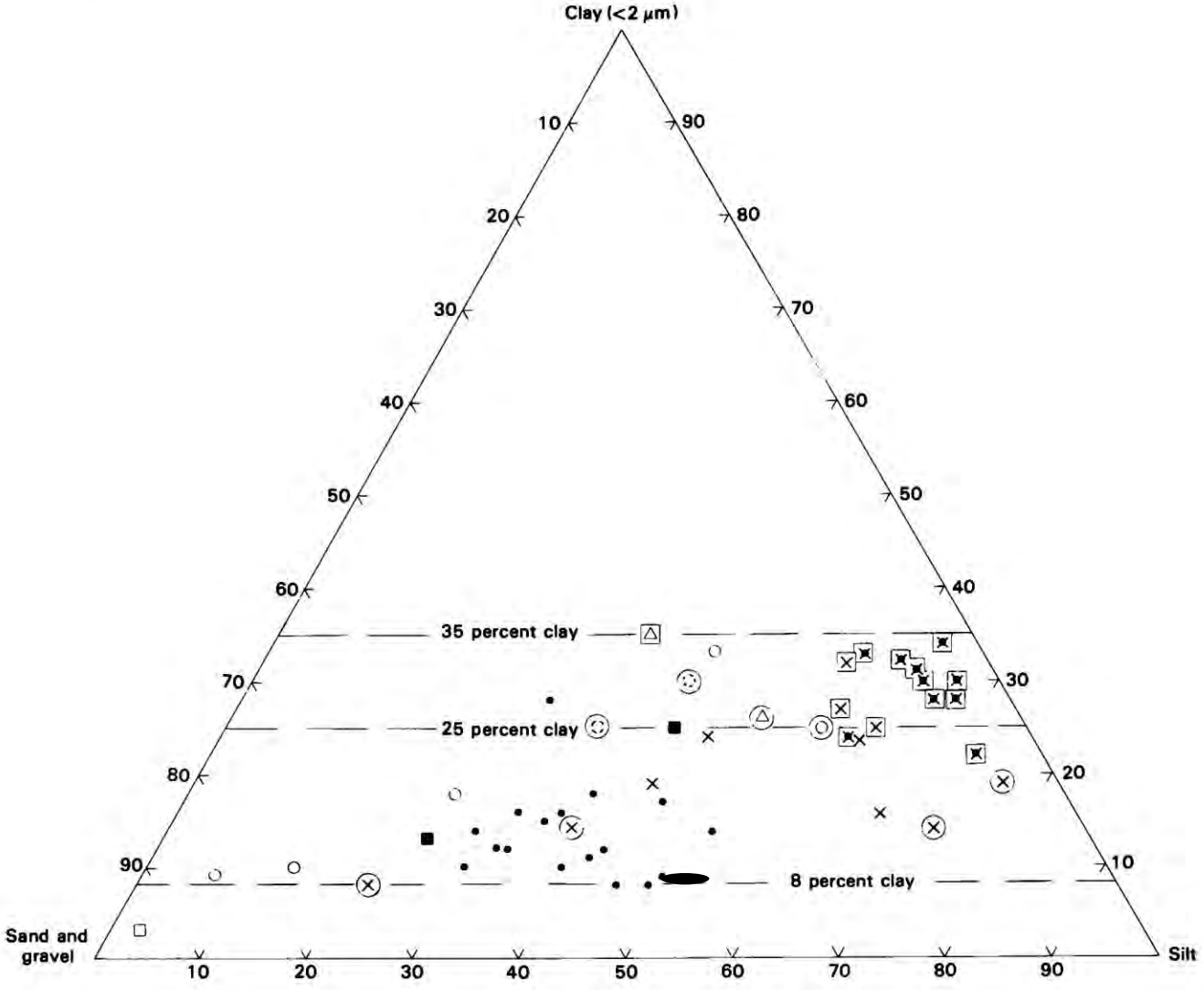


FIGURE 6.16.—Slopes of ground surface at soil-slip sources of debris flows resulting from the storm, in comparison with those at other soil-slip sources of debris flows. Slopes were measured in the field. Arrows show range of slopes; dots denote average of measured slope angles. Numbers above dots indicate number of measurements averaged; x, single observation.

Water can also concentrate by downslope seepage within the soil mantle, called throughflow or interflow (fig. 6.21*B*). Throughflow is governed largely by the form of the bedrock surface below the soil mantle. Because the bedrock surface generally approximately parallels the ground surface, throughflow, like surface flow, is com-



EXPLANATION

Soils over—

- • Sandstone and metasandstone of the Franciscan assemblage
- ○ Franciscan greenstone and metagreenstone—Dotted where proportions were estimated
- △ Franciscan sheared rock (melange)
- ✖ Tertiary sedimentary rocks in the La Honda study area, San Mateo County (see chap. 5)
- × Other Tertiary sedimentary rocks
- ■ Unknown parent materials
- □ Slightly cemented sand of the Merced Formation (late Pliocene and early Pleistocene)
- ◯ Debris flows that showed evidence of uncommonly slow movement
- ▣ Debris flows that originated on cut slopes, scarps of deep-seated landslides, or margins of active slow-moving shallow slides

FIGURE 6.17.—Size-fraction diagram showing soils that flowed as debris flows in the storm. Dashed lines show significant boundaries of clay content discussed in text. Data from table 6.1.

monly concentrated in concave areas. Some concavities in the bedrock surface, however, may be entirely filled by accumulations of soil (Dietrich and Dunne, 1978), and so areas of water concentration by throughflow may be concealed. In some soils, throughflow may contribute to water levels in the soil mantle almost as rapidly as surface flow (Sidle, 1984).

Occurrence of soil slips in concave parts of the landscape during the storm suggests that throughflow, surface flow, or both contributed significantly to water levels that led to these soil slips. For a study area in Marin County, Reneau and Dietrich (1987a) found that 62 percent of the debris flows triggered by the storm occurred in concavities. In the Hicks Mountain area of Marin County, 49 percent of the scars that produced debris flows occupy conspicuously concave parts of hillslopes; and in selected smaller areas of Marin County, more than 70 percent of the scars occupy conspicuous concavities (see chap. 7); even higher percentages would result if less conspicuous concavities were included. Thus, water concentration by surface flow and throughflow appears to have contributed significantly to a large proportion of the soil slips in the storm.

BEDROCK CONTACTS

Several conditions that concentrate ground water commonly occur along bedrock contacts. Water can concentrate along bedrock contacts by seepage through bedrock, by changes in slope that typically accompany contacts, and by contrasts in soil mantle that accompany the contrasts in bedrock. Many breaks in slope in the bay region coincide with contrasts in both bedrock and soil materials, and so it is difficult to distinguish the effects of these several conditions.

These conditions apparently exerted a significant influence on soil slips during the storm because many soil-slip scars lie conspicuously along bedrock contacts (fig. 6.22). The tendency for soil slips to occur at bedrock contacts and over bedrock units with abundant strong permeability contrasts is discussed in chapter 7.

Bedrock Seepage

Water that infiltrates bedrock can be concentrated by permeability contrasts in bedrock (fig. 6.21*B*). Seepage of water from bedrock out into the soil mantle would be favored where the bedrock has strong permeability contrasts that dip out of slope, particularly where permeable bedrock that has a broad areal contact with the ground surface overlies impermeable material. Seepage through bedrock can take months or years, but at least some of the bedrock seepage that influenced soil slips in the storm appears to have been fed by storm rainfall that emerged into the soil mantle while rain was still falling. Seepage from bedrock in the storm was suggested by sustained

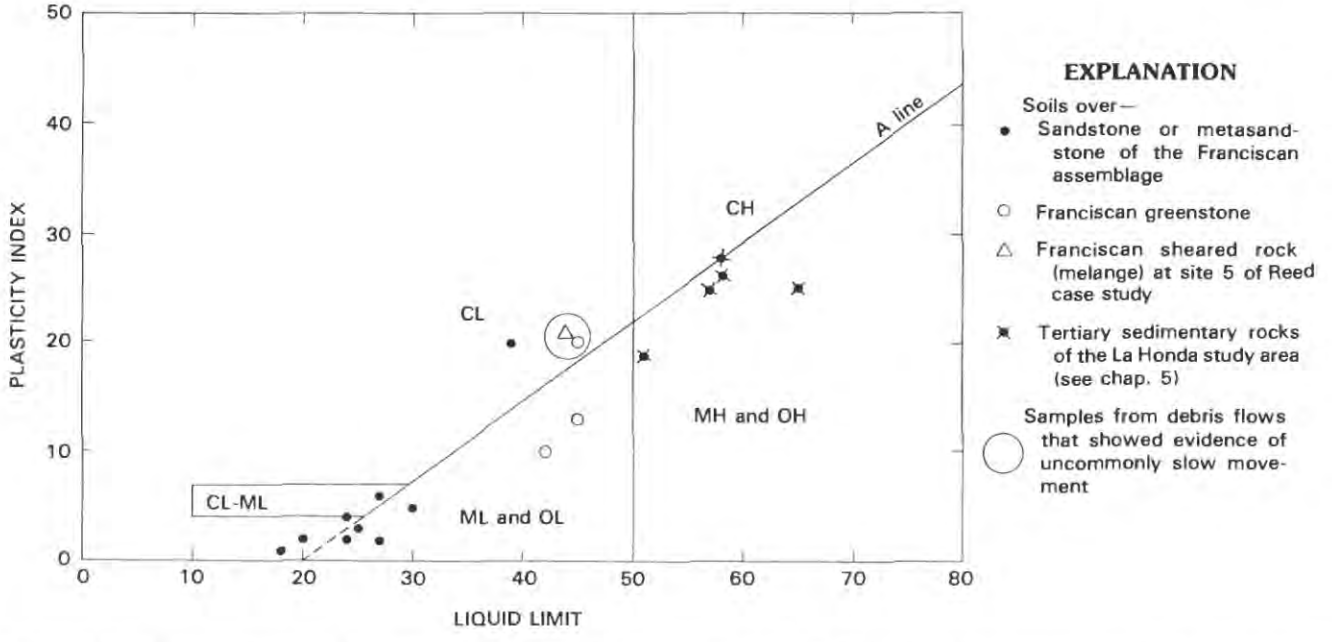


FIGURE 6.18.—Plasticity chart (U.S. Army Corps of Engineers, 1953, pl. 2) showing fine-grained soils involved in soil slip/debris flows resulting from the storm. Letters designate soil groups of the Unified Soil Classification system, which, along with the A line, are described in most texts on soil engineering (for example, Lambe and Whitman, 1969, p. 34–38). Coarse-grained soils are not plotted. Also not plotted are soils that lack sufficient plasticity for the Atterberg tests that define the plasticity chart; if slightly more plastic, such soils would plot near points in lower left. Data from table 6.1.

flow of large volumes of water from some soil-slip scars, as reported by E.W. Hart and S.J. Rice (oral communs., 1982; see chap. 10), and by other eyewitnesses.

Breaks in Slope and Contrasts in Soils

Throughflow can be concentrated at places along the downslope profile of a hillslope by decreases in slope and changes in soils. Throughflow is impeded wherever its gradient of flow, which commonly approximates the slope of the ground surface, decreases. Water levels must rise near such points unless the soil mantle increases in permeability or thickness. In fact, the permeability of soil mantle in the bay region commonly decreases below such breaks in slope because the soil derived from bedrock below such slope breaks is typically more clayey. At many such places, the less permeable soil probably combines with decreased gradient to impede throughflow, and so water levels in the soil mantle rise near the break in slope.

Although water concentration by these means generally was indistinguishable from bedrock seepage, in places soil-slip scars are concentrated where hillsides abut alluviated surfaces (see chap. 7). Water concentration at these scars probably resulted largely from these breaks in slope.

HILLSLOPE MODIFICATIONS

Where hillslopes have been modified by even such small features as animal trails, water may collect from large parts of the landscape and then be transported along roads, gutters, or trails to induce failure at a distant site. Many soil slips in the storm occurred where water was concentrated by such means; the debris torrent at First Valley in Inverness, for example, originated from a soil slip immediately downslope from a road culvert.

In at least one case related to the storm, modification of hillslopes significantly affected the transit time of ground water to a soil-slip site. At Hurricane Gulch in Sausalito, a soil slip/debris flow originated from highway fill about 22 hours after rainfall had ceased (see Smith and Hart, 1982, p. 148–149). The delay can be attributed, at



FIGURE 6.19.—Three small debris flows near San Geronimo, Marin County, issue from flank and toe of larger shallow slide. Larger slide, defined by dark cracks at crown and toe, is about 35 m wide.

least in part, to the gravelly-clay highway fill of low permeability that dammed throughflow down a colluvium-filled draw (D.G. Heyes, oral commun., 1983). Seepage through bedrock may also have contributed to the delay, as suggested by the abundance of water that seeped from the scar after failure (more than 2,000 m^3/d) and by the proximity of the scar to an old tunnel excavated either for water collection or for manganese mining—in either case, suggesting strong permeability contrast in the bedrock.

ELEVATED PORE PRESSURE

Concentration of water can result in pore pressures greater than those possible from throughflow parallel to the ground surface, and such elevated pore pressures permit failure on relatively gentle slopes. Elevated pore pressures can develop from seepage in an out-of-slope direction and from artesian conditions. Out-of-slope seepage may accompany several of the water-concentration mechanisms discussed above, namely, bedrock seepage, breaks in slope, and contrasts in soil.

Artesian conditions, which can generate greater pore pressures than can unconfined aquifers, are possible where sloping permeable materials are confined between less permeable materials. During the storm, artesian pressures may have developed in bedrock with such contrasts in permeability, as where more and less permeable sedimentary beds are interlayered or where zones of permeable shattered rock pass through an impermeable sheared rock mass. Artesian pressures may also have developed within the soil mantle and underlying shallow weathered bedrock (see chap. 5; Wilson and Dietrich, 1985). In the bay region, such shallow confined aquifers can occur where the soil mantle includes impermeable clayey soil overlying permeable sandy soil (Hayes, 1985), where colluvial accumulations include highly permeable layers of rock fragments (see Murray Park and Inverness area case studies above), where fractured weathered bedrock is more permeable than the overlying soil mantle (Nicholas Sitar and K.A. Johnson, oral communs., 1986), or where animal burrows or other passageways in the soil mantle terminate downslope (Pierson, 1983; see section entitled "Grant Road" in chap. 8).

SUMMARY

Movement of water to sites of failure occurred by several means that are reflected in the timing and distribution of soil slip/debris flows in the storm. Timing of debris flows indicates that intense rainfall was almost always involved, and the common occurrence of soil-slip scars at such features as concavities, breaks in slope, soil and bedrock contacts, or manmade modifications suggests that concentration of water in the landscape was almost always required for failure. Because features suggesting concentration of water so commonly accompany scars, those places where scars occur in the absence of such features, such as on smooth planar or convex hillslopes, are suspect for concealed colluvial fill or bedrock seepage. Several of the likely water-concentration mechanisms are capable of generating pore pressures in excess of those attainable by unconfined slope-parallel seepage.

INITIAL FAILURE

Once water has arrived at a site, it interacts with the materials there to determine the occurrence of ground failure, the geometry of the failed mass, and the type of movement. Initial failure is discussed in this section; the type of movement after initial failure is discussed below in the subsection entitled "Mobilization."

Failure of hillslopes generally results from shear along a basal slip zone, as modeled by the Coulomb criterion for failure. In any place where the upward force of groundwater seepage equals or exceeds the weight of the soil, however, failure may occur by static liquefaction, or quick conditions (Iverson and Major, 1986). Such quick conditions might have been responsible for the "water blowouts" described by Hack and Goodlett (1960, p. 45), but they were probably not a common trigger for debris flows



FIGURE 6.20.—Small soil-slip/debris-flow complex near Barnabe Mountain, Marin County. Complex consists of two scars along a debris-flow trail, 3 to 4 m wide. Between scars, trail is defined by lateral deposits.

in the storm, judging from the steep slopes occupied by virtually all soil slips in the storm (fig. 6.16). Thus, the following analysis focuses on Coulomb failure.

Hillslope failure is best analyzed quantitatively by using detailed information from specific sites. The results of such analyses are discussed in chapter 9 for landslides that occurred in Pacifica. The present discussion lacks suitable site studies, and so initial failure is discussed only briefly, using a simplified model for the materials and geometry of failure.

INFINITE-SLAB MODEL

Most soil-slip scars left by the storm define slide masses that resemble planar slabs, and so soil slips are modeled here as slab failures. For further simplicity, soil slips are modeled as infinitely long and wide slabs of homogeneous soil, for which edge effects are absent; such infinite-slope analysis has been applied to similar landslides by other investigators (see chap. 9; Campbell, 1975; Moser and Hohensinn, 1983). For the general case in which soil has cohesive as well as frictional strength, and seepage is parallel to the hillslope, stability of the infinite slab is described by

$$FS = \frac{c'}{\gamma_t h \sin \beta} + \left(\frac{\gamma_t - m\,\gamma_w}{\gamma_t}\right)\left(\frac{\tan \phi'}{\tan \beta}\right), \qquad (1)$$

where FS is the factor of safety, c' is the apparent cohesion, h is the thickness of the slab measured normal to the slope, γ_t is the saturated unit weight of soil, γ_w is the unit weight of water, ϕ' is the effective angle of internal friction of the soil at peak strength, β is the inclination of the hillslope, and m is the proportion of the slab thickness that lies below the piezometric surface (for example, Campbell, 1975, p. 19). Failure occurs when $FS \leq 1$.

Equation 1 provides a general model for the initial failure of hillslopes during the storm. At a given site, where slope (β), soil thickness (h), and soil properties (c', γ_t, ϕ') were fixed, rising water level during the storm

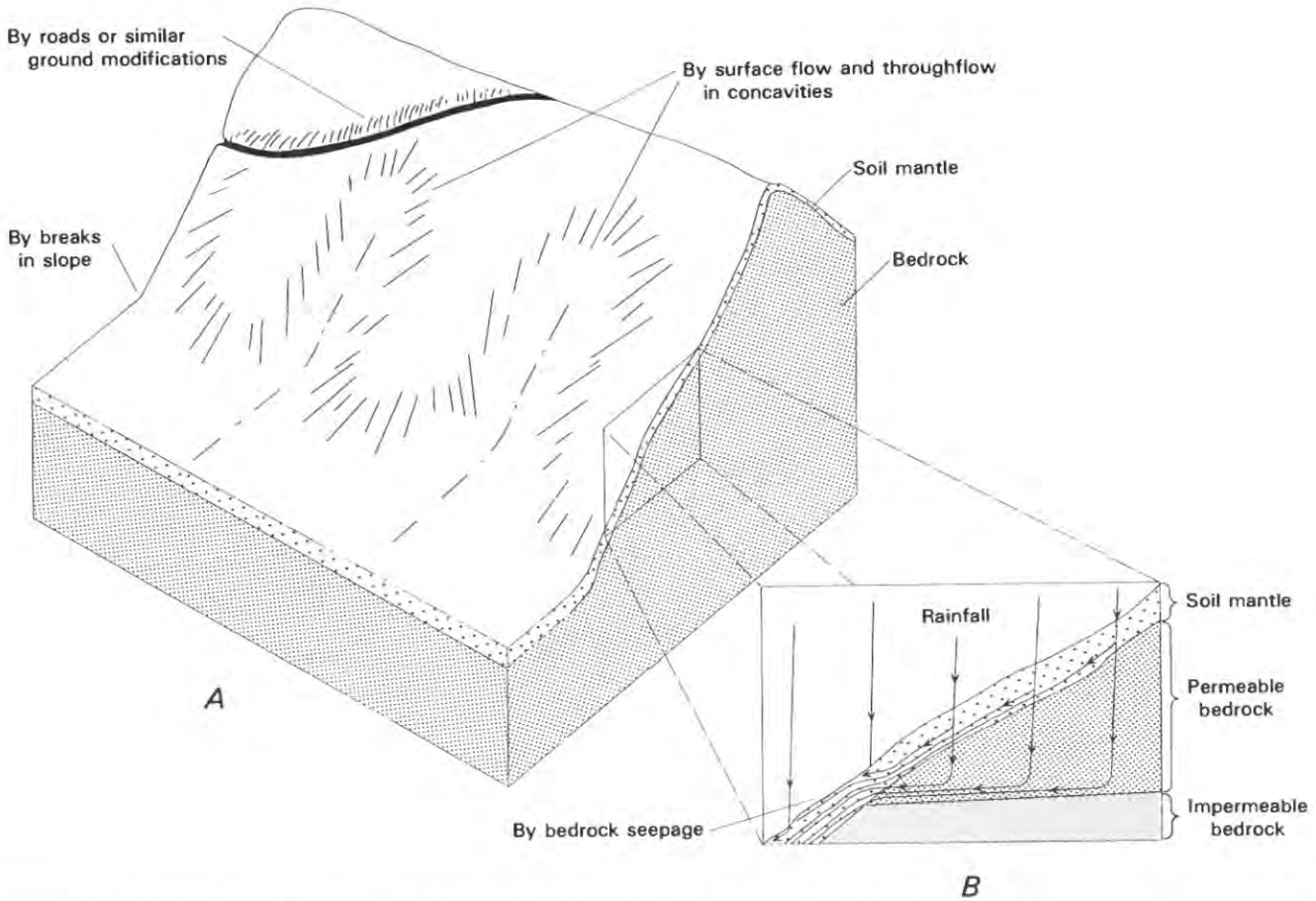


FIGURE 6.21.—Schematic block diagram (*A*) and cross section (*B*) showing some means of water concentration in the landscape. Schematic water paths in cross section illustrate throughflow (within soil mantle) and bedrock seepage.

(expressed by increasing m) decreased the FS until failure occurred. This theoretical relation is supported by studies in the bay region that correlate soil slips during the storm with high measured ground-water levels (see chap. 5). Similar work has confirmed this relation elsewhere (for example, Swanston, 1970; Sidle and Swanston, 1982).

The dimensions of soils slips appear to be determined by edge effects, which are not included in the infinite-slab model. Reneau and Dietrich (1987a) have discussed the influence of edge effects on the dimensions of soil slips triggered by the storm in a study area in Marin County.

SLOPES OF FAILURE

According to the infinite-slab model, failure on relatively gentle slopes is favored where soils have relatively low internal friction (as in clayey soils), where relatively high water levels are necessary to trigger failure, and where cohesive strength, commonly provided by roots, is low. Failure on relatively steep slopes is favored where soil has high frictional strength, where roots provide high cohesive strength, and where relatively low water levels are sufficient to trigger failure. Differences in slope at soil-slip scars in Marin County appear to reflect some of these controls (see chap. 7).

Measured slopes of failure in the storm (fig. 6.16) lie within a broad range that appears to be reasonable for the soil properties listed in table 6.1, when these are substituted into equation 1 with values of m between 0 and 1. A more specific discussion of stability analyses in chapter 9 implies that total saturation of infinite slabs, with seepage parallel to the ground surface, generally was sufficient to account for the observed slopes of failure at 9 sites in Pacifica. In some cases, however, hillslopes failed at slopes gentler than calculated for infinite slabs of the tested soils under these ground-water conditions. In those cases, pore pressures greater than attainable by slope-parallel seepage may have contributed to failure.



FIGURE 6.22.—Landslides on the Tiburon Peninsula, Marin County, localized along a prominent break in slope that coincides with a contact between permeable bedrock and soil mantle above and impermeable clayey bedrock and soil mantle below. Contact extends about horizontally across center of view, at foot of broad rounded hill. Complex scars from soil slip/debris flows are at center and left above contact; shallow slide at right above contact (arrow) did not mobilize as a debris flow, although distinct boundaries suggest movement during the storm.

LOCATION OF THE FAILURE SURFACE

An infinite slab of homogeneous cohesionless soil, represented by the second term in equation 1, should fail near the permeability boundary that perches the water table; as the water table rises, this surface will reach the critical value of m before shallower hypothetical slabs. The effect of cohesion on failure, represented by the first term in equation 1, is similar in favoring failure of thick slabs. However, variations in soil properties can favor failure well above the bedrock surface (Moser and Hohensinn, 1983, p. 209; Reneau and Dietrich, 1987a).

Many soil-slip scars resulting from the storm bottomed in soil close above the bedrock surface, which generally forms the chief permeability boundary. In many places, however, soil slips bottomed near low-permeability horizons within the soil mantle (Davenport, 1984; see Inverness area case study above and Reed case study below).

MOBILIZATION

By Stephen D. Ellen and Robert W. Fleming

Once failure has begun, the soil slip must mobilize as a slurry if debris flow is to take place. This process of transformation is the critical step between localized sliding of soil and its rapid flowage to distant parts of the landscape. Our discussion focuses on the means by which mobilization is accomplished and the factors that control these means. Mobilization is also discussed elsewhere (Ellen and Fleming, 1987; Fleming and others, in press).

Johnson and Hampton (1969) distinguished four general means by which debris flows can mobilize: (1) saturation of soils in place; (2) incorporation of water by sliding; (3) erosion, particularly by strong gushes of water; and (4) incorporation of coarse debris into clayey slurries. Because almost all the debris flows during the storm mobilized from soil slips, they did not involve the last two of these processes to any significant degree. Thus, soil slips apparently gained the water content necessary for debris flow either by saturation of inplace soil or by incorporation of water during sliding.

CONTRASTS IN MOBILIZATION

Accounts from the world literature, as cited by Rodine (1974), confirm that debris flows can mobilize from slides in different ways. In some places, mobilization has resulted from slow sliding; in other places, hillslopes have mobilized as masses of flowing debris without preceding macroscopic movement.

Eyewitness reports from the storm suggest a similar contrast in speed of mobilization. Most eyewitnesses reported signs of movement preceding rapid flow, in some cases by many hours (table 6.2; see subsections entitled "Alba Road" and "Creekwood Drive" in chap. 8); these debris flows were mobilizing from slow-moving slides. Instantaneous movement was also witnessed: At one site, within a span of several seconds an observer saw a small waterfall in an intermittent drainage change in color from white to brown and then disappear as the hillside collapsed downslope as part of a debris flow (table 6.2). Such reports of instantaneous mobilization are inconclusive, however, because eyewitnesses might not have detected movements preceding mobilization, especially during storm conditions.

TABLE 6.2.—*Eyewitness accounts of mobilization in the storm*

Source person and location	Indications of movement	Time interval between indication of movement and rapid movement
Susan Melvin, Woodacre, Marin County.	Intermittent waterfall in small drainage changed from white to brown in an instant, then disappeared downslope in a fast-moving debris flow.	3 seconds.
Dave McCleery, Mill Valley, Marin County.	Scotch-broom (a tall brushy plant) leaned downhill across driveway in area that later mobilized as liquid mud; other areas of Scotch-broom did not lean.	8 hours.
Dustin Leer, San Rafael, Marin County.	Water from horizontal drainpipes changed from clear to muddy (always clear before, even during heavy storms).	At least half an hour.
	Sound like tree cracking, then hillside turned to liquid; looked like wave breaking on beach.	3–5 seconds.
Barbara Denton, Crockett, Contra Costa County.	Cracks opened across hillslope, then stream of water from hillside, then slide in surficial soil (moved approx 0.3–1.5 m/s).	Several hours between cracks and rapid movement.
Thomas Lewis, San Rafael, Marin County.	Hollow rumbling sound like thunder, close by (no other major slides in area), then varyingly rapid movement, generally progressing upslope.	45 minutes.
Leonard Davis, Sausalito, Marin County.	Brush and trees lean downslope.	24 hours.
	Numerous small (less than 1 m^3 volume) failures from the same place.	Several hours.
	Heavy runoff of viscous water and earth.	Immediately before major pulse.
Gary Greene, near Branciforte Creek, Santa Cruz County.	Noticed pullaway cracks on brush-covered hillslope; mass left the scar as a slab, rapidly became fluid, then turned and flowed down canyon at about 6 m/s.	Less than 2 minutes.

Another prominent contrast was degree of mobilization. Most shallow slides that mobilized during the storm mobilized completely, leaving scars empty of failed material (figs. 6.1, 6.3, 6.4, 6.14, 6.15, 6.20). Other slides mobilized partially, leaving dislocated slide masses as well as scars from which soil had flowed (figs. 6.19, 6.35); debris flows in such cases characteristically issued from the flanks or toes of slides. Many other shallow slides moved during the storm but did not mobilize at all as debris flows (figs. 6.22, 6.23).

Deposits of debris flows differed in several respects that may have reflected contrasts in the style of mobilization. Differences in the thickness and lumpiness of deposits particularly caught our attention (see case studies below).

These various contrasts raise such questions as: Why was mobilization faster in some cases than in others? Why did some slides mobilize and not others? Why did only parts of some slides mobilize? To pursue such questions, we discuss the influence of soil texture and the relation between slide and flow, and then consider possible means of debris-flow mobilization.

THEORY OF MOBILIZATION

SOIL TEXTURE

Soil texture, particularly clay content, influences the susceptibility of soils to debris flow. Debris flows generally occur in poorly sorted soil that contains a small proportion of clay-size material (Rodine, 1974, p. 69). The lower limit of clay content is important because sustained flow requires at least a small proportion of clay (Rodine, 1974), presumably because clay content permits a clay-water pore fluid that helps to maintain the pore pressures which facilitate flow (Pierson, 1981). At the other extreme, large proportions of clay may prevent mobilization by providing cohesion that inhibits remolding. In soils that must take on water to flow, abundant clay also increases the amount of water needed to reach states capable of flow, and it limits the permeability needed for incorporation of water. Slow-moving slides called earth flows, rather than debris flows, are typically found in such clay-rich soils (Keefer and Johnson, 1978).

The influence of clay content on mobilization of debris flows is illustrated in figure 6.17, which shows textures of 50 soils that flowed in the storm. Minimum 2 μm-clay content is 3 percent, and 8 percent clay forms the lower bound for 98 percent of the samples. The highest clay content is 35 percent, which suggests that clay content higher than about 35 percent was sufficient to prohibit mobiliza-



FIGURE 6.23.—Mobilized and nonmobilized shallow landslides induced by the storm on a hillslope near Tomales Bay. Soil slip/debris flows have left trails at A, B, and C, extending downslope from scars; at least one fresh scar (D) developed from a subdued old soil-slip scar. Slide at E has not mobilized; movement is evidenced by fresh cracks at head and bulge at toe. Subtle break in slope that crosses hillside horizontally immediately above the slide at E probably follows a bedrock contact. Contrast in materials across this contact probably accounts for difference in style of movement, and concentration of water along this contact probably contributed to soil slips that left debris-flow trails at A and C.

tion of debris flows during the storm. Most fast-moving debris flows that originated from hillslopes in long-term equilibrium had clay contents less than 25 percent, as discussed above in the subsection entitled "Soils Involved." Thus, susceptibility to mobilization was limited to soils with clay contents of 3 to 35 percent, more commonly 8 to 25 percent. These ranges are so broad, however, that clay content, by itself, has only a limited use in determining the potential for debris flow.

TRANSITION FROM SLIDE TO FLOW

The conditions under which a debris flow can develop from a soil slip may be evaluated by using the concept of plug flow, in which flowing debris is modeled as a relatively rigid plug or slab rafted on a zone of laminar flow (fig. 6.24). Johnson (1970) called the thickness of the plug the critical thickness for flow, because as a debris flow thins to this point the plug bottoms out and becomes a deposit. Thus, critical thickness is reflected, at least approximately, in the thickness of the lateral deposits or the lobe at the distal end of the flow. For a broad sheet of Bingham material, which is representative of the flow as it leaves the soil-slip scar (figs. 6.1, 6.13), the critical thickness (T) measured normal to the slope is given by the relation

$$T=\frac{k_f}{\gamma_f \sin \beta}, \qquad (2)$$

where k_f and γ_f are the shear strength and saturated unit weight of the flow, respectively, and β is the slope (Johnson, 1970, p. 488, 503). Thus, the thickness of the plug is proportional to the strength of the debris-flow material.

For the process of soil slip/debris flow, inherent relations exist between critical thickness for flow and thickness of the sliding slab. For a sliding slab of soil to transform directly into a debris flow, its critical thickness when remolded must not exceed the thickness of the sliding slab; otherwise, the slab must thicken for flow to begin, which is unlikely (fig. 6.25). Thus, the theoretical limiting case for flow from the scar is described by equation 2 when T equals the slide thickness. In actuality, the critical thickness probably must be somewhat less than the slide thickness if much of the slab is to be remolded during sliding. As a result, mobilization apparently requires development of slurry strengths low enough that the critical thickness is somewhat less than the slide thickness.

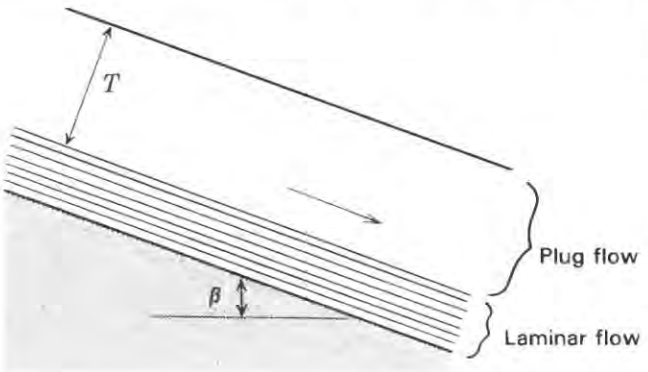


FIGURE 6.24.—Schematic cross section of a debris flow on a hillside of slope β. T, critical thickness for debris flow; arrow indicates downslope movement. Modified from Johnson (1970, p. 488).

MOBILITY INDEX

Rodine (1974) and Johnson (1984) considered water content to be the key to the low slurry strengths needed for mobilization. They devised a mobility index (M.I.), defined by Johnson (1984) as the ratio of saturated water content of the inplace soil to the water content needed for flow of that soil down the available channel. They assumed the soil to be saturated, as we do in the following analysis, because high water levels typically accompany failure and mobilization. They determined the water content needed for flow through innovative strength testing and measurement of channel form. Mobilization was considered likely where the saturated water content of inplace soil was sufficient for debris flow down the available channel, and less likely where soil must take on additional water to flow. They found that the soils involved in debris flow had M.I.>0.85.

APPROXIMATE MOBILITY INDEX

An approximation of the M.I. can be obtained by using the Atterberg liquid limit to approximate the water content needed for flow.[2] Thus, this approximate mobility index (A.M.I.) is the ratio of the saturated water content of inplace or undisturbed soil to its liquid limit. Qualitatively, the liquid limit seems suitable for this use because it represents the water content at which soil behavior is marginally fluid under shallow conditions. Quantitatively, the liquid limit represents a shear strength of about 2 kPa (Seed and others, 1964, p. 77), which can be translated to a critical thickness of 20 cm by using equation 2 with typical values for the debris flows under discussion ($\beta=30°$; saturated unit weight of flow material, 20 kN/m^3). This critical thickness is substantially less than the typical thickness of soil slips induced by the storm (approx 1 m), and it lies near the upper end of the typical

[2]We use liquid limit to represent the water content at which soil would flow as a slurry because it is a simple, reproducible test. Unfortunately, however, the liquid limit is measured on only the fine fraction of the soil (fraction smaller than the No. 40 sieve size—fine sand and smaller). For soils that contain an abundant coarse fraction, the liquid limit is probably significantly larger than the water content needed for flow.

range of thicknesses of lateral deposits left by debris flows during the storm. For these reasons, the liquid limit seems well suited to approximate the water content needed for debris flow during the storm.

The A.M.I. is plotted in figure 6.26 for the soils listed in table 6.1 that mobilized as debris flows during the storm. Soils that plot above the solid line (case A, A.M.I.>1), had an initial capacity to hold more water than their liquid limit. When remolded, these soils would flow readily because they would have low shear strengths and critical thicknesses well below typical slide thickness.

Soils that plot below the solid line (A.M.I.<1) must have taken on water in order to flow. These soils correspond to a low potential for flow according to the M.I., yet figure 6.26 demonstrates that many such soils flowed during the storm. We subdivide this area of the plot into two zones. For soils of case B (0.45<A.M.I.<1), incorporation of water was sufficient for flow, at least in parts of slide masses. Soils of case C (A.M.I.<0.45) apparently could not incorporate enough water for flow.

THE STEADY STATE AND LIQUEFACTION

The M.I. approach can be elaborated by considering the initial sliding of a slab of soil. As significant deformation begins at failure, soil in the basal shear zone will approach a critical, or steady, state (Castro, 1969; Casagrande, 1976). Critical-state soil mechanics indicates that a saturated soil, if continuously distorted until it flows as a frictional fluid, will come into a well-defined state characterized by a water content and corresponding strength, both of which are related to effective confining stress (Schofield and Wroth, 1968). A similar concept was described by Poulos (1981) as the steady state of deformation.

The significance of the steady state is summarized in figure 6.27. Figure 6.27*A* shows that the void ratio (or water content) of a drained saturated sand undergoing shear approaches a single value regardless of its initial density; loose sand contracts (contractive behavior), whereas dense sand dilates (dilative behavior). Where deformation occurs in undrained conditions, loose soil behaves very differently from dense soil. This contrast is illustrated in figure 6.27*B*, which shows the variations in both axial load and pore pressure in undrained, load-controlled, monotonic triaxial tests on sand (Castro, 1969; Casagrande, 1976). As strain begins, both loose and dense sands behave similarly; but at strains of about 1 percent, sudden decrease in the resistance to shear in the loose material permits rapid acceleration of strain, even at reduced load. This decrease in strength results from increased pore pressure, generated by a tendency for contraction of the loose material; the approach of this pore pressure to the confining load of the test indicates that most of the load is borne by the pore fluid and little by grain-to-grain contact that provides frictional strength. Such behavior is called actual liquefaction (Casagrande, 1976). Dense undrained sand does not show this weakening but initially strengthens with strain as a tendency for dilation reduces pore pressure. Figure 6.27*C* shows that the steady-state void ratio, or critical void ratio (Terzaghi and Peck, 1967, p. 108; Casagrande, 1976), depends on the effective confining stress under which deformation occurs.

Repeated tests like those in figure 6.27*B* have shown that liquefaction occurs only in soil that is contractive, that is, soil for which the combination of void ratio and effective confining stress plots above its steady-state line (Casagrande, 1976; fig. 6.27*C*). Loose soil that is not

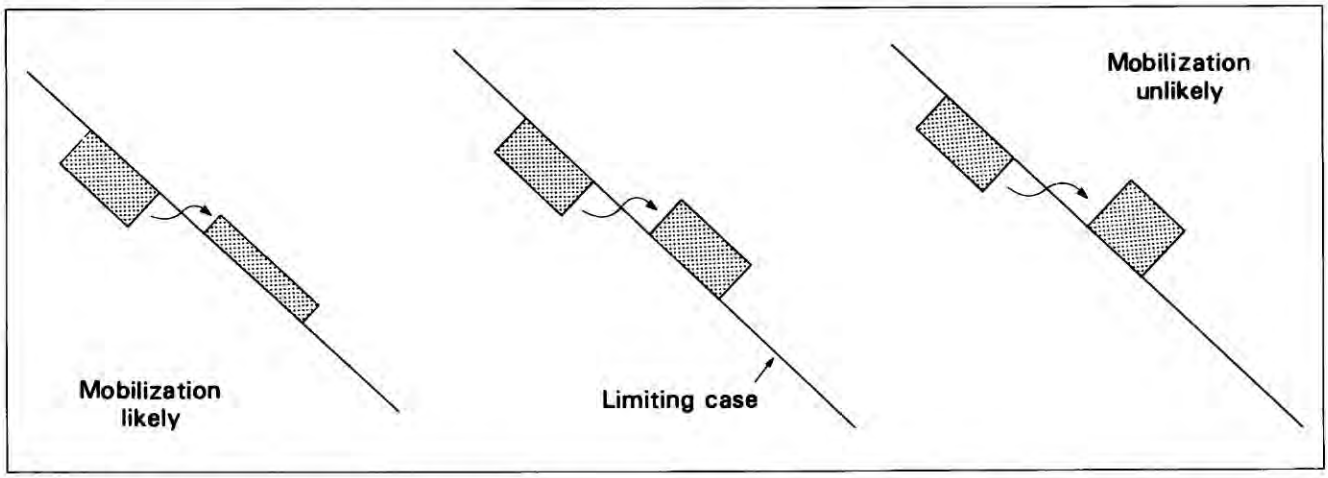


FIGURE 6.25.—Schematic cross sections of soil slip/debris flows, showing hypothetical relations between slide depth (upslope rectangle) and critical thickness (downslope rectangle) for debris flow. Transformation to flow is likely where critical thickness is less than slide depth, and unlikely where slide mass must thicken for flow to begin.

highly contractive (fig. 6.27*B*, test B) may not undergo significant loss of strength or may liquefy only temporarily ("limited liquefaction" of Casagrande, 1976).

The transition of soil in the basal shear zone from an initial void ratio at critical equilibrium just before failure to a steady-state void ratio can be described by using "state diagrams" (fig. 6.28), in which the soil's void ratio (e) is plotted against effective confining stress ($\bar{\sigma}_3$). For loose (contractive) soil at an initial state represented by point A in fig. 6.28*A*, shear deformation during failure moves the soil state toward the steady-state line. If deformation is undrained, the increased pore pressures result in a horizontal path to point B, at which steady-state flow conditions would be attained. This path is the common result of strongly contractive behavior in soils without high permeability, and so it is emphasized by shading in figure 6.28*A*. Any contraction permitted by drainage during shear reduces e and thus shifts the state downward to a point such as C. The unlikely circumstance of drained conditions, in which there is no increase in pore pressure, would permit a vertical path to point D on the steady-state line.

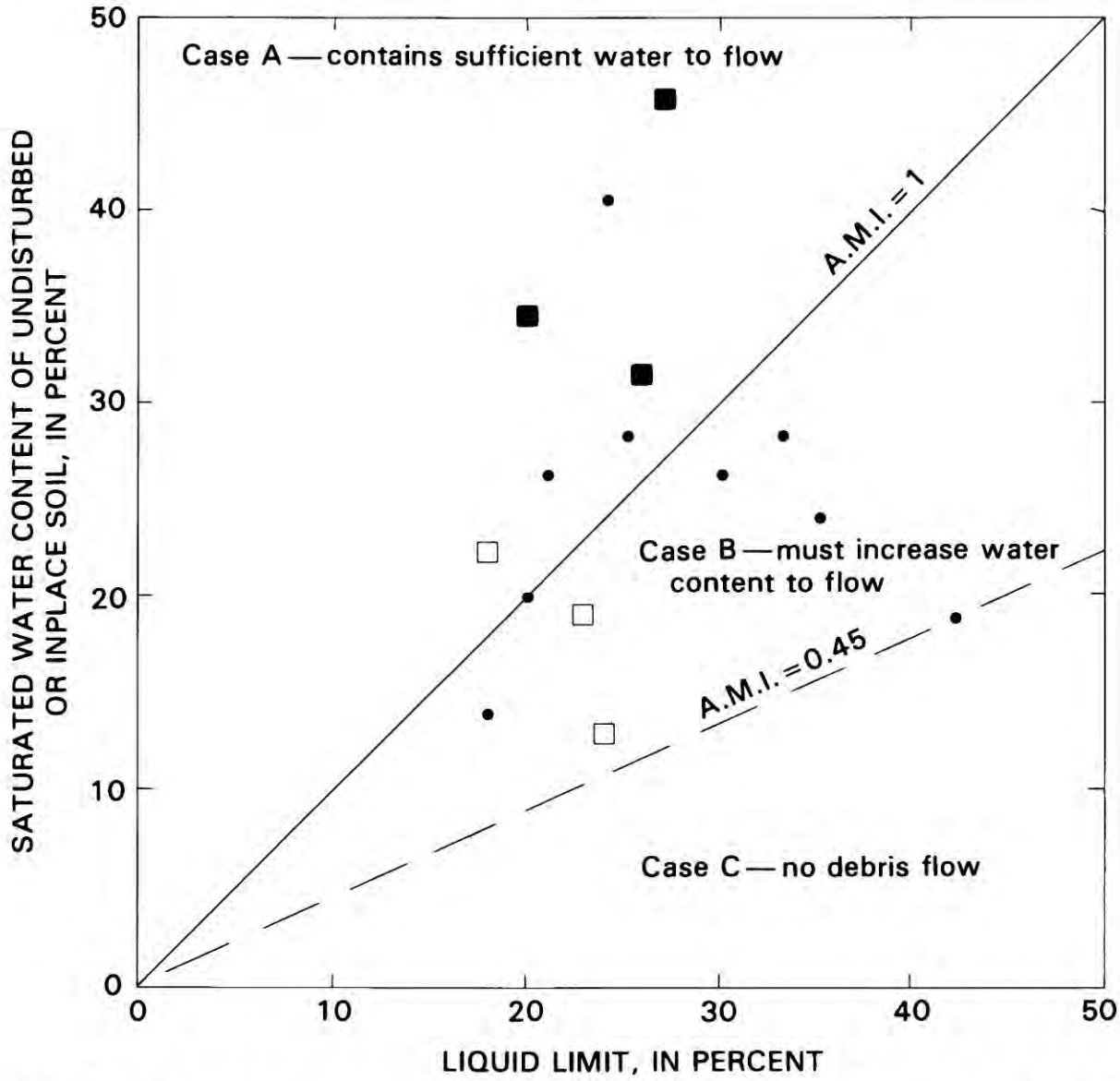


FIGURE 6.26.—Relation between saturated water content and liquid limit for soils in table 6.1 that mobilized as debris flows during the storm. Approximate mobility index (A.M.I.) is ratio of saturated water content to liquid limit. Dashed line, lower limit of A.M.I. for soils that flowed in the storm; upper limit is 1.70. Squares represent soils in two-layer soil slip/debris flows at three sites in Marin County: solid squares, dark surficial soils; open squares, tan subsoils.

Dense (dilative) soils, in contrast, must draw water to the dilating zone for deformation to continue, and so dilation, and the mobilization that may result, requires time, particularly in soil of low permeability. On the state diagram in figure 6.28*B*, shear deformation shifts the state upward (increases e) from a prefailure, critical-equilibrium state (point E) that lies below the steady-state line. Drained conditions with no change in effective stress would permit a vertical path to point F. Partially drained and undrained conditions would result in paths toward the right in figure 6.28*B*, such as to points G and H. However, paths that veer far to the right are unlikely in rainfall-triggered landslides, particularly where soil is noncohesive, because movement and the resulting deformation in the basal shear zone are brought about by low effective confining stress; in such landslides the basal shear strain is probably held to a rate that permits enough drainage for movement. Paths that veer somewhat to the left from point E could occur, for example, if continuing rainfall during drained deformation increased pore pressures sufficiently to reduce the effective confining stress below the value at point E. In general, however, state paths in dilative soils in basal shear zones of rainfall-induced landslides probably are constrained to a nearly vertical zone, as shown by shading in figure 6.28*B*.

POSSIBLE MEANS OF MOBILIZATION

When the steady-state concept is combined with the M.I. approach, means of mobilization can be portrayed on state diagrams through relations among three factors: the initial state, the steady-state line, and the minimum void ratio needed for flow from the scar (e_f), which corresponds uniquely to the strength k_f defined by equation 2 when T equals the slide thickness. Figure 6.29 portrays these factors for examples of both contractive and dilative soils, with the likely paths of contractive and dilative behavior shown by shading.

If these three factors were independent, there would be six relations logically possible among the factors, defining six possible cases of mobilization or absence of mobilization. The value of e_f, however, is not independent of the other factors. To define the position of e_f along the steady-state line in figure 6.29, particular hypothetical examples of dilative and contractive soils are plotted. These particular soils are noncohesive, have similar steady-state behavior as represented by the single steady-state line, and have similar unit weight; each soil lies under a slope of inclination β in a potential failure zone at depth h that is at critical equilibrium under slope-parallel seepage with saturation to the ground surface. These soils thus have similar effective confining stress before deformation, in each case resulting from the normal component of buoyant weight of the soil (fig. 6.29; see Lambe and Whitman, 1969, p. 354). The position of e_f on this plot can be determined by noting that the driving shear stress at failure of an infinite slab of thickness h, under conditions of slope-parallel seepage with saturation to the ground surface, equals the driving shear stress for the limiting case of flow at the same thickness ($T=h$ in eq. 2), namely, the downslope component of saturated weight of the soil per unit area (see Lambe and Whitman, 1969, p. 354; Johnson, 1970, p. 488). Thus, the frictional strengths mobilized in resistance, and their corresponding effective confining stresses, must also be equal, and the limiting-case steady-state void ratio e_f must correspond to point C in figure 6.29.

Mobilization probably requires void ratios somewhat greater than e_f, as mentioned previously, and so the void ratio at liquid limit is shown in figure 6.29 to approximate the lower limit of void ratios likely to mobilize. The plotted position of liquid limit represents a strength severalfold lower than k_f. Plotting the position of the liquid limit also clarifies the relation of the A.M.I. to the state diagram. Where A.M.I.>1, initial conditions fall above the void ratio at the liquid limit, in the upper part of figure 6.29. Where A.M.I.<1, initial conditions fall below the void ratio at the liquid limit. Thus, the A.M.I. serves as a guide to contractive or dilative soil behavior in shallow landslides.

With the basic relations among these factors defined as in figure 6.29, two principal cases of mobilization emerge, the contractive and the dilative. These results confirm the impressions of many investigators, as reported by Costa (1984, p. 270), that liquefaction and dilation constitute the principal processes of debris-flow mobilization.

Contractive Case

For strongly contractive soils, shear deformation at the base of the slide results in paths like path 1 from point A (fig. 6.29). Such paths result in steady-state void ratios that are much greater than e_f, and so flow from the scar can occur readily by liquefaction (as defined by Poulos and others, 1985). Mobilization is essentially instantaneous because strains of only about 1 percent are sufficient to initiate liquefaction (Casagrande, 1976). Mobilization is typically complete because strength is so greatly reduced upon small strain. Deposits that reflect critical thickness are much thinner than the parent scar because slurry strength is much less than k_f; thus, travel distance may be great because little material tends to be left along the path (Cannon, 1985, 1986). Deposits are of smooth consistency because excess water was present initially throughout the saturated portion of the soil. This means of mobilization corresponds approximately to case A of figure 6.26 (A.M.I.>1).

For soils that are weakly contractive or that have sufficient permeability to permit significant drainage, state

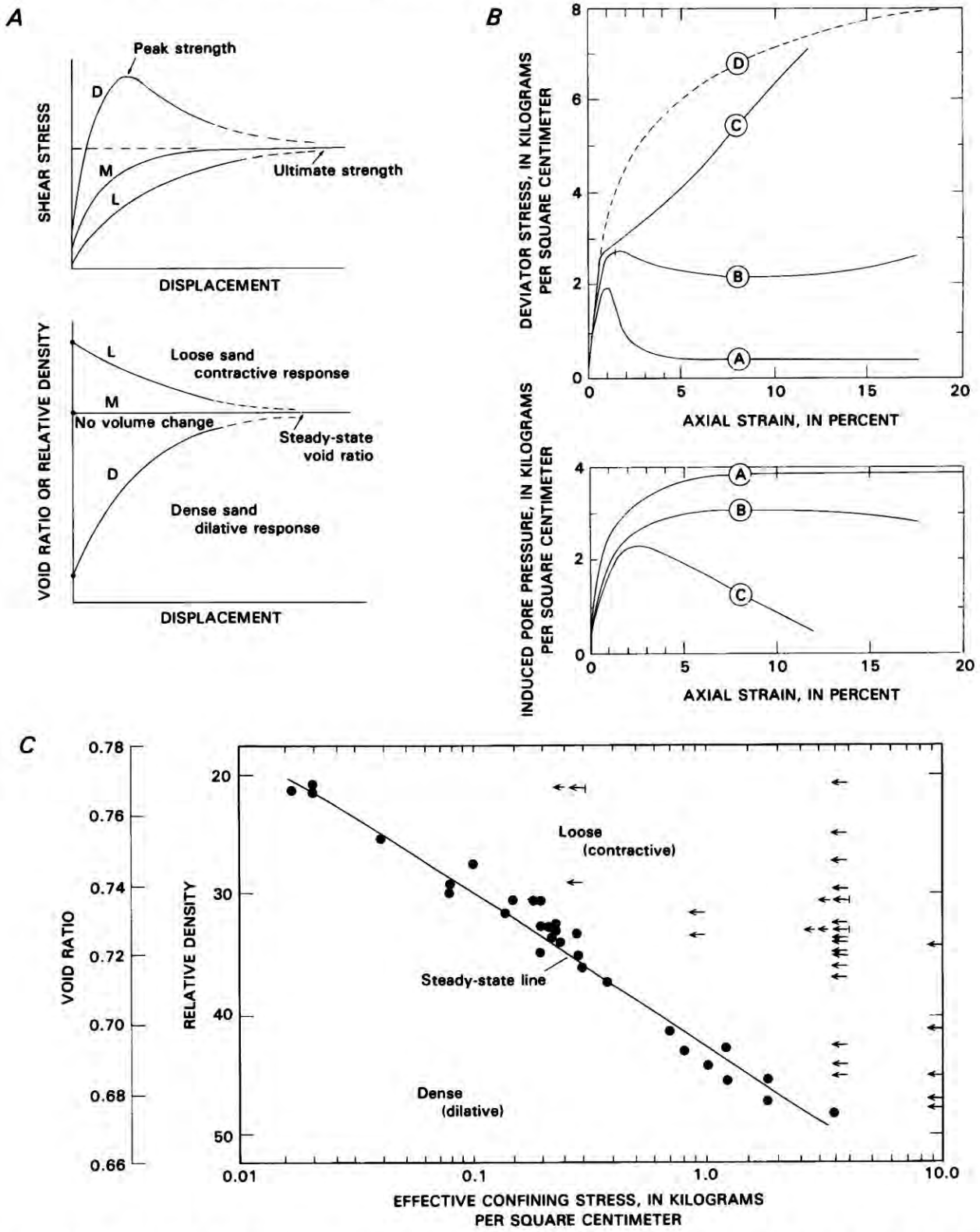


FIGURE 6.27.—The steady state of sands (modified from Casagrande, 1976, figs. 1, 3, 6). *A*, Shear stress (upper plot) and void ratio (lower plot) as functions of displacement, from drained direct shear tests on sand at different initial densities. D, dense sand; L, loose sand; M, sand initially at steady-state void ratio. A steady-state void ratio is approached during shear from either a dense or a loose initial

paths will intersect the steady-state line lower down (such as path 2, fig. 6.29). Here, the steady-state void ratio is closer to e_f, and the resulting flows are stronger. Where drainage is complete or where soil is barely contractive (initial condition A′, figure 6.29), the soil may not mobilize because the steady-state void ratio may be less than the void ratio at the liquid limit.

Dilative Case

Dilative soils in the basal shear zone start from states such as B, below the steady-state line (fig. 6.29). Dilation by basal shear deformation during failure results in paths like path 3, which reach the steady-state line with void ratios near e_f, marginally capable of flow from the scar. Such paths may originate somewhat to the right or left of point B, and then follow more or less vertical paths to the steady-state line. Paths to the right of path 3 would occur in cases where failure is triggered by pore pressures lower than those resulting from slope-parallel seepage with saturation to the ground surface. Under the conditions illustrated in figure 6.29, such paths could not attain mobilization through steady-state behavior in the basal shear zone. Paths to the left of path 3 would occur in cases where failure is triggered by pore pressures greater than those represented by path 3.[3] Such high pore pressures promote mobilization by steady-state deformation in the basal shear zone, and mobilization by this means can be complete because the entire basal shear zone can undergo sufficient dilation.

In many cases, dilative soils probably cannot mobilize solely by steady-state deformation of the basal shear zone. Slide movement may not be sustained enough to reach the steady state, in part because cracks opened by movement tend to lower water levels in the slide mass, and steady-state void ratios, if achieved, may not be quite sufficient for flow. Parts of the sliding mass, however, may be mobilized by local dilations that result from deformation outside of the basal shear zone. Such partial mobilization may occur along the flanks of the slide, where shear may be accompanied by extension and by abundant water channeled along pullaway cracks, and at the toe of the slide, where dilation may be accompanied by abundant water and oversteepened slopes. Dilation from such sources is reflected in the pattern of flows shown in figure 6.19. Major deformation also occurs where the slab passes over the lip of the scar (fig. 6.30). Bending here causes successive dilations and contractions that, with sufficient water, would promote mobilization.

Mobilization by dilation is slower than by liquefaction because the water content must increase. Deposits that reflect critical thickness are thinner than the scar depth, but they are typically thicker with respect to scar depth than are deposits mobilized by liquefaction; thus, travel distance is generally less. Deposits are lumpy because water content has increased in some parts of the mass more than others, as when milk is added to oatmeal. Dilative mobilization is documented in the Salmon Creek case study below and by Fleming and others (in press). This means of mobilization corresponds approximately to case B in figure 6.26.

The foregoing analysis of mobilization has focused largely on behavior in the basal shear zone. Mobilization of a slide mass is also facilitated by other deformations incurred as it moves from the scar, some of which are illustrated in figure 6.30. The results of these deformations are influenced by soil state in the general manner discussed above. In homogeneous soil, deformation in the body of the slide mimics that in the basal shear zone and thus results in the features described above for each case. Where soil is heterogeneous at a site, means of mobilization and the resulting features may be mixed.

MOBILIZATION DURING THE STORM

Although we lack the steady-state test data needed to identify the specific means of mobilization that occurred in the storm, the wide range in A.M.I. (fig. 6.26) suggests that mobilization occurred by both contractive and dilative means. The debris flows that eyewitnesses observed to follow from slow sliding probably occurred in dilative soils, whereas apparently instantaneous debris flows probably resulted from liquefaction of contractive soils. Empty scars, as shown in figures 6.1 and 6.3, probably resulted from contractive behavior, although complete mobilization is possible also in dilative soils. The partial mobilization shown in figure 6.19 is typical of dilative behavior. Nonmobilized slides, such as those shown in figures 6.22 and 6.23, probably occurred in dilative soils. The following case studies illustrate these means of mobilization.

[3]Regardless of loose or dense soil behavior, initial conditions well to the left of line AB approach the quick conditions ($\bar{\sigma}_3 = 0$) described by Iverson and Major (1986).

state. *B*, Deviatoric stress (upper plot) and induced pore pressure (lower plot) as functions of axial strain (ε), from undrained triaxial tests on sand at different initial relative densities after consolidation (D_{rc}). Curves: A, $D_{rc} = 30$ percent, 0.2 s from peak to $\varepsilon = 18$ percent; B, $D_{rc} = 44$ percent, 0.4 s from peak to $\varepsilon = 18$ percent; C, $D_{rc} = 47$ percent, 37 minutes to $\varepsilon = 12$ percent; D, drained test for comparison, $D_{rc} = 30$ percent. *C*, Steady-state void ratio as a function of effective confining stress. Arrows, start of test (after consolidation); dots, liquefaction. Actual liquefaction occurred only in loose (contractive) soil.

REED (CASE STUDY 7, PL. 5)

By Stephen D. Ellen, Philip C. Lahr, and Susan H. Cannon

Several soil slip/debris flows and other landslides occurred during the storm on a hill near Reed, in the southern part of Marin County (fig. 6.31). Residents witnessed four debris-flow events from the wooded northwest side of the ridge between 1:00 and 9:00 p.m. P.s.t. January 4 (E.W. Hart, written commun., 1983); these events probably correspond to the four scars in the northwestern part of figure 6.31. Sounds of snapping trees accompanied the afternoon events. One house, approximately 275 to 300 m from the soil-slip scars and 180 m from the nearest point of the debris-flow trail, shook noticeably during at least one of these events (Harry North, Jr., oral commun., 1982).

Lahr (1982) tested materials from five of the landslides shown in figure 6.31. Most of these landslides were soil slip/debris flows, both in woodland (site 1, fig. 6.31) and in grassland (sites 2–4). For comparison, he also sampled clayey soil from a complex of earth slides, small parts of which had mobilized as a slow-moving debris flow (site 5). The results of his field and laboratory tests are listed in table 6.1 and plotted in figures 6.16 through 6.18 and figure 6.26.

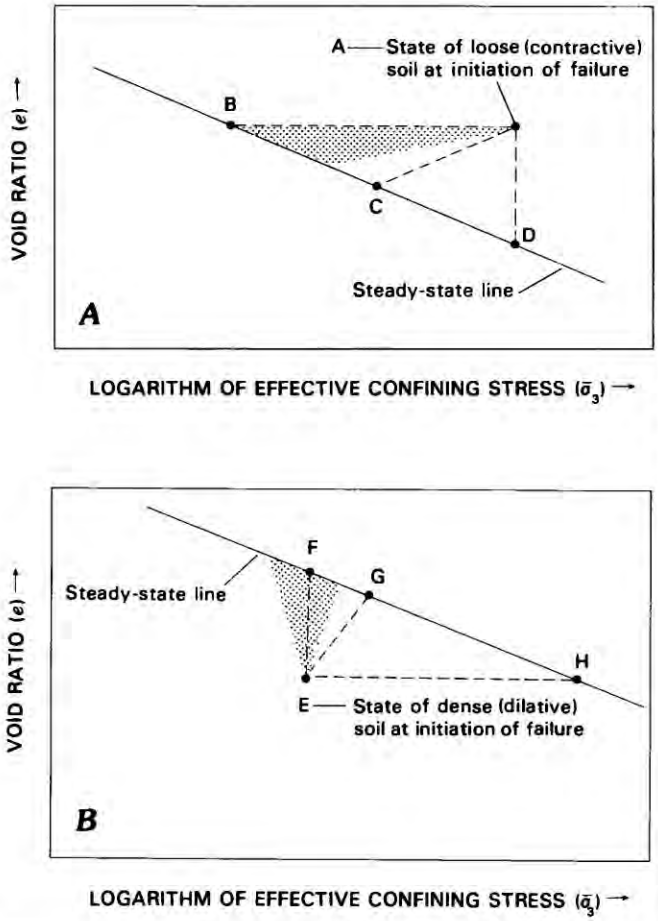


FIGURE 6.28.—"State diagrams" illustrating changes in state during deformation of contractive soil (*A*) and dilative soil (*B*). Shading shows state paths likely in rainfall-induced landslides. Letters identify state paths discussed in text.

Scars of the soil slips studied by Lahr are underlain by Franciscan metasandstone; similar bedrock underlies the entire area, according to mapping by Rice and others (1976). The scars occur in granular soil mantle derived from metasandstone, similar to the soil mantle over Franciscan sandstone in the bay region. Permeability contrasts are present in bedrock near each of these soil-slip scars, as evidenced by springs emanating from scars (sites 1, 2, fig. 6.31) and by clayey materials immediately downslope of scars (sites 1, 3, 4). Proximity of these scars to permeability contrasts suggests the influence of water-concentration mechanisms that operate along bedrock contacts. Slopes at these scars range from 21° to 27°; these relatively gentle slopes of failure (see fig. 6.16) suggest elevated pore pressures that can accompany these water-concentration mechanisms.

Sites 2 and 3 show evidence of two distinct flows from each scar (fig. 6.32). At each site, one flow developed from dark surficial soil, and one from underlying tan colluvial soil; a zone of clay enrichment separated these two soils. In each case, the first material to flow from the scar was the dark, organic-rich surface layer. This material left a broad trail, largely of flattened grass, bounded by low (approx 10 cm) lateral deposits that were smooth textured except for lumps of sod, suggesting a broad thin sheet of fluid, fast-moving slurry (figs. 6.33, 6.34). The second flow in each case involved the tan inorganic lower part of the soil mantle; at site 3, where relations were clear, this second flow resulted from partial mobilization. This flow left a narrower trail lined by generally thicker (approx 30 cm) and lumpier lateral deposits and including more abundant patches and lumps of deposit within the trail (figs. 6.33, 6.34), suggesting a stronger, less fluid slurry that moved as a thicker sheet. The single scar suggests that both flows began mobilization at the same instant from a sliding failure that extended down into the tan colluvial soil; otherwise, the precise superposition of scars would be fortuitous. Thus, the time interval between the two flows apparently resulted solely from different rates of mobilization.

The behavior of these two-layer soil slip/debris flows is clarified through the test results plotted in figure 6.26, which include data for a third site that shows similar relations (see Salmon Creek case study below). At all three sites, dark surficial soil has A.M.I.>1, suggesting contractive behavior. The underlying tan soil at site 3 and at Salmon Creek had A.M.I.<1, suggesting dilative behavior;

at site 2, the A.M.I. of tan soil was slightly greater than 1, and so this soil appears to be slightly contractive. Thus, these results are consistent with the observed relations between rapidly mobilized, thin, smooth deposits derived from the dark soil, and more slowly mobilized, thicker, lumpy deposits derived from the tan soil.

Some features of the deposits at these sites may have been influenced by other factors. Water held by the grass before passage of the flows probably was incorporated into the flows and contributed to thinning and smoothing of the first flow episode at each site. Geometry of the landslide failure surface probably also affected the results. Because rotational slides tend to stabilize themselves by movement, they are less likely than slab slides to mobilize completely, particularly for soils that must dilate to flow. Partial mobilization at these sites may have resulted in part because sliding in the tan soil involved considerable rotation.

Similar modes of failure and mobilization occurred at other sites. Failure of dark surficial soil without failure of underlying tan soil was common during the storm (Davenport, 1984; see subsection entitled "Brookhaven Site" in chap. 9). At Canham Road (see chap. 8), a rapid debris flow of black soil, followed by less-fluid debris flows, suggests a two-layer soil slip/debris flow.

SALMON CREEK (CASE STUDY 8, PLS. 5, 6)

By Stephen D. Ellen, Robert W. Fleming, and Mitchell A. Algus

The features shown in figure 6.35 resulted from a complex landslide in which some parts mobilized as debris flows and another part slid approximately 1 m and rotated slightly but did not mobilize. The site is described more fully by Fleming and others (in press). R.W. Nichols and S.H. Cannon assisted in sampling and testing. We appreciate access to the site granted by Alvin and Robert Gambonini.

The landslide developed in a broad subtle swale near the base of a nearly planar hillslope adjacent to an alluvial terrace along Salmon Creek. Franciscan sandstone is exposed in the scar, and the hillslope was mapped as Franciscan sandstone by Blake and others (1974). The dominantly colluvial soil in which the landslide occurred is granular and slightly cohesive (SM or SC of the USC system), similar to soil over Franciscan sandstone elsewhere in the bay region. The soil mantle consists of a dark layer (dry density, 1.40 g/cm^3) extending from the ground surface to 0.6-m depth, a clay-rich zone (dry density, 1.88 g/cm^3) from 0.6- to 0.9-m depth, and a homogeneous tan colluvium (dry density, 1.75 g/cm^3) from 0.9 m to bedrock at about 2- to 2.5-m depth. Features in a large concavity

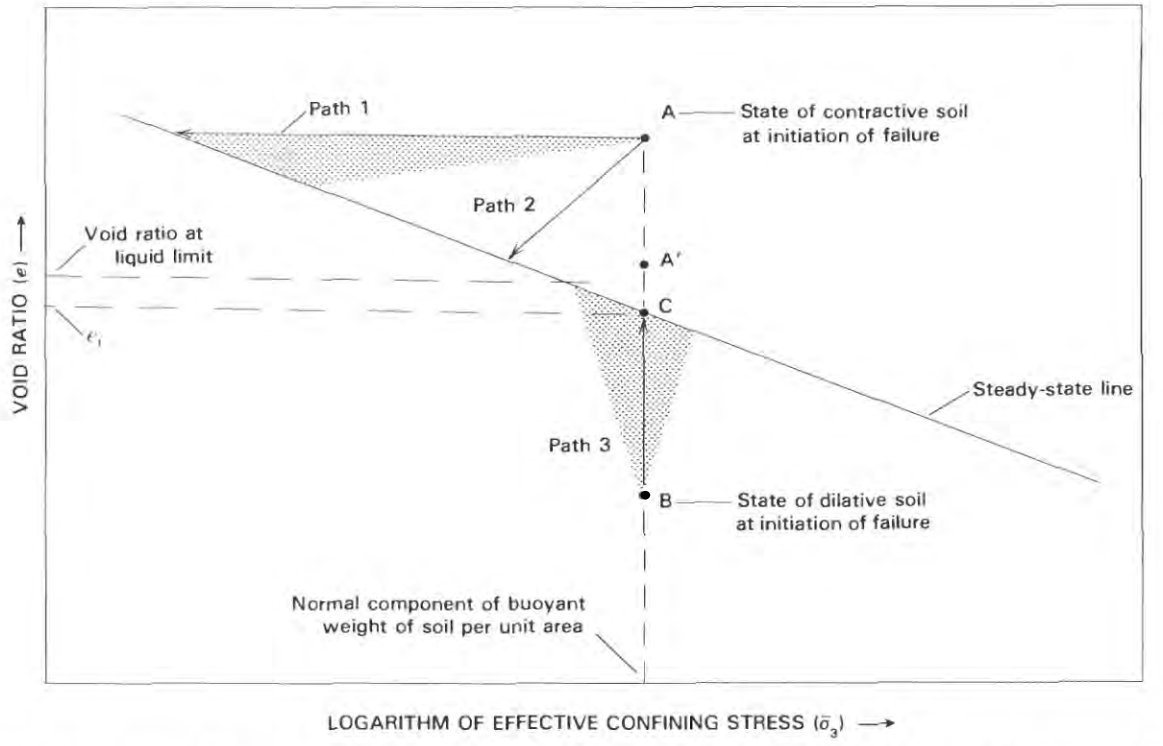


FIGURE 6.29.—"State diagram" showing contractive and dilative means of mobilization. Shading shows state paths likely in rainfall-induced landslides from initial conditions A and B; points A' and C are discussed in text. Steady-state void ratio greater than e_f is necessary for debris flow from soil-slip scar. Initial conditions that plot above void ratio at liquid limit have A.M.I.>1.

upslope from the site suggest past soil-slip activity; the soil mantle at the site probably consists of, or is derived from, deposits of these past events.

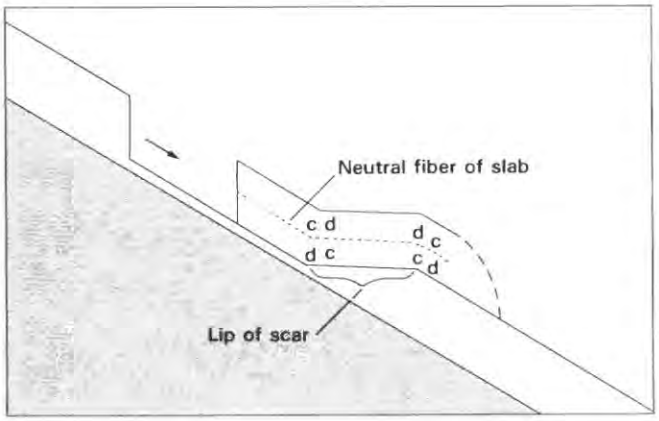


FIGURE 6.30.—Schematic downslope cross section of soil slip/debris flow as it leaves scar, showing zones of dilation (d) and contraction (c) in slab as it passes over lip. Position of neutral fiber depends on behavior of soil.

Seepage, which occurred for at least several months after the storm from a broad zone directly below the scar (fig. 6.35), suggests the presence of permeability contrasts that during the storm may have resulted in out-of-slope seepage. The uncommonly gentle (22°) slope of failure in typical materials suggests elevated pore pressures, which could result from out-of-slope seepage.

Principal landslide features (fig. 6.35) are the large arcuate scar from which materials mobilized; the slab remaining within the arc of the scar; and the debris-flow deposits that lead downslope from both ends of the scar, then turn on the very gently sloping terrace surface to extend beyond the left side of figure 6.35.

Both the deposits and scar showed evidence of two-layer soil slip/debris flows. In trails leading from both ends of the scar, lateral deposits of tan soil, which were lumpy and commonly at least 60 cm thick, lay nested within thin (max 10 cm thick) lateral deposits, consisting largely of grass clods, mobilized from the dark upper layer. This nested relation indicates that the dark soil flowed first. At both ends of the arcuate scar, paired dark lateral deposits led from the very edges of remnants of shallow scars in the dark surface layer. Several lateral deposits

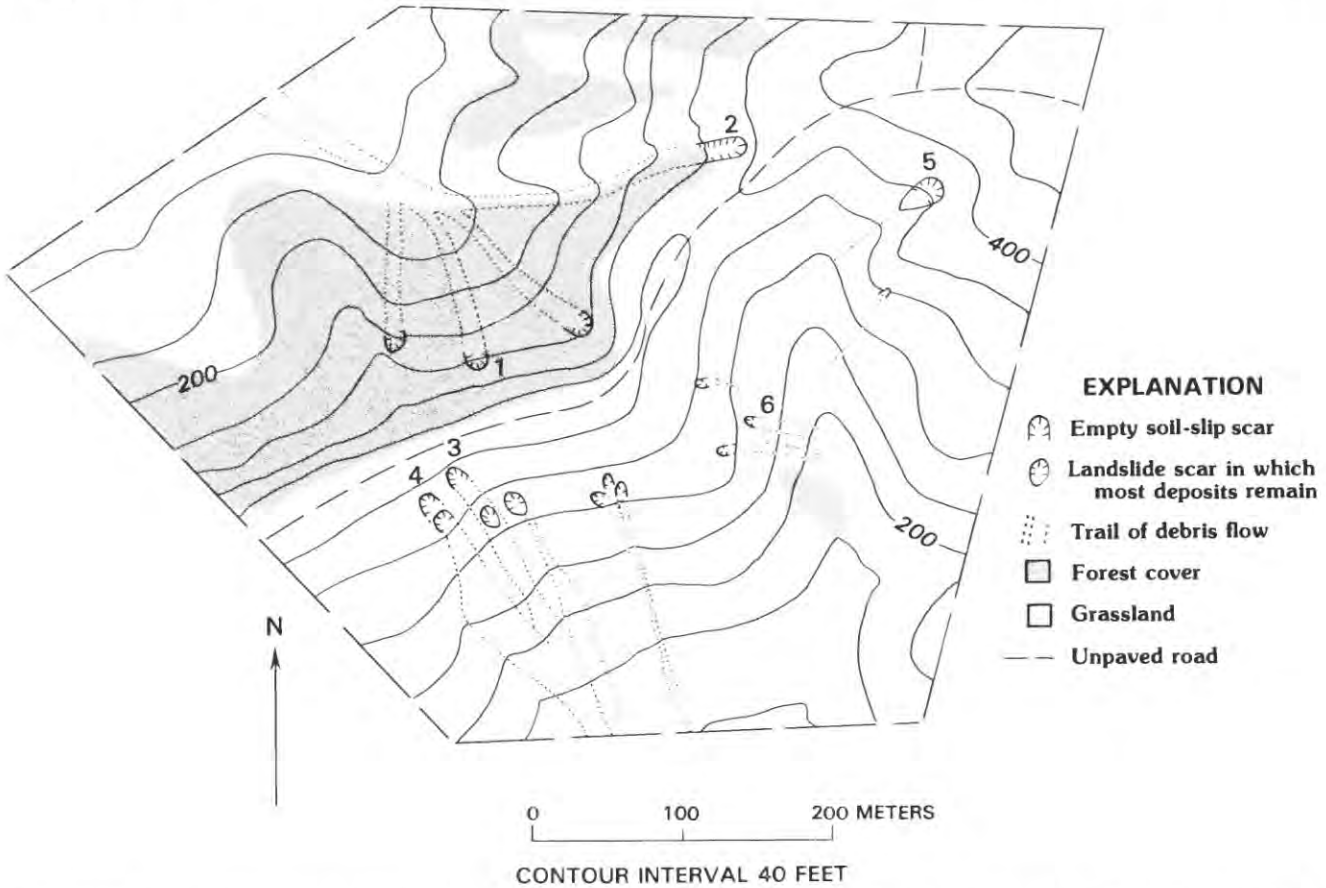


FIGURE 6.31.—Storm-generated landslides near Reed, Marin County. Sites 1 through 5 denote landslides studied by Lahr (1982); site 6 is a landslide from which samples SQ-15A and SQ-15B (table 6.1) were taken. Base enlarged from U.S. Geological Survey San Rafael (1954) and San Quentin (1959) 7.5-minute quadrangles.

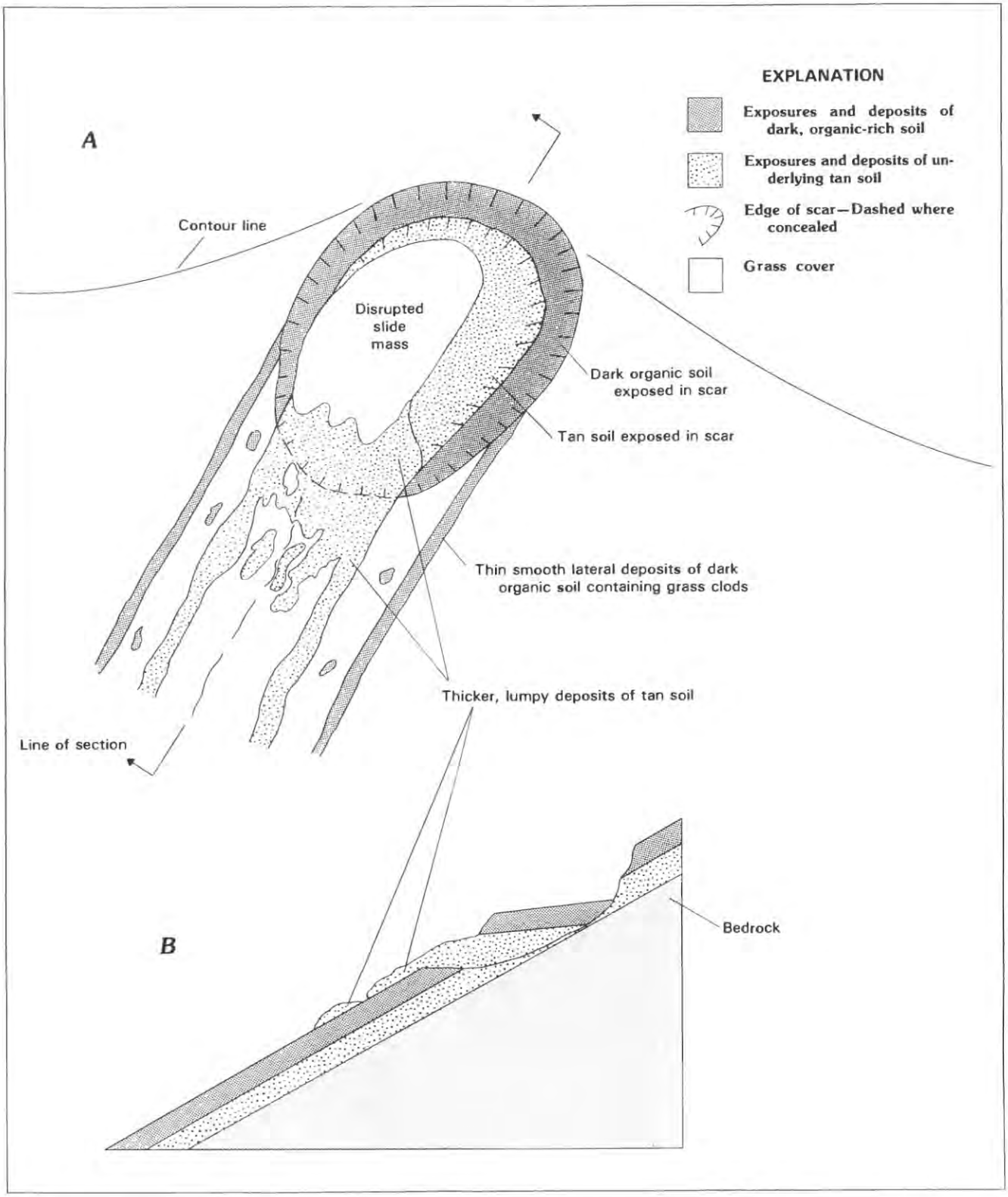


FIGURE 6.32.—Schematic map (*A*) and downslope cross section (*B*) showing features typical of two-layer soil slip/debris flows. Figure 6.32*B* shows only those deposits in plane of cross section. Grass cover not shown in cross section.

of tan soil extended from the lips of the scar, at least on the end of the scar at the right side of figure 6.35, but identification of matching pairs is complicated by the partially mobilized slump (including nonmobilized dark surficial soil) that occupied most of the right half of this trail, upslope from the calf.

Laboratory testing described representative samples (table 6.1) and concentrated on factors affecting mobilization. The dark soil had A.M.I. = 1.70, suggesting contractive behavior; the tan soil had A.M.I. = 0.83, suggesting dilative behavior. Typical samples of the tan soil, which was studied in more detail, had liquid limits 3 to 4 percent higher than saturated water contents, and slurries that would pour from a beaker could be mixed with as little as 2 percent water beyond the liquid limit. An undisturbed sample of the tan soil, collected just above the basal shear zone, showed dilation in simple shear under confining pressure appropriate for the depth of the basal shear zone (approx 1.5 m). The measured dilation corresponded to a 3.4-percent increase in saturated water content, and the sample may not have reached its steady-state void ratio. Thus, shear dilation near the slip surface was apparently sufficient or nearly sufficient to increase water content to the liquid limit, and thus barely sufficient to mobilize debris flows from the tan soil.

The landslide features and measured soil properties suggest the following sequence of events.

1. Failure occurred in the shear zone that defines the base of the slab, near the base of the tan soil. The sliding mass occupied most of the volume of the present empty scar plus the slab remaining. Sliding of the large mass was slow and probably sporadic because the soil at the slip surface was dilative; if this soil had been contractive, small displacements of the mass would probably have resulted in liquefaction and consequent rapid movement of the entire mass.
2. Movement of the slide mass affected the hillslope in two principal ways: (i) By opening a pullaway crack at the crown, it interrupted throughflow and surface flow to the slide mass, tending to arrest its movement,

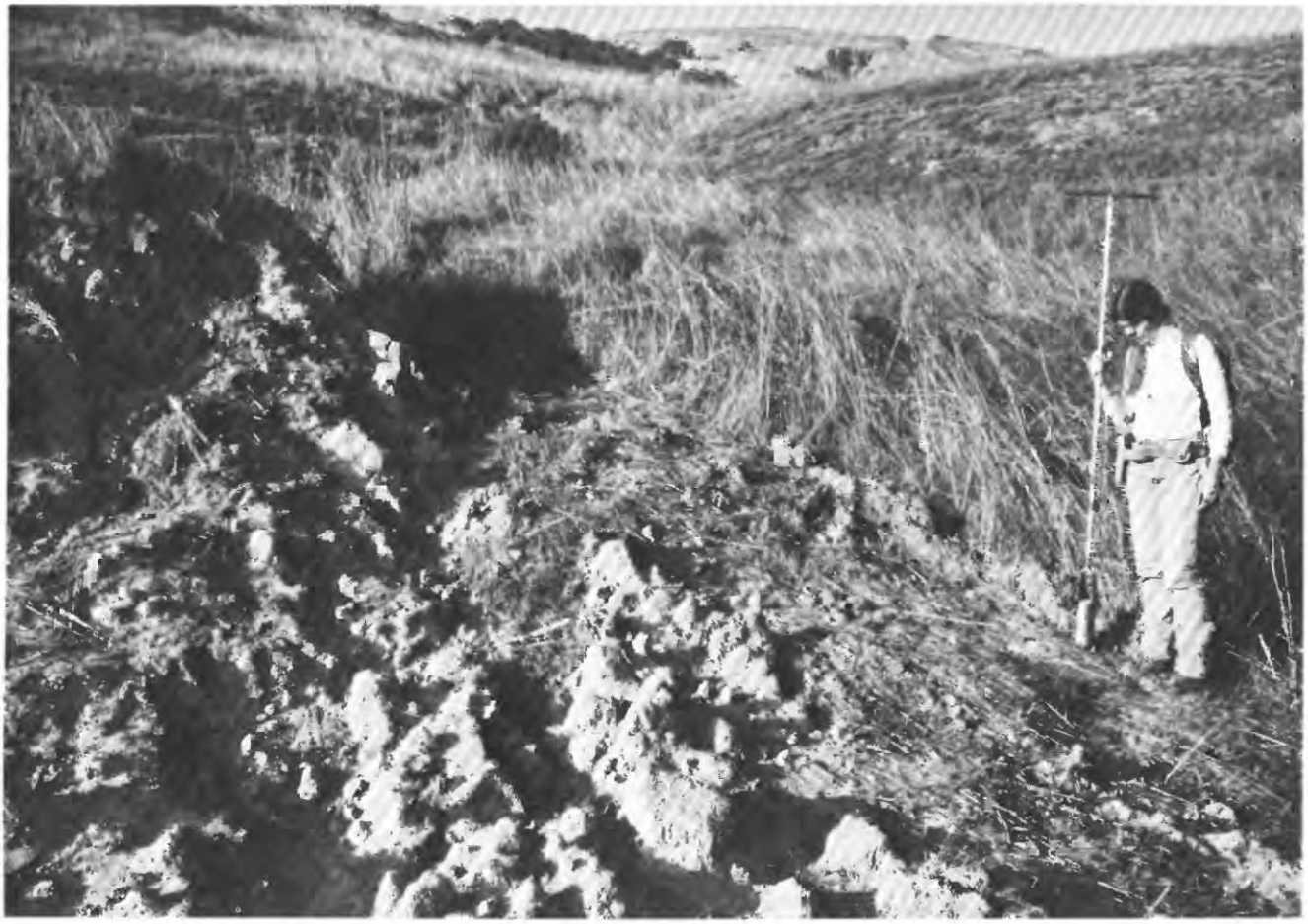


FIGURE 6.33.—Deposits from two-layer soil slip/debris flow near Reed, Marin County. Dark surficial soil forms thin deposit of relatively smooth consistency near auger; underlying tan colluvial soil forms thicker lumpy deposits at bottom center of view.

and channeled this flow toward the flanks of the slide, promoting further movement there; and (ii) it dilated soil in the basal shear zone and in other parts of the landslide, particularly near the flanks, head, and toe, where dilation could result from extension and shear.

3. Near the flanks of the slide mass, elevated water levels induced failures in the weakened materials. First, the contractive dark surface soil mobilized rapidly by liquefaction to produce a fluid flow that left thin lateral deposits. Then, the tan soil, dilated by extension and shear, mobilized slowly as a more viscous slurry that left thick lumpy deposits, reflecting dilation to a water content barely sufficient for debris flow down the hillslope. The remaining slab did not mobilize because either it was stabilized by slight rotation, access of water was insufficient for continued failure, or dilation from basal shear alone was insufficient to mobilize the soil.
4. Failure and mobilization occurred in the crown area of the slide (to complete the arc of the scar), in the slump near the right side of figure 6.35, and at the subsidiary scars that cut back into the main scar. Erosion by seeping and running water modified the scar throughout the sequence.

PREDICTING MOBILIZATION

The foregoing analysis provides three principal methods for predicting mobilization of debris flows from soil slips: clay content, A.M.I., and steady-state soil testing. Clay content provides a crude first cut at predicting susceptibility to debris flow at sites subject to shallow slope failure. Soils with clay contents between 3 and 35 percent were capable of debris flow in the storm, and a more limited sample of fast-moving debris flows from hillslopes in long-term equilibrium showed clay contents generally between 8 and 25 percent (fig. 6.17). The breadth of these ranges, however, makes this measure, by itself, of limited use.

The ratio of saturated water content to liquid limit, the A.M.I. (fig. 6.26), distinguishes in approximate manner soils capable of rapid mobilization by liquefaction (A.M.I. >1) from soils that must dilate to flow (A.M.I.<1). This index also provides an empirical limit for soils susceptible to soil slip/debris flow (boundary between cases B and C, fig. 6.26; A.M.I. = 0.45), and the simplicity of this index encourages additional testing that can define this boundary more precisely. Clay content or plasticity of soils may be a useful supplement to the A.M.I. for evaluating the susceptibility of dilative soils. At sites where failure is likely, the A.M.I. provides a simple and inexpensive means of predicting the likelihood of debris flow and the nature of its initiation.

The most precise site-specific method of prediction permitted by this analysis uses the liquefaction-evaluation procedures of Poulos and others (1985) to determine the steady-state parameters of critical soils at sites of potential failure. These procedures permit determination of the initial state and the steady-state line, and thus the soil's contractive or dilative behavior, the magnitude of divergence from steady-state conditions, and the steady-state strengths that can be expected. When combined with liquid limit or a more precise measure of conditions needed for flow, these measures provide as precise a description as possible of the aspects of soil behavior critical to mobilization. Testing required by the steady-state method may be complicated by heterogeneity of materials, coarse particles in the soil, and the low confining stresses that characterize shallow landslides.

SUMMARY

Almost all the debris flows induced by the storm mobilized directly from soil slips. Theoretical analysis and limited test data indicate that the rapid and complete mobilization that produced thin lateral deposits resulted from liquefaction of contractive soils, whereas mobilization that was slow and partial, or slide movement that did not produce debris flow, resulted from dilative soil behavior. The means of mobilization may be evaluated in approximate or precise fashion by soil testing. Such evaluation will help in predicting: (1) the potential for mobilization—whether debris flow is likely from a given slide or potential slide; (2) the completeness of mobilization—the proportion of a slide or potential slide that may be expected to transform into debris flow; (3) the speed of mobilization—the lag time between initial failure and flow; (4) the velocity and thickness of flow from the scar, based on likely strength of the slurry; and (5) the travel distance of the debris flow.

TRAVEL

Debris flow, as modeled by either simple plastic or Coulomb viscous (Bingham) material, consists of a relatively rigid plug riding on a zone of slurry that is undergoing flow (fig. 6.24; Johnson and Hampton, 1969; Johnson, 1970, 1984; Rodine, 1974). Travel of debris flows can be analyzed by using the concept of critical thickness, the thickness of the rigid plug, as discussed above in the subsection entitled "Transition from Slide to Flow." For a debris flow to travel, its thickness must remain greater than its critical thickness; deposition occurs where the plug bottoms out, as the flow's thickness decreases to its critical thickness. The critical thickness of a simple plastic or Bingham material in a broad channel is described by equation 2, in which the critical thickness T varies directly with the strength of a slurry. According to Johnson and Hampton (1969, fig. 3.3), the strength of a slurry is determined chiefly by its water content and the proportions

of various grain sizes. Pierson (1981) showed that slurry strength also depends on pore pressures within the slurry, which dissipate after deformation ceases.

Equation 2 shows the effect of change in slope on travel of debris flows. Where slope steepens along the path, decrease in the critical thickness promotes flow. Where slope decreases along the path, a greater critical thickness must be maintained for flow to continue.

EFFECT OF CHANNELS

Because debris flow requires a critical thickness of slurry, a channel greatly facilitates sustained flow. As expressed by Rodine (1974, p. 69), "* * * flow containment appears to be a necessary condition for continued flow of debris flows." Drainage channels may further promote flow by providing additional water to weaken the slurry.

During initial flow from soil-slip scars, debris flows in the storm typically moved without preexisting channels; in some places, such flows traversed considerable distances (fig. 6.36). During this initial phase of debris flow, lateral deposits left by the leading part of a flow probably channelized the rest of the flow. Once preexisting channels were entered by a debris flow, its chances for sustained flow were greatly enhanced. Those debris flows that traveled farthest moved down channels, and some channels sustained debris flows on gradients as gentle as several degrees (pl. 6).

EFFECT OF VEGETATION IN THE PATH

Debris flows in grassland typically left only lateral deposits lining a swath of flattened grass that included bits of muddy deposit (figs. 6.13, 6.15, 6.20). Some of these trails showed evidence of subsequent running water, but most appeared to be as they were left by the debris flow. Movement of slurry over grassland appears to have been accomplished by sliding as well as flow (fig. 6.36). Sliding seems to be reasonable, considering the water-laden con-



FIGURE 6.34.—Two-layer soil slip/debris flow at site 3 near Reed, Marin County. *A*, Different debris-flow deposits lead from single soil-slip scar. *B*, Lateral deposit to left of flagged stake in foreground of figure 6.34*A* consists of soil from organic upper layer of soil mantle. This deposit is thinner and smoother than light-colored lumpy deposits to right of flagged stake, which derive from lower horizons of soil mantle. Much light-colored lumpy material remains in and near scar as a disaggregated slump that only partially mobilized.

dition of the standing grass and the rapid movement of the debris flows, which would flatten the grass and release water to form a near-frictionless blanket at its base. During movement over grass, incorporation of some of the water released from the grass into the debris flow probably permitted progressive thinning of the deposits.

Brush and trees did not provide such slick paths for debris flows. Such vegetation either caught and held bits of the flow, or was torn from the hillslope to become part of the flow (figs. 6.3, 6.5, 6.8). Brush and trees thus served to transfer some of the downslope force of the debris flow to the path and thereby facilitated additional failures that probably added directly to the volume of the major pulse (see Three Peaks case study above). This effect helps explain the abundance of soil-slip/debris-flow complexes on forested and brush-covered hillslopes, and why such hillslopes appeared to be capable of larger debris-flow events than grassland hillslopes.

The interaction that brush and trees provide between debris flow and path also increases frictional drag on the base of the debris flow. By slowing the front and base of debris flows, frictional drag appears to encourage tall flow fronts by permitting materials from the top and rear of the flow to overtake materials at the front and base. Such effects help explain observed flow heights greater than scar depth and the tumbling or rolling motion observed at flow fronts (see Three Peaks case study above).

DEPOSITION

Debris flows may cease their movement and form deposits for various reasons, most of which can be explained through the concept of critical thickness. Broadening of the channel may decrease flow thickness to the critical thickness. Decrease in channel slope or dewatering of the flow may increase critical thickness to the point of stoppage. Deposits left along the path, described by the lag rate (Cannon, 1985, 1986), may diminish the volume of the flow to the extent that a critical thickness cannot be maintained. And the tendency for concentration of coarse particles at the front and lateral margins of debris flows may lead to strong marginal rims that cause deposition of weaker flow material within (Pierson, 1984).

The most conspicuous deposits left by the storm were lateral deposits, or levees, lining flow paths (figs. 6.15,



FIGURE 6.34.—Continued

6.33–6.36). These lateral deposits generally represented the edges of broad tabular flows, where their thickness decreased toward zero. Except where coarse clasts were concentrated or velocities were great, the thickness of lateral deposits recorded the critical thickness of debris flows.

TRIGGERING MECHANISMS WITHIN COMPLEXES

Within complexes of soil slip/debris flows (pl. 4), the spatial association between auxiliary scars and the major path suggests that the auxiliary slope failures were triggered by other failures in the complex, either by loss of support due to movement of adjacent ground or by debris flows passing over the ground surface. The likely influence of different triggering mechanisms can be explored through time relations among scars in a complex and through the likely role of vegetation in the path.

Most of the complexes examined in this study showed evidence of complex sequences of events, suggesting that different parts of a given complex failed at different times during the storm. Within this complexity, however, some consistent time relations emerged. Where one scar was contiguous to the downslope side of another, time relations commonly suggested that the debris flow from the upslope scar followed a debris flow from the downslope scar; in such places, failure at the upslope scar appeared to have been triggered by removal of support from below. In contrast, where scars lay separated within the path of a debris flow, evidence commonly suggested that these scars were absent when the debris-flow front passed. In such places, auxiliary scars were probably triggered by passage of the major debris flow; otherwise, the strong spatial association between auxiliary scars and the major path would make little sense.

Triggering of auxiliary soil slips by the passage of debris flows could result from three possible mechanisms. Shaking accompanying passage would add dynamic loads to soil in the path. The suddenly imposed weight on soil underlying the path would constitute an undrained loading (Hutchinson and Bhandari, 1971). And the downslope force of the moving debris, where coupled to the path by vegetation, would add directly to the forces facilitating failure. The greater abundance of complexes in forested and brush-covered areas provides a clue to the relative significance of these mechanisms. Whereas shaking and undrained loading would probably not be significantly affected by type of vegetation, the downslope pull of a debris flow would be decidedly more effective in forest or brush than in grassland. Thus, the downslope pull of debris flows

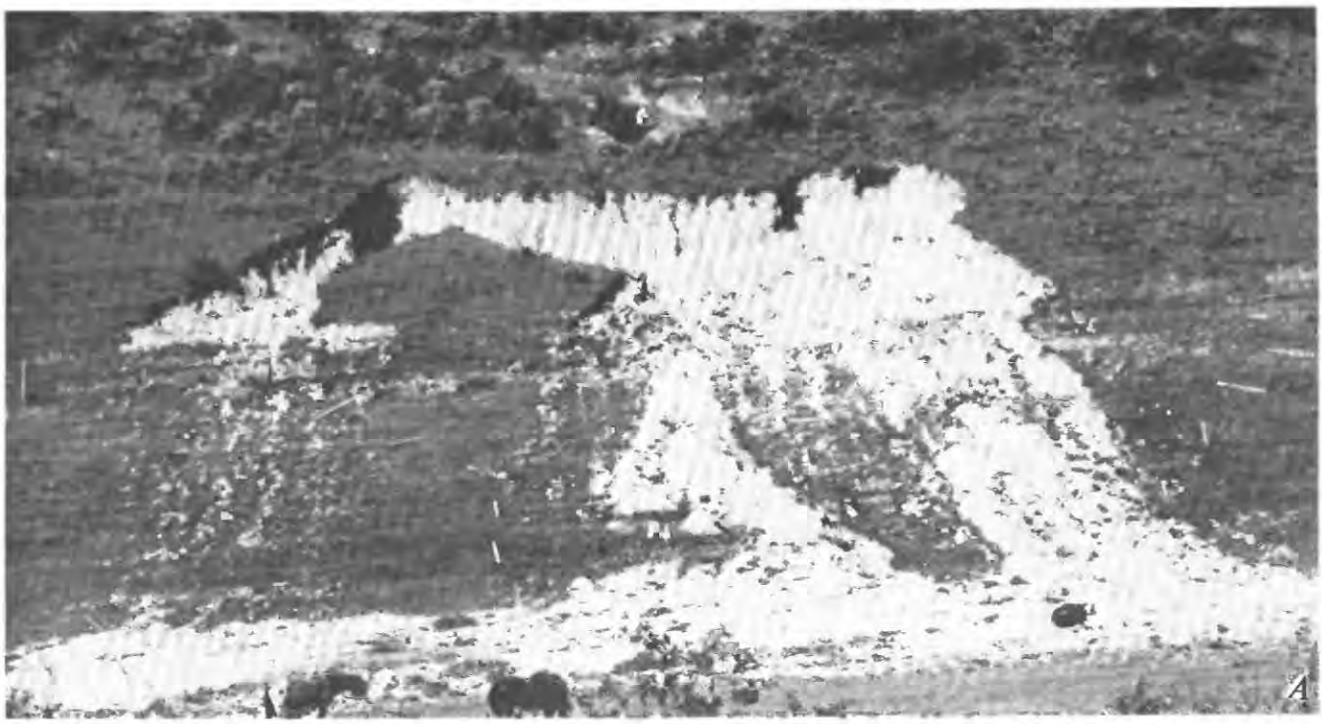


FIGURE 6.35.—Shallow landslide along Salmon Creek, Marin County, of which both margins have mobilized as debris flows. *A*, Hillside slopes 22° toward observer; alluvial terrace in foreground is approximately horizontal. Slab remaining within arcuate scar (above horses) has slid downslope about 1 m; its toe is near fenceline that formerly crossed hillside horizontally near center. *B*, Sketch identifying features discussed in text.

on their paths appears to be the most effective triggering mechanism for auxiliary soil slips.

CONCLUSIONS

Debris flows in the San Francisco Bay region during the storm originated from shallow slides of the soil mantle on steep hillslopes. These soil slip/debris flows varied widely in scale and complexity, from small single events to large complexes in which numerous soil slips apparently were triggered by passage of a major debris flow and thus contributed to its volume.

The distribution and features of soil slip/debris flows triggered by the storm make sense mechanically when the overall process is viewed as a sequence of steps. The perched water tables that triggered failure of the soil mantle generally resulted from a combination of current intense rainfall and concentration of water in the landscape. Failure in most cases can probably be explained by saturation to the ground surface, with seepage parallel to the hillslope, but in some cases failure may have required elevated pore pressures. Soil slips mobilized into debris flows by two principal processes that are reflected in basic features of scars, trails, and timing of events. The

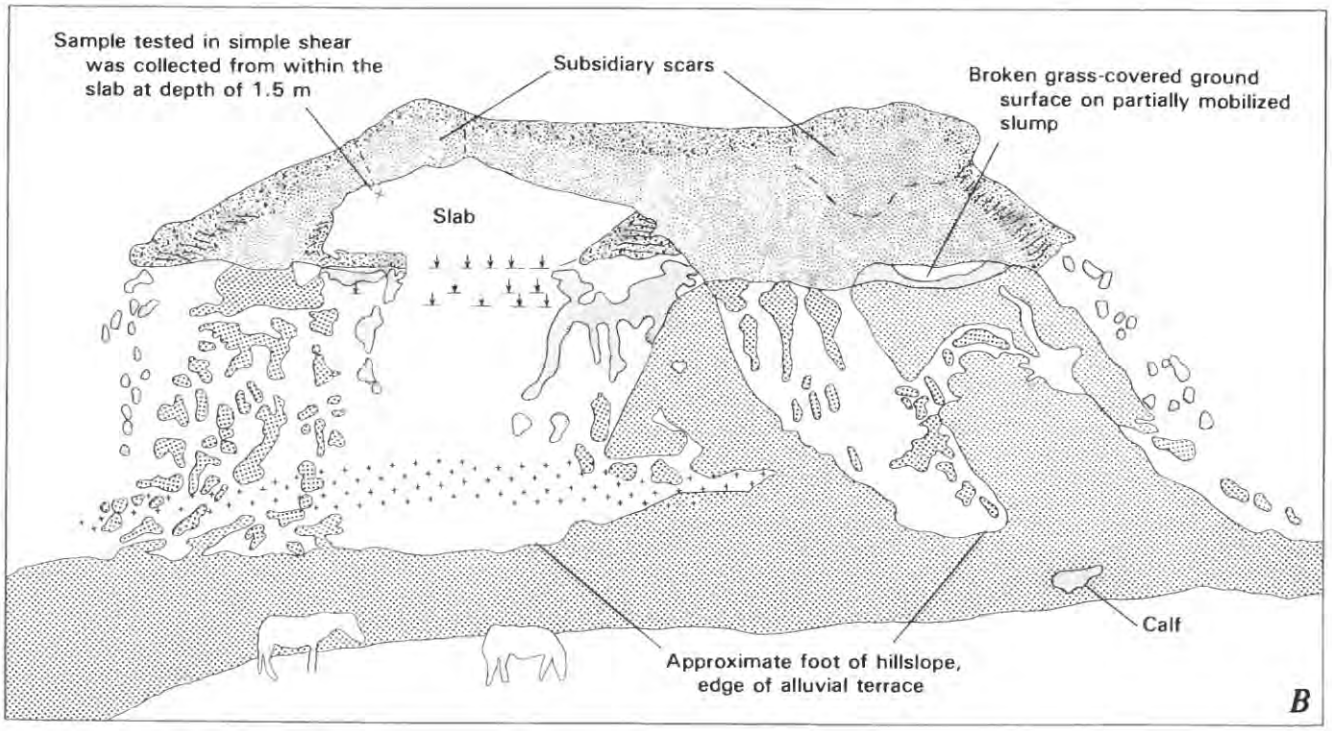


FIGURE 6.35.—Continued

resulting debris flows were sustained by channels and affected by vegetation in their paths.

The following points summarize the practical information gained or confirmed through this analysis.

Timing with respect to rainfall.—Soil slip/debris flows generally occurred during intense rainfall or within several hours after intense rainfall. In uncommon cases, where water concentration was delayed by passage through bedrock or by hillslope modifications, debris flows occurred as much as 22 hours after rainfall ceased.

Susceptible hillslopes.—Although most soil slip/debris flows originated on slopes of at least 26°, they were commonly reported on slopes as gentle as 20°, and one occurred on a slope of 14°. Most soil slips occupied areas where concavity, break in slope, or geologic contacts could account for a concentration of water, but some occurred in areas without such recognizable features.

Susceptible soils.—Soil slip/debris flows occurred in a broad range of soils, from noncohesive sandy soils to moderately plastic soils containing as much as 35 percent clay-size particles, but none was documented in highly plastic clayey soils. At sites where shallow sliding is likely, susceptibility to debris flow can be determined by steady-state soil testing or estimated from the approximate mobility index (A.M.I.), the ratio of saturated water content to liquid limit. The same index indicates whether mobilization is likely to be partial or complete.

Movement preceding mobilization.—Although many debris flows were preceded by detectable sliding movement at the source area, many others probably mobilized without preceding macroscopic movement. The likelihood of detectable antecedent movement at a site can be determined by using the A.M.I. or steady-state soil testing.

Effect of channels.—Sustained debris flow generally required a channel, and channels sustained debris flows on gradients as gentle as several degrees.

Effect of vegetative cover.—Although abundant soil slip/debris flows occurred in grassland as well as in forest and brushland, large debris flows resulting from complexes generally occurred in forest or brushland.



FIGURE 6.36.—Trail of unchannelized debris flow in grassland near Nicasio, Marin County. Upright clump of sod resting on flattened grass suggests that debris flow slid over ground surface; delicate stems of tall dry grass remain undisturbed by their ride tens of meters downslope. Photograph by S.L. Reneau.

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7. DISTRIBUTION OF DEBRIS FLOWS IN MARIN COUNTY

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and Stephen W. Robinson

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ABSTRACT

Debris flows, generally soil slip/debris flows but including soil slip/debris torrents, were abundant and widespread in Marin County during the January 3–5, 1982, storm. We mapped about 4,600 debris flows; the areal density of soil-slip sources for debris flows was generally less than 5 per square kilometer but ranged as high as 55 per square kilometer. Most of the debris flows developed in the natural landscape and were not affected by geologically recent ground modifications. Regional distribution of soil-slip sources for debris flows was not strongly associated with the amount of rainfall, but it was associated with steep slopes (80 percent occurred on slopes steeper than 27.5°, as measured from contour maps); with granular soil mantle, as mapped using terrain analysis; and with both bedrock contacts and materials that have strong contrasts in permeability. Within the local landscape, debris flows were closely associated with drainages; about half of the debris flows originated in amphitheaters at the heads of first-order drainages, and most debris-flow trails of significant extent followed drainages. In selected areas of steep, regular terrain, statistical analysis shows that debris flows originated preferentially in amphitheaters that contained scars from previous soil slips, and this preference is explained by the 26 percent of new scars that developed contiguous to preexisting scars.

Temporal distribution of debris flows in the county is associated with intense rainstorms. Rainfall equivalent to that of the January 1982 storm, along with a corresponding level of debris-flow activity, can be expected to recur every 20 to 100+ years in the county. Radiocarbon dating suggests that the recurrence interval of debris flows at sites may range from less than 33 to more than 1,950 years and that debris flows have occurred in the county for more than 46,500 years.

INTRODUCTION

Intense and sustained rainfall on January 3–5, 1982, triggered abundant landslides in Marin County, as well as in other parts of the San Francisco Bay region. Landslides occurred in the county both on natural hillslopes and on hillslopes modified by grading, and they ranged from slow-moving earth slides and earth flows to fast-moving debris flows (see "Introduction" to this volume for landslide terminology). These debris flows caused the three landslide-related fatalities and most of the $18,464,000 in landslide damage in the county that resulted from the storm (see chap. 11). Thus, the discussion here is limited to debris flows.

Debris flows triggered by the storm were dominantly soil slip/debris flows, in which debris flows mobilized from shallow landslides of the soil mantle. Soil slip/debris flows ranged from small, isolated events, in which damage occurred within several meters of the soil-slip scar, to large complexes that involved numerous soil slips along debris-flow trails hundreds of meters long. Soil slip/debris torrents, recognized near Inverness, formed the end member of this spectrum of phenomena; originating as soil slips, they flowed more than a kilometer down major canyons and impacted populated areas as flood phenomena, far from landslide sources. These various types and scales of debris flows are described through case studies in chapter 6. Terms used here to denote earth materials and landslide processes are defined in the "Introduction" to this volume.

Our primary purpose is to document the areal distribution of debris flows that occurred in Marin County during

the storm and to analyze this distribution by comparing it with maps of likely causal factors. We also discuss the temporal distribution, or recurrence, of debris flows in the county, using case studies that involve radiocarbon dating.

PREVIOUS WORK

Landslide features throughout most of Marin County were mapped from aerial photographs at 1:24,000-scale by Wentworth and Frizzell (1975). This mapping, however, did not recognize debris flows because it emphasized the generally slow moving landslides that are large enough to leave recognizable disruptive patterns in the topography. These maps were incorporated into landslide maps of the entire San Francisco Bay region at 1:125,000-scale by Nilsen and others (1979).

Phenomena similar to soil slip/debris flows, called disintegrating soil slips, were previously recognized in the county by Kesseli (1943). Rice and others (1976) described several kinds of landslides, including debris flows, during 1:12,000-scale field mapping in the central and southeastern parts of the county; the text that accompanies their map discusses the nature, timing, and distribution of debris flows.

Detailed mapping at scales of 1:6,000 to 1:8,000 has documented debris flows within small areas in the northern and western parts of the county (Trautmann, 1976; J.M. Coyle, unpub. data, 1978; Reid, 1978; Peterson, 1979; Savina, 1982). That work was directed toward determining the relations of different types of shallow landslides to types of bedrock, to types of soil mantle, and to the topographic form of hillsides as viewed in high-altitude aerial photographs (Ellen and others, 1979). This detailed mapping was later used to calibrate a 1:62,500-scale map that distinguishes areas in the county susceptible to different kinds of shallow landslides, including debris flows (Ellen and others, 1982).

ACKNOWLEDGMENTS

Information on landslides in the storm was efficiently supplied by personnel of the California Division of Mines and Geology, particularly S.J. Rice, E.W. Hart, D.L. Wagner, and C.W. Davenport. The observations obtained from their quick response provided essential basic information on the nature of debris flows in the storm. C.M. Wentworth of the U.S. Geological Survey originated the terrain-mapping approach, including the concept of landslide habitats, on which much of our analysis is based.

Ellen supervised this study and is responsible for the discussion of the regional and temporal distribution of debris flows. Cannon and Reneau gathered most of the map information on the distribution and features of debris flows (pls. 5, 6). R.K. Mark prepared figures 7.1 and 7.2. In addition, several sections have separate authorship.

AREAL DISTRIBUTION OF DEBRIS FLOWS

Although debris flows were numerous and highly disruptive during the storm, they directly affected only a small fraction of the land area in Marin County. As shown in figure 7.1, most of the county had less than 5 mapped soil-slip sources for debris flows per square kilometer; however, much of the county had more than 10 soil slips per square kilometer, and locally the concentration exceeded 50 soil slips per square kilometer.

The countywide inventory map on plate 5 (1:62,500 scale) and the quadrangle inventory map of the Hicks Mountain area on plate 6 (1:24,000 scale) record our knowledge of the regional distribution of debris flows in the county that resulted from the storm; plate 5 shows more than 4,600 debris flows, plate 6 about 1,800. Damaging debris flows are documented in chapter 11. We first discuss preparation of the inventory maps and then examine controls on the distribution they document.

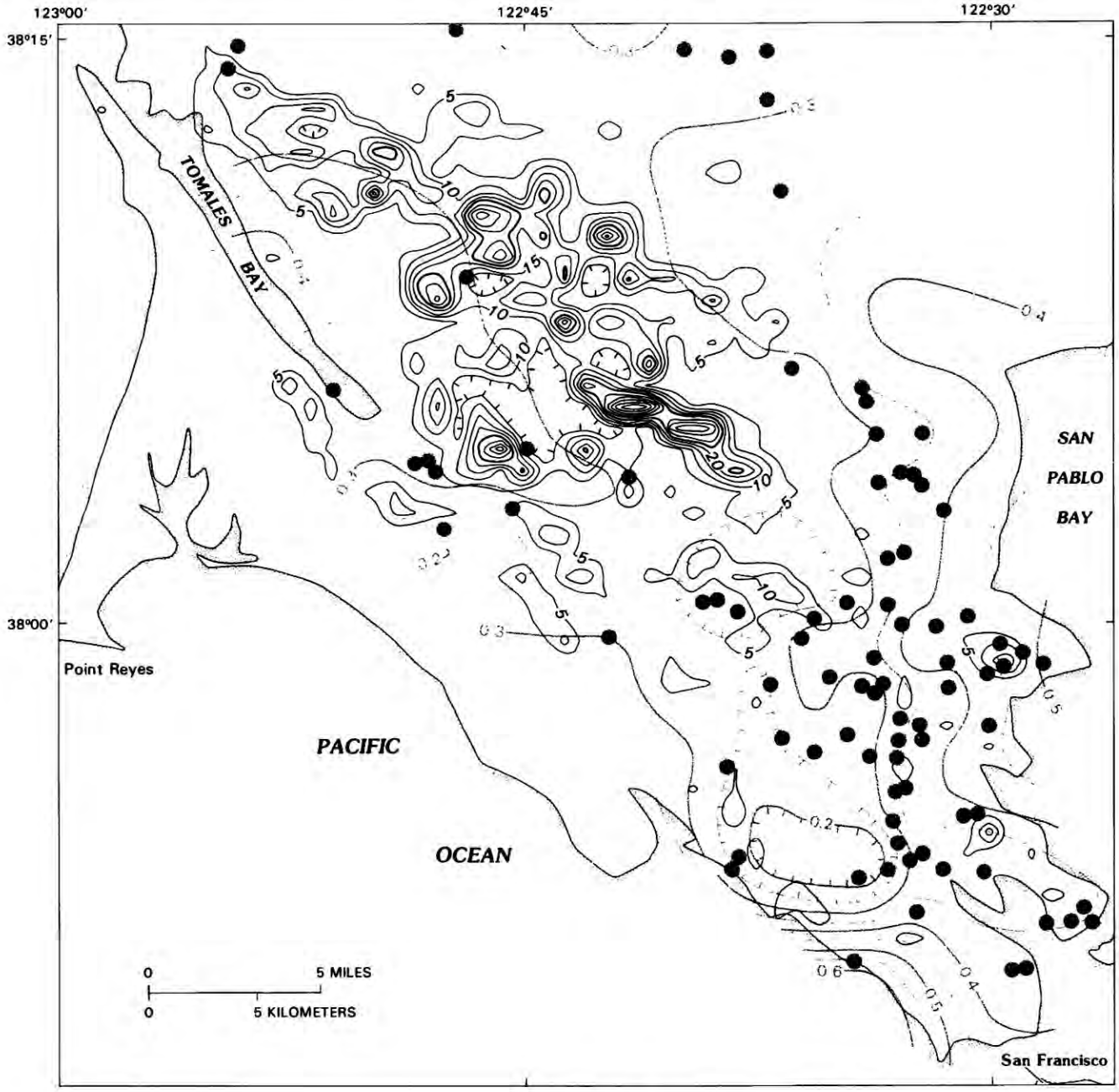
METHODS OF INVENTORY

The inventories in plates 5 and 6 were compiled largely by mapping on stereoscopic pairs of vertical aerial photographs taken about midday on January 6 and 7, 1982, several days after the storm. Most of the county was inventoried by using 1:20,000-scale photographs, but the Hicks Mountain area (see pl. 6) was inventoried by using 1:12,000-scale photographs. Mapping from aerial photographs was supplemented by field observations along roads in parts of the county, by field observations in the eastern part of the county by personnel of the California Division of Mines and Geology, and by field observations near Inverness; however, most areas in the county were surveyed solely by means of the aerial photographs.

Only landslides that appeared fresh in the photographs and that mobilized as debris flows are shown in the inventories. These landslides exhibited empty soil-slip scars, commonly with debris-flow trails leading downslope. Fresh movement was also evident in many shallow landslides that had not mobilized as debris flows, but these landslides are not shown in the inventories.

Although use of aerial photographs permitted economical areal coverage, it has two principal limitations: Forest cover, where present, conceals most debris-flow features; and shadows present at the time of photography almost completely conceal debris-flow features. Shadows were particularly extensive in the photographs because of the low sun angle in early January; they obscured steep north-facing hillslopes, and near such hillslopes they concealed valley bottoms, which hold evidence for debris-flow trails. Thus, the inventories on plates 5 and 6 are incomplete in areas of forest cover and shadow. To facilitate proper use of these maps, areas of woodland cover compiled from

7.5-minute quadrangle maps are superimposed on the inventories. Because almost all the areas concealed by shadow are wooded as well, the woodland cover shown on plates 5 and 6 includes almost all areas where the inventories are incomplete. The most likely exception is that shadows may locally have concealed steep north-facing



EXPLANATION

Contours showing areal density of mapped soil-slip sources for debris flows. Contour interval 5 soil slips per square kilometer; bold contour at 25 soil slips per square kilometer. Hachures indicate closed depressions in contour portrayal

Contours showing normalized storm rainfall. Hachures indicate closed depressions in contour portrayal

Data points for storm rainfall

FIGURE 7.1.—Areal density of soil-slip sources for debris flows in comparison with normalized storm rainfall in Marin County.

slopes and adjacent valley bottoms shown on the maps as lacking woodland cover.

The inventories on plates 5 and 6 show two principal kinds of features left by soil slip/debris flows—the scars of soil-slip sources for the flows and the trails left by debris flows; plate 6 in places shows deposits as well. Trails are shown only where they are long enough to portray at the map scale. In places, trails are shown without accompanying soil-slip scars because these scars are concealed in the photographs; likewise, scars shown as lacking trails may be accompanied by trails that are concealed in the photographs.

CONTROLS ON AREAL DISTRIBUTION

The development of debris flows from soil slips requires several conditions that serve as likely controls on debris-flow distribution. These conditions have been explored by studies in Marin County (Kesseli, 1943; Rice and others, 1976; Trautmann, 1976; Reid, 1978; Ellen and others, 1979; Peterson, 1979) and elsewhere (for example, Campbell, 1975; Hollingsworth and Kovacs, 1981; Smith and Hart, 1982). The principal requirements at source areas appear to be steep hillslopes, granular soil,[1] and the presence of perched ground-water levels in the soil mantle. The low cohesion in granular soil permits the initially sliding mass to mobilize and flow as a slurry; steep slopes are necessary for failure of granular soil; and high ground-water levels in the soil mantle, generally perched on less permeable bedrock or soil, typically trigger the soil slips that mobilize as debris flows.

In the analysis that follows, the effect of slope is discussed directly, but the other two conditions—granular soil and perched water table—are evaluated indirectly through terrain form, rainfall, and topographic setting. Also evaluated is the affinity of soil slips for scars from previous soil slips, as well as the role of recent natural and manmade ground modifications. The analysis primarily addresses the distribution of soil-slip scars; the resulting debris-flow trails extend more or less predictably down hillslopes and channels.

Other likely controls on the distribution of soil slips are not evaluated here. Local variation in rainfall, resulting from passage of high-intensity rainfall cells, is not discussed, although it probably affected the distribution of soil slips in the storm (C.M. Wentworth, written and oral communs., 1982). The roles of vegetation and slope aspect are not examined because the inventories in plates 5 and 6 are biased by forest cover and shadow.

[1]The term "granular soil," as used here, means noncohesive to slightly cohesive soil composed dominantly of sand, silt, and rock fragments.

RAINFALL

By Robert K. Mark

Although the debris flows in Marin County were triggered by rainfall, their distribution in the county shows little correlation with amounts of rainfall. Several measures of rainfall were tested against map distribution, and none showed a good correlation. For example, figure 7.1 illustrates in map form the relation between areal density of soil slips and normalized storm rainfall, which is the ratio of total storm rainfall to mean annual precipitation. Normalized storm rainfall should be a useful measure because it reflects divergence from typical rainfall conditions (see chap. 3; Govi and Sorzana, 1980). Figure 7.1, however, shows little correlation between soil slips and normalized storm rainfall; and similar apparent absence of map correlation is evident for total storm rainfall, total prestorm rainfall, and normalized prestorm rainfall.

Poor correlation is also evident from graphs of these data (fig. 7.2). Figure 7.2*A* compares the areal density of soil slips, expressed as landslide-density ratio (see chap. 2), with storm-rainfall and prestorm-rainfall totals. Both curves show peaks in landslide density, and for rainfall values exceeding those peaks the decrease in landslide density indicates that amount of rainfall in itself does not explain the areal density of soil slips. Similar conclusions hold for plots of normalized storm and prestorm rainfall (fig. 7.2*B*). Thus, Marin County contrasts with the bay region as a whole (see chaps. 2, 8) by showing a poor correlation with all these measures of rainfall.

Bias in the inventories may explain much of this poor correlation. Areal density of soil slips is low in areas concealed by forest cover and shadow, and high in the Hicks Mountain area, where more detailed photographs were used (pl. 6). If areal densities in unconcealed areas are compared, however, it is evident that factors in addition to aggregate amount of rainfall controlled the distribution of soil slips.

GROUND MODIFICATION

At several places in the inventories, soil-slip scars are concentrated in parts of the landscape where the ground configuration has been modified in geologically recent time by natural processes or human activity. Oversteepened bluffs resulting from coastal erosion appear to be responsible for the concentration of scars at Tomales Point (area B-3/4, pl. 5). Abundant scars in area G/H-3 on plate 5 occupy canyon walls steepened by downcutting of Walker Creek; similarly, stream impingement on canyon walls appears to be largely responsible for the groups of scars in area O–15 on plate 5 and in area D-11 on plate 6. Clusters of scars in area I-2/3 on plate 6 and in area W-27 on plate 5 occupy scarps or deposits of large preexisting landslides, places where deep-seated move-

ment could be expected to leave oversteepened hillslopes. Finally, cuts, fills, and resulting water concentration along roads appear to be responsible for groupings of scars, as in area T/U-25 on plate 5. In most of the landscape, however, soil slips developed in the absence of such natural and manmade modifications, under relatively longterm, steady-state conditions of landscape evolution.

SLOPE

The inventory on plate 6 is combined with a slope map, for which the areas of each slope interval were generated by photomechanical means from the contours on 7.5-minute topographic maps. Examination of this plate indicates that almost all the soil-slip scars lie in areas mapped as steep slopes. The scars, however, by no means occupy all steep hillslopes; and in many places scars occupy other than the steepest parts of an area, as in areas E-6, I-5, G-3, and B/C-6. Thus, the relations shown on plate 6 indicate that steep slope was generally necessary to initiate debris flows but that other factors must have influenced debris-flow distribution as well.

Examination of plate 6 shows that most soil-slip scars lie on slopes shown as steeper than 27° but that many lie in areas shown as having gentler slopes (to less than 22°). Figure 7.3*A*, a plot of slopes at 202 of the scars shown on this plate, shows that the debris flows typical of this sample originated on slopes shown by contour spacing to lie between 27.5° and 37.5°. The cumulative plot in figure 7.3*B* shows that 80 percent of the scars lie in areas shown by contour spacing to be steeper than 27.5° and that nearly 94 percent lie in areas shown to be steeper than 22.5°.

Slope values determined from contour spacing, as used in this analysis, should be regarded only as approximations to the true slopes. These approximations may be useful, but work elsewhere suggests that the correlation can be poor (E.E. Brabb, oral commun., 1983). Measurement of slope from contour spacing has several major limitations. First, as illustrated on figure 7.4, slopes determined from contour spacing are, at best, average slopes over elevation differences equal to the contour interval, in this case 40 ft. Thus, small steep parts of irregular hillslopes, as shown on figure 7.4*B*, are not revealed by the contours, and soil-slip scars at such places will appear to occupy the gentler slope shown by the contour spacing. Second, slope information generated from contours on the 7.5-minute quadrangle maps used in this study retains inaccuracies present in these contours—inaccuracies that are inevitable both because of forest cover and because these maps were prepared for less precise uses. Third, when used to prepare slope maps, the method produces false slope information where contours double back on themselves, as in many of the draws and at some of the ridge crests shown on plate 6.

MATERIALS, SLOPE, AND WATER CONCENTRATION, AS DESCRIBED BY TERRAIN MAPPING

A terrain map predicting the regional distribution of debris flows in most of Marin County had been prepared before the January 1982 storm (Ellen and others, 1982). This map formed a major basis for our analysis of areal distribution, largely because it shows the distributions of bedrock materials, soil materials, and topographic configurations, all of which probably controlled the distribution of soil-slip scars. We first describe the terrain map and its units, and then we examine the relation of soil-slip scars developed in the storm to these units.

Terrain Units

The terrain map was prepared by systematically mapping differences in the forms of hillsides as viewed stereoscopically in small-scale (1:80,000) aerial photographs. The

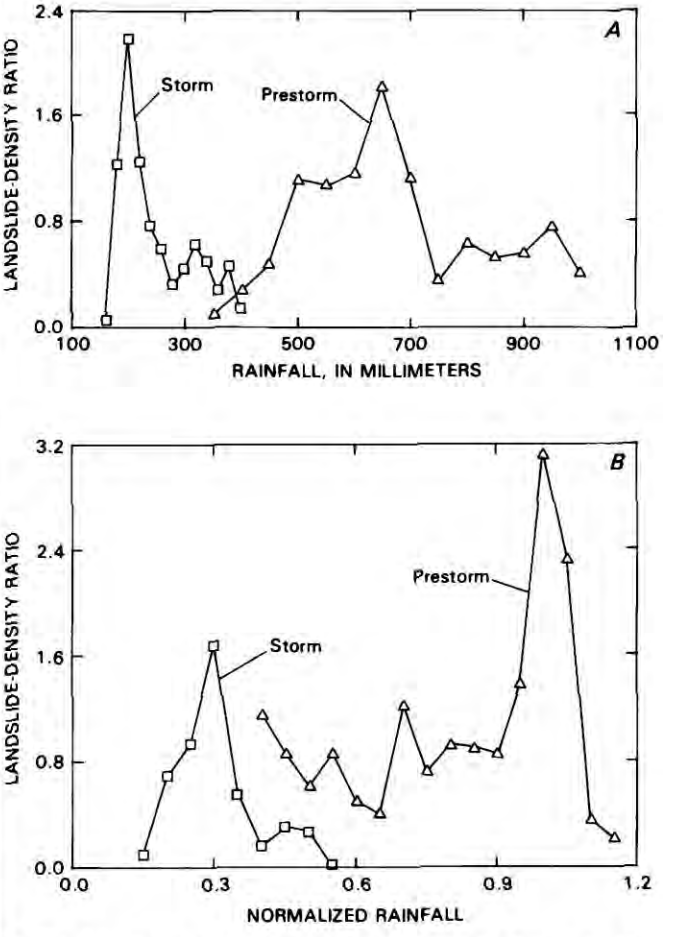


FIGURE 7.2.—Relations between areal density of soil-slip sources for debris flows, expressed as landslide-density ratio, and measures of rainfall. *A*, Relations for storm-rainfall and prestorm-rainfall totals. *B*, Relations for normalized storm and prestorm rainfall.

topographic forms so distinguished, called terrain units, were calibrated by detailed (1:8,000-scale) field studies of bedrock, soil, and landslides (Trautmann, 1976; Reid, 1978; Ellen and others, 1979; Peterson, 1979; Savina, 1982). These studies showed spatial associations between the various terrain units and types of bedrock, types of soil mantle, and types of shallow landslides—associations that were sufficiently consistent to justify extrapolation of these relations to the entire terrain-map area. The terrain mapping is shown on plates 5 and 6; the terrain units are listed in table 7.1 and described on plate 5.

Terrain mapping and field calibration were applied only in that part of Marin County, east of the San Andreas fault, that is underlain by the highly disrupted and heterogeneous bedrock of the Franciscan assemblage. In parts of the county underlain by bedrock other than the Franciscan assemblage, bedrock and soil mantle are described on plate 5 by means of the geologic units mapped by Blake and others (1974).

The terrain units form a continuum that ranges from steep, sharp-crested, regularly incised (fluted) topography (see block diagram, pl. 5) to gently sloping, rounded topography (table 7.1). The relation between slope and terrain units is shown on plate 6, where strong associations are evident in many places, particularly where contrasting terrain units are juxtaposed, as in area A-4. The range in topographic form corresponds to a range in composition and structural condition of the Franciscan bedrock materials, from highly sheared and mixed rock (melange) that includes masses of relatively resistant and intact rock, through varyingly disrupted and sheared rock, to essentially intact rock masses (fig. 7.5; see Bailey and others, 1964).

The several terrain units that consist of steep, fluted topography, called collectively *hard terrains*, are under-

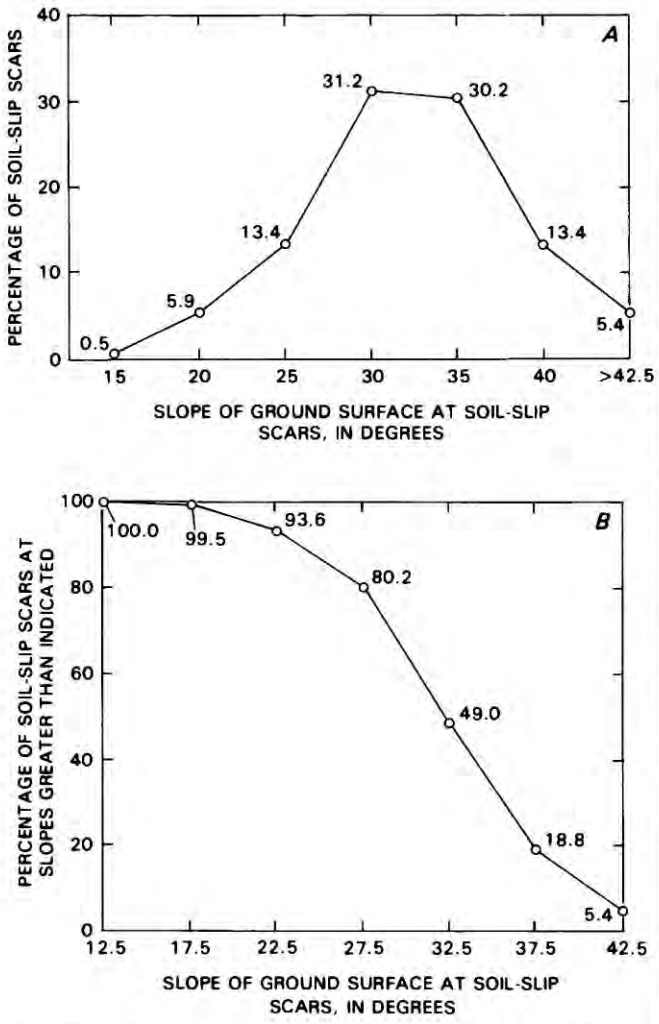


FIGURE 7.3.—Slope of ground surface at 202 soil-slip sources for debris flows formed during the storm in the Hicks Mountain area of western Marin County (pl. 6). Slope is measured to nearest 5° from spacing of 40-ft contours on 1:24,000-scale topographic map. *A*, Percentage of soil-slip scars in each slope interval. *B*, Cumulative percentage of scars at slopes greater than indicated values.

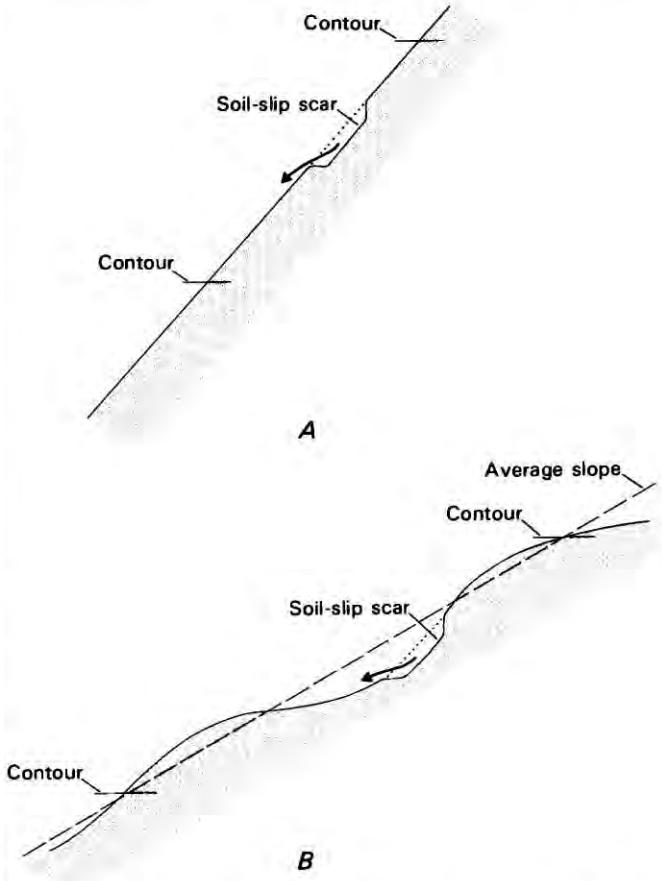


FIGURE 7.4.—Schematic downslope cross sections of uniform (*A*) and irregular (*B*) hillslopes, showing relation of actual slopes to average slope described by contour spacing.

TABLE 7.1.—*Principal terrain units mapped in Marin County*

Unit	Description
Hard terrains:	Steep, sharp-crested, angular terrain with regular, sharply incised fluting.
Very hard terrain	
Rounded, very hard terrain	
Hard terrain	
Intermediate terrains:	Irregular terrain of intermediate form.
Fluted intermediate terrain	
Intermediate terrain	
Smooth intermediate terrain	
Soft terrain	Gently sloping, rounded terrain.

lain by intact bedrock (largely sandstone and interbedded shale) that is mantled by granular soil which fails principally as debris flows (fig. 7.5*A*). The gently sloping, rounded topography, called *soft terrain*, is underlain by highly sheared and mixed bedrock materials, including abundant impermeable clayey sheared rock (fig. 7.5*C*). Soft terrain is mantled principally by clayey soil that fails by slow-moving earth flows and earth slides, although granular soil exists in many places where blocks of relatively intact rock are too small to distinguish at the scale of the terrain mapping (smaller than about 400 m in maximum dimension).

Topography intermediate between the hard terrains and soft terrain is mapped as several units that are called collectively *intermediate terrains*. Bedrock of intermediate terrains is disrupted but contains less abundant clayey sheared rock than does soft terrain; thus, it probably consists dominantly of masses of sandstone or other resistant rock types, separated by zones of sheared rock that include impermeable clayey sheared rock (fig. 7.5*B*). Soil mantle in intermediate terrains includes granular soil, clayey soil, and soil of intermediate texture, and this variety results in various kinds of shallow landslides.

Terrain units are useful to an analysis of the distribution of debris flows because each such unit represents a combination of materials and topographic form, which includes steepness of slope. If we consider the simple combination of steep slope and granular soil as the principal controls on the distribution of soil-slip scars, then we would expect most soil slips to occur in hard terrains, which consist almost entirely of steep slopes with granular soil. Intermediate terrains should show soil-slip scars, but scars there should be less abundant than in hard terrains because steep slopes and granular soils constitute only parts of intermediate terrains. By similar reasoning, soft terrain, which is dominated by gentle slopes and clayey soil, should lack scars except where masses of relatively intact rock with steep slopes and granular soil are included because of the map scale. The distribution of debris flows

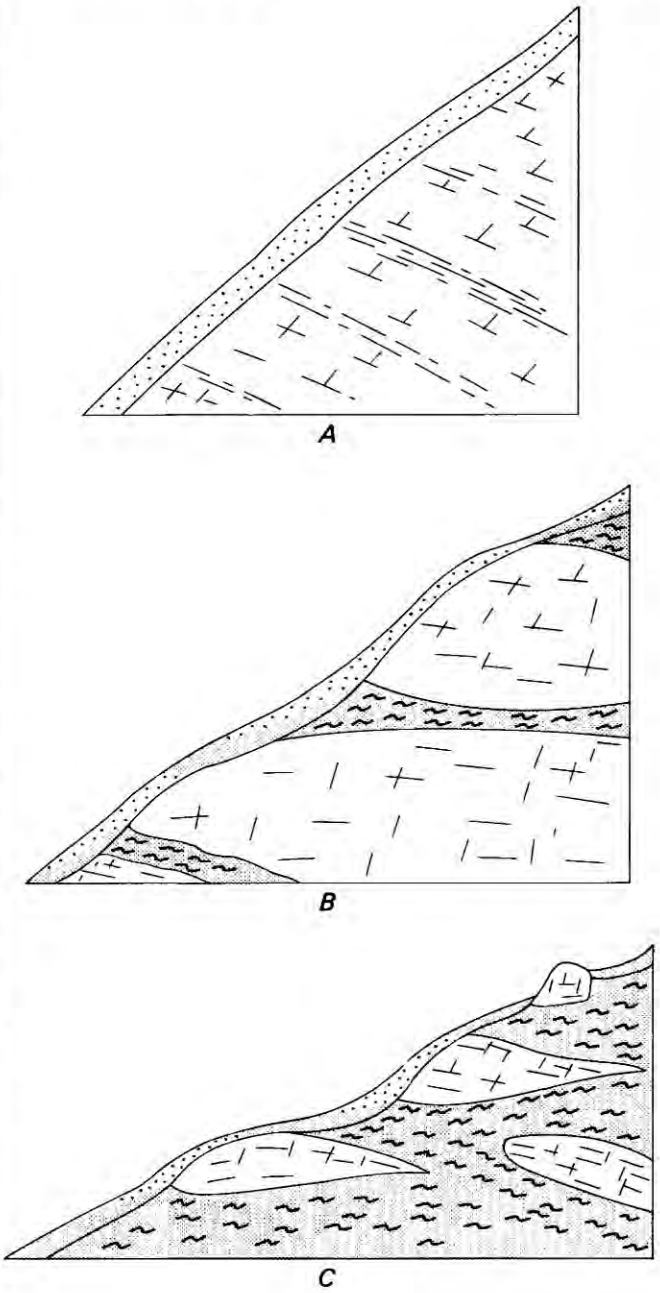


FIGURE 7.5.—Schematic downslope cross sections of hillsides in hard (*A*), intermediate (*B*), and soft (*C*) terrains.

predicted by Ellen and others (1982), which is described on plate 5, is based on such reasoning, supported by the mapped distribution of landslide features in the calibration studies.

Distribution of Scars Among Terrain Units

Plates 5 and 6 show that scars of the soil slips triggered by the storm generally occupy intermediate and hard terrains, but the relations are far from simple. Soil-slip scars in such areas as A-4, C-3, D-3, and I-6 on plate 6 are strongly concentrated in hard terrains. In contrast, broad forested areas of hard and intermediate terrains, including much of the southern part of the county (pl. 5), show few debris flows. This small areal concentration generally could be explained by gaps in the inventory that resulted from forest cover or shadow, but it cannot be determined whether forest cover simply concealed features or whether forested areas actually had fewer debris flows. Field mapping by Davenport (1984) in forested hard terrains near San Rafael (areas BB/CC-18/19, pl. 5) shows abundant scars and trails not detected in our photographic inventory. In contrast, some areas of hard terrains that are not concealed, as in areas F/G-6 and D-7/8 on plate 6, show few scars. Thus, soil-slip scars generally coincide with intermediate and hard terrains, but the distribution of scars within hard terrains is nonuniform, and so it must have been influenced by factors other than steep slope and granular soil.

In many places, the inventories reveal unexpected patterns of distribution. Scars in some places are particularly abundant in intermediate terrains, as in areas H-8, D-2, and I-9 on plate 6; in such areas as BB/CC-19, J-5, I-6, T-22, and R/S-11 on plate 5, intermediate terrains show more scars than nearby unconcealed hard terrains. Similarly, soft terrain shows abundant scars in places, as in areas H-3, I-9, and G/H-10/11 on plate 6. In several places, as in areas H-11, H-3, H/I-2/3, F-6, G-7, E-2, and E/F-5 on plate 6 and areas DD-26, EE-26, and X-16/17 on plate 5, scars are conspicuously concentrated along contacts between terrain units.

These unexpected patterns of distribution have a common element: They suggest that debris flows during the storm originated preferentially in places where materials have strong permeability contrast, which is where ground water can be concentrated by several means (see chap. 6). This affinity for permeability contrast is explicit where scars are concentrated along terrain-unit contacts, reflecting contacts between contrasting soil and bedrock materials. Preferential occurrence of scars in intermediate rather that hard terrains can likewise be explained by the material contrasts that characterize intermediate terrains. Local abundance in soft terrain may arise from similar material contrasts. This suggestion is supported by the inventory on plate 5, which distinguishes scars that lie along distinct breaks in slope at which gentle slope (reflecting impermeable material) lies downslope from steeper slope (reflecting relatively permeable material); such scars are especially abundant in soft terrain, as in areas L/M-9, O-10, and P-11 on plate 5.

In summary, the distribution of soil-slip scars among terrain units is consistent with the hypothesis that granular soil and steep slope are principal controls on the distribution of scars. Some conspicuous aspects of this distribution, however, suggest that concentration of ground water related to contrast in materials favored development of debris flows in the storm.

Distribution of Scars Within Terrain Units

At a local scale, commonly within a terrain unit, the soil-slip scars shown in plate 6 show several patterns of distribution. In such areas as I-6, scars are distributed more or less evenly on a hillside. In other areas, such as B/C-6 and F/G-7/8, scars are grouped in clusters; and in such areas as F/G-4, scars are grouped in linear patterns. In many places, groupings of scars are related to local steep slopes in otherwise gently sloping ground, but in other places, such as areas G-3 and I-5, clusters show little relation to steep slope.

Contrast in local patterns of distribution is well illustrated in area B-9 on plate 6, where hard terrain along the south side of an east-west-trending canyon shows scars regularly distributed near each sidehill drainage. On the north side of the canyon, scars occur in a linear group, which is apparently related to the boundary between a relict erosional surface (unit e) and smooth intermediate terrain (unit si).

Inspection of plate 6 shows that these different patterns of distribution, which reflect different controls on soil-slip failure, are generally related to terrain units. Soft and intermediate terrains typically show the strongest groupings, probably because the susceptible soils and slopes, as well as permeability contrasts, are distributed as irregular masses and crudely planar zones within these units. Some clusters in soft terrain appear to be related to mapped or unmapped masses of resistant rock, as in areas C-6, H-3, and G/H-10/11; however, other clusters, as in areas G-3, I-5, and E-4, show little obvious relation to discernible factors. In hard terrains, scars typically occur singly in a pattern related to hillside drainages, as discussed below in the subsection entitled "Local Topographic Setting." This distribution reflects the relatively uniform materials and slopes of hard terrains, in that soil slips appear to be controlled largely by topographic effects on water concentration rather than by variations in slope or materials. Locally, however, as in area F/G-4, hard terrains show a strong linear grouping of scars.

Scars related to relict erosional surfaces (unit e) typically lie along the unit margins because unstable conditions are generally confined to the edges of such surfaces.

Some scars are grouped at the bases of hillslopes that abut alluvium (whether mapped or unmapped), such as in areas G/H-3, F/G-3, I-3/4, and I-6 on plate 6. These clusters probably result largely from ground-water concentration at breaks in slope (see chap. 6).

Slope at Scars in Different Terrain Units

Slopes at soil-slip scars, as measured from the contours on plate 6, are systematically related to terrain units (fig. 7.6). Scars in hard terrains show the steepest slopes, scars in soft terrain show gentler slopes, and scars in intermediate terrains show a bimodal distribution of slopes.

These relations between terrain units and slope at soil-slip scars could result from differences in true slope at the scars, or they could arise simply from measurement of slope by means of contours. Even if actual slopes at scars were uniform, relations similar to those plotted in figure 7.6 would result from the averaging effect of the contours from which these slopes were measured. Thus, the relatively uniform slopes that accompany the relatively uniform materials of hard terrains would be accurately reflected in the contours (fig. 7.4*A*). In contrast, the

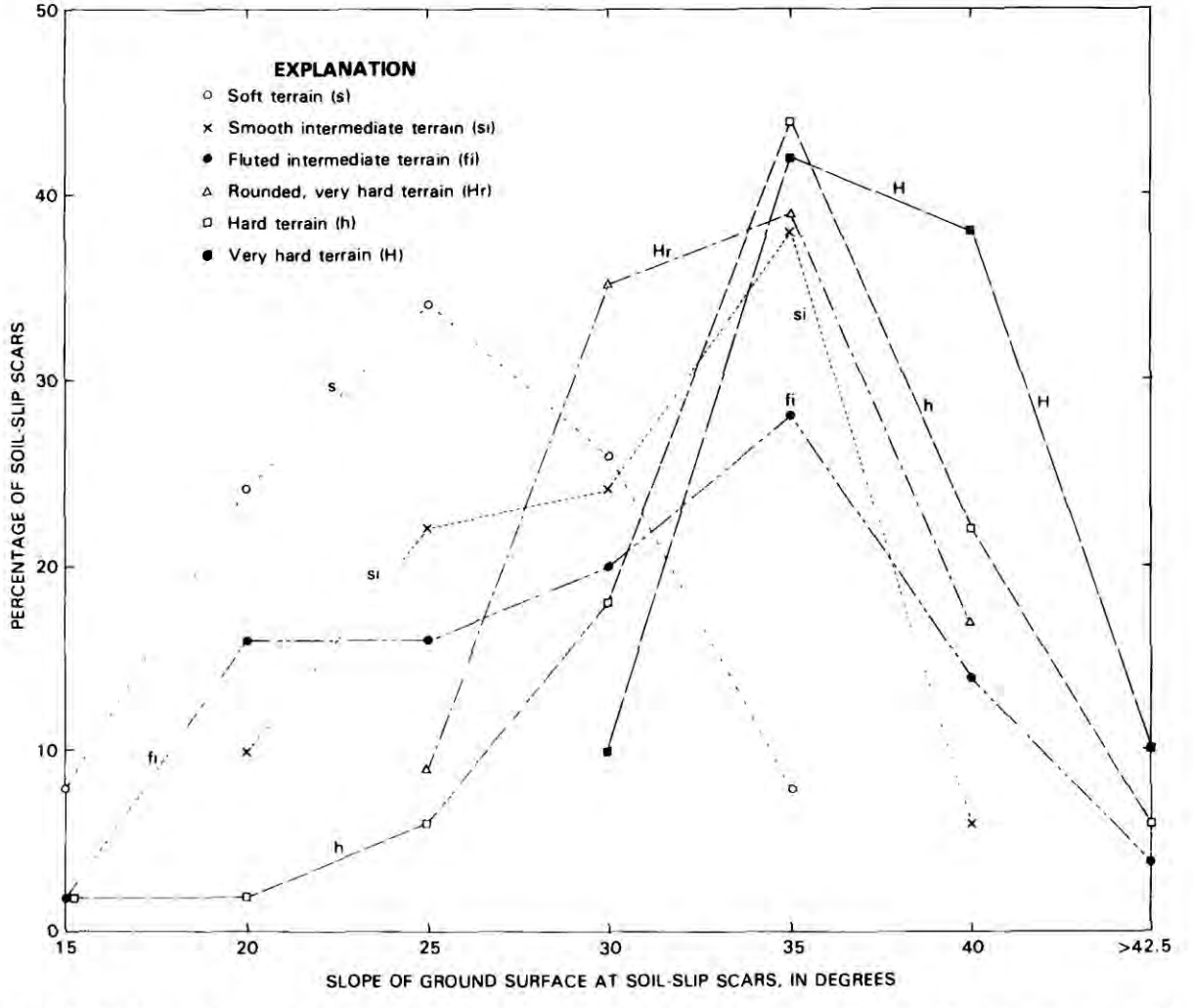


FIGURE 7.6.—Slope of ground surface at soil-slip sources for debris flows formed during the storm in the Hicks Mountain area of western Marin County (pl. 6), plotted by terrain units containing the soil-slip scars. Slope is measured to nearest 5° from spacing of 40-ft contours on 1:24,000-scale topographic map. Slopes are shown for samples of 50 scars in each terrain unit except the rounded, very hard terrain unit, for which only 23 scars are included.

irregular slopes that accompany the mixed materials of soft and intermediate terrains would tend to dilute the local steep slopes at which failure occurred, and so the slopes measured in these terrain units would appear to be gentler than the actual slopes at the scars (fig. 7.4*B*).

Differences in the true slope of failure can be expected theoretically from differences in the materials that constitute the terrain units. Relatively gentle slopes of soil-slip failure can generally be expected either where granular soil mantle is somewhat clayey, as would be expected in soft and intermediate terrains, or where concentration of water and resulting high pore pressures are favored by contrasts in permeability or by breaks in slope, as would be expected in the mixed materials of soft and intermediate terrains (see chap. 6). Even the small differences evident in figure 7.6 between the several hard terrains are consistent with these explanations. The relatively gentle slopes of failure in rounded, very hard terrain are consistent with the relatively clayey soil mantle of this terrain unit, and the relation shown between hard and very hard terrain is consistent with the relatively uniform and clay-free materials of very hard terrain.

The relations plotted in figure 7.6 probably result from both true slopes of failure and contour representation of slope, and the relations between true slopes of failure and terrain units can be resolved only with a large number of field-measured or photogrammetrically measured slopes at soil-slip scars. Without such resolution, however, the relations in figure 7.6 may still be useful; in comparison with the slopes shown in figure 7.3, figure 7.6 provides a detailed breakdown of the contour-generated slopes at which debris flows originated in the storm.

LOCAL TOPOGRAPHIC SETTING

Debris flows in the storm typically originated in, then flowed through, particular topographic settings, or *habitats*, within hillside areas. The affinity of debris flows for certain habitats is shown on plate 6 and figure 7.7 by the mapped positions of scars and trails on the contour base. Examination of these maps indicates two principal associations between local topographic setting and the features left by debris flows: A large proportion of the scars lie near the heads of sidehill drainages, and most trails follow sidehill drainages or canyon bottoms. Local topographic setting probably influences initial failure of soil slips principally by concentration of water (see chap. 6).

Distribution of Scars Among Habitats

To quantify the spatial association between debris flows in the storm and topographic settings, we distinguished several principal habitats and subunits; then, using aerial photographs, we tallied the habitats occupied by 1,816 soil-slip scars in and about the Hicks Mountain area shown on plate 6. The habitats distinguished are illustrated in the "Explanation" to plate 5, and the principal habitats are mapped in figure 7.7. Habitats of scars throughout most of Marin County are shown by symbol on plate 5.

Habitat 1 consists of amphitheaters at the heads of sidehill draws and first-order drainages, as well as bottoms of drainages except where drainages occupy alluviated valleys (fig. 7.7). Habitat 1A designates the amphitheaters; habitat 1B designates zones along the drainages. A total of 47 percent of the scars tallied lie in the amphitheaters that constitute habitat 1A. Only 2 percent of the scars tallied lie along drainages (habitat 1B), but this habitat is occupied by most trails and by almost all trails longer than 100 m (pl. 6). Thus, the small part of the landscape represented by habitat 1 includes almost half of the scars tallied and most of the trails.

Habitat 2 consists of hillsides that lack well-defined draws and that slope down toward nonalluviated drainages (fig. 7.7). Habitat 2B designates the lowermost edges of these hillsides, where failure could be affected by undercutting along the draw; habitat 2A designates the rest of such hillsides. A total of 33 percent of the scars tallied lie in habitat 2A, and 4 percent lie adjacent to drainages in habitat 2B. Thus, 37 percent of the scars tallied lie on sideslopes from which material would tend to flow into nonalluviated drainages.

Habitat 3 consists of hillsides that abut alluviated surfaces and that lack well-defined draws (fig. 7.7). These hillsides may be planar, somewhat concave, or convex. A total of 13 percent of the scars tallied lie in this habitat. Debris flows originating in this habitat flowed downslope toward alluviated surfaces, so they could impact flatland directly from the hillside; the remaining 87 percent of the debris flows could impact flatland only from the mouths of canyons or hillside draws.

All scars tallied could reasonably be assigned to one of these three habitats. No scars occupied ridge crests, which constitute the rest of hillside terrain (fig. 7.7), but many scars lie contiguous to ridge crests.

A separate tally of 107 scars in several selected areas of hard terrains in the county shows a stronger influence of habitat 1. A total of 71 percent of these scars lie in habitat 1, 28 percent in habitat 2, and 1 percent in habitat 3. This tally, in combination with the previous tally, suggests that the affinity of soil-slip scars for habitat 1 was strongest in hard terrains and that habitat 3 was most commonly occupied by scars in soft and intermediate terrains. The dominance of habitat 1 makes this tally similar to several others: Chapter 10 reports that about two-thirds of the debris flows studied there originated in habitat 1; chapter 9 reports that a preponderance of debris flows originated near the heads of first-order drainages;

and Reneau and Dietrich (1987, p. 42) reported that 62 percent of the debris flows in an area of hard terrains near San Rafael in Marin County originated in hollows.

We note that the several habitats are distinguished for different reasons. We distinguished habitat 1, particularly habitat 1A, because of its propensity for generating debris flows. In contrast, habitat 3 was distinguished because debris flows originating there would not intersect draws that could channelize, and thus sustain, the flow. In propensity for debris flow, habitat 2 may differ little from habitat 3; both habitats may contain the surface and subsurface concavities that serve to concentrate water and promote soil-slip failure (see chap. 6). One such concavity in habitat 3 is shown in figure 7.7 on the triangular hillslope between points A and B, although the degree of concavity here is exaggerated by the contours.

SCARS AND INDIVIDUAL HABITATS OF PREVIOUS SOIL SLIPS

By Susan H. Cannon and Bryan M. Langholz

Many debris flows in the storm originated near the scars left by soil slips of past years. In some places, scars that formed during the storm lie within old scars or contiguous to old scars; in other places, new scars lie apart from old scars but within the same individual habitat occupied by old scars (fig. 7.7). By *individual habitat* we mean a particular area on a hillside, in contrast to the group of similar areas designated as a habitat, such as habitat 1.

To determine whether the presence of old scars in an individual habitat indicated an increased susceptibility to debris flows in the storm, we statistically tested for spatial association between new and old scars within three small

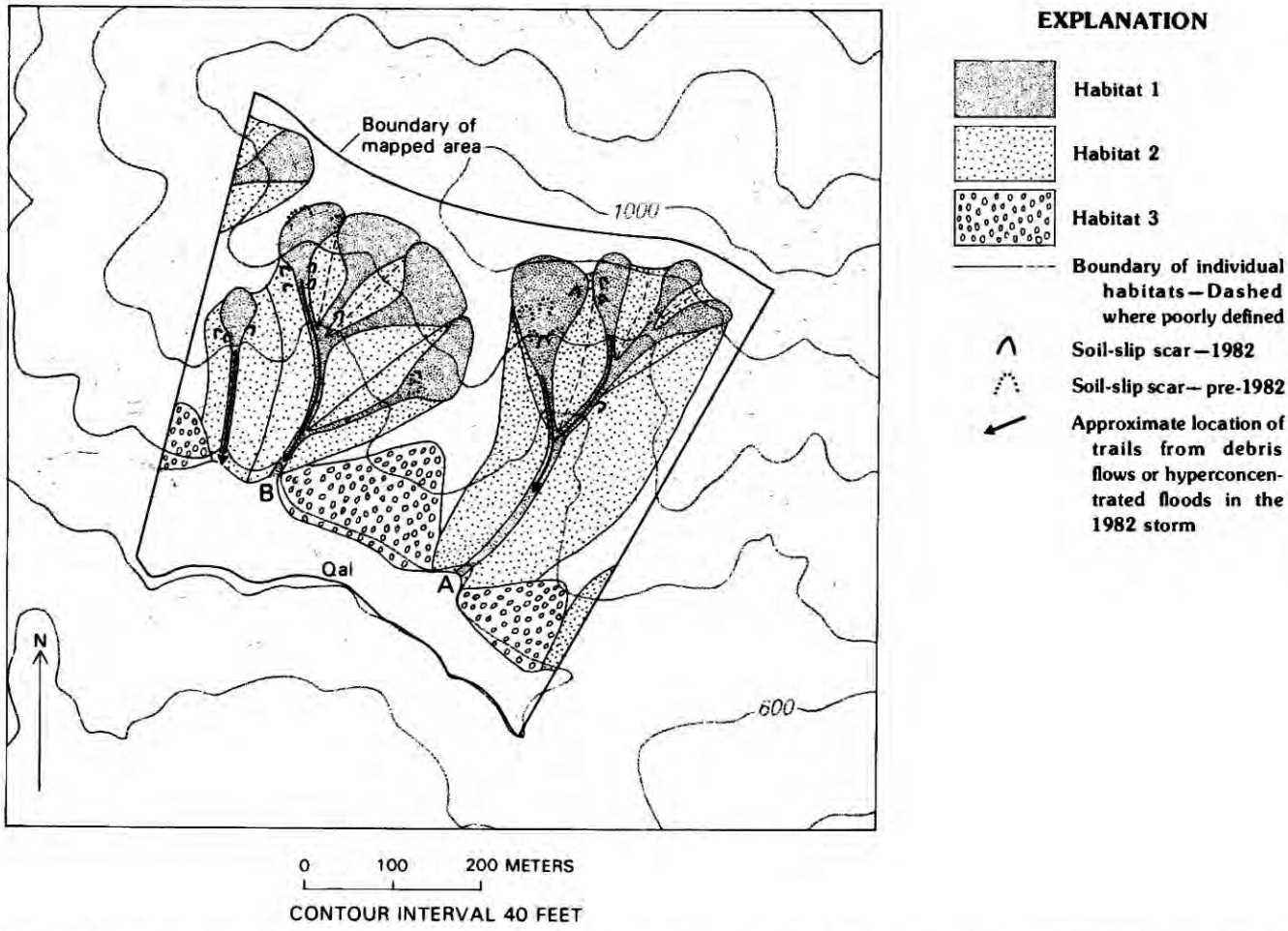


FIGURE 7.7.—Contour map of hillslopes and an alluvial flat in hard terrain near Three Peaks, showing habitats, soil-slip scars, and trails from debris flows or hyperconcentrated floods in 1982 storm. Ridge crests and alluvium (Qal) lack shading and pattern. Soil-slip scars from 1982 storm mapped from aerial photographs by D.M. Peterson and S.H. Cannon; pre-1982 scars are from Peterson (1979). Points A and B are discussed in text in subsection entitled "Radiocarbon Site near Three Peaks." Base from U.S. Geological Survey, 1:24,000 scale, Point Reyes NE, 1954 (photorevised 1971).

areas in the western part of the county. These areas consist of hard terrains where soil slips and debris flows had been mapped at a scale of 1:8,000 before the January 1982 storm and where previous work had shown the bedrock and soil mantle to be uniform (S.D. Ellen and J.M. Coyle, unpub. data, 1978; Reid, 1978; Peterson, 1979). Analysis is restricted to hard terrains because individual habitats are most clearly defined there and because the uniformity of materials and topographic configuration in hard terrains reduces variables other than the presence of old scars that could influence the initiation of debris flows.

To test for spatial association, we superimposed maps of the soil-slip scars generated in the January 1982 storm on maps of old scars and of habitats (fig. 7.7). Maps of old scars included all scars recognized in the field or on photographs during previous work; some of these scars had been dated by using sequential aerial photographs (Reid, 1978; Peterson, 1979), but most had formed at unknown times before 1978. New scars, as well as habitats, were mapped from aerial photographs taken several days after the storm. The resulting composite maps, as in figure 7.7, show the spatial association between new scars, old scars, and individual habitats; each individual habitat shows either only new scars, only old scars, new scars with old scars, or no scars. These associations were tallied on 2×2 contingency tables for each study area (table 7.2); analysis is restricted to habitat 1.

TABLE 7.2.—*Statistical data for recurrence from individual habitats in three areas*

[Numbers in contingency tables are numbers of individual habitats. Expressions in parentheses are given as examples of how the various values were calculated]

Study area		San Barnabe		Walker Creek		Three Peaks	
		New scars					
		+	−	+	−	+	−
Old scars	+	11	16	9	21	7	4
	−	19	54	3	27	17	21
Individual habitats with new scars and no old scars							
Probability		0.26 [19/(19+54)]		0.10		0.45	
Odds		.35 (19/54)		.11		.77	
Individual habitats with new and old scars							
Probability		0.41 [11/(11+16)]		0.30		0.64	
Odds		.69 (11/16)		.43		1.75	
Odds ratio		1.95 (0.69/0.35)		3.86		2.16	

Statistical Method

To determine whether a statistical association exists between the occurrence of new soil slips in the January 1982 storm and the existence of old soil-slip scars, a stratified analysis of the odds ratio was used. The odds ratio, a measure of association between two factors, has become the measure of choice for analysis of 2×2 contingency tables; its advantages were described by Fleiss (1973, p. 43–49). For the present purposes, the odds ratio gives the proportional increase (or decrease) in the odds of occurrence of new scars, given the existence of old scars, to the odds that new scars will occur in the absence of old scars. The odds, probabilities, and odds ratios for each study area are listed in table 7.2.[2]

Conditional-maximum-likelihood methods were used for inference and hypothesis testing based on the odds ratio, as described by Gart (1971) and Zelen (1971). The procedure begins with testing of the hypothesis of homogeneity of the odds ratio, which indicates whether the proportional relations of new and old scars are similar for the three study areas. The test consists of determining whether the odds ratios for each of the three study areas are statistically close enough to be considered equal. If the hypothesis of homogeneity of the odds ratio is not rejected, then it may be tested whether an association exists between the two factors. This further test indicates whether the presence of old scars is predictive of the occurrence of new scars. To reject the null hypothesis of no association, or to conclude that an association does, in fact, exist, we test to see whether the odds ratios in the three study areas, taken together, are greater than one. If the hypothesis of no association is rejected, then we conclude that a relation exists between old and new scars. The estimate of the common odds ratio then gives a measure of that association.

Results

The test of the hypothesis that the odds ratios for the three study areas are equal yields a p-value of 0.81; the hypothesis of homogeneity of the odds ratio is clearly not rejected. The test of association yields a p-value of 0.009, indicating that within habitat 1 the existence of old scars is associated with the presence of new scars.

The estimate of the common odds ratio is a measure of the association of old and new scars within habitat 1. For this analysis, the common odds ratio is 2.3, which indicates that during the January 1982 storm the odds were 2.3 times greater that a new scar would occur in an individual habitat 1 where an old scar was present than that a new scar would occur in an empty individual habitat 1.

[2]We note that the odds and probabilities of new scars, given no old scars, vary substantially among the study areas. Thus, combining the tables into one by adding across the study areas would be inappropriate (Feinburg, 1977, p. 48–51; Breslow and Day, 1980, p. 93–108).

Discussion

This analysis indicates that an association clearly exists between old and new scars, but the nature of this association is not immediately obvious. If the association resulted from inherent differences in the susceptibility of individual habitats, the long-term product would appear to be an irregular topography with marked contrasts in the size of flutes and ribs, the result of selective erosion by debris flows in the susceptible individual habitats. Such is not the case in the regular and uniform hard terrains to which this analysis was restricted.

The results of this analysis may indicate short-term disequilibrium at sites of soil-slip scars, rather than long-term differences in the susceptibility of individual habitats. From this point of view, the association of old and new scars might result from increased susceptibility to failure along the headwalls or sidewalls of preexisting scars. This possibility is investigated by calculating the excess number of individual habitats with both old and new scars, over and above the number predicted (or expected) on the basis of the probabilities of new landslides in individual habitats with no old scars (table 7.2). This calculation (table 7.3) suggests that the excess number of individual habitats with both old and new scars can be more than accounted for by individual habitats which contain contiguous old and new scars. Contiguity was determined by comparison of aerial photographs taken before and after the storm. In terms of numbers of scars, 26 percent of the scars that produced debris flows during the storm in these study areas formed contiguous to preexisting scars; this proportion holds for the scars in habitat 1, as well as for the areas as a whole.

Short-term disequilibrium at sites of soil-slip scars suggests that, to some extent, individual habitats may undergo cycles consisting of a discrete period of colluviation followed by a period of debris-flow activity. Within such a cycle, colluviation would occur until a critical thickness of material accumulated and a storm sufficient to trigger debris flows occurred. Once debris-flow activity had been initiated during a cycle, it would continue at times of extreme rainfall until the accumulated material was removed; then, a new period of colluviation would begin. Such cycles, repeated over a long time period and in a number of individual habitats, could result in the uniform, regular topography that characterizes hard terrains.

CONCLUSIONS CONCERNING AREAL DISTRIBUTION

Except where influenced by recent ground modification, the distribution of soil-slip sources for debris flows resulting from the storm generally coincides with the mapped distributions of steep slope and granular soil mantle, but neither of these factors alone nor their combination as represented by hard terrains explains some significant aspects of the distribution of soil-slip scars. Variation in the abundance of scars in hard terrains, concentration of scars along contacts and in intermediate terrains, local groupings of scars in clusters and linear patterns, and concentration of scars in certain local topographic settings (habitats) all suggest that concentration of water was the principal control on distribution of scars within areas with susceptible slope and soil. Distribution of scars suggests that water was significantly concentrated both by configuration of the local topography, as described by habitats, and by conditions resulting from contrasts in soil and (or) bedrock; variation in rainfall had little detectable effect. Distribution of scars was also influenced significantly by preexisting scars; statistical analysis shows that new scars in hard terrains were more than twice as likely in amphitheaters containing recognizable old scars than in those lacking old scars, and this bias is explained by the 26 percent of new scars that developed contiguous to preexisting scars.

DISTRIBUTION OF DEBRIS FLOWS OVER TIME

In Marin County and elsewhere in the bay region, almost all the debris flows related to the January 1982 storm occurred during or immediately after intense storm rainfall (see chap. 3; Smith and Hart, 1982, p. 148). The principal exception is the event at Hurricane Gulch in Sausalito, which occurred about 22 hours after rainfall had ceased (see chap. 6 and case study by Smith and Hart, 1982, p. 148–149). The concurrence of debris torrents near Inverness suggests that at least some debris flows were triggered at times of exceptionally intense rainfall during the storm (see Inverness area case study, chap. 6).

Rainstorms capable of triggering at least some debris flows in the county have occurred about every 5 years (E.W. Hart, oral commun., 1983); in the San Francisco Bay region as a whole, debris flows have occurred during at least 12 winters between 1905 and 1978, and during 8 winters between 1961 and 1981 (Smith and Hart, 1982, p. 150). Debris flows as abundant as those in the 1982 storm have occurred less frequently. Before 1982, the most recent occurrence of abundant debris flows in the county was in January 1973 (S.J. Rice, oral commun., 1982), and these debris flows occurred largely in the southern part of the county. Rainfall-recurrence intervals for the January 1982 storm at gages in the county (see table 3.1) suggest that debris flows of the abundance seen in the January 1982 storm can be expected in the county every 20 to 100+ years. Rainfall criteria for storms capable of triggering abundant debris flows in the bay region are defined in chapter 4, and criteria for abundant debris flows in Marin County were discussed by Rice and others (1976).

TABLE 7.3.—*Comparison of excess number of individual habitats that have both old and new scars with the number of individual habitats that have contiguous old and new scars*

[Expected number is given by probability of new scars, given no old scars, times total number of individual habitats with old scars. Excess number is observed number minus expected number]

Study area	Expected number of individual habitats with both old and new scars if old scars have no influence	Observed number of individual habitats with both old and new scars	Excess number of individual habitats with both old and new scars	Number of individual habitats with contiguous old and new scars
Barnabe----------	7.0	11	4.0	7
Walker Creek----	3.0	9	6.0	7
Three Peaks-----	4.9	7	2.1	5

Long-term frequency of recurrence is addressed by the following case studies.

RADIOCARBON SITE NEAR THREE PEAKS (CASE STUDY 6, PLS. 5, 6)

By STEPHEN D. ELLEN, DAVID M. PETERSON, and STEPHEN W. ROBINSON

A hillside and adjacent alluviated valley near Three Peaks, in the northwestern part of the county, show evidence of a succession of debris flows. Soil-slip scars and debris-flow trails were formed during the January 1982 storm, older scars and trails were present when the area was mapped by Peterson (1979), and a series of deposits, which we dated by radiocarbon methods, were left at a canyon mouth by pre-1978 debris flows. Bedrock underlying the hillside is thin-bedded sandstone and shale of the Franciscan assemblage; soil mantle is approximately uniform in texture and is classified as ML-CL in the Unified Soil Classification System. Figure 7.7 shows the area and features related to this succession of events.

At point A in figure 7.7, deposits from pre-1982 debris flows lie on a somewhat irregular alluvial terrace; other deposits from debris flows are exposed in the bank of the modern stream channel, which is incised into the terrace deposits (fig. 7.8). A shallow bulldozed jeep trail crosses the area between trees tilted by debris-flow deposits unit df_1 and trees growing on debris-flow deposits unit df_2, but this trail does not appear to have significantly affected the features observed. Units df_1 and df_2 in figures 7.8*A* and 7.8*B* clearly postdate the terrace surface on alluvial deposits unit al_3, and unit df_3 appears to postdate most of the section of unit al_3 exposed in the bank of the stream channel.

Samples of charcoal fragments from fluvial lenses and discontinuous beds of medium to coarse sand along two horizons in deposits of unit al_3 (figs. 7.8*A*, 7.8*C*) were dated. Sample USGS-549 yielded an age of less than 100 years B.P., and sample USGS-550 an age of 230 ± 55 years B.P. Using the precise calibration between radiocarbon ages and calendar dates by Stuiver (1982), the date for sample USGS-550 falls in the range A.D. 1610–1810 (140–340 years B.P.), with a most likely date of A.D. 1680 (270 years B.P.). We note that radiocarbon ages on charcoal in alluvial deposits tend to be older than the age of deposition (for example, Blong and Gillespie, 1978).

Interpretation of the ages of debris-flow deposits from these dates is made somewhat uncertain by the discontinuity of fluvial bedding exposed in the streambank, in combination with the complexity of deposits that can result from migration of streams across alluviated surfaces (Clyde Wahrhaftig, oral commun., 1978). These relations appear to indicate that all three debris-flow episodes have occurred since sample USGS-549 was deposited, within the past 100 years. However, this sample may have occupied the fill of an undetected channel that, like the present stream channel, had incised into unit al_3. Given this possibility, sample USGS-550 provides a more reliable maximum age for the debris-flow episodes because it was collected lower in the deposits, although this sample, like sample USGS-549, might be younger than those parts of the terrace occupied by debris-flow deposits. The evidence thus suggests an average recurrence interval for debris flows at this canyon mouth of less than 33 years, more certainly less than 90 years.

During the January 1982 storm, debris flows occurred in the canyons above points A and B in figure 7.7, but there is no evidence that debris flows issued from either canyon mouth. Features typical of fresh debris-flow trails were absent in the lowermost reaches of these canyons at the time of our inspection shortly after the storm. Also absent near these canyon mouths were fresh deposits that were poorly sorted like those identified as debris-flow deposits in figure 7.8; fresh deposits near these canyon

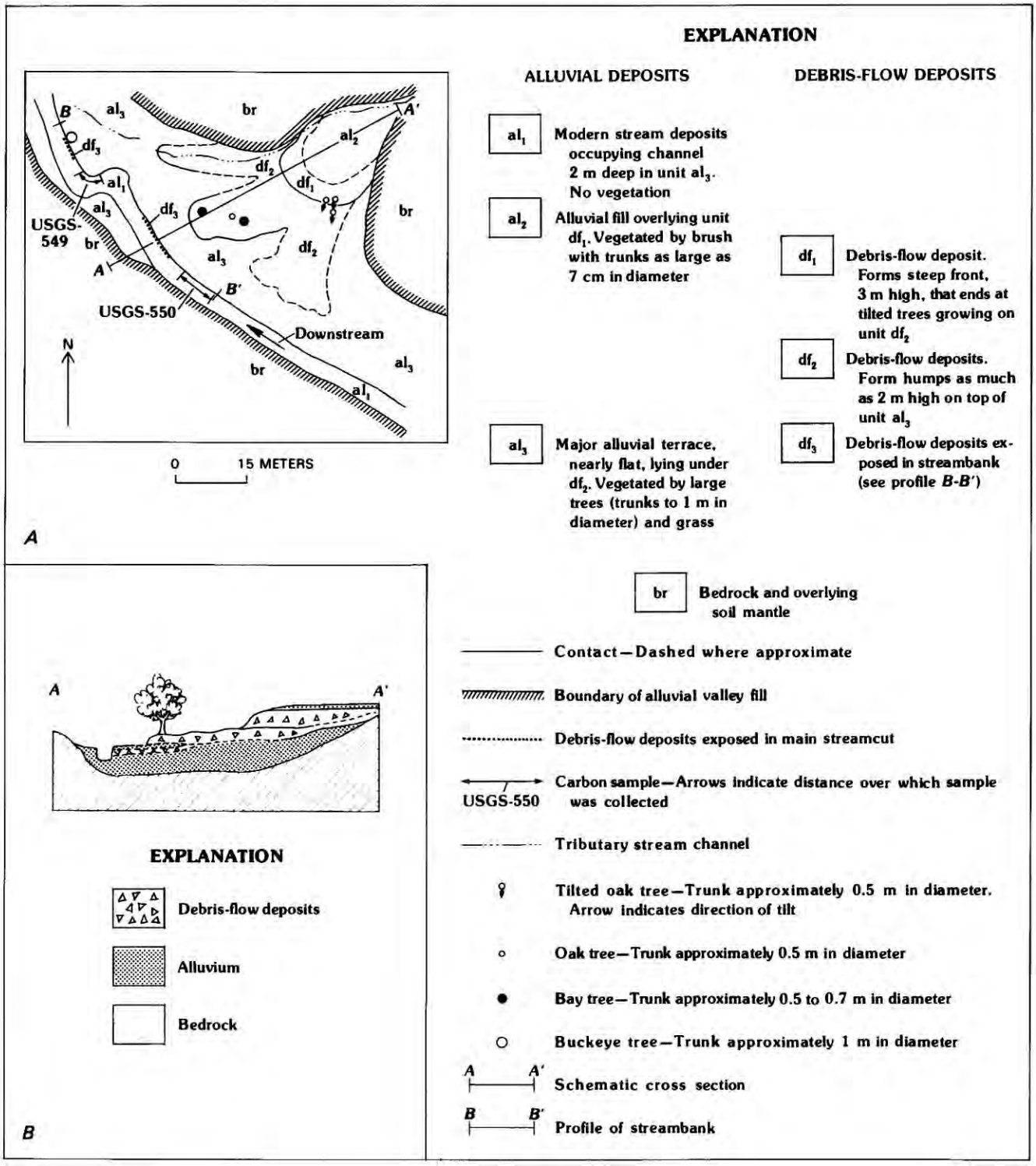
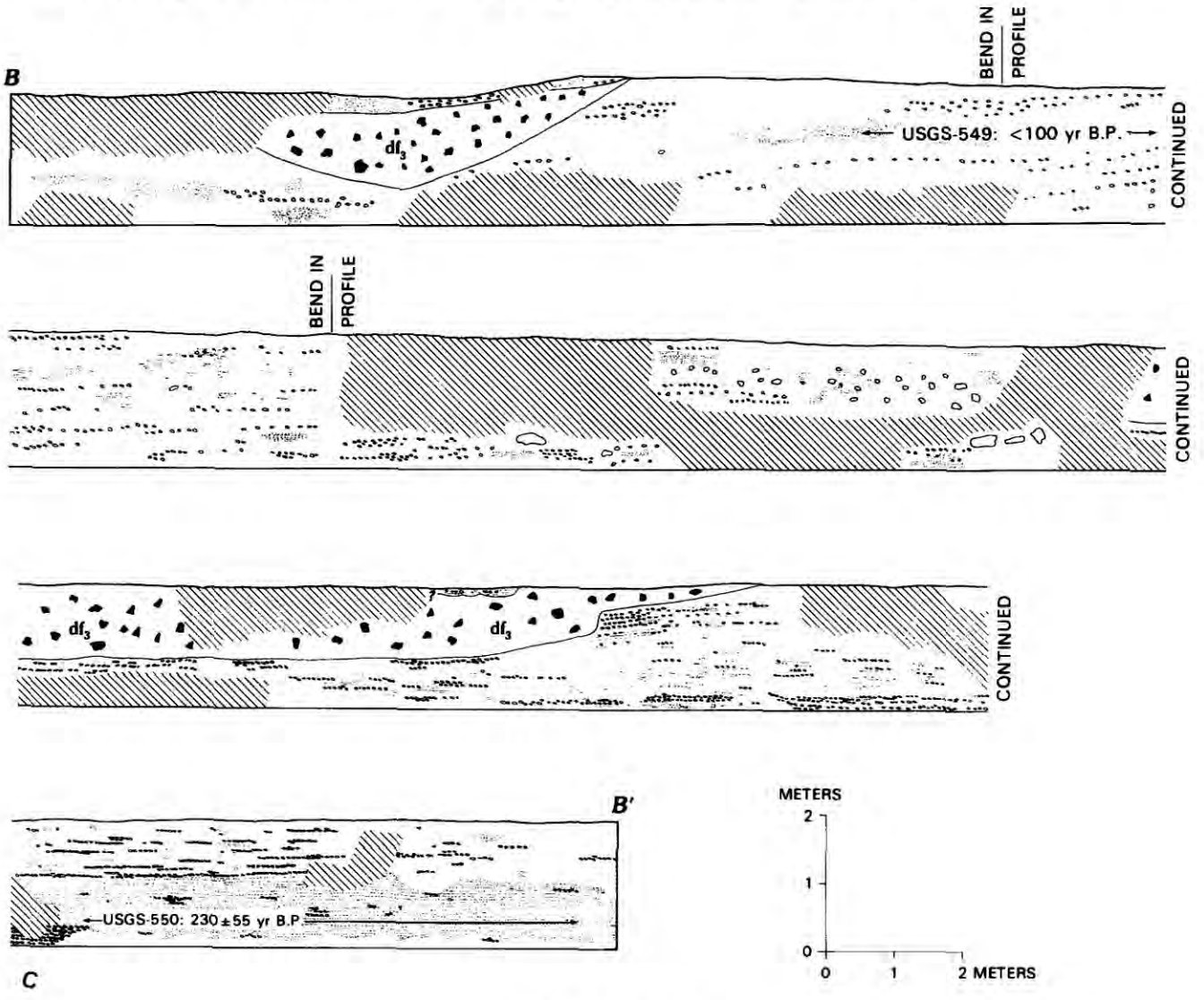


FIGURE 7.8.—Radiocarbon site near Three Peaks. *A*, Sketch map of area A in figure 7.7, showing relations between debris-flow deposits, alluvium, and profiles. *B*, Schematic cross section along *A-A'*. *C*, Profile *B-B'* of nearly vertical streambank incised into terrace, showing relations between debris-flow deposits, alluvium, and radiocarbon samples.

mouths consisted of sorted and bedded fluvial deposits, including much cobble gravel with a matrix of clean to silty sand. Thus, the debris flows in 1982 must either have stopped in the upper parts of these canyons or have been diluted in passage downcanyon. The fact that so major an event as the January 1982 storm was not represented by debris-flow deposits at these canyon mouths demonstrates that debris flows have reached these canyon mouths less frequently than rainfall events capable of triggering abundant debris flows.



EXPLANATION

Contact between debris-flow deposit and stream deposits

Cover of vegetation and sloughed material

Cobbles and boulders

Stream-deposited gravel

Stream-deposited sand and silt

df_3 Debris-flow deposit—Angular blocks of rock suspended in poorly sorted mixture of sand, silt, and enough clay to be more cohesive than stream deposits

USGS-549: <100 yr B.P. Location of radiocarbon sample—Showing sample number and age

FIGURE 7.8.—Continued

RADIOCARBON SITES NEAR INVERNESS (CASE STUDY 5, PL. 5)

By Steven L. Reneau and Stephen W. Robinson

During the January 1982 storm, debris torrents and other debris flows in canyons on the east side of Inverness Ridge (see Inverness area case study, chap. 6) eroded large volumes of material from stream channels and exposed many surficial deposits that contained charcoal and wood debris. Six samples were chosen from these exposures for radiocarbon dating to explore the timing of past depositional events along the channels and to evaluate the usefulness of these deposits for estimating recurrence intervals for debris flows. The radiocarbon ages and calendar dates of samples are listed in table 7.4, and sample locations are shown in figure 6.7.

In small, forested drainage basins, scour by debris flows can be the dominant erosional process, as discussed by Swanston and Swanson (1976) and Dietrich and Dunne (1978). This condition existed in 1982 on Inverness Ridge, where extensive erosion occurred along the debris-flow paths, commonly scouring colluvium and sediment to bedrock. In contrast, comparable channels unaffected by debris flows showed little erosion. Significant deposition during the storm occurred behind logjams left at the termini of debris flows and on flood plains where debris flows upstream were a source of sediment. The apparent relation between major erosion and deposition in these canyons and debris-flow events provides a means to infer the timing of particular events by dating these deposits. The age of discrete depositional units can be used to date events directly, and the age of material immediately overlying bedrock provides a minimum age for a preceding period of scour at that point.

Three of the dated samples were collected from the north fork of First Valley (pl. 4). An age of 1,950 ± 35 years B.P. (sample USGS-1466) was obtained in the upper drainage basin from charcoal in an organic-rich layer directly overlying granitic bedrock. This layer was buried beneath 3 m of fairly uniform granitic sand, possibly colluvial in origin, that was deeply eroded during the January 1982 storm. The drainage channel there appears to have been a smooth swale before passage of the debris flow. An age of 1,215 ± 40 years B.P. (sample USGS-1465) was obtained from charcoal in a similar organic-rich layer beneath the eroded flood plain of the lower valley. The sampled layer was overlain by 1 m of granitic sand and was separated from bedrock by a sand and gravel unit that pinched out 10 m upstream. An age of 110 ± 50 years B.P. (sample USGS-1513) was obtained from a large wood fragment within a buried layer of woody debris in the intermediate part of the canyon. This layer, which was exposed immediately below the surface of an eroded flood plain, was similar in appearance to logjams left by the 1982 debris flows. The layer exceeded 1 m in thickness, with the base unexposed.

TABLE 7.4.—*Radiocarbon ages from the Inverness area*

[Calibrated dates from Stuiver (1982, p. 1)]

Sample	Locality	Material	Radiocarbon age (yr)	Calibrated date
USGS-1465	North fork of First Valley.	Charcoal---	1,215±40	A.D. 670-920
USGS-1466	do---	do---	1,950±35	110 B.C.-A.D. 110
USGS-1467	Vallejo Street Canyon.	Wood---	14,720±50	---
USGS-1468	South fork of First Valley.	do---	675±40	A.D. 1260-1380
USGS-1469	do---	do---	>46,500	---
USGS-1513	North fork of First Valley.	do---	110±50	After A.D. 1650

Two dated samples were collected from the southern basin of First Valley (see fig. 6.7), along a small tributary to the main stream. The lower 150 m of this tributary was scoured in 1982 by a debris flow originating immediately below a dirt road, apparently related to road drainage. For 90 m upstream from its confluence with the main stream, the tributary flows through a sequence of partially cemented granitic gravel that has an estimated exposed thickness of 15 to 20 m. This sequence contains layers of sand, woody debris, and buried soils, and includes a probable debris-flow deposit that consists of clayey sand containing randomly oriented pieces of wood. A sample of wood from near the top of the sequence yielded an age older than 46,500 years B.P. (sample USGS-1469). An age of 675 ± 40 years B.P. (sample USGS-1468) was obtained from wood in a 0.5-m-thick layer containing decomposed vegetation and many small sticks, situated 15 m upstream from the confluence and immediately below a 3- to 4-m-high waterfall over the gravel sequence. The sampled layer was deposited unconformably against the gravel, with the base unexposed, and was overlain by 0.25 m of granitic sand. These latter units were almost completely eroded during the January 1982 storm.

The sixth sample was collected from the basin above Vallejo Street in Inverness Park, a short distance up a narrow tributary canyon. An age of 14,720 ± 50 years B.P. (sample USGS-1467) was obtained from a large piece of wood within a blue-gray sandy clay overlying granitic bedrock. This deposit was exposed by approximately 1 m of local incision.

The dated samples record various events. Two samples (USGS-1467, USGS-1469) are Pleistocene in age and probably cannot be used to evaluate the frequency of modern processes, although this fact was not obvious in the field.

The youngest dated event is a probable debris flow, represented by a buried debris layer on the north fork of First Valley (sample USGS-1513). Because the correlation between radiocarbon ages and calendar dates is imprecise, a post-A.D. 1650 date is all that can be obtained for the wood in this deposit. Possible subsequent debris flows could have passed by without leaving a record, as in January 1982, and so this date is inferred to represent a maximum age for the latest debris flow there.

The next youngest sample (sample USGS-1468) is from a loose deposit of sticks in the southern basin of First Valley. Because a major debris flow down that tributary should have eroded this material, the latest major event there is inferred to predate A.D. 1260–1380. The overlying sand may record a landslide event upstream that did not send a debris flow past this point.

The sampled layer from the lower flood plain of First Valley (sample USGS-1645) overlies bedrock and places a minimum date of latest erosion to bedrock at this point of A.D. 670–920. Deposition of the overlying sand may have been related to debris flows from a later storm.

The sample from the upper north fork of First Valley (sample USGS-1466) places a minimum date on the latest major erosion there at 110 B.C.–A.D. 110. The drainage basin above this site is relatively small, and the only debris flow produced in January 1982 was related to road drainage. These observations suggest that the natural frequency of erosional events in this basin is low and that the date may indirectly record the latest major debris-flow event passing this site.

The individual debris flows that were triggered during the January 1982 storm left varying records of their passage. Each flow scoured material from its path, but the efficiency of this process varied greatly along each debris-flow path and in different drainages, and no debris flow was completely effective in this erosion. Deposition by each flow was also sporadic, and the effects of earlier debris flows probably were equally irregular. The varying dates obtained show that the material mantling each canyon bottom should be viewed as a mosaic of different-age deposits, recording many separate events. The youngest dated deposit in any canyon places an approximate maximum limit on the timing of the most recent previous debris flow. To calculate an average recurrence interval for debris-flow events in a single canyon or a given area, a large-enough sample set is needed to include most events; some events will probably be missed, and so this method provides, at best, a maximum average recurrence interval. If the dates cluster around particular times, this clustering would provide evidence for discrete erosional periods.

The dated samples from Inverness Ridge do not have concurrent ages. The disparity in the ages indicates that the deposits do not record a common storm event and that the record is complex. Although a minimum of four events in the past 2,000 years is shown, the data set is too small to calculate a meaningful recurrence interval. These four dates suggest, however, that the mean residence time of material along these channels is less than 2,000 years. The two older samples demonstrate local preservation of Pleistocene deposits, which complicates interpretation of all the deposits there in relation to the frequency of modern processes.

CONCLUSIONS CONCERNING DISTRIBUTION OVER TIME

Almost all the debris flows induced in Marin County by the January 1982 storm probably occurred during intense storm rainfall, and concurrence of the debris torrents near Inverness suggests that at least some events were triggered by periods of exceptionally intense rainfall during the storm. Rainstorms capable of triggering some debris flows in the county have occurred about every 5 years or so. However, rainfall capable of abundant debris flows, as in the January 1982 storm, has occurred less frequently; rainfall-recurrence intervals for this storm suggest that similar rainfall and, thus, similar levels of debris-flow activity can be expected every 20 to 100+ years in the county.

Radiocarbon dating suggests that the recurrence intervals of debris flows at different sites in the county may range from less than 33 to more than 1,950 years. Dates from many more sites would be needed to determine a recurrence interval for abundant debris flows. The earliest date from Inverness suggests that debris flows have occurred in the county for more than 46,500 years.

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8. DEBRIS FLOWS AND OTHER LANDSLIDES IN SAN MATEO, SANTA CRUZ, CONTRA COSTA, ALAMEDA, NAPA, SOLANO, SONOMA, LAKE, AND YOLO COUNTIES, AND FACTORS INFLUENCING DEBRIS-FLOW DISTRIBUTION

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ABSTRACT

Debris flows and other landslides resulting from the January 3–5, 1982, storm were mapped throughout the San Francisco Bay region from aerial photographs, with limited field checking. The concentration of debris flows (number per square kilometer) was measured and contoured. Maximum concentrations reached 63 debris flows per square kilometer, which, though high, is lower than observed from some intense rainstorms in other parts of the world.

In San Mateo County, we examined factors affecting the distribution of debris flows, including rainfall, bedrock geology, slope steepness, and vegetation. Normalized storm rainfall (total storm rainfall divided by mean annual precipitation) influenced debris-flow distribution more strongly than did total storm rainfall; areas of high debris-flow concentration showed normalized storm rainfall greater than 0.30. The influence of bedrock geology on debris-flow incidence was evaluated by a comparison of debris flows with bedrock geology, using digitized data bases; this evaluation correlated with a suggestive geologic indicator of long-term geomorphic slope-forming processes. Slope steepness determined from a digital elevation model (DEM) showed that debris flows most commonly occurred on DEM-derived slopes of 19–22°, below typical field-measured values. However, when normalized by taking into account the availability of slopes of different steepness, the DEM slope interval most densely populated by debris flows was 25° to 29°, more in accord with

experience elsewhere. Vegetation showed no distinct influence on regional distribution of debris flows, but in one area logging correlated with an increase in debris-flow concentration. In Santa Cruz, Contra Costa, Alameda, Napa, Solano, Sonoma, Lake, and Yolo Counties, we noted areas of dense debris-flow concentration and related those areas to high values of normalized storm rainfall.

In addition to describing the regional distribution and factors affecting debris-flow concentration, in this chapter we describe several of the largest landslides in San Mateo and Santa Cruz Counties to illustrate the complexity of the landslides that occurred in the storm.

INTRODUCTION

The January 3–5, 1982, storm triggered thousands of landslides in the San Francisco Bay region (see "Introduction" to this volume for landslide terminology). Field reconnaissance after this storm revealed that many slides transformed into flows, and we use the term "debris flow" for these complex landslides. The distribution of debris flows within the bay region was irregular; some areas had dense concentrations (more than 60 debris flows per square kilometer), whereas other areas were virtually devoid of debris flows (less than 1 per square kilometer). We document here the distribution of debris flows and discuss factors that significantly affected this distribution.

Few studies have inventoried the debris-flow distribution resulting from a single storm over a large area, or quantified debris-flow distribution on a regional basis, and then assessed the factors that affected this distribution. In northwestern Italy, Govi and Sorzana (1980) quantified debris-flow distribution and examined this distribution with respect to several parameters, including slope, bedrock lithology, soil type and thickness, and measures of storm rainfall. In the Kinki District of Japan, Okuda and others (1979) examined the relations of debris-flow distribution to geology, geomorphology, and rainfall. In the Shizuoko Prefecture of Japan, Omura and Nakamura (1983) related debris-flow distribution to bedrock lithology, vegetative land use, and rainfall.

We describe the method, difficulties of preparation, and limitations of the debris-flow inventory, and describe the procedure for quantifying the distribution of debris flows. For areas with a high concentration of debris flows, we examine the factors that contributed to that concentration.

We also present case studies of seven large landslides in San Mateo and Santa Cruz Counties for which site investigation revealed details, such as initial failure conditions or characteristics of movement, that illustrate slope processes during the storm. For comparative purposes, the characteristics of large landslides in the storm, including volume, degree of slope, and distance of travel, are tabulated.

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Debris flows in Contra Costa County were mapped by Wieczorek and Bhattacharyya, a visiting United Nations Educational, Scientific, and Cultural Organization (UNESCO) Fellow from the Department of Geological Sciences at Jadavpur University in Calcutta, India. Debris flows and other landslides in Santa Cruz and San Mateo Counties were mapped and partially field checked by Harp and Wieczorek. Debris flows and other landslides in Alameda and parts of Napa, Solano, Sonoma, Yolo, and Lake Counties were mapped by Wieczorek. Mark provided computer-generated maps of normalized storm rainfall and performed computer correlation between slope, geologic units, and debris-flow distribution.

DISTRIBUTION OF DEBRIS FLOWS

PROCEDURE FOR DESCRIBING DISTRIBUTION

AIRPHOTO COVERAGE

The distribution of debris flows was compiled from interpretation of aerial photographs, in some areas coupled with aerial and ground-based reconnaissance. Aerial reconnaissance from fixed-wing aircraft immediately after the storm identified the areas most affected by debris flows. On the basis of this preliminary evaluation, the U.S. Geological Survey contracted for black-and-white aerial stereophotography at 1:20,000 scale for the areas most affected—Marin, San Mateo, and Santa Cruz Counties. Independently, the U.S. National Aeronautics and Space Administration (NASA) took false-color infrared photography at 1:24,000 scale for selected parts of the San Francisco Bay region, including parts of Contra

Costa County. Both sets of photographs were taken within a 7-day rain-free period after the storm in early January, and so none of the fresh-appearing debris flows can be attributed to rainfall after the storm. However, field observations in San Mateo County during the weeks before the storm revealed that a few debris flows had been triggered by storms during late December (see chap. 5; R.C. Wilson, written commun., 1982). In the La Honda study area (see chap. 5), 5 debris flows were triggered in December, in comparison with 74 triggered by the January 1982 storm—a difference suggesting that about 6 percent of the fresh debris flows identified from the January photographs are attributable to previous storms.

Because airphoto coverage was incomplete for some parts of the bay region, a subsequent series of 1:24,000-scale infrared photographs was commissioned from NASA and flown during summer 1982. We used these photographs to map areas not previously covered in Contra Costa, Alameda, Napa, Solano, Sonoma, Yolo, and Lake Counties, and to remap areas obscured by shadow in the January 1982 photography. In steep, heavily forested canyons, as much as 30 percent of the inventoried debris flows were detected by using the summer photography.

Although some landslides and debris flows may have occurred between the times of the January and summer 1982 photography, our field observations and photointerpretation in areas covered by both sets of photographs indicate that they were few. For example, field observations after the February 14–15, 1982, storm revealed no additional debris flows in either the Pleasant Valley area of Santa Cruz County or the La Honda area of San Mateo County, both of which had been examined extensively after abundant debris flows in the January 1982 storm. This February 1982 storm was the most intense to occur in the San Francisco Bay region between January 5 and the time of the summer photography. In the Montara Mountain area of San Mateo County, only 1 percent of the debris flows mapped in areas visible in both sets of photographs are attributable to the period after the January 1982 storm (C.M. Wentworth, oral commun., 1985). Considering the small percentages of debris flows in sample areas shortly before (6 percent) and after (1 percent) the January 1982 storm, the debris flows detected by photointerpretation represent a generally accurate distribution from the storm in unforested areas.

In forested areas, however, photointerpretation has underestimated the abundance of debris flows, as discussed below. In some aerial photographs, recent debris-flow deposits could be identified at the mouth of a canyon, but the scar and (or) track could not be identified because of tree cover on the hillside. In other photographs, because of obscuration by trees, the tracks and deposits of debris flows may extend farther downslope than mapped.

In addition to the numerous debris flows, we noticed in the field less common falls, slumps, and translational slides. These other types of landslides, if small, were difficult to detect in aerial photographs; thus, some of these landslides may have been missed, and others may have been identified as debris flows. However, because relatively few of these other types of landslides occurred during the storm, the inventory of debris flows is essentially accurate. Landslides other than debris flows are shown to scale and distinguished from debris flows in the inventory, but they are not subdivided further by type of movement. Several such landslides, numbered on plates 8 and 9, are tabulated and described further below.

We noted several large, slow-moving landslides, specifically earth flows and earth block slides, that began to move between mid-January and summer 1982. These subsequent large landslides were not included in the inventory.

FIELD CHECKING

Fieldwork during 1982 provided a check on the accuracy of photointerpretative mapping, allowed detection of landslides not visible on the airphotos, and permitted investigation of individual sites. Because of the size of the study area and the total number of debris flows, field observations were limited largely to areas with high concentrations of debris flows and to areas easily accessible by roadway.

After reconnaissance of debris flows[1] from roads, more thorough examination was undertaken. Officials of parks and public lands were contacted to determine the extent of debris flows in the areas under their jurisdiction. Some of these officials provided rainfall measurements or information on the times of debris flows or on previous debris flows. In San Mateo County, field examinations were conducted in Huddart and Pescadero County Parks, Butano and Portola State Parks, and on the extensive public lands administered by the San Francisco Water Department, in addition to detailed studies that were carried out in the La Honda study area (see chap. 5). In Santa Cruz County, field examination was conducted in Big Basin State Park and in the area of Pleasant Valley. No field checking was done in the other counties. The extent of the areas field checked is shown in plate 7.

Field examination generally confirmed the locations of the debris flows mapped from aerial photographs; however, we recognized that not all debris flows had been identified in thickly forested areas. Particularly in parts

[1]In this section, we omit further discussion of other types of slope movement, except where complex movement involved debris flow.

of northern Santa Cruz County, the number of debris flows that occurred was greater than identified from aerial photographs because many of the smaller debris flows did not disrupt the tree canopy. In Big Basin State Park, for example, a debris flow 7 to 10 m wide traveled 45 m and destroyed the park's water-treatment plant (figs. 8.1, 8.2), but it did not disrupt any trees and was not recognized in the photographs. In the heavily forested areas of San Mateo and Santa Cruz Counties (identified on pl. 7), the distribution shown on plates 8 and 9 represents a lower bound to the number of debris flows that actually occurred.

MAP REPRESENTATION

The scar of a typical debris flow is represented schematically on the 1:62,500-scale maps (pls. 8–12) by arcuate lines drawn upslope of the more accurately plotted location of the track of the debris flow. The widths of the arcuate scar and the track are not necessarily drawn to scale; small features are shown at the minimum size distinguishable on the maps. Thus, the larger debris flows are shown at approximately true scale; for a smaller flow, only the location of the track is shown accurately. Large debris-flow deposits are shown with a dotted pattern for emphasis, but they do not differ significantly from smaller debris-flow deposits, except, possibly, in thickness.

Because of their regional scale, the maps on plates 8 through 12 are insufficient to evaluate debris-flow hazards at individual sites, for which detailed engineering-geologic mapping at a scale of 1:1,000 or larger is generally necessary. These maps are sufficient, however, for the purpose of documenting the regional distribution of debris flows and evaluating the factors that affected this distribution.



FIGURE 8.1.—View upslope to a small (less than 75 m^3 volume) debris-flow scar in black organic soil and tan weathered sandstone from which a slump mobilized into a debris flow. This flow traveled 45 m before hitting the water-treatment plant at Sempervirens Creek in Big Basin State Park, Santa Cruz County. Scar is about 1 m deep. Note organic debris against base of trees in path at left.

CONTOURING THE CONCENTRATION OF DEBRIS FLOWS

The inventory of debris flows was quantified by digitizing the number of debris flows and contouring this distribution per square kilometer. Isopleth mapping of landslide deposits was used by Campbell (1973) and Wright and Nilsen (1974); Okuda and others (1979) and Govi and Sorzana (1980) applied this technique to depict abundance of debris flows.

Contours were drawn in increments of 5 debris flows per square kilometer to represent different debris-flow concentrations. Areas of less than 5 debris flows per square kilometer were assigned a sparse concentration rating, areas of 5 to 20 debris flows per square kilometer a moderate rating, areas of 20 to 30 debris flows per square kilometer a dense rating, and areas of more than 30 debris flows per square kilometer a very dense rating.

FACTORS AFFECTING THE DISTRIBUTION OF DEBRIS FLOWS IN SAN MATEO COUNTY

RAINFALL

About 50 storm-rainfall measurements were available from stations in the hilly and mountainous parts of San Mateo County where debris flows were most abundant (pl. 7; Mark and others, 1983). Using the measurements from these stations, we compared rainfall totals with the concentrations of debris flows. Many areas of moderate and dense debris-flow concentration lacked nearby measurements; however, in a few places, measurements were recorded within such areas or nearby (within 0.8 km in the same drainage).

When mean storm rainfall was compared for areas with different debris-flow concentrations, no clear relation was apparent (table 8.1). Mean storm rainfall was even slightly



FIGURE 8.2.—Water-treatment plant in Big Basin State Park after impact of debris flow shown in figure 8.1. Plant was moved nearly 7 m from its foundation by debris flow, which was only about 0.6 m thick.

TABLE 8.1.—*Mean storm rainfall, mean normalized storm rainfall, and standard deviations for areas of varying debris-flow concentrations in San Mateo County*

[Sample locations: sparse--rainfall-measurement stations were more than 0.8 km from areas of dense debris-flow concentration; moderate--rainfall-measurement stations were within areas; dense--rainfall-measurement stations were less than 0.8 km from areas; very dense--rainfall-measurement station was less than 0.25 km from area. $\underline{R}_s$, mean storm rainfall; $\underline{N}_s$, mean normalized storm rainfall, defined by $\underline{N}_s = \underline{R}_s / \underline{R}_a$, where $\underline{R}_a$ is the mean annual precipitation. All measurements from 53 rainfall stations shown on plate 7]

Debris-flow concentration	$\underline{R}_s$ (mm)	Sample size	$\underline{N}_s$
Sparse	214.3±53.2	36	0.280±0.069
Moderate	224.2±47.0	22	.302±0.077
Dense	209.5±42.6	14	.316±0.079
Very dense	223	1	.338

higher for areas of moderate concentration than for areas of dense concentration.

Normalized storm rainfall, which is defined as the storm total divided by the mean annual precipitation, was also compared with debris-flow concentration. This measure might better reflect a storm's effect on slope stability because hillslopes must adjust over time to average rainfall, and the magnitude of departures from average rainfall can best be compared through normalized storm rainfall. Using the isohyetal map of Rantz (1971), we computed the normalized storm rainfall at each measurement station. The group mean of values within and near areas of different debris-flow concentration revealed the positive relation between normalized storm rainfall and debris-flow concentration evident in table 8.1. Though not obvious on plate 8, this statistical analysis indicated that areas with normalized storm rainfall above 0.30 showed moderate concentrations of debris flows, and those above 0.32 showed dense concentrations. Although only one measurement was near an area of very dense debris-flow concentration, its 0.34 value is consistent with this statistical trend. This result is consistent with that of Mark and Newman (see chap. 2), who found that parts of the San Francisco Bay region with greater than 0.30 normalized storm rainfall had a significant increase in the propensity for damaging landsliding.

BEDROCK GEOLOGY

Bedrock geology (from Brabb and Pampeyan, 1983) appeared to influence the distribution of debris flows in San Mateo County. Although almost all the debris flows observed in the field involved only shallow residual or colluvial soils overlying bedrock, the material properties of these soils, as well as their thicknesses, were influenced by bedrock geology.

RANKING OF DEBRIS-FLOW INCIDENCE

The effect of bedrock geology was evaluated by comparing the abundance of debris flows in different geologic units. The percentage of debris flows that occurred within each geologic unit was divided by the percentage of the county occupied by that geologic unit to give a ratio called incidence. The incidence was evaluated by using a computer to compare the digitized locations of the 4,571 debris flows that occurred in the storm in San Mateo County with the 53 geologic units. On the basis of their incidence to debris flow, the units were ranked and divided into groups of high-, medium-, and low-incidence, as listed in table 8.2.

The group of 10 geologic units of high incidence accounted for more than 50 percent of the debris flows in the county within less than 20 percent of the area (table 8.2). Within this group, the debris-flow concentration averaged 10.4 debris flows per square kilometer, well below the peak values shown on plate 8. The group of units with medium incidence had more nearly equal percentages of debris flows (20.6) and area (16). The remaining group of units of low debris-flow incidence constitute 64 percent of the county area but accounted for only 27 percent of the debris flows; concentration averaged less than 1.6 debris flows per square kilometer. The fact that most debris flows occurred within a group of geologic units composing less than 20 percent of the area of the county indicates that bedrock geology strongly influenced debris-flow distribution.

COMPARISON WITH PREVIOUS LANDSLIDE-SUSCEPTIBILITY EVALUATION

The ranking of geologic units by debris-flow incidence shows differences from the ranking of susceptibility to landsliding in San Mateo County determined by Brabb and others (1972). Several geologic units of high debris-flow incidence, notably the unnamed volcanic rocks (KJv), the granitic rocks of Montara Mountain (Kgr), the Pigeon Point Formation (Kpp), and the unnamed sandstone unit of Jurassic or Cretaceous age (KJs), had relatively low susceptibility to landsliding according to Brabb and others (1972). This difference arose because ranking of landslide susceptibility by Brabb and others (1972) was based on the areal proportions of geologic units that had failed by landsliding. The areal predominance of large, deep-seated landslides in San Mateo County (Brabb and Pampeyan, 1972) weighted the assessment toward susceptibility to large, deep-seated landslides. Areas with many small landslides noted by Brabb and Pampeyan (1972) did not strongly affect their evaluation of landslide susceptibility because of the small areas involved.

TABLE 8.2.—*Debris-flow incidence in bedrock geologic units of San Mateo County during the January 1982 storm, in decreasing order*

[Unit names and map symbols follow nomenclature of Brabb and Pampeyan (1983). Asterisks denote bedrock units with associated colluvial deposits shown by Brabb (1980) or Brabb and Pampeyan (1983). Incidence for a unit is ratio of its percentage of debris flows to its percentage of areal extent]

Bedrock geologic unit	Symbol	Areal extent in county (pct)	Debris flows (pct)	Incidence
High debris-flow incidence				
Unnamed volcanic rocks	KJv	0.01	0.11	11.00
Pomponio Mudstone Member of the Purisima Formation	Tpp*	2.50	7.46	2.98
Granitic rocks of Montara Mountain	Kgr*	5.18	15.10	2.91
Purisima Formation, undivided	Tp*	5.09	14.29	2.81
San Gregorio Sandstone Member of the Purisima Formation	Tpsg	.56	1.53	2.73
Pigeon Point Formation	Kpp*	1.32	3.41	2.58
Unnamed sandstone of Jurassic or Cretaceous age	KJs*	1.07	2.71	2.53
San Lorenzo Formation, undivided	Tsl	.12	.26	2.17
Unnamed sandstone, shale, and conglomerate of Paleocene age	Tss*	.91	1.95	2.14
Mindego Basalt and related volcanic rocks	Tmb	2.80	5.51	1.97
Total		19.56	52.33	---
Medium debris-flow incidence				
Lambert Shale and San Lorenzo Formation, undivided	Tls	1.47	2.89	1.96
Lompico Sandstone	Tlo	.09	.17	1.88
Lobitos Mudstone Member of the Purisima Formation	Tpl*	.92	1.64	1.78
Limestone of the Franciscan assemblage	fl	.09	.13	1.44
Twobar Shale Member of the San Lorenzo Formation	Tst	.19	.24	1.26
Tahana Member of the Purisima Formation	Tpt*	7.71	9.52	1.23
Tunitas Sandstone Member of the Purisima Formation	Tptu	.60	.70	1.17
Sandstone of the Franciscan assemblage	fs*	4.89	5.32	1.09
Total		15.96	20.61	---
Low debris-flow incidence				
Greenstone of the Franciscan assemblage	fg	2.50	2.23	0.89
Vaqueros Sandstone	Tvq	1.75	1.51	.86
Lambert Shale	Tla	4.85	4.16	.86
Colluvium	Qcl	2.26	1.79	.79
Butano Sandstone	Tb	10.61	8.09	.76
Santa Cruz Mudstone	Tsc	4.40	3.33	.76
Monterey Formation	Tm	1.16	.81	.70
Shale in the Butano Sandstone	Tbs	.03	.02	.67
Santa Margarita Sandstone	Tsm	.25	.15	.60
Merced Formation	QTm	1.95	1.03	.53
Marine-terrace deposits	Qmt	3.21	1.47	.46
Franciscan assemblage, undivided	KJf	.46	.15	.33
Sand-dune and beach deposits	Qs	.54	.18	.33
Sheared rock of the Franciscan assemblage	fsr	2.42	.35	<.15
Rices Mudstone Member of the San Lorenzo Formation	Tsr	.32	.04	<.15
Serpentinite	sp	1.15	.15	<.15
Coarse-grained alluvial-fan deposits	Qyf	2.86	.33	<.15
Coarse-grained older alluvial-fan and stream-terrace deposits	Qof	4.10	.46	<.15
Butano(?) Sandstone	Tb(?)	2.02	.20	<.15
Colma Formation	Qc	2.50	.22	<.15
Santa Clara Formation	QTs	2.14	.18	<.15
Fine-grained younger alluvial-fan deposits	Qyfo	2.49	.17	<.15
Artificial fill	Qaf	6.19	.04	<.15
Unnamed sedimentary and volcanic rocks	Tuv	.01	.00	.0
Marble and hornfels	m	.01	.00	.0
Basin deposits	Qb	1.03	.00	.0
Conglomerate of the Franciscan assemblage	fcg	.01	.00	.0
Metamorphic rocks of the Franciscan assemblage	fm	.01	.00	.0
Bay mud	Qm	2.11	.00	.0
Chert of the Franciscan assemblage	fc	.34	.00	.0
Unnamed shale	Ksh	.01	.00	.0
Fine-grained older basin and alluvial-fan deposits	Qob	.13	.00	.0
Page Mill basalt	Tpm	.01	.00	.0
Unnamed sandstone	Tus	.45	.00	.0
Alluvium	Qal	.20	.00	.0
Total		64.48	27.06	---

In contrast, the evaluation of debris-flow incidence in the storm reflects principally the number of debris flows per square kilometer rather than the area occupied. Thus, in a geologic unit with a high debris-flow incidence, with about 10 debris flows per square kilometer, probably less than 5 percent of the area was occupied by debris flows. Thus, the evaluation by Brabb and others (1972) reflects primarily susceptibility of bedrock to large, deep-seated landsliding, whereas the evaluation here reflects debris-flow incidence in shallow soils developed over bedrock.

Correlation with Mapped Colluvial Deposits

Colluvial deposits along valley bottoms or below steep slopes, as shown on geologic maps (Brabb and Pampeyan, 1983; Brabb, 1980), correlate with many bedrock units with a medium or high debris-flow incidence in the storm (table 8.2), whereas mapped colluvial deposits are generally absent over bedrock units with a low debris-flow incidence. This association suggests that the colluvium is derived from previous debris flows and that the geologic units with mapped colluvium have been producing debris flows over a long period.

SLOPE STEEPNESS

The effect of steepness on slope stability has long been recognized. In particular, the importance of slope steepness for the initiation of debris flows has been documented in southern California (Campbell, 1975), where debris flows most commonly originate on slopes of 26° to 45°. In San Mateo County, onsite measurements of slopes at which debris flows originated in the January 1982 storm ranged from 14° to 45° (see chaps. 5, 6, 9).

A digital elevation model (DEM) of San Mateo County with a 30-m grid spacing was used to determine the effect of slope steepness on debris-flow distribution. A quadratic surface was fitted to each set of nine points from the model, and its steepness assigned to the centerpoint of the set. By repeating this process for all sets, a file of digitized slope-steepness values at 30-m spacing was generated that could then be compared with the digitized data base of debris-flow-scar locations. The slopes derived from the DEM are representative of terrain areas with dimensions of approximately 100 m. They cannot be directly compared with values measured in the field at debris-flow scars. Experience shows that generally the DEM slopes are substantially lower than field-measured slopes.

The population of slopes within the county, represented by the first histogram in figure 8.3, shows that gentle slopes (0°–3°) predominate, moderate slopes (3°–17°) are common, steep slopes (17°–42°) are progressively less common, and very steep slopes (42°+) are rare. The frequency of debris-flow-scar locations with slope steepness is shown by the second histogram in figure 8.3. The peak of this second histogram lies at 19°–22°, the DEM-derived slope steepness where debris flows most frequently initiated. As expected, this range is well below the 26°–45° range where debris-flow sources are most common in southern California (Campbell, 1975), well below the typical values shown in figure 7.3 for part of Marin County during this storm, and well below typical field-measured values (fig. 6.16).

The means by which we determined slope steepness must account for most of the discrepancy. Although determination of slope from either DEM or topographic contours tends to give lower values than field measurements (see fig. 7.4), the values cited above for Marin County, which were determined from topographic contours, are considerably higher than those reported here for San Mateo County and more in line with field-measured values. Thus, the DEM method of slope determination appears largely responsible for the low San Mateo County values.

To explore this apparent discrepancy, we normalized the histogram of the frequency of debris flows in San Mateo County with respect to the slope population, dividing by the area of available slopes with different degrees of steepness. This ratio, shown as a curve in figure 8.3, indicates that for an equal area of slopes of different steepness the peak of the debris-flow distribution shifts to 25°–29°, more in agreement with experience elsewhere. This shift results from the fact that the tendency to fail increases as the slope increases, but fewer steep slopes are available to fail. Above the peak range of 25°–29°, the abundance of debris flows as well as the ratio decreases, possibly reflecting the inability of debris to form and remain on steeper slopes.

The correlation of debris flows with slope is affected by interaction of the geology with geomorphic processes shaping the terrain. As indicated in our analysis of San Mateo County, the relatively gentle (19°–22°) DEM-derived slopes that favored debris flows reflect the paucity of steep slopes. In Marin County, the peaks of debris-flow frequency with slope varied between different terrain units, from a peak of 25° in soft terrain to a peak of 35° in hard terrains (see fig. 7.6). Inasmuch as geologic units correlate with terrain units (Ellen and others, 1982), the range of slope frequency for debris flows within a county reflects the composite of geologic units in that area. Therefore, the frequency of debris flows with slope could vary from area to area, depending on differences in slope population and geologic units, but the normalized distribution of debris flows with slope should show a more consistent range of slope values from area to area by eliminating the effects of differences in slope population. Remaining differences in slope could reflect differences in the strength of soil materials or vegetative root mats.

VEGETATION

The influence of vegetation on the regional distribution of debris flows in San Mateo County is difficult to assess, at least in part because geology, rainfall, and slope steepness all influence vegetation, as well as the distribution of debris flows.

In general, heavily forested areas in southernmost San Mateo County and along California Highway 35 (Skyline Boulevard) (pl. 7) generally show sparse debris-flow concentration, whereas many grass- and brush-covered hillslopes, as at San Bruno Mountain, Montara Mountain, and many areas west of California Highway 35, show moderate, dense, or very dense debris-flow concentrations. However, this apparent relation may be biased because debris flows were difficult to detect beneath thick forest cover.

DEBRIS-FLOW ABUNDANCE ON BUTANO RIDGE

In the southern part of San Mateo County near Butano Ridge, timber harvesting appears to have affected debris-flow abundance in the storm. Debris flows were very densely concentrated in parts of the upper watershed of Butano Creek. This area had been clearcut between 1953 and 1967, and a small part of the clearcut area subsequently was selectively logged between 1979 and 1981. In adjacent parts of the Pescadero Creek watershed, which had been either tractor clearcut between 1925 and 1953 or selectively logged between 1968 and 1971, notably fewer debris flows occurred. Similar topography and bedrock geology in these areas suggest that the difference in abundance of debris flows could be associated with the method and age of timber harvest, although differences in the direction and degree of bedding dip, as well as other factors, could also account for the observed distribution.

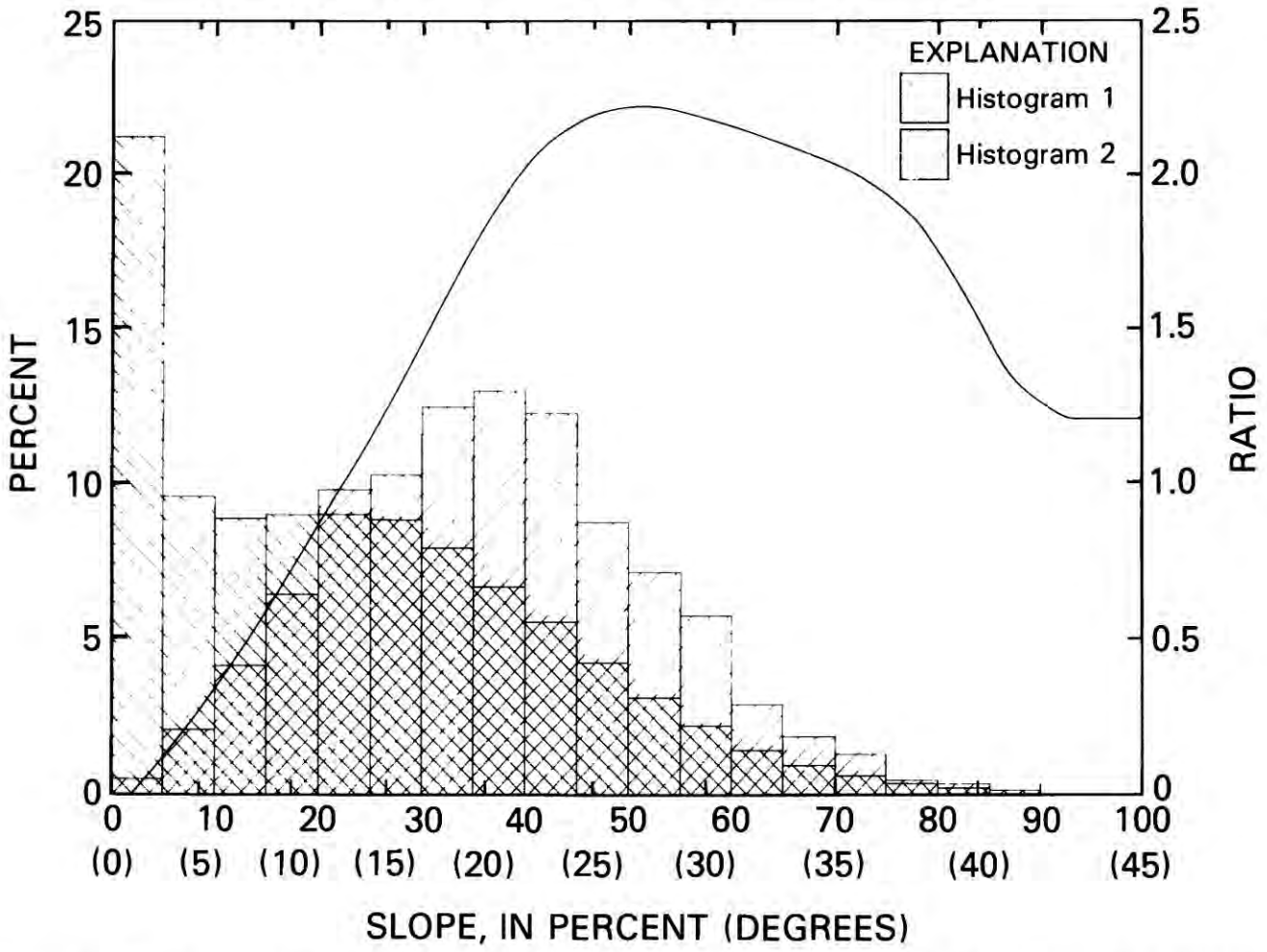


FIGURE 8.3.—Slope steepness at debris-flow sources in San Mateo County, derived from digital elevation model. Histogram 1 shows steepness of all slopes, whereas histogram 2 shows steepness at debris-flow source areas. Normalized curve of steepness distribution of debris flows is ratio of histogram 2 to histogram 1.

Although data from San Mateo County or other areas of central California are unavailable, data from forest lands in the Pacific Northwest indicate a severalfold increase in the abundance of debris flows in clearcut areas over that in forested areas, and even greater increases are associated with roads in these areas (Swanson and others, 1981). Thus, available data suggest that timber harvest can affect the abundance of debris flows.

According to studies in the Pacific Northwest, the shear strength of decaying roots generally begins to decrease markedly within 3 years after cutting and reaches a minimum some 15 years after cutting (Swanston and Swanson, 1976). Correspondingly, shallow landsliding and debris-flow activity noticeably increase beginning after 2 years and continuing as long as 20 years after deforestation (Wu and Swanston, 1980; Swanson and others, 1981; Selby, 1982, p. 142). Loss of root strength is not so likely in San Mateo County, however, because in the Santa Cruz Mountains of California, part of the native vegetation (redwood, tanoak, and madrone) resprouts after cutting and thus tends to maintain root strength. No detailed studies have been conducted in this part of California to document the temporal relation of deforestation to slope stability.

Approximately two-thirds of the abundant debris flows triggered by the storm in the clearcut parts of the Butano Creek watershed originated outside of areas selectively logged in 1979–81. The very dense concentrations of debris flows in this area may be due largely to the clearcutting and road construction some 15 to 29 years earlier. In the Pescadero Creek watershed, the debris-flow concentration was sparse to moderate, possibly because resprouting and reforestation had strengthened soils within the 3 to 5 decades after clearcutting. Any inferences concerning the effects of logging on debris-flow abundance near Butano Ridge are tentative because detailed site-specific studies are necessary to evaluate the importance of the many factors affecting debris-flow initiation.

DISTRIBUTION OF DEBRIS FLOWS ELSEWHERE IN THE SAN FRANCISCO BAY REGION

We determined debris-flow concentrations from the digitized inventory of debris flows in Santa Cruz, Contra Costa, Alameda, Napa, and parts of Solano, Sonoma, Lake, and Yolo Counties (pls. 9–12). Inspection of aerial photographs indicated that the concentration dropped off noticeably to the north into Lake County, to the east toward the Sacramento Valley in Alameda, Contra Costa, Solano, and Yolo Counties, and to the south into Santa Clara and Monterey Counties. Debris flows were observed but not mapped in the western part of Sonoma County west of Santa Rosa. These trends in concentration are also evident in figure 2 (see "Introduction" to this volume); the areas of highest debris-flow concentration are listed in table 8.3.

TABLE 8.3.—*Mean storm rainfall, normalized storm rainfall, and maximum debris-flow concentration for areas of dense to very dense debris-flow concentration*

[$\underline{R}_s$, mean storm rainfall; $\underline{N}_s$, normalized storm rainfall; $\underline{C}_{max}$, maximum debris-flow concentration. $\underline{R}_s$ values are the mean and standard deviation of closest measurements, generally within 3 km of the area under consideration; where there is only a single nearby measurement, the value is given without a standard deviation. N/A, no nearby measurement available]

Area	$\underline{R}_s$ (mm)	$\underline{N}_s$	$\underline{C}_{max}$ (km^{-2})
San Mateo County			
Montara Mountain	218	0.358	51.0
San Bruno Mountain	118	.212	23.0
Santa Cruz County			
Lompico Creek-Zayante Creek	455.2±89.3	0.390	32.0
Bean Hill-Pleasant Valley	243.3±53.7	.342	63.0
Soquel-Branciforte Creek	313.5±58.7	.386	28.0
Contra Costa County			
San Pablo Ridge-Wildcat Creek	225.5±43.6	0.386	25.9
Franklin Ridge-Pinole Creek	173.7±23.2	.311	60.0
Solano County			
Sulphur Springs Mountain	N/A	N/A	43.2
American Canyon-Jameson Canyon	201.3±8.5	.360	37.0

In Santa Cruz County, debris-flow concentrations show maximums in the central part of the county. The drainage of the San Lorenzo River and its tributaries, particularly the upper watersheds of Newell, Lompico, Bean, Carbonera, and Zayante Creeks, had concentrations, as did the drainages of Soquel and Branciforte Creeks. The Aptos Creek and Valencia Creek drainages between Bean Hill and Pleasant Valley had the highest concentrations, as shown in figure 8.4. The concentration of debris flows drops off sharply to the southeast toward Freedom and Chittenden, to the west of Ben Lomond Mountain, and to the northeast over the crest of the Santa Cruz Mountains.

A detailed study by Coats and others (1982), in a heavily forested small part of Santa Cruz County, addressed landslide distribution and sediment transport after the January 1982 storm. In an inventory of 242 landslides along roads and streams in the Zayante Creek basin, they collected data on the volume, steepness, material, and type of slope movement for comparison with bedrock lithology and other factors that might have affected landslide distribution. They quantified the sediment contribution

of landslides within each channel and, dividing by the length of channel underlain by each bedrock unit, quantified the landslide sediment contributed by each unit. They examined only the channels of the main subwatershed streams (Zayante, Bean, Lompico, Mackenzie, and Ruins Creeks, and Lockhart and Mount Charlie Gulches); because sediment contributions from tributaries and hillsides high in the drainages were not accounted for, the sediment volumes were minimum estimates. They found that differences in bedrock alone could not explain the differences in landslide distribution.

In Contra Costa County (pl. 10), debris flows were most heavily concentrated in the northwestern part of the county, between San Pablo Ridge and Wildcat Creek, and between Franklin Ridge and Pinole Creek. In this last area, concentrations were very dense, reaching a maximum of 60 debris flows per square kilometer (table 8.3). Areas of moderate concentration were in the Berkeley Hills near Moraga and Lafayette, and in the area on the south side of Mount Diablo near the Black Hills.

In Alameda County (pl. 11), debris-flow concentration was sparse to moderate. Only two areas of any appreciable



FIGURE 8.4.—Numerous debris-flow scars and tracks on brush-covered hillslopes above Pleasant Valley, Santa Cruz County. These flows coalesced into a single flow track that extended through buildings at bottom of view and 0.3 km beyond. Photograph taken March 25, 1983, after revegetation and grading along valley bottom had obscured main debris-flow track (dashed lines).

size had a moderate concentration of debris flows. The area of the San Leandro, Cull, and Crow Creek drainages to the northeast of Castro Valley, and the area between Walpert Ridge and Sunol Ridge north of Niles Canyon, reached comparable maximums in the range of 13–16 debris flows per square kilometer.

In the North Bay area of Napa, Solano, Sonoma, Lake, and Yolo Counties (pl. 12), debris-flow concentration was dense in only two localities, in the vicinity of Vallejo—along Sulphur Springs Mountain and in the American Canyon–Jameson Canyon area. In other parts of these counties, debris-flow concentration was sparse to moderate, with no sizable areas of dense concentration.

Although rainfall totals during the storm (see chap. 2; Mark and others, 1983) varied greatly between the areas of highest debris-flow concentration, normalized storm rainfall presented a somewhat more consistent pattern. As listed in table 8.3, debris flows were generally concentrated where normalized rainfall exceeded 0.30. This result is similar to that reported in chapter 2 for an independent analysis of normalized rainfall versus the locations of damaging landslides in the storm. The contours of normalized storm rainfall shown on plates 9 through 12 generally indicate that the areas of densest debris-flow concentration had values of normalized storm rainfall exceeding 0.30.

DISCUSSION OF DEBRIS-FLOW CONCENTRATION

The concentrations of debris flows observed in the January 1982 storm throughout the San Francisco Bay region were not nearly so high as those resulting from some intense storms elsewhere throughout the world. In San Mateo, Santa Cruz, Contra Costa, Alameda, Napa, Solano, Sonoma, Lake, and Yolo Counties, maximum concentrations ranged from 25 to 63 debris flows per square kilometer (table 8.3); and in Marin County, concentrations locally reached 55 debris flows per square kilometer (see chap. 7). In contrast, Okuda and others (1979) reported more than 100 debris flows per square kilometer in parts of the Minamiyamashiro region of Japan on August 15, 1953; Omura and Nakamura (1983) reported concentrations as high as 90 debris flows per square kilometer near Shizuoka, Japan, on September 12, 1982; and Govi and Sorzana (1980) reported maximum concentrations that generally ranged from 20 to 50 debris flows per square kilometer for many storms in northwestern Italy.

Concentration of debris flows—that is, the number of debris flows per unit area—is not necessarily the best indicator of debris-flow hazard. The cumulative area of debris flows per unit area (areal ratio) or the volume (in cubic meters) of debris flows within a unit area may be a more accurate measure of debris-flow hazard, but these values are difficult to compile on a regional basis. If the size of individual debris flows falls within a narrow range and if the areal ratio is relatively small (possibly less than 5 percent), then the concentration of debris flows is a good comparative measure of debris-flow hazard. Investigators that have evaluated the size distribution of debris flows in storm events (Govi and Sorzana, 1980; Omura and Nakamura, 1983; Okuda and others, 1979) found that most debris flows fall within a fairly narrow range of sizes, and so these investigators used concentration to compare storm effects. However, in places where entire slopes have been denuded by coalescing debris flows (Jones, 1973, p. 25–26), counting individual debris flows may be impossible, and so the areal ratio would be a better indicator of debris-flow effects. The relatively small areal ratio depicted on plates 8 through 12 confirms that concentration is an appropriate measure for comparing the debris-flow effects of the January 1982 storm in the San Francisco Bay region.

Although bedrock lithology, in part through its influence on soil type and thickness, affected the concentration of debris flows in San Mateo County, worldwide evidence of lithologic control on debris flows is far from conclusive. For example, Govi and Sorzana (1980) found no direct control by bedrock lithology on debris flows, whereas Pomeroy (1980) found soils derived from certain clay-rich stratigraphic units to be more susceptible than soils from other units. Although the reason for this apparent disparity is unknown, differences in the characteristics of soils derived from bedrock are likely to be central to the solution (see section entitled "Soils Involved," chap. 6).

A major difficulty in evaluating the factors that influence the concentration of debris flows in San Mateo County and elsewhere is the probable interaction among these factors. Ideally, a multivariate analysis should be used to detect the individual and combined effects of important variables. Such analysis for debris flows should include the following factors: rainfall (prestorm, storm total, normalized storm total, hourly intensity, and duration and timing of intense bursts within storms), bedrock lithology, properties and thickness of soils, vegetation (root strength and depth of penetration), and slope steepness and configuration. With new digital techniques for manipulating spatial information (for example, Sailor and Berry, 1980), such regional analyses should soon become more common.

DESCRIPTION OF LARGE LANDSLIDES

Site investigations of particular landslides revealed details that illustrate slope processes during the storm in San Mateo and Santa Cruz Counties. The following descriptions illustrate the complexity and variety of many of the landslides. This section concludes with a brief men-

tion of other large landslides in these two counties that either are described elsewhere or were only briefly observed during reconnaissance. Information on all these large landslides is compiled in tables 8.4 and 8.5; locations are numbered on plates 8 and 9.

ELKUS RANCH

About 240 m upslope of the Elkus 4-H Ranch house in Purisima Canyon, San Mateo County (site 1, pl. 8), a slump mobilized into a relatively slow moving debris flow. This debris flow reached the house during the evening of January 4, piled against it, and flowed around both sides but did not move the house from its foundation (fig. 8.5). Two vehicles in the driveway were pushed against the garage and partly through the walls.

The hillside where the slump occurred was irregular in profile, with a pronounced bench immediately upslope from the slump and a distinct break in slope just downslope. The slope of the hillside averaged 20°, but above and below the bench, slopes were steeper, averaging 30° to 40° (as measured on a 1:24,000-scale topographic map). The scarp of the slump exposed colluvium over weathered silty sandstone of the Purisima Formation. Ground water issued from the scarp for at least several days after the failure (fig. 8.6).

On the basis of measurements on 1:20,000-scale aerial photographs and field reconnaissance, the slump was approximately 61 m long by 34 m wide, with a maximum thickness of 15 m. The volume of the slump was about 15,000 m^3. About half of the material from the slump mobilized into the debris flow.

TABLE 8.4.—*Large landslides in San Mateo County triggered by the storm*

[Average slope is slope at site of initial failure, measured in the field from adjacent slopes or from maps of prefailure topography. Travel distance is measured along slope and so does not necessarily agree with distance measured on plate 8. n.a., not available]

Site (pl. 8)	Locality	Landslide material	Dominant type(s) of movement	Estimated volume (10^3 m^3)	Average slope	Travel distance (km)	Remarks/references
1	Elkus Ranch, Purisima Canyon.	Colluvium and weathered silty sandstone of the Purisima Formation, undivided.	Slump/debris flow----------	15	20°	0.27	Near Elkus Ranch house; rate of movement was observed to be only about a meter per minute, slow for a debris flow. Flow carried and pushed two vehicles into walls of house. Flow split and moved around both sides of house but did not move house from foundation.
2	Grant Road, Moss Beach.	Angular gravelly-sand colluvium derived from the granitic rocks of Montara Mountain.	Translational slides coalescing into a single debris-flow track.	8.6	14°	.76	Gentlest measured slope to generate a debris flow in the storm. Piping probably influenced failure; subsequent erosion incised source and track of debris flow. Average slope measured by C.M. Wentworth (oral commun., 1985).
3	Fall Creek, Pescadero County Park.	Clayey-sand colluvium on steep hillsides; large boulders, gravel, sand, and logs scoured from channel. Deposit at mouth of Pescadero Creek consisted of silty sand containing abundant logs and other organic debris.	Translational debris slides, at least nine of which coalesced into two debris-flow tracks in upper tributaries of Fall Creek. Hyperconcentrated streamflow occurred in middle of drainage; in lower part, a debris flow traveled to near mouth of Pescadero Creek.	n.a.	34°-40°	n.a.	Channel exhibited evidence of debris flows and hyperconcentrated streamflow in different reaches over 3.5-km length. Blocking of culvert embankment where Old Haul Road crosses Fall Creek created small pond before embankment failed. Area where debris slides initiated in upper part of drainage had been tractor clearcut logged in 1968-69 (Jeffrey Peters, written commun., 1982).
4	Oddstad Boulevard, Pacifica.	Colluvium of dark-brown clayey-silty sand and gravel, overlain by very dark gray to grayish-brown clayey-sand topsoil; bedrock not exposed in scarp.	Translational slide(s)/debris avalanche.	2.3	26°	.20	Evidence indicates possibly three separate events, but time between events could have been so short as to appear as one continuous event. Maximum rate of movement probably exceeded 10 m/s. The fast-moving flow destroyed two houses and killed three children at approximately 11:10 p.m. P.s.t. January 4, 1982 (see chap. 9).
5	Mindego Creek, near La Honda.	Bedrock mapped as the Tahana Member of the Purisima Formation; very fine sandstone and siltstone, and some silty mudstone (Brabb and Pampeyan, 1983).	Translational soil, debris, and rock(?) slides/debris flow.	50-135	19°	.47	Site was observed only from light airplane, and so these are only approximate estimates from low-altitude aerial photographs and measurements from 1:20,000-scale aerial photographs and 1:24,000-scale topographic maps.

TABLE 8.5.—*Large landslides in Santa Cruz County triggered by the storm*

[Average slope is slope at site of initial failure, measured in the field from adjacent slopes or from maps of prefailure topography. Travel distance is measured along slope and so does not necessarily agree with distance measured on plate 9. n.a., not available]

Site (pl. 9)	Locality	Landslide material	Dominant type(s) of movement	Estimated volume (10^3 m^3)	Average slope	Travel distance (km)	Remarks/references
6	Whitehouse Creek, north flank of Chalk Mountain.	Colluvium and fractured bedrock of the Santa Cruz Mudstone exposed in main scarp.	Slump/debris flow	120–175	29°–31°	0.69	One of the largest debris flows in the storm. Debris flow mobilized where slumps slid over springs. Near terminus of flow, several cabins were destroyed by toppled trees or inundation by debris (D.K. Keefer, written commun., 1985).
7	Canham Road and Carbonera Creek, Scotts Valley.	Colluvium, weathered Santa Cruz Mudstone, and Santa Margarita Sandstone.	Soil and rock slumps coalescing into a single debris-flow track.	[1]16.8, 9.2; 28.1	27°–36°	[2].45	Nine landslides at this site generated four nearly simultaneous debris-flow pulses that traveled down Bethany Drive between 7:00 and 7:15 p.m. P.s.t. January 4, 1982. Two boys walking on Bethany Drive were swept into the flow; one was later thrown clear of the flow, and the other drowned in Carbonera Creek (Nielson, 1984).
8	Alba Road and California Highway 9, Ben Lomond.	Colluvium and weathered silty sandstone and siltstone of the Monterey Formation.	Slump/debris flow	6.8	30°–31°	.20	Very rapid movement took place between 7:30 and 8:00 p.m. P.s.t. January 4, 1982, preceded for several hours by development and enlargement of cracks. The landslide destroyed five structures and damaged six; no one was injured (Mark Foxx, written commun., 1982).
9	Creekwood Drive, Lompico.	Colluvium containing weathered shale and siltstone fragments derived from the Monterey Formation.	Translational slide/debris avalanche.	.6	35°–47°	[2].20	Slide on very steep slopes generated a very rapidly moving debris flow. (Mark Foxx, written commun., 1982).
10	Love Creek, near Ben Lomond.	Mixture of colluvium and rock debris derived from sandstone and shale of the Monterey Formation. Bedrock exposed along basal surface.	Block slide, which triggered several smaller debris flows.	460	25°–32°	[3].06–0.15	Largest and most disastrous landslide in the storm. Catastrophic failure of the dip slope occurred at approximately 1 a.m. P.s.t. January 5, 1982, and was extremely rapid. Landslide buried 9 homes and killed 10 people. Information from Cotton and Cochrane (1982).
11	Newell Creek, near Ben Lomond.	Similar to Love Creek (see site 10).	Block slide	72–268	33°	.05	Landslide caused no damage to structures. Information from Cotton and Cochrane (1982) and D.G. Herd (written commun., 1982).
12	Año Nuevo Creek, south flank of Chalk Mountain.	Bedrock, mapped as the Santa Cruz Mudstone (Brabb, 1970).	Slump/debris flow	150–190	26°–30°	.78	One of the largest debris flows in the storm. Site was observed only from light airplane, and so estimates here are crude, based on low-altitude photographs, 1:20,000-scale aerial photographs, and 1:24,000-scale topographic maps.

[1]Volume of two largest individual slumps and total volume of nine slumps, respectively.
[2]Because debris-flow runout into major streams was not traced, this travel distance is a minimum.
[3]Range of distances from scarp to landslide mass, suggesting that different parts of slide moved different distances.

Beyond the toe of the slump, the flow traveled a sinuous path for about 200 m on a slope of about 13° until it reached the house. A steep debris-flow front, as much as 2.4 m high, alerted the occupants by slowly pushing against the garage door. The debris piled up against the house to the level of the eaves without pushing the house from its foundation, as this debris-flow front came to rest. Near the house, the rate of movement was observed to be only about 1 m/min—a slow rate for a debris flow. The flow then split and flowed around the house as two lobes that traveled a short distance and formed distinct toes. The distance from the scarp of the slump to the toes of the lobes was about 0.27 km.

A sample of the material in the flow from near the toe of the slump is a silty sand composed of 14 weight percent clay finer than 2 μm. Two samples from near the terminus of the flow were of silt containing 14 to 19 weight percent clay. One other sample from the terminus was a silty-gravelly sand containing only 8 weight percent clay (see table 6.1 for results of grain-size analyses). On the basis of these four samples, the material in the flow appeared to be heterogeneous, including both fine

and coarse materials. Steep, high flow fronts, which indicate significant cohesive strength in a flow, suggest a predominately fine grained material.

GRANT ROAD

About 300 m upcanyon from Grant Road, north of Moss Beach in San Mateo County (site 2, pl. 8), two debris flows from translational slides coalesced into a single debris-flow track that extended about 0.76 km. For much of this distance the track followed a street and an existing gully. The flow left a broad, thin deposit on nearly flat slopes.

The principal slide initiated in a swale on brush-covered slopes of about 14°; thus, this was the gentlest measured slope to generate a debris flow in the storm (fig. 8.7). The material from both slides mobilized entirely. The combined volume of the empty scars was crudely estimated at about 8,600 m^3. The scarp and the base of the slide exposed crumbly, angular, gravelly-sand colluvium. Where subsequent erosion incised the slide scar, creating a badlands topography, weathered granitic rocks of Montara Mountain were exposed. Pipes were observed in association with the scar, and closed pipes could locally have increased pore-water pressures and permitted failure on such a gentle slope.

FALL CREEK

Debris slides, debris flows, and hyperconcentrated streamflows disrupted the Fall Creek drainage in Pescadero Creek County Park, San Mateo County (site 3, pl. 8). The steep upper part of the 1.3-km^2-area Fall Creek drainage was tractor clearcut logged during 1968–69; the middle and lower parts were logged during 1940 and 1941 (Jeffrey Peters, written commun., 1982). Major features of this site are illustrated in figure 8.8.

Nine debris slides that initiated near skid tracks, roads, or pads left from logging were noted in aerial photographs in the steep upper part of the drainage. Slopes in this area averaged 34° to 40°, as measured on a 1:24,000-scale



FIGURE 8.5.—Debris flow against house at the Elkus 4-H Ranch, San Mateo County. Near the house, occupants observed the debris flow moving about 1 m/min.

topographic map. These debris slides, as well as slumps noted in the channel banks during field examination, contributed large amounts of sediment to two major debris-flow tracks in the two main tributaries of the drainage. These debris-flow tracks joined at point A in figure 8.8. The flows continued downstream (fig. 8.9) until stopped in a massive blockage of logs, boulders, and finer sediment where the stream gradient flattened.

Below this blockage, in the middle of the drainage, debris-flow effects were noticeably absent, although high-water-line marks and extensive removal of loose material from the channel attest to high floodflows (or hyperconcentrated streamflows). Deposition of sediment in this section of the drainage was minimal, except for a few large boulders that evidently could no longer be carried along by the streamflow.

In the lower part of the drainage, where Old Haul Road crosses Fall Creek, a small lake formed during the storm, apparently because a 0.91-m-diameter steel culvert was plugged with debris. High strandlines from the lake, marked by leaves and twigs, indicated that the lake was approximately 225 m^2 in area and as much as 1.2 m deep. The 275-m^3-volume embankment gave way, mixed with the water behind it, and flowed rapidly as a debris flow down the narrow gorge in the lower part of Fall Creek. A thin veneer of deposit on the channel sides indicated that, at one downstream location, the debris flow was 3 to 5 m deep and 11 to 12 m wide. Much debris, including large redwoods, previously cut and discarded logs, and loose sediment and colluvium from the channel sides and bottom, was scoured and incorporated into the flow. Bedrock was exposed in many places, and the appearance of Tip-Toe Falls was changed appreciably by this scouring, according to park personnel.

This debris flow in the lower part of the drainage came to rest behind a massive logjam where Fall Creek emerges from its narrow gorge onto a wide, flat plain near the confluence with Pescadero Creek. Logs backed up against



FIGURE 8.6.—Slump at source of debris flow at Elkus 4-H Ranch several days after failure. Abundant subsurface water was issuing from this scarp. Note man (circled) in left center for scale.

a stand of redwoods in the center of the plain. The log-jam was 18 m wide and blocked about 3,000 m^3 of sediment, 0.5 to 0.85 m thick.

Though not examined in detail, several other small drainages in Pescadero Creek County Park had debris flows and (or) hyperconcentrated floods that were comparable in scale and caused similar effects. Because of the absence of development and the remote location of Fall Creek and these other tributaries of Pescadero Creek, there was no known damage to structures and only minor damage to secondary roads.

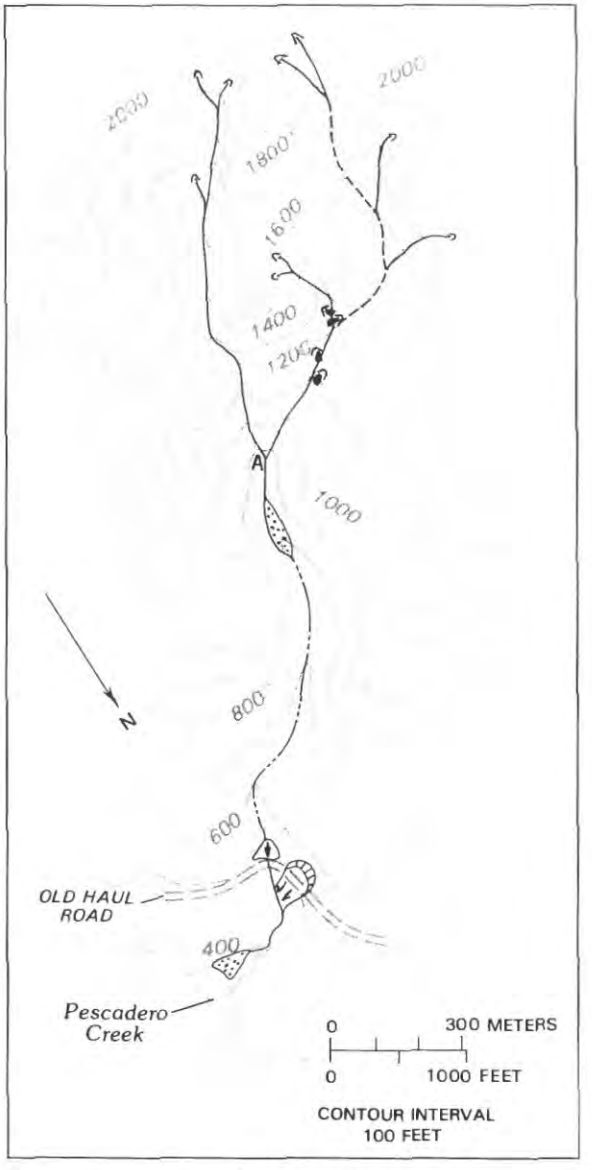
WHITEHOUSE CREEK

The complex landslide in Whitehouse Creek, Santa Cruz County, initiated as several slumps near the crest of the north flank of Chalk Mountain (site 6, pl. 9) and mobilized into a debris flow that traveled northward down an existing draw to near the confluence with Whitehouse Creek. Pertinent features of this landslide are shown in the sketch map in figure 8.10. The distance from the crown of the uppermost slump to the end of the debris-flow deposit is nearly 0.70 km. The main scarp, which is inclined at 45°, about 50 m high, and 50 to 60 m wide, exposes colluvium and bedrock composed of Santa Cruz Mudstone. Depending on assumptions of landslide geometry, the volume of material involved in slumping ranged from 120,000 to 175,000 m^3 (fig. 8.11).

Within the area of slumping, several springs were observed; below these springs, the slide material mobilized into a debris flow. For about 250 m below the springs, the debris flow scoured a channel, exposing bedrock in places. The width of the flow here was about 20 m, and the height of flow indicated by lateral levees generally ranged from 5 to 7 m, with a maximum height of 10 m. The presence of at least three pairs of levees in this scoured section below the springs indicates several pulses of debris flow.



FIGURE 8.7.—Source area and beginning of track of debris flow near Grant Road, Moss Beach, San Mateo County. Light-colored sandy debris (arrows) above walls of gully incised into debris-flow track indicates original level of flow.



EXPLANATION

- Scar and track of debris flow—Dashed where concealed
- Slumps into channel—Arrows show direction of movement
- Reach of channel affected by flooding and (or) hyperconcentrated streamflow
- Debris-flow deposit associated with blockage by logs
- Lake formed by blockage of culvert beneath Old Haul Road at Fall Creek crossing

FIGURE 8.8.—Features related to slides, flows, and hyperconcentrated floods in Fall Creek drainage, San Mateo County. Two major debris-flow tracks joined at point A. Topographic base modified from map of Pescadero Creek by San Mateo County Department of Public Works.

Below this scoured section, the debris flow widened to about 60 m and continued for 180 m on slopes of 14° to 16°. About 80 m past a distinct break in slope, a blockage formed, some 50 m wide, as the fallen timber carried by the flow became lodged against a stand of redwoods. Behind this blockage, subsequent flow was deflected to the east, where it continued another 200 m on slopes of 10°. The flow traveled a total distance of about 0.6 km from the springs before terminating short of Whitehouse Creek.

Several houses were destroyed, mainly by trees toppled by the debris flow. One house was inundated with debris-flow material (fig. 8.12), and a tree fell through its roof. Only one house near the flow was occupied at the time; the people escaped when they saw their neighbor's house being carried along by the flow.

The description of this site is based primarily on descriptions and field notes by David K. Keefer (written commun., 1985).



FIGURE 8.9.—Debris-flow track lined with fallen trees, boulders, and sediment in channel along upper part of Fall Creek, San Mateo County. Slump with rotated trees is visible in lower left. Standing trees along the track are about 15 m high. Photograph by Jeffrey Peters.

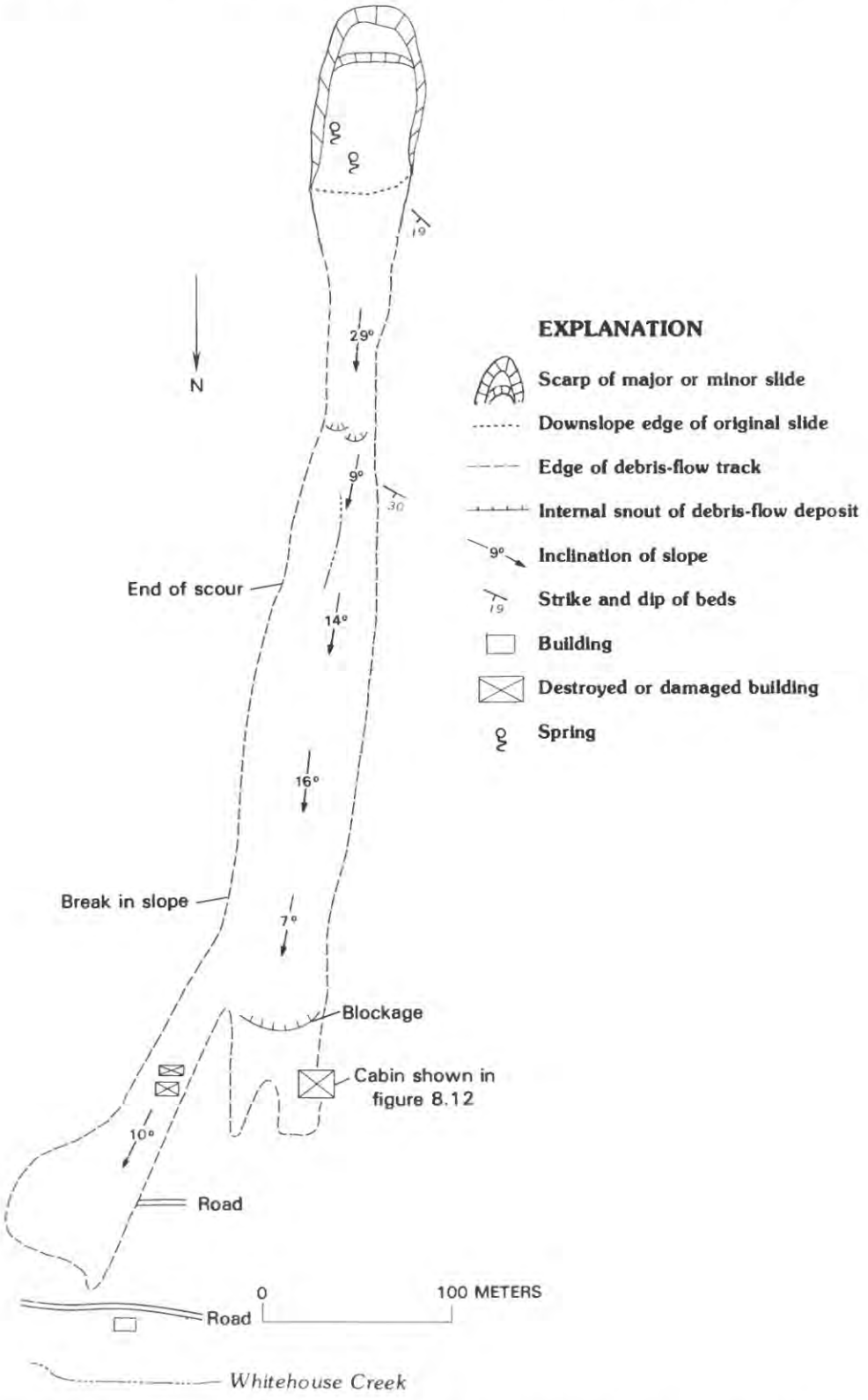


FIGURE 8.10.—Features of slump/debris flow from north flank of Chalk Mountain toward Whitehouse Creek. Modified from D.K. Keefer (written commun., 1985).

CANHAM ROAD

In northeastern Scotts Valley, Santa Cruz County (site 7, pl. 9), several slides on steep slopes above a small valley mobilized as debris flows that crossed an old apple orchard and coalesced in a narrow canyon. Two boys walking along a road in the canyon were picked up by a flow; one boy was thrown clear of the flow and survived, but the other was carried away and eventually drowned in Carbonera Creek.

An eyewitness observed the series of events between 7:00 and 7:15 p.m. P.s.t. January 4 at Bethany Drive, partway down the canyon. The first of four debris-flow pulses traveled down the canyon shortly before 7:00 p.m. This first pulse was mostly of black, highly fluid mud. Shortly thereafter, a massive wall of rock, mud, and water, about 2.1 m high, flowed by very rapidly, carrying blocks of rock "half as big as a car." Two smaller pulses of rock and mud followed this main flow mass.

The debris flows continued to the confluence with Carbonera Creek; beyond that point, the flows were not traced. However, if the flows entered Carbonera Creek during the storm, it is unlikely that they traveled far before being significantly diluted by floodwaters. The distance from the source area of the flows to the confluence with Carbonera Creek is about 0.45 km.

Nine landslide scars were found in the source area, where the brush-covered slopes ranged from 27° to 36° in steepness. A site map of this area is shown in figure 8.13. The two largest landslides were both about 7.7 m deep and mobilized 9,200 and 16,800 m^3 of material, mostly bedrock composed of Santa Cruz Mudstone and a minor amount of colluvium. Six other shallow landslides of soil, less than 2.5 m deep, contributed another 2,150 m^3 to the flows (fig. 8.14). At the south end of the valley, a shallow sand flow from outcrops of Santa Margarita Sandstone added to the total volume of flow.

These debris flows occurred during an intense part of the storm, as indicated by average intensity values of 24.9 mm/h (0.98 in/h) measured between 4:00 and 8:00 p.m. January 4 about 120 m east of the source area along Canham Road (fig. 8.15). This was the highest average



FIGURE 8.11.—Slump/debris flow from north flank of Chalk Mountain toward Whitehouse Creek. This was one of the largest debris flows in the storm; it traveled nearly 0.7 km. Cabins at lower left show scale.

intensity measured at this site during the storm. The timing of the debris flows and the prolonged high average rainfall intensities can be compared with those at the other sites where continuous rainfall measurements are available (see chap. 3).

The description of this site is based on field examination and documentation by Nielsen (1984).

ALBA ROAD

Between 7:30 and 8:00 p.m. P.s.t. January 4, a slump from above Alba Road, near Ben Lomond, Santa Cruz County (site 8, pl. 9), mobilized as a debris flow that traveled nearly 0.20 km to California Highway 9. This debris flow totally destroyed one house and four cabins, and substantially damaged another house, two other cabins, a preschool, and two utility buildings. A site map of this area is shown in figure 8.16.

At about 3:00 p.m., a crack was noticed on Alba Road; by 4:30 p.m., this crack had developed a 0.15- to 0.25-m vertical offset, making vehicular crossing difficult. A plugged culvert drop inlet directed water into a ditch alongside the road; this ditch overflowed across Alba Road in the vicinity of the slide (fig. 8.16). Approximately 10 minutes before the debris flow initiated, a loud crack was *heard that sounded like a tree crashing to the ground.* The debris flow moved rapidly and with considerable force, crushing several structures, tearing sections from structures on the edge of the flow path, and carrying structures as far as 30 m. However, there was little turbulence in the flow; most of the pieces of pavement from Alba Road stayed on the surface during transport of more than 100 m. Where these pieces came to rest, their distribution was arcuate, reflecting a displacement profile that was smallest along the edges of flow and largest in the center.

The hillslope that failed was almost planar, without major gullies; it was vegetated with redwood, pine, tan oak, and madrone. Slopes in the vicinity of the slump measured 30° to 31°. During previous storms, the hillside



FIGURE 8.12.—Cabin inundated by debris flow near Whitehouse Creek (fig. 8.11) to a depth of 1.2 to 2.4 m (see fig. 8.10 for location). Note track of debris flow and blockage by fallen timber in background.

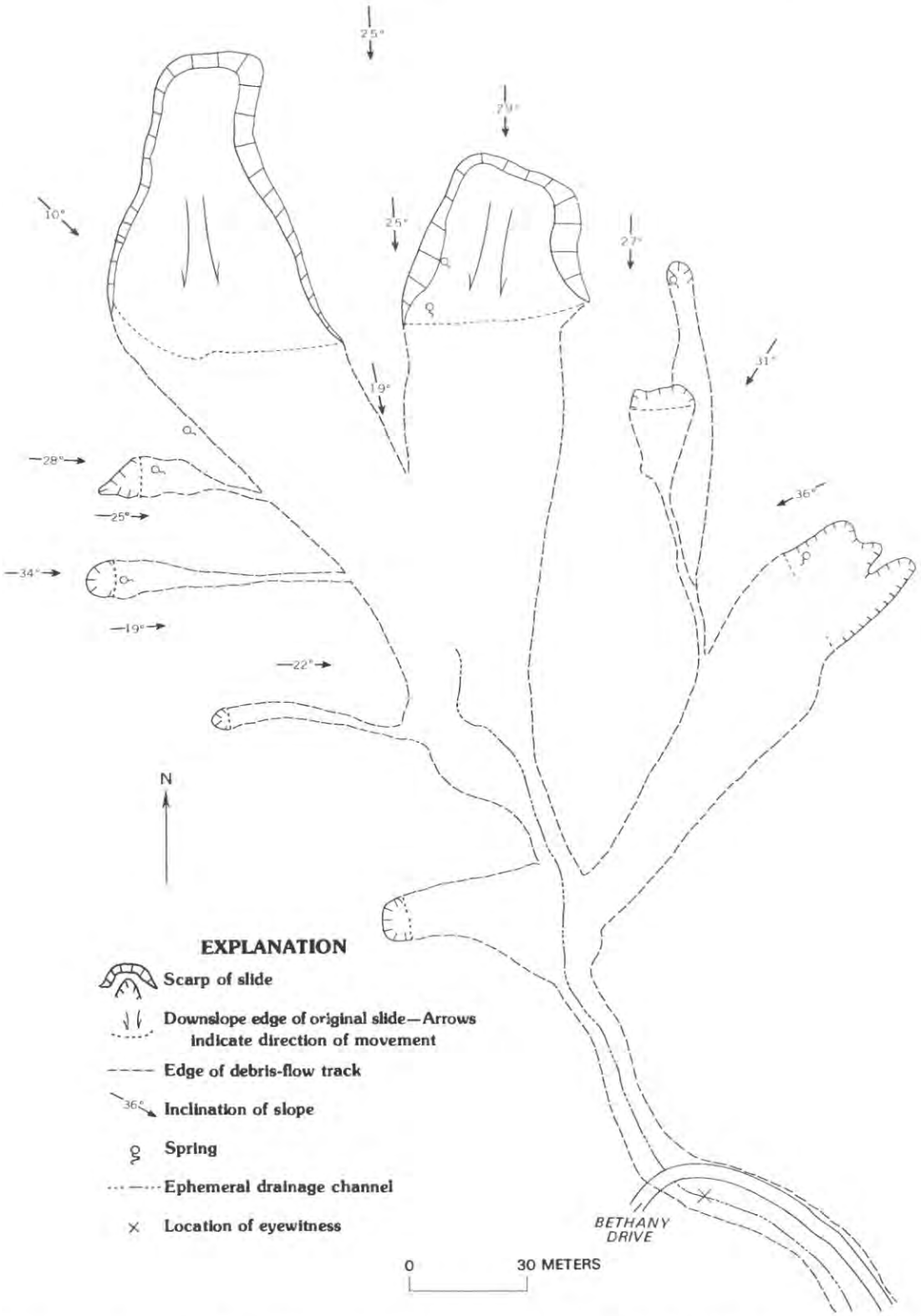


FIGURE 8.13.—Source area of debris flows at Canham Road, Santa Cruz County. Modified from Nielsen (1984, fig. 4).

was reported to produce little runoff. This particularly intense storm, however, in combination with the preceding rainfall, generated overland flow.

The slump above Alba Road measured about 30 m wide by 55 m long and had a maximum thickness of 6.4 m. The slump involved a total of about 6,800 m^3 of material, most of which mobilized into the debris flow. Rotational movement was indicated by fallen trees oriented with their tops in an uphill direction.

Massive silty sandstone of the Monterey Formation was exposed in the slickensided basal shear surface of the slump. Bedding in siltstone exposed in the scar was somewhat irregular, varying in dip from 26° to 45° in a generally eastward direction. The downslope component of dip was at some localities less than the slope gradient, providing a dip slope conducive to sliding (fig. 8.16). A thin layer of highly plastic clay was found in places immediately over bedrock. The main scarp and flanks of the slump exposed colluvium, as much as 4.5 m thick, of saturated and moderately plastic, clayey soil containing weathered siltstone fragments as large as 45 cm in maximum dimension. A silty-clay-loam topsoil, 20 to 25 cm thick, mantled the colluvium.

Intense rainfall measured in nearby Ben Lomond was continuous through the afternoon and into the evening before the debris flow (fig. 8.17). Hourly measurements indicate intensities of 15.2 to 22.4 mm/h (0.60–0.88 in/h) between 4:00 and 8:00 p.m. This prolonged intense rainfall, which resulted in saturated ground conditions, in combination with crack opening, provided access for water that facilitated further failure and the resulting debris flow.

The description of this site is based on field examination and documentation by Mark Foxx (written commun., 1982).

CREEKWOOD DRIVE

At about 1:10 p.m. P.s.t. on January 4, a debris flow mobilized from a slide below Lake Boulevard, near the



FIGURE 8.14.—Slides at Canham Road that generated debris flows which coalesced into a single debris-flow track in a narrow canyon (out of view) and eventually flowed into Carbonera Creek, Santa Cruz County. Houses at far right show scale.

town of Lompico, Santa Cruz County (site 9, pl. 9). This debris flow traveled rapidly down a long, narrow drainage, crossed Creekwood Drive, and flowed into Lompico Creek, a distance of about 0.2 km. The flow destroyed or damaged several houses in its path by toppling trees onto them, battering them with fast-moving debris, or piling debris against them until they collapsed. A site map of this area is shown in figure 8.18.

The landslide initiated just below Lake Boulevard on a slope ranging in steepness from 35° to 47°, forested with secondary-growth redwood, oak, and madrone, as well as brush. A gentle swale, gullied before the January 1982 storm, is in the vicinity of the slide. During the storm, surface runoff from Lake Boulevard was flowing over the slide area.

Eyewitness reports indicate that for 1 or 2 hours before the slope failed, rocks as large as 15 cm had been rolling down the slope. Failure was rapidly followed by a debris flow. The scar left by the slide measured approximately 10 m wide, 35 m long, and as much as 4.3 m deep; its volume of approximately 625 m^3 almost entirely mobilized as a debris flow. Siltstone of the Monterey Formation is exposed at the base of the slide scar; colluvium containing fragments of weathered shale and siltstone, as large as 30 cm, is exposed in its flanks and main scarp. A 10- to 20-cm-thick topsoil of silty-clayey loam mantles the colluvium.

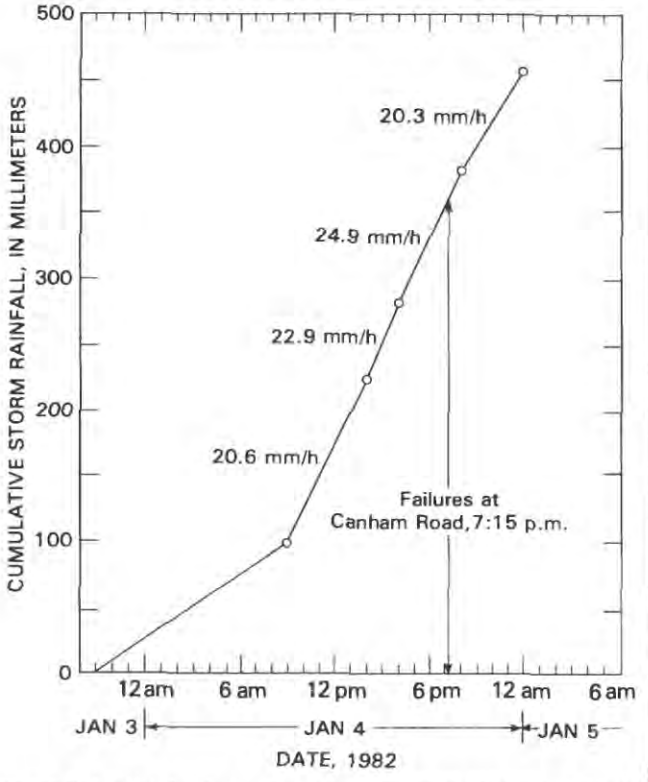


FIGURE 8.15.—Rainfall during the storm measured at 709 Canham Road, about 120 m east of debris-flow source area. Time of failures coincides with period of most intense rainfall. Modified from Nielsen (1984, fig. 5).

Between the initial slide and Creekwood Drive, the debris flow widened to as much as 21 m. An eyewitness described the flow as initially moving as fast as a frightened man can run at full speed downhill (possibly about 7.6 m/s) and therefore could be called a debris avalanche on the basis of its velocity. The material in the flow had a consistency of stiff, wet concrete, and surface waves were visible on the flow as it moved downslope. Below Creekwood Drive, the flow widened and bifurcated on slopes ranging from 10° to 15°. Both flow lobes reached Lompico Creek, adding debris to the creek, which was in flood stage.

The description of this site is based on field examination and documentation by Mark Foxx (written commun., 1982).

OTHER LARGE LANDSLIDES

Several other large landslides were investigated by others and are reported elsewhere, or were observed only in reconnaissance. Tables 8.4 and 8.5 list data on large landslides, including those described above, triggered by the storm in San Mateo and Santa Cruz Counties.

Primary among the other large landslides was the block slide at Love Creek (fig. 8.19) near Ben Lomond in Santa Cruz County (site 10, pl. 9), which was described by Cotton and Cochrane (1982). Another large block slide, shown in figure 8.20, occurred at nearby Newell Creek (site 11, pl. 9); this slide was similar in several aspects to the Love Creek landslide (Cotton and Cochrane, 1982). The debris flow at Oddstad Boulevard (fig. 8.21; site 4, pl. 8) and several other landslides in Pacifica, San Mateo County, are described in chapter 9.

A complex landslide from the south flank of Chalk Mountain (site 12, pl. 9) began as a slump that mobilized into a debris flow and traveled approximately 0.8 km into the headwaters of Año Nuevo Creek. We viewed this landslide only from the air and estimated its volume at 150,000 to 190,000 m^3, on the basis of measurements from 1:20,000-scale aerial photographs and 1:24,000-scale topographic maps. This landslide and the Whitehouse Creek landslide from Chalk Mountain were two of the largest debris flows in the storm.

A large debris flow was observed during aerial reconnaissance near Mindego Creek in the vicinity of La Honda, San Mateo County (site 5, pl. 8). Because this site was observed only from light airplane, the data listed in table 8.4 are approximate estimates from low-altitude aerial photographs and measurements from 1:20,000-scale aerial photographs and 1:24,000-scale topographic maps.

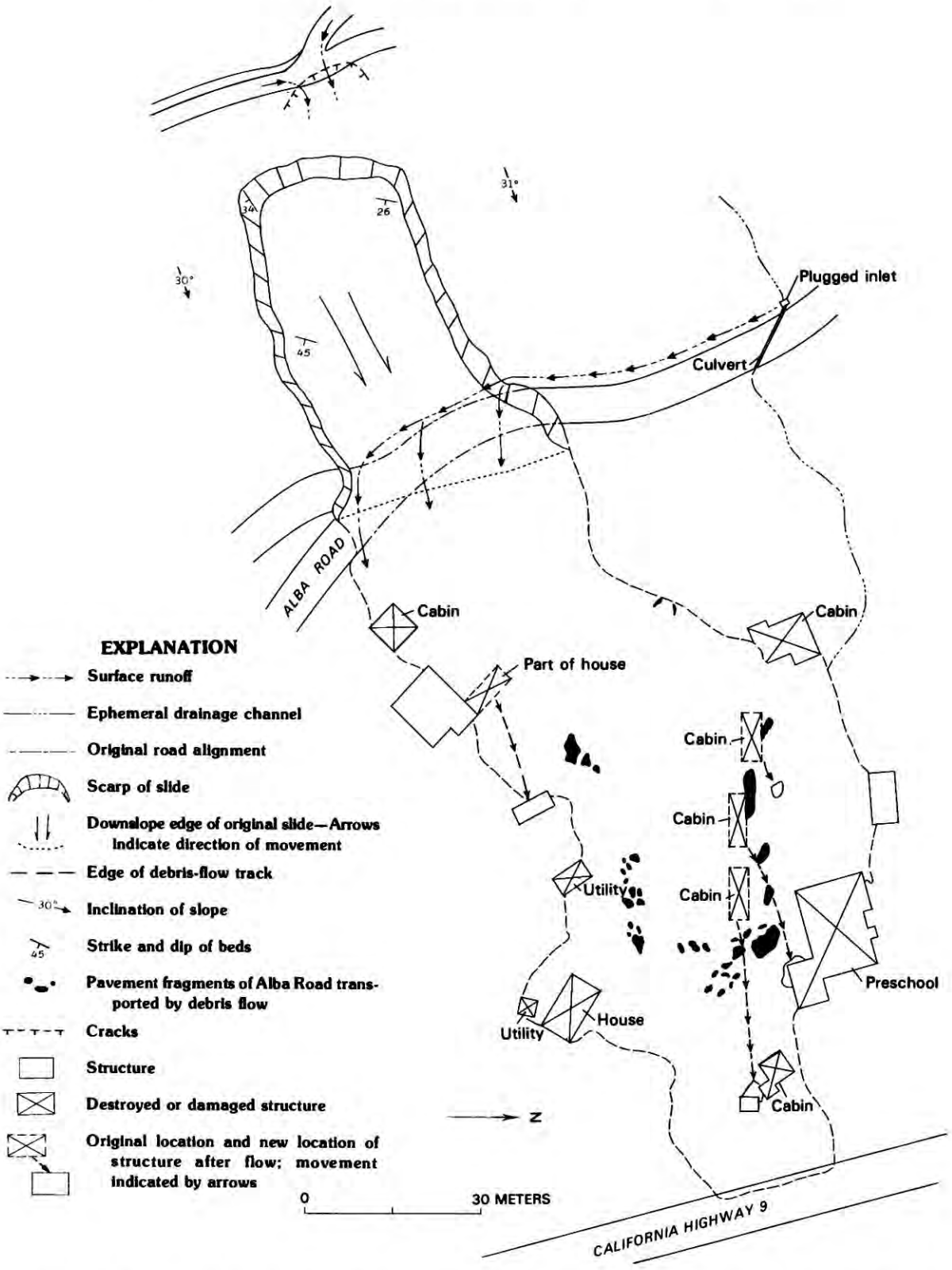


FIGURE 8.16.—Features of Alba Road landslide, Santa Cruz County. Modified from Mark Foxx (written commun., 1982).

CONCLUSIONS

1. Normalized storm rainfall appears to have been more significant than total storm rainfall in determining the concentration of debris flows in the San Francisco Bay region. Debris-flow concentration (number of debris flows per square kilometer) increased with increasing amounts of normalized storm rainfall, a result consistent with those of Govi and Sorzana (1980) and chapter 2. Dense and greater debris-flow concentration (20 or more per square kilometer) occurred where normalized storm rainfall exceeded 0.30. This threshold agrees with the results of an independent analysis of rainfall that caused damaging landslides in the San Francisco Bay region during the storm (see chap. 2).
2. Bedrock geologic units influenced the distribution of debris flows in San Mateo County. The quantitative measure of debris-flow incidence showed a wide range of values for different geologic units, indicating that some units are highly susceptible to debris flows, whereas others are only slightly so. Colluvial deposits mapped over many geologic units with a medium or high incidence suggest that the colluvium is derived from previous debris flows and that these geologic units have been producing debris flows over a long period.
3. In San Mateo County, debris flows initiated most commonly on slopes with DEM-derived steepness of 19° to 22°. This range is well below the 26°–45° range where debris-flow sources were most common in southern California, and well below typical field-measured values in Marin and San Mateo Counties during this storm. When the frequency of debris flows with DEM-derived steepness was normalized by taking into account the population of slopes with different steepnesses, the peak of debris-flow frequency shifted to 25°–29°, more in accord with experience elsewhere.
4. The effect of vegetation on the regional distribution of debris flows in San Mateo County was not clarified by our analysis. In one area, however, the strong influence of removal of vegetation by logging on the concentration of debris flows indicates the control of vegetation on the susceptibility to debris flows.
5. Few, if any, generalizations can be drawn from the wide range of characteristics exhibited by the few documented large landslides in San Mateo and Santa Cruz Counties. Most landslides involved either colluvium or a combination of colluvium and weathered bedrock, initial average slopes covered a wide range of values, and rates of movement varied.

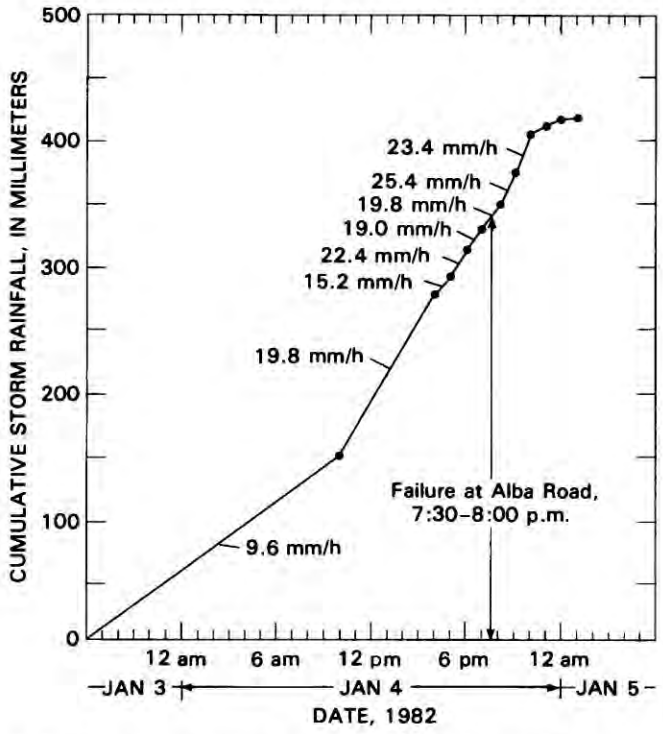


FIGURE 8.17.—Rainfall during the storm measured at 205 Willowbrook, Ben Lomond, about 2.7 km from the Alba Road landslide. From 3 p.m. P.s.t. on January 4, 1982, when cracks were first noticed, until failure at 7:30-8:00 p.m., rainfall intensity averaged 19.8 mm/h.

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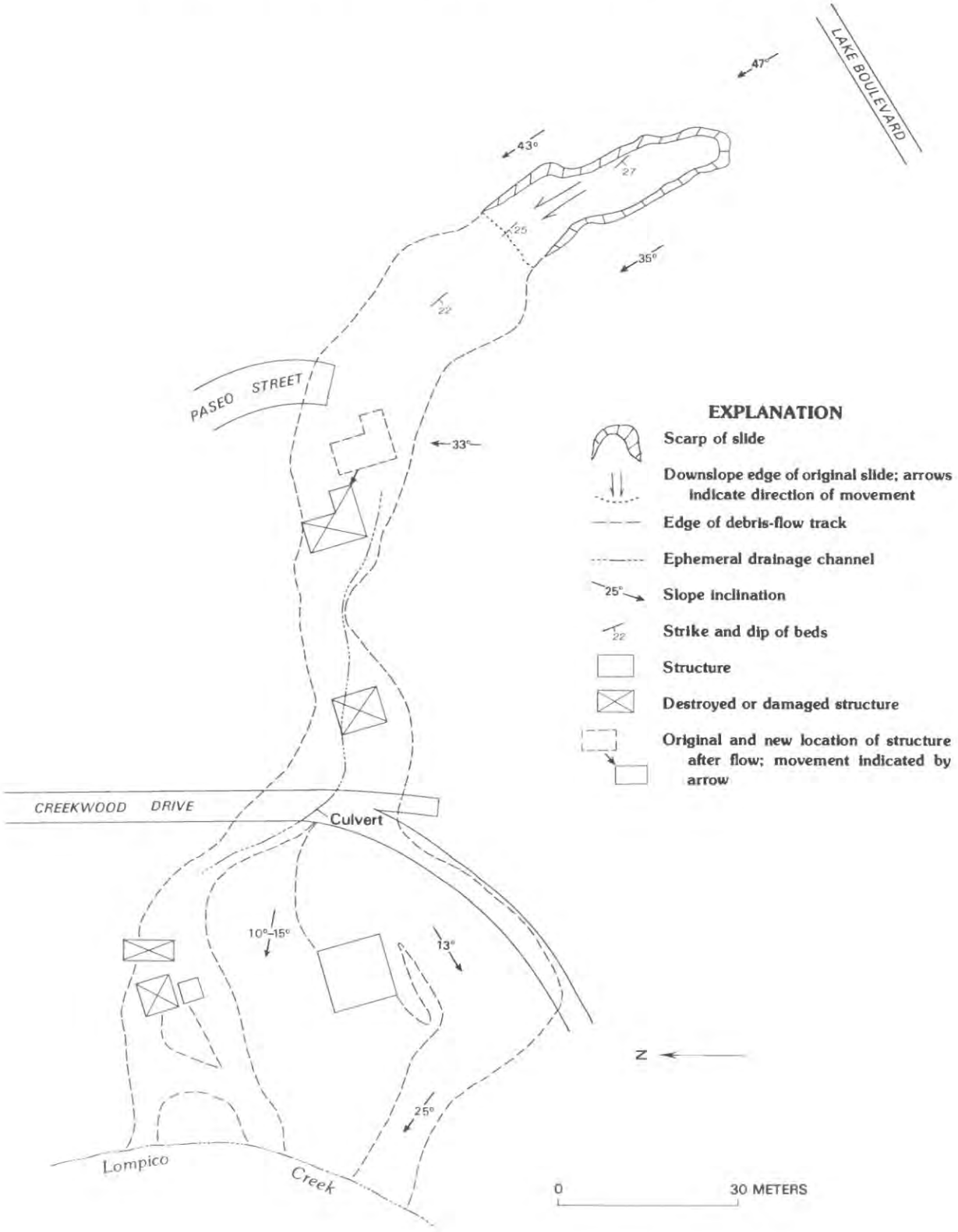


FIGURE 8.18.—Features of Creekwood Drive landslide, Santa Cruz County. Modified from Mark Foxx (written commun., 1982).

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FIGURE 8.19.—Block slide at Love Creek near Ben Lomond, Santa Cruz County, which failed at approximately 1 a.m. P.s.t. on January 5, 1982, killing 10 people and burying 9 homes. This was the largest landslide in the storm, with an estimated volume of 460,000 m^3. Slide extends about 610 m from crown to toe (in shadows at bottom). The slide triggered several debris flows, the largest of which (indicated by dashed lines on left) flowed rapidly down the margin of the main landslide mass and into the channel of Love Creek (Cotton and Cochrane, 1982). Note bulldozer (indicated by circle) in lower center for scale (site 10, pl. 9).

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FIGURE 8.20.—Newell Creek block slide (site 11, pl. 9) below and Love Creek block slide above, near Ben Lomond, Santa Cruz County. Movement was toward left. Both slides moved initially along bedding in Monterey Formation on flank of the Scotts Valley syncline (Cotton and Cochrane, 1982). Note house (circled) in left center for scale.

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FIGURE 8.21.—Debris flow from brush-covered, concave hillside above Oddstad Boulevard in Pacifica, San Mateo County, where three children were killed and two houses destroyed at about 11:10 p.m. P.s.t. January 4, 1982. Debris and remains of two houses had been removed (lower left) by the time of this photograph (site 4, pl. 8).

9. LANDSLIDES IN PACIFICA, CALIFORNIA, CAUSED BY THE STORM

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ABSTRACT

The January 3–5, 1982, storm caused 475 landslides in Pacifica, Calif. A total of 85 percent of the landslides mapped involved both sliding and flow. Most of these landslides occurred in soils with common engineering properties, near the head of first-order drainages, on slopes of 26°–45°. Each landslide was probably preceded by a near-vertical tension crack extending to bedrock. The rupture surfaces occurred in soil near or on the soil-bedrock contact.

INTRODUCTION

The city of Pacifica, located in northwestern San Mateo County (fig. 9.1), received exceptionally heavy rainfall during the January 3–5, 1982, storm in the San Francisco Bay region. The heavy rains triggered hundreds of landslides. These landslides caused 3 deaths, the destruction of 4 homes, damage to tens of other homes, and perceived life-threating situations for at least 500 families living at the foot of steep hillsides. Never before had the potential danger of landsliding been so widely experienced in Pacifica. Damage to municipal facilities and city cleanup costs alone exceeded $1.5 million.

PURPOSE

The purpose of this chapter is to report on the distribution and types of landslides that were triggered by the storm, to evaluate the geologic conditions and mechanics

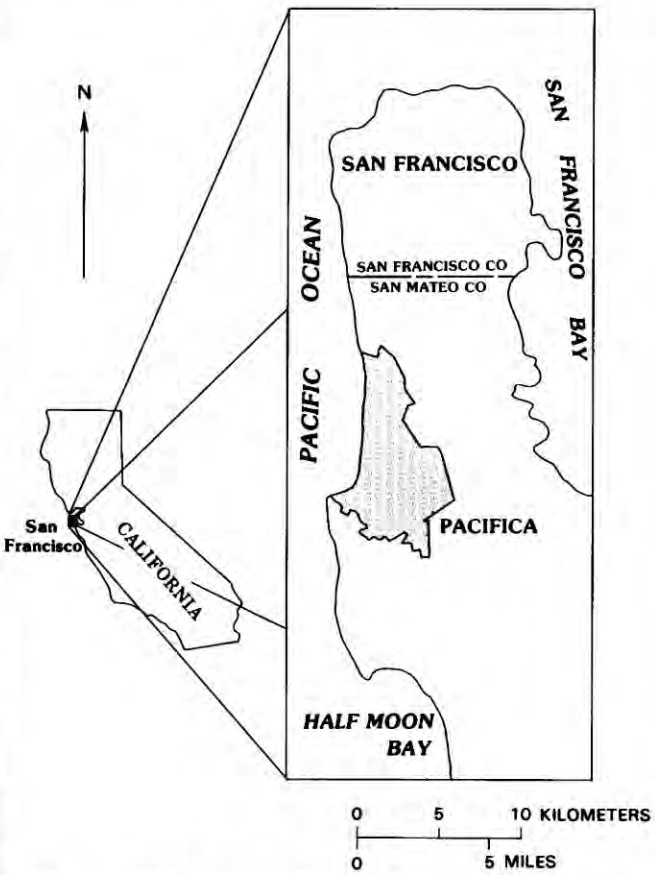


FIGURE 9.1.—Sketch map of the San Francisco peninsula, showing location of the city of Pacifica.

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of failure for four representative landslides, and to present soil-property and shear-strength data for the materials involved in the landslides.

SCOPE

We mapped landslides occurring as a result of the storm (1) to locate all the landslides; (2) to correlate the locations of landslides with such slope features as degree of slope, aspect, vegetation, and drainages; and (3) from this correlation, to identify slopes with a high potential for failure, given the prediction of more rainfall to come. These data were then used by city officials to warn the citizens of Pacifica of immediate danger and, if necessary, to require them to move temporarily (see subsection below entitled "Regional Study").

After this preliminary work, we began a more detailed investigation of nine landslides, selected for further study by their location, classification, and potential for future hazard. This detailed investigation included geology, geometry, ground water, and laboratory shear-strength and moisture-density relations. Four of these nine landslides are discussed here.

SETTING

GEOGRAPHY

The city of Pacifica is located within the northern Santa Cruz Mountains. The south half of the city includes interior valleys and highlands that are influenced by Montara Mountain, situated slightly south of the city (fig. 9.2). Montara Mountain exhibits deeply entrenched stream valleys. The drainage divides that separate the valleys are characteristically flat topped. Their moderately dissected margins contain numerous subtle linear swales and well-developed first-order drainages. Elevations in the south half of the city range from sea level to approximately 365 m.

North of Sharp Park, the highland terrain consists of subdued, isolated hills with a crude north-northwestward grain. The drainage divides are much broader here than to the south, and relief is generally less than 180 m. Numerous first-order drainages occupy the hillsides.

The coastal margin, like the interior highlands, varies in topographic expression from south to north. South of Sharp Park, the coastal margin is characterized by broad, low alluvial plains and intermittent, west-northwest-trending bedrock promontories, with an average relief of 60 m. The coastal margin north of Sharp Park is characterized by hillsides into which has been cut a nearly linear, slightly dissected seacliff with a relief of approximately 30 m. Shelter Cove, in the southwest extremity of the city, is steeper and expresses higher relief.

CLIMATE

The climate of Pacifica is characterized by dry, mild summers and moist, cool winters (Wagner and Nelson, 1961). Mean annual precipitation is 635 mm (25 in.), most of which occurs during the months of December through March. Since 1940, mean annual precipitation has been exceeded in 18 of these years. During the rainy season from October 1981 through April 1982, the total rainfall measured at the Half Moon Bay Weather Station near Pacifica was 1221 mm (48.07 in.), of which 150 to 200 mm (6–8 in.) fell on January 4, 1982 (J.P. Monteverdi, written commun., 1982). This rainfall occurred over a period of less than 30 hours, giving an average intensity of 5.0 to 6.6 mm/h (0.20–0.26 in/h)—certainly above average for Pacifica.

GEOLOGY

Published information on the geology of Pacifica is generally on a regional scale. Lawson (1914) was the first to map the areal geology. Darrow (1951) published a geologic map of the Montara Mountain quadrangle, which was later revised by Pampeyan (1981). Bonilla (1960) mapped landslides and briefly described the geology of the San Francisco South quadrangle. Brabb and Pampeyan (1972) compiled geologic data on a 1:62,000-scale map of San Mateo County; figure 9.3 shows their mapping in the city of Pacifica.

Most of the study area is underlain by alternating, northwest-trending bodies of sheared greenstone and sandstone of the Jurassic and Cretaceous Franciscan assemblage, containing local inclusions of diabase, basalt, serpentinite, chert, and limestone. Near the ground surface, these rocks are commonly weathered and are mantled by residual soil and colluvium. Weathering is pronounced in the more highly altered rocks.

The valleys contain unconsolidated deposits of Quaternary alluvium. Artificial fill is present in many of the larger valleys occupied by residential developments. Remnants of marine-terrace deposits occur along the western part of the study area. Other Quaternary surficial deposits include slopewash, windblown sand, and beach deposits.

A northwest-trending structural grain, influenced by deformation along the San Andreas and related faults, dominates the geology of Pacifica (fig. 9.3). The San Andreas fault passes through the north end of the city. The Pilarcitos fault, a generally northwest-trending structure that enters the Pacific Ocean near Point San Pedro, is mapped through the southern part of the city. Paleocene rocks adjacent to this fault have been deformed into tight northwest-trending folds. Several unnamed mapped faults transect the Franciscan assemblage between the Pilarcitos and San Andreas faults.

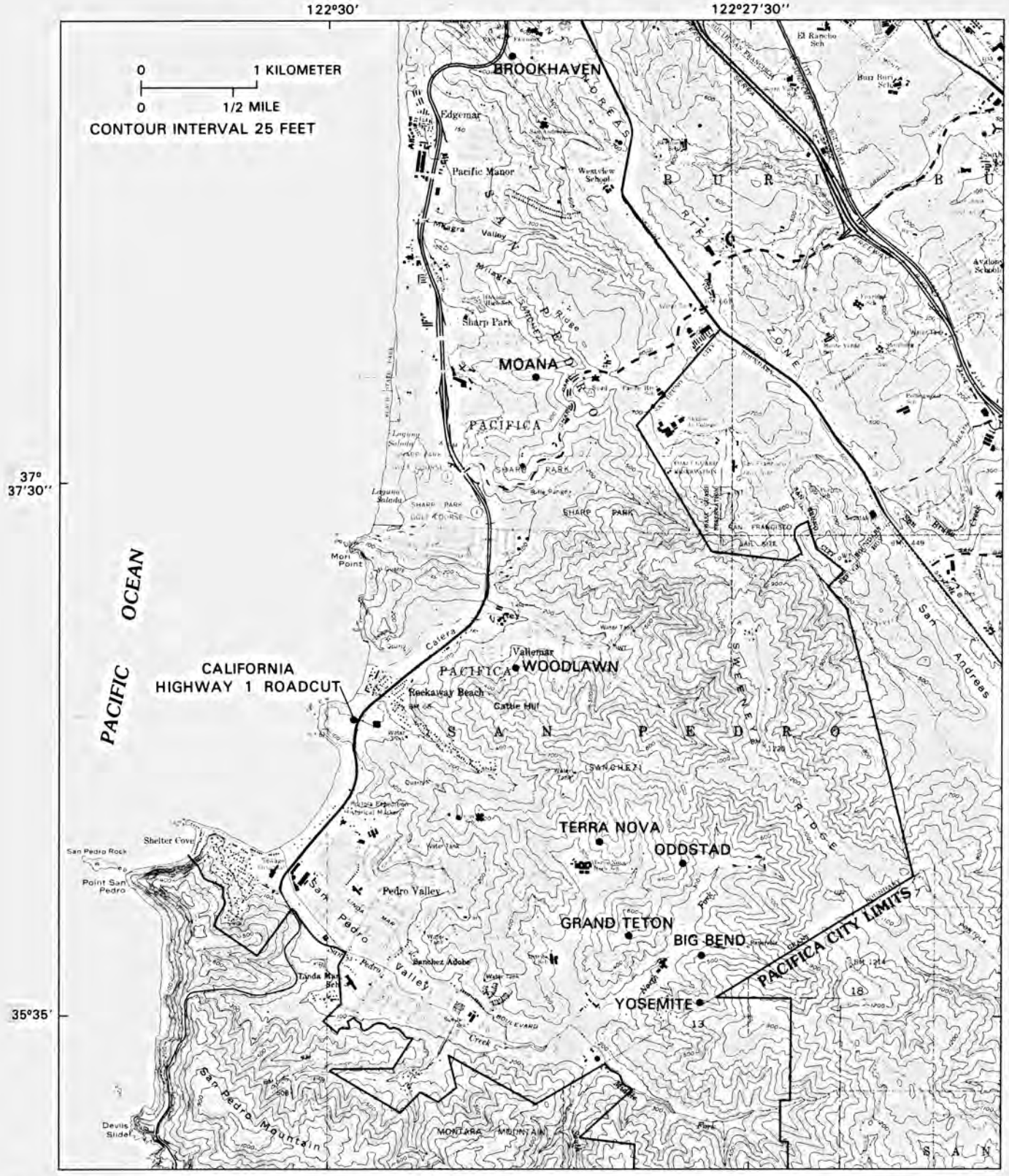


FIGURE 9.2.—Pacifica, Calif., area, showing locations of the nine landslides (dots) analyzed in detail. Base from U.S. Geological Survey, 1:24,000 scale, Montara Mountain and San Francisco South, 1980.

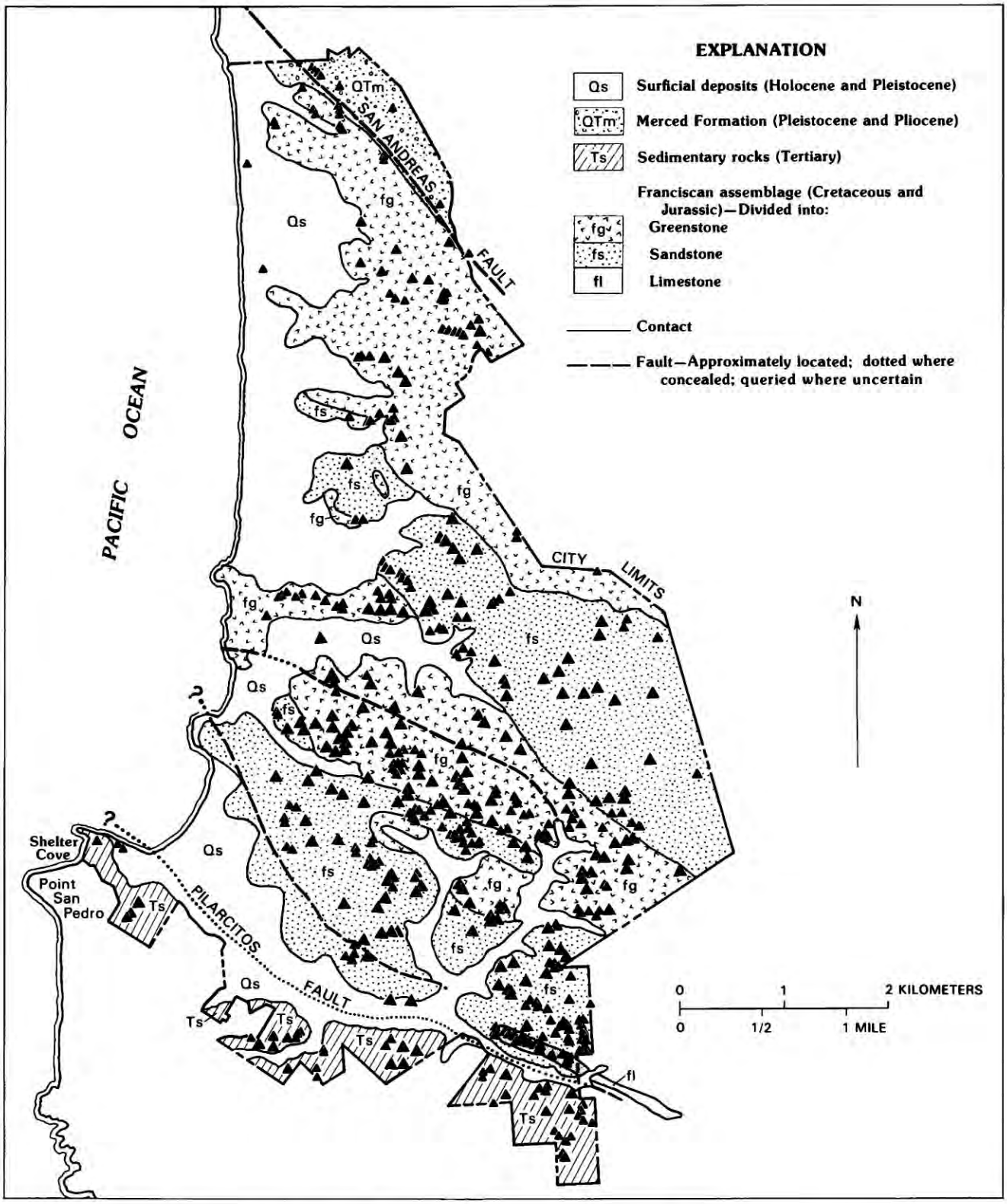


FIGURE 9.3.—Geologic sketch map of Pacifica, Calif., area (modified from Brabb and Pampeyan, 1972), showing locations of landslides (triangles) mapped in the inventory.

Franciscan sandstone beds in the southern part of the city exhibit no systematic, preferred structural trend; beds are oriented in all directions (Brabb and Pampeyan, 1972). Joints and shear zones are common in the Franciscan rocks.

STUDY METHODS

LANDSLIDE CLASSIFICATION

Landslide terminology is described in the "Introduction" to this volume. The major types of landslide movement resulting from the storm were rotational and translational slides and flows. One landslide was classified as solifluction. Most landslides were complex (Varnes, 1978) because after initial sliding the masses disaggregated into flows. In this chapter we use combined terms, such as "slump/debris flow," that distinguish sliding from flow, and we identify fast-moving debris flows as debris avalanches.

REGIONAL STUDY

A total of 475 landslides, ranging in volume from a few cubic meters to 2,290 m^3 of earth material, were identified within the city limits of Pacifica. Most landslides occurred near the top of the natural hills, and most involved only the soil cover and thus were categorized as surficial failures (less than 3 m deep), as opposed to deep-seated bedrock failures.

Shortly after the storm, with a forecast of more rain, we made a concentrated effort to delineate hazardous hillslopes, so that the affected residents could take measures to evacuate their homes when additional rains began. This was a concerted effort by the city to avert additional injury or death. The emergency effort was performed by airphoto interpretation and reconnaissance field visual observation only. However, it quickly became apparent that more thorough study was needed to locate and identify all the landslides that occurred during the storm, as well as to obtain valuable geotechnical data.

The high-hazard areas we delineated were hillslopes similar in geomorphic form to those that failed during the storm. These areas were initially delineated by examining poststorm (Jan. 8, 1982) 1:20,000-scale black-and-white aerial photographs provided by the U.S. Geological Survey. The study area was then overflown by a team of geologists who compared the photogeologic interpretations with the results of direct visual observation. The high-hazard areas were plotted onto existing San Mateo County 1:4,800-scale orthophotographs and submitted to the city, who, in turn, distributed evacuation advisories to homeowners in high-hazard areas on January 16, 1982. This advisory list was later revised by careful ground checking, which resulted in a corrected and official list of affected homesites. An updated evacuation advisory was distributed on January 28, 1982. Cataloging of landslide distribution and analysis of nine representative landslides were performed during and after the emergency measures.

DETAILED STUDIES

We selected four landslides from the nine analyzed in detail (fig. 9.2) for discussion here. We mapped each landslide on 1:120-scale base maps generated photogrammetrically from poststorm aerial photographs. We paid particular attention to the landslide-source areas, where failure geometry was well exposed. We also studied the soils along the failure surfaces.

During geologic mapping, we collected samples from representative soil horizons adjacent to the failure surfaces at each landslide site for testing in our laboratory. Tests included moisture content, dry density, Atterberg limits, gradation, and direct shear.

BROOKHAVEN SITE

GEOGRAPHIC SETTING

At the Brookhaven site, located on the north side of Pacifica (fig. 9.2) in the Fairmont No. 2A subdivision, a series of failures occurred on a natural slope immediately above a cut slope. Additional grading had been done at the top of this slope. Grading and development in the area preceded 1970. Tract homes built since 1970 have apparently been affected only slightly by recurring shallow failures of the hillside, which are evidenced by two older scars at the southeast end of the site.

The hillside at the site (fig. 9.4) is 46 m high, slightly convex, and inclined at a slope of approximately 34°. A gentle and apparently natural break in slope occurs midway up this hillside. Vegetation consists primarily of sagebrush and grass.

GEOTECHNICAL SETTING

The inferred active trace of the San Andreas fault passes within 300 m of the Brookhaven site. Thus, the Franciscan greenstone that underlies most of the hillside is strongly deformed and sheared, as revealed in adjacent roadcuts and in hand-dug holes. Sheared rock that includes other Franciscan rock types is also present at the site (fig. 9.4).

Greenstone observed in the test pits and headscarp within the failure area was highly weathered and sheared, in contrast to more competent, less weathered greenstone encountered elsewhere. The bedrock is overlain by a light-colored lower layer of colluvium, as much as 1.2 m thick,

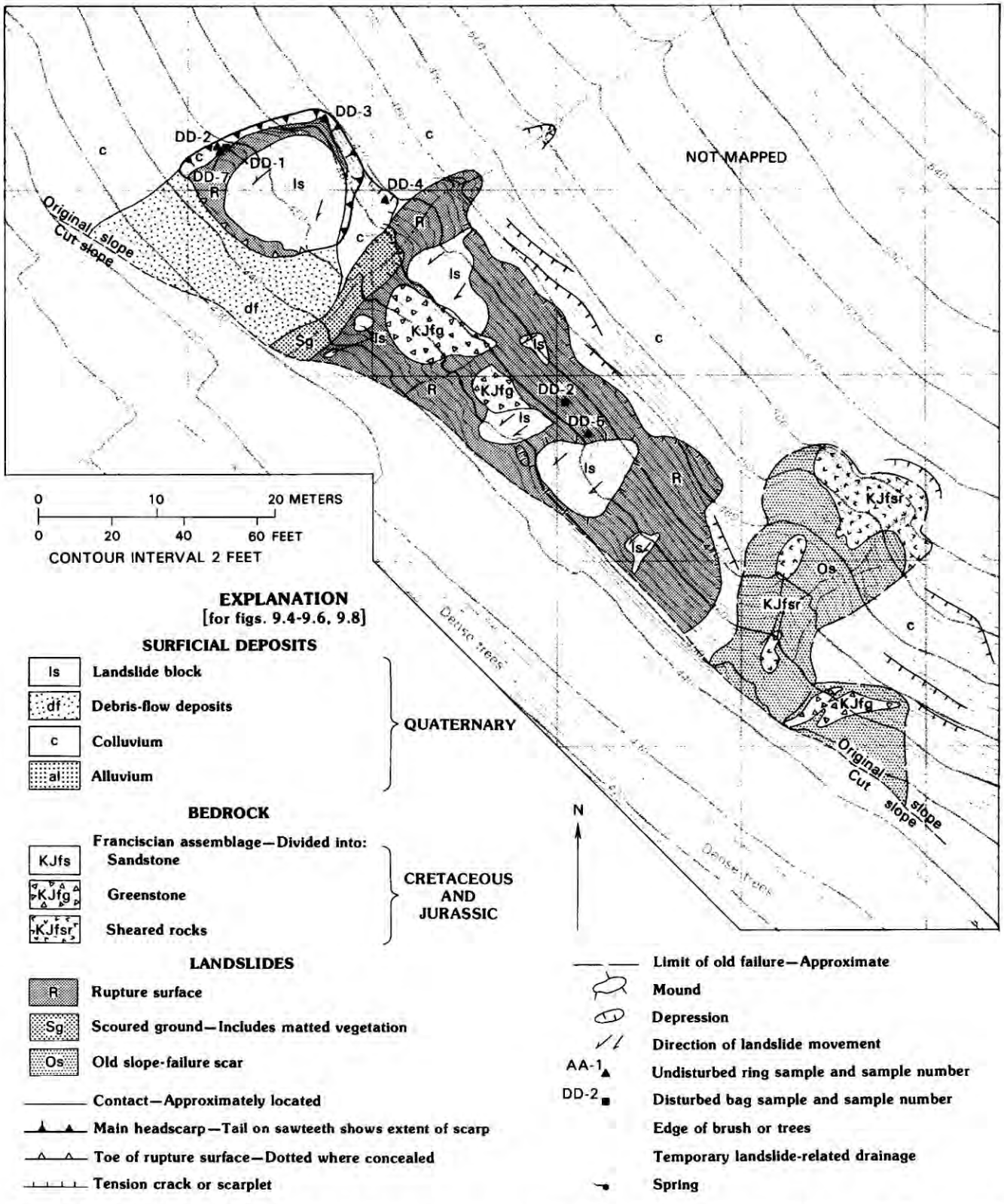


FIGURE 9.4.—Brookhaven site, showing series of failures on a natural slope immediately above a cut slope. Original topographic base prepared for the city of Pacifica by Hammon-Jensen-Wallen & Associates, Oakland, Calif., 1982.

which consists of moist, yellowish-brown, sandy to silty clay containing rock fragments. This material, in turn, is overlain by about 0.6 m of dark colluvium, consisting of moist, dark-grayish-brown, friable, coarse-sandy clay to clayey sand containing rock fragments.

LANDSLIDE CHARACTERISTICS

A slump/debris flow (northwesternmost landslide, fig. 9.4) dominated the slope failure at the Brookhaven site. It was 15 m wide, 9 m long, and about 2.1 m deep, and was characterized by a nearly square crown and a hummocky, cracked ground surface. The other landslides were shallow translational slides/debris flows that removed soil from the slope to a depth of 0.6 m. The resulting scars were characterized by 0.6-m-high, jagged headscarps and by slip surfaces that were continuously exposed except where concealed by a few rafted clumps of topsoil and vegetation.

Scarplets, generally less than 0.3 m high, and cracks indicating incipient failure bounded the slope areas between the failed areas (fig. 9.4); similar scarplets (not shown in fig. 9.4) extended nearly to the top of the slope.

The affected area included about 1,600 m^2, and the total volume of the landslides was approximately 765 m^3. An estimated 380 m^3 of additional material exhibited cracking that indicated incipient failure. Areas bounded by fresh cracks upslope of the landslides are omitted from these estimates.

MODE OF FAILURE

The Brookhaven site includes debris flows that resulted from both translational and rotational slides. Translational sliding occurred at depths of about 0.6 m, near the boundary between the dark top layer of colluvium and the underlying light-colored colluvium. After initial sliding, most of these masses disaggregated into viscous slurries of soil and water. However, numerous clumps of dark soil, held together by shallow roots, slid without disaggregation. At the time of our investigation, these clumps formed unstable masses that rested on the sloping rupture surface.

The dominant failure, in terms of both volume and disruption to an adjacent residential site, began as a rotational slide. The rupture surface was concave upward and extended to a maximum depth of about 2 m. Like the shallow translational failures, the mass disaggregated during failure into a viscous flow. Occupants of a residence downslope and across a road said that the mass moved slowly enough for them to move safely from its path. It had enough momentum, however, to flow downslope, topple an embedded basketball goal, and slightly damage their house.

BIG BEND SITE

GEOGRAPHIC SETTING

Big Bend Drive, located near the southeast point of Pacifica (fig. 9.2), occupies a 1-km^2 drainage basin in the Park Pacifica No. 2 subdivision. The area is characterized by dense residential development at the foot of a steep, east-west-trending ridgeline. Development of the area began during the late 1960's. Debris-flow hazards in the drainage basin were discussed by Fowler (1984).

The Big Bend failure (fig. 9.5) originated near the head of a broad first-order drainage swale on a north-facing natural slope. The drainage channel broadens upslope and is widest near the ridgetop. Review of historical aerial photographs indicates that the broadest part of the channel is the site of past slope failures.

Vegetation on the slope consists of dense scrub brush and grasses, with local stands of trees in the drainage channel. Vegetation within the drainage appears stunted in comparison with the vegetation in adjacent drainages and on divides, an appearance possibly reflecting paths of past debris flows. The average slope gradient is about 30°; over short reaches of the channel, gradients range from 20° to 45°.

GEOTECHNICAL SETTING

Bedrock exposed on the hillslope is Franciscan greenstone (fig. 9.5). Where observed in place, the greenstone is moderately fractured. Where orientations of fractures were measured, they dipped obliquely out of slope. The greenstone in most exposures is deeply weathered to a soft, cohesive, green clayey soil. Seepage was discharging from the greenstone exposure at the base of the headscarp. Sandstone float in the headscarp area suggests that Franciscan sandstone occurs upslope, but dense vegetation prevented mapping bedrock.

Overlying the bedrock was about 5 cm of moist, very plastic, dense, brown gravelly-sandy clay. This material had a massive structure and resembled a greenstone saprolite or residual soil.

Above the clay was about 1 m of light-colored colluvium, consisting of loose, brownish-yellow silty and clayey sand containing rock fragments, that might be old debris-flow material. The material was moist, massive, and friable. Where damp or wet, it displayed a slightly plastic consistency.

About 35 cm of dark colluvium rested on the light-colored colluvium. This material was damp, loose, and porous and consisted of very dark grayish brown silty coarse sand containing clay and rock fragments. The structure was granular and very friable.

Gaping tension cracks and scarps, as much as 0.6 m high, were initially observed upslope from the source area just off the map. Subsequently, scarplike features as much

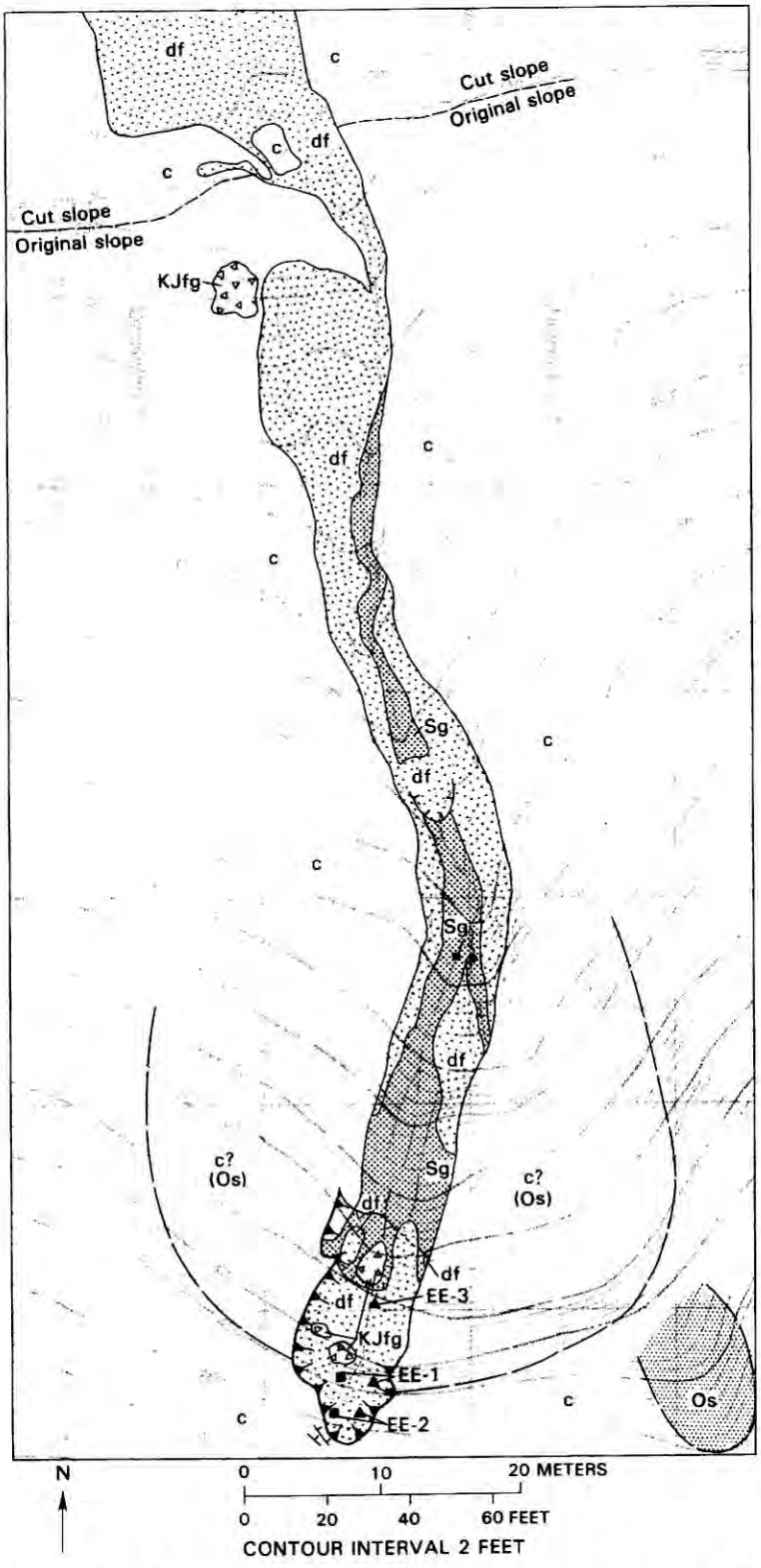


FIGURE 9.5.—Big Bend site, showing landslide in a first-order drainage swale. See figure 9.4 for explanation of symbols. Original topographic base prepared for the city of Pacifica by Hammon-Jensen-Wallen & Associates, Oakland, Calif., 1982.

as 2 m high were observed. Although the depth of penetration of these tension cracks is unknown, they are evidence of incipient failure. Their areal extent suggests a potential slope failure much larger than that in January 1982.

There is evidence on 1941 aerial photographs of a past, larger slope failure at this site. Its scar morphology is identical to that of the failure in January 1982. This older landslide appears in the 1941 photographs as an arcuate scar area, partly denuded of vegetation, that extends nearly to the ridgetop (beyond edge of fig. 9.5). This older failure must have occurred at least a few years before 1941 because much of the scar had been revegetated.

This older failure suggests the time required to mask the scar by vegetation and to degrade the scarps. By 1970 the scar was completely revegetated, and the scar slopes were reduced to the angle of the adjacent hillslopes. In 1970, however, the secondary growth of vegetation was recognizably lighter toned and shorter than in adjacent undisturbed areas. This is the sole evidence in the 1970 photographs that a failure had occurred on this hillslope.

LANDSLIDE CHARACTERISTICS

The landslide occurred on January 4, 1982, behind the residence at 831 Big Bend Drive. Its volume was estimated at 660 m^3. The landslide occurred in two time-separated surges. The smaller, first surge occurred during the day; it moved slowly downslope, overtopped a low retaining wall, and oozed into the backyard. The larger, second surge occurred that evening and probably moved as did the first; it had enough momentum and volume to overtop the retaining wall, fill a 1.2-m-deep swimming pool, and cover much of the yard with mud.

The Big Bend landslide exhibited the long, shallow, narrow and sinuous path typical of debris flows (fig. 9.5). It exhibits the classic debris-flow morphology, consisting of three distinct sections: source area, main track, and depositional area.

The source area of the Big Bend flow was 23 m long, measured along slope, and averaged 7.6 m in width. It was defined by a 0.3- to 1.2-m-high headwall and flanks that exposed primarily colluvial material. Exposed in the irregular basal failure surface was weathered Franciscan greenstone and associated materials. Downslope, within the source area, a minor scarp was partly covered by material that had flowed from upslope.

Downslope from the source area, the main track was characterized by a relatively narrow, deep gully, flanked on both sides by thin lateral deposits that overlay matted grass and brush. The main track was about 70 m long and 4.5 to 6.0 m wide.

The main track extended downslope to an area where it appeared that the decreasing slope angle and a debris dam of small trees and brush had caused deposition on the hillslope above the affected residence. This damming of the flow resulted in a fan-shaped, two-lobed deposit, at least 1.2 m thick. Much of the depositional area, however, was the backyard and swimming pool.

MODE OF FAILURE

The presence of an irregular rupture surface and a minor scarp below the headscarp suggests that initial failure was by two translational sliding events. Sliding was probably retrogressive; it started with failure at the lower scarp. This movement, in turn, removed lateral support and triggered subsequent sliding of the source area adjacent to the headscarp.

As each slide mass moved downslope, it disaggregated into a flow. The flows, following the drainage course, made a turn of approximately 30° before reaching the bottom of the slope. Obstructions in the path and an incised drainage channel along this lower course probably retarded movement and limited acceleration of the flows.

The combination of translational sliding and probable low velocity of flow classify this complex landslide as a translational slide/debris flow.

ODDSTAD SITE

GEOGRAPHIC SETTING

The slope failure at the Oddstad site occurred on a natural east-facing hillslope above the 1200 block of Oddstad Boulevard in the Park Pacifica subdivision (fig. 9.2). This failure, which was the largest and most destructive of the landslides studied, occurred at about 11:00 p.m. P.s.t. January 4. A translational slide/debris avalanche with an estimated volume of 2,290 m^3 destroyed two homes and killed three children in one of the homes; two other homes were slightly damaged. Features of this landslide were discussed by Shlemon and others (1987).

Failure occurred near the head of a broad first-order drainage on a hillslope about 85 m high and generally inclined 26°(fig. 9.6). Vegetation on the slope consists of dense coyote brush, poison oak, and scrub oak; the ridge is covered by low perennial grass.

Drainage was controlled by the broad swale. Scouring of the topsoil and vegetation by the passing debris avalanche removed much of the erosion-retardant vegetation, to the extent that subsequent runoff established gullies in the lower part of the slope. Gullying also took place where the runoff crossed landslide deposits.

GEOTECHNICAL SETTING

Franciscan sandstone with a fracture spacing closer than 10 cm was exposed downslope of the source area, where soil had been stripped by the passing debris ava-

lanche. The scar locally exposed a minimum of 3.3 m of a lower layer of colluvium, which consisted of dark-brown clayey-silty sand containing rock fragments, overlain by an upper, darker colluvial layer about 0.6 m thick, which consisted of very dark gray to grayish-brown clayey sand (fig. 9.7). Bedrock was not exposed in the landslide scar.

The lower layer of colluvium was dense and moist and had a moderately developed, vertically oriented prismatic structure. The hard, slightly friable soil had thin clay films lining pores and soil-structure faces.

The upper layer of colluvium was moist to damp and had a moderately developed, medium-size granular struc-

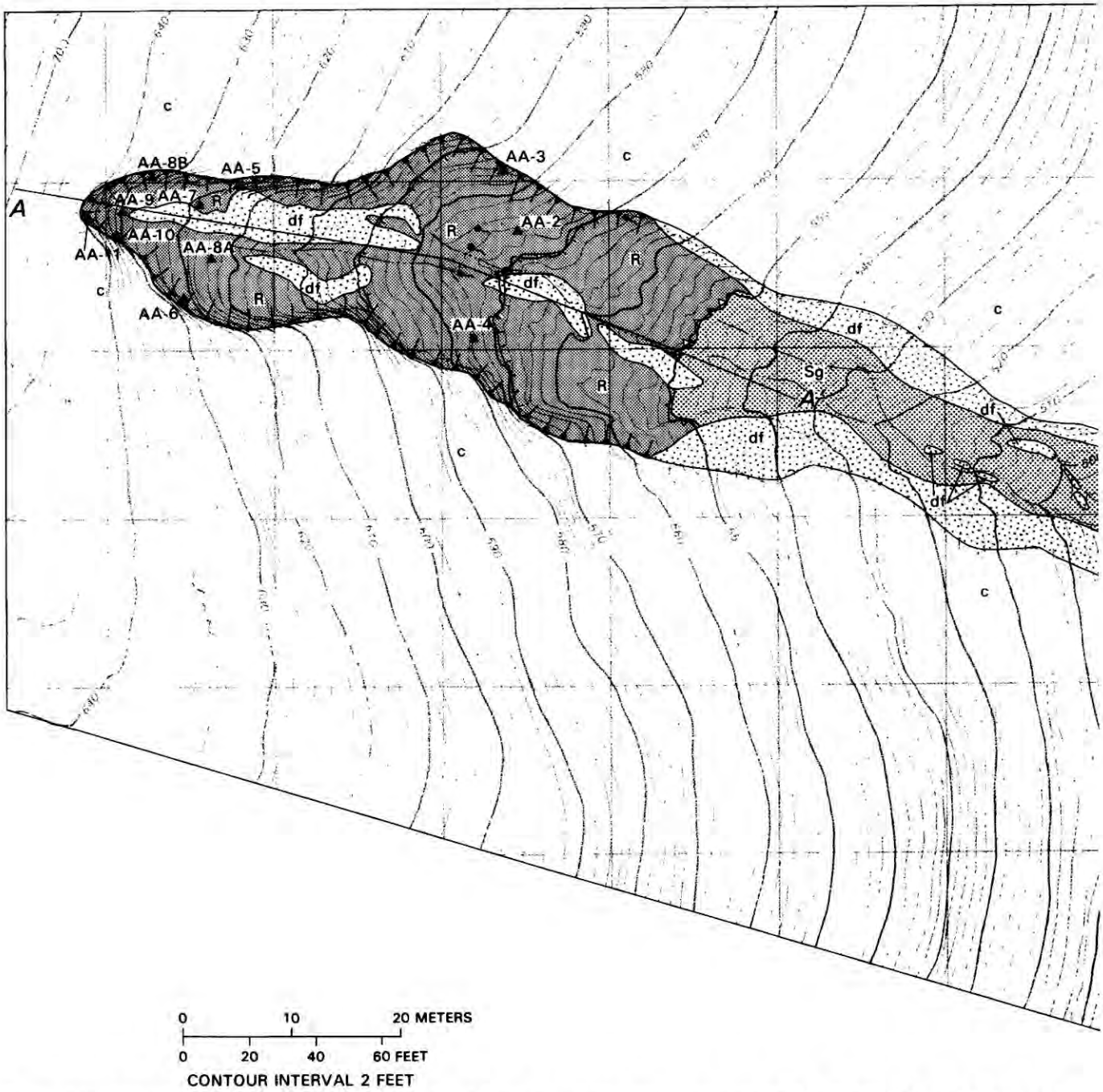


FIGURE 9.6.—Oddstad site, showing landslide on a natural east-facing slope and location of cross section *A-A'* in figure 9.7. See figure 9.4 for explanation of symbols. Original topographic base prepared for the city of Pacifica by Hammon-Jensen-Wallen & Associates, Oakland, Calif., 1982.

ture. The soil was loose and friable. Dense root growth occupied this porous horizon. High-angle tension cracks and fissures were oriented perpendicular to the flanks of the slope-failure surface exposed in the colluvium.

Ground water was seeping from the colluvium midway up the source-area scar. Seepage issued from a linear zone of nearly equal elevation across the scar. Enough ground water was discharging at the time of our site investiga-

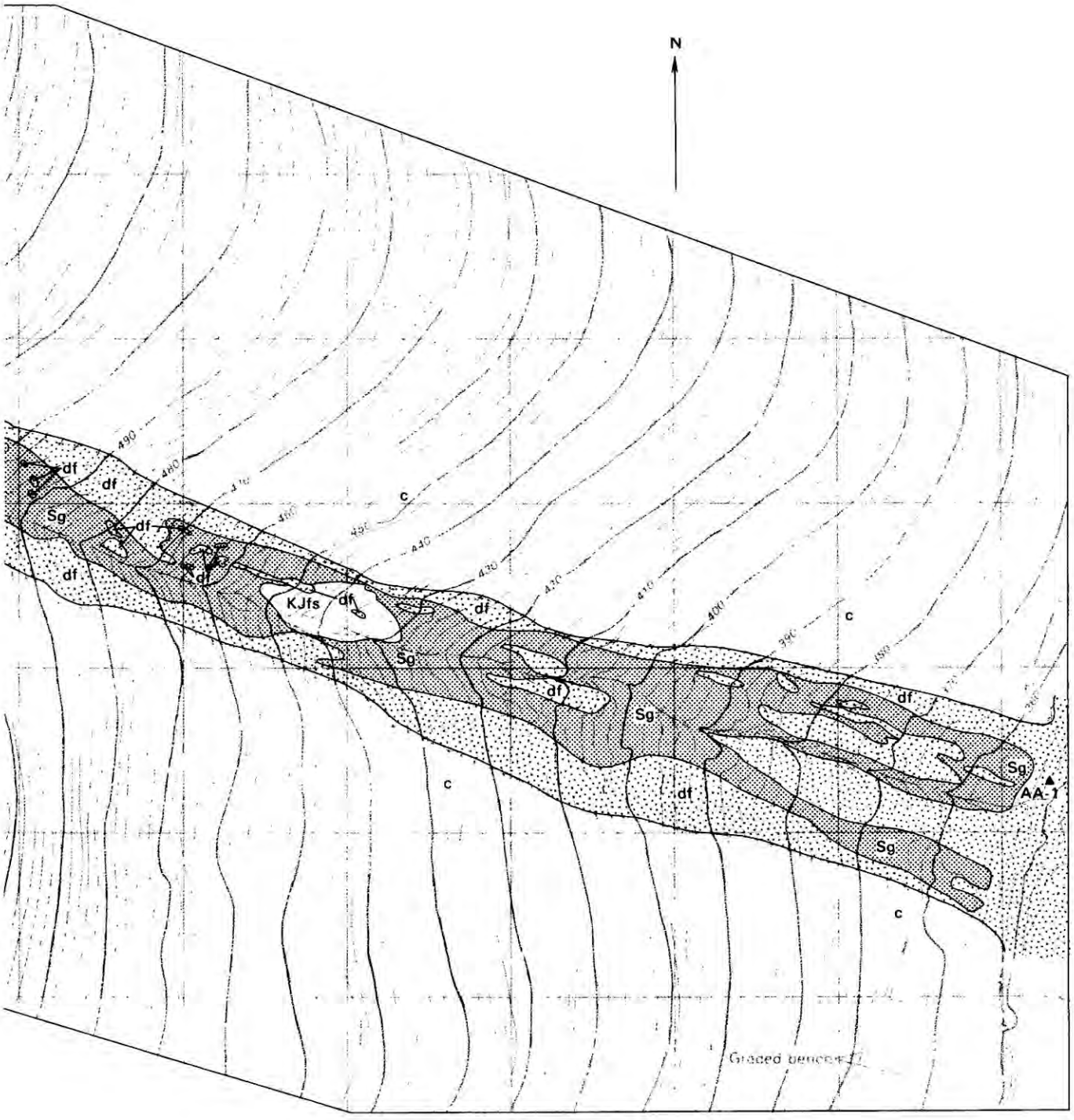


FIGURE 9.6.—Continued

tion (Jan. 25, 1982) to form a steady erosive flow that extended to the bottom of the slope.

LANDSLIDE CHARACTERISTICS

The landslide source area was characterized by an irregular, 58-m-long, U-shaped scarp that ranged in height from about 2.5 m at the crown to more than 3.4 m near the toe (figs. 9.6, 9.7). The source area exposes an irregular rupture surface of approximately 840 m^2, with scattered patches of landslide debris.

The main track extended 140 m from the toe of the source area to the edge of the residential development located at the foot of the slope. The width ranged from about 11 m in the midpart to approximately 18 m at the upper and lower ends.

Vegetation in the track was stripped to the roots by the passing debris avalanche, and some larger roots were sheared off. Where vegetation remained in the track, it characteristically lay flat, pointing in the direction the debris traveled.

Scattered, 0.3- to 0.6-m-thick deposits of debris-avalanche material, commonly striated and pushed into mounds by subsequent surges of debris, occupied the central part of the main track. The margins of the main track contained a nearly continuous, 0.3-m-thick mantle of debris (lateral deposits) resting on the original vegetated ground surface. The depositional area was the housing tract at the base of the slope. The debris crashed through and between two houses, crossed Oddstad Boulevard, and slightly damaged another two homes.

MODE OF FAILURE

Slope failure at this site was complex. The geometry of the rupture surface and of the onsite soil structure indicated that the failure was initiated by translational sliding near the lower third of the source area. After an unknown amount of movement and time, the landslide mass mobilized as a debris flow, which gained debris-avalanche speeds (probably greater than 9 m/s) by the time it reached homes at the foot of the slope.

The initial failure caused loss of support and, probably, simultaneous sliding of the remaining two-thirds of the source area. These subsequent failures began as translational slides that transformed, first, into debris flows and, then, high-velocity debris avalanches as they moved downslope.

Although witnesses claim to have seen only one surge of debris, the presence of two distinct scarplets in the rup-

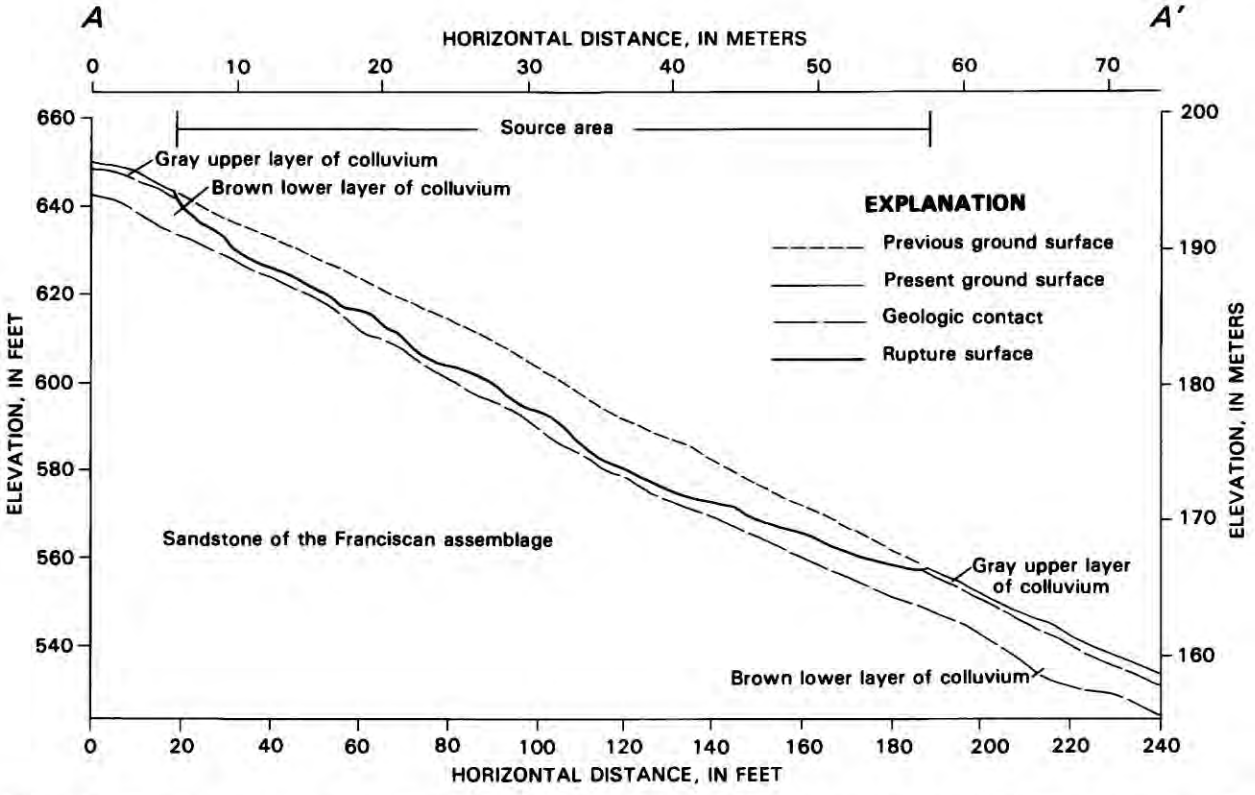


FIGURE 9.7.—Cross section *A-A'* through source area of debris flow at the Oddstad site. See figure 9.6 for location of cross section.

ture surface (fig. 9.6) and the occurrence of several sets of striated levees of debris in the source area and main track suggest a minimum of three time-separated events. However, the timespan could have been so short that the failures appeared to be one continuous event.

YOSEMITE SITE

GEOGRAPHIC SETTING

Several landslides occurred on a natural north-facing hillside above Frontierland Park, located at the end of Yosemite Drive (fig. 9.2). The main slope failure (fig. 9.8), consisting of about 280 m^3 of material, and two other failures that occurred on adjacent slopes created a total material volume estimated at 610 m^3.

These landslides damaged landscaping and recreational facilities in the southeastern part of the park. The main debris flow originated in a moderately well developed first-order drainage, then traveled along a V-shaped channel that extended downslope to the park. Stairs leading to a nature trail near the source area were badly damaged by impact from the debris flow. The site details and geology are shown in figure 9.8.

The source area of the main debris flow had a natural slope of about 26°. The channel extended downslope to the park at a gradient ranging from 18° to 26°. Arcuate, locally steepened segments of the slope to the southwest of the affected slope were photogeologically interpreted as old landslide scars.

Dense vegetation occupied the entire slope except for the stair area. The dominant vegetation types are coyote brush, poison oak, scrub oak, and grass. Several small trees occupied the central part of the drainage channel.

GEOTECHNICAL SETTING

The affected slope is underlain by Franciscan rocks consisting of greenstone and some sandstone. The greenstone is highly sheared and includes hard blocks of massive greenstone. Foliation in the greenstone dips steeply in various directions. A contact between greenstone and sandstone was inferred near the head of the source area. The sandstone is highly weathered and has no distinct structure.

Approximately 1 m of colluvium overlay the bedrock. This colluvium consisted of a 30-cm-thick upper layer of moist, loose, very dark grayish brown to black silty-clayey sand that had a well-developed granular structure, grading to a lower layer with a weak blocky structure. The upper layer of colluvium was porous, containing fine and coarse roots, and was friable and slightly plastic.

Curvilinear tension fissures were aligned subparallel to the headscarp adjacent to the flanks and above the source area. Numerous rodent burrows were observed in the scarp exposures and in the undisturbed ground surface. Surface manifestation of these features, however, was commonly masked by organic debris.

Seepage was observed in the source area, discharging from the contact between colluvium and bedrock. Piping by ground water had resulted in development of a 20-cm-diameter hole in the headscarp.

LANDSLIDE CHARACTERISTICS

The landslide was defined by a straight, steep-sided source area, a long, narrow, sinuous main track, and remnants of a depositional area at the foot of the slope. The source area was approximately 26 m long and 8 m wide, characterized by a U-shaped main scarp diminishing in height from 2.1 to 1.2 m at the headscarp to 0 m at the toe, and ranging in inclination from about 26° to vertical. The basal rupture surface followed the bedrock-colluvium contact and was highly irregular. Subsequent runoff caused local gullying of the basal rupture surface.

The main track was approximately 70 m long and 8 m wide in the upper reach, and increased in width to about 14 m below the point where a 30° change of course occurred. Preexisting vegetation within the main track was either stripped down to the ground surface or laid flat to the ground in the direction of movement. Immature trees in the main track were impacted by the debris flow but not toppled. Mud from the advancing debris flow splashed onto tree trunks as high as 3 m above the original ground surface.

Part of the debris flow was deposited approximately 30 m from the foot of the slope and was less than 0.3 m thick. Most of the debris flow, however, made a 60° change in course and continued nearly 610 m downslope to Oddstad Boulevard, depositing soil along the way. This deposit was generally less than 0.3 m thick and discontinuous.

MODE OF FAILURE

The presence of an irregular rupture surface coincident with the colluvium-bedrock contact and of three scarplets below the main scarp suggests that the main failure occurred as four separate translational slides, which were probably simultaneous or nearly so. Disaggregation of the slide blocks into a debris flow probably occurred instantaneously. The long confining drainage course and the distance of travel from the foot of the slope suggest that high speeds were attained; thus, this complex landslide could be called a translational slide/debris avalanche. The length and composition of the deposit suggest that the debris avalanche had a relatively low viscosity. Impact by the debris avalanche on obstacles along the path probably dissipated some of the kinetic energy and lowered the peak velocity.

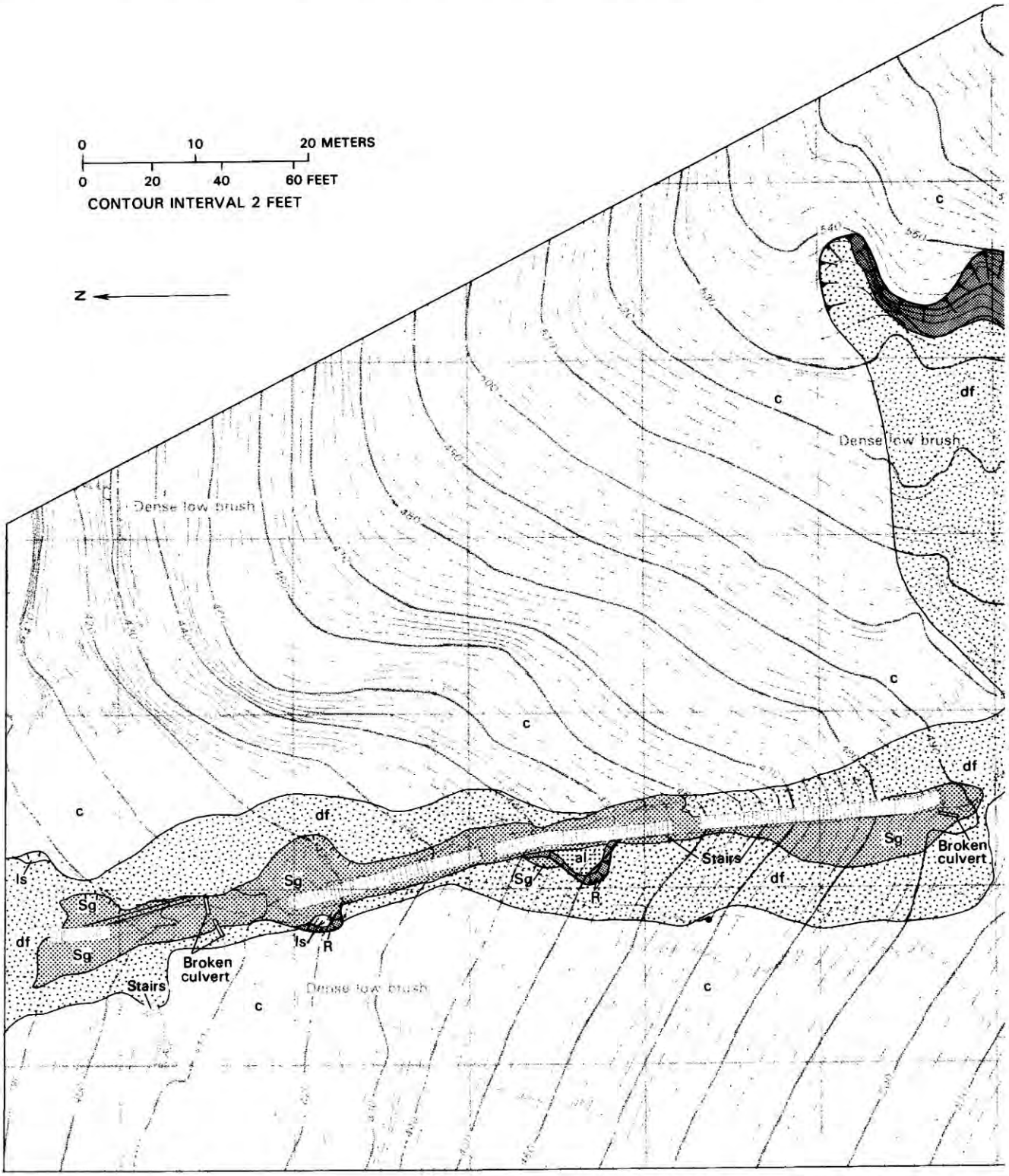


FIGURE 9.8.—Yosemite site, showing landslide on a natural north-facing hillside. See figure 9.4 for explanation of symbols. Original topographic base prepared for the city of Pacifica by Hammon-Jensen-Wallen & Associates, Oakland, Calif., 1982.

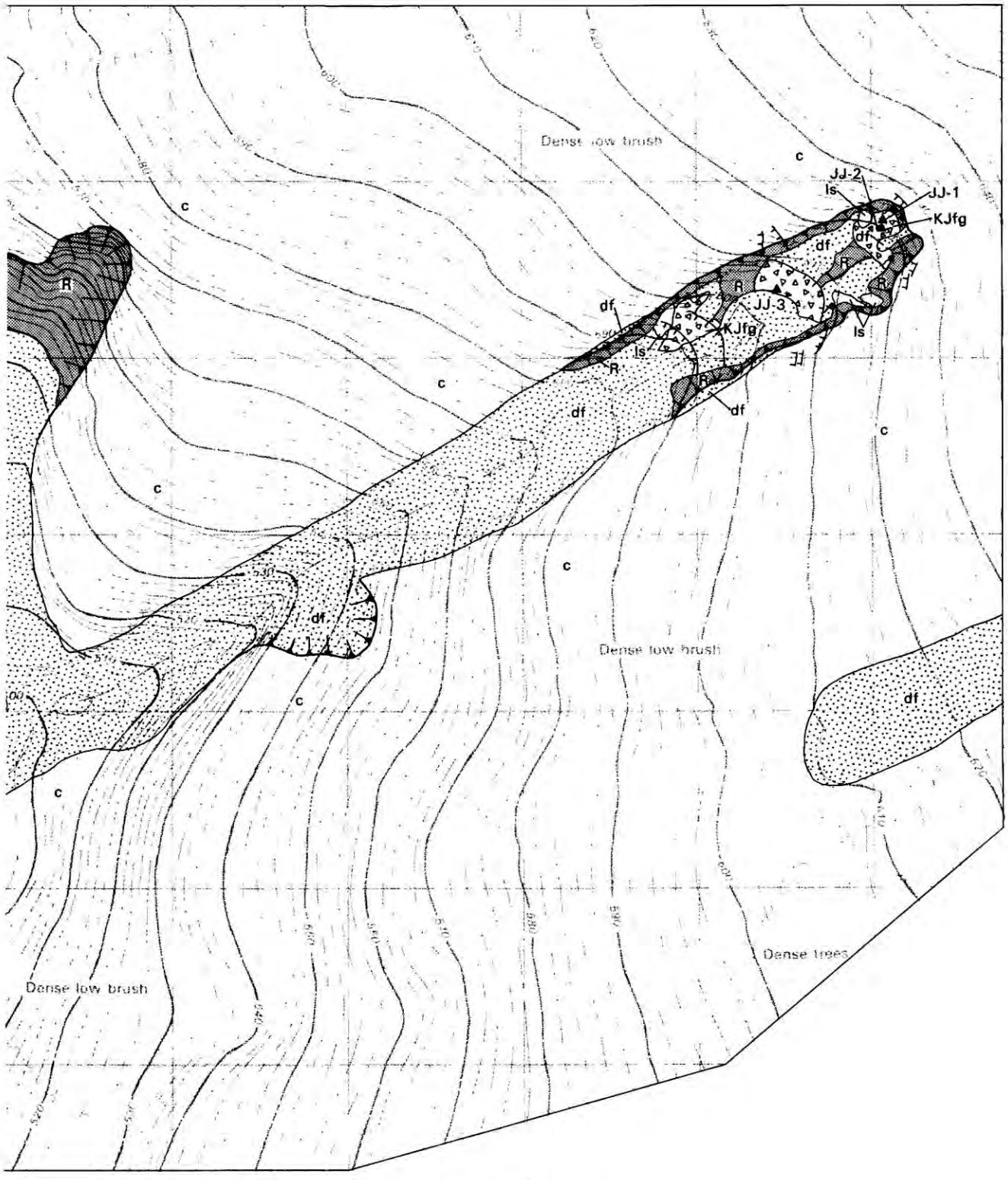


FIGURE 9.8.—Continued

DISCUSSION

LANDSLIDE DISTRIBUTION AND TYPE

The 475 landslides related to the January 3–5, 1982, storm were widely distributed within the city limits of Pacifica (fig. 9.3; see chaps. 8, 10). Most of these landslides occurred on hillsides near and within the Linda Mar district, namely, in the area west of Sweeney Ridge, east of California Highway 1, and south of Sharp Park (fig. 9.2). Distinguishable concentrations of landslides were mapped on a generally northwest-trending ridge that extends from northeast of the Highway 1 roadcut landslide to the Oddstad landslide (fig. 9.2). Another concentration of landslides was mapped in the southeast corner of the city in the headwaters of San Pedro Creek. North of Sharp Park, landslides were sparse. Most of the landslides occurred on natural slopes; engineered slopes performed relatively well.

Four principal types of landslides were mapped, including (1) translational slide/debris flow, (2) rotational slide/debris flow, (3) rotational slide, and (4) solifluction. Types 1 and 2, which are complex landslides (Varnes, 1978), resulted in the debris flows and debris avalanches. These complex landslides totaled 85 percent of all mapped landslides. They commonly occurred on natural slopes, although several were mapped on oversteepened cut slopes underlain by soil.

Rotational slides make up about 15 percent of the total landslide inventory. This type of landslide occurred on cut slopes and natural slopes underlain by soil or intensely weathered bedrock. They differed from the complex landslides in that flow subsequent to sliding did not occur. Rotational slides were commonly observed on hillslopes that also contained nearby debris-flow or debris-avalanche scars. Deeper rotational slides were observed locally along high, oversteepened cut slopes.

One occurrence of solifluction was mapped on a slope adjacent to Grand Teton Avenue. This type of failure resulted in a rippled ground surface without distinct boundaries; it can be considered a creep process that is capable of generating a debris flow or a rotational landslide as movement proceeds to locally oversteepen the slope.

TOPOMORPHOLOGY

The preponderance of flows originated near the heads of first-order drainages (swales) which in some places were so subtle that they showed less than 1 m of relief in transverse profile (see chaps. 7, 10).

Original slope angle plays an important role in the distribution of failures (fig. 9.9; see chaps. 6, 7). The slope angles at the sources of the nine landslides mapped in detail all fall within the range 26°–45°. This range of slope angle was suggested by Campbell (1975) as the most common range for soil slides that transform into flows. Although gentle slopes also generated flows in Pacifica, invariably the toe of the landslide coincided with an artificial or natural steepening of slope. Slope failure generally appeared to be independent of slope orientation.

SOIL CHARACTERISTICS

The presence of soil, ranging in thickness from 0.45 to more than 3.7 m, was a common denominator of the source areas of the slope failures mapped in detail. Most soils examined had been transported from an upslope source (colluvial), but some had been formed in place from the underlying bedrock (residual). Debris-flow source areas generally exposed an upper dark layer, 0.6 m or less thick, of slightly expansive colluvium, underlain by a homogeneous lower layer of granular colluvium.

Engineering properties of the landslide soils were comparable (table 9.1; see table 6.1). Figure 9.10 illustrates the grain-size distribution of soils involved in the nine slope failures that we mapped in detail. Of the soils tested, 58 percent contained 40 to 60 percent sand, 20 to 40 percent silt, and 10 to 30 percent clay. In general, the representative soils involved in debris flows contained 30 to 70 percent sand, 15 to 50 percent silt, and 10 to 45 percent clay. For these ranges in gradation, the shear-strength parameters were a cohesion commonly less than 20 kPa and an angle of internal friction averaging 35°.

LANDSLIDE GEOMETRY

Tension cracks commonly appear to have controlled the configuration of the source areas. Tension cracks were commonly observed on the flanks of the source areas, where they extended downward to become concordant with the basal rupture surface. The cracks were generally lined with fine roots and contained relatively loose soil. Projection of the tension cracks from source-area scars to the adjacent ground surface generally aligned with subparallel, 5- to 15-cm-high scarplets observed on the ground surface.

Most debris-flow source areas clearly exposed the geometry of the basal rupture because most of the overlying soil was removed during failure. The rupture surface occurred at or about 0.6 m above the soil-bedrock contact and was commonly subparallel to the adjacent natural ground surface. Bedrock was commonly exposed in "windows" on the floor of the source area, and springs were observed discharging from fractured rock or soil.

Rupture-surface profiles were very irregular; some profiles had a relief of as much as 0.6 m. Locally, steep reaches of the rupture surface coincided with root-lined tension cracks exposed in the adjacent flanks of the source

area. This relation may represent the headscarps of individual landslide blocks that failed retrogressively, probably nearly simultaneously.

SLOPE-STABILITY ANALYSES

Slope-stability analyses, using prefailure geometry, were conducted for the nine slope failures studied in detail. An infinite-slope model was used initially to represent the landslide geometries, and calculations were made using the soil unit weights and shear-strength parameters listed in table 9.1. These calculations were accomplished by using the charts from Duncan and Buchignani (1975), which assume seepage parallel to the slope. In some cases, the stability analyses showed that total saturation with seepage parallel to the slope was insufficient to cause landsliding. For these cases, it was necessary to assume seepage out of the slope to obtain a factor of safety (FS) less than or equal to one.

However, as shown in figure 9.12*A*, the failure surface is finite rather than infinite. In addition, numerous tension cracks were observed during the field investigation, and we believe that these tension cracks preceded landsliding. Therefore, we reanalyzed the failures, using a method of slices that incorporates prefailure geometries with finite downslope length and total-stress conditions. Again, in some cases an FS greater than 1 was obtained. For these cases, lowering the effect of cohesion by assuming a tension crack at the headscarp, extending from the ground surface to the basal rupture surface, was sufficient to reduce the FS to within 10 percent of 1.0. We consider this FS value sufficient for failure under the given conditions and method of analysis. However, the FS can be further reduced by adding the hydrostatic force

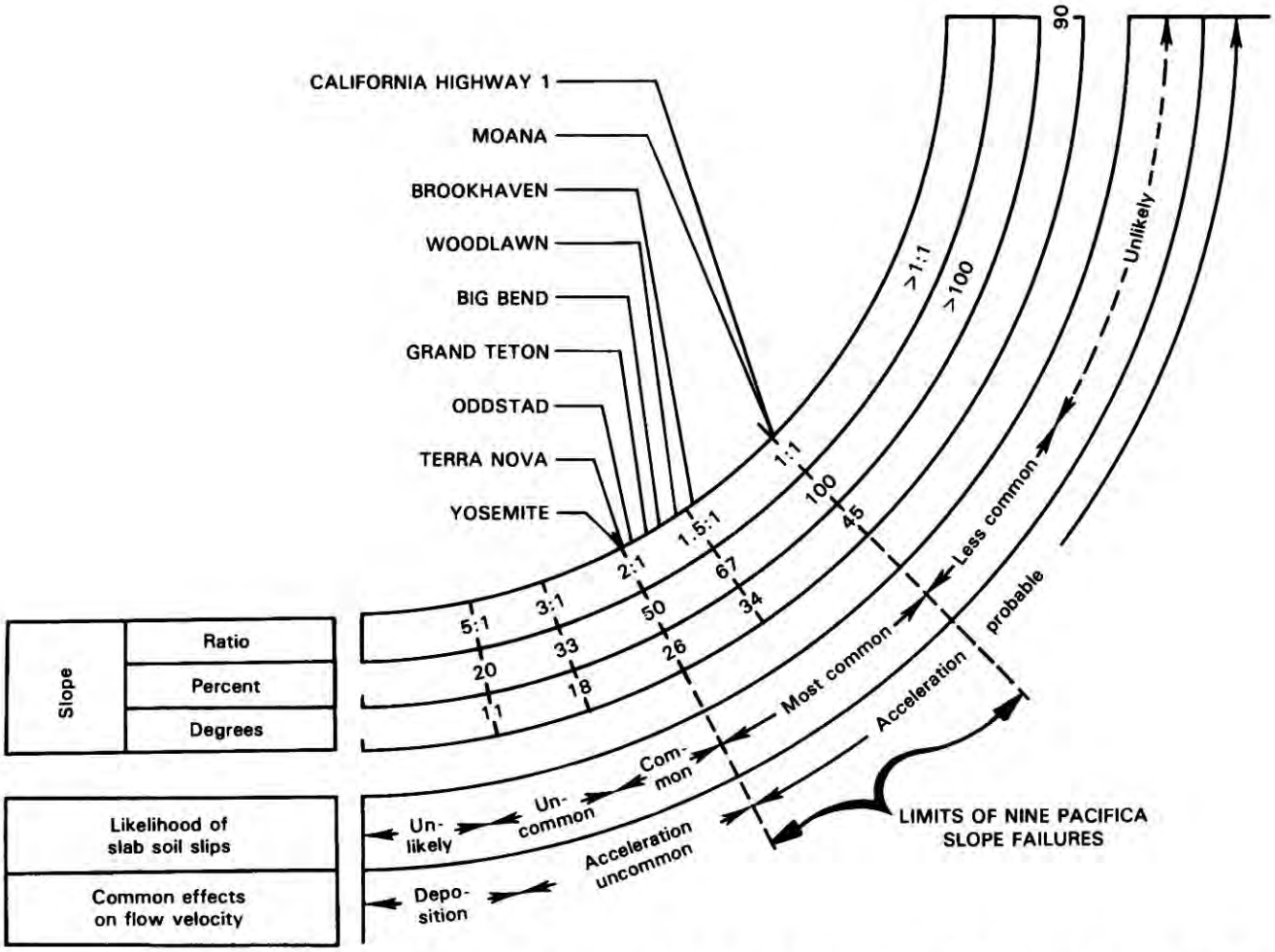


FIGURE 9.9.—Slopes at sources of nine landslides in Pacifica compared with the range of natural slopes, the likelihood of shallow slides, and the effects of slope on the velocity of debris flows (modified from Campbell, 1975, fig. 8).

TABLE 9.1—*Engineering characteristics of soil samples at nine slope failures near Pacifica, Calif.*

[C, cohesion; FI, silt and clay; GR, gravel; LL, liquid limit; PI, plasticity index; PL, plastic limit; SA, sand; Ø, angle of internal friction]

Sample	Depth (m)	Dry density (g/cm^3)	Moisture content (percent)	Atterberg limits			Gradation (pct)			Direct shear	
				LL	PL	PI	GR	SA	FI	C (kPa)	Ø (°)
Grand Teton-BB 3	1.89	1.52	26.2	50.3	26.8	23.5	3	27	70	7.66	25
Brookhaven-DD 1	1.52	1.70	19.7	---	---	---	--	--	--	11.97	40
Brookhaven-DD 3	.61	1.76	13.4	---	---	---	--	--	--	0	50
Brookhaven-DD 7A	1.98	1.70	19.8	41	23	18	4	57	39	12.93	34
Moana-HH 1	3.05	1.41	31.6	53	22	31	4	57	39	23.94	26
Big Bend-EE 2	.91	1.76	20.1	42	22	20	10	41	49	9.72	28
Woodlawn-FF 1	3.05	1.63	19.4	35	19	16	7	53	40	11.97	37
Terra Nova School-GG 4	.61	1.36	24.3	40	22	18	4	46	50	0	35
Terra Nova School-GG 7	.91	1.49	28.8	34	24	10	3	37	60	0	44
Yosemite-JJ 2	.91	1.54	26.9	33	19	14	1	58	41	3.35	47
Yosemite-JJ 3	1.52	1.94	10.0	18	15	3	2	55	43	12.45	36
Highway 1 roadcut-II 1	1.22	1.68	20.2	37	16	21	2	34	64	4.79	25
Oddstad-AA 1	1.22	1.62	24.0	---	---	---	--	--	--	9.58	37
Oddstad-AA 2A	4.57	1.65	22.4	36	20	16	0	60	40	23.94	39
Oddstad-AA 5A	2.44	1.57	23.7	30	25	5	--	--	--	18.19	26
Oddstad-AA 9	1.22	---	---	39	19	20	0	42	58	---	--

caused by surface water filling the tension crack. This additional force is sufficient to lower the calculated FS to below 1.0.

As movement takes place, however, the tension crack widens, the height of water in the tension crack decreases, and, in turn, the driving force decreases. Several episodes of movement may be necessary to decrease the shear strength from the peak toward the residual value and thus to initiate the landslide. This sporadic type of movement could account for the addition of large volumes of water to the sliding mass.

These calculations show that both effective-stress and total-stress analyses can be used to calculate an FS that indicates failure.

MECHANICS AND MODE OF FAILURE

Intense rainfall during the January 3-5, 1982, storm was evidently the triggering mechanism for the landslides. Cumulative values for the storm, as well as antecedent rainfall data, are given in chapter 2; one measurement of cumulative storm rainfall near Sharp Park indicated a total of 221 mm (8.7 in.) (chap. 2). A regional estimate of rainfall by J.P. Monteverdi (written commun., 1982) shows a range of 150 to 200 mm (6–8 in.) for the city of Pacifica during the storm.

Much work has been done to relate debris-flow occurrences to rainfall (see chaps. 2–5, 8). Campbell (1975) suggested that in southern California at least 267 mm (10.5 in.) of rainfall is necessary after an average dry season to bring the soil to field capacity, the water content at which water drains from the soil at the same rate as it is added. Campbell demonstrated that a critical rainfall intensity of 5 to 6 mm/h (0.20–0.25 in/h) is necessary to trigger flows, once field capacity is achieved. Govi and Sorzana (1980) indicated that storm-rainfall totals sufficient to trigger debris flows increase with an increasing mean annual precipitation (see chaps. 2–4, 8). They also showed that critical storm rainfall is lower for wet antecedent than for dry antecedent conditions.

The role of intense rainfall in triggering debris flows is illustrated in figure 9.11. Kesseli (1943) postulated that slope failure occurs during rainfall sufficiently intense that

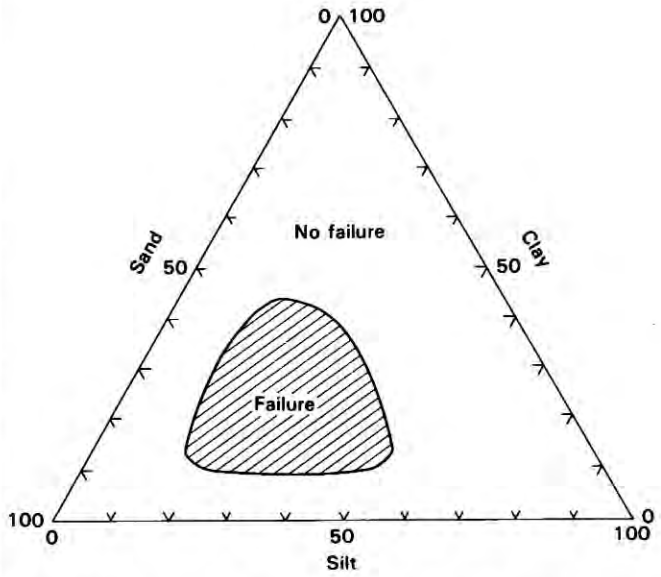


FIGURE 9.10.—Grain-size distribution for unstable soils at nine sites studied in detail. All values in weight percent.

water percolates into overburden soils at a rate greater than into bedrock. This condition develops a temporary perched water table in the soil. The height of this water table increases with continued intense rainfall, and a downslope seepage force develops in the soil mass. As saturation occurs, excess rainfall is distributed as surface runoff. In response to the pore pressures that develop, the soil becomes buoyant, and the resisting forces decrease.

The model of Kesseli, applied to debris flows in southern California by Campbell (1975), assumes that debris flows are initiated by sliding. Johnson and Rahn (1970) and Govi and Sorzana (1980) reported similar failure modes for other areas. Their model seems reasonable to apply to the flows in Pacifica, on the basis of rupture-surface geometry, the presence of remnant slide blocks exposed in the source areas of many slope failures, and the results of our stability analyses.

Once a saturated, noncohesive or slightly cohesive, granular soil mass fails by sliding, it commonly disaggregates into a debris flow (see chap. 6). Transformation of an initially rigid slide block into a flow is shown diagrammatically in figure 9.12. The first stage (fig. 9.12*A*) occurs when the slide mass begins gliding along or just above the soil-bedrock contact. At this stage, high pore-water pressure, caused by the permeability differences between soil and bedrock, and tension cracks are the primary controls. As the slide mass moves, plastic deformation (fig. 9.12*B*) occurs in the formerly rigid mass as internal shearing causes a reduction in strength (Johnson and Rahn, 1970; Campbell, 1975). Water filling tension cracks as the mass dilates could aid in mobilization of a debris flow from the slide. Further disaggregation reduces the strength of the slide mass and initiates flowage over the original ground surface (fig. 9.12*C*). As the flow moves farther downslope, it may accelerate to debris-avalanche speed, and it may incorporate vegetation and soil (fig. 9.12*D*). If the slide occurs as separate blocks, one surge may overtake another during descent of the slope, or separate surges may occur. Decrease in slope gradient at the base of the hill initiates deposition of the debris (fig. 9.12*E*).

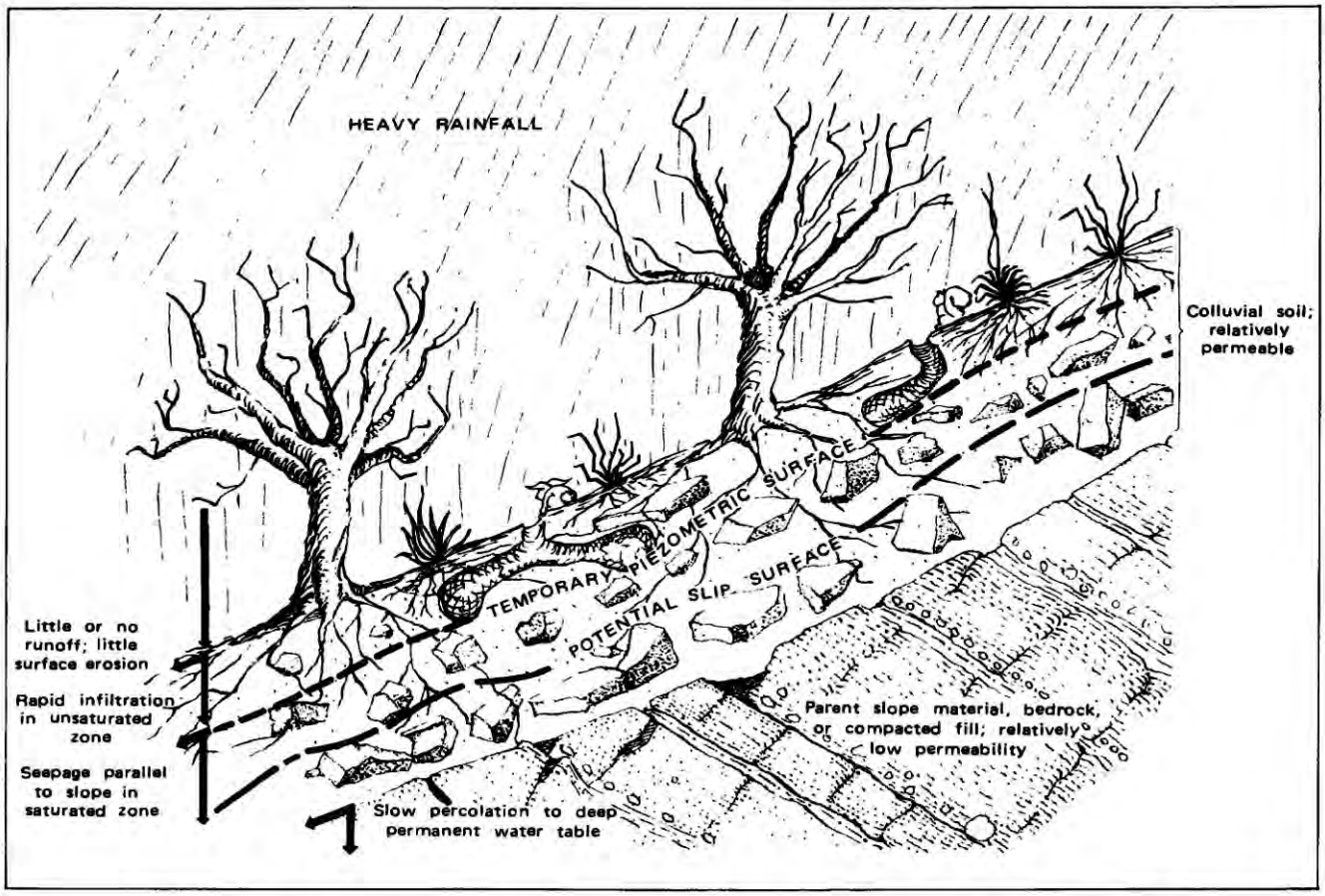


FIGURE 9.11.—Buildup of a perched water table in soil cover during heavy rainfall (from Campbell, 1975, fig. 16).

CONCLUSIONS

1. Complex landslides involving both sliding and flow totaled 85 percent of the mapped landslides.
2. Most of these complex landslides originated near the heads of first-order drainages on slopes between 26° and 45°, independently of slope orientation.
3. Engineering properties of the landslide soils were comparable.
4. Tension cracks were common to all the landslides and probably could serve as precursors.
5. Rupture surfaces at the sources of flows occurred in soil at or slightly above the soil-bedrock contact.
6. A tension crack and (or) water filling the tension crack was necessary in some cases for failure to occur.

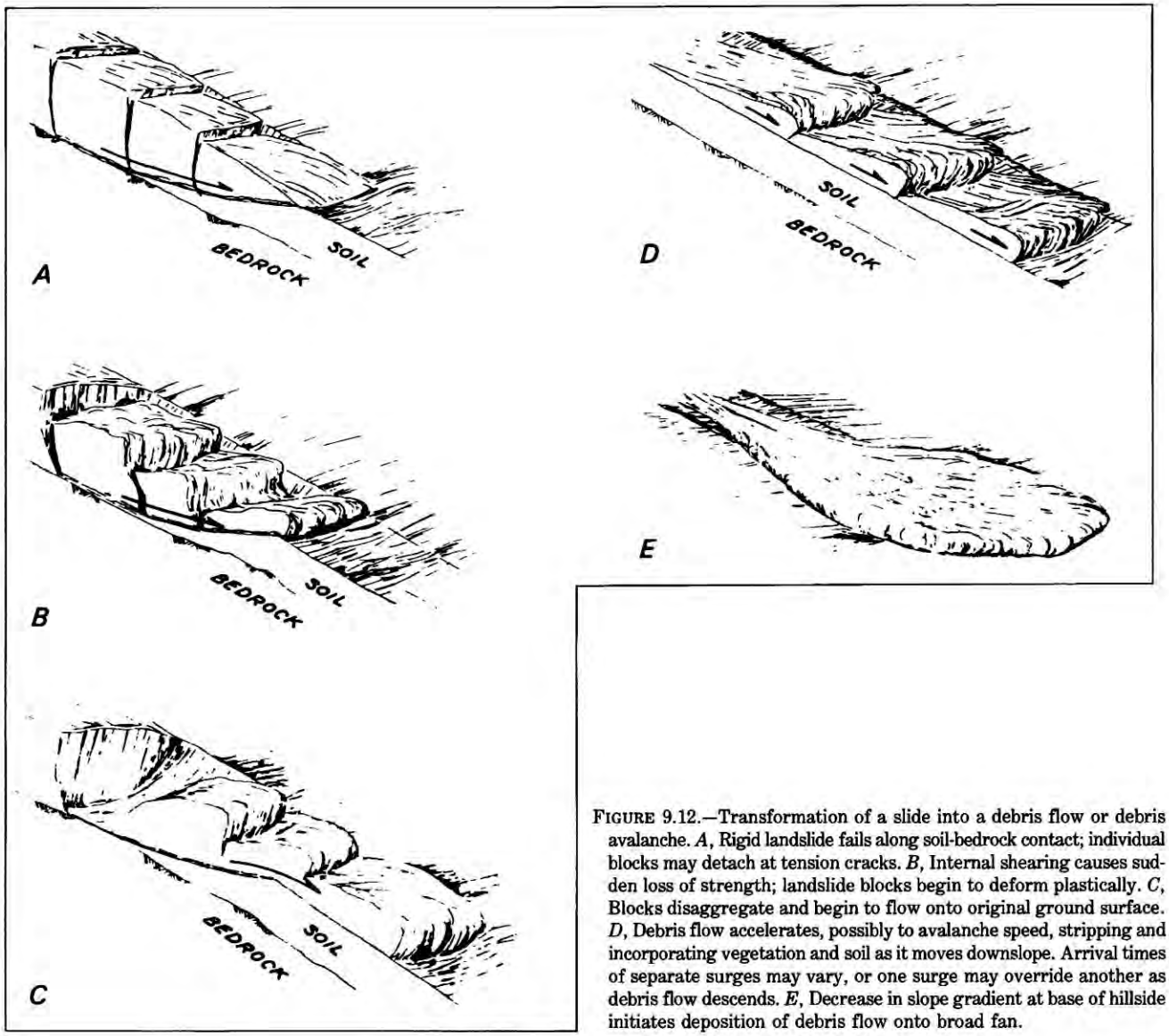


FIGURE 9.12.—Transformation of a slide into a debris flow or debris avalanche. *A*, Rigid landslide fails along soil-bedrock contact; individual blocks may detach at tension cracks. *B*, Internal shearing causes sudden loss of strength; landslide blocks begin to deform plastically. *C*, Blocks disaggregate and begin to flow onto original ground surface. *D*, Debris flow accelerates, possibly to avalanche speed, stripping and incorporating vegetation and soil as it moves downslope. Arrival times of separate surges may vary, or one surge may override another as debris flow descends. *E*, Decrease in slope gradient at base of hillside initiates deposition of debris flow onto broad fan.

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10. A METHOD FOR MAPPING RELATIVE SUSCEPTIBILITY TO DEBRIS FLOWS, WITH AN EXAMPLE FROM SAN MATEO COUNTY

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ABSTRACT

The method described herein principally consists of the preparation of a geomorphic map by a geologist, once it has been established that the regolith and bedrock materials in a given area may be susceptible to debris flows that develop from shallow slides. Areas that appear most prone to debris-flow failure are hollows and concave areas on slopes steeper than about 20°. Debris flows also commonly originate on sideslopes steeper than about 20°, although they may also occur on slopes that are less steep. Convex surfaces, such as ridge spurs, are least likely to generate debris flows. In addition to the delineation of areas with the above-mentioned characteristics, drainages downstream from potential source areas are identified as prone to inundation by debris flows or debris floods.

Using elements of this method, I prepared a debris-flow-susceptibility map for part of San Mateo County, Calif. (Smith, 1977), 5 years before the January 3–5, 1982, storm hit the San Francisco Bay region. During and immediately after this storm, about 85 debris flows occurred in the area of my pilot study. Almost all (98 percent) of these flows originated in areas designated on the map as most susceptible to debris-flow formation. On the basis of this experience, debris-flow-susceptibility maps sufficiently detailed for land-use planning at the local level apparently can be prepared for at least some areas.

INTRODUCTION

The purpose of this chapter is to report on one method that appears to be useful for delineating areas susceptible to rapid flows that develop from shallow slides, which are here called simply debris flows (see "Introduction" to this volume for landslide terminology). Because debris flows and related phenomena differ significantly from the more commonly recognized rotational and translational slides, the hazards posed by debris flows differ substantially from those posed by slides, especially in a spatial context. Therefore, slope-stability maps that incorporate or present data solely on rotational or translational slides do not normally depict the potential hazards from debris flows, debris floods, and mud floods.

A typical debris flow begins as a slide that leaves a distinct, commonly spoon-shaped scar at its source (fig. 10.1). The slide material may immediately mobilize as a slurry or be quickly transformed from a relatively coherent slide mass into a slurry. Once mobilized, the soil material flows rapidly downslope, commonly gathering speed and, possibly, more soil material. This soil material eventually is deposited as the debris flow slows, commonly when gentler slopes are reached. These areas of deposition are sometimes far from the point of origin.

During the early part of this study, I reviewed the literature to determine whether a consensus exists regarding the factors controlling formation of debris flows. On the basis of this initial review and independent field observations, it became apparent that several factors control the formation of debris flows and that some of these factors can be mapped. I selected an area in northern San Mateo County and prepared a sample debris-flow-susceptibility map (Smith, 1977). I compared this initial map (hereafter referred to as the 1977 version) with older aerial photographs on which scars and tracks from earlier debris flows are apparent. In early 1982, after the January 3–5 storm, I checked this map again, using infrared aerial photographs and limited field reconnaissance. On the basis of

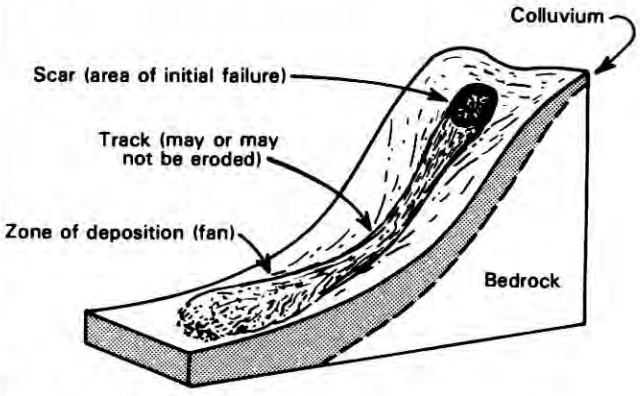


FIGURE 10.1.—Principal features of a debris flow.

these additional data, I have refined the 1977 version slightly to better portray the relative hazards from debris flows.

PREVIOUS WORK IN THE SAN FRANCISCO BAY REGION

January 1982 was not the first time that debris flows occurred in the San Francisco Bay region. Lawson (1908), in his report on the effects of the great 1906 San Francisco earthquake, referred to several "earth-flows" that occurred near Half Moon Bay. It is apparent from the photographs included in his report that these "earth-flows" would here be called debris flows.[1] Rice and others (1976) indicated that debris flows constitute a major hazard in much of Marin County, but they were unable to adequately reflect this hazard on the slope-stability maps they prepared. Thomas (1939), Bonilla (1960), Radbruch and Weiler (1963), Stromberg (1967), and Smith (1977) all briefly addressed debris-flow phenomena in the bay region. Rodine (1975) and Johnson and Hampton (1969) discussed, in considerable detail, selected debris flows that have occurred in parts of the region. Before the January 3–5, 1982, storm, however, none of these reports, except that by Lawson (1908), had been widely distributed or received much attention either by the public or by the geologists and engineers who work in the bay region.

To date, most of the landslide-hazard-mapping effort in the San Francisco Bay region has been directed toward delineating large landslides that leave fairly well-defined deposits which, for the most part, remain virtually where they originated—at or near the landslide source. In contrast, debris flows generally are not very large and do not leave well-defined deposits, particularly near the points of origin. For these reasons, and because the source scars commonly are quickly revegetated (within a few months or years), much of the evidence of past debris flows has been overlooked, and the potential hazard has gone unrecognized or unreported.

Furthermore, the effects of debris flows differ significantly from those of the more commonly recognized larger landslides. Because many debris flows occur with relatively little or no warning and commonly attain velocities of 10 m/s or more, they pose a substantial threat to life and property—a threat that can only be minimized if it is recognized before the landslide occurs. In contrast, most of the more commonly recognized landslides, though larger, move more slowly and thus allow persons and, in some places, structures to be removed from the hazardous area after landslide movement begins.

[1]Some of these phenomena might also be classified as debris slides according to Varnes (1978).

The combined result of all these factors was that virtually no one in the bay region was prepared for the types of landslides that occurred during and immediately after the January 3–5, 1982, storm. In view of the serious hazard of debris flows and their widespread occurrence in populated areas, the identification of areas susceptible to debris flows is an important step in the effort to protect the public from these destructive landslides.

Acknowledgments.—I thank Earl W. Hart and Salem J. Rice (retired) of the California Division of Mines and Geology, and Joel W. Baldwin of Baldwin Consultants, Pacifica, Calif., for discussions on this topic.

FACTORS THAT INFLUENCE THE LOCATIONS OF DEBRIS FLOWS

A wealth of literature exists describing debris flows. However, any review of this literature is hindered by the fact that more than 40 names have been used by experts in various disciplines (including geology, hydrology, engineering, and forestry, to name only a few), working in different parts of the world, to refer to debris flows and similar phenomena. Also, many investigators do not fully describe debris-flow events, although photographs accompanying their reports sometimes permit inferences to be made.

On the basis of the literature available, several factors appear to control the origin of the debris flows discussed here, which originate from shallow slides. Basically, debris flows are triggered by high pore-water pressure. Thus, the characteristics of the materials at the point of origin and the volume of water available at the site are of primary importance (see chaps. 5, 6, 7). In turn, the characteristics of the materials and the volume of water at the site of origin are controlled to varying degrees by other factors, including topographic form, slope inclination, vegetation, and bedrock materials and structure. There appears to be a consensus on the importance of some, but not all, of these factors.

TOPOGRAPHIC FORM

Many authors (Holmes, 1917; Hack and Goodlett, 1960; Swanston, 1969; Pain, 1972; Swanston and Swanson, 1976; Bogucki, 1977; Eyles and others, 1978; Rapp and Stromquist, 1979; Govi and Sorzana, 1980; McConchie, 1980; Hollingsworth and Kovacs, 1981; Zeimer, 1981) have reported that most debris flows originate in hollows,[2]

[2]A hollow is defined as the central part of a valley that contains the head of a stream. On a topographic map, any area in which the contours are concave outward (away from the hillside) constitutes a hollow (fig. 10.2). Commonly, more hollows are apparent on high-resolution aerial photographs than on topographic maps. Noses appear as areas where the contours are convex outward. Areas where the contours are essentially straight constitute the sideslopes.

at the heads of first-order drainages, or in incipient hollows on sideslopes (fig. 10.2). Almost all these authors concluded that such sites are particularly susceptible because water concentrates in these areas. In the study area of this report, 60 percent of the debris flows triggered by the January 3–5, 1982, storm occurred adjacent to first-order drainages, and 9 percent along drainages of higher order. Similar conclusions are reported in chapters 7 and 9.

Hack and Goodlett (1960) suggested two major reasons why hollows appear to be the areas most susceptible to debris-flow failure. First, they theorized that during and immediately after rainstorms, hollows should be the wettest areas of a hillslope because the slopes above converge toward the hollow. They likewise envisioned that the ridge nose or spur should be drier than either the hollow or the sideslope areas. These hypotheses were largely verified in the field by Dunne and Black (1970) and Pierson (1980).

Second, hollows theoretically are also the areas on hillslopes where the regolith is thickest because material moved from the surrounding slopes by water or soil creep tends to converge there. Hack and Goodlett (1960) found that the regolith in hollows in some mountainous areas is generally coarser and better sorted than that on sideslopes and noses, although they cautioned that studies of valleys in lowland areas have revealed that such generalizations do not everywhere apply.

In considering the effects of water on debris-flow failures, most workers have considered only the contributions of surface runoff and water flow through near-surface soils (throughflow). Some geologists (E.W. Hart and S.J. Rice, oral communs., 1982) believe that deeper, subsurface flow along joints or beds is more important than shallower flow in triggering debris flows. Such appears to be the case at least locally (see chaps. 6, 7; Bogucki, 1977; Bevin and others, 1978). In places where deep flow through bedrock has caused debris flows, telltale depressions (scars) remain after the event. Over time, either these scars gradually fill with colluvium, or a first-order drainage develops downslope. If a drainage develops, it may be inferred from the existence of the hollow at the head of the drainage that another debris flow may occur in the future. If the scars fill with colluvium, similar peak subsurface flows might be anticipated in the future—flows that would be capable of triggering another debris flow once sufficient colluvium has accumulated. In either case, a similar failure appears likely at some future time in the same place.

Regardless of the means of water concentration, the time required for a debris flow to recur at a given site depends on local topography, the size of the "initial" failure, and the local soil-forming or colluvial processes. For example, in January 1982, during cleanup of a small debris flow in western Marin County, a wooden flume was

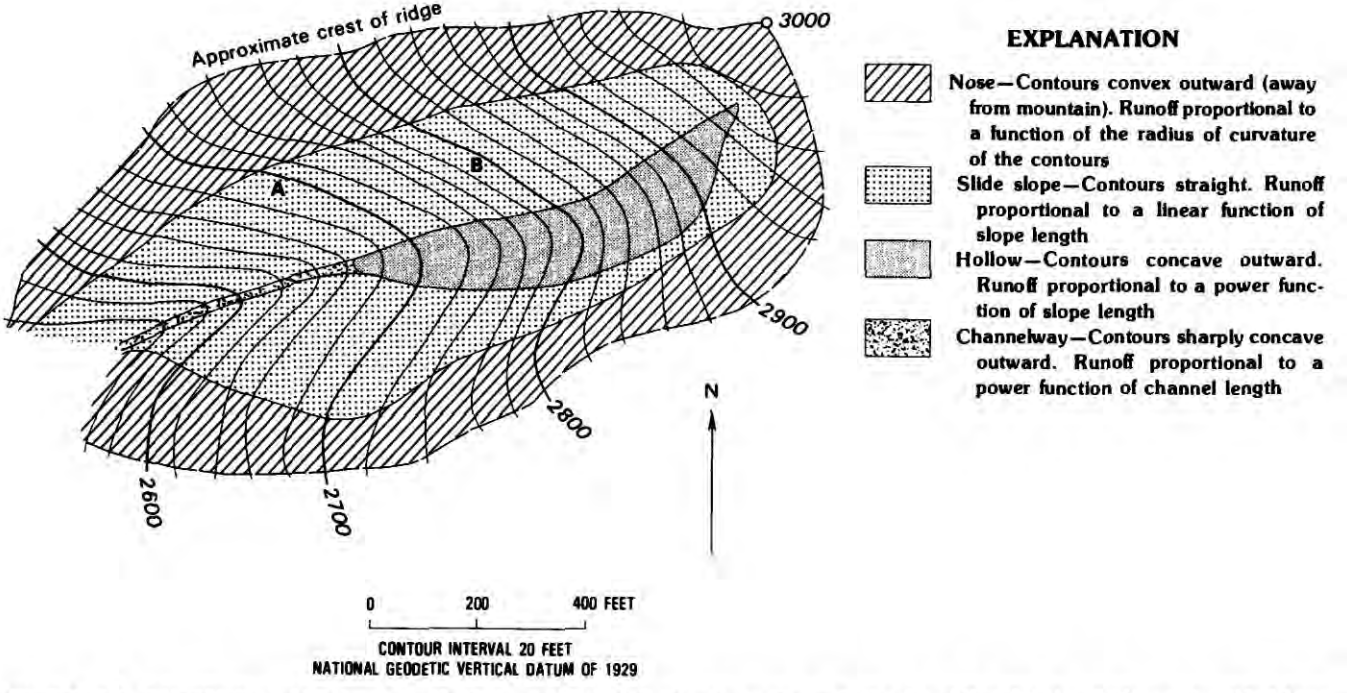


FIGURE 10.2.—Classification of various parts of a drainage. Slight inflections in contours at sites A and B in this planetable map (modified from Hack and Goodlett, 1960, fig. 2) indicate locations of incipient hollows.

uncovered below the scar. Discussions with the property owner revealed that this flume had been constructed in January 1956 after a similar debris flow had occurred. Examination of the site, the relation of the flume to the scar, and recollections of the previous owner of the property strongly suggest that the scar had filled during the intervening 26 years and had failed again. High-resolution aerial photographs of the site taken in 1978 show no evidence of the 1956 scar, although some larger scars nearby had not filled in during that same period. Examination of other debris-flow scars created in 1982 revealed soil features that appear to be remnants of debris-flow scars which developed decades or centuries earlier (J.E. Baldwin, oral commun., 1982; see section entitled "Scars and Individual Habitats of Previous Soil Slips," chap. 7).

Until now, most of this discussion has dealt with debris flows triggered by "small" catastrophic storms or, in other words, the areas most likely to fail first. A slightly different approach can also be taken, namely, determining which areas are most likely to fail "last" or not at all, even given the most extreme weather conditions. Photographs similar to those presented by Jones (1973) lend themselves to such an analysis (figs. 10.3, 10.4). As might be anticipated from the preceding sections, ridgetops remain intact most of the time, although ridgetop areas may be extremely narrow and occasionally fail (fig. 10.4). Ridge spurs or noses appear to fail less frequently than hollows or sideslopes; noses generally fail only near the base of the slope or at other significant breaks in slope (see section entitled "Concentration of Water," chap. 6).

SLOPE INCLINATION

Most workers documenting debris-flow failures provide data on the inclination of the hillslope(s) that failed. Most reported failures occurred on slopes of 20° to 45°. Except for unusual conditions (discussed below), the lowest reported slope angle of failure was 26 percent (14.56°) (Schneider, 1973; see "Grant Road," chap. 8). The upper inclination limit of susceptible slopes appears to be controlled largely by the tendency of regolith to slip off steep slopes. Thus, we may conclude that if regolith exists on a steep slope, a debris flow may occur. Although such observations suggest that debris-flow-susceptibility maps may be prepared by simply using slope maps, Bailey and Rice (1969) cautioned that slope maps depict only the average slope rather than the local maximum slope, which is a more important factor (see chap. 7).

VEGETATION

The relation between type of vegetation and the occurrence of debris flows is not entirely clear. Some workers (Bailey and Rice, 1969; Clark, 1973) claimed a clear relation, whereas others (Holmes, 1917; Bogucki, 1970) reported no relation. This disagreement suggests that vegetation may locally reflect subsurface conditions (such as soil type and permeability) and that we may be able to determine which slopes are more susceptible to debris-flow failure in some places by mapping vegetation types.

Gray and Leiser (1982) reported that the binding power of roots affects the stability of slopes underlain by cohesionless regolith (see chap. 5). Indeed, Gray and Megahan (1980) concluded that root reinforcement is an important, if not the most important, source of cohesion for regolith on steep slopes in granitic terrane. Scott (1975) observed that the rooting depths of different plants partly control how thick a regolith can develop on steep slopes before failure occurs. If these observations and hypotheses are correct, then the susceptibility of a given slope to debris-flow failure could be significantly altered by altering the type of vegetation covering the slope. Such an occurrence has been documented in southern California, where conversion of slope cover from brush to grass was accompanied by an increase in the number of debris flows triggered during a single storm (Corbett and Rice, 1966).

Intuitively, we might expect a slope covered with cohesionless regolith and lacking vegetation to erode grain by grain, rather than fail catastrophically, unless some cohesive layer, such as a compacted soil horizon, covers the surface. Pain (1971) documented the occurrence of debris-flow phenomena in an overgrazed area in New Zealand and postulated that compaction of the soil by cattle was an important factor in the formation of these failures at the site he studied. A dense root mat of grass or similar vegetation might also act as a confining upper horizon to inhibit the flow of water from regolith to the surface. Observations by Cumberland (1944) and Stewart (1952, p. 75–78) support this hypothesis. Such a mat might also delay failure and thus allow additional water to enter the slide mass, either (1) allowing more material to liquefy (causing a larger failure) or (2) making the slurry more fluid (see section entitled "Mobilization," chap. 6). A slight change in water content can strongly affect the properties of slurries formed from cohesionless regolith (Johnson and Hampton, 1969).

Thus, vegetation appears to be a significant factor, at least locally. However, vegetation mapping does not consistently provide additional information valuable for preparing debris-flow-susceptibility maps, except, possibly, in areas which have been converted from one type of vegetative cover to another.[3]

[3]Vegetation can be useful in documenting past events. For example, after the January 3–5, 1982, storm, investigations in Mount Tamalpais State Park revealed several debris-flow deposits (presumed to be the products of 1956 or earlier events) at the mouths of several low-order drainages. In each place, these deposits were covered with Russian thistle (*Salsola kali* var. *tenuifolia*), which is easily detected on the California Department of Parks and Recreation's color aerial photographs taken in 1978.

BEDROCK MATERIALS

Debris flows have commonly been reported in areas underlain by granitic rocks and various types of sandstone. Although some workers (for example, Bogucki, 1977; Crozier and others, 1980; Govi and Sorzana, 1980) concluded that bedrock type is not a significant factor controlling the location of debris flows, I disagree.

Regolith is derived from bedrock, and bedrock characteristics are major factors contributing to the properties of the regolith. However, because cohesionless regolith develops over or downslope from many kinds of bedrock (for example, sandstone, granite, and chert), debris flows can occur over many types of rock. In areas where most of the bedrock yields cohesionless regolith, such as the hillside areas selected for my pilot mapping project, debris flows may appear to occur independently of bedrock type. A more regional analysis, however, indicates that some types of bedrock, such as the smectite-rich melange matrix of the Franciscan assemblage, yield regolith that typically fails as slower moving translational or rotational slides. Debris flows rarely originate in such terrane, except where isolated blocks of sandstone, greenstone, or other types of bedrock that commonly yield cohesionless regolith exist (Rice and others, 1976; Ellen and others, 1982; see chap. 7).

In unusual cases, the regolith may have characteristics that particularly favor the formation of debris flows. For example, Bucher (1980) identified a pumice gravel that appeared to be particularly susceptible to debris-flow failure because the density of the pumice was so low that



FIGURE 10.3.—Landslides in area of upper part of old road across the Serra das Araras escarpment, Brazil (from Jones, 1973, fig. 20). Analysis of such photographs of areas affected by larger, catastrophic storms suggests that ridgetops and spurs are less susceptible to debris-flow failure than are swales and sideslopes.

it floated in water. He found that most slope failures that did not involve pumice occurred only where an impervious layer permitted the piezometric head to rise above ground level. In contrast, where sufficient pumice was present, debris flows occurred on slopes as gentle as 7° at times when the piezometric head was well below the ground level.

THE METHOD

This method of delineating areas susceptible to debris flows consists of two separate but related parts. First, the predictive factors that are relevant and mappable for a given study area must be determined. Second, these factors must be mapped.



FIGURE 10.4.—Debris flow in Fazenda Creek valley, Brazil (from Jones, 1973, fig. 23). Although ridgetops remain intact most of the time, these "stable" areas may be extremely narrow and occasionally fail.

To illustrate the process of creating a debris-flow-susceptibility map, I made such an analysis in 1976–77 for a 9.8-km^2 area near Pacifica, Calif. (pl. 13A; Smith, 1977). This area was selected because several generations of aerial photographs were available covering the area and debris-flow scars were clearly discernible on these photographs. The boundary of the study area was drawn so that a legible 35-mm Kodachrome slide (for a 1977 lecture) could be obtained.

As summarized above, several factors may influence or control the origin of debris flows. Rather than mapping all the factors that might influence the origin of such failures—a rather time-consuming task—a brief review of the project area should first be made. Ideally, this review should use aerial photographs of varying ages, field reconnaissance, and, where appropriate, sample collection and testing. During this initial review, the locations of debris-flow scars and tracks should be noted, along with information concerning bedrock type and (or) soil type, vegetation, and slope inclination.

Review of the aerial photographs suggests that debris flows have originated over almost all the various bedrock units in my study area (principally granodiorite and Franciscan sandstone, shale, and greenstone). Soil maps of the study area, however, were unavailable. In areas where only some of the regolithic or geologic units are subject to debris-flow formation, the susceptibility maps have to reflect such a condition (for an example, see Smith, 1985). Vegetation maps were also unavailable, although no relations between vegetation and debris-flow sites were readily apparent (furthermore, the services of a botanist were not readily available). Thus, the study area selected here appears to represent a relatively simple case in which, given the propensity for debris flows to occur in hollows and along first-order drainages and not to involve ridgetops, areas susceptible to debris-flow failure may be delineated by using morphologic factors alone. Although morphologic maps can be quite complex (for example, Klimaszewski, 1963; Starkel, 1965), matters can be simplified by limiting the effort to identifying only those morphologic features significant to the formation of debris flows. This simplified morphologic analysis can be accomplished with varying levels of accuracy by using topographic maps and stereoscopically paired aerial photographs.

Plate 13A presents the 1977 version, with a minor correction along one margin. The units delineated are: (1) ridgetops, ridge noses, and lowland areas with slopes of less than about 20°, the areas least susceptible to debris-flow formation; (2) ridgetops and ridge noses steeper than approximately 20°; and (3) sideslopes and hollows, the areas hypothesized at that time as most susceptible to debris-flow formation. The slope classifications (nose, hollow, and sideslope) are defined in figure 10.2.

The method used to prepare the 1977 version addressed only the sites of origin of future debris flows. However, the major hazard posed by debris flows is from impact and inundation. Detailed maps showing inundation areas have to date been based only on eyewitness accounts or written records of past events (for example, Mears, 1977) and cannot yet be reliably developed by other means. However, just as water flows downhill, debris flows also flow downhill and commonly down drainages. As illustrated in figure 10.5, the probability that a given site will be overrun by a debris flow can generally be deduced from its spatial relation to potential source areas. Such a deduction may not be valid everywhere because the distance a debris flow travels depends on the velocity and volume it attains (Johnson and Hampton, 1969; Smith and Hart, 1982).

In spite of our inability to predict the precise areas that will be inundated by debris flows, the areas of greatest hazard can be delineated in a general way simply by delineating drainage channels. If this method were to be

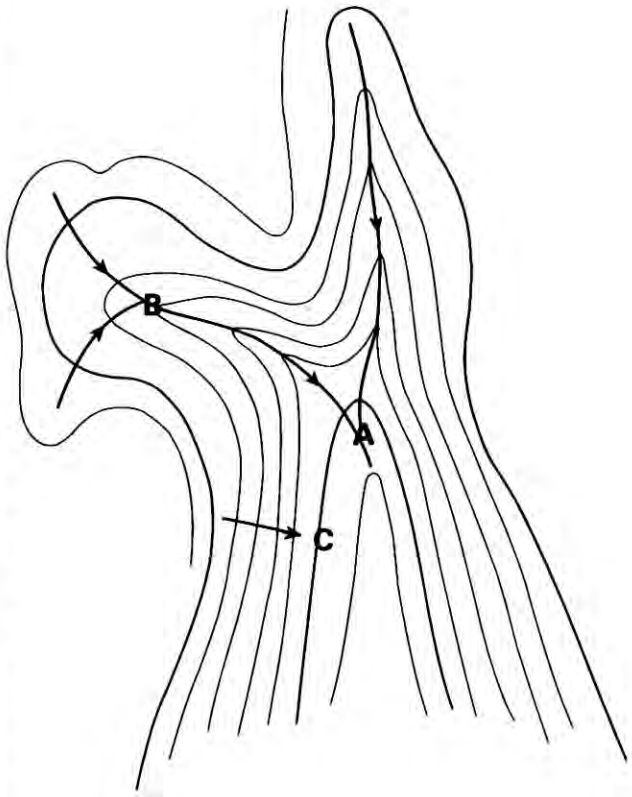


FIGURE 10.5.—Schematic map showing hypothetical routes of debris flows originating from various parts of a hillslope. A structure located at point A could be affected by more debris flows than one at point B; a structure located at point B could, in turn, be overrun by more debris flows than one at point C. Arrows show hypothetical debris-flow tracks; lines are contours.

used for preparation of the hazard maps required by the National Flood Insurance Program, streams that are susceptible to inundation by debris flows in their upper reaches would probably be declared susceptible to debris flooding in their lower reaches. Arguments about whether a given site may be inundated by a debris flow or by debris flooding may be moot in many areas; the site is likely to be inundated by some form of flowing-debris phenomenon. In any case, it is prudent to assume that at some future time, a debris flow may inundate any and all areas inundated by debris flows in the past.

By delineating drainage channels, the hollows, which are expected to be the sources of about 60 percent of debris flows, are indirectly identified at the upper ends of the drainage channels. Most of the remaining 40 percent of debris flows will originate on the sideslopes and quickly flow into and down the drainages.

TABLE 10.1.—*Summary of the number of 1982 debris flows in relation to the 1977 debris-flow-susceptibility map*

[Number in parentheses indicates percentage of total number of events. Slope categories: 1, area of low susceptibility to debris-flow failure; morphology does not favor the formation of debris flows, and slope is normally insufficient for debris flows to occur; 2, area of intermediate susceptibility to debris-flow failure; morphology favors the formation of debris flows, or slopes are sufficiently steep (more than approx 20°) for debris flows to originate; 3, area of high susceptibility to debris-flow failure; both the morphology and the inclination of a slope favor the formation of debris flows; 1-2, 1-3, and 2-3, areas of intervening slope category. Note that about two-thirds of all debris flows originated on drainage channels (including hollows as parts of drainage channels)]

Slope category——	1	1-2	2	1-3	2-3	3	All
Slopes							
Graded:							
On drainage——	0(0)	0(0)	0(0)	1(1)	0(0)	3(4)	4(5)
Off drainage——	0(0)	0(0)	0(0)	0(0)	0(0)	2(2)	2(2)
Natural:							
On drainage——	0(0)	0(0)	0(0)	5(6)	9(11)	42(49)	56(66)
Off drainage——	1(1)	0(0)	1(1)	1(1)	12(14)	8(9)	23(27)
All:							
On drainage——	0(0)	0(0)	0(0)	6(7)	9(11)	45(53)	60(71)
Off drainage——	0(0)	0(0)	1(1)	1(1)	12(14)	10(12)	25(29)
Total——	1(1)	0(0)	1(1)	7(8)	21(25)	55(65)	85(100)

TEST OF THE METHOD

As part of my earlier study, I compiled the locations of debris-flow scars and tracks from aerial photographs taken in 1941, 1969, and 1970. Plate 13B shows the relations between the locations of pre-1970 scars and the morphologic zones delineated on the 1977 version. Note the large number of scars on sideslopes and swales (slope category 3) and along the boundary between slope category 3 and the adjacent slope categories.

The January 3–5, 1982, storm provided a further check on this method (pls. 13C, 13D; table 10.1). Note that: (1) none of the 1982 debris flows initiated at the scars previously identified (see section entitled "Scars and Individual Habitats of Previous Soil Slips," chap. 7), (2) not all the drainages affected by earlier storms produced debris flows in January 1982, and (3) about two-thirds of the debris flows originated in hollows or along other parts of the drainages (see section entitled "Local Topographic Setting," chap. 7). The fact that, in graded areas, a greater proportion of debris flows appeared to originate on or near former drainages (subsequently obliterated by human activity) suggests that grading had not significantly reduced the debris-flow susceptibility of these sites. This observation probably reflects the fact that the regolith was thicker on the finished slope in areas beneath former drainages or that more water flowed through the regolith in such areas, or both.

To determine whether the susceptibility zones delineated on the original predictive map are significant, I counted the number of pre-1982 and 1982 events originating in each zone. I estimated the areal extent of each zone by placing a 10-to-the-inch grid over the susceptibility map and counting the number of cells in which the various zones dominated. Zone 1 includes two geomorphically distinct settings—wide valley bottoms and broad ridgetops. Because the valley bottoms could not conceivably produce debris flows, it appears appropriate to eliminate the 1,781 cells in valley bottoms from the analysis. Furthermore, because the boundaries of the zones may be thought of as delimiting the edge of the less stable categories, I included events plotting on the zone boundaries as originating within the less stable (more susceptible) zones. The resulting data are listed in table 10.2. These data reveal that about 97 percent of the events originated within zone 3, which constitutes about 70 percent of the upland slopes—a relation suggesting that the method is reasonably valid.

SUMMARY

Although it appears to be beyond our current abilities to pinpoint precisely which sites are likely to fail next as debris flows, maps showing general areas susceptible to debris-flow failure can rather quickly and easily be developed for at least some areas. The method summarized herein is one way by which potential source areas and areas that may potentially be inundated by debris flows might be delineated. As noted above, this method should, ideally, be tailored to suit the areas studied by initially identifying those factors that significantly affect the formation of debris flows in any given area. Once identified, these factors can then be considered in preparing debris-flow-susceptibility maps.

TABLE 10.2.—*Comparison of the areal extent of susceptibility zones within the hillside area with the number of events originating within each zone*

[The 1,781 cells within valley bottoms are omitted from comparison. Events that originated on zone boundaries are included in the totals for less stable (more susceptible) zones. Numbers in parentheses are percentages of totals]

Zone	1	2	3	Total
Number of cells	1,131(13.76)	1,425(17.34)	5,663(68.90)	8,219(100.00)
Number of 1982 events	1(1.18)	1(1.18)	83(97.65)	85(100.00)
Number of pre-1982 events.	2(0.63)	8(2.50)	310(96.88)	320(100.01)
Total number of events.	3(0.74)	9(2.22)	393(97.04)	405(100.00)

It appears that the volume of future debris flows depends considerably on site-specific factors which may defy analysis, at least given our present understanding. I have not incorporated size factors into the method outlined here, and so the maps (pl. 13) may not accurately portray the total runout of future debris-flow phenomena. Such estimates may be desirable for site-specific design and hazard assessments.

I have not attempted to indicate when in the future such events will occur. Also, on the basis of the aerial photographs analyzed during the course of this study and other information summarized herein, I believe that the site-specific recurrence interval may be shorter for smaller than for larger debris flows, although further work is necessary to confirm this hypothesis.

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11. LANDSLIDE DAMAGE: A COSTLY OUTCOME OF THE STORM

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U.S. Geological Survey

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ABSTRACT

The January 3–5, 1982, storm triggered landslides that caused extensive damage in the San Francisco Bay region of California. Total direct costs of landslide damage from the storm in the counties of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, and Sonoma exceeded $66 million. Santa Cruz County suffered the most damage—40 percent of the total for the bay region. The economic losses resulting from landsliding are tabulated here according to damage to transportation, utilities, parks and open spaces, private property and other businesses, and miscellaneous. The category of private property and other businesses accounted for 56 percent of the total landslide-damage costs. Landslide damage was concentrated along roads and in the developed parts of hilly and mountainous areas of the San Francisco Bay region.

INTRODUCTION

Extensive damage in the San Francisco Bay region occurred during the January 3–5, 1982, storm. Shortly after this storm, the Federal Emergency Management Agency (FEMA) estimated the total damage at $300 million (U.S. Federal Emergency Management Agency, 1982). Although most of this damage was caused by flooding, considerable damage also resulted from landslides. This study quantifies the damage caused by landslides during the storm and identifies the distribution of landslide damage throughout the San Francisco Bay region.

PROCEDURE

In the winter and spring immediately following the January 3–5, 1982, storm, I compiled damage costs for the San Francisco Bay region counties of Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, and Sonoma. Unlike two previous U.S. Geological Survey landslide-cost studies (Taylor and Brabb, 1972; Taylor and others, 1975), Napa County was excluded and Santa Cruz County was included. Napa County was excluded because it had sustained relatively few landslides and because of time constraints; Santa Cruz County was included because of the extensive landslide damage that had occurred there.

Three basic criteria were used to qualify landslide damage for inclusion in this study. First, the damage had to have occurred during the January 3–5, 1982, storm; damage before or after this period was not considered.

Second, the damage had to have resulted from a landslide, defined by Varnes (1958, p. 20) as the "* * * downward and outward movement of slope-forming materials composed of natural rock, soils, artificial fills, or combinations of these materials. The moving mass may proceed by any one of three principal types of movement: falling, sliding, or flowing, or by their combinations." The landslides that caused damage during the storm were mostly debris flows (see "Introduction" to this volume for landslide terminology) but included rock slides, slumps, and other landslide types. Damage from slipouts was considered as landslide damage (many agencies use the word "slipout" to denote a minor landslide or the downward movement of material below a roadway). Damage from washouts, creek and river erosion, sloughing, subsidence, and creep was not considered because the mechanism of damage is not a landslide as defined.

Third, economic loss was defined as the direct cost attributed to landsliding. The category of direct cost includes temporary and permanent repairs, replacement costs, and debris removal. Stabilization of landslides was counted as a direct cost if the stabilization was complete or underway at the time of this study.

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As a result of the widespread flooding and landsliding during the period December 19, 1981–January 8, 1982, President Reagan designated nine of the San Francisco Bay region counties as a declared major disaster area eligible for Federal assistance. Thus, disaster-assistance records were available from FEMA, the Small Business Administration (SBA), the Individual and Family Grant Program, and the Federal Highway Administration (FHA). These records provided most of the information for this study.

Other agencies believed to have sustained landslide damage or to have knowledge of landslide damage were also contacted. Such State agencies as the California Department of Transportation (Caltrans) and the California Department of Forestry, as well as county and municipal departments of public works, building inspection, planning, community development, parks and open spaces, and emergency services, in addition to various city offices, helped identify areas of landslide damage and the costs of such damage. Utilities, railroads, and communication agencies provided additional landslide-damage information.

An accurate assessment of private-property damage—that is, losses to private businesses or individuals—was difficult to obtain. Such information was commonly inaccessible because much of the damage was unreported; even when such damage was reported, the direct cost was in many cases unobtainable owing to the Privacy Act of 1974. The estimates of private-property damage made in this study were computed by adding the total landslide-damage costs reported by the Individual and Family Grant Program to a statistically estimated total of the damage reported in the SBA applications for each county. Care was taken to avoid any duplication of damage costs.

I have assumed the information on the costs and locations of landslide damage supplied by public and private agencies and individuals to be correct. Field checks to verify damage reports were not feasible in most cases because of time restrictions and the extent of area to be covered. Wherever possible, estimates were verified by secondary sources and reviewed for consistency with reports from the media, public agencies, or assistance organizations.

ACKNOWLEDGMENTS

This investigation would not have been possible without the cooperation of the public and private agencies and individuals contacted. The following list acknowledges those who contributed; their help is greatly appreciated.

Multicounty Sources:

Federal Emergency Management Agency; U.S. Small Business Administration; Individual and Family Grant Program; Pacific Gas and Electric Co.; Pacific Telephone; Atchison, Topeka & Santa Fe Railroad Co.; Southern Pacific Transportation Co.; Association of Engineering Geologists, Landslide Committee; U.S. Department of Agriculture, Soil Conservation Service; California Department of Forestry; California Department of Transportation; San Francisco Water Department; Citizens Utility Co. of California; California Water Service Co.; California Public Utilities Commission; U.S. Department of the Interior, National Park Service; Federal Highway Administration; California Division of Mines and Geology; Golden Gate National Recreation Area; California Parks and Recreation Department; U.S. Department of Agriculture, Stabilization and Conservation Service; U.S. Bureau of the Census; East Bay Regional Park District; East Bay Municipal Utility District.

Alameda County:

County Public Works Agency, County Flood Control & Water Conservation District, County Parks and Recreation, County Office of Emergency Services, County Engineering Geologist, County Resource Conservation District, Albany Public Works, Berkeley Public Works, Oakland Park System, Oakland Office of Public Works Agency, Piedmont Public Works, San Leandro Building Department.

Contra Costa County:

County Public Works, County Building Inspection Department, County Office of Emergency Services, Clayton Public Works, Concord Public Works Administration, El Cerrito Community Development Department, Hercules City Engineer, Martinez Public Works Department, Moraga City Engineer, Pinole Public Services, Pittsburg Public Services and Maintenance, Pleasant Hill City Engineer, San Pablo Public Works, Walnut Creek Community Development.

Marin County:

County Public Works, County Building Inspection Department, County Parks and Recreation Department, County Open Space District, County Office of Emergency Services, County Administration, Belvedere City Manager, Corte Madera Engineering and Public Works, Larkspur Public Works Department, Mill Valley Public Works Department, Novato Public Works, Ross Public Works, San Rafael Public Works, Sausalito Public Works, Tiburon Public Works, Point Reyes National Seashore.

San Francisco County and City:

Department of Public Works, Building Inspection Department, Recreation and Park Department, Assessor's Office.

San Mateo County:
County Public Works Department; County Building Inspection Department; County Civil Defense Operational Office; County Geologist; Atherton City Manager; Belmont Public Services Department; Brisbane Public Works; Burlingame Public Works Office; Colma Public Works; City Attorney of Daly City; Hillsborough City Manager; Menlo Park City Manager; Millbrae Public Works; Pacifica Department of Community Development and Services; San Bruno Public Works; San Carlos City Engineer; San Mateo Parks and Recreation Department; San Mateo Public Works Department; South San Francisco Department of Public Services; Woodside Town Manager; University of California, Berkeley, Cooperative Extension Program, Elkus 4-H Ranch.

Santa Clara County:
County Environmental Management & General Services Agency, County Building Department, County Parks and Recreation, County Office of Emergency Services, County Transportation Agency, County Geologist, Monte Sereno City Offices.

Santa Cruz County:
Much of the data for Santa Cruz County was collected by Mark Foxx (written commun., 1982); this information was supplemented by other multicounty sources.

Solano County:
County Public Works Department, County Planning Department, County Operations Manager, County Parks, County Office of Emergency Services, Benicia Public Works, Vallejo Public Works.

Sonoma County:
County Department of Public Works, County Community & Environmental Services, County Parks-Regional, County Office of Emergency Services-Civil Defense, Cloverdale Public Works, Healdsburg Public Works.

I also thank the many people at the U.S. Geological Survey who compiled an initial damage map after the storm. I especially thank Earl Brabb, Stephen Ellen, Catherine McMasters, Robert Mark, and Evelyn Newman for their contributions.

CATEGORIES OF DAMAGE COSTS

I have quantified the landslide-damage costs according to land use or ownership. Costs were categorized as damage to either transportation, utilities, parks, private property and other businesses, or miscellaneous. "Transportation" includes railroads and State, county, and municipal roads. (Roads considered as Federal are actually Federally funded State or local highways.) "Utilities" includes both private and public: private utilities are those that are investor owned, for example, the Pacific Gas and Electric Co. and Pacific Telephone; public utilities include water, power, sewage, and drainage services publicly owned and maintained by governmental agencies, such as the East Bay Municipal Utility District and the Central Contra Costa County Sanitary District. "Parks" includes damage to Federal, State, county, and municipal parks and open spaces. "Private property and other businesses" consists mostly of personal residences but includes private access roads, private businesses other than railroads and utilities, and other private real estate and personal property.

DAMAGE COSTS BY COUNTY

Damage costs are listed by county in the following sections. All costs have been rounded to the nearest thousand dollars. Plate 14 and figure 11.1 show the distribution of landslide damage and landslide-damage costs, respectively, in the San Francisco bay region; and table 11.1 summarizes the costs for each county.

ALAMEDA COUNTY

Category	*Cost*
Transportation	
State roads	$ 90,000
County roads	340,000
City roads	688,000
Railroads	20,000
Total	$1,138,000
Percent	32.0
Utilities	
Private	$ 299,000
Public	70,000
Total	$ 369,000
Percent	10.4
Parks	
Regional	$ 67,000
City	73,000
Total	$ 140,000
Percent	3.9
Private property	$1,880,000
Percent	52.8
Miscellaneous	
Other city damage	$ 33,000
Percent	0.9
County total	$3,560,000

Damage in Alameda County was concentrated in Oakland, Piedmont, and Berkeley.

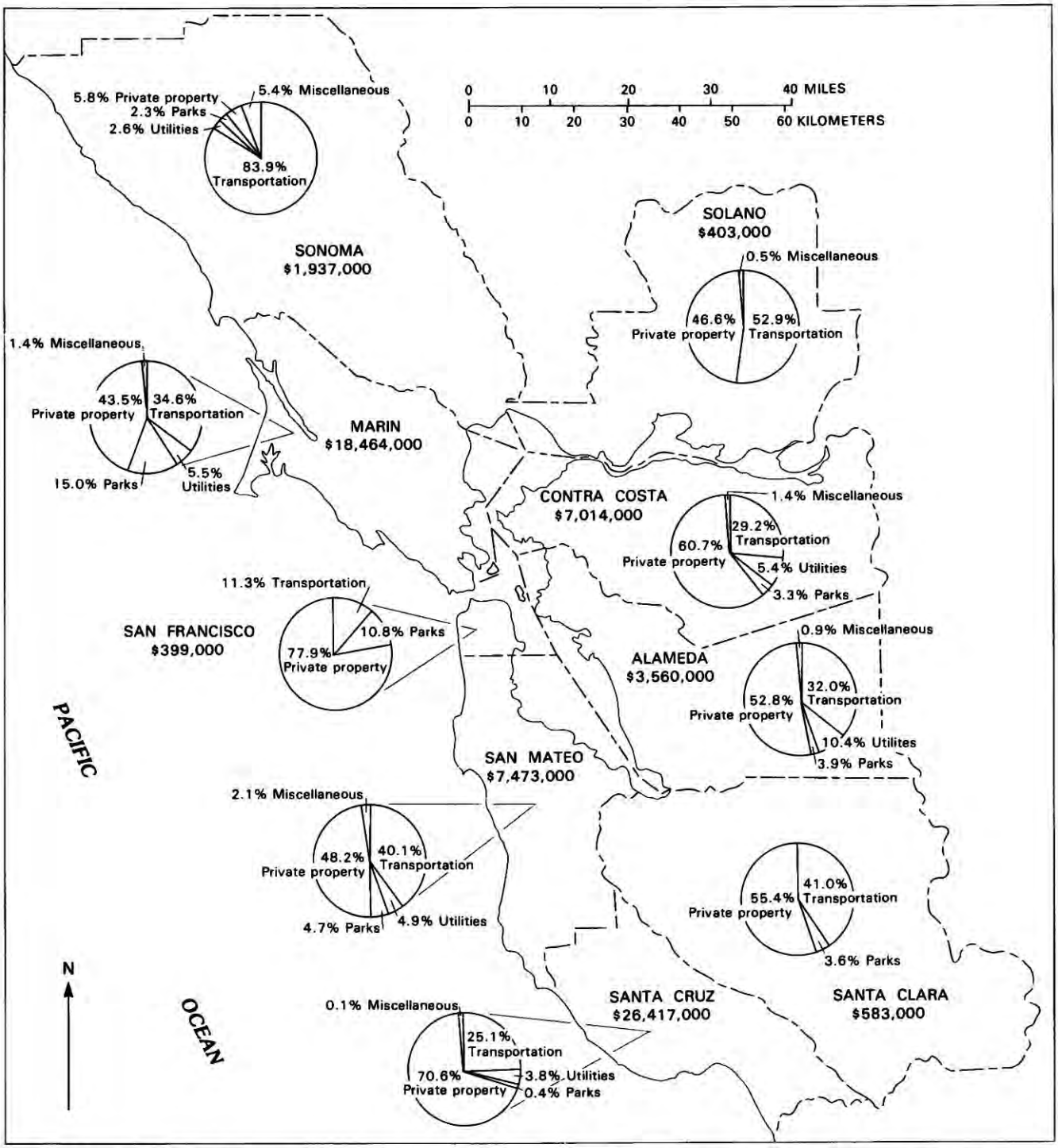


FIGURE 11.1.—San Francisco Bay region, showing landslide-damage costs from the January 3-5, 1982, storm for each county. Pie charts illustrate proportions of total costs for each category.

TABLE 11.1.—*Summary of landslide-damage costs in the San Francisco Bay region from the January 3–5, 1982, storm, by county*

[Population figures from U.S. Bureau of the Census, 1980]

County	Transportation	Utilities	Parks	Private property and other businesses	Miscellaneous	Total	Population	Per capita	Land area (km^2)	Land area (mi^2)	Per square kilometer	(Per square mile)
Alameda	$ 1,138,000	$ 369,000	$ 140,000	$ 1,880,000	$ [1] 33,000	$ 3,560,000	1,105,379	$ 3.22	1,898	(733)	$1,875.66	($4,856.75)
Contra Costa	2,044,000	381,000	234,000	4,256,000	[1] 99,000	7,014,000	656,380	10.69	1,901	(734)	3,689.64	(9,555.86)
Marin	6,384,000	1,021,000	2,778,000	8,030,000	[1] 251,000	18,464,000	222,568	82.96	1,347	(520)	13,707.50	(35,507.69)
San Francisco	45,000	0	43,000	311,000	0	399,000	678,974	.59	126	(49)	3,166.67	(8,142.86)
San Mateo	2,999,000	364,000	355,000	3,600,000	[2,3,4] 155,000	7,473,000	587,329	12.72	1,176	(454)	6,354.59	(16,460.35)
Santa Clara	239,000	0	21,000	323,000	0	583,000	1,295,071	.45	3,372	(1,302)	172.89	(447.77)
Santa Cruz	6,636,000	1,016,000	98,000	18,652,000	[2] 15,000	26,417,000	188,141	140.41	1,137	(439)	23,233.95	(60,175.40)
Solano	213,000	0	0	188,000	[4] 2,000	403,000	235,203	1.71	2,142	(827)	188.14	(487.30)
Sonoma	1,624,000	51,000	45,000	112,000	[2] 105,000	1,937,000	299,681	6.46	4,090	(1,579)	473.59	(1,226.73)
Total	$21,322,000	$3,202,000	$3,714,000	$37,352,000	$ 660,000	$66,250,000	5,268,726	$ 12.57				

[1] Fire Protection District.
[2] California Department of Forestry.
[3] University of California, Berkeley, Cooperative Extension Program.
[4] Miscellaneous county and city expenses.

CONTRA COSTA COUNTY

Category	*Cost*
Transportation	
State roads	$ 127,000
County roads	678,000
City roads	303,000
Railroads	936,000
Total	$2,044,000
Percent	29.2
Utilities	
Private	$ 355,000
Public	26,000
Total	$ 381,000
Percent	5.4
Parks	
State	$ 54,000
Regional	132,000
City open space	48,000
Total	$ 234,000
Percent	3.3
Private property	$4,256,000
Percent	60.7
Miscellaneous	
Other city damage	$ 85,000
Fire-protection district	14,000
Total	$ 99,000
Percent	1.4
County total	$7,014,000

Damage in Contra Costa County was concentrated in the areas of Richmond, El Sobrante, El Cerrito, Martinez, Orinda, Walnut Creek, and Lafayette. This county sustained the most railroad damage of all the counties studied; 13 percent of the total county damage occurred to two railroads. Total damage in Contra Costa County was almost as great as in San Mateo County. Surprisingly, during and after the storm, media coverage of the storm events in Contra Costa County was rather limited.

MARIN COUNTY

Category	*Cost*
Transportation	
State roads	$ 4,095,000
County roads	1,400,000
City roads	889,000
Total	$ 6,384,000
Percent	34.6
Utilities	
Private	$ 370,000
Public	651,000
Total	$ 1,021,000
Percent	5.5
Parks	
Federal	$ 2,635,000
State	49,000
County	90,000

City	4,000
Total	$ 2,778,000
Percent	15.0
Private property	$ 8,030,000
Percent	43.5
Miscellaneous	
Other county damage	$ 199,000
Other city damage	50,000
Fire-protection district	2,000
Total	$ 251,000
Percent	1.4
County total	$18,464,000

Damage in Marin County (see section entitled "Case Studies," chap. 6) was concentrated in the southeastern part of the county between Sausalito and Fairfax. Other areas with high concentrations of damage were near Inverness, Novato, and Lagunitas. A total of 15 percent of the damage in the county occurred in parks and open spaces; 91 percent of the park damage occurred in Point Reyes National Seashore, where landslide damage to roads and trails was the major problem.

Although costs from unconducted business, unearned wages, and general inconvenience were not included in this study, Marin County experienced such losses to a greater degree than the other counties. For example, U.S. Highway 101, the major route connecting Marin County to San Francisco, was closed for 24 hours as a result of a landslide on the Waldo Grade. This closure isolated Marin County from the San Francisco peninsula and stranded thousands of Marin County residents in San Francisco.

SAN FRANCISCO COUNTY AND CITY

Category	*Cost*
Transportation	
County roads	$ 45,000
Percent	11.3
Utilities	$ 0
Percent	0
Parks	
Federal	$ 24,000
County	19,000
Total	$ 43,000
Percent	10.8
Private property	$311,000
Percent	77.9
County total	$399,000

Most landslides in San Francisco County were located in the center of the city in the Twin Peaks, Mount Davidson, and Glen Canyon Park areas. Most of the damage was to private dwellings.

SAN MATEO COUNTY

Category	*Cost*
Transportation	
State roads	$1,278,000
County roads	890,000
City roads	831,000
Total	$2,999,000
Percent	40.1
Utilities	
Private	$ 64,000
Public	300,000
Total	$ 364,000
Percent	4.9
Parks	
State	$ 324,000
County	28,000
City	3,000
Total	$ 355,000
Percent	4.7
Private property	$3,600,000
Percent	48.2
Miscellaneous	
California Department of Forestry	$ 51,000
University of California, Berkeley	35,000
Other city damage	69,000
Total	$ 155,000
Percent	2.1
County total	$7,473,000

The most extensive damage in San Mateo County occurred in Pacifica (see chap. 9), South San Francisco, Brisbane, Daly City, and west of Woodside. A total of 40 percent of the county's damage was to roads; the private sector sustained an estimated 48 percent of the total damage. In the area around Pescadero, many farms had landslide damage that remained unreported, and so it is omitted from the totals listed above. Damage to property of the University of California, Berkeley, occurred at the Elkus 4-H Ranch (see chap. 8).

SANTA CLARA COUNTY

Category	*Cost*
Transportation	
State roads	$ 81,000
County roads	152,000
City roads	6,000
Total	$239,000
Percent	41.0
Utilities	$ 0
Percent	0
Parks	
County	$ 21,000
Percent	3.6
Private property	$323,000
Percent	55.4

County total	$583,000

Damage in Santa Clara County was more scattered than in the other counties. Pockets of damage occurred near Morgan Hill, in Saratoga and Gilroy, and near the Anderson and Lexington Reservoirs.

SANTA CRUZ COUNTY

Category	*Cost*
Transportation	
State roads	$ 865,000
County roads	5,709,000
City roads	17,000
Railroads	45,000
Total	$ 6,636,000
Percent	25.1
Utilities	
Private	$ 816,000
Public	200,000
Total	$ 1,016,000
Percent	3.8
Parks	
State	$ 98,000
Percent	0.4
Private property	$18,652,000
Percent	70.6
Miscellaneous	
California Department of Forestry	$ 15,000
Percent	0.1
County total	$26,417,000

Damage in Santa Cruz County (see chap. 8) was more widely dispersed. Areas greatly damaged by landslides were Boulder Creek, Felton, Ben Lomond, Scotts Valley, Soquel, and Aptos. A total of 69 percent of the damage was to dwellings and private roads.

As previously mentioned, most of the damage costs for Santa Cruz County were compiled by Mark Foxx (written commun., 1982). I have modified his data to conform with the format of this chapter and combined them here with additional information that I collected. Foxx cited additional, unspecified private damage approximating $7 million, a figure based on his estimate of the probable unreported private damage; this figure is omitted from this study because it could not be verified.

SOLANO COUNTY

Category	*Cost*
Transportation	
State roads	$179,000
County roads	15,000
City roads	19,000
Total	$213,000
Percent	52.9
Utilities	$ 0
Percent	0
Parks	$ 0
Percent	0
Private property	$188,000
Percent	46.6
Miscellaneous	
Other city and county damage	$ 2,000
Percent	0.5
County total	$403,000

Damage in Solano County was reported near Vallejo and Vacaville.

SONOMA COUNTY

Category	*Cost*
Transportation	
State roads	$ 941,000
County roads	531,000
City roads	2,000
Railroads	150,000
Total	$1,624,000
Percent	83.9
Utilities	
Private	$ 13,000
Public	38,000
Total	$ 51,000
Percent	2.6
Parks	
State	$ 45,000
Percent	2.3
Private property	$ 112,000
Percent	5.8
Miscellaneous	
California Department of Forestry	$ 105,000
Percent	5.4
County total	$1,937,000

Landslide damage in Sonoma County was concentrated in the areas of Bodega, Bodega Bay, Salmon Creek, Occidental, and along the Russian River. Unlike the other counties in this study, private-property damage in Sonoma County accounted for only a small proportion of the total. Although significant damage to private farm and pasture land was reported, this information was not communicated to public agencies, and so it was omitted from this study.

Two previous studies of landslide damage in the San Francisco Bay area (Taylor and Brabb, 1972; Taylor and others, 1975) classified damage costs as public or private. For comparison with these earlier studies, the damage estimates in this study were also divided by county into public and private costs, as listed in table 11.2. Public-damage costs are defined as costs to Government agencies; conversely, private-damage costs are losses to the

non-Government sector, such as private property and private businesses. In table 11.2, public costs are divided into costs to Federal, State, county, and city governments and to municipal utilities. Damage to the Federal Government occurred in Federal parks. "Miscellaneous" includes damage to Government agencies, such as the special districts of regional parks and fire-protection districts. The reader should note that the present study is based on a different criterion from that used in these other two studies, and so adjustments must be made for any direct comparisons.

LIMITATIONS

The estimated total economic loss of $66 million from the January 3–5, 1982, storm in the San Francisco Bay region is a conservative figure. Agencies commonly combined flooding, erosion, wind, landslide, and other storm-related damage into one budgetary category. Unless the landslide damage could be separated from other damage or estimated accurately, its cost was omitted from this study.

Some landslide-damage information was unobtainable. Damage that was not reported until months after the storm could have been missed by this study. Some damage was not reported at all, especially if the damage was small or occurred on farm or pasture land.

Because this information was undertaken in the winter and spring following the storm, final costs for repair were not everywhere available. Estimates were obtained whenever possible, but the actual cost of the damage may vary from these estimates.

The costs of labor by public servants, such as policemen, firemen, the California Conservation Corps, and the National Guard, were omitted from this study. Records are rarely kept that distinguish the time spent directly for landslides. Nonprofit organizations, such as the American Red Cross and the Mennonites, contributed labor and supplies to landslide victims; their costs also were omitted.

Although landslides caused a loss of revenue to many businesses, these costs were omitted here. For example, a section of the Southern Pacific Railroad's main line between Point Costa and Martinez in Contra Costa County was closed. The Golden Gate Bridge Authority lost revenue owing to the closing of U.S. Highway 101 as a result of the Waldo Grade slide.

Other costs omitted here are the inconvenience of closed roads and the loss of production as workers took leave from work to rectify landslide damage. Depreciation of property and litigation costs also were excluded because they were indeterminate at the time of this study. This study does not estimate the losses related to death or personal injury of landslide victims.

FINANCIAL ASSISTANCE

Because the January 3–5, 1982, storm was declared a national disaster, the costs of landslide damage were not borne totally by the State, counties, municipalities, and local residents. Federal disaster assistance compensated part of the economic losses due to landslides. The counties of Alameda, Contra Costa, Marin, San Mateo, Santa Cruz, Solano, and Sonoma were declared eligible for Individual and Public Assistance; Santa Clara County was designated for Public Assistance; and San Francisco County was eligible for the SBA loan program. For landslide damage that qualified according to FEMA guidelines, public agencies received 75-percent funding. The FHA declared Alameda, Contra Costa, Marin, San Mateo, Santa Cruz, and Sonoma Counties available for Federal Emergency Relief funding; this declaration allowed certain roads to be repaired entirely with Federal funds.

Landslide damage to public agencies other than Federal agencies in Alameda, Contra Costa, Marin, San Mateo, Santa Clara, Solano, and Sonoma Counties has been estimated at $16,197,000. Federal Government agencies, such as FEMA and FHA, funded an estimated $13,043,000, or 81 percent, of that total.

Eligibility for Individual Assistance allowed private individuals and businesses to participate in 8- and 16-percent SBA loans and in Individual and Family Grants. These SBA loans enable individuals to finance repair and reconstruction at rates below the current bank lending rates.

Additional factors reduced the local economic impact of the storm. Losses to private utilities and railroads were borne by investors or transferred to consumers systemwide. Help to individuals was granted by the American Red Cross, the Mennonites, the Buck Foundation of Marin, and other nonprofit organizations. The National Guard and the California Conservation Corps also helped during and after the storm.

CONCLUSION

On the basis of the data collected, landslide damage in the San Francisco Bay region from the January 3–5, 1982, storm is estimated to be at least $66 million. The various counties suffered damage, in decreasing order, as follows: Santa Cruz, Marin, San Mateo, Contra Costa, Alameda, Sonoma, Santa Clara, Solano, and San Francisco. Santa Cruz County reported the greatest damage per capita and

TABLE 11.2.—*Public and private landslide-damage costs in the San Francisco Bay region from the January 3–5, 1982, storm, by county*

[Per capita costs calculated from U.S. Bureau of the Census population figures, 1980]

County	Public						Private	Total	Per capita
	Federal	State	County	City	Municipal utility	Miscellaneous			
Alameda	$ 0	$ 90,000	$ 340,000	$ [1]835,000	$ 29,000	$ 67,000	$ 2,199,000	$ 3,560,000	$ 3.22
Contra Costa	0	181,000	678,000	[1,2]437,000	25,000	146,000	5,547,000	7,014,000	10.69
Marin	2,635,000	4,144,000	1,689,000	[2]953,000	641,000	2,000	8,400,000	18,464,000	82.96
San Francisco	24,000	0	64,000	0	0	0	311,000	399,000	.59
San Mateo	0	1,391,000	1,216,000	943,000	259,000	0	3,664,000	7,473,000	12.72
Santa Clara	0	81,000	173,000	6,000	0	0	323,000	583,000	.45
Santa Cruz	0	978,000	5,709,000	17,000	200,000	0	19,513,000	26,417,000	140.41
Solano	0	179,000	16,000	20,000	0	0	188,000	403,000	1.71
Sonoma	0	1,091,000	531,000	5,000	38,000	0	272,000	1,937,000	6.46
Total	$2,659,000	$8,135,000	$10,416,000	$3,216,000	$1,192,000	$215,000	$40,417,000	$66,250,000	$ 12.57

[1]Regional parks.
[2]Fire-protection districts.

per unit area of the nine counties studied. Contra Costa County sustained more landslide damage than has been popularly perceived.

Most of the reported landslide damage corresponds to the concentration of development and roads in hilly and mountainous areas of the nine counties (pl. 14). Although many landslides occurred in undeveloped areas, these landslides caused relatively minor economic loss and thus were not so critical to this study.

The greatest amount of landslide damage was to private residences. Damage to private property and other businesses accounted for 56 percent of the total landslide damage. Few businesses were directly affected by landslides, probably because businesses are generally located in flat areas. Those businesses that did sustain landslide damage were railroads, utilities, and farms located on steeper slopes.

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12. IMPACT OF THE JANUARY 1982 FLOOD IN SANTA CRUZ COUNTY

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ABSTRACT

Santa Cruz County, along with most of the San Francisco Bay region, experienced prolonged and intense precipitation during January 3–5, 1982, and this precipitation resulted in heavy flood damage. The storm followed 2 months of abnormally high rainfall and produced 24-hour rainfall totals in excess of the 100-year event at many stations in the county. Flood levels along the upper San Lorenzo River, Soquel Creek, and Aptos Creek approached the largest flood on record. Log and debris jams at numerous bridge constrictions and culverts contributed significantly to flooding and flood damage in the heavily wooded basins. Development on flood plains and streambanks sustained heavy damage as floodwaters undercut their banks and inundated their flood plains. Continuing construction on flood plains necessitates accurate flood-plain mapping, especially for events with recurrence intervals of less than 100 years. Mapping of the areas flooded in 1982 can be used to revise and update existing flood-hazard maps, so that flood-prone areas can be more accurately delineated.

INTRODUCTION

The central coast of California, particularly in Santa Cruz County, received prolonged and intense precipitation during January 3–5, 1982. Heavy rainfall lasted about 28 hours over most of the Santa Cruz Mountains; some localities received 25 mm/h (1 in/h) for more than 8 hours. High-intensity precipitation was not confined to steep mountainous areas; at sea level, the city of Santa Cruz received 209 mm (8.23 in.) of rain in the 24 hours ending 7 p.m. P.s.t. January 4 (Santa Cruz *Sentinel*, Jan. 10, 1982). This total exceeded any other 24-hour measurement since record keeping began in 1891, and it also exceeded the 100-year 24-hour event (Rantz, 1971). Rainfall stations at higher elevations in the Santa Cruz Mountains received considerably more precipitation; most values exceeded that for the projected 100-year 24-hour storm (table 12.1). Storm rainfall, therefore, was extreme throughout the area (see chap. 2).

Antecedent rainfall had been high as well (see chap. 2). Some communities in the San Lorenzo River valley, such as Lompico, Ben Lomond, and Boulder Creek, had received 840 to more than 990 mm (33–39 in.) of rain during November and December (table 12.1). This 2-month rainfall has an average return period of 5 to 15 years (Rantz, 1971). Such high antecedent rainfall created conditions favorable for rapid runoff at the time the January 3–5, 1982, storm hit these steep basins.

FLOODING IN THE SANTA CRUZ MOUNTAINS

Flood season in the Santa Cruz Mountains extends from November through April, although most historical flooding has taken place in either December or January. At least 11 major historical floods have been recorded in this area during the past 120 years. These floods have generally been of short duration, largely because of the steepness and small size of the drainage basins. Damaging flood stages generally last less than 18 to 36 hours; in contrast, during the 1973 floods on the lower Mississippi River, flood stages persisted for a record 77 days. Those same basins that generate short-duration floods also cause very rapid rises in river stage, and little warning is possible before overbank flooding.

Flood plains have been utilized and populated on a worldwide basis for centuries, and Santa Cruz County is no exception. Flat land, fertile soil, and the availability of water have all contributed to intense use of these areas. Downtown Santa Cruz and Soquel, and sections of Felton, Ben Lomond, Boulder Creek, Aptos, and Capitola, all lie on flood plains (fig. 12.1). Although generalized flood-plain maps exist for urbanized parts of the San Lorenzo River, Soquel Creek, and Aptos Creek (U.S. Army Corps of Engineers, 1973a, b, c), construction in these areas has

TABLE 12.1.—*Rainfall data for the January 3–5, 1982, storm in the San Lorenzo Valley, Santa Cruz County, Calif.*

[Storm rainfall is for 24-hour period ending 8 a.m. P.s.t. January 5 (Santa Cruz, Calif., Sentinel, Jan. 10, 1982). Recurrence intervals from Rantz (1971)]

Station	Mean annual precipitation (mm)	Nov.-Dec. 1980-81 rainfall (mm)	1981-82 prestorm period		January 1982 storm (24 hours)	
			Rainfall (mm)	Recurrence interval (years)	Rainfall (mm)	Recurrence interval (years)
Ben Lomond-------	1,168	179	847	6-7	292	>100
Boulder Creek----	1,473	207	1,009	5	324	>100
Lompico----------	1,118	221	968	15-20	394	>100

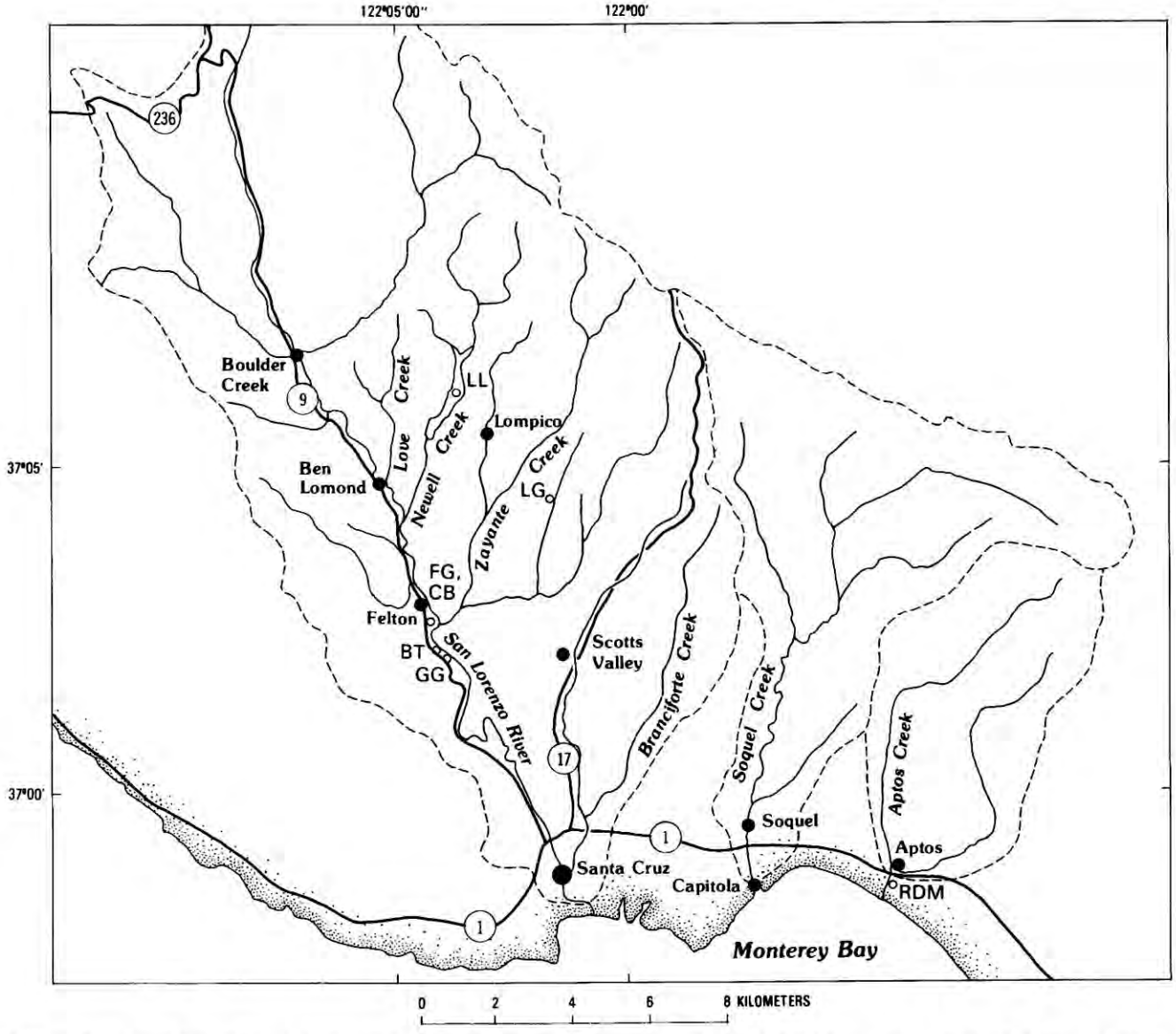


FIGURE 12.1.—Santa Cruz County, showing major areas affected by the January 1982 flood. BT, Big Trees gaging station; CB, Covered Bridge; FG, Felton Grove; GG, Gold Gulch; LG, Lockhart Gulch; LL, Loch Lomond; RDM, Rio Del Mar Flats. Dashed lines, watershed boundaries.

not been deterred. The last major flood to affect the area occurred in December 1955, when the San Lorenzo River topped its banks and inundated the downtown area of the city of Santa Cruz; 7 lives were lost, 2,830 persons were displaced from their homes, and damage amounted to $8.7 million.

FLOODING AND FLOOD DAMAGE ON THE SAN LORENZO RIVER

BASIN DESCRIPTION AND POTENTIAL FOR FLOODING

The San Lorenzo River drains 357 km^2 of the central California Coast Ranges (fig. 12.1). Its steep, redwood-forested basin extends about 33 km in a northwesterly direction from the river mouth; the lower 5 km flows across a flood plain occupied by the city of Santa Cruz. Elevations range from sea level to 1,000 m, and annual precipitation in the basin averages 1,200 mm (47 in.). Stream gradients range from 0.0008 near the river mouth to 0.06 in the upper watershed.

The watershed, excluding the city of Santa Cruz, is home to 33,000 people. Owing to the prevalence of extremely steep hillsides, most of this population is concentrated near the river and its tributaries, where flooding has been common. Steep slopes, landsliding, and unstable soils, in combination with high-intensity precipitation, have led to severe erosion in parts of the basin. Logging, quarrying, and the removal of vegetation, grading, and impermeable surfaces that accompany development have increased both runoff and sediment production (Brown, 1973; Santa Cruz County Office of Watershed Management, 1976).

Logging and land clearing can contribute directly to flood problems in the basin. Organic-debris jams, formed where logs and other debris pile up at bridge constrictions, commonly result in stream impoundment and overbank flooding. Debris may also collect against culverts, which are designed to carry only water and are normally undersized for major floods.[1] Where a culvert is plugged, upstream or roadway flooding occur, commonly followed by erosion and failure of fill or roadbeds. Flooding caused by obstruction of culverts and bridges by organic debris was a major factor in the damage from both the 1955 flood (U.S. Army Corps of Engineers, 1973b) and the 1982 flood. Logs and trees as much as 20 m long, carried down the San Lorenzo River during the January 1982 flood, lodged against the five major bridges that span the river within the city of Santa Cruz. Two cranes worked throughout the flood peak removing logs and thus prevented logjams downstream (fig. 12.2).

[1]Most culverts, if engineered at all, are sized only to carry runoff from 5- to 10-year events.

MAGNITUDE OF THE 1982 FLOOD

The magnitude of the January 1982 flood was close to that of the last preceding disastrous flood, which occurred in December 1955 (see chap. 13). U.S. Geological Survey slope-area calculations near the Big Trees gaging station at Felton indicated a peak flow of 841 m^3/s on January 4; the calculated 1955 peak flow was 861 m^3/s (table 12.2).

Floodwater elevations at specific points can also be used for comparison. The San Lorenzo River above Felton is crossed by several bridges, which provide permanent datums (fig. 12.3). Flood levels from 1955 and the projected 100-year flood (also referred to as intermediate regional flood) were determined at each location by the U.S. Army Corps of Engineers (1973a, b, c). The maximum 1982 levels measured at many of these bridges are listed in table 12.3. Proceeding down the San Lorenzo River from Ben Lomond to Felton, a reversal occurs in the relation between 1982 and 1955 flood levels. Between Ben Lomond and Brackney south (a 4.5-km reach), 1955 flood peaks were 120 to 150 cm above 1982 levels. However, beginning at the San Lorenzo Way Bridge (0.7 km upstream from Felton) and proceeding through Felton to the Big Trees gaging station and bridge, 1982 levels were about 30 to 40 cm above 1955 levels. This downstream increase in the 1982 flood peak relative to the 1955 flood peak appears to result from more intense rainfall along the east flank of the middle reaches of the watershed in 1982, in contrast to the longer duration rainfall throughout the basin in 1955. The cumulative contribution of high discharges from east-side drainages, principally Love, Newell, and Zayante Creeks, during 1982 led to the higher downstream stages. At the Big Trees gaging-station bridge just south of Felton (figs. 12.1, 12.3), the 1982 event was actually 43 cm higher than the 1955 peak; 1,000 m upstream at the historic Covered Bridge (East San Lorenzo Way), the 1982 peak was 30 cm above the 1955 peak. Although no major organic-debris jams are known to have occurred at any of these upstream bridges during the 1982 flood, this may not have been the case in 1955 (U.S. Army Corps of Engineers, 1973b); river impoundment at these bridge constrictions in 1955 may have created anomalous elevations. The foundation for an inflatable diversion dam, constructed in 1976 just upstream from the gaging-station bridge, may have affected 1982 flood stages in the Felton area. No major logjams or backwater occurred in the Felton reach of the watershed in 1982. It is reasonable to conclude, therefore, that the 1982 peak discharge was slightly higher than the 1955 peak in this area, despite the differences in discharge calculations at the Big Trees gage (table 12.2).

According to WRC Log Pearson type III flood-frequency analyses performed by the U.S. Geological Survey (see chap. 13), the 1982 and 1955 flood peaks at

Big Trees in Felton represent approximately 33- and 36-year events, respectively (table 12.2). These discharges are 3.6 to 3.7 times the mean annual flood.

INUNDATION AND DAMAGE

CITY OF SANTA CRUZ

On January 4, 1982, overbank flooding occurred along much of the San Lorenzo River and its tributaries. Because of a major flood-control project within the city of Santa Cruz, that city was spared the heavy damage inflicted on the county's other riverside communities. The river rose to within about 1 m of the top of the levees in Santa Cruz (fig. 12.4), and it actually flowed onto parklands and a roadway at one point. Surface velocities, determined from the transit times of floating objects between bridges, reached as much as 4.2 m/s in the downtown reach and caused considerable scouring in the silted channel.

The flood-control channel along the lower San Lorenzo River in the city of Santa Cruz was constructed by the U.S. Army Corps of Engineers in 1958 after the flood of 1955 (fig. 12.5). Levees were constructed for 4 km upstream from the mouth, and about 590,000 m^3 of sediment was excavated from the existing channel to increase the slope and capacity of the new channeled reach. The design channel bottom was lowered by as much as 2.1 m from the natural or original river bottom. The city agreed to maintain the channel to design specifications and was provided with a maintenance plan; annual maintenance costs, including sediment removal, were estimated at $25,000. However, the sediment yield from the steep slopes of the watershed had not been considered in the channel design for below-bed flood containment, and the city did not initiate a sediment-removal program. During subsequent years, about 370,000 m^3 of sediment was deposited in the lower 5 km of the river channel, and this sediment significantly reduced the flood-control capacity (Griggs and Paris, 1982).

The high flows of January 3–4, 1982, scoured about 143,000 m^3 of sediment from the channel. The depth and volume of scour reached maximums in the last kilometer



FIGURE 12.2.—Crane working on the Riverside Avenue Bridge on the afternoon of January 4, 1982, removing logs and other debris from the San Lorenzo River in the city of Santa Cruz to prevent logjams from forming. See figure 12.5 for location. Photograph by Pete Amos and Bill Lovejoy, Santa Cruz, Calif., *Sentinel*.

TABLE 12.2.—*Flood statistics for gaged streams in northern Santa Cruz County, Calif.*

[Ratios are of peak flow to mean annual flood. Most discharges and recurrence intervals from table 13.3; other flood data from U.S. Geological Survey, Water Resources Division (Ken Lee and Bud Hoffard, written commun., 1982). Recurrence intervals were determined using WRC log Pearson type III flood-frequency analysis]

Stream and gaging station	Years of record (period)	Mean annual flood (m^3/s)	1955 flood peak			1982 flood peak		
			Discharge (m^3/s)	Recurrence interval (years)	Ratio	Discharge (m^3/s)	Recurrence interval (years)	Ratio
Zayante Creek at Zayante.	23 (1958-80)	41.71	([1])	([1])	([1])	104	7	2.5
San Lorenzo River at Big Trees.	46 (1937-82)	232.5	861	36	3.7	841	33	3.6
Branciforte Creek at Market Street.	19 (1941-43, 1953-68)	59.15	229	77	3.9	188	29	3.2
Soquel Creek at Bridge Street.	27 (1937, 1952-80)	89.74	447	62	5.0	275	14	3.1
Aptos Creek at Aptos.	22 (1959-80)	16.48	99	35	6.0	113	40	6.9

[1]No gaging station.

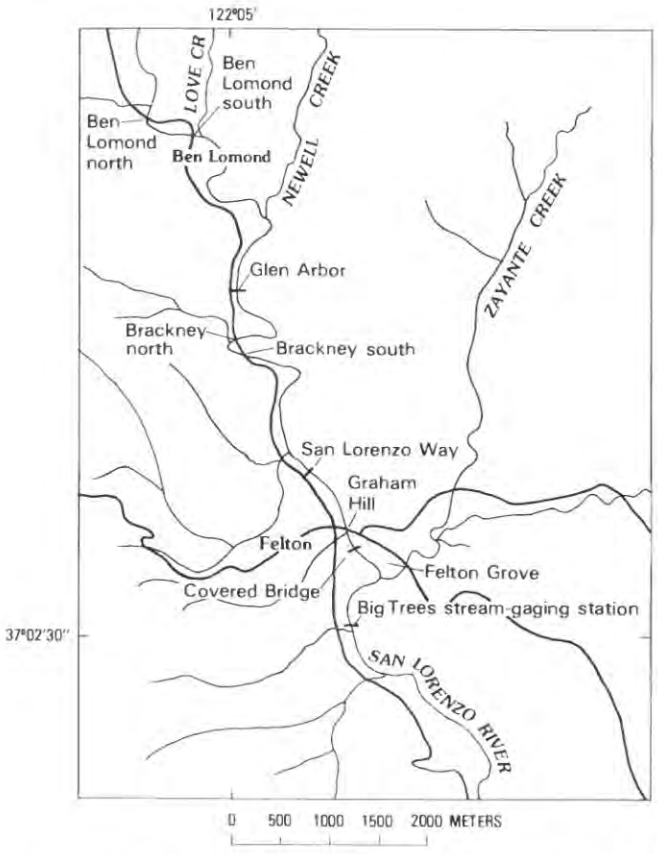


FIGURE 12.3.—San Lorenzo River area, showing locations of bridges where comparative levels for 1955 and 1982 floods have been measured. See table 12.3 for elevations.

TABLE 12.3.—*Comparative floodwater elevations along the San Lorenzo River*

[All elevations relative to mean sea level. 1955 and intermediate regional or 100-year flood levels from U.S. Army Corps of Engineers (1973b)]

Bridge location	1982 flood level (m)	1955 flood level (m)	Intermediate regional or 100-year-flood level (m)
Ben Lomond North (BR 36-49).	98.47	99.69	100.30
Ben Lomond South (BR 36-48).	95.41	96.94	98.47
Glen Arbor Bridge	88.99	[1]92.05	91.42
Brackney North (BR 36-47).	87.46	[1]91.74	89.76
San Lorenzo Way	84.40	83.49	84.71
Graham Hill Road	80.73	80.43	80.73
Felton Covered Bridge	80.12	79.82	80.43
Henry Cowell State Park (Big Trees gage).	78.10	77.68	79.20

[1]Error in U.S. Army Corps of Engineers data or elevated water level due to logjam.

of channel and decreased gradually upstream. Part of the Riverside Avenue Bridge (0.8 km from the mouth) was damaged by scour. This old bridge also forms the greatest constriction to floodwaters, owing to its low arches; the peak flow of January 4 was barely contained at this point (fig. 12.2).

Branciforte Creek enters the San Lorenzo River 1.8 km upstream from its mouth, at the point where the Soquel

Avenue Bridge crosses the river. The rectangular, concrete flood-control channel designed to convey Branciforte Creek through Santa Cruz to its confluence with the San Lorenzo River was filled to capacity by the storm (fig. 12.6).[2] The combined discharge from the San Lorenzo River and Branciforte Creek caused severe scouring that undermined an older pier of the Soquel Avenue Bridge. One span of the bridge collapsed (fig. 12.7), taking with it half of Santa Cruz' telephone circuits.

FELTON AND VICINITY

Upstream from the city of Santa Cruz, no flood protection exists, and inundation of homes along the banks and flood plain of the river and its tributaries was widespread. Between the city of Santa Cruz and Felton, individual developments adjacent to the river, including Paradise Park, Gold Gulch, and Felton Grove, were especially severely damaged.

Felton Grove provides an example of flood-plain development in the study area (figs. 12.3, 12.8). The group of more than 50 cabins and homes adjacent to the historic Covered Bridge is only 4 to 5 m vertically above the river bottom at this point, and most homes have been there for at least 25 years. The houses closest to the river have been inundated four times in the past 12 years (1969, 1973, 1978, 1982). Discharge data for the Big Trees station indicate that flows large enough to inundate part of Felton Grove have occurred 14 times in the past 46 years; this calculation is based on major flooding in 1978, during a peak discharge of 320 m^3/s, and 14 annual floods in excess of this volume since 1937. During the 1955 floods, "Felton Grove, near Felton Road, was nearly wiped out. Five cabins were carried away, some 20 were destroyed,

[2]Although the Branciforte Creek flood-control channel was designed to carry 238 m^3/s, its maximum capacity was reduced to about 200 m^3/s owing to backwater effects of the San Lorenzo River. Thus, the Branciforte channel can contain only the 30-year flood, rather than the 100-year flood, during high water on the San Lorenzo River (K.W. Lee, written commun., 1982).



FIGURE 12.4.—San Lorenzo River from the Water Street Bridge in the city of Santa Cruz at 1:00 p.m. P.s.t. January 4, 1982. River came within about 1.7 m of topping the levees here.

crushed by the rushing current" (Santa Cruz, Calif., *Sentinel*, December 25, 1955, p. 1).

Virtually all the houses in Felton Grove were inundated by the high water on January 4; this was the first area along the San Lorenzo River to be flooded and evacuated in the January 1982 storm. Water levels quickly reached 1 to 2 m in many homes (fig. 12.9), and a meter or more of sand was left behind. Most damage was due to the deposition of sediment in homes and automobiles. Residents who were evacuated have since dug out the mud, sand, and debris and reoccupied their homes. No major structural damage was received, and so no permits or permission was required to again take up residency in this flood-prone area.

In Gold Gulch, 1.8 km south of Felton, a group of about 25 homes was inundated and damaged along the southwest bank of the river. In 1955, 30 homes in Gold Gulch were reported pushed off their foundations, and 3 were reported carried down the river (Santa Cruz, Calif., *Sentinel*, December 25, 1955, p. 1).

In the town of Felton itself, water entered some businesses and reached a depth of 0.3 m in the firehouse. This flooding resulted from overflow of a small tributary stream, Bull Creek, rather than the San Lorenzo River.

Between Felton and Ben Lomond, 60 to 70 homes and other structures built along the San Lorenzo River were flooded. One downtown business section of Ben Lomond (Mill Street) was inundated by 30 cm of water.

The effects of flooding in the San Lorenzo Valley were felt by the entire population of the city of Santa Cruz because overflow from the Loch Lomond Reservoir on Newell Creek broke the principal waterline to the city. A total of 70,000 users were ordered to ration water for about a week until repairs could be made.



FIGURE 12.5.—San Lorenzo River in the city of Santa Cruz, showing flood-control channel and bridge crossings. RA, Riverside Avenue Bridge; SA, Soquel Avenue Bridge; WS, Water Street Bridge.

LOCKHART GULCH

A graphic example of flooding due to undersized culverts can be documented along Lockhart Gulch, a small watershed that parallels Zayante Creek northwest of the city of Scotts Valley. Many cabins and small homes have been built over the years along the narrow flood plain of this creek. In some places, the streamcourse has been severely confined between concrete retaining walls and capped with concrete driveways. This part of the San Lorenzo watershed received some of the heaviest rainfall in the January 1982 storm, and the flow of water and debris down Lockhart Gulch exceeded the capacities of the culverts and channel constrictions. Thus, the creek overtopped a culvert and flowed down Lockhart Gulch Road, across driveways, and through houses and garages. At least 20 homes in this area were reported destroyed or heavily damaged by flooding and mud.

Two homes had been built directly at the confluence of Lockhart Gulch with a small intermittent tributary that drains about 1 km^2. This tributary had been placed underground in this area within a 1-m-square box culvert. Flood flows on January 4 reached depths of over 2 m at this site and spanned the entire 15 m of the stream bottom (fig. 12.10). The culvert was simply bypassed as flow from the small tributary swept through one home and filled it with debris.

FLOODING AND FLOOD DAMAGE ON SOQUEL CREEK

BASIN DESCRIPTION

Soquel Creek drains a triangular basin, 18 km long and about 104 km^2 in area (fig. 12.1). Maximum elevations in this basin are more than 900 m. The upper reaches of the basin are steep and heavily forested, and the stream channel occupies a deep narrow canyon that can contain all expectable flood flows. The lower 8 km of the basin opens up into a broad valley, much of which is used for agriculture. Two towns, Soquel and Capitola, with populations totaling about 15,000 people, lie on the lower 3 km of the flood plain. Channel gradient ranges from about 0.004 in the lower reaches to 0.038 in the upper reaches, and some



FIGURE 12.6.—Branciforte Creek flood-control channel at peak capacity on the afternoon of January 4, 1982. Photograph by Pete Amos and Bill Lovejoy, Santa Cruz, Calif., *Sentinel*.

of the tributaries have gradients of at least 0.15. Mean annual precipitation over the entire basin is 1,020 mm (40 in.) (U.S. Army Corps of Engineers, 1973c). Although the wet season normally extends from October to May, most flooding has occurred in the months of December through February. Streamflows can rise to flood peaks within a few hours, and so the effectiveness of flood warnings is limited.

Soquel Creek is spanned four times by bridges in its lower reaches; two of these bridges, in the town of Soquel, have restricted clearances and thus form obstructions to floodflow and associated debris. Streambank vegetation in the basin, particularly large trees, in addition to logs and other organic debris, has the potential to form debris jams that can cause overbank flow in unpredictable places.

MAGNITUDE OF THE 1982 FLOOD

Peak discharge of Soquel Creek, calculated 3 km upstream from the gaging station located in the town of Soquel, was 275 m^3/s on January 4, 1982, corresponding to a stage of 6.66 m. The peak discharge of the 1955 flood has been calculated at 447 m^3/s at only a slightly higher stage of 6.81 m (table 12.2). The significantly lower discharge in 1982 at nearly the same stage as in 1955 is ascribed to backwater effects of a massive logjam at the Soquel Avenue Bridge in downtown Soquel on January 4, 1982; the gaging station is only 275 m upstream from this bridge. Nonetheless, a major debris jam in 1955 had similar effects. The 1955 discharge value was obtained at a location only 150 to 250 m upstream from the gaging station by using the slope-area method and is probably too high.

Downstream evidence gives a clearer picture of the relative flood peaks and discharge volumes. At the California Highway 1 Bridge (0.9 km downstream from the Soquel Avenue Bridge), surveys indicate that the 1982 peak was only 28 cm below the 1955 peak. Because the channel is confined at this point by the freeway-bridge



FIGURE 12.7.—Soquel Avenue Bridge in the city of Santa Cruz, showing collapsed span. Scour at confluence of the San Lorenzo River and Branciforte Creek led to subsidence of an older bridge pier. Arrow denotes high-water line.

constriction, the 28 cm greater stage at this point in 1955 could not have caused the additional 172 m^3/s that official discharge figures indicate. Thus, peak discharge for the 1955 event probably was only slightly greater than for the 1982 event.

The calculated January 1982 peak flow has a recurrence interval of about 15 years (table 12.2) and is 3 times the mean annual flood.

INUNDATION AND DAMAGE

The areas inundated along Soquel Creek in January 1982 were nearly identical to those inundated in 1955. Creek levels rose so quickly on January 4, 1982, that some residents of the two mobile-home parks adjacent to the stream in downtown Soquel had to wade out through knee-deep water. At about noon on that day, Soquel

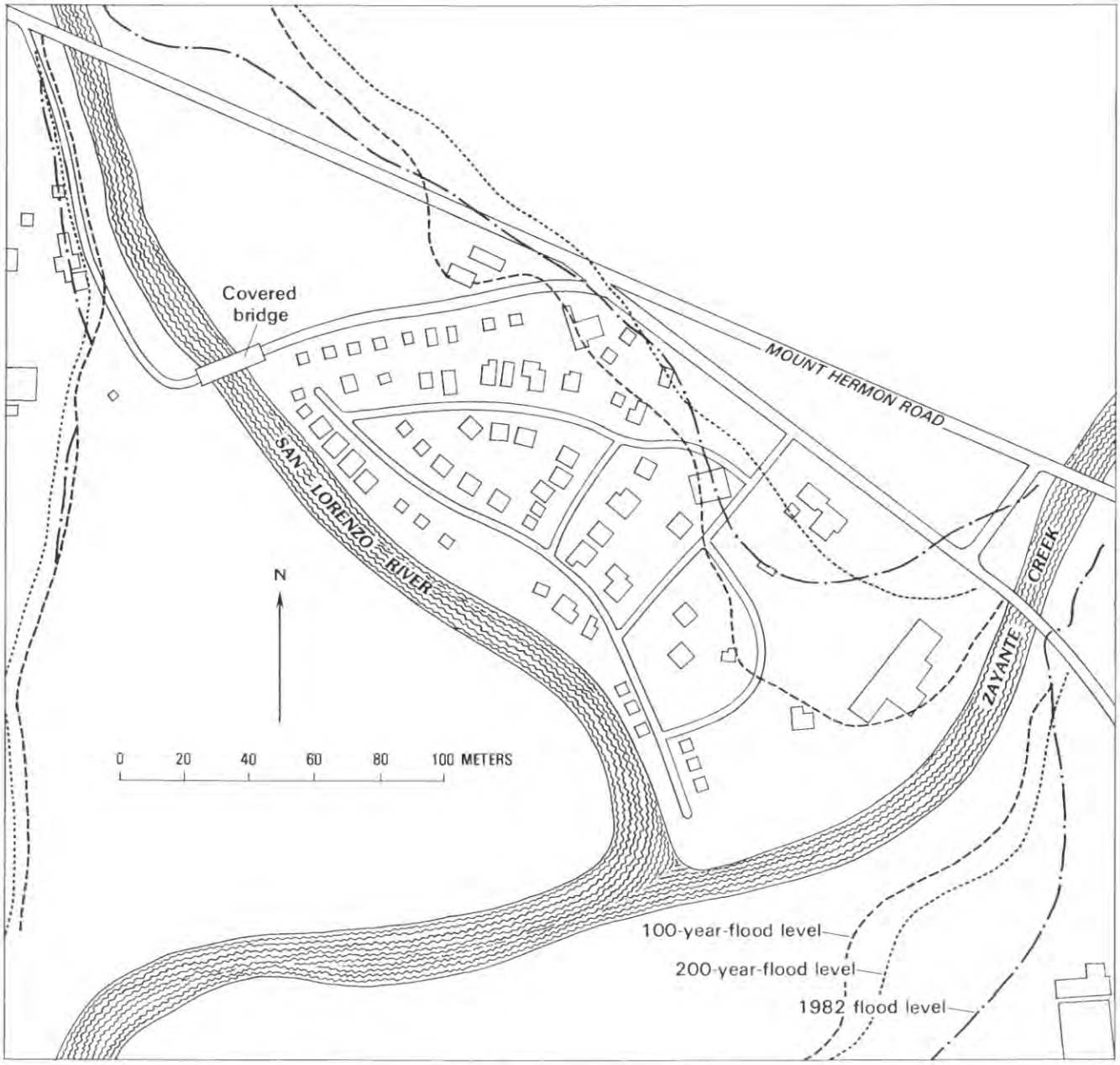


FIGURE 12.8.—Felton Grove, showing projected 100- and 200-year-flood levels and high water of January 4, 1982.

Creek, flowing at 114 m^3/s, entered the Heart of Soquel trailer park. One resident was not aware of a flood problem until water began to flow under the door of his mobile home. By 2:30 p.m. P.s.t., water began to enter the downtown business district. About 3 hours later, the logs and trees being carried downstream began to get caught at a constricted downtown bridge (maximum horizontal span, 18 m) spanning the creek at Soquel Drive (see fig. 12.15). A repeat of the 1955 flood occurred at this point. In that earlier flood, at an older bridge on the same site, a tremendous logjam, which included a four-room house and five auto-court apartments, diverted the muddy floodwaters into downtown Soquel.

By 10:00 p.m. P.s.t. January 4, 1982, the logjam extended the entire width of the creek and about 120 m upstream (fig. 12.11). County fire officials considered using plastic explosives to break up the logjam but, instead, called for a crane from the county. The crane broke down on route and never arrived. Much of the approximately 275 m^3/s of discharge of Soquel Creek was



FIGURE 12.9.—Flood level and sand deposits along the San Lorenzo River in Felton Grove. High-water mark (arrow) is about 1 m above sediment fill. This particular area was flooded four times during the period 1970–82.

diverted through the Old Mill Trailer Park and then through the town's main street (figs. 12.11, 12.12). Floodwaters reached depths as great as 1.5 m and left as much as 1.2 m of sand and mud behind. Two mobile-home parks adjacent to the creek received major damage. Trailers were swept off their piers and broken up by logs and other debris (fig. 12.13); only 17 out of the 39 mobile homes damaged were determined to be salvageable. In addition, 58 businesses, 21 homes, the firehouse, post office, library, and Grange Hall were damaged by floodwaters and the debris they left behind (fig. 12.14). The bridge at Soquel Drive sustained an estimated $270,000 in damage, due principally to scour and roadway collapse at the abutments, but the low structure remained standing and was soon back in use.

The size of the flood and the presence of the debris jam were almost identical to conditions in 1955. A resident who had also experienced the 1955 flood stated that the 1982 flood, though slightly lower in elevation, was much worse because "it hit harder and quicker" and because so much growth had occurred in the business district since the 1955 event.

Although logjams here and elsewhere in Santa Cruz County contributed to and exacerbated flooding, overbank flow along Soquel Creek occurred both before the logjam and at sites unaffected by that obstruction. The chronology of events of January 4 indicates that overbank flow had inundated the two trailer parks and the downtown business district by late afternoon on that day; by that time, the entire downtown area had been evacuated. At



FIGURE 12.10.—Culvert overflow in Lockhart Gulch. This box culvert was totally inadequate to handle the runoff from this small ephemeral stream. At peak discharge, flow was approximately 15 m wide and more than 2 m deep. Arrow denotes high-water mark.

about 5:15 p.m., water in the creek had risen high enough that logs and other organic debris were beginning to jam against the underside of the Soquel Drive Bridge, and not until 10:00 p.m. did this logjam divert much of the creek through the downtown area (fig. 12.12).

Flooding unrelated to the logjam also occurred 350 m downstream. Homes built within the past 5 years on a flood terrace along Soquel Wharf Road (fig. 12.15), downstream from the Porter Street Bridge, were inundated by more than a meter of water and mud as the creek topped its banks (fig. 12.16). This area had been recognized as flood prone, and specially designed elevated structures had been permitted in recent years. The second-story living structures were not inundated, but the first-floor carports, many of which had been remodeled as solid garages, were damaged by water and mud, as were automobiles.

After the flood, local residents and business owners washed out their residences and businesses, trucked away the sand and mud, and made the necessary repairs. The two mobile-home parks have again been filled with coaches. Most of the residents of downtown Soquel apparently do not realize that they live on a flood plain. The historical record indicates that Soquel has been flooded at least eight times since 1890 (Singer and Swanson, 1983); severe damage was incurred during the floods of 1931, 1937, 1940, and 1955. Flood-frequency data indicate that the 1982 flood was not an extreme event; similar floods can be expected every 15 years on an average. Overbank flooding would still have occurred without a constricted bridge opening. Most of the community occupies the flood plain, and flooding will continue to occur in the same areas (fig. 12.15).

FLOODING AND FLOOD DAMAGE ON APTOS CREEK

BASIN DESCRIPTION

Aptos Creek drains a basin of about 63 km^2 of south-central Santa Cruz County (fig. 12.1). The drainage extends inland 11 km from the coast to a maximum elevation of 765 m. Channel gradients range from 0.0015 near



FIGURE 12.11.—Logjam on Soquel Creek and path of diverted floodwaters through the Old Mill Trailer Park (arrows). Photograph by Pete Amos and Bill Lovejoy, Santa Cruz, Calif., *Sentinel*.

the creek mouth to as high as 0.284 in some of the steeper canyons of the upper watershed. Near the coast, Aptos Creek and its tributaries are flanked by a marine terrace and low hills, which are occupied by the communities of Aptos and Rio Del Mar. Only in the lowermost reaches of the creek, between California Highway 1 and the ocean, has construction occurred on the flood plain.

Upstream from California Highway 1, Aptos Creek enters the steep, heavily forested mountains of the central Coast Ranges. Approximately 1.5 km above its mouth, the creek enters the Forest of Nisene Marks, an undeveloped State park that has been virtually untouched by human activity for nearly 50 years. This park constitutes most of the Aptos Creek watershed upstream from this point. The condition of this watershed stands in marked contrast to that of the San Lorenzo River basin, which has been heavily altered by quarrying, logging, and the land clearing and grading that accompany development. Although the Aptos Creek drainage was logged 50 to 100 years ago, it appears to have regenerated to a natural, relatively undisturbed secondary-growth-redwood-covered basin. The runoff from this basin provides a useful datum for comparison with the heavily altered drainages in the area.

MAGNITUDE OF THE 1982 FLOOD

The U.S. Geological Survey has maintained a stream gage on Aptos Creek, about 1 km upstream from the mouth, since 1959. In 1971, this gage was moved farther upstream. Owing to the steep slopes and short length of the basin, creek levels can rise to flood stage within a few hours. For these same reasons and because peak precipitation intensities do not persist for long periods, floodwaters generally do not persist for more than 6 to 12 hours.

The last major flood to affect the drainage was during December 1955, when estimated peak discharge was 99 m^3/s. The 1982 flood peaked on January 4 at 113 m^3/s, according to U.S. Geological Survey slope-area calculations. At the California Highway 1 Bridge, the flood level from the 1982 flood was about 15 cm above the 1955 peak.

The 1982 flood has a recurrence interval of about 40 years and a peak discharge 6.9 times the mean annual flood (table 12.2). The 1955 flood, by comparison, ranked as approximately the 35-year event, with a discharge 6.0 times the mean annual event. The 1982 flood peak on Aptos Creek had the largest return period for any major gaged stream in Santa Cruz County (table 12.2).



FIGURE 12.12.—Downtown Soquel being inundated by waters of Soquel Creek on the evening of January 4, 1982. Floodwaters rose another meter after this photograph was taken. Photograph by Pete Amos and Bill Lovejoy, Santa Cruz, Calif., *Sentinel*.

INUNDATION AND DAMAGE

During the December 1955 flood, major damage to the houses along Aptos Creek was apparently limited to four homes that were flooded along Moosehead Drive. The Southern Pacific Railroad bridge sustained damage due to roadbed undermining, and underground telephone lines in the flood plain were also damaged. Damage in 1955 totaled about $62,000.

Small organic-debris jams formed throughout the park portion of the basin in 1982, and a massive debris jam formed nearly at the park entrance. This mass consisted both of cut logs and of trees with their roots intact; it measured 180 m long, 60 m wide, and 6 to 9 m high. In contrast to the overbank flood damage that resulted from the debris jam in Soquel Creek, however, Aptos Creek flowed around the debris jam across an undeveloped part of the flood plain.

Downstream from the California Highway 1 Bridge (fig. 12.17), the 1982 flood inflicted much damage to older homes that had been rebuilt after the 1955 flood and to newer homes that had been built on streamside fill brought in after the 1955 flood. Aerial photographs flown directly after the 1955 flooding show that at that time Aptos Creek meandered in its course between the California Highway 1 Bridge and the Spreckels Drive Bridge, and that two cutbank areas were clear. After those floods, the creek channel was constricted and straightened by fill in these areas, and additional houses were constructed. In January 1982, the two former meanders were again sites of bank cutting. Water levels rose throughout January 4 and began undermining the foundations of the homes along Moosehead and Spreckels Drive at these two sites (figs. 12.17, 12.18). At 7:00 p.m. that evening, foundations started to fail because these houses were built on



FIGURE 12.13.—Row of damaged mobile homes along Soquel Creek in the Heart of Soquel Trailer Park. Arrow denotes high-water mark.

perimeter foundations, which collapsed as the loose fill and unconsolidated flood-plain sediment were eroded, rather than on caissons or piers. At least seven homes sustained major damage. One heavily damaged home had been rebuilt after the 1955 floods. Two other homes broke in half owing to undermining (fig. 12.19); the detached part of one ended up in the creek, and the other floated downstream. A third home on the north bank totally collapsed into the creek at 8:00 p.m.; part of the house ended up on a nearby bridge (fig. 12.20), and the rest floated downstream to the ocean.

Further downstream, major sections of the two streets paralleling Aptos Creek, along with their associated utilities, collapsed into the floodwaters owing to streambank erosion, as did the entire lower floor of a creekside home.

All these heavily damaged areas are delineated on the existing flood-plain map (U.S. Army Corps of Engineers, 1973a). In contrast to construction on the flood plains of the San Lorenzo River and Soquel Creek, houses along Aptos Creek were built on the streambanks, directly in the floodway; and some were built partly on artificial fill placed in the stream channel. Structural damage and passive inundation occurred as a result.

Where less than 50 percent of a structure has been damaged or destroyed, local government cannot require relocation, floodproofing, or elevation of a damaged home. Thus, before winter was over, residents applied for emergency permits, dumped fill into the stream channel, poured new foundations, and rebuilt homes (fig. 12.21). Some riprap was brought in to protect the new fill and rebuilt homes, but rocks of the same size had been swept



FIGURE 12.14.—Mud being removed from automotive garage in downtown Soquel. High water (arrow) here reached a depth of 1.43 m.

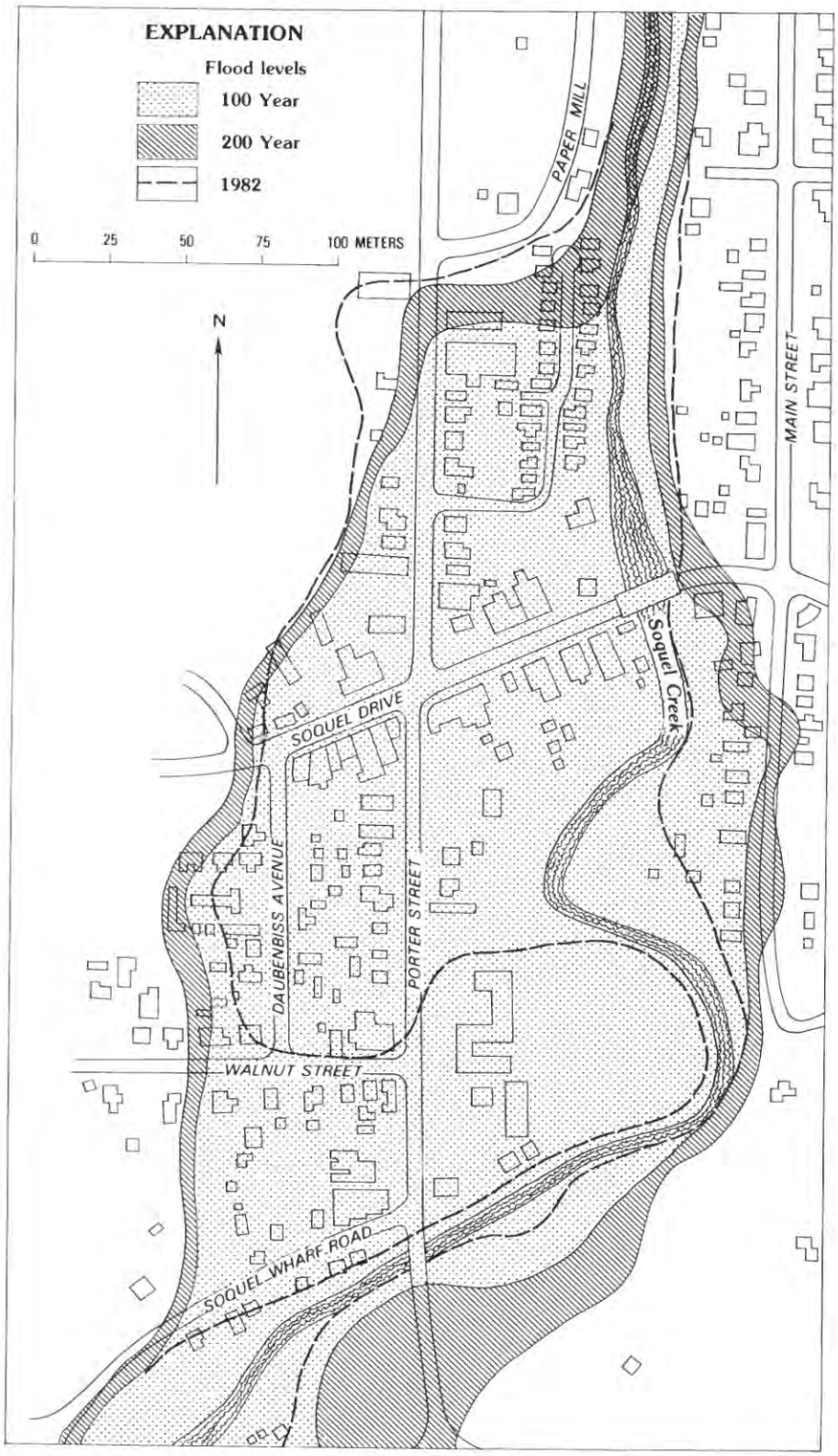


FIGURE 12.15.—Downtown Soquel, showing projected 100- and 200-year-flood levels and January 4, 1982, high water. California Highway 1 is located along south edge of map.

away by the January floodwaters. The course of Aptos Creek has again been straightened, and rebuilding has been done in the same flood-prone locations.

LESSONS LEARNED

Although some of the flood damage in 1982 was to structures built long before flood-plain maps were published by the U.S. Army Corps of Engineers (1973a), many of the damaged structures had been built or rebuilt in areas inundated by the 1955 flood. The availability of accurate and useful flood-plain maps, combined with building restrictions in these areas, would certainly have reduced this winter's damage.

UTILITY OF FLOOD-PLAIN MAPS

One shortcoming in flood-plain mapping for planning purposes is the preoccupation with a single event, the 100-year (or intermediate regional) flood. U.S. Army Corps of Engineers maps also project the limits of a standard-project flood, approximately a 200-year event. For land-use and risk-assessment purposes, designation of those areas inundated more frequently than the 100-year event—for example, the 10- or 25-year flood levels—would be of equal or greater significance. In the mind of the public, the 100-year flood plain is an area that will be flooded each 100 years or so. A wide range of hazard exists , however, across the 100-year flood plain. At Felton Grove, for example, homes adjacent to the river have been flooded four times since 1969, and they received more than 2 m of water and a meter of sand in 1982. Structures on the very periphery of the designated flood plain, however, may receive only several centimeters of water every 100 years on the average; yet both areas have the same flood-plain designation. Nothing on existing maps or in existing policies or restrictions draws distinctions between areas of vastly different flood frequency within the designated 100-year flood plain. Such distinctions would allow for considerable improvement and resolution in planning efforts for flood-prone areas and might present a clearer picture of risk to the general public.



FIGURE 12.16.—Flooding and mud deposition along Soquel Wharf Road. Construction was approved on Soquel Creek flood plain at this site because structures were to be elevated. Arrow denotes high-water mark.

RELIABILITY OF FLOOD-PLAIN MAPS

Areas outside 100-year-flood-plain boundaries on existing maps were also inundated during the 1982 flood. Along the San Lorenzo River, major discrepancies exist along the urbanized 1.6 km of river from Felton to the gaging station at Big Trees. Along the northeast side of the river from Mount Hermon Road to the confluence with Zayante Creek, 1982 levels were generally well above the 100-year floodline (fig. 12.8). At the confluence itself, flood levels extended as much as 35 m laterally beyond the projected 200-year event. Downchannel at the Big Trees gaging station and Gold Gulch, levels for 1982 remained at the 200-year line. On the southwest side of the river, flood levels followed the 100-year line to the gaging station and then reached the projected 200-year level from there to Gold Gulch. Local discrepancies also exist upstream at Glen Arbor and at the Newell Creek confluence. In all these places, 1982 flood levels, which represent approximately a 33-year event, were well above the levels that existing maps would have projected. Clearly, either the data available on flood-recurrence intervals or the methods used in constructing the maps (or both) were limited.

In Soquel, a similar discrepancy exists between flood-map boundaries and the areas inundated in 1982 (fig. 12.15). The downtown area occupies the broad flood plain west of the creek. North of Soquel Drive, 1982 levels exceeded projected 200-year levels (fig. 12.15). Midway through town at Soquel Drive, water reached the 100-year level; but at the California Highway 1 Bridge, high water was somewhat below this level. Because the 1982 peak represents approximately a 15-year event, the existing maps appear to have significantly underestimated the 100-year-flood levels in much of downtown Soquel. Certainly the debris jam at the Soquel Drive played a role here, as it has in at least four earlier floods (Singer and Swanson, 1983).

Along Aptos Creek, 1982 high-water levels in the principal areas of flooding (between California Highway 1 and Spreckles Drive) were above the projected 100-year level and close to the 200-year mark (fig. 12.17). Although the peak on Aptos Creek had a higher return period (approx 40 years) than on other county streams, the existing maps again are inadequate in accurately assessing inundation frequency or flood hazard.

The reliability of existing maps can now be assessed because most major areas of 1982 flooding along the San Lorenzo River, Soquel Creek, and Aptos Creek have been mapped by the Earth Sciences Department of the University of California, Santa Cruz, as well as by the U.S. Geological Survey. With a well-documented 30- or 40-year-flood level, we now can develop a more accurate 100-year inundation line.

CONCLUSIONS

The extensive flooding and flood damage in Santa Cruz County from the January 3–5, 1982, storm in the San Francisco Bay region demonstrate that existing flood-hazard maps are inaccurate in many critical areas and furthermore, delineate only 100-year-flood levels. A definite need exists both (1) to accurately map inundation levels of more frequent floods, such as 10- or 25-year floods, and (2) to continually update the 100-year hazard zone in the light of data gathered during smaller, more frequent events. Flood-inundation mapping is relatively quick and inexpensive immediately after a flood. Such information can be used to update and revise existing flood-hazard maps, so that flood-prone areas can be more accurately delineated.

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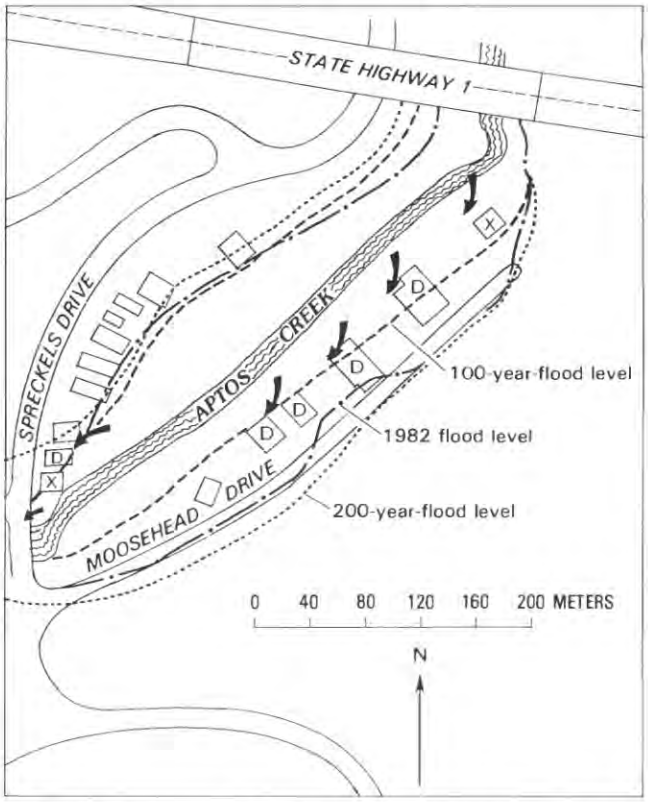


FIGURE 12.17.—Aptos Creek flood plain, showing area inundated by the January 1982 flood and projected inundation areas of 100- and 200-year floods. D, damaged structures; X, destroyed structure. Arrows denote sites of bank erosion.

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FIGURE 12.18.—View upstream along Aptos Creek from the Spreckels Drive Bridge, showing bank erosion, foundation failure, and house collapse.



FIGURE 12.19.—Bank erosion from lateral cutting during the January 1982 flood on Aptos Creek. Much of this house fell into the creek and was carried downstream. Bank erosion occurred at this same site during the 1955 flood, and fill was subsequently brought in.



FIGURE 12.20.—Wreckage of a house sits atop the Spreckles Drive Bridge across Aptos Creek. Timber in foreground was part of foundation for another house that was totally destroyed. House was built after 1955 flood in an area where bank erosion had previously occurred.

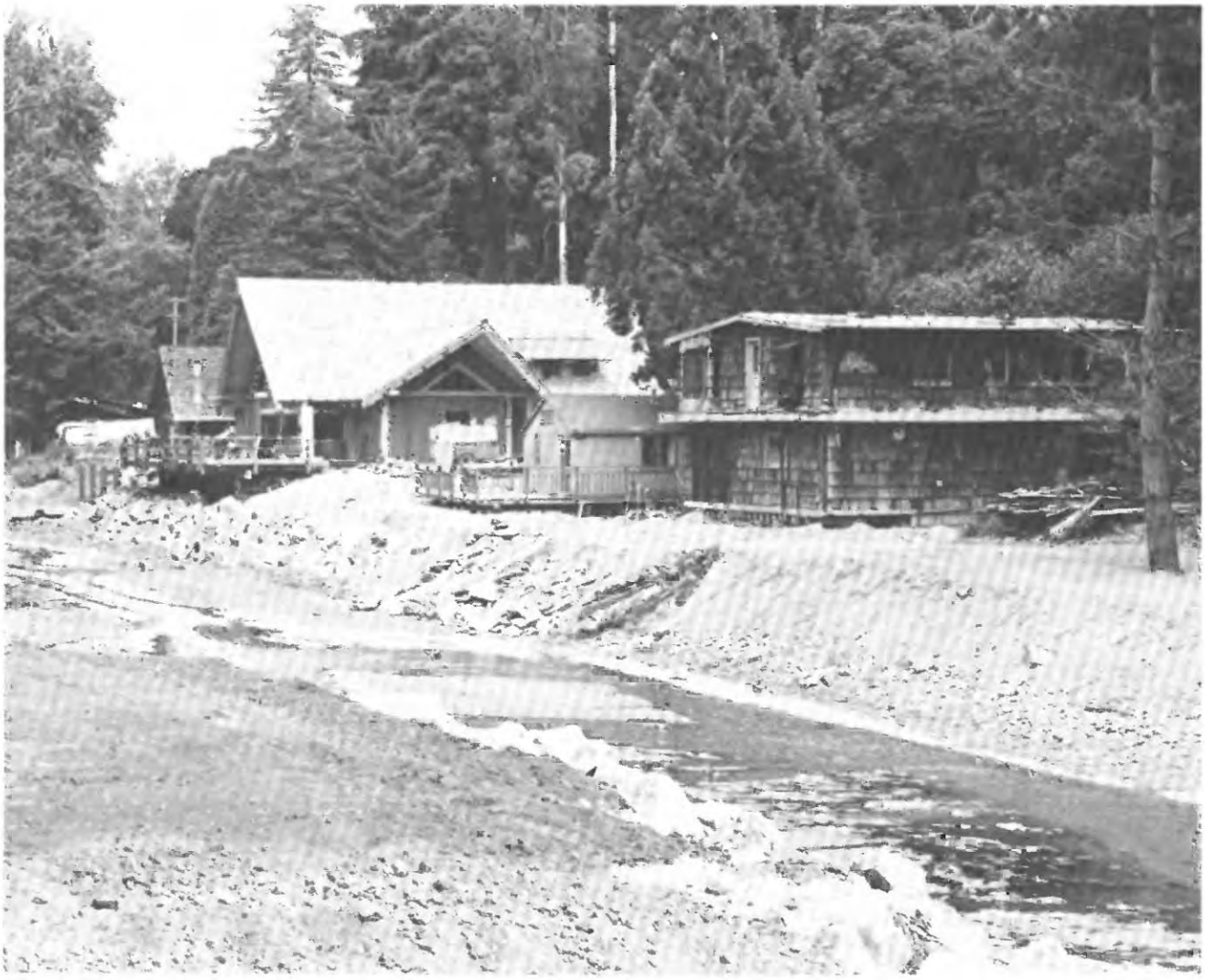


FIGURE 12.21.—View upstream along Aptos Creek from the Spreckles Drive Bridge in August 1982, showing filling and reconstruction that have taken place since the January 1982 flood. Compare with figure 12.18.

13. PEAK DISCHARGE, VOLUME, AND FREQUENCY OF THE JANUARY 1982 FLOOD IN THE SANTA CRUZ MOUNTAINS AND VICINITY

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U.S. Geological Survey

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ABSTRACT

In many parts of the Santa Cruz Mountains, the flooding and landslides caused by the January 3–5, 1982, storm were the most severe since December 1955. To assess the severity of the January 1982 flood, this chapter compares this flood with other historical floods, including that of December 1955.

The areal distribution of precipitation during the January 1982 storm in the Santa Cruz Mountains and vicinity was chiefly influenced by the topography. On the west side near Boulder Creek, the 1-day precipitation depth reached 310 mm (12.2 in.), with a recurrence interval of 67 years. In the rain shadow of the mountains, by contrast, the 1-day precipitation depth at San Jose was 34 mm (1.33 in.), with a recurrence interval of less than 2 years.

The rain shadow of the Santa Cruz Mountains also influenced flooding during the storm. For example, the flow, calculated as unit peak discharge, ranged from 0.91 $(m^3/s)/km^2$ for Pescadero Creek near Chittenden on the east side of the mountains to 6.84 $(m^3/s)/km^2$ for a tributary to the San Lorenzo River near Boulder Creek on the west side. The median recurrence interval for the peak discharge on the west side of the mountains is 21 years, whereas on the east side it is only 6 years.

During the January 1982 flood, peak discharges of many streams were similar to those observed during the December 1955 flood. Although precipitation and flood magnitude for both the December 1955 and January 1982 floods are similar, the damages caused by landslides, inundation, and channel changes during the 1982 storm and flood are considered more severe.

A study of historical floods and precipitation characteristics in the San Lorenzo River basin suggests that major floods in the area are the product of (1) greater than normal antecedent precipitation for as many as 60 days before the flood and (2) subsequent intense frontal-type storms immediately preceding the peak.

INTRODUCTION

During January 3–5, 1982, an intense storm system passed through the coastal area of central California and caused record amounts of precipitation, which resulted in flooding in the Santa Cruz Mountains and vicinity. This storm originated from the merger of a cold front from Alaska with another storm originating in the warmer midlatitudes. Rainfall rates of more than 25 mm/h (1 in/h) for more than 8 hours were recorded in the Santa Cruz Mountains south of San Francisco. The 1-day rainfall of 291 mm (11.47 in.) at the Ben Lomond precipitation station on January 4, 1982, was the highest daily rainfall total since the beginning of record in 1938.

The introduction of large amounts of sediment and debris into the waterways by heavy runoff, together with debris flows and other landslides in steep terrain, resulted in reduction in channel capacity, logjams, blockage of bridges, channel scouring and filling, changes in channel alignment, and overflow of the banks. High-water levels caused inundation of the flood plain and damaged residences, commercial establishments, roadways, and bridges (see chap. 12).

On the west side of the Santa Cruz Mountains, only the peak discharges from the December 19–26, 1955, storm exceeded those of January 1982. Flooding on the east side of the mountains during January 1982 was less severe; peak discharges there were comparable to those in the floods of January 1952 and April 1958.

Normally, a frequency analysis of historical peak discharges of streams in the flood area provides a good indication of the severity of a given event. During the January 1982 flood, however, peak discharges of many streams were similar to those observed during the December 1955 flood, whereas damage resulting from landslides and channel changes was considered much more severe. The greater severity of damage from the 1982 storm relative to that of previous events may have been due to antecedent (prestorm) conditions and to the storm duration and intensity. In addition, increased cultural development in the study area, including construction of buildings, roads, fills, and benching in hillside areas, may have contributed to damages from the 1982 storm.

In this chapter, we use data from 5 precipitation stations and 37 streamflow sites located in the Santa Cruz

Mountains, along the coast northward to San Francisco and inland eastward to the San Francisco Bay and the Santa Clara Valley (fig. 13.1), to compare the January 1982 and December 1955 floods. The study area includes basins that underwent major flooding, as well as adjacent basins both east and west of the Santa Cruz Mountains divide and south of the major areas of flooding. Areas north and east of the San Francisco Bay were also subject to extensive flooding by the storm, but flooding in those areas is not discussed in this volume. Gaging stations are located in mountainous terrain, except those on terraces directly adjacent to the coast. Most stations east of the divide are located near the base of the Santa Cruz Mountains and in the Santa Clara Valley.

We compared data for the January 1982 flood with historical precipitation and streamflow records to assess the magnitude of the storm. Our specific objectives were (1) to evaluate the effects of prestorm conditions, such as antecedent precipitation, on runoff; (2) to document peak discharge and runoff for selected durations; (3) to estimate the frequency of occurrence of peak discharges and runoffs; (4) to indicate the areal variation of flooding; and (5) to compare the magnitudes of the January 1982 and December 1955 floods.

SOURCES OF DATA

We used daily precipitation data (U.S. National Oceanic and Atmospheric Administration, 1938-82) for stations in San Francisco, San Jose, Santa Cruz, Ben Lomond, and Boulder Creek (Locatelli Ranch) to compare the 1982 storm with other historical storms (fig. 13.1). To supplement the streamflow-data base, as well as for purposes of comparison, precipitation data from these stations were analyzed for frequency of occurrence.

Streamflow data were obtained at 33 continuously recording gaging stations, 3 discontinued crest-stage gages, and 1 miscellaneous site near a former crest-stage gage (U.S. Geological Survey, 1937–70, 1971–74, 1975–80). The lengths of record, basin sizes, and comparative flood data for these stations are listed in table 13.1. Only six stations in the vicinity of the Santa Cruz Mountains have streamflow records of 25 years or longer. We consider the selected gaged streams throughout the Santa Cruz Mountains and vicinity to provide a reasonable sample of the various hydrologic conditions in the study area. The largest flow recorded during the flood was 841.1 m^3/s on the San Lorenzo River at Big Trees, and the smallest was 1.2 m^3/s on a Pescadero Creek tributary near La Honda. All the gaging stations listed in table 13.1 are located on streams that are generally unaffected by regulation and diversion upstream from the gage.

The crest-stage gages (stas. 11153800, 11159770, 11162470) are devices that record the peak stage, which can then be converted to a peak discharge. These gages were operated on a systematic basis between 1958 and 1972. Peak discharge data obtained at crest-stage gages located throughout California were summarized by Waananen (1973).

The January 1982 peak discharge was determined by indirect measurements at the crest-stage-gage sites and several inactive gaging stations. These measurements of peak discharge were used to extend the period of historical record at these sites from the date of discontinuance to January 1982.

ANTECEDENT CONDITIONS

Flooding in the coastal areas of central California during early January 1982 was preceded by a series of storms that moved eastward from the Pacific Ocean during October through December 1981. The rainfall resulting from these storms is shown in plate 1. These storms provided greater than normal amounts of cumulative precipitation to the region. The accumulated precipitation from October 1, 1981, to January 31, 1982, is shown in intervals of 5 days in figure 13.2 as a percentage of the norm for each month at three precipitation stations in the Santa Cruz Mountains and vicinity. Norms for each month were obtained from data published by the U.S. National Oceanic and Atmospheric Administration (1938–82). By November 12, 1981, the accumulated precipitation at all stations was near or above 100 percent of normal for November. Precipitation later in November and December continued at a greater than normal rate, and by the end of December, soils were generally saturated. The Santa Cruz precipitation station recorded 111 mm (4.36 in.) for December 1981, of which 58 mm (2.29 in.) fell on December 30. This greater than normal precipitation in November and December significantly increased the potential for flooding during the subsequent winter months.

Streamflow in the study area responded to the greater than normal rainfall during the 3 months preceding the January 1982 storm with a rapid increase in accumulated flow (fig. 13.2) after the storms of October 25 to November 12. Runoff was near or above normal for the three stations shown in figure 13.2 during part of November and all of December. During the first 4 days of January, runoff increased rapidly to peak discharges, from about 120 to 400 percent of normal for January.

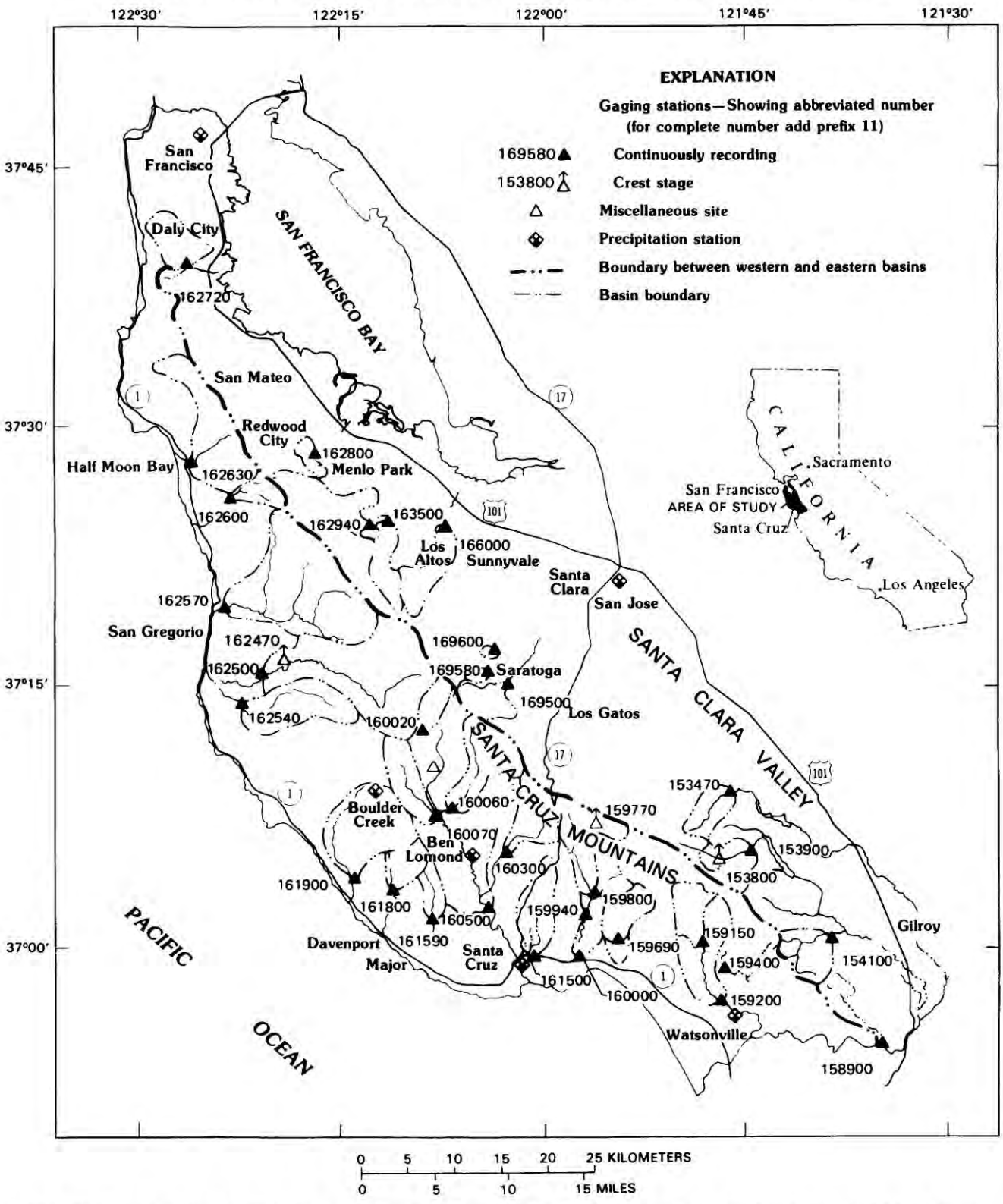


FIGURE 13.1.—Southern San Francisco Bay region, showing locations of data-collection sites in the study area in the Santa Cruz Mountains.

TABLE 13.1.—*Summary of flood stages and discharges*

Station	Stream	Drainage area (km^2)	Maximum previously known				Maximum, January 1982			
			Period	Year	Gage height (m)	Discharge (m^3/s)	Date	Gage height (m)	Discharge (m^3/s)	(m^3/s)/km^2
11153470	Llagas Creek above the Chesbro Reservoir, near Morgan Hill.	24.94	1971-81	1978	2.29	27.44	4	2.09	27.75	1.12
[1]11153800	Alec Canyon near Morgan Hill------	2.36	1961-73	1963	---	10.39	4	17.97	4.48	1.90
11153900	Uvas Creek above the Uvas Reservoir, near Morgan Hill.	54.39	1961-81	1962	4.02	186.35	4	3.65	147.26	2.71
11154100	Bodfish Creek near Gilroy---------	19.17	1959-81	1963	2.52	35.12	4	2.70	33.42	1.74
11158900	Pescadero Creek near Chittenden---	26.42	1970-81	1981	1.85	12.04	4	2.48	23.96	.91
11159150	Corralitos Creek near Corralitos.	27.45	1957-72	1958	2.30	55.79	4	3.16	60.04	2.19
11159200	Corralitos Creek at Freedom-------	72.00	1955-81	1955	4.76	102.52	4	5.08	158.88	2.21
11159400	Green Valley Creek near Corralitos.	18.26	1961-73	1963	17.26	26.20	4	17.57	33.98	1.86
11159690	Aptos Creek near Aptos----------	26.42	1959-81	1963	---	54.37	4	3.69	112.71	4.26
[1]11159770	Laurel Creek near Laurel----------	2.41	1961-73	1963	9.85	8.21	4	9.73	7.65	3.17
11159800	West Branch Soquel Creek near Soquel.	31.60	1959-72	1967	3.50	128.29	4	3.81	106.2	3.36
11159940	Soquel Creek near Soquel----------	82.88	1968-72	1969	2.75	76.46	4	4.99	169.92	2.06
11160000	Soquel Creek at Soquel----------	104.12	1937, 1951-81	1955	6.81	447.46	4	6.66	274.70	2.64
11160020	San Lorenzo River near Boulder Creek.	15.98	1968-81	1973	2.77	19.03	4	3.50	29.74	1.86
([2])	San Lorenzo River tributary near Boulder Creek.	.30	---	---	---	---	4	---	2.04	6.84
11160060	Bear Creek at Boulder Creek-------	41.44	1977-81	1980	3.16	58.91	4	4.05	126.87	3.06
11160070	Boulder Creek at Boulder Creek----	29.27	1976-81	1978	2.45	46.16	4	2.90	99.12	3.39
11160300	Zayante Creek at Zayante----------	28.75	1957-81	1978	2.60	130.84	4	2.70	103.93	3.62
11160500	San Lorenzo River at Big Trees----	274.54	1936-81	1955	6.87	860.93	5	8.79	841.10	3.06
11161500	Branciforte Creek at Santa Cruz---	44.81	1940-43, 1952-68	1955	6.72	229.39	4	6.39	188.33	4.20
11161590	Laguna Creek near Davenport-------	7.95	1969-76	1974	1.12	8.01	4	1.54	18.41	2.32
11161800	San Vicente Creek near Davenport.	15.72	1969-81	1974	1.78	26.54	4	2.71	64.57	4.11
11161900	Scott Creek above Little Creek, near Davenport.	65.01	1937-41, 1958-73	1940	---	205.04	4	3.07	119.51	1.84
[1]11162470	Pescadero Creek tributary near La Honda.	.57	1961-73	1973	15.77	1.44	4	15.61	1.19	2.09
11162500	Pescadero Creek near Pescadero----	118.88	1951-82	1955	6.48	266.77	4	6.38	266.21	2.24
11162540	Butano Creek near Pescadero-------	47.40	1961-74	1962	3.06	45.31	4	6.85	59.47	1.26
11162570	San Gregorio Creek at San Gregorio.	131.83	1969-81	1973	5.33	105.63	4	6.49	224.01	1.69
11162600	Purisima Creek near Half Moon Bay.	12.51	1958-69	1967	1.65	9.71	4	2.07	31.15	3.15
11162630	Pilarcitos Creek at Half Moon Bay.	70.45	1966-81	1968	3.41	36.53	4	3.99	134.52	1.91
11162720	Colma Creek at South San Francisco.	27.97	1963-81	1973	3.60	81.56	4	3.54	72.22	2.58
11162800	Redwood Creek at Redwood City-----	4.71	1959-81	1963	2.85	18.24	4	2.12	10.73	2.27
11162940	San Francisquito Creek below the Ladera damsite, near Stanford University.	73.82	1961-70	1967	4.51	81.84	4	3.79	147.83	2.00
11163500	Los Trancos Creek at Stanford University	19.32	1931-41	1940	1.24	18.32	4	1.31	26.34	1.37
[3]11166000	Matadero Creek at Palo Alto-------	18.80	1952-81	1973	1.70	39.08	4	1.12	17.78	.95
11169500	Saratoga Creek at Saratoga--------	23.88	1933-81	1955	1.95	77.31	4	2.15	48.71	2.04
11169580	Calabazos Creek tributary at Mount Eden Road, near Saratoga.	.96	1972-78	1978	1.68	3.40	4	1.49	3.12	3.25
11169600	Prospect Creek at the Saratoga Golf Course, near Saratoga.	.70	1972-78	1978	1.56	1.78	4	1.52	1.56	2.23

[1]Crest-stage gage.
[2]Miscellaneous site.
[3]January 4, 1982, flood not maximum for water year.

DESCRIPTION OF THE STORM

REGIONAL CHARACTERISTICS OF PRECIPITATION

About 85 percent of the annual precipitation in the Santa Cruz Mountains and vicinity occurs from November through March (Rantz, 1971). Mean annual precipitation in the area ranges from about 356 mm (14 in.) at San Jose to more than 1,321 mm (52 in.) at the towns of Boulder Creek and Ben Lomond. This range from east to west results from the orographic influence of the Santa Cruz Mountains, which rise abruptly from the coastline to more than 1,200 m, causing high annual depths of precipitation

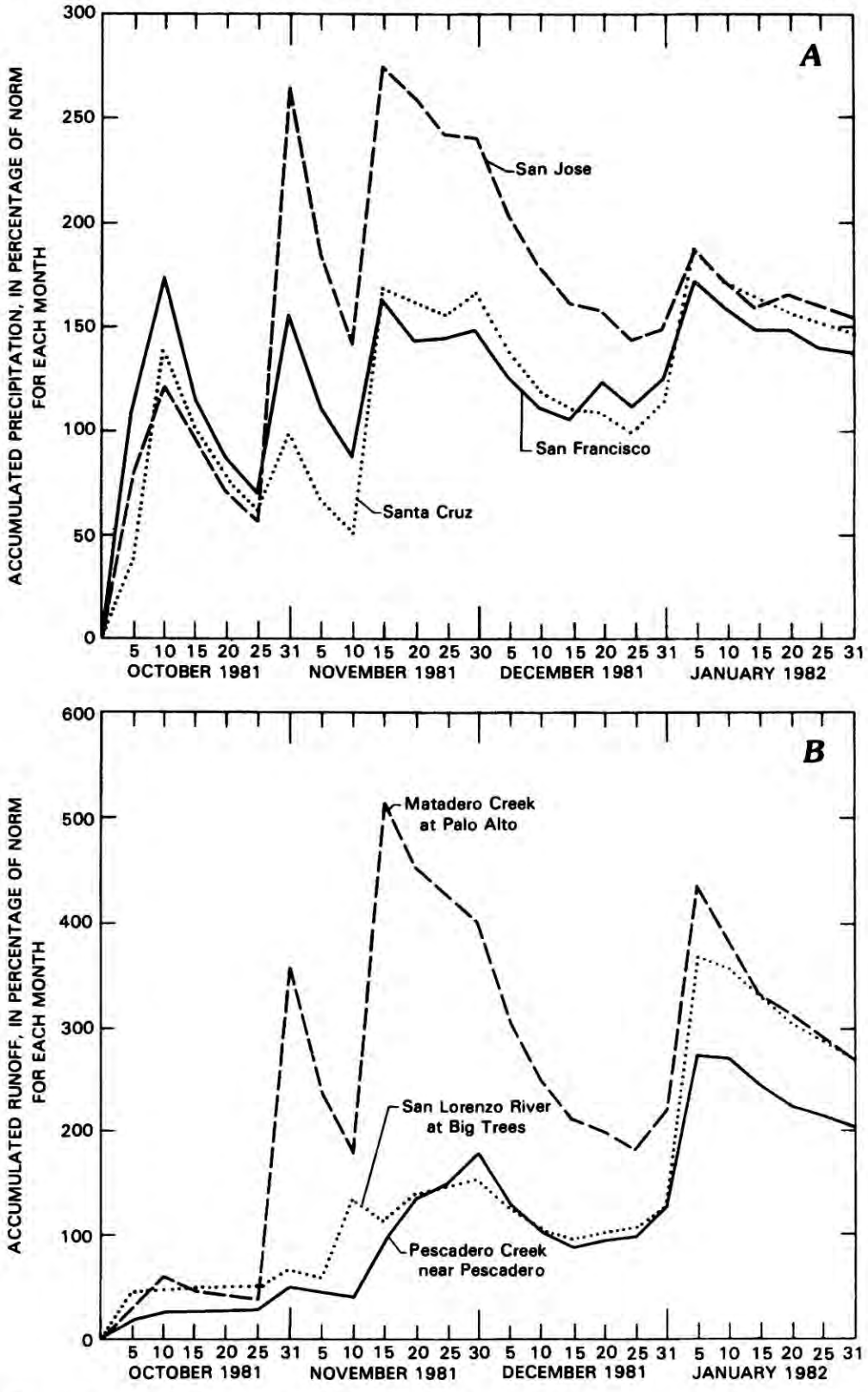


FIGURE 13.2.—Accumulated precipitation and runoff from October 1, 1981, to January 31, 1982, for precipitation stations (*A*) and stream-gaging stations (*B*) in the Santa Cruz Mountains and vicinity.

in some areas of the mountains and creating a rain shadow on the leeward side. The location of the divide between the west and east sides of the Santa Cruz Mountains is shown in figure 13.1. The orographic effect of the Santa Cruz Mountains is reflected in the areal variation in precipitation during the 1955 and 1982 storms. The 1-day precipitation at Boulder Creek during the 1955 and 1982 storms was more than 6 times that recorded in the valley at San Jose (table 13.2). The 1982 storm-rainfall isohyetal map shows this same effect (pl. 2).

PRECIPITATION DEPTH-DURATION-FREQUENCY

To compare the intensity, duration, and frequency of the storms of December 1955 and January 1982, we assembled precipitation-depth data from the five stations listed in table 13.2 for 1-, 3-, and 8-day intervals. The 1-day depth was selected as an indicator of maximum rainfall associated with peak discharge. The 3- and 8-day precipitation depths were selected to identify the largest segment of precipitation during a storm that can be related to runoff for a typical flood. Many major storms in the vicinity of the Santa Cruz Mountains last for 8 or 9 days, as did the December 1955 and January 1982 storms (fig. 13.3).

The data listed in table 13.2 suggest that the maximum 1-day precipitation of the December 1955 storm averaged 26 mm (1 in.) less than that of the January 1982 storm, although the average precipitation measured in 3- and 8-day periods was about 38 mm (1.5 in.) greater for the December 1955 than for the January 1982 storm.

The areal variation of precipitation for a given storm can be described by the standard deviation of observed precipitation at various locations. For example, the standard deviations of 1-day rainfall for the December 1955 and January 1982 storms at selected stations in the study area (table 13.2) differed by about 2 percent. This small difference indicates that both storms had a similar areal variation in precipitation. The standard deviations of the ratios of 3- and 8-day rainfall to 1-day rainfall of the two storms differed by 6 and 12 percent, respectively, a difference indicating that both storms also had a similar areal variation of precipitation over the longer period. The similarity of precipitation intensity and duration for the December 1955 and January 1982 storms suggests that areal-streamflow patterns of the two floods should have comparable characteristics, provided that antecedent conditions and hydrologic features are similar.

We used a frequency analysis of the precipitation totals at 1, 3, and 8 days for each precipitation station in the study area to estimate the average recurrence interval of the December 1955 and January 1982 storms. General precipitation depth-duration-frequency relations developed by Rantz (1971) for the San Francisco Bay region were applied to these five stations to obtain the recurrence intervals listed in table 13.2. During the January 1982 storm, the 1-day rainfall depth at the Ben Lomond station was 291 mm (11.5 in.), with a recurrence interval of 95 years. The 1-day precipitation depth for a 100-year recurrence interval is about 293 mm (11.5 in.). By comparison, on the basis of an interpretation of precipitation maps by the U.S. National Oceanic and Atmospheric Administration (1973), the 100-year precipitation depth for this location is about 356 mm (14 in.).

The recurrence intervals of the 3- and 8-day precipitation depths for the December 1955 storm were longer than those for the January 1982 storm (table 13.2) at three of the five stations. Stations at which precipitation in 1955 was less than in 1982 are located on the perimeter of the study area.

ANALYSIS OF FLOW FREQUENCY

REGIONAL CHARACTERISTICS OF FLOODING

Floods in the Santa Cruz Mountains result from precipitation during winter-frontal storms, which are greatly influenced by orographic uplift. Floods in basins in the eastern part of the study area, however, reflect the rain shadow of the mountains. During years in which winter-frontal storms are less intense, as in 1977 and 1981, floods in basins along the eastern part of the study area may result from isolated storm systems occurring at different times from those centered along the west side of the mountains.

This rain-shadow effect is demonstrated by the variation in unit peak discharge[1] observed at the gaging stations during the January 1982 flood (fig. 13.4). For example, the unit peak discharge was 4.11 $(m^3/s)/km^2$ for San Vicente Creek near Davenport (sta. 11161800), but on the east side of the mountains it was only 1.12 $(m^3/s)/km^2$ for Llagas Creek above the Chesbro Reservoir near Morgan Hill (sta. 11153470; fig. 13.4). The January 1982 flood also suggests a north-southward trend in the magnitude of unit peak discharge. Unit peak discharge from streams near the northern part of the study area was about 2.2 $(m^3/s)/km^2$, in comparison with about 3.3 $(m^3/s)/km^2$ near the southwestern part of the study area. The highest unit peak discharge measured was 6.84 $(m^3/s)/km^2$ at the miscellaneous site on the San Lorenzo River tributary near Boulder Creek; this site was selected to indicate the peak discharge from a very small basin near a former crest-stage gage.

Although some snow falls during the winter in the study area at altitudes above about 610 m, it generally does not

[1]Because discharge varies with basin size, flow is expressed here in terms of unit peak discharge to discount this effect.

TABLE 13.2.—*Precipitation depth, duration, and frequency for selected precipitation stations, December 19–26, 1955, and December 29, 1981–January 5, 1982*

Station	Length of record (yr)	Mean annual precipitation (mm)	Year	1-day precipitation		3-day precipitation			8-day precipitation		
				(mm)	Recurrence interval (yr)	(mm)	Recurrence interval (yr)	Ratio to 1-day	(mm)	Recurrence interval (yr)	Ratio to 1-day
Boulder Creek at the Locatelli Ranch, near Boulder Creek.	36	1,480	1955	308	63	496	46	1.61	676	53	2.19
	---	---	1982	310	67	333	5.3	1.07	531	11	1.71
Ben Lomond	43	[1]1,328	1955	265	43	431	35	1.63	605	55	2.29
	---	---	1982	291	95	409	25	1.41	564	32	1.94
Santa Cruz	105	797	1955	112	5	226	16	2.03	281	10	2.52
	---	---	1982	176	70	240	23	1.37	330	26	1.88
San Francisco	133	525	1955	57	2	107	3.7	1.86	148	3.9	2.58
	---	---	1982	107	27	120	5.5	1.12	170	6.7	1.58
San Jose	109	347	1955	48	3.3	85	7.8	1.76	147	32	3.05
	---	---	1982	34	<2	50	<2	1.48	86	2.5	2.54
Average			1955	158	---	269	---	1.78	371	---	2.53
			1982	184	---	230	---	1.29	336	---	1.93
Standard deviation			1955	121	---	187	---	.17	253	---	.33
			1982	118	---	148	---	.18	212	---	.37

[1]Average of data collected at four sites in the vicinity of Ben Lomond during the period 1937–82.

remain on the ground for more than a few days. Snowmelt was not a significant factor during the January 1982 flood.

We used the flows for durations of 1, 3, and 8 days and the peak discharges to define the magnitude of the flood and to compare the precipitation and streamflow data. Most of the storm runoff occurs within an 8-day period for streams in the study area. To analyze a complete storm system, therefore, streamflow data were developed for periods as long as 8 days.

Some maximum 1-day flows for the year do not coincide with the periods of maximum 3- and 8-day flows. For determining frequency relations, runoff was defined by selecting consecutive daily flows that gave the greatest flow for periods of 1, 3, and 8 days, whether or not the maximum 1-day flows coincided with the maximum 3- and 8-day flows.

We compared runoff and precipitation by using flows and precipitation for durations of 1, 3, and 8 days as well. To relate a particular flood to the precipitation that caused it, however, the maximum 1-day flow was made to coincide with the 3- and 8-day flows.

FREQUENCY OF THE FLOOD

For many streams in the Santa Cruz Mountains and vicinity, peak discharges during the January 1982 flood were among the largest since the December 1955 flood. To determine the magnitude of the January 1982 flood, data for 37 streamflow sites in the study area (fig. 13.1) were analyzed. Flood-frequency relations were developed for stations that have systematic records of at least 10 years' duration. The annual flow and flood volumes for selected periods were analyzed for frequency of occurrence. The recurrence interval is defined as the average number of years between exceedences of a flood of a given magnitude; it is also the reciprocal of the probability of exceedence. A log-Pearson type III distribution of annual floods was used to define the frequency curves from which recurrence intervals for peak discharges and 1-, 3- and 8-day flow volumes were determined.

In determining the recurrence intervals of floods from the frequency relations, historical data were used to lengthen the period of record and to improve the reliability of estimates of flow frequency. For sites with historical data, the period of record used in the flood-frequency analysis was expanded to include historical periods that preceded or followed the period of systematic record. To determine the number of years of historical record that could be included as unrecorded peaks smaller than the flood magnitude of interest—in this case, the January 1982 floodflow—it was necessary to estimate by regression analysis the historical period of record. Annual peak discharges for stations with gaps in the record (dependent stations) were estimated from data from stations with more complete records (independent stations). Independent stations were selected that yielded the highest correlation coefficient when correlations with several stations were attempted.

Estimated annual peak discharges were not incorporated into the flow record but were used solely as an indication of the historical period during which peaks were less than the January 1982 floodflow. The systematic data

base was extended as much as 8 years for 14 stations, on the basis of estimated historical information.

To estimate the frequency relations of peak discharges, a generalized skew coefficient of −0.78 was calculated by the procedures of the U.S. Water Resources Council (1981). To estimate the frequency of flow volumes for the selected durations, using comparable procedures, it was necessary to determine the generalized skew coefficients applicable for flow volumes as well as flood peaks. However, the U.S. Water Resources Council (1981) did not present methods for estimating the generalized skew coefficient of flow volumes. For the present report, we assumed that the appropriate generalized skew coefficients are −0.73, −0.80, and −0.84, which were derived from 1-, 3-, and 8-day flow volumes in the same manner as for peak discharges.

The peak discharge and 1-, 3-, and 8-day flow volumes of the January 1982 flood and their associated recurrence

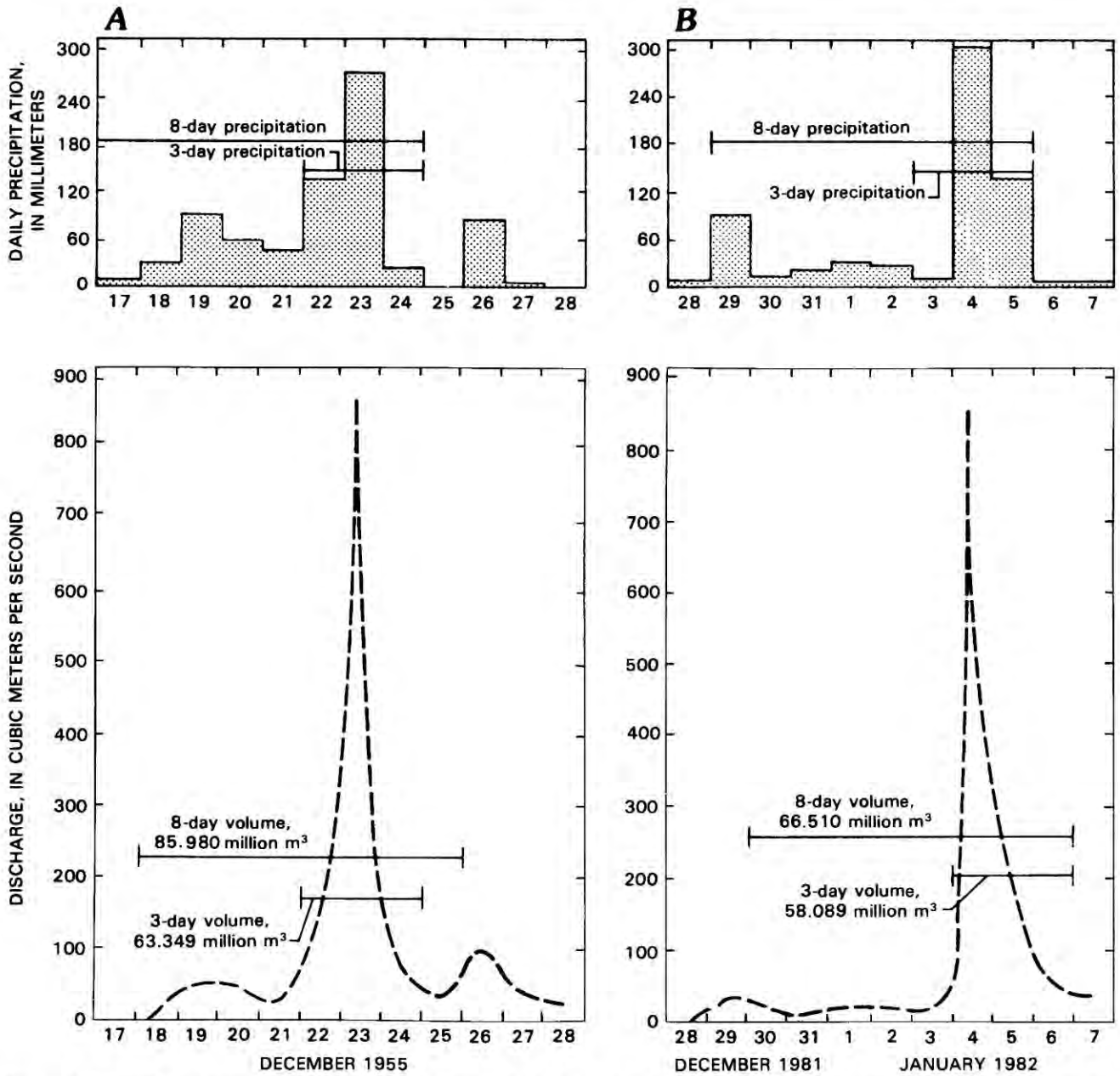


FIGURE 13.3.—Daily precipitation at Ben Lomond and discharge of the San Lorenzo River at Big Trees for the storms of December 1955 (*A*) and January 1982 (*B*).

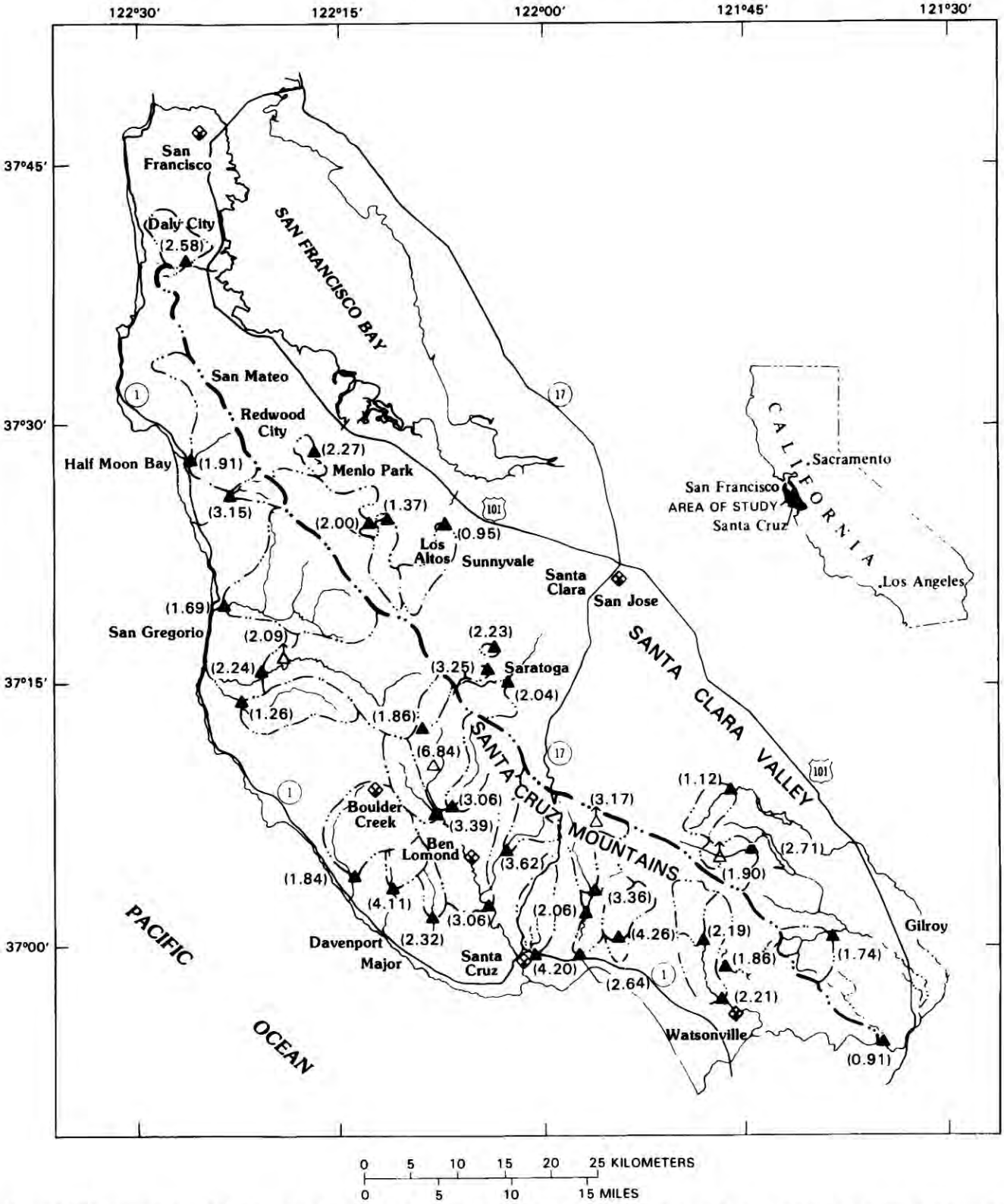


FIGURE 13.4.—Southern San Francisco Bay region, showing areal distribution of unit peak discharge (in cubic meters per second per square kilometer) during the January 1982 flood. See figure 13.1 for explanation.

intervals for selected gaging stations in the Santa Cruz Mountains and vicinity are listed in table 13.3. Where available, the recurrence intervals of peak discharge and flood volume for the December 1955 flood are listed for comparison. The median recurrence interval of the January 1982 peak discharge for 33 stations in the study area is 14 years. On the basis of data from six stations, the median recurrence for the December 1955 flood is 36 years. Only one of the seven sites with comparable data—Corralitos Creek at Freedom (sta. 11159200)—had a higher peak discharge in January 1982 than in December 1955.

The peak discharges of the January 1982 flood for San Vicente Creek near Davenport (sta. 11161800, table 13.3) and Purisima Creek near Half Moon Bay (sta. 11162600) indicate recurrence intervals longer than 100 years, but flows expressed as unit runoff are comparable to flows for nearby basins. Most of the other basins in areas of high flow had peak discharges with recurrence intervals of about 40 to 50 years.

Flood volumes during January 1982 for a 1-day period had a longer recurrence interval than peak discharges at 10 of the 15 stations. Recurrence intervals of flows for a 3-day period, however, were longer than those for the peak discharge at only 5 of these 15 stations. In terms of flow volumes (table 13.3), the median recurrence intervals of the January 1982 flood for 1-, 3-, and 8-day periods are 22, 18, and 10 years, respectively. Corresponding recurrence intervals of the December 1955 flood are 62, 22, and 30 years. In comparison, the recurrence intervals of runoffs of 3- and 8-day periods on the west side of the Santa Cruz Mountains were similar to or shorter than those of peak discharges, as indicated in table 13.3, whereas on the east side they were longer.

The median recurrence intervals of peak discharges at selected stations listed in table 13.3 indicate that the December 1955 flood was much larger and longer in duration than the January 1982 flood. Although precipitation records (table 13.2) indicate that 1-day precipitation during the January 1982 storm generally was greater than that recorded during the December 1955 storm, the peak discharge and runoff of the January 1982 flood for 1-, 3-, and 8-day periods were less than those of the December 1955 flood. This difference in the flow characteristics of the two floods may be attributable to differences in total precipitation.

EFFECT OF ANTECEDENT PRECIPITATION ON FLOODING OF THE SAN LORENZO RIVER AT BIG TREES

Streamflow-related damages in the Santa Cruz Mountains and vicinity caused by the January 1982 storm were the greatest since the December 1955 flood. Precipitation data at Ben Lomond and flood data for the San Lorenzo River at Big Trees indicate that the amount of precipitation and corresponding runoff for these two floods are similar (table 13.4). For comparison, we note that both the January 1963 and February 1945 floods, which had similar amounts of precipitation, also had similar-size peak discharges and runoffs (table 13.4). These comparisons suggest that for certain precipitation patterns, the resulting floods may be of similar magnitude and volume. Although the storm in January 1963 was more severe (in terms of 3-day duration) than either the 1955 or 1982 storm (table 13.4), the resulting runoff was about half that recorded during the 1955 and 1982 floods. Because it has been established that locally intense convective-type storms and snowmelt are not factors in causing floods in the Santa Cruz Mountains (Rantz, 1971), the variation in runoff of a flood for a given amount of storm precipitation is attributable to antecedent precipitation.

A review of the dates of annual peak discharges of the San Lorenzo River at Big Trees (table 13.4) indicates that all the floods occurred during the winter months November through March, except for two floods that occurred in April, the largest of which was very early in the month. October and November are the only two months with storm activity that precede the period of major precipitation and flooding, December through March (fig. 13.5); September is omitted from the analysis of antecedent precipitation because it is a low-precipitation month (fig. 13.5).

The data in figure 13.3 indicate that most of the runoff for two major floods on the San Lorenzo River at Big Trees occurred during a 3-day period. To compare the precipitation at Ben Lomond and the corresponding runoff of the San Lorenzo River for different floods, the 3-day period that includes the annual peak discharge was selected. Using the precipitation and runoff data in table 13.4 for this 3-day period, the variation in runoff of the San Lorenzo River versus the precipitation at Ben Lomond is plotted in figure 13.6.

The enveloping lines for minimum and maximum 3-day runoff on figure 13.6 indicate that the runoff for a given amount of precipitation may vary by a factor of as much as 18, depending on antecedent conditions. For example, with a 3-day precipitation of 114 mm (4.5 in.), the flow of the San Lorenzo River may range from 0.9 million to 16 million m^3. The water years[2] in which the runoff was minimal for a given amount of precipitation, 1963 and 1976 (fig. 13.6), had antecedent precipitations for the 15 days preceding the flood that were the lowest on record (table 13.4). Water years with maximum runoff, 1965,

[2]A water year is the 12-month period from October 1 to September 30, designated by the calendar year in which it ends. All references to years in this chapter are to water year unless otherwise noted.

TABLE 13.3.—*Peak discharges, volumes, and recurrence intervals during various durations of flow at selected stream-gaging stations, December 19–26, 1955, and December 30, 1981–January 6, 1982*

["Side" refers to side of the Santa Cruz Mountains drained by the stream]

Station		Side	Peak discharge			1-day volume		3-day volume		8-day volume	
No.	Name		Date	(m^3/s)	Recurrence interval (yr)	(10^3 m^3)	Recurrence interval (yr)	(10^3 m^3)	Recurrence interval (yr)	(10^3 m^3)	Recurrence interval (yr)
11153470	Llagas Creek above Chesbro Reservoir, near Morgan Hill.	East---	1- 4-82	27.75	4	---	---	---	---	---	---
[1]11153800	Alec Canyon near Morgan Hill.	do---	1- 4-82	4.47	4	---	---	---	---	---	---
11153900	Uvas Creek above Uvas Reservoir.	do---	1- 4-82	147.26	5	6,699	15	12,324	22	14,310	9
11154100	Bodfish Creek near Gilroy.	do---	1- 4-82	33.42	10	1,130	12	1,678	9	2,110	7
11158900	Pescadero Creek near Chittenden.	do---	1- 4-82	23.96	6	---	---	---	---	---	---
11159150	Corralitos Creek near Corralitos.	West---	1- 4-82	60.04	9	---	---	---	---	---	---
11159200	Corralitos Creek at Freedom.	do---	12-22-55	102.52	12	---	---	---	---	---	---
			1- 4-82	158.88	40	5,603	30	9,822	19	10,887	10
11159400	Green Valley Creek near Corralitos.	do---	1- 4-82	33.98	15	---	---	---	---	---	---
11159690	Aptos Creek near Aptos.	do---	1- 4-82	112.71	40	4,083	37	5,095	21	5,971	14
[1]11159770	Laurel Creek near Laurel.	do---	1- 4-82	7.65	6	---	---	---	---	---	---
11159800	West Branch Soquel Creek near Soquel.	do---	1- 4-82	106.20	9	---	---	---	---	---	---
11159940	Soquel Creek near Soquel.	do---	1- 4-82	169.92	9	---	---	---	---	---	---
11160000	Soquel Creek at Soquel.	do---	12-23-55	447.46	62	21,588	>100	34,911	>100	43,423	>100
		do---	1- 4-82	274.70	14	10,523	18	14,927	11	17,517	6
11160020	San Lorenzo River near Boulder Creek.	do---	1- 4-82	29.74	11	1,234	8	2,085	7	2,295	5
11160060	Bear Creek at Boulder Creek.	do---	1- 4-82	126.87	7	4,478	---	6,538	---	7,648	---
11160070	Boulder Creek at Boulder Creek.	do---	1- 4-82	99.12	14	2,233	6	4,404	6	5,502	4
11160300	Zayante Creek at Zayante.	do---	1- 4-82	103.93	7	4,182	16	5,428	10	5,909	6
11160500	San Lorenzo River at Big Trees.	do---	12-23-55	860.93	36	41,573	62	63,408	30	85,983	30
		do---	1- 5-82	841.10	33	36,022	36	58,103	24	66,492	11
11161500	Branciforte Creek at Santa Cruz.	do---	12-22-55	229.39	77	---	---	---	---	---	---
		do---	1- 4-82	188.33	29	---	---	---	---	---	---
11161800	San Vicente Creek near Davenport.	do---	1- 4-82	64.57	>100	2,085	38	2,813	27	3,158	10
11161900	Scott Creek above Little Creek, near Davenport.	do---	1- 4-82	119.51	20	---	---	---	---	---	---
[1]11162470	Pescadero Creek tributary near La Honda.	do---	1- 4-82	1.19	23	---	---	---	---	---	---
11162500	Pescadero Creek near Pescadero.	do---	12-23-55	266.77	21	13,570	41	21,342	31	31,334	25
			1- 4-82	266.21	21	8,561	14	12,336	7	14,927	6
11162540	Butano Creek near Pescadero.	do---	1- 4-82	59.47	11	---	---	---	---	---	---
11162570	San Gregorio Creek at San Gregorio.	do---	1- 4-82	224.01	43	---	---	---	---	---	---
11162600	Purisima Creek near Half Moon Bay.	do---	1- 4-82	31.15	>100	---	---	---	---	---	---
11162720	Colma Creek at South San Francisco.	East---	1- 4-82	72.22	40	2,011	>100	2,677	>100	3,417	>100
11162800	Redwood Creek at Redwood City.	do---	1- 4-82	10.73	5	421	29	528	9.2	738	9.1
11163500	Los Trancos Creek at Stanford University.	do---	1- 4-82	26.34	21	---	---	---	---	---	---
11166000	Matadero Creek at Palo Alto.	do---	12-22-55	24.19	7	819	15	1,332	16	1,776	11
			1- 4-82	17.78	4	801	13	1,021	8	1,283	8
11169500	Saratoga Creek at Saratoga.	do---	12-22-55	77.31	46	1,468	14	3,306	22	5,662	20
			1- 4-82	48.71	13	1,194	25	2,788	11	4,108	9
11169580	Calabazas Creek tributary at Mount Eden Road, near Saratoga.	do---	1- 4-82	3.12	4	---	---	---	---	---	---
11169600	Prospect Creek at the Saratoga Golf Course, near Saratoga.	do---	1- 4-82	1.56	5	---	---	---	---	---	---
Median values, 1982											
Study area					13.5	---	21.5	---	17.5	---	9.6
West side					20.5	---	33.0	---	20.0	---	10.0
East side					5.5	---	15.0	---	13.5	---	9.0
Median, 1955					36	---	62	---	22	---	30

[1]Crest-stage gage.

TABLE 13.4.—*Precipitation at Ben Lomond and annual flood discharge of the San Lorenzo River at Big Trees, Calif., for the years 1938-82*

Water year	Date of flood	Precipitation (mm)			Antecedent precipitation (mm)			Discharge (m^3/s)	Volume (10^3 m^3)		
		1-day	3-day	8-day	15-day	45-day	60-day		1-day	3-day	8-day
38	1-31-38	138	190	303	122	---	---	390.8	11,867	21,924	40,025
39	3-09-39	80	118	123	36	252	252	19.2	1,301	2,476	3,624
40	2-27-40	159	300	367	358	533	1,330	679.7	33,522	53,781	68,568
41	2-09-41	99	208	355	144	425	805	439.0	18,057	37,657	54,328
42	1-24-42	182	279	373	44	558	628	379.5	18,278	27,869	42,362
43	1-21-43	171	300	402	112	276	443	393.6	18,180	28,750	35,670
44	3-04-44	63	99	170	195	498	521	53.5	3,817	6,631	11,880
45	2-02-45	261	420	496	77	189	190	373.8	17,739	32,397	40,050
46	12-27-45	76	124	308	185	447	577	79.6	3,769	8,337	15,654
47	11-22-46	162	129	302	91	94	117	41.1	1,292	2,219	3,707
48	4-29-48	65	113	114	62	320	371	39.4	1,343	3,306	5,016
49	3-10-49	95	180	210	173	356	447	109.9	5,750	15,024	20,955
50	2-06-50	135	239	254	80	393	547	175.3	6,289	16,097	21,716
51	11-18-50	180	368	551	177	318	319	300.2	10,693	23,612	30,459
52	1-12-52	160	225	369	339	800	910	422.0	15,659	29,827	48,986
53	12-07-52	197	240	256	171	569	701	262.0	8,075	9,753	11,527
54	1-17-54	124	144	145	120	393	393	76.7	22,594	3,193	3,836
55	12-02-54	133	200	265	58	280	283	93.5	2,447	5,848	8,877
56	12-23-55	265	431	670	236	488	488	860.9	41,596	63,349	82,327
57	2-24-57	76	161	222	66	285	365	72.5	3,132	6,956	8,867
58	4-02-58	124	210	296	263	656	1,016	487.1	15,366	32,250	51,109
59	2-16-59	76	123	197	208	421	528	189.5	6,558	10,910	17,502
60	2-01-60	117	138	183	253	482	566	84.7	2,570	4,078	6,599
61	11-26-60	89	106	106	36	141	220	18.1	661	893	1,192
62	2-14-62	130	224	319	288	416	416	172.5	5,799	15,121	23,764
63	1-31-63	247	487	496	9	59	148	368.2	18,107	36,458	43,093
64	1-21-64	63	146	215	19	329	329	75.3	2,814	5,583	7,456
65	1-05-65	69	115	210	147	330	482	239.3	7,365	16,027	28,782
66	12-29-65	---	---	---	105	157	158	30.6	1,403	3,262	5,217
67	1-21-67	275	320	407	22	29	351	294.5	15,537	23,475	35,087
68	1-30-68	125	195	203	96	185	285	247.0	8,833	11,738	13,815
69	2-15-69	120	128	161	185	441	452	325.7	13,653	20,236	30,813
70	1-16-70	102	200	249	105	331	331	231.9	9,151	18,033	26,205
71	11-29-70	70	136	257	188	340	340	71.6	3,352	6,680	13,566
72	12-27-71	56	88	184	138	293	293	30.0	1,565	3,262	5,427
73	1-16-73	89	137	150	171	261	265	334.2	11,231	22,732	30,268
74	3-28-74	84	144	256	42	81	202	119.5	5,138	12,007	14,131
75	3-21-75	58	94	126	32	329	355	142.7	3,645	7,653	13,509
76	2-29-76	76	117	122	0	100	124	13.0	396	903	1,301
77	3-15-77	34	67	72	9	60	60	7.4	313	540	796
78	1-14-78	139	287	399	272	539	661	320.0	14,656	32,861	46,177
79	2-13-79	116	147	208	27	333	374	143.9	4,062	7,986	11,312
80	2-19-80	137	241	483	424	767	1,024	297.4	15,636	28,848	51,516
81	3-21-81	82	128	144	126	138	289	68.3	3,645	5,762	8,523
82	1-05-82	291	427	582	253	396	645	841.1	35,968	58,088	66,510
Mean----------		127	202	279	139	343	446	231.5	9,618	17,431	24,713

1969, 1973, and 1975, had average antecedent precipitation for a 15-day period, but the 60-day antecedent precipitations were above average (table 13.4).

We note that major floods during the years 1940, 1955, and 1982 fall midway between the enveloping curves in figure 13.6. Although these floods were larger than average, an even greater flood might occur in the future, given the right combination and storm intensity. For example, under antecedent conditions observed before the 1940 flood and with a 3-day precipitation similar to that of the 1982 storm (table 13.4), a flood greater than any other observed to date would be likely.

To determine which periods of antecedent precipitation were most influential on subsequent runoff under different storm conditions, we developed a rainfall-runoff model based on precipitation data from the Ben Lomond station and flow data from the stream-gaging station (11160500) on the San Lorenzo River at Big Trees. An equation relating flood magnitude to various periods of antecedent precipitation was developed from a linear multiple regression:

$$Q = a + bP_n + cAP_n,$$

where Q is the peak discharge (in cubic meters per second) or runoff (in cubic meters) for a selected duration for the stream-gaging station on the San Lorenzo River at Big Trees, P_n is the precipitation depth (in millimeters) for the selected period, concurrent with the annual maximum flow of a similar period, AP_n is the antecedent precipitation (in millimeters) preceding the beginning of the selected flood period (generally, the beginning day of a 60-day period is 62 to 64 days before the date of the peak discharge), n is the number of days in a period, and a, b, and c are constants. Various transformations, such as logarithms or use of a polynomial expansion in the regression analysis, did not improve the accuracy of this regression. Inclusion of other hydrologic variables, such as those that tend to define the shape of the precipitation hydrograph, also did not improve the regression.

Precipitation data from the Ben Lomond station were used to regress with streamflow data from the stream-gaging station on the San Lorenzo River at Big Trees because the Ben Lomond station is located near the center of the basin. We found that antecedent precipitation for 15- and 30-day periods was statistically insignificant. Because the largest floods on record occurred either in late December or in January and February (table 13.4), a period of antecedent precipitation longer than 45 days was considered a possible influence on the flood magnitude.

The data in table 13.5 are based on antecedent precipitation for a 60-day period. The highest correlation coefficient of the various regressions was 80 percent. On the basis of the standard estimation error, use of a 60-day period instead of a 15- or 45-day period improved all the regressions by an average of 10 percent. We note that the 60-day period of antecedent precipitation was significant for all the durations of floods listed in table 13.5, including the annual peak discharge.

The regression analysis and a comparison of the precipitation and flood data listed in table 13.4 indicate that major floods (those with a 3-day flood volume greater than 50 million m^3 or with an annual peak discharge exceeding 566 m^3/s) on the San Lorenzo River reflect a combination of two climatic conditions, in the following sequence: (1) a prolonged period of continual greater than normal storm activity, as occurred during winter 1981–82; this precipitation saturated the ground and reduced the infiltration capacity of the soil; and (2) a period of intense storm activity near the end of this prolonged period of precipitation, in which large amounts of precipitation fall within a short period (generally more than 254 mm [10 in.] within 3 days).

For example, the February 1980 flood season had a high 60-day antecedent precipitation of 1,024 mm (40.3 in.) but a low 3-day storm intensity of 241 mm (9.5 in.), and the recurrence interval of the resulting 3-day flood volume is 5 years (fig. 13.7). By comparison, the flood season before February 1945, which had a low 60-day antecedent precipitation of 190 mm (7.48 in.), had a strong 3-day storm that produced 420 mm (16.54 in.) of rainfall, and the recurrence interval of this flood is 7 years. This analysis suggests that major floods on the San Lorenzo River are not the result of isolated severe storm events during winter months but are the combined effect of greater than normal antecedent precipitation and subsequent intense frontal-type storms.

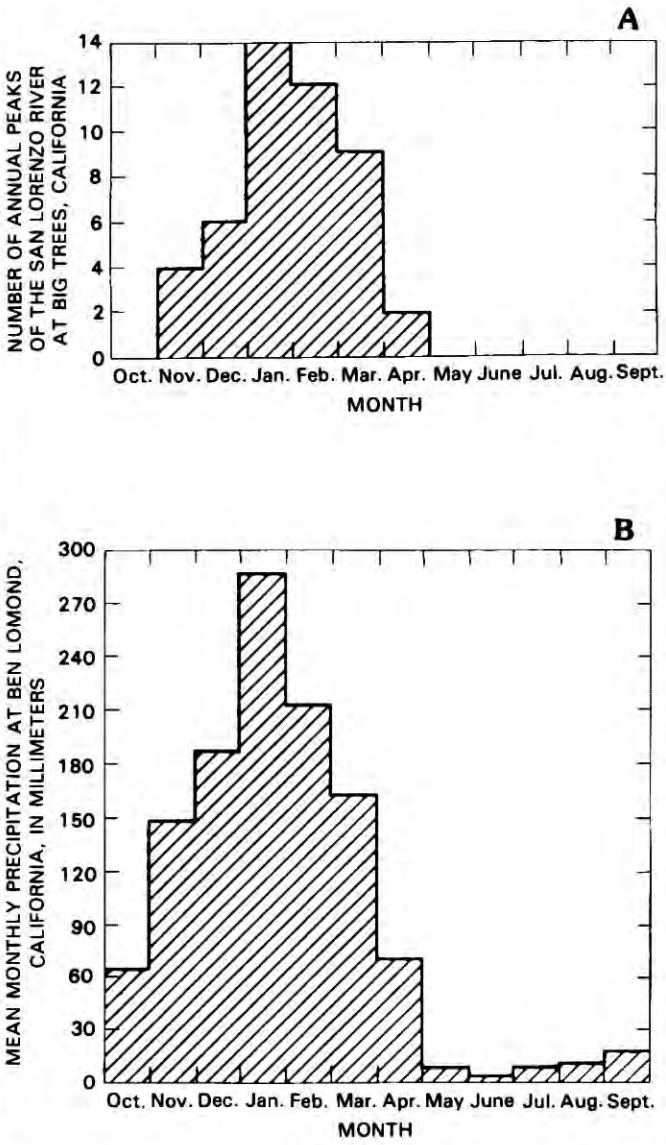


FIGURE 13.5.—Patterns of streamflow and annual rainfall in the study area. *A*, Monthly distribution of annual peak discharge of the San Lorenzo River at Big Trees for the period 1938–82. *B*, Mean monthly precipitation at Ben Lomond for the period 1968–82.

TABLE 13.5.—*Regression of discharge of the San Lorenzo River at Big Trees and precipitation at Ben Lomond, Calif., to determine the effect of antecedent precipitation on streamflow*

[Form of equation: $Q=a+bP_n+cAP_0$, where P is the precipitation depth (in millimeters) for the selected period, AP is the antecedent precipitation (in millimeters) preceding the day of peak discharge or the beginning of the flood period, n is the number of days, and Q, a, b, and c are defined below]

Peak discharge or runoff	Mean flow for period 1938-82	Intercept a	Coefficient b for duration of flood	Coefficient c for antecedent period of 60 days	Statistical measure of regressions	
					Correlation coefficient (r^2)	Standard error of estimate (S_e)
Peak discharge (m^3/s)---	0.232×10^3	-0.188×10^3	2.72×10^3	56.0	.71	0.125×10^3
1-day runoff (m^3)-------	9.62×10^6	-9.61×10^6	127×10^6	2.40×10^6	.71	5.10×10^6
3-day runoff (m^3)-------	17.4×10^6	-14.9×10^6	119×10^6	16.7×10^6	.80	6.96×10^6
8-day runoff (m^3)-------	24.7×10^6	-17.0×10^6	122×10^6	10.4×10^6	.80	9.17×10^6

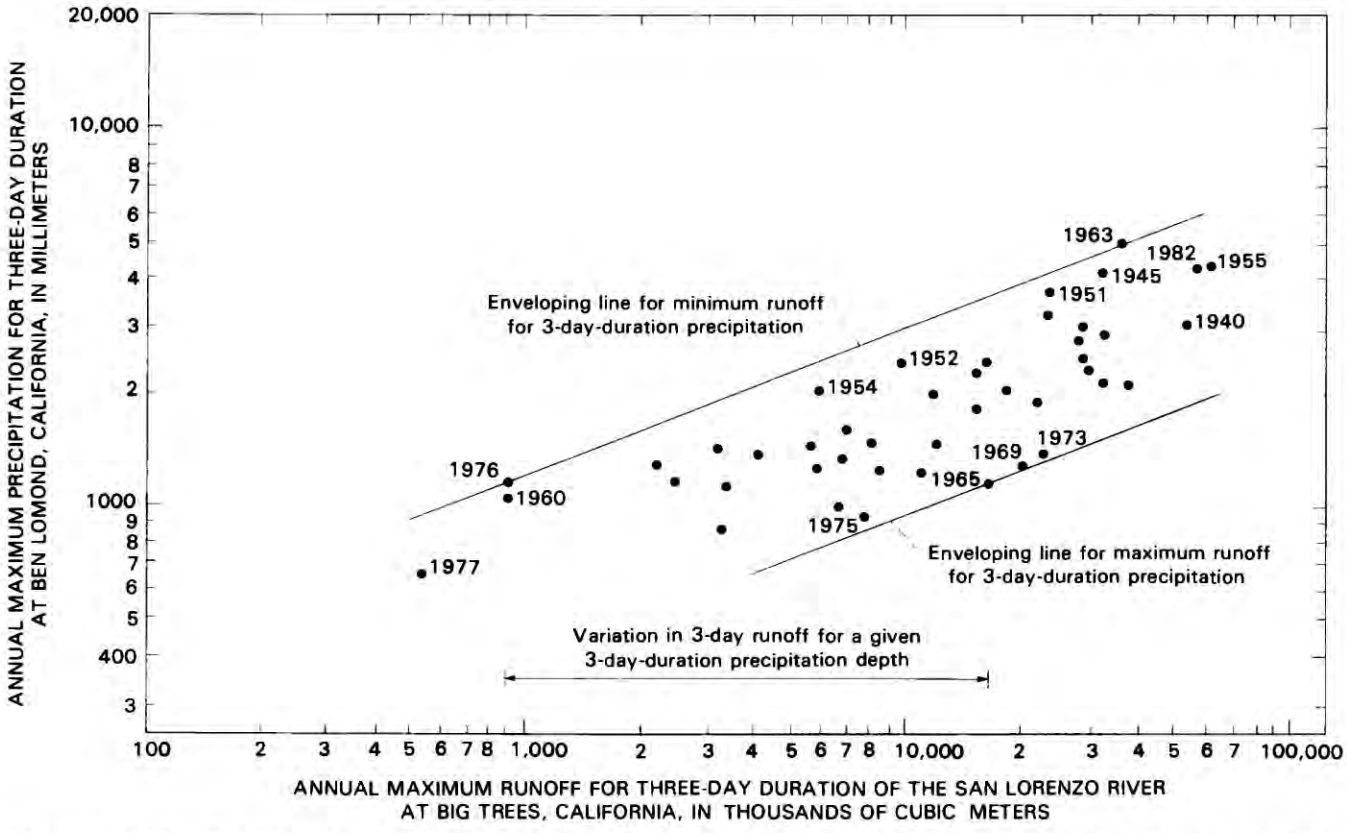


FIGURE 13.6.—Runoff of the San Lorenzo River at Big Trees for a 3-day period, versus precipitation at Ben Lomond. Dates indicate year of flood.

SUMMARY

1. Antecedent precipitation for 2 months before the January 3–5, 1982, storm was more than 100 percent of normal.
2. The maximum 1-day precipitation of the December 1955 storm averaged 26 mm (1 in.) less than that of the January 1982 storm.
3. For 3- and 8-day periods, precipitation during the December 1955 storm was about 38 mm (1.5 in.) greater than during the January 1982 storm.
4. Unit peak discharge of the January 1982 flood for the study area ranged from 0.91 to 6.84 $(m^3/s)/km^2$; the smaller amounts were on the east side of the Santa Cruz Mountains.
5. The median recurrence interval of the January 1982 peak discharge for 33 stations in the study area is 14 years. On the basis of data from six stations, the median recurrence interval for the December 1955 flood is 36 years.
6. In terms of flow volumes, the median recurrence intervals of the January 1982 flood for 1-, 3-, and 8-day periods are 22, 18, and 10 years, respectively. Corresponding recurrence intervals for the December 1955 flood are 62, 22, and 30 years.
7. Major floods on the San Lorenzo River are the result of greater than normal antecedent precipitation for a period as long as 60 days, combined with subsequent intense frontal-type storms.

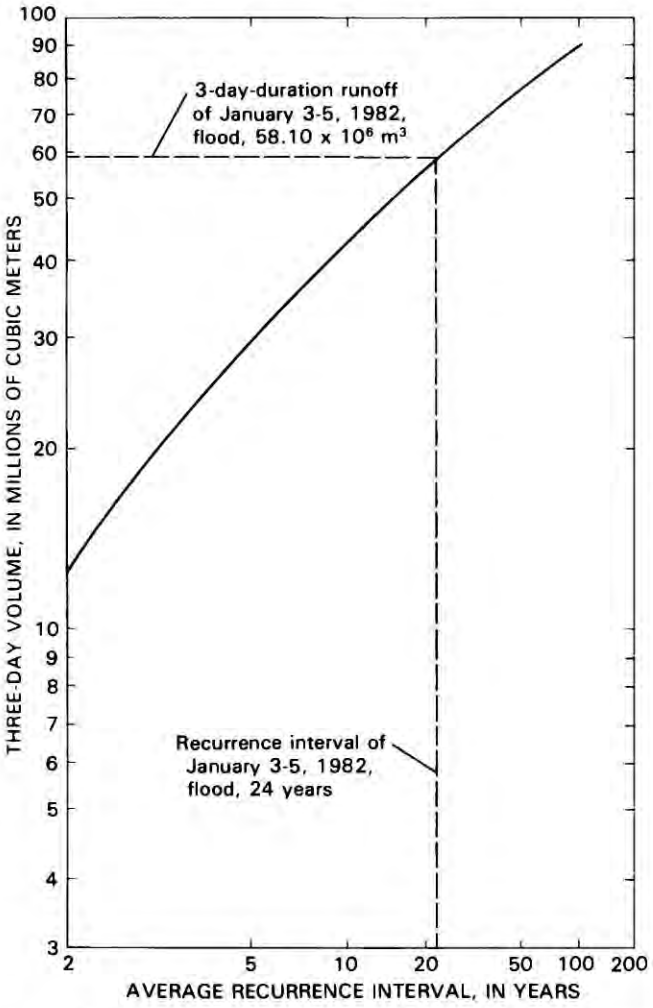


FIGURE 13.7.—Runoff for 3-day duration versus average recurrence interval for the San Lorenzo River at Big Trees. Curved line represents flood-frequency relation for 3-day flood volume based on 44 years of record.

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14. STREAM-CHANNEL RESPONSE TO THE STORM IN THE SANTA CRUZ MOUNTAINS

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ABSTRACT

Intense rainfall on January 3–5, 1982, in the Santa Cruz Mountains caused high streamflow and widespread landsliding. In the watersheds studied, recurrence intervals for peak streamflows were as much as 33 years, and recurrence intervals for maximum rainfall intensities were more than 100 years. Generalized channel response in these basins included scour in steep low-order channels and moderate filling in higher order channels. Large volumes of channel fill were noted along some channels, but this observation was limited to reaches that received large amounts of colluvium from debris flows and streamside debris slides. Such major effects were generally local and did not extend great distances upstream or downstream. The localization of these effects on channel geometry contrasts with the widespread depositional effects observed after major storms in steep terrain in other parts of California. This contrast may be related to the manner in which channel and hillslope processes interact.

Storm-related changes in channel morphology, coupled with frequency analysis of sediment transport, indicate that the morphology of most intermediate- and high-order channels is formed at least as much by events with moderate recurrence intervals as by extreme events. Along low-order channels that were scoured during the storm and along isolated reaches of some intermediate- and high-order channels where filling was severe, however, storm effects will probably persist for long periods. Individual high-magnitude storms are therefore effective in modifying channel geometry, but only in some places. Because the localized effects of high-magnitude storms can persist longer than the recurrence interval of the storms themselves, channel morphology throughout the area probably reflects the effects of several storms.

INTRODUCTION

The January 3–5, 1982, storm brought as much as about 600 mm (23.6 in.) of rain within a 36-hour period in the steep drainage basins of the Santa Cruz Mountains. This intense rainfall generated record or near-record flood peaks throughout the area and caused widespread shallow landsliding. This chapter assesses the effects of high streamflow on stream-channel geometry and sediment transport in three drainage basins within this steep terrain, and relates these effects to hillslope processes operating during the storm. The data presented have been collected from sites of previously established stream-gaging stations, as well as from postflood field investigations. Land use does not appear to have altered the natural response of stream channels to the storm, and so storm effects on manmade structures, though locally extensive, are described here only briefly (see chap. 12).

DESCRIPTION OF THE STUDY AREA

LOCATION AND PHYSICAL CHARACTERISTICS

Effects of the January 1982 storm were studied in the drainage basins of Soquel Creek, San Lorenzo River, and Pescadero Creek. These streams drain 300 km^2 in the Santa Cruz Mountains and are situated approximately 50 km southeast of San Francisco and 25 km west of San Jose (fig. 14.1). Elevations in the study basins range from sea level to more than 800 m along the crest of Ben Lomond Mountain. The San Lorenzo River watershed, which encompasses much of the study area, is highly asymmetric; short steep tributaries feed the main channel from the west, and longer, more gently sloping tributaries feed the main channel from the northeast. Several levels of marine terraces extend along some coastal sections of the study area.

Hillslopes within the study basins are relatively steep; average gradients range from 30 to more than 50 percent, and stream gradients from 3 to 200 m/km. The steepest gradients occur along small low-order tributaries in the extreme upper parts of drainage basins. These small channels are only slightly incised into surrounding hillslopes, and bedrock is common along such channels. Low-order channels generally contain a relatively thin deposit of alluvium over the underlying bedrock. Larger, intermediate-order channels in the middle of the watersheds are typically V shaped and narrow, and are incised into the surrounding landscape more than the lower order channels. Because of this incision, steep hillslopes are common adjacent to these intermediate-order channels. Varying amounts of bedrock are exposed in the channel. Alluvium is commonly composed of sand or boulders surrounded by sand. The bedrock along intermediate-order channels is effective in reducing the rate of bank erosion in many localities. High-order channels in the downstream parts of the study basins flow through alluviated valleys and show well-defined meander and point-bar morphology. The lowest stream gradients within the study basins are found along these channels. Flood plains developed adjacent to high-order channels generally buffer them from the direct input of colluvium from landslides.

CLIMATE, VEGETATION, AND LAND USE

The Santa Cruz Mountains have a Mediterranean climate, with moist cool winters and warm dry summers. Mean annual precipitation ranges from about 500 mm (19.7 in.) near the coast to about 1,500 mm (59.0 in.) on top of Ben Lomond Mountain. Rainfall occurs almost exclusively from November to March. The area frequently has coastal fog during the summer months.

Most ridgetops and hillslopes are densely vegetated by second-growth coastal redwood and associated Douglas-fir, oak, and madrone. Riparian vegetation is dominated

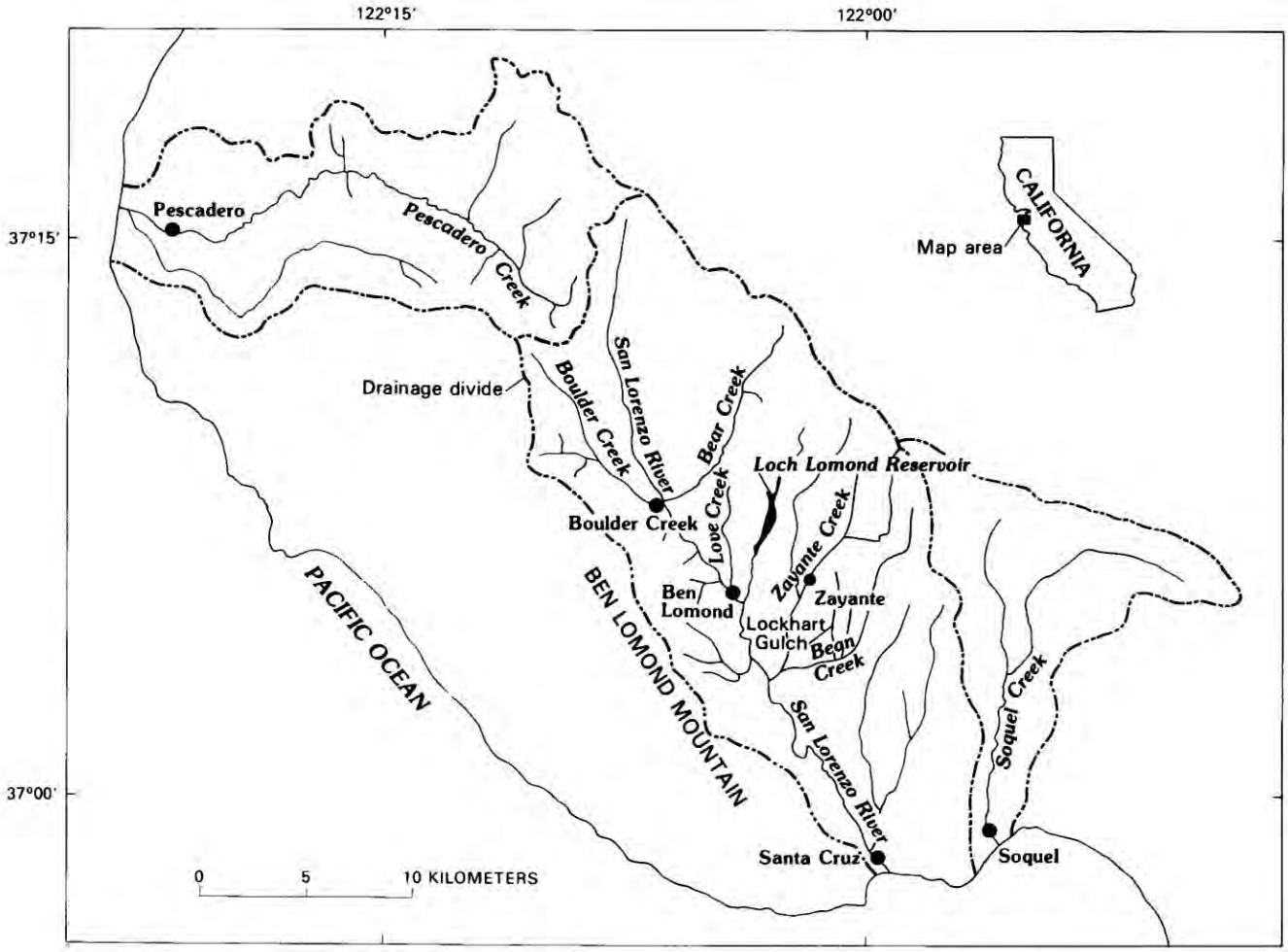


FIGURE 14.1.—Sketch map of study area in the Santa Cruz Mountains, west-central California.

by alder, willow, and cottonwood. Open prairies occur on some ridgetops and marine terraces.

Timber was harvested from most slopes in the study area during the early and middle 1900's. At present, low-density suburban development is the major land use. Artificial flow constrictions in stream channels and structures on low flood plains are common. The Santa Margarita Sandstone is quarried in parts of the Zayante Creek watershed.

GEOLOGY

Bedrock in the study area is dominated by a thick sequence of Tertiary units consisting of marine arkosic sandstone, mudstone, and interbedded volcanic rocks (Clark, 1981). Weathered materials from most units are predominately sand to gravel size and are readily transported by streams. The most common rock types are bedded mudstone, and sandstone with abundant mudstone interbeds. These stratigraphic units, which include the Santa Cruz Mudstone of late Miocene age and the Monterey Formation of middle Miocene age, are highly susceptible to landsliding and typically shed colluvium and alluvium that consist mostly of sand, gravel, and some boulders. Massive sandstone units, such as the Santa Margarita Sandstone of late Miocene age and the Lompico Sandstone of middle Miocene age, contribute predominately sand-size material to streams. These units are highly susceptible to dry raveling, sheetwash, and gullying, particularly where disturbed by quarrying and roadbuilding (Brown, 1973). Several Tertiary marine units crop out in most tributary drainages.

Stratigraphically beneath the Tertiary marine section are Cretaceous granitic and metasedimentary rocks, which crop out along the summit and on the flanks of Ben Lomond Mountain. Alluvium in creeks draining these rocks is rich in sand-size particles but contains more cobbles and boulders than does alluvium derived from the overlying Tertiary sedimentary rocks.

According to Clark (1981), major active faults in the Santa Cruz Mountains include the San Andreas fault, which lies inland of the study area, and the San Gregorio fault, which crosses Pescadero Creek approximately 5 km upstream from its mouth. Most folds and faults in the study area trend northwest. Some ridgetops and stream channels, particularly Ben Lomond Mountain, the San Lorenzo River downstream from Boulder Creek, and a tributary of Zayante Creek called Mountain Charlie Gulch, follow bedrock structures so aligned.

LANDSLIDES

Landslides are numerous throughout the study area (see "Introduction" to volume for landslide terminology). Steep hillslopes combine with friable regolith in many places to give a high susceptibility to debris flows. Where the dip surfaces of bedding planes parallel hillslopes, the susceptibility to block slides is great. Debris slides are also common. Debris flows, block slides, and debris slides are triggered both by high pore-water pressures induced by intense rainfall and by undercutting due to streambank erosion. The role of streambank erosion, however, is somewhat limited because bedrock along many stream channels limits bank erosion. Such persistently active landslides as earth flows are sparse.

STORM EFFECTS ON STREAM-CHANNEL MORPHOLOGY

The January 1982 storm generated short-lived flood peaks on the study streams. Recurrence intervals of peak discharges in the Santa Cruz Mountains ranged from 4 to greater than 100 years (see chap. 13). The recurrence intervals of flood peaks varied as a result of the distribution of rainfall. Reported storm-rainfall totals ranged from 135 mm (5.3 in.) to 616 mm (24.3 in.) (Mark and others, 1983; see chap. 2). Maximum 24-hour precipitation intensities recorded during the storm were associated with recurrence intervals of greater than 100 years (J.P. Monteverdi, written commun., 1982). Maximum precipitation values were recorded along a northwest-southeast line running through the lower two-thirds of basins draining into the San Lorenzo River from the northeast.

The storm triggered numerous landslides throughout the study area. The most common features were debris flows and debris slides that were caused by high pore-water pressures induced in soils during the storm. Variations in precipitation intensity resulted in considerable variation in the spatial distribution of landslides and thus in the amount of colluvium introduced to different stream systems. The distribution of storm-related landslides is shown on plates 8 and 9 and discussed in chapter 8.

General effects of the storm on channel morphology included scour in small first- and second-order channels and filling in larger, higher order channels. In most places, effects from channel filling were either not particularly severe or are not likely to persist for a long period. In localized reaches, however, deposition caused severe decreases in stream cross-sectional area that may persist for long periods. This deposition occurred adjacent to large individual streamside debris slides and where small-scale landsliding was particularly abundant. Landsliding was most abundant in the basins that drain into the San Lorenzo River from the east and in the Soquel Creek basin (see chap. 8).

METHODS USED TO ASSESS CHANNEL CHANGES

We assessed the effects of the January 1982 storm on stream channels in the San Lorenzo River, Soquel Creek, and Pescadero Creek watersheds, using field and airphoto observations and measurements, in addition to information from U.S. Geological Survey stream-gaging stations. To assess basinwide effects of the storm, stream reaches were described at study sites chosen to represent a range in stream size, bedrock type, and impact severity (fig. 14.2). The length of channel investigated at each study site equaled approximately five channel widths. We estimated sediment accumulation and scour in each reach, using botanical and physical evidence. Botanical evidence included burial of vegetation and exposure of roots in streambanks; physical evidence included burial of preflood surfaces by alluvium, burial of culverts and bridge aprons, and exposure of fresh bedrock, waterpipes, drains, and drainlines.

Table 14.1 lists the measured channel changes and basic physiographic parameters of the study sites. The measures of channel change listed in table 14.1 include average filling within the active channel, average decrease in cross-sectional area, and weighted sediment accumulation. The average decrease in channel cross-sectional area was calculated by dividing the total volume of flood deposits in each reach by the reach length; this area change includes both inchannel and overbank deposition. Because location of preflood channel levels along reaches characterized by scour proved to be difficult, no estimates of the volume of material removed by scour were made. Thus, table 14.1 contains only the word "scour" for those sites where evidence of pervasive channel scour was found. The weighted decrease in cross-sectional area represents the average decrease in cross-sectional area divided by the drainage area; this value was calculated to provide perspective on the amount of cross-sectional change relative to channel size. Gradients of stream

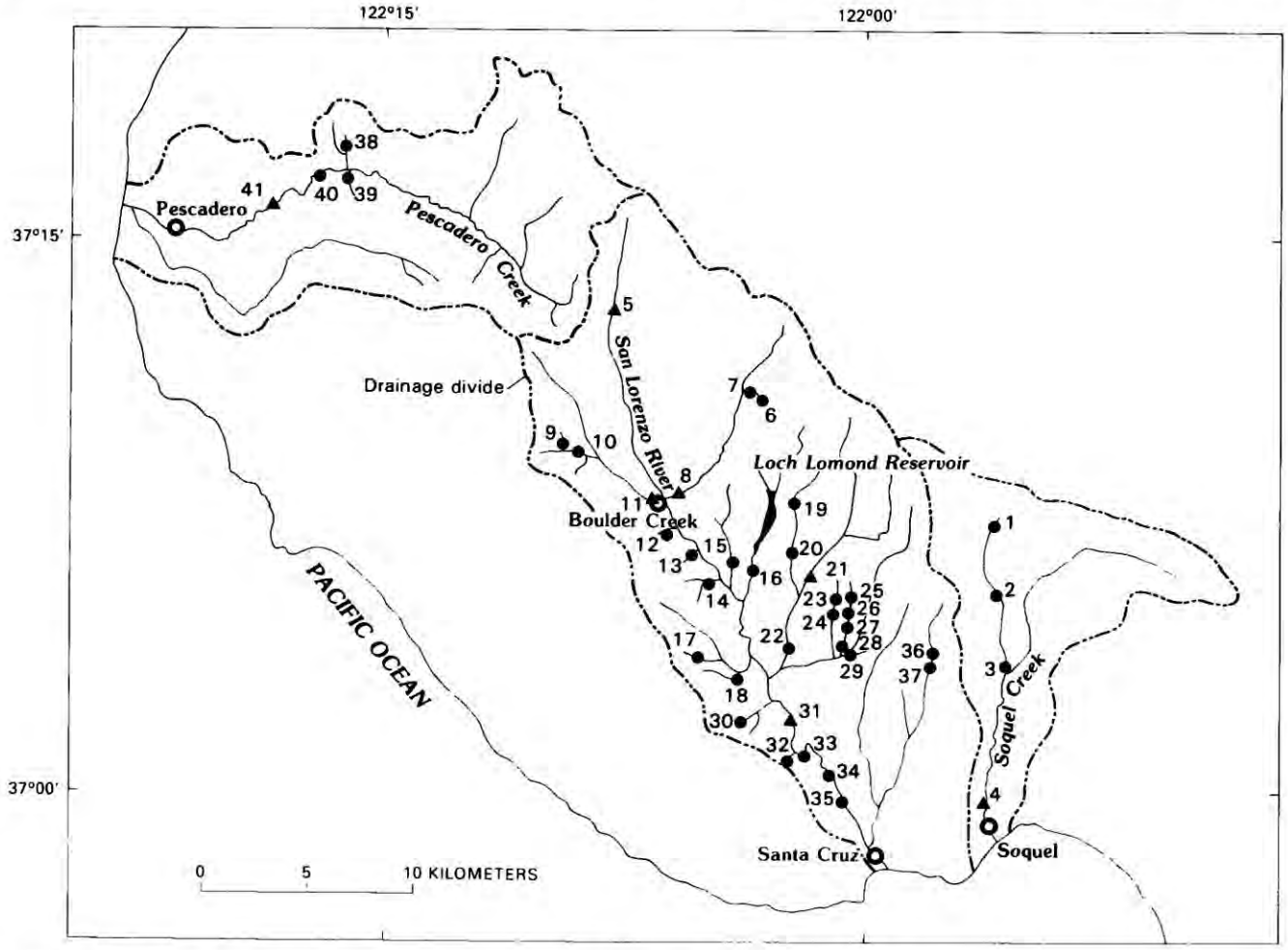


FIGURE 14.2.—Sketch map of study area, showing locations of study sites (dots) and U.S. Geological Survey stream-gaging stations (triangles). Numbers refer to tables 14.1 and 14.2.

TABLE 14.1.—*Summary of physiographic parameters and channel scour or filling due to the January 3-5, 1982, storm at study sites in the Santa Cruz Mountains*

Study site (see fig. 14.2)	Drainage basin	Drainage area (km^2)	Average bankfull width (m)	Channel gradient (m/m)	Average depth of channel fill (m)	Average decrease in cross-sectional area (m^2)	Weighted decrease in cross-sectional area (m^2/km^2)
1	Hester Creek--------	0.3	1.3	0.15	0.06	0.09	0.30
2	do----------	2.8	5.5	.023	.23	3.19	1.14
3	do----------	5.3	4.1	.0033	.08	.33	.06
[1]4	Soquel Creek--------	104.1	---	.0050	.39	---	---
[1]5	San Lorenzo River---	16.0	---	.021	.41	---	---
6	Unnamed tributary---	.3	1.2	.20	.08	.38	1.27
7	do----------	.4	.9	.11	0	-------Scour------	
[1]8	Bear Creek----------	38.5	8.4	.0070	.31	.26	.01
9	Unnamed tributary---	.2	---	.20	0	-------Scour------	
10	Jamison Creek-------	3.4	4.2	.050	.16	.73	.21
[1]11	Boulder Creek-------	29.3	8.4	.16	.03	.55	.02
12	Unnamed tributary---	.1	---	.36	0	-------Scour------	
13	do----------	.1	---	.20	---	---	---
14	Marshall Gulch------	2.8	3.5	.011	.07	.99	.35
15	Love Creek----------	7.3	4.0	.025	.15	.92	.13
16	Newell Creek--------	23.2	7.6	.015	0	.30	.01
17	South Fall Creek----	1.1	1.1	.73	0	-------Scour------	
18	Bennett Creek-------	1.0	1.2	.011	.04	.06	.06
19	Lompico Creek-------	2.8	2.9	.033	.22	2.33	.83
20	do----------	5.5	2.2	.029	.42	2.82	.51
[1]21	Zayante Creek-------	28.7	7.9	.017	.05	.78	.03
22	do----------	32.9	6.9	.010	.31	3.27	.10
23	Lockhart Gulch------	1.7	2.8	.040	.49	1.53	.90
24	do----------	2.0	2.0	.022	.84	11.97	5.99
25	Ruins Creek---------	.8	1.5	.030	.51	4.19	5.24
26	do----------	1.0	1.7	.039	.08	.92	.92
27	do----------	1.9	2.5	.029	.72	3.09	1.63
28	do----------	2.0	2.4	.023	.17	.65	.33
29	Bean Creek----------	13.7	4.6	.010	.30	5.34	.39
30	Gold Gulch----------	2.2	2.1	.043	.09	.90	.41
[1]31	San Lorenzo River---	288.8	19.0	.017	.47	8.67	.03
32	Unnamed tributary---	.1	---	.82	0	-------Scour------	
33	San Lorenzo River---	291.8	15.2	.0050	.46	40.02	.14
34	do----------	297.4	25.9	.0030	.46	23.04	.08
35	do----------	300.8	18.6	.0020	.46	21.88	.07
36	Branciforte Creek---	5.8	5.2	.013	.20	2.32	.40
37	do----------	7.3	5.4	.0090	.11	.68	.09
38	McCormick Creek-----	2.9	3.8	.034	.13	.59	.20
39	Hoffman Creek-------	.8	1.2	.10	0	-------Scour------	
40	Pescadero Creek-----	107.8	12.6	.0030	.07	2.81	.03
[1]41	do----------	118.9	13.9	.0040	.22	8.6	.07

[1]U.S. Geological Survey stream-gaging station.

reaches were measured on 1:24,000-scale topographic maps and thus represent average gradients above reaches. Local irregularities in gradient are not represented in these data.

Channel conditions portrayed on vertical aerial photographs taken on February 15, 1982, at a scale of 1:8,000 were compared with conditions depicted on preflood photographs. The steep, redwood-dominated hillslopes in the study area, coupled with low midwinter sun angles, made airphoto identification of flood effects possible only at the wider reaches of high-order channels.

Changes in channel geometry were more rigorously quantified at U.S. Geological Survey stream-gaging stations (fig. 14.2) by comparing changes in channel profiles drawn normal to the direction of streamflow (crossprofile). We compared preflood channel crossprofiles at these sites with postflood crossprofiles measured at similar discharges and at similar times of the year at the same locations. Crossprofile information was also used to gain a historical perspective on the channel changes caused by floodflows during the previous 42 years.

POSTSTORM FIELD OBSERVATIONS

LOW-ORDER CHANNELS

Most small stream channels observed after the storm showed evidence of recent scour (table 14.1). These first- and second-order channels (Strahler, 1954) have drainage areas of less than 0.10 km^2 and local gradients of more than 100 m/km. Many of these channels were scoured through older alluvium, so that underlying bedrock is now exposed (fig. 14.3). Channel fill was prevalent only above artificial constrictions, such as culverts blocked by sediment and by such organic debris as trees and bushes. Most accumulations of organic debris in unconstricted channel reaches formed open frameworks that were ineffective in trapping sediment (fig. 14.4).

Sediment was removed and transported through these steep channels by both high streamflow and debris flows. The effects of debris flows on channel morphology resembled those described by Campbell (1975) and Swanston and Swanson (1976). Some debris flows apparently were highly fluid, and although they transported large volumes of sediment through steep reaches, they caused only minimal channel scour (fig. 14.5). In contrast, other in-channel debris flows stripped large amounts of alluvium and colluvium from steep reaches, commonly exposing bedrock and leaving much more obvious scars on the landscape (fig. 14.6). These effects closely resemble the scouring debris flows described by Campbell (1975), as well as the debris torrents described by Swanston and Swanson (1976). Campbell (1975) attributed variations in the erosive potential of debris flows to gradient steepness and, therefore, flow velocity, and to the moisture content of the moving material. Along low-gradient reaches at the mouths of some channels that received debris flows, large volumes of channel fill were spread over wide areas (fig. 14.7).



FIGURE 14.3.—Scour in second-order channel near Ben Lomond.



FIGURE 14.4.—Open framework of debris jam near Ben Lomond. Note nondeposition behind debris.



FIGURE 14.5.—Minor channel changes resulting from debris flow near the town of Boulder Creek. Note that most soil and vegetation remains in place upstream of house on left. Downstream deposition resulting from this activity is visible in figure 14.7.



FIGURE 14.6.—Scoured trail of debris flow in San Lorenzo River basin near Ben Lomond. Note removal of large amounts of vegetation and colluvium.



FIGURE 14.7.—Deposition and damage on low-gradient slopes below channel shown in figure 14.5. Despite absence of major channel changes upstream, large amounts of debris were transported through the channel and deposited on the low-gradient slopes shown here.

INTERMEDIATE-ORDER CHANNELS

Flood effects in intermediate-order channels varied considerably. Such observations were made primarily along third- and fourth-order channels with drainage areas of 1 to 50 km^2. Although many reaches along these streams showed little or no effects from the storm, significant channel modification was observed along some reaches (table 14.1). Most of these channel modifications occurred where input of colluvium from large streamside debris slides or large debris flows overwhelmed the sediment-transport capacity of the affected channel (fig. 14.8). These effects were generally confined to the immediate area of colluvial input. In such places, large volumes of introduced colluvium were removed by streamflow with little or no effect on downstream reaches (fig. 14.9).



FIGURE 14.8.—Streamside debris slide in Soquel Creek. This slide, which entered the creek from the left side of the photograph, caused locally severe channel changes typical of those observed in many places that received exceptionally intense rainfall.



FIGURE 14.9.—Channel of Soquel Creek, 1.4 km downstream of severe channel changes shown in figure 14.8, showing absence of channel effects downstream of streamside landslide. Nonburial of preflood bouldery alluvium and minimal effects on riparian vegetation indicate a general absence of channel changes in this reach.

The most numerous and severe channel modifications were observed along the midbasins of Zayante and Bean Creeks. Figure 14.10 maps the distribution of weighted changes in cross-sectional area at all the study sites. Comparison of figure 14.10 with plate 2, which shows storm-rainfall totals, and with plates 8 and 9, which show the locations of storm-related landslides, indicates that the most numerous and severe channel modifications occurred in areas that were also characterized by the most landslides and the most storm rainfall. The relation between landslides and rainfall becomes particularly significant when normalized storm rainfall is considered (see chap. 8; table 8.3).

In a few areas, such as at study sites 19, 23, and 24, major channel modifications extended beyond the areas immediately adjacent to individual landslides. The deposits in these areas, which were characterized by poorly sorted, angular to subangular cobbles and gravel, suggested inchannel debris-flow activity (figs. 14.11, 14.12). These deposits were commonly found overlying well-sorted sandy deposits, interpreted to be water-worked alluvium that was deposited before the debris flows. Debris-flow deposits were found only in the higher areas bordering stream channels, such as in overbank areas or on the tops of point bars. Post-debris-flow streamflow probably obscured evidence of debris-flow deposits in lower stream-channel positions.

Debris-flow deposits were found only along reaches adjacent to the most abundant landsliding. The mechanisms for formation of these inchannel debris flows are unclear. The debris flows may have been downchannel continuations of flows that started high in steep tributaries (Takahashi, 1980), or they may have been formed within intermediate-order channels, owing to sudden large increases in sediment load from abundant streamside debris slides and debris flows (Ashida and others, 1981). Some lithologic control was apparent on the occurrence of inchannel debris flows. Debris-flow deposits were found only

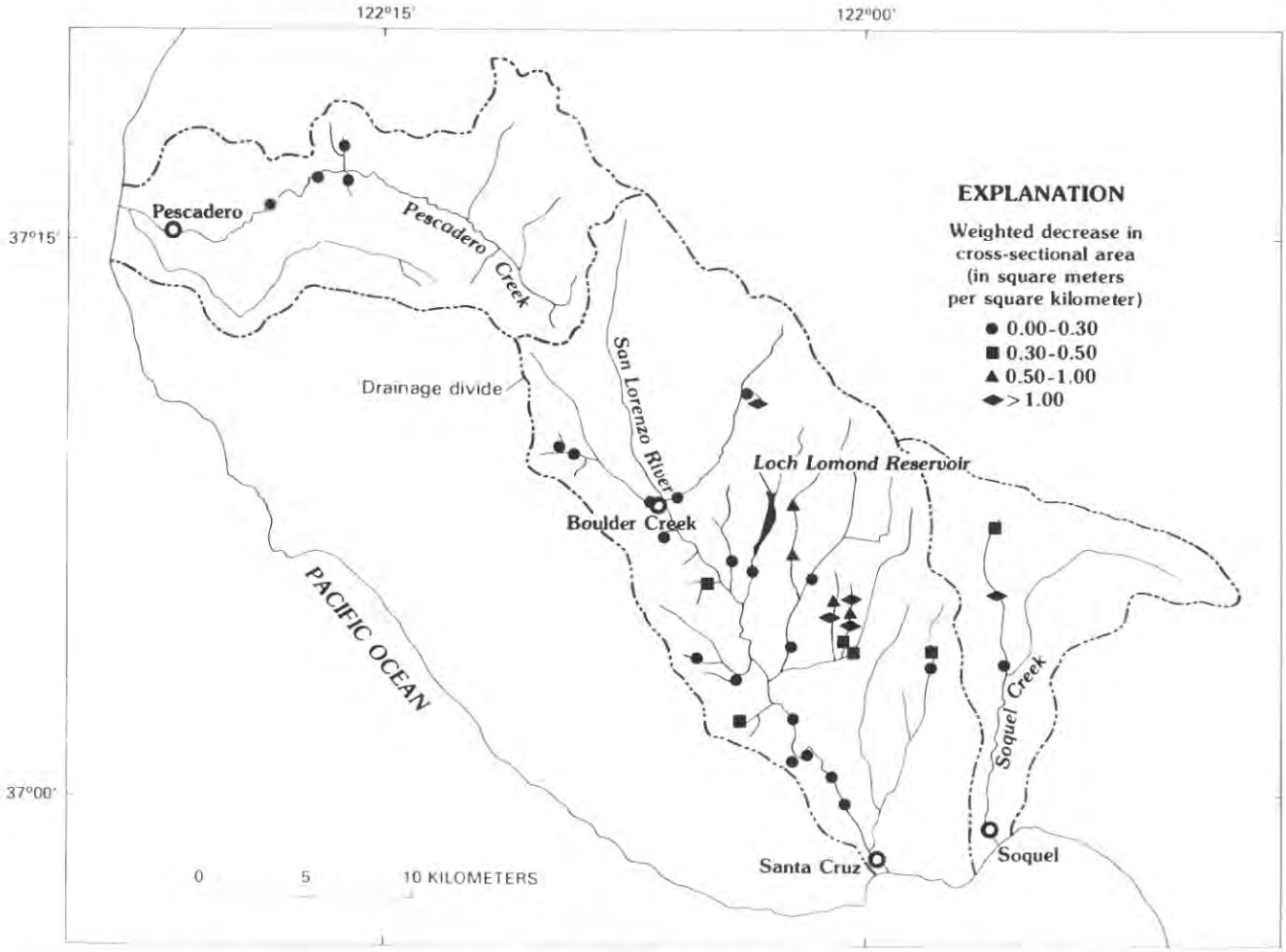


FIGURE 14.10.—Sketch map of study area, showing distribution of measured sediment accumulation. Weighted decrease in cross-sectional area at each site was calculated by dividing the volume of flood deposits by the product of the reach length times the drainage area.

in reaches receiving colluvium derived predominately from well-consolidated mudstone, siltstone, and sandstone. Well-sorted, noncohesive sandy colluvium introduced from the Santa Margarita Formation, though exceptionally voluminous in some places, either was not conducive to debris-flow initiation or did not generate deposits that were easily recognizable as resulting from debris flows. As much as 0.84 m of average channel fill was observed in reaches subjected to debris flows.

Where landslides were numerous but evidence of inchannel debris flows was absent, the transport of colluvium and alluvium by floodwaters generated as much as 0.72 m of average channel fill. The most extensive and voluminous channel fill and overbank-flood deposits in these areas were observed at or near study sites 20, 25, 27, and 29 (figs. 14.13, 14.14). Fluvially reworked deposits consisted predominantly of well-sorted sand and gravel. Naturally extensive deposition appeared to have been augmented by the blocking or overloading of artificial flow constrictions (bridges and culverts) by organic and inorganic debris (fig. 14.15). Some local bank erosion occurred where channel filling was great because streamflow was affected by landslides and (or) organic debris (fig. 14.16).

Changes in intermediate-order channels throughout the rest of the study area were due predominantly to deposition of moderate amounts of well-sorted alluvium. Average channel fill ranged from 0 to 0.30 m in thickness.

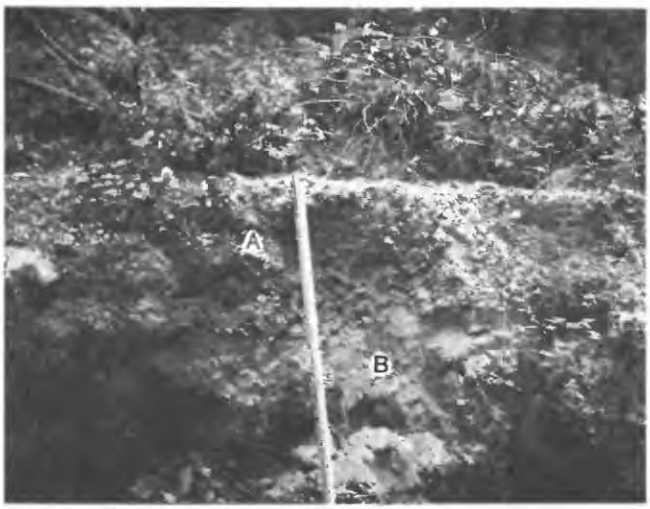


FIGURE 14.11.—Debris-flow deposit in Lockhart Gulch at study site 23. Deposit consists of approximately 0.50 m of poorly sorted material composed predominantly of sand and gravel (*A*) over approximately 0.25 m of well-sorted sand (*B*).



FIGURE 14.12.—Massive flood berms in Lockhart Gulch at study site 24. The sedimentology of the deposits at this site and immediately upstream (fig. 14.11) suggests that the massive deposits along this reach resulted from inchannel debris-flow activity.



FIGURE 14.13.—Channel fill in Bean Creek at study site 29. Note absence of streambanks and burial of riparian vegetation.



FIGURE 14.14.—Overbank deposits in Bean Creek near study site 29. This area contained some of the thickest overbank deposits observed in the study area.

Hydrologists who have a long-term familiarity with the stream-gaging sites in the area noticed a postflood increase in the amount of sandy alluvium filling interstices between cobbles and boulders in many channels (S.H. Hoffard, oral commun., 1982). Although such changes may be pervasive throughout the study area, they generally are too subtle to be documented by the available data. Streambank scour was evident in both highly and moderately affected reaches, but major changes in bank-to-bank channel width were uncommon. Streambanks in the study area are typically quite stable, owing to bedrock control and buttressing by riparian vegetation (fig. 14.17).

HIGH-ORDER CHANNELS

Moderate channel filling was common in larger high-order channels as a result of the storm. Observations were made along channels with drainage areas of 100 to 300 km^2. Average channel fill recorded in these places ranged from 0.07 to 0.47 m; much of this sediment was transported from upstream reaches and deposited in wide, low-gradient reaches characteristic of the high-order channels. Point-bar and overbank deposits of well-sorted sand, though not everywhere particularly thick, were extensive (figs. 14.18, 14.19). Direct colluvial input to the reaches was minimal because flood plains were wider than those of smaller streams and prevented most landslide material from directly entering stream channels. Large amounts of organic debris were removed from and redeposited along many infrequently occupied portions of floodways (fig. 14.20). Because the last major flood to occupy many floodway areas occurred in 1955, vegetation had 27 years to become established in such areas.



FIGURE 14.15.—Damage to manmade structures along tributary to Lockhart Gulch. The volume of water and debris transported during the storm totally overwhelmed the small box culvert (arrow) and destroyed some streamside structures.



FIGURE 14.16.—Streambank erosion caused by deflection of streamflow by organic debris in Love Creek.

CHANNEL-GEOMETRY CHANGES AT GAGING STATIONS

We also assessed storm-related changes in the geometry of intermediate- and high-order channels at seven stream-gaging stations operated by the U.S. Geological Survey (see fig. 14.2), using techniques similar to those of Hickey (1969) and Lisle (1981). We assessed changes in channel crossprofiles and median streambed elevations at five of these stations, using data collected during water-discharge measurements at fixed locations, such as bridges and cableways, and during leveling surveys conducted during indirect measurements of water discharge. When data collected during water-discharge measurements at fixed locations were used, preflood data were selected to conform as closely as possible to the time of year and to the rate of water discharge associated with the available postflood data. This selection limited any



FIGURE 14.17.—Channel widening limited by bedrock along streambanks in Zayante Creek. Although high water along this and many other reaches extended from bank to bank and removed riparian vegetation, it did not cause streamside instability.

ambiguity that might be caused by scour and fill associated with variations in the rate of water discharge or seasonal variations in bed elevations. Median streambed elevations were used rather than mean elevations, to deemphasize the effects of extreme elevations associated with streambanks. Lisle (1981) discussed more completely the ambiguities caused by scour and fill and the use of median streambed elevations.

At two gaging stations, the fixed location for highwater measurements was inappropriate for assessing changes in channel geometry. Discharge measurements on the San Lorenzo River near Boulder Creek were made at a culvert, and those at Zayante Creek at a bridge that severely constricted the channel. At these two locations, changes in channel geometry were assessed by using mean streambed elevations, which were determined during low-flow measurements by wading. This technique introduces additional error because the locations of wading measurements are not precisely fixed in space; Hickey (1969) suggested that an error of ± 0.15 m is associated with such comparisons. Thus, we used mean streambed elevations, rather than median elevations, for these comparisons because of the limited streambank heights associated with these low-flow wading measurements. These elevations were calculated by subtracting the mean depth during the discharge measurement from the gage height associated with the measurement. Elevations of the thalweg (the deepest part of the channel) were also calculated for all study sites by subtracting the greatest depth during a given discharge measurement from the gage height associated with that measurement. The data on channel geometry at the stream-gaging stations are summarized in table 14.2. Preflood and postflood cross-profiles of Boulder Creek and the San Lorenzo River are shown in figures 14.21 and 14.22.



FIGURE 14.18.—Flood berm in downstream reach of Pescadero Creek near study site 40. This berm was typical of many observed along downstream reaches of high-order channels in the study area.



FIGURE 14.19.—Detail of flood berm shown in figure 14.18. This and most other such deposits observed along high-order channels in the study area consisted of well-sorted crossbedded sand. Lens cap for scale.

Five of the seven stream-gaging stations showed some degree of poststorm channel filling. The greatest measured changes were on the San Lorenzo River at Big Trees, on Pescadero Creek, and on Soquel Creek. The median streambed elevation of the San Lorenzo River rose 0.85 m, the bed of Pescadero Creek rose 0.56 m, and the bed of Soquel Creek rose 0.39 m. Changes in streambed elevations at the other stations ranged from 0.46 m of scour on Bear Creek to 0.06 m of fill on the San Lorenzo River near Boulder Creek.

VARIATIONS IN CHANNEL RESPONSE TO PREVIOUS STORMS

Available data from 1936 to 1982 for the stream-gaging station on the San Lorenzo River at Big Trees indicate that the January 1982 storm affected that channel at least



FIGURE 14.20.—Organic debris deposited along downstream reach of Soquel Creek.

TABLE 14.2.—*Prestorm and poststorm stream-bed elevations at U.S. Geological Survey stream-gaging stations*

[Median and mean bed elevations are heights above gage datum. Do., ditto; n.a., not available]

Stream-gaging station	Location	Study site (fig. 14.2)	Date	Median bed elevation (m)	Mean bed elevation (m)	Thalweg elevation (m)	Water discharge (m^3/s)	Type of measurement	Location
11160000	Soquel Creek at Soquel.	4	1/15/80	0.52	---	0.32	10.5	Cable------	Cable.
			2/17/82	.91	---	.84	10.2		
11160020	San Lorenzo River near Boulder Creek.	5	12/16/81	---	.50	.41	.04	Wading-----	15 m above gage.
			1/07/82	---	.56	.35	1.09		
11160060	Bear Creek near town of Boulder Creek.	8	3/21/78	1.18	---	-.15	n.a.	Survey-----	60 m above gage.
			1/15/82	.72	---	-.21	n.a.		
11160070	Boulder Creek near town of Boulder Creek.	11	3/24/78	1.49	---	.94	n.a.	do-------	8 m above gage.
			3/10/82	1.34	---	.92	n.a.		
11160300	Zayante Creek at Zayante.[1]	21	11/25/81	---	.31	.21	.15	Wading-----	55 m above gage.
			1/19/82	---	.31	.24	.30		
11160500	San Lorenzo River at Big Trees.	31	1/11/80	.45	---	.33	29.2	Bridge-----	At bridge.
			1/06/82	1.30	---	.90	40.8		
			3/16/82	.98	---	.68	15.0		
11162500	Pescadero Creek near Pescadero.	41	2/21/80	-.27	---	-.40	30.6	do-------	Do.
			1/06/82	.29	---	-.14	15.6		

[1]Bed elevation controlled by concrete weir with dropoff on downstream side.

as much as any other storm did during the period of record. Effects of previous floods in February 1940 and December 1955 are evident in the variation of mean low-flow streambed elevations (fig. 14.23) and by comparison of channel crossprofiles before and after those floods (figs. 14.24, 14.25). The data plotted in figure 14.23 indicate that the effects of these earlier storms were no greater than those associated with moderate flows during the rest of the record. Figures 14.23 and 14.24 show that the 1940 storm caused slight channel filling, which persisted to some degree until 1943. Figure 14.25 shows that the 1955 storm, unlike the 1940 and 1982 storms, caused moderate channel scour.

Differences in storm characteristics may have caused the observed contrast in channel response. The 1940 storm was a short, discrete event that occurred late in the rainy season. In contrast, the 1955 storm was a longer event that occurred early in the rainy season. The greater

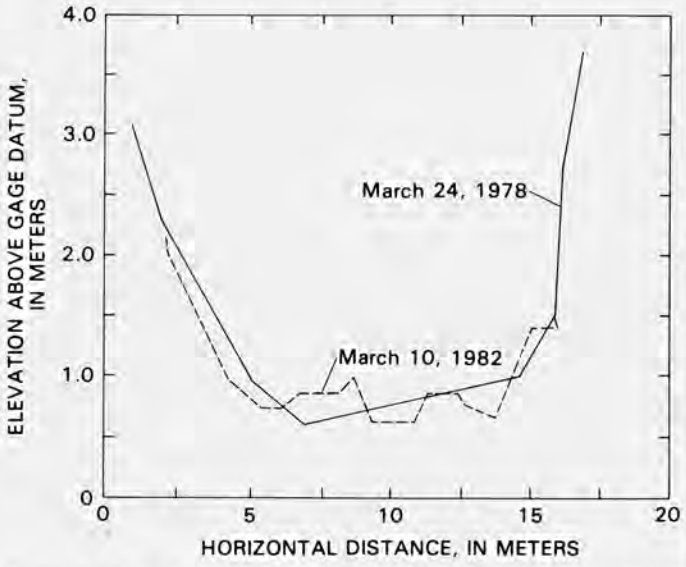


FIGURE 14.21.—Crossprofiles of Boulder Creek before and after the storm, showing dates of survey.

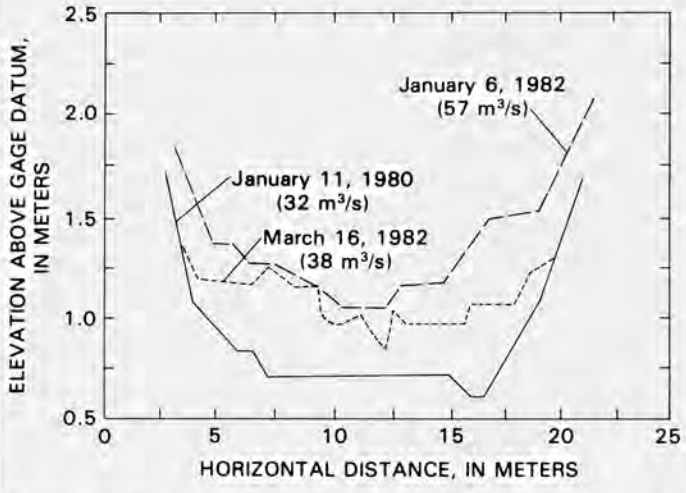


FIGURE 14.22.—Crossprofiles of the San Lorenzo River at Big Trees before and after the storm, showing dates of survey and discharges.

volume of streamflow associated with the 1955 storm may have been sufficient to transport all the available sediment and thus cause net channel scour at the stream-gaging station on the San Lorenzo River. Total 7-day streamflow during the 1955 storm was 81.4 million m^3, whereas that during the 1940 storm was only 65.3 million m^3.

Streams may also have carried additional sediment supplied by landslides during the 1940 storm. Because that storm occurred later in the rainy season, soil moisture may have been higher, and hillslopes more prone to landsliding. No definitive means exist, however, for assessing the relative amount of landsliding associated with these two storms. Examination of available preflood and postflood aerial photographs was inconclusive, owing to the small scale of the photographs, dense vegetal cover, and the small size of most landslide features.

SEDIMENT TRANSPORT

STORM SEDIMENT TRANSPORT

SAN LORENZO RIVER

Despite the short duration of the January 1982 storm, large amounts of sediment were transported by all stream systems throughout the study area. The total suspended-sediment transport of the San Lorenzo River at the Big Trees stream-gaging station from January 4 to 6 was 940,700 Mg, or 3,420 Mg/km^2. Bedload discharge for these three days has been estimated at 3,320 Mg, or 12.1 Mg/km^2 (L.F. Trujillo, written commun., 1982). The water and sediment discharges for this event are plotted in figure 14.26. The importance of these data may best be viewed from the perspective of the sediment record at this station. The 3-day total of 944,000 Mg is 5.8 times the average annual total-sediment load at this station for the period 1973–80 (table 14.3) and represents 42 percent of all the sediment transported between 1973 and 1980 plus the 3 days of January 4–6, 1982.

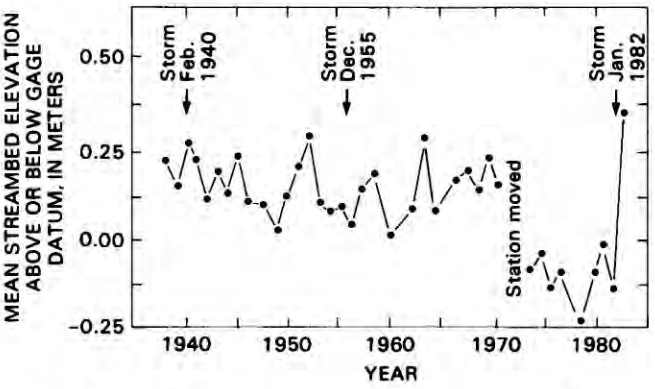


FIGURE 14.23.—Variations in mean streambed elevation of the San Lorenzo River at Big Trees, determined from low-flow water-discharge measurements between April and October at sites from 30 to 60 m upstream from the gage (pre-1973) and from 0 to 10 m downstream from the gage (post-1973).

The role of extreme events in transporting sediment in the San Lorenzo River resembles that in other mountainous areas of California. Hawkins (1982) assessed the magnitude and frequency of suspended-sediment transport at five stream-gaging stations in northwestern California. His data indicate that 50 percent of the sediment transported by northern California streams is carried by daily discharges that occur on the average of at least 1.9 days per year and that 90 percent is carried

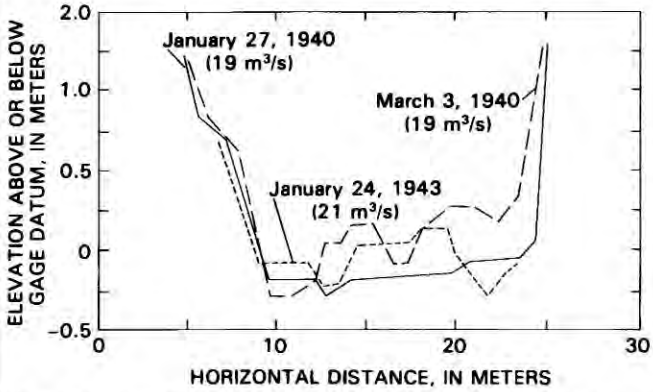


FIGURE 14.24.—Crossprofiles of the San Lorenzo River at Big Trees before and after flood of February 27, 1940, determined during discharge measurements at stream-gaging station. Dates of survey and discharges are given. Note tendency toward channel filling as a result of the flood.

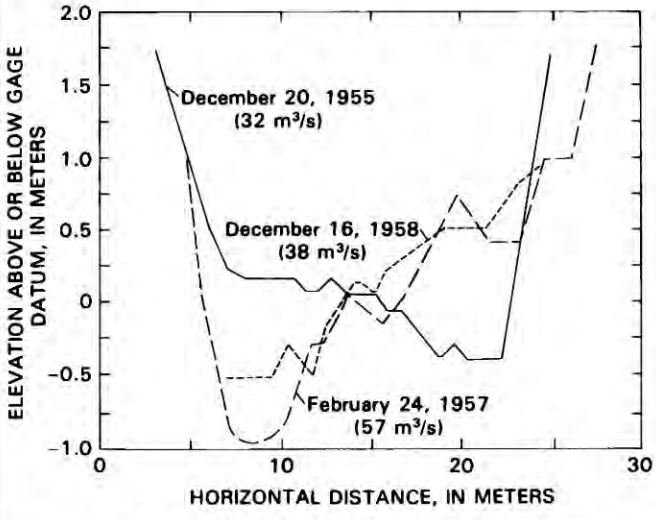


FIGURE 14.25.—Crossprofiles of the San Lorenzo River at Big Trees before and after flood of December 23, 1955, determined during water-discharge measurements at stream-gaging station. Dates of survey and discharges are given. Note tendency toward channel scouring as a result of the flood.

by flows that occur on the average at least once every 12.5 years or 0.08 days per year. Similar analysis of suspended-sediment data collected between water years 1973 and 1980 and January 4–6, 1982, on the San Lorenzo River indicate that 50 percent of the suspended sediment is transported by daily discharges that occur on the average of 2.0 days per year and that 90 percent is carried by flows that occur on the average of once every 15 years or 0.07 days per year. Infrequent flows appear to be more important in determining the magnitude and frequency of sediment transport in both these areas than in many other areas for which data are available (Wolman and Miller, 1960; Webb and Walling, 1982). The effectiveness of infrequent flows probably results from the large amounts of sediment delivered to channels by hillslope processes operating during high-flow periods, the steepness of stream channels in these mountainous areas, and the effects of highly varying flow, as described by Baker (1977).

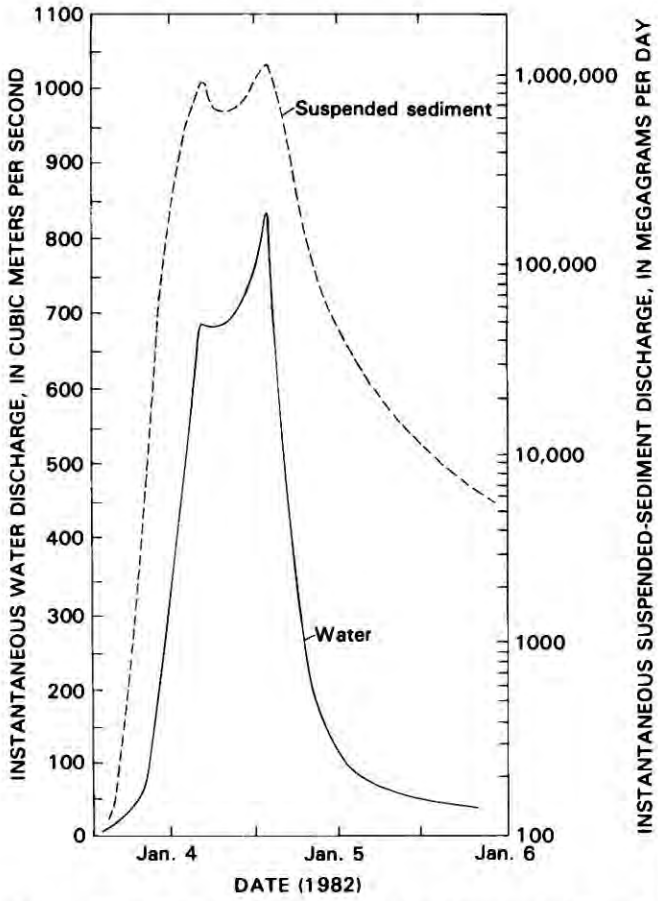


FIGURE 14.26.—Water and sediment discharge from the San Lorenzo River at Big Trees during period of the January 1982 storm.

TABLE 14.3.—*Sediment discharge of the San Lorenzo River at Big Trees (sta. 11160500)*

[Time interval is water year unless otherwise noted. All values in megagrams; n.a., not available]

Time interval	Suspended-sediment discharge	Bedload discharge	Total sediment discharge
1973	397,500	13,450	411,000
1974	84,700	10,600	95,300
1975	58,200	5,540	63,740
1976	481	94	575
1977	510	7	517
1978	304,400	12,400	316,800
1979	26,200	655	26,850
1980	383,500	3,740	387,300
1981	16,900	n.a.	---
Jan. 4–6, 1982	940,700	3,320	944,000

SEDIMENT TRANSPORT AT UNGAGED SITES

Although the most easily quantifiable information on sediment transport is from the San Lorenzo River, post-flood field observations indicate that sediment transport throughout the entire study area was high. Scour in lower order channels, deposition of midchannel and overbank alluvium and debris-flow deposits, and accumulation of large volumes of alluvium behind such flow constrictions as culverts and bridges all indicate that large amounts of sediment were transported by nearly all the stream systems.

The massive accumulations of sediment behind such flow constrictions as culverts and debris jams indicate that large amounts of sediment were transported through reaches where the flood caused minimal effects on channel geometry or riparian conditions. The amount of sediment transported by one small steep tributary (study site 13, fig. 14.2) was estimated by measuring the amount of sediment deposited behind a small-diameter (1 m) culvert that plugged during the storm (fig. 14.27). High-water marks indicate that the wingwall surrounding this culvert was overtopped by flow and that water was ponded 40 m upstream from the culvert. The flat tops of the backwater deposits, their concordant tops, and the sediment adhering to a tree in the center of the deposit (fig. 14.27) suggest that backwater deposits filled the entire area and that the void now present in the middle represents scour by flow after unplugging of the culvert. Field measurements indicate that approximately 145 m^3 of sediment remained behind the culvert and that, assuming that sediment once filled the void between the flat-topped lateral berms, scour has removed approximately

575 m^3 of sediment. Using a specific weight[1] of sediment of 1.3 g/cm^3, these data indicate a possible 3-day unit-sediment yield of 9,400 Mg/km^2, approximately 2.7 times the 3-day unit-sediment yield of the San Lorenzo River at Big Trees. Unit-sediment yields, which are calculated by dividing sediment yields by the drainage area, are used in drainage-basin comparisons. The estimated 3-day unit-sediment yield for this small tributary seems high but is not unreasonable in comparison with the suspended-sediment data collected on Zayante and Newell Creeks between water years 1970 and 1973 (Brown, 1973; U.S. Geological Survey, 1973). The maximum annual yield reported for these two study sites was 2,760 Mg/km^2 for Zayante Creek during the moderate-flow year 1973. The episodicity of sediment transport in this terrain and the somewhat lower gradient of Zayante Creek (table 14.1) indicate that yields of far more than 2,760 Mg/km^2 can be expected from the tributary at study site 13. Sediment yields from tributaries in which storm effects were particularly severe may have been significantly higher than that estimated at study site 13, particularly in stream reaches subjected to debris flows.

REGIONAL COMPARISON OF SEDIMENT TRANSPORT

Despite apparently high sediment yields during storms in the Santa Cruz Mountains, from a regional perspective, annual unit-sediment yields of the San Lorenzo River are not exceptionally high. Low average annual runoff, rather than sediment-transport capacity, accounts for this discrepancy. In comparison, the 720-km^2-area Redwood Creek watershed in northwestern California has one of the highest annual unit-sediment yields in the conterminous United States (Janda and Nolan, 1979b). The San Lorenzo River's suspended-sediment-transport curve, which relates volume of water to suspended-sediment discharge, resembles that of Redwood Creek (fig. 14.28). Although the San Lorenzo River has a potential for high annual sediment transport, annual unit-sediment yields are limited by the amount of annual runoff. For example, the average annual runoff for Redwood Creek between water years 1973 and 1980 was 1,200 mm, whereas the average annual runoff from the San Lorenzo River during the same period averaged 420 mm. Average annual unit-sediment yields of the San Lorenzo River and Redwood Creek reflect their difference in average annual runoff. The average annual unit-sediment yield between 1973 and 1980 for Redwood Creek was 1,333 Mg/km^2, whereas that for the San Lorenzo River was only 590 Mg/km^2.

[1]Specific weight is from data presented by Brown (1973, fig. 1); 1.3 g/cm^3 is the density of the most sand rich deposit collected by Brown in the Loch Lomond Reservoir. This density was used because its grain-size distribution most nearly resembles that of sediment transported by the tributary studied.

The suspended-sediment discharge associated with a given water discharge on the San Lorenzo River increased after the January 1982 storm (fig. 14.29). Other investigators have noticed similar effects of storms on suspended-sediment-transport curves elsewhere (Anderson, 1968; Brown and Ritter, 1971; Knott, 1971). Janda and Nolan (1979a) suggested that the sediment discharge associated with a given water discharge directly depends on the amount of sediment readily available for transport. This observation is consistent with the poststorm situation in the San Lorenzo River because much of the sediment responsible for poststorm channel fill is in mid-channel areas and thus is available for transport during a wide range of flow conditions.

The suspended-sediment-transport curve of the San Lorenzo River did not shift upward until after the storm, as confirmed by the fact that a sample taken on January 6 falls within the prestorm relation. Because no suspended-sediment samples were taken during the slow recession in streamflow that occurred from January 6 to 20, it is not known exactly when the shift in the suspended-sediment-transport curve occurred. It seems reasonable, however, to assume that this shift occurred in response to a rise in streamflow on January 19–20. This shift may have been caused by downstream migration of sediment from upstream areas during the January 19–20 event. The higher position of the suspended-sediment-transport curve of the San Lorenzo River in figure 14.29 is probably temporary, as was the case elsewhere. The shift will last only as long as excessive sediment deposited during the storm remains in the channel.



FIGURE 14.27.—Backwater deposits resulting from plugging of culvert at study site 13.

INTERACTIONS OF PROCESSES WITHIN WATERSHEDS

RELATIONS BETWEEN SEDIMENT TRANSPORT AND CHANNEL CHANGES

The relation between sediment transport in tributary and mainstem channels displayed during the January 1982 storm seems to be consistent with that observed in other steepland watersheds (Kelsey, 1977; Nolan and Janda, 1981). Steep stream gradients and relatively high water discharge per unit area from smaller areas generally caused the sediment-transport capacity of small streams to be exceptionally high during the storm and resulted in channel scour. The propensity for scour in these steep first-order channels was aided by minimal colluvial input. These streams are only slightly incised into the surrounding hillslopes, hillslope segments adjacent to them are not particularly expansive or steep, and streamside landslides are relatively scarce. The sediment removed from these steep streams was transported to higher order channels, which generally have gentler gradients and lower unit runoff. Where sediment delivery from tributaries exceeded the transport capacity of higher order channels, filling resulted.

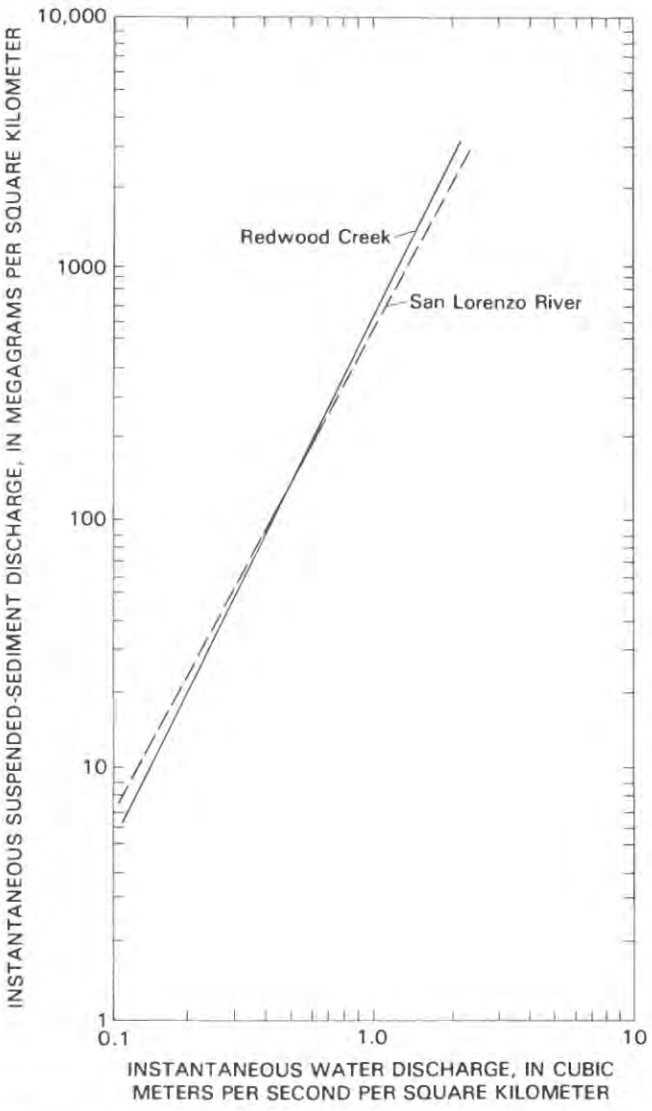


FIGURE 14.28.—Suspended-sediment transport during 1973–80 for the San Lorenzo River at Big Trees and for Redwood Creek at Orick. Curves were fitted to data by regression analysis; coefficients of determination: San Lorenzo River, 0.94; Redwood Creek, 0.95.

INTERACTION OF HILLSLOPE AND STREAM-CHANNEL PROCESSES

Although the link between channel processes in the Santa Cruz Mountains appears to resemble that in steep terrain elsewhere, the interactions of physical processes in stream channels and on hillslopes contrast with such interactions in other areas. In the Santa Cruz Mountains, local geology and the distribution of rainfall intensity apparently control the extent of changes in channel geometry during major events. During the January 1982 storm, major depositional effects on stream channels were limited to reaches that received massive amounts of colluvium from landslides. Areas of most abundant sliding were, in turn, limited to areas of maximum precipitation intensity.

Although large volumes of sediment were transported out of highly affected channel reaches, this sediment did

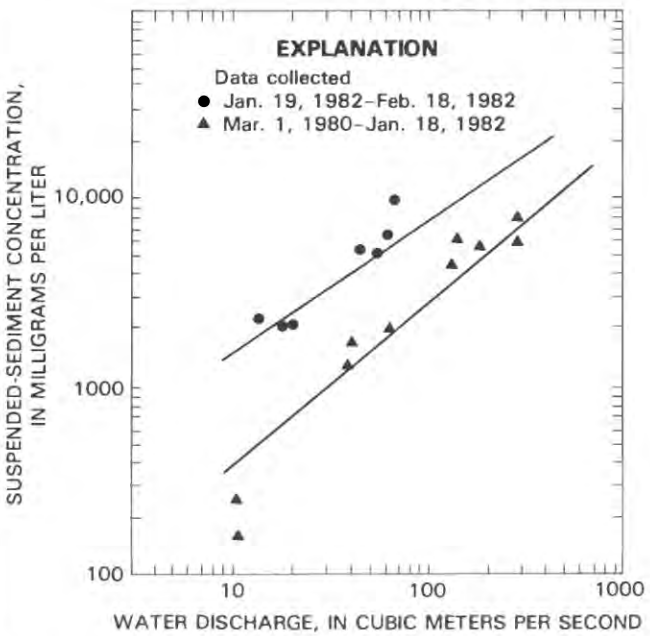


FIGURE 14.29.—Suspended-sediment transport of the San Lorenzo River at Big Trees. Curves were fitted by eye.

not cause widespread downstream channel modification. The high sediment-transport capacity of streams, due at least in part to steep gradients and the sandiness of the sediment load, limited downstream effects. Bedrock banks or dense and well-rooted riparian vegetation limited channel widening in most reaches. The absence of major increases in channel width, coupled with the relative stability of the lower parts of many streamside hillslopes, limited the amount of streamside landsliding. Much of the landsliding related to the storm apparently resulted from failures initiated in the upper parts of hillslopes in response to high-soil-moisture conditions (see chap. 5) and not from undercutting associated with channel widening.

CONTRAST WITH HILLSLOPE AND STREAM-CHANNEL INTERACTION IN OTHER STEEP TERRAINS

The interactions between hillslope and stream-channel processes in the Santa Cruz Mountains contrast with the interactions of these physical processes in steep terrains elsewhere in California. Studies by Stewart and LaMarche (1967), Janda and others (1975), Kelsey (1977), Harden and others (1978), and Lisle (1981) have illustrated that storms in northwestern California have had catastrophic effects on channel morphology throughout large drainage basins. High streamflow during these storms initiated numerous streamside debris slides by undercutting the toes of the inherently unstable hillslopes that occur throughout the area (Harden and others, 1978). The large volumes of colluvium from these debris slides overloaded the transport capacity of most channels and resulted in massive channel filling. Evidence has been reported for as much as 4 m of fill and channel widening by more than 100 percent in the Redwood Creek drainage basin as the results of a major storm in 1964 (Harden and others, 1978).

Stream channels in the rapidly eroding terrain common in northwestern California are particularly prone to aggradation because they commonly contain large amounts of sediment even without the effects of storms. This sediment includes deposits from previous storms (Janda and others, 1975), in addition to yearly input from persistently active mass movement (Harden and others, 1978; Janda and Nolan, 1979b). When this terrain is subjected to a major storm, stream channels already contain large amounts of readily transportable alluvium, and unstable streamside hillslopes found throughout the area fail easily when undercut by streamflow. This set of conditions appears to be responsible for initiating a series of positive-feedback loops during which colluvium from landslides causes channel aggradation and widening, which initiates further bank undercutting and streamside landsliding (Colman, 1973). This loop can result in widespread channel aggradation and hillslope failures even away from the locus of initial failure and channel fill.

Unlike stream channels in northwestern California, intermediate- and high-order streams in the Santa Cruz Mountains can transport a high percentage of the sediment supplied to them during storms because of their high transport capacity, because the sediment is commonly sand size, and because, before a major storm, channels do not contain exceptional amounts of sediment. Large volumes of storm-related sediment can be introduced into a channel before its transport capacity is reached. When channel modification does occur in the Santa Cruz Mountains, it does not propagate downstream. Limitation of bank undercutting by the bedrock along streambanks effectively prevents the positive-feedback effects seen in northwestern California.

GEOMORPHIC EFFECTIVENESS OF THE STORM

As discussed in the preceding sections, the effects of the January 1982 storm on channel geometry in the studied basins varied considerably. Scour was pervasive in lower order channels. In most of the study area, however, the effects of this storm on intermediate and high-order channels were minimal and generally no more severe than those of more frequently occurring events. In some localities, the storm caused severe channel modification that can be expected to last for a long time. Because of these varying effects, both the concept of geomorphic work suggested by Wolman and Miller (1960) and that of geomorphic effectiveness suggested by Wolman and Gerson (1978) seem to be relevant in assessing the role of the storm in shaping channel morphology throughout the study area.

Wolman and Miller (1960) suggested that the amount of geomorphic work done during individual events is measurable, at least in part, by the amount of sediment transported in such events. Their data indicate that for such streams as the Rio Puerco in New Mexico and Brandywine Creek in Delaware, daily discharges which recur more frequently than 6 and 11 times per year, respectively, transport 50 percent of the sediment and that these moderate flows control the shape of some fluvial landforms. Although the flows that transport 50 percent of the sediment in the Santa Cruz Mountains recur only 2 days per year and are therefore less frequent than in the study areas cited by Wolman and Miller, flows with such moderate recurrence intervals appear to have the potential to influence the morphology of channels in the Santa Cruz Mountains. The data presented here indicate that channel morphology along most intermediate- and high-order reaches is probably shaped at least as much by frequently occurring flow events as by catastrophic events. The morphology of such reaches either was not

modified significantly by the flood or is expected to return quickly to the preflood configuration. In such reaches, the concepts of Wolman and Miller (1960) probably apply.

In other reaches, however, channel geometry was severely modified by the flood of January 1982. These were the reaches scoured to bedrock by exceptionally high runoff or subjected to severe deposition related to the influx of overwhelming volumes of colluvium. Although most of these severe changes will subsequently be modified during more moderate events, the imprint of the storm will remain for a long time. In these areas, the concept of impact persistence proposed by Wolman and Gerson (1978) seems to apply. This concept suggests that if effects produced by a high-magnitude storm persist longer than the recurrence interval of the storm itself, the storm has long-term geomorphic significance. In such cases, the landscape always reflects the effects of high-magnitude storms. Channel geometry in these areas cannot be totally attributed to effects of more moderate events.

Storm-related changes in highly affected reaches persist because the forces tending to restore channel geometry to prestorm conditions either are not totally able to remove storm-related effects, act very slowly, or act only intermittently. The massive amounts of colluvium supplied to highly affected intermediate-order reaches by debris flows and debris slides totally rearrange channel morphology. The effects of this large volume of material are probably visible in the crossprofiles and longitudinal profiles of these channels for long periods. Channels incise through this debris and leave colluvial remnants along channel margins. Filling of voids left by scouring debris torrents or by simple scour in some first-order channels depends on slowly operating processes, such as soil creep. Although most overbank deposits in the study area are not particularly massive, some of the more massive of these deposits may persist for a long time. The degree to which the less massive overbank deposits can resist weathering and subsequent overbank flooding is uncertain.

The long-term persistence of effects of previous storms was evident in the landscape before the January storm. Field observations revealed multiple sites along intermediate-order streams where channels are exceptionally wide and gently sloped and where colluvium mantles adjacent hillslopes. Channels in these reaches are lined with well-established vegetation. These observations indicate that such reaches were probably the depositional sites of ancient landslides. Channels upstream and downstream of these sites are typically much steeper and narrower, and abut directly against steep hillslopes.

The persistence of storm-related effects also depends on the sequence of future events (Bevin, 1981). If the 1982 storm is followed by an exceptionally long storm-free period, the effects of moderate events will become more obvious within the studied watersheds than will the effects of extreme events. The effects associated with future storms will also depend somewhat on the sequencing of those storms. For example, effects of another storm that might follow the one of January 1982 closely in time with maximum precipitation intensities in similar locations may cause substantially less impact than one with maximum precipitation intensities located elsewhere, or one that occurs hundreds or even thousands of years in the future.

In such areas as the Santa Cruz Mountains where debris slides and debris flows can contribute volumes of colluvium sufficient to modify channel geometries, it may be more appropriate to measure the persistence of impacts against the recurrence intervals associated with precipitation intensity than those associated with streamflow. The occurrence of debris slides and debris flows similar to those observed in the studied watersheds depends more on short-duration precipitation intensity (Campbell, 1975) than on the volume of water necessary to produce exceptionally high streamflow. Recurrence intervals associated with peak rainfall intensity for the January storm were considerably higher than those associated with peak streamflow. Although 24-hour precipitation recorded during the storm had estimated recurrence intervals of more than 100 years (J.P. Monteverdi, written commun., 1982), peak streamflows in the study area had estimated recurrence intervals between 7 and 33 years (see chap. 13).

Because of the high precipitation intensity associated with the January 1982 storm, postflood observations of channel behavior probably permitted assessment of the effects of a particularly effective geomorphic event with a relatively rare frequency of occurrence. Observations of the response of stream channels to this event and of gross preflood channel morphology indicate that the morphology of stream channels in the Santa Cruz Mountains reflects the effects of both moderate and catastrophic events. The morphology of most intermediate- and high-order channels appears to reflect the effects of moderate, at least as much as of catastrophic, events. However, the morphology of most steep low-order channels and of localized reaches along higher order channels strongly reflects the effects of extreme events because the scour along these low-order channels and the fill along these isolated reaches of larger channels can persist as long as or longer than the recurrence interval of the storm itself. If such storm-related effects persist for periods exceeding the recurrence interval of the storm, there is a reasonable probability that the effects of multiple storms could be found throughout the studied watersheds. This appears to be the case because the morphology of some reaches shows the influence of deposition of colluvium during previous storms.

SUMMARY

In most of the channels studied, channel changes resulting from the January 3–5, 1982, storm in the Santa Cruz Mountains were not particularly severe and are not expected to persist for a long time. This absence of channel response occurred despite streamflow recurrence intervals of as much as 33 years and the large volumes of sediment that were transported through most stream systems in the study area. Significant channel changes did occur where low-order channels were scoured to bedrock and where colluvial input from debris slides and (or) debris flows was exceptionally voluminous. Depositional changes were mostly observed in areas characterized by maximum precipitation intensities because high pore-water pressures induced by this intense precipitation were a dominant triggering mechanism of landsliding. These major channel changes were commonly local because the positive-feedback loop between hillslope and stream-channel processes that is responsible for downstream propagation of storm-related channel changes elsewhere in California was not found to be effective in the Santa Cruz Mountains. In the Santa Cruz Mountains, bedrock along many stream channels limits the importance of channel widening as a mechanism for triggering stream-side debris sliding; stream-transport capacities are high, owing to steep gradients and sand-size alluvium and colluvium; and channels are relatively clear of sediment before major storms, owing at least in part to the absence of persistently active landslides.

Consideration of channel response to this and previous major storms suggests that channel morphology in the Santa Cruz Mountains is formed by both moderate and extreme events. For example, steep low-order channels generally contain only small amounts of alluvium because alluvium is periodically flushed from them during major storms. Some intermediate-order streams flow through alluvial channels that are relatively wide and flat, owing to deposition related to the influx of overwhelming volumes of colluvium. Elsewhere, channels of this size generally are V shaped and relatively steep, and appear to reflect the effects of moderate, at least as much as of extreme, events. Because the localized effect of a high-magnitude storm can persist longer than the recurrence interval of the storm itself, channel morphology throughout the study area probably reflects the effects of many storms. These effects are apparently scattered throughout the study area, owing to variation in the spatial distribution of maximum precipitation intensity.

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15. EPHEMERAL DELTA DEVELOPMENT AT THE MOUTH OF APTOS CREEK, NORTHERN MONTEREY BAY

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ABSTRACT

The high-intensity rainfall and runoff associated with the January 3–5, 1982, storm led to substantial deposition of sediment at river mouths along the central California coast. This chapter examines the deposition induced by the storm at the mouth of Aptos Creek in northern Monterey Bay.

During and immediately after the peak-rainfall period, a delta formed on the previously straight beach. This delta, which prograded as much as 90 m, deposited an intertidal volume of material of about 23,000 m^3. The clasts deposited from this flood ranged in size from clay to boulders more than 50 cm in median dimension. The flood deposits formed a fining-upward sequence composed of basal flood gravel in a poorly sorted muddy-sand matrix, overlain by horizontally laminated and nonlaminated beds of slightly muddy sand. Immediate reworking of the flood-delta deposits by waves contributed to coarsening of the delta surface.

INTRODUCTION

The January 3–5, 1982, storm, which caused severe landsliding and erosion in onland parts of the northern Monterey Bay area, was responsible for the deposition of large amounts of sediment at nearby river mouths. The purpose of this study was to examine some of the effects on coastal sedimentation at the mouth of one small stream in this area, Aptos Creek (fig. 15.1), including sedimentary structures, grain-size variations, and morphology of the flood deposits.

Larger rivers, such as the San Lorenzo, commonly develop river-mouth bars or deltas annually in response to seasonal winter rains. The high sediment discharge (average sediment load for the San Lorenzo River is 140,000 Mg/yr; Janda and Nolan, 1979) forms seasonal delta deposits that generally are beyond the capacity of the waves to redistribute rapidly. Aptos Creek, however, rarely has any significant deltaic buildup because of its open exposure to waves and its small sediment discharge; thus, this setting is advantageous for determining the effects of a single event (or a closely timed series of events). Other advantages to choosing the Aptos Creek mouth as a study site include: (1) its position on an otherwise relatively straight, unbroken stretch of sandy beach; (2) extensive subaerial exposure of the delta surface at spring low tides; (3) a wide variation in particle size in the flood sediment (from mud through boulder-size clasts); and (4) easy and safe access.

Although numerous investigations have been directed toward sediment source and distribution within Monterey Bay (for example, Arnal and others, 1973), most have focused either on southern Monterey Bay (for example, Dorman, 1968; Combellick and Osborne, 1977; Porter and others, 1979; Clark and Osborne, 1981), an area of extensive sand-mining operations, or on the coastline near the Santa Cruz Yacht Harbor (Griggs and Johnson, 1976, 1979). None of these studies has dealt with the sediment derived from a single storm.

Acknowledgments.—For their assistance in the fieldwork, I thank Beth Laband, Jeff List, Tom Reiss, Don Hirschaut, Bob Mallonee, Roberto Anima, and Ed Kempema. Zenon Valin, Jr., performed the grain-size analyses and sand-grain point counts.

PHYSICAL SETTING

LOCATION

Aptos Creek debouches into northern Monterey Bay at Seacliff State Beach, approximately 10 km east of Santa Cruz (fig. 15.1). Seacliff State Beach is part of a continuous stretch of sandy coastline that extends from New Brighton State Beach, 3.2 km to the northwest, to Del Mar Beach near Monterey, 47 km to the south. This concave-seaward coastline is broken only by the mouths

of the Pajaro and Salinas Rivers and by the inlet to Elkhorn Slough at Moss Landing. At the mouth of Aptos Creek, the beaches are backed by 30-m-high cliffs composed of semiconsolidated Pleistocene Aromas Sand (Dupre, 1975).

CLIMATE

The Mediterranean climate of the Monterey Bay area is characterized by dry summers, precipitation that exceeds potential evaporation, and more than 30 days of fog per year (Donley and others, 1979). The annual range of mean temperature is less than 9 °C, and the average temperature of the coldest month is above 12 °C. Mean annual precipitation near the coast is 660 mm (26 in.), and about 1,000 mm (40 in.) in the upper watershed (Rantz, 1971).

DRAINAGE-BASIN CHARACTERISTICS

The following pertinent hydrologic information is summarized from the U.S. Army Corps of Engineers (1973). The Aptos Creek drainage basin (including Valencia Creek, Trout Creek, Bridge Creek, and Mangles Gulch) is typical of the small coastal basins of central California in its limited areal extent (63 km^2) but high relief (762 m). Streambed slopes are 1.5 m/km in the lower reaches, 57 m/km in the middle reaches, and 286 m/km in the upper canyons. The lower part of the basin is an area of low-density residential development, whereas the upper part of the basin, which extends 11 km inland, includes parts of Nisene Marks State Park, where development is very sparse.

Flow within the Aptos Creek system varies seasonally. The bulk of precipitation is between October and May,

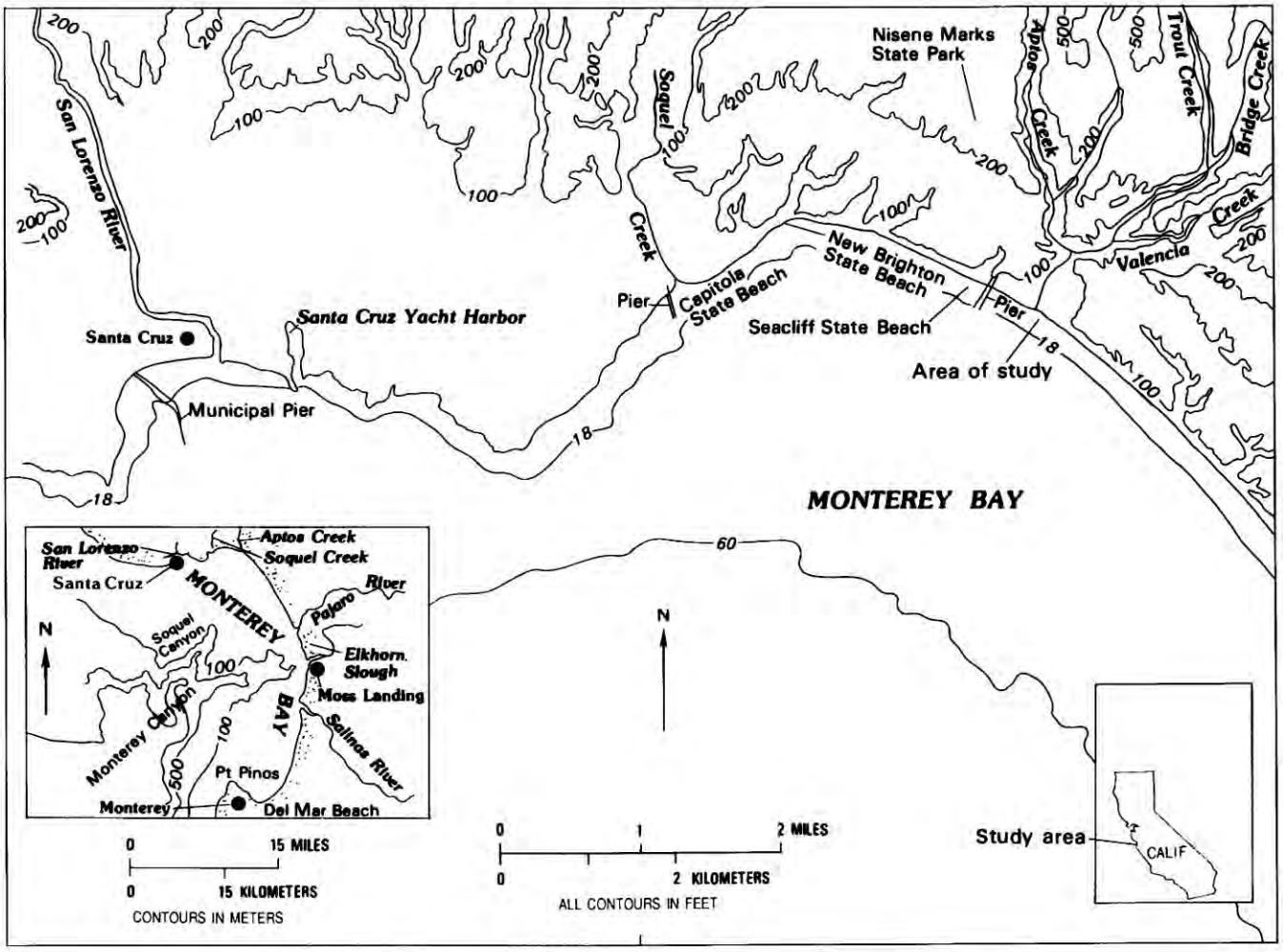


FIGURE 15.1.—Index map of Monterey Bay, Calif., showing location of study area.

and the heaviest rains generally fall between December and March. The drainage system responds rapidly to storms; the water level can rise to flood stage within hours (fig. 15.2). The estimated peak discharge from the creek in previous storms is as follows:

Date	*Estimated peak discharge (m^3/s)*
Jan. 31, 1963	60
Dec. 22, 1964	27
Mar. 16, 1967	37
Jan. 16, 1970	32

During the dry summer season, buildup of the beach berm commonly blocks the river mouth and creates a shallow pond behind the beach. Freshwater discharged into the pond during such blocked conditions presumably percolates through the beach into the sea.

WAVES AND TIDES

The central California coast receives high-energy swell from the North Pacific throughout much of the year. Half of all waves (both sea and swell) that are greater than 1 m in amplitude arrive from azimuths between 300° and 340° (Meteorology International Inc., 1977a, b). The California Coastal Data Collection Program operated a wave-gaging station near the Seacliff Beach Pier sporadically from August 1978 to May 1980. Figure 15.3, a composite of several years' data, illustrates the seasonal probability of exceeding various significant wave heights. Wave heights between January and March typically exceed 1 m 25 percent of the time, and 1.5 m slightly less than 5 percent of the time. The wave direction is predominantly from the northwest at peak periods of 13 to 17 s for swell

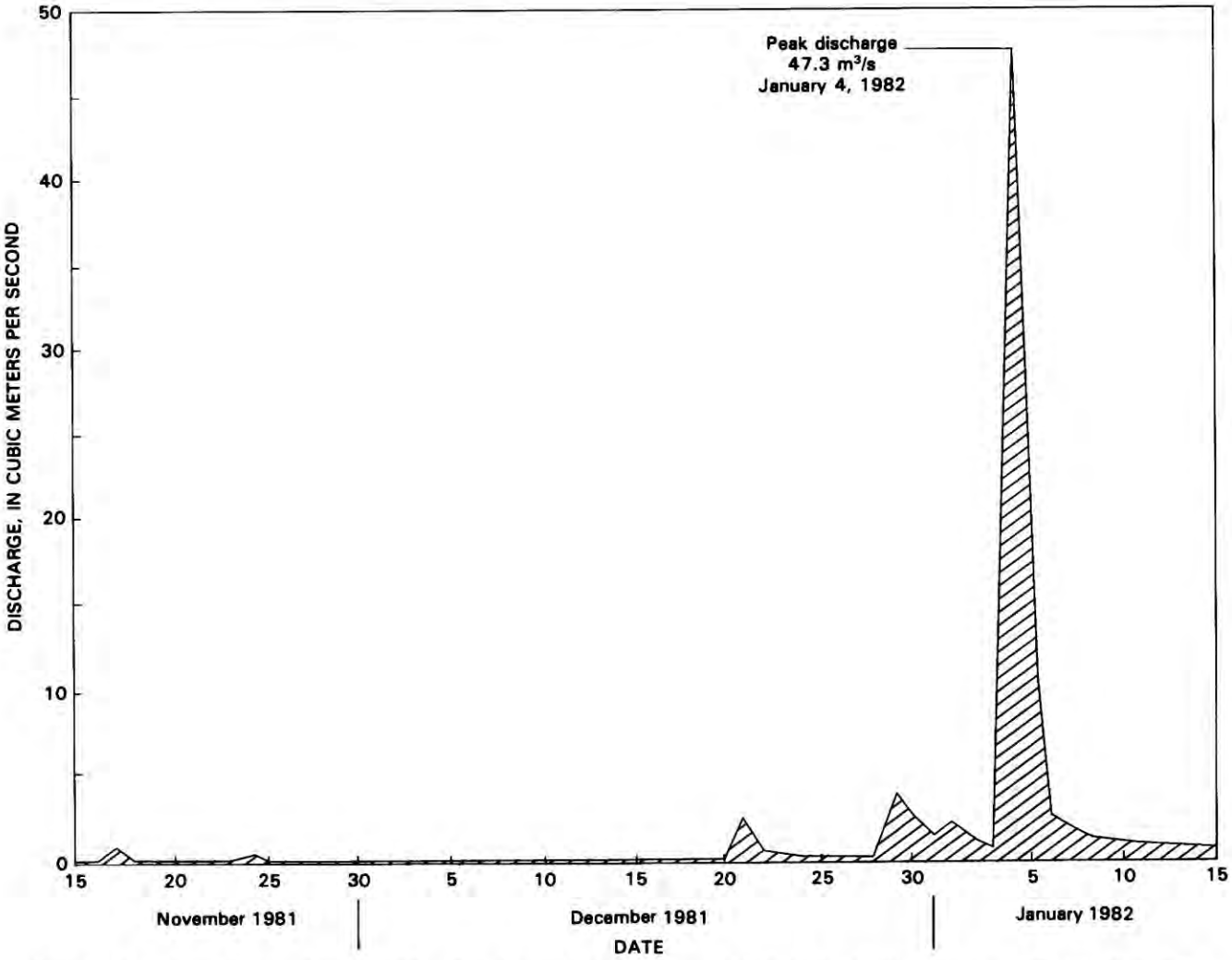


FIGURE 15.2.—Stream discharge from Aptos Creek from November 1981 to January 1982 (Ken Lee, written commun., 1982). U.S. Geological Survey stream-gaging station is just above the Aptos Creek/Valencia Creek junction; the discharge from the entire drainage is about 2.3 times that shown.

and of 5 to 7 s for seawaves. Net longshore drift near the study area is generally regarded as from north to south (Arnal and others, 1973).

The tides in Monterey Bay are semidiurnal and have maximums of 2.6 m during spring tides and of about 0.5 m during neap tides (U.S. National Ocean Survey [NOS] tide tables).

GEOLOGY

Tertiary and Quaternary marine and nonmarine rocks overlie a Mesozoic basement complex composed chiefly of granodiorite. The outcrop area of granodiorite within the drainage basin is small. Of largest areal extent within the basin is the upper Miocene and Pliocene Purisima Formation (Greene and Clark, 1979), composed of semiconsolidated to consolidated, locally fossiliferous marine mudstone, siltstone, and sandstone. The semiconsolidated Pleistocene Aromas Sand, a unit of fluvial, eolian, and shallow-marine depositional environments (Dupre, 1975), composes most of the sequence that is late Pliocene and younger in age. Other Quaternary deposits consist of undifferentiated alluvium and terrace deposits.

THE JANUARY 3-5, 1982, STORM

The Aptos Creek drainage basin was near the center of maximum rainfall from the January 1982 storm. As much as 300 mm (11.8 in.) of rain fell in the lower reaches of the drainage basin (see chap. 2); this amount was probably exceeded in the higher elevations of the basin, inasmuch as the upper parts of nearby basins received more rainfall than did their lower parts.

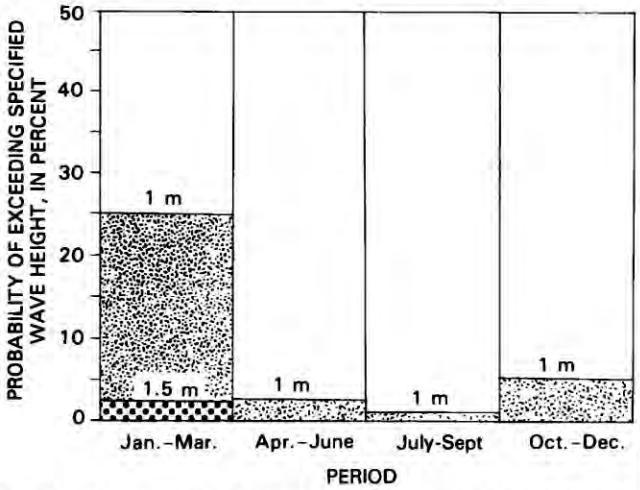


FIGURE 15.3.—Seasonal probability of exceeding wave heights of 1 and 1.5 m at Seacliff Beach. Composite diagram modified from Seymour and others (1979, fig. 21; 1980, fig. 26).

Peak flow for Aptos Creek during the storm was measured at about 110 m^3/s (Ken Lee, written commun., 1982), using slope-area calculations. As shown in figure 15.2, the January 1982 storm far exceeded any previous discharges for the 1981–82 rainy season. The previous high flow at the U.S. Geological Survey streamgaging station (located 1 km upstream from the creek mouth) was 54 m^3/s in 1963; however, the 1955 floodflow was estimated at 99 m^3/s. The 1982 floodflow had a recurrence interval of 40 years for Aptos Creek, as determined using WRC Log Pearson type III flood-frequency analysis (see chap. 12), and the peak discharge was 6.8 times larger than the mean annual flood.

The principal morphologic effect of the storm in the lower reaches of the creek was a widening of the channel. Bank erosion in some areas exceeded 5 m. Because of the numerous artificial channel-stabilization structures (concrete walls, riprap, and so on), it is difficult to identify how much bank erosion would have occurred in the natural state.

The Santa Cruz Harbor array (which provides wave height, period, and direction information) recorded a sizable increase in wave height during passage of the storm front. On January 3, the maximum daily significant wave height was 0.9 m, whereas on January 4 it had increased to 3.2 m (Coastal Data Information Program, 1982). Wave data after January 4 were not transmitted because telephone lines were damaged by the storm. Dominant wave periods during the storm, ranging from 4 to 10 s, indicate seawaves generated from the storm rather than long-distance swell waves. By January 7, the wave height (visual observations) at the mouth of Aptos Creek was approximately 0.5 m. My own observations indicated a rapid decrease in wave size on January 5 and 6. The maximum tidal range during this period (as determined from NOS tide tables, uncorrected for any storm surge that may have occurred during the storm) was 1.75 m. Spring tides occurred on January 7 with a range of 2.6 m.

THE FLOOD DELTA

Flooding on January 4, 1982, generated a deltaic deposit (fig. 15.4) at the mouth of Aptos Creek, where before the storm the beach was essentially linear. The initial cuspate delta was centrally bisected by a slightly sinuous channel bounded by natural levees that were submerged at higher tides. On January 7, the vertical distance between the channel bottom and these levees was less than half a meter. The vertical relief of the channel during peak streamflow is not known. Initial progradation of the subaerially exposed shoreline was approximately 90 m at its maximum point. Pronounced wave refraction seaward

of the delta (delta front and prodelta) indicates that significant amounts of deposition occurred in this area as a result of the flood. Wave refraction and shoaling continued on the delta front for another 4 to 6 weeks after the storm.

Initial northward displacement of the deltaic buildup (fig. 15.5) is consistent with waves traveling from the south-southwest, the direction reported by the Santa Cruz Harbor array. Aerial photographs taken on January 7, 1982 (fig. 15.5), show suspended-sediment plumes deflected to the north at the mouth of Aptos Creek.

On the delta flanks at midbeach level, ridge-and-runnel-type swash bars developed, similar to those described by Wright (1977) and Wright and others (1980). These swash bars, which probably developed within one or two tidal cycles of the initial delta progradation, most likely represent the first pulse of landward and longshore wave-transported sediment.

The volume of deltaic intertidal sediment deposited from this single storm is estimated at about 23,000 m^3. This volume is based on ground measurements using a hand-held Abney level in a pace-and-compass survey, and on areal boundaries determined from aerial photographs, assuming that, before the flood, the intertidal beach configuration at the creek mouth was nearly linear, without large three-dimensional topographic perturbations (U.S. National Aeronautics and Space Administration aerial photographs taken on December 11, 1981, about 3 weeks before the storm, depict a nearly linear beach). The estimate of 23,000 m^3 is probably conservative because the aerial photographs and pace-and-compass survey were not done until 3 days after the storm, when some material had probably been removed by waves. The amount of material transported through the creek mouth was certainly greater than the amount deposited intertidally on the delta. The subtidal part of the delta (the delta front and prodelta) equaled, or possibly exceeded, that of the intertidal delta. Drake and others (1972), in their study of flood-derived shelf sediment from the Santa Clara River, estimated that about twice as much detritus was deposited in offshore areas as retained in the river-mouth delta.

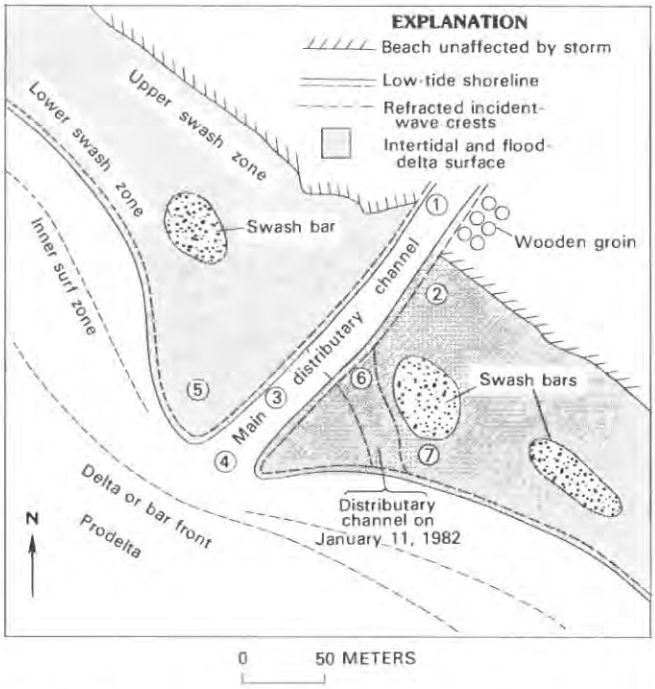


FIGURE 15.4.—Sketch map of mouth of Aptos Creek, showing relative positions of various geomorphic features of the flood delta. Numbers denote locations of cores in figure 15.8.

ANALYSIS OF STORM DEPOSITS

Surficial (upper 2 cm) sediment samples were collected from deltaic, fluvial, beach (primarily the active swash zone), and prestorm (dry backbeach) environments (fig. 15.4). Oriented and undisturbed pipe cores (90 mm diam), with an average length of 0.7 m, were also taken from the sediment deposited in each of these environments. Percentages of gravel, sand, and mud were determined for each surface sample and core subsample. Selection of subsamples from each core was based on stratigraphic intervals of relatively uniform texture and sedimentary-structure characteristics. Sand-textural parameters were determined using standard Rapid Sediment Analyzer (RSA) techniques, and the percentages of mud and of silt and clay were determined using pipette analysis. Textural terms follow the usage of Folk (1980). Epoxy-resin peels of all the pipe cores were made, and selected peels underwent X-ray radiography for analysis of sedimentary structures.

SURFACE FEATURES

Most surficial deposits in the subaerial delta consisted of medium sand, but large areas of this sand were overlain by a deposit, as much as about 30 cm thick, composed primarily of a coarse-textured woodpulp. This woodpulp probably represents the remnants of vegetative debris that was fragmented during its short but active fluvial journey. In addition to the woodpulp, many sticks and logs collected on the beaches and within the sediment adjacent to the creek mouth (fig. 15.6). Scattered pebbles and cobbles were also present on the delta surface.

Bedforms observed on the exposed delta surface after the initial (storm) phase of deposition (Jan. 7, 1982) included those formed both by swash-zone and by fluvial processes. Swash-zone bedforms, such as rhomboid ripple marks, swash marks (Sallenger, 1981), and V-swash marks (Komar, 1976), were widespread on the delta surface except within the active fluvial channels. The swash



FIGURE 15.5.—Mouth of Aptos Creek on January 7, 1982. Wave height is approximately 0.5 m. U.S. Geological Survey aerial photograph.

marks were composed of coarser sand grains, shell fragments, and such low-density material as woody debris. By 3 days after the peak flow, the main channel had started to meander and branch into several smaller distributary channels. Within each of these smaller channels, various ripple types were observed, including straight to sinuous long-crested ripples, three-dimensional ripples, and, where wave influences were strong, near-symmetrical and flat-topped ripples. In shallow swift flows, standing waves and antidunes were present. A small abandoned channel on the delta flank contained two intersecting ripple sets draped by a thin mud layer. The same channel at the level of the low-tide swash zone also contained large (approx 1.2 m diam and 15 cm deep) lunate megaripples, commonly covered with a thin mud layer (fig. 15.7). These megaripples faced in a southerly (east-southeastward to southwestward) direction indicating oblique onshore, shore-parallel, and oblique offshore bedform migration. The bedforms occurred as isolated features, commonly with several meters' spacing between individuals and different facing directions amongst neighbors. Formed during higher tides, they occurred in an area influenced by waves and streamflow.

I examined the sea floor below the surf zone by wading at low tide where a coarse-gravel pavement covered the floor opposite the main stream channel. Any overlying sand was presumably winnowed away by waves.

VERTICAL DISTRIBUTION OF SEDIMENTARY FEATURES

The initial coring (Jan. 11, 1982) established that much of the delta deposit consisted of a sand body (max 80 cm thick, fig. 15.8) containing scattered pebbles, overlying a much coarser gravel deposit. The cores were unable to penetrate this gravel, and probing indicated that it was widespread within the delta. Subsequent erosion of the sand veneer confirmed that gravel underlay most of the delta. Thus, all the cores from the initial coring program,



FIGURE 15.6.—Vegetative debris (mainly twigs and branches) deposited on beach face near mouth of Aptos Creek after a winter flood.

with the possible exception of the one from the upper stream channel (core 1, fig. 15.8), record only the waning phases of flood deposition, that is, postgravel deposition. The relative positions of the sand and gravel and approximate core locations are schematically illustrated in figure 15.9. The length of each core (except the one from the upper stream channel) approximates the thickness of sand overlying the gravel.

The core subsample intervals used for textural analysis are shown in figure 15.8, and the results of the statistical analysis are listed in table 15.1. Composed primarily of sand, the samples also contained as much as 6 weight percent of gravel (mainly granules) and as much as 3.5 weight percent of mud (mostly silt). The mean grain size of the sand fraction for 22 samples ranged from 1.48 to 2.02ϕ (fine to medium sand). Measures of sorting (standard deviation) indicated that the sand analyzed was, at worst, moderately well sorted and that most was well or very well sorted (0.29–0.61ϕ). Skewness values ranged from strongly coarse skewed through fine skewed. About half the samples exhibited near-symmetry in their skewness values.

Sedimentary structures recognized in the Epoxy peels include (fig. 15.8) (near) horizontal planar stratification, low-angle (less than 15°) and high-angle (more than 20°) cross-stratification, and nonlaminated beds that appear somewhat massive.

The horizontal planar stratification comprised distinct laminae ranging from a few millimeters to more than 20 mm in thickness (for example, intervals 1c, 2c, 3c, fig. 15.8). Some of the near-horizontal laminae exhibit subtle truncations and are probably analogous to the horizontal discontinuous stratification of Picard and High (1973). The sediment is composed of well-sorted medium

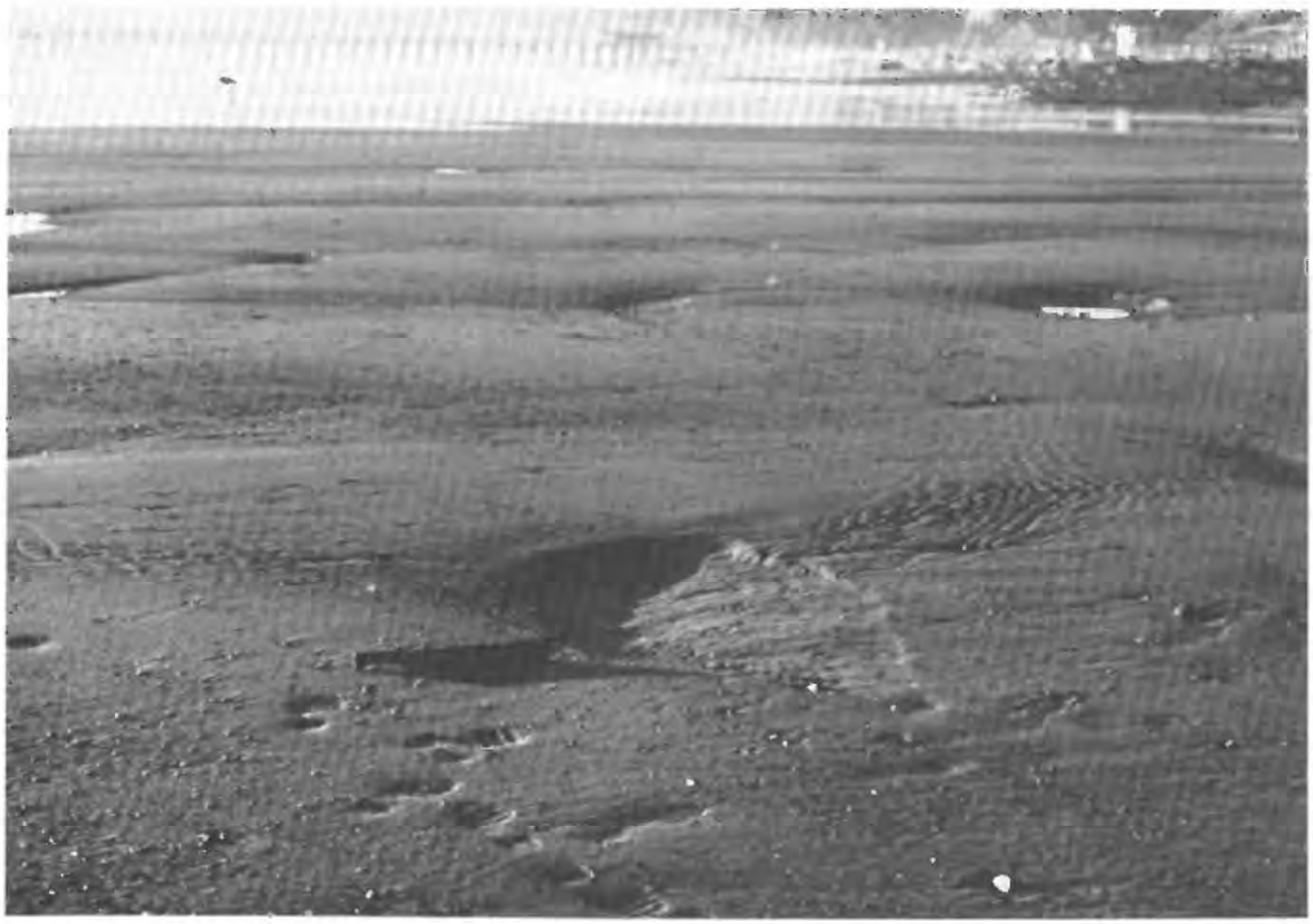


FIGURE 15.7.—Lunate megaripples near a meandering distributary channel at mouth of Aptos Creek. View westward toward ocean. Photograph by H.E. Clifton, taken January 9, 1982.

sand (table 15.1) containing a small percentage of mud that increases downcore. Grading within the laminations commonly is poorly developed, but where the laminations are present, both normal and inverse grading occurs. Contacts between laminae are generally sharp.

Interbedded with the planar-laminated sediment are beds, as much as 10 cm thick, similar in texture to the planar beds but containing no obvious sedimentary structures and appearing somewhat massive (for example, within interval 2c, fig. 15.8). Crude layering, where

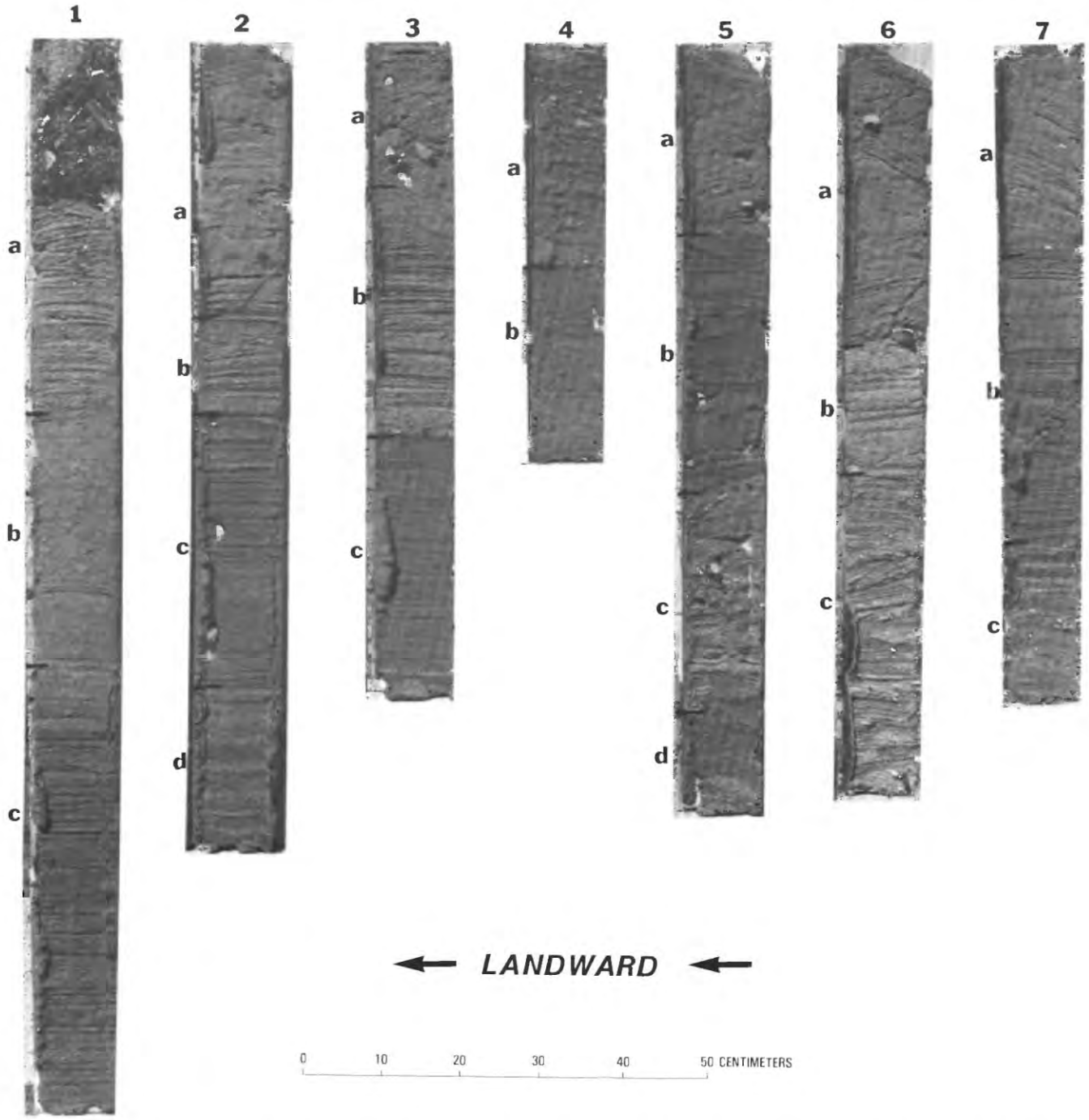


FIGURE 15.8.—Epoxy-resin peels of initial (Jan. 11, 1982) set of oriented pipe cores; landward direction is to left in all cores (see fig. 15.4 for locations). Core numbers and lettered subsample intervals same as for samples in table 15.1.

TABLE 15.1.—*Surficial and downcore sediment-texture parameters*

[All sedimentary-component values in weight percent; statistical parameters for sand fraction only]

Sample	Mean size (Ø)	Skewness	Standard deviation	Gravel	Sand	Silt	Clay
1a	1.52	-0.06	0.50	1.75	96.96	0.82	0.47
1b	1.85	.04	.44	---	96.97	2.38	.66
1c	1.75	.19	.55	---	96.86	2.90	.24
2a	1.72	-.35	.52	5.52	94.31	.17	---
2b	1.76	-.34	.61	1.66	97.43	.90	---
2c	1.80	-.04	.54	1.54	95.52	1.93	1.01
2d	1.79	.10	.50	---	96.65	2.06	1.29
3a	1.48	-.36	.57	6.00	93.75	.25	---
3b	1.83	-.11	.40	---	99.61	.39	---
3c	1.75	.09	.42	---	97.14	1.89	.67
4a	1.77	-.16	.44	1.40	98.60	---	---
4b	1.86	-.01	.61	1.64	95.50	2.07	0.79
5a	1.79	-.15	.40	2.33	96.83	.30	.54
5b	2.02	.09	.44	---	96.46	2.53	1.02
5c	1.48	-.23	.53	5.41	94.21	.21	.17
5d	1.71	-.08	.38	---	99.18	.48	.34
6a	1.80	-.30	.51	2.54	96.46	.49	.50
6b	1.51	-.01	.50	1.35	98.54	.11	---
6c	1.57	-.08	.49	1.07	98.82	.11	---
7a	1.65	-.21	.41	---	99.43	.15	.42
7b	1.78	-.11	.52	---	97.96	1.18	.86
7c	1.64	-.29	.61	2.80	95.83	.47	.90
North beach.	1.81	-.12	.29	---	100	---	---
South beach.	1.60	-.12	.31	---	100	---	---

developed, does not have the same degree of grain segregation as within the planar-laminated sediment. Normal grading is present within some beds. Contacts with adjacent beds are both sharp and gradational.

Cross-stratification within the cores occurs as: (1) low-angle (less than 15°) sets, generally less than 10 cm thick, commonly associated with horizontal planar-laminated beds (interval 2b, fig. 15.8); and (2) high-angle (more than 20°) sets, possibly as much as 20 cm thick (interval 7a). Texturally coarser than the planar-laminated and nonlaminated beds, the crossbedded sediment commonly contains small amounts of gravel (mostly granules or a few pebble clasts) and only very small amounts of mud. Most of the low-angle crossbeds have a landward component of dip,

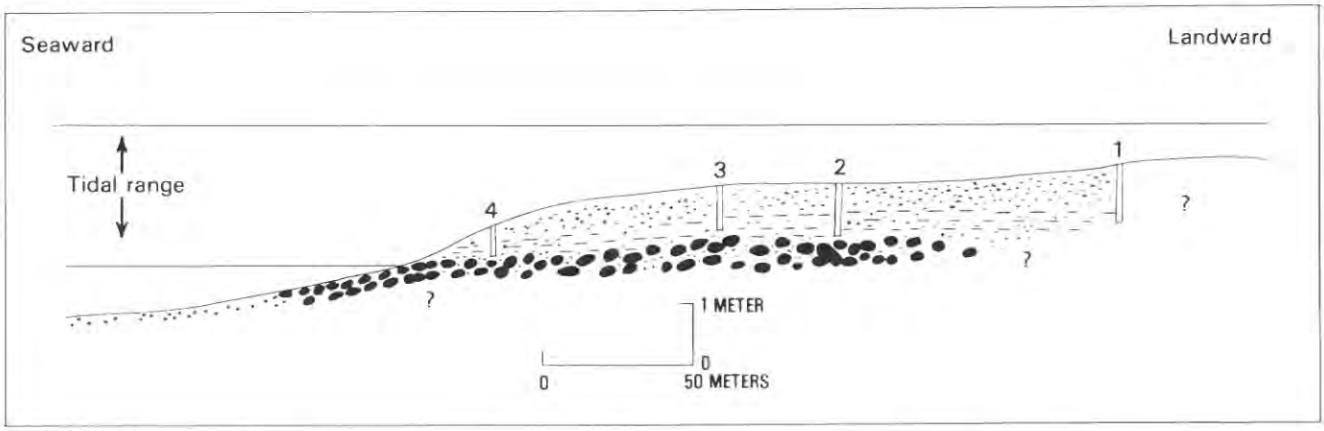


FIGURE 15.9.—Schematic cross section of flood delta, showing relative locations of cores and approximate thicknesses of deposited sand (dots), gravel (ovals), and mud (dashes).

whereas the high-angle crossbeds show both landward (upstream; interval 5a) and seaward (downstream; intervals 6a, 7a) dip directions.

The beach sand sampled (from a section of dry, prestorm backbeach) contained no mud or gravel, was very well sorted, and was negatively skewed (table 15.1). Planar laminations, some of which are inversely graded, are the dominant sedimentary structure.

The above sedimentary structures typically occur in assemblages commonly arranged in a vertical succession. Slightly muddy sand, containing horizontal planar laminations intermixed with nonlaminated beds (lowermost units of cores 1–4), directly overlies the gravel. These muddy-sand beds, which probably consist of distributary-channel fill and subaqueous-levee sand deposited during the waning stages of the flood (see section below entitled "Discussion"), are here referred to as the "flood sand."

Low-angle cross-stratified, horizontal planar-laminated, and nonlaminated, slightly gravelly sand that overlies the flood sand probably represents flood-derived fluvial sediment mixed with marine sediment. Some units are more marinelike, such as core interval 6c (fig. 15.8), which contains shell fragments and onshore- and offshore-dipping low-angle crossbeds.

The upper units of most cores contain medium-scale crossbedding, formed by migration and deposition of lower-flow-regime bedforms (see section below entitled "Discussion"). Both seaward- and landward-dipping cross-strata are present. Although more gravel and less mud distinguishes this sediment from the underlying material, the sediment can still be regarded as deposits of delta reworking.

Fabric, stratification, and grading within the gravel deposits could not be determined quantitatively because the flood gravel occurred below the water table, where trench faces could not be maintained. Although shallow trenching was inadequate for observing sedimentary structures, it did indicate at least two types of gravel-rich deposits. The flood gravel of the intertidal delta (the first type) contained a wide variety of clast sizes and an abundant muddy-sand matrix. As best as could be determined by trenching, most of these gravel beds were not clast supported but, instead, were matrix supported or, at least, lacked a tight gravel framework. In contrast, the gravel beds in the subtidal part of the inner surf zone (the second type) formed a tightly packed network or pavement at least two layers thick. Mud was absent, and sand (much of it coarse) formed a matrix between the clasts. Though probably originally deposited as flood gravel, these beds were quickly reworked and redistributed within the surf zone. Pebble segregation and bed lenticularity, used by Clifton (1973) to differentiate wave-worked from fluvial gravel, could not be properly assessed in the present deposits because of inadequate exposure.

Maximum clast size was greater than 50 cm (median dimension). The average size of the larger clasts was approximately 18 cm (average median dimension of 100 measured clasts in the reworked gravel).

SEDIMENT COMPOSITION

Examination of the core subsamples under a binocular microscope revealed some differences in characteristics between the sand layers. Point-count histograms for the flood, prestorm beach, and deltaic (mixed marine-fluvial) sediment are shown in figure 15.10. The flood sand is characterized by abundant light minerals and lithic fragments (predominantly siltstone and sandstone), and moderate amounts of dark minerals. The beach sand (taken from a non-storm-affected section of backbeach) contains abundant dark minerals and very few lithic fragments. Most of the samples examined contained a mixture of the flood-type (fluvial) and beach-type sand-grain compositions and morphologies (fig. 15.10). This mixture is expectable because the riverborne sediment is rapidly reworked by wave and tidal processes; as the material is deposited at the creek mouth, it immediately undergoes wave reworking. Grain angularity proved to be of little value in distinguishing between sand types; most of the grains examined were either angular, subangular, or subrounded (fig. 15.10). The relatively high percentages of angular grains suggest little abrasion and, therefore, recent introduction to the high-energy coastal environments where the samples were gathered.

The cobble and gravel clasts consisted predominantly of well-indurated fine-grained sandstone and mudstone, in some samples highly fossiliferous, most likely from the Purisima Formation, which forms extensive outcrops within the drainage basin. Other clasts consisted of such manmade materials as concrete and asphalt, and several types of crystalline rock (marble and (or) granite) that could have come either from the riprap used in artificial-stabilization measures along the channel (marble) or from the Mesozoic basement outcrops (granite) within the drainage basin. Because both angular (riprap?) and well-rounded (stream gravel?) crystalline clasts were observed, both of these sources are probable. Additional evidence for recent deposition included angular concrete clasts with painted surfaces and angular blocks of asphalt roadway. It is highly unlikely that painted surfaces and angular corners on soft asphalt would last long under the rigorous conditions in the surf zone. Observations over a 4-month period indicated a deterioration of these features.

DISCUSSION

Although neither accurate measurements nor sediment samples were taken from the delta until 4 days after the

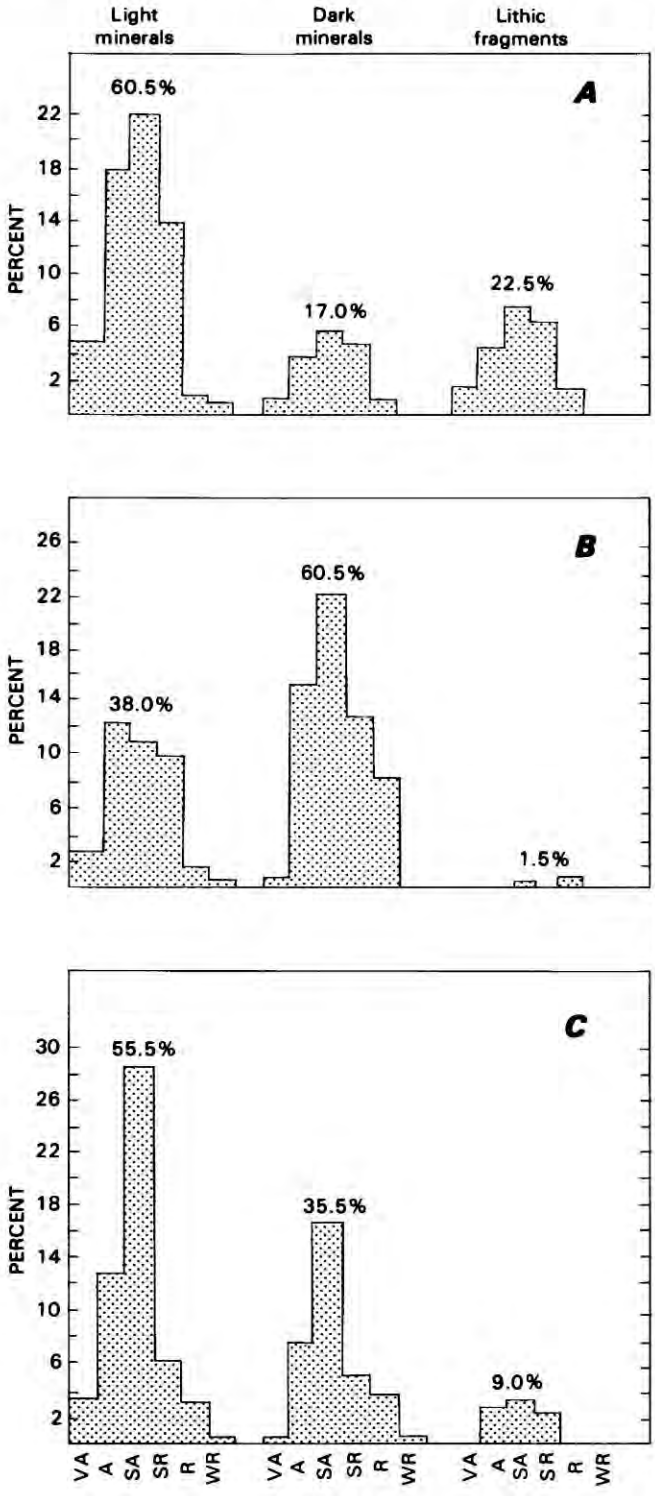


FIGURE 15.10.—Point-count histograms of light (predominantly quartz and feldspars) and dark (opaque and nonopaque) minerals and lithic fragments from three samples (500 grains per sample). *A*, Flood sand. *B*, Prestorm beach sand. *C*, Mixed deposits. A, angular; R, rounded; SA, subangular; SR, subrounded; VA, very angular; WR, well rounded.

storm, some of the processes that occurred during the flood can be deduced from the delta morphology, sedimentary structures, and particle characteristics.

FLOOD-DELTA MORPHOLOGY

Most of the flood delta was built within less than 24 hours. The resulting morphology was a product of the interaction between stream discharge, incident-wave characteristics, and tidal stage (Mikhailov, 1966; Clifton and others, 1973). Because these parameters changed continually during passage of the storm front, delta morphology evolved rapidly. Any discussions of delta form, therefore, must include generalizations based on observations taken at different stages of delta development.

Channel-stabilization measures in the lower half-kilometer of the stream prevent channel meandering and constrain the creek mouth to a fixed position. As the stream channel enters the shoreface, the channel is no longer bounded by rigid artificial levees, and so the streamflow can expand, and its competence to transport sediment is reduced (Harms and others, 1982). In addition, the collision between the outgoing discharge and incoming waves promotes mixing and rapid deceleration of the sediment load (Wright, 1977). The resulting flood deposition proceeded by vertical accretion within the channel and lateral progradation on an essentially undisturbed shoreface. Wave refraction around the prodelta and delta front acted to confine the deposits because of lateral convergence of the breaking waves (fig. 15.5; see Wright, 1977). Observations 2 days after the storm (at low tide) suggest that as the stream channel crossed the beach, it scoured to a depth approximating the low-tide level. As streamflow decreased, the bed aggraded vertically. The actual locus of deposition probably varied longitudinally, depending on the tidal stage. During the storm, the tidal range of 1.75 m could have been responsible for as much as 175 m of difference in mean shoreline position at the creek mouth and have resulted in elongation of the delta. Elongation of the flood-delta perpendicular to the shoreline trend was thus enhanced by (1) unusually high sediment discharge at the creek mouth, (2) a 1.7-m tidal range during the storm, and (3) relatively low wave heights combined with wave refraction and convergence of transport around the delta front.

Between January 5 and 9, the low-tide position of the mouth of Aptos Creek migrated approximately 60 m to the south. In addition, the main distributary channel changed from nearly linear to more sinuous as stream discharge declined. Division of the channel into several branches accompanied this increase in sinuosity. The sequence of channel straightening during peak flows followed by increased meandering as discharge declined

was also observed during storms in February and April 1982. One effect of the change in creek-mouth position will be to deposit sediment laterally along the shoreline.

CURRENT VELOCITIES

Mean flow velocity for the January 1982 flood 0.29 km upstream from the mouth of Aptos Creek can be estimated from discharge data, high-water marks (Ken Lee, written commun., 1982), and published stream cross sections (U.S. Army Corps of Engineers, 1973). The resulting mean flow velocity was about 1.70 m/s. Maximum flow velocities can be estimated by calculating the current needed to transport large clasts at the creek mouth. Calculation of U_{100}, the threshold flow velocity 100 cm above the bed, using the empirical relation $U_{100} = 160\ D^{0.45}$ (Miller and others, 1977), where D is the grain diameter (in centimeters), yields a value of $U_{100} = 9.30$ m/s, or 5.4 times the mean flow velocity. Here, 50 cm was used as the median diameter of the largest clasts transported. This modified Sundborg equation assumes, among other things, material of quartz density, a water temperature of 20 °C, and a kinematic viscosity of 0.01 cm^2/s (Miller and others, 1977). Although most of the clasts are probably close to quartz density, the water temperature and viscosity of Aptos Creek during the storm were very unlikely to be at these typical values. A change in the temperature from 21 to 10 °C (a more probable temperature for Aptos Creek) can affect the discharge of sand by as much as 20 percent (Colby, 1964). Very high suspended-sediment concentrations will also increase the fluid viscosity and thus reduce the threshold velocity (Colby, 1964). Another complicating factor is the composition of the bed during high-flow conditions; did it consist of a gravel pavement, or was it essentially a sandy bottom with gravel material sporadically dispersed? Poststorm observations of the channel bottom in the lower reaches of the stream revealed a primarily sandy bottom with a few gravel clasts. The current needed to transport gravel on a sandy bed is less than that needed to transport it on a gravelly bed (Harms and others, 1982). The calculated maximum flow velocity of 9.30 m/s would most likely represent an upper limit, and on the basis of the above considerations, the maximum current velocity was most likely below that limit.

The calculated U_{100} value for gravel clasts 18 cm in diameter (mean of 100 larger clasts exposed as a poststorm lag) is about 5.90 m/s, or 3.4 times the mean flow velocity. Even though many of the assumptions used to calculate current velocities from clast size may overestimate the streamflow associated with the January 1982 storm, it appears that current velocities significantly greater than the mean flow velocity did occur.

INTERPRETATION OF SEDIMENTARY STRUCTURES

The analysis of sedimentary structures can be an important interpretative tool in reconstructing processes operating at the time of sediment deposition (Harms and others, 1982). However, because the cores taken represent such a limited area of the overall feature, some caution must be exercised in such interpretations. For example, low-angle cross-stratification in the cores may be real (that is, deposition on a gently inclined surface), or it could be high-angle cross-stratification observed in a plane other than the one perpendicular to the direction of bedform migration. Care was taken during the coring operation to note surface bedform type and orientation at each core location, so that any structures preserved in the core tops could be related to known bedforms. Most of the peels are sufficiently thick (1+ cm) that any large component of inclination perpendicular to a major peel face (that is, the photographed surface) is recognizable.

Horizontal planar stratification developed in medium sand can form under various flow conditions and in various environments (for example, Harms and others, 1982), and so its interpretation can be difficult. The planar laminations in core intervals 1c, 2c, 2d, and 3c (fig. 15.8) (the flood sand) probably result from bed aggradation under upper-flow-regime plane-bed transport. The mean grain size (medium sand), water depth (max 2.5 m), and mean flow velocity (1.7 m/s) fall well within the range predicted for upper flat beds (Rubin and McCulloch, 1980). Horizontally laminated sand is a common feature of sandy streamflood deposits (McKee and others, 1967; Williams, 1971; Picard and High, 1973). Although swash lamination formed on beaches is similar in appearance (for example, Clifton, 1969; Sallenger, 1981), the plane beds observed in the lower core segments most likely represent deposition from unidirectional fluvial currents. The location of core 1 in a fluvial channel and the presence of mud in the samples, which is very uncommon in swash-zone deposits, suggest a fluvial setting. The continuation of horizontal planar laminations seaward (cores 2–4, fig. 15.8) along the trace of the main channel indicates that flood-controlled deposition extended at least 75 m from the mean shoreline position. During unidirectional upper-regime flow conditions, the bed is presumed to be planar and near-horizontal. Bedload and suspended-sediment transport is appreciable and nearly continuous (Colby, 1964). The mechanics whereby plane beds are formed under (quasi?) steady-state unidirectional flows are not fully understood but are thought to be related either to turbulent variations within boundary layers (that is, bursting cycle; Bridge, 1978) or to areal variations in sorting or packing (Moss-Kuenen hypothesis, in Harms and others, 1982).

The flood sand also contains the greatest proportion of mud (3.5 weight percent), which apparently was deposited with the sand during upper-flat-bed conditions. Many of the horizontal laminations examined in flood deposits by McKee and others (1967) likewise contain small amounts of silt and clay. Although the mechanism(s) responsible for the (near?) simultaneous deposition of sand, silt, and clay at high flow velocities are poorly understood, one possibility is that the viscous sublayer of the turbulent boundary layer accepts sediment by settling but does not eject it back into the main flow (McCave, 1970).

The nonlaminated beds present another problem in interpretation. Blatt and others (1980, p. 136) attributed the absence of lamination in sand either to very rapid deposition from suspension, to deposition from very highly concentrated sediment dispersions, or to destruction of original lamination by liquefaction soon after deposition. Complete bioturbation, though unlikely here (considering the evidently rapid rate of deposition), may also create homogenous beds (Reineck and Singh, 1980). McKee and others (1967, p. 849) observed "* * * units of virtually structureless sand that contains thick laminae locally" from flood deposits, but they were unable to document the origin of this sand. The intercalation of nonlaminated beds with upper flat beds indicates variations in sediment transport and depositional rates at relatively high flow velocities. At higher tides, incoming waves could interact with stream outflow such that periodic current decelerations (Wright, 1977) could lead to rapid deposition of suspended sediment and bedload. Wave-induced setup, due to surf beat, could last for minutes (Komar, 1976). During this time, greater sediment transport to than from the creek mouth could result in a brief period of increased deposition, primarily from suspension producing nonlaminated or poorly laminated deposits.

The horizontal laminations in the mixed flood and marine sediment could be formed from unidirectional flow under shallow-water upper-flat-bed conditions (Bridge, 1978), in wave-swash processes on the delta (Clifton, 1969), or by migration of low-relief bedforms (McBride and others, 1975). The spatial and temporal variations of these processes can occur over very short distances (meters) and timeframes (minutes). For example, at a low incoming tide, a small distributary channel with shallow (less than 10 cm) flow can form upper flat beds. A rise in mean sea level with the rising tide could cause deceleration of the streamflow and a change to lower-flow-regime bedforms, whereas on an adjacent delta surface, wave swash could be the dominant process.

The cross-stratification within the mixed sediment was formed by various bedforms. The medium-scale landward-dipping cross-strata (intervals 3a, 5a, fig. 15.8) are the products of landward-migrating lunate megaripples similar to that shown in figure 15.7. Core 5 was taken just seaward of one of these lunate megaripples on a smooth sandy surface (see fig. 15.4). The cross-strata in interval 5a (fig. 15.8) record landward migration by slipface avalanching. The high-angle crossbedding near the tops of cores 6 and 7 (fig. 15.8) were formed by slipface progression of straight-crested bars within the distributary channel. The upstream-inclined low-angle crossbeds in core interval 6a (fig. 15.8) were probably formed by stoss deposition on a climbing bedform. The stoss-slope deposits are overlain, first, by lower-angle, then, by higher-angle crossbeds that are oriented downstream (the very top of core 6 was distorted during coring). The laminae in interval 6a appear to be conformable with each other and thus probably represent a continuous sequence of deposition. This core was taken just upstream from the crest of a small straight-crested bar in the main distributary channel. The high-angle cross-strata were formed by sand avalanching on the bar's slipface (cross-strata in interval 7a, fig. 15.8).

Although the cross-stratification within the cores (that is, not at the top, where it can be related to known surface features) presents uncertainties in interpretation, possible mechanisms of formation for the various types of crossbedding can be briefly discussed. Picard and High (1973) attributed low-angle cross-stratification in flood deposits to deposition of point and longitudinal bars with bed inclination in a downcurrent direction. However, most of the low-angle crossbeds at Aptos Creek are inclined upstream. Antidunes were a common feature during the waning stages of the flood, and so many of these upstream-dipping beds may be the products of antidune deposition. Alternatively, landward-migrating bedforms, driven by waves, during a rising tide could form landward-dipping crossbeds (Clifton and others, 1973). The narrow core diameter (9 cm) hampers distinction of low-angle cross-stratification. A set of cross-strata formed by antidunes would be expected to be highly lenticular (Hand and others, 1969), whereas sets formed by lunate megaripples would be trough shaped (Williams, 1971) or, possibly, approaching tabular-planar (Clifton and others, 1971).

VERTICAL SEQUENCE

An idealized composite vertical sequence of the flood deposits and associated reworked sediment is illustrated in figure 15.11. Two types of basal gravel deposits are probable during progradation. The lowermost gravel would be of the surf-zone type, consisting of framework-supported clasts in a clean sand matrix. Segregation of the gravel into well-defined beds that are laterally regular also is likely (Clifton, 1973). Flood-deposited gravel overlies the surf-zone gravel and is characterized by more matrix and a wider range of sediment sizes, especially finer (mud). The flood gravel was deposited during the

peak of the storm runoff, when current velocities were the highest. The surf-zone gravel was initially deposited as flood gravel under highly energetic conditions. Initial deposition of the seawardmost (and thus topographically lowest) gravel occurred at the highest flow velocities and during the lowest tidal stage. Lower streamflow and (or) higher tidal stage is responsible for a landward shift in the center of gravel deposition. During falling tide, flood gravel will be deposited atop gravel that has been reworked by waves. Surf-zone gravel may overlie flood gravel if the entire thickness of flood gravel is not reworked.

The flood sand can overlie both flood and surf-zone gravel. The flood sand is characterized by horizontally laminated and nonlaminated beds and small (less than 3.5 weight percent) amounts of mud. The flood gravel was deposited under peak storm conditions, whereas the flood sand represents deposition under upper-flow-regime conditions during the waning stages of the flood. Plane beds and, possibly, antidunes were present at that time. The flood sand grades upward into reworked sand that contains horizontal laminations, small- to medium-scale cross-stratification, and small amounts (less than 6 weight percent) of gravel. Beds rich in organic material may also be present.

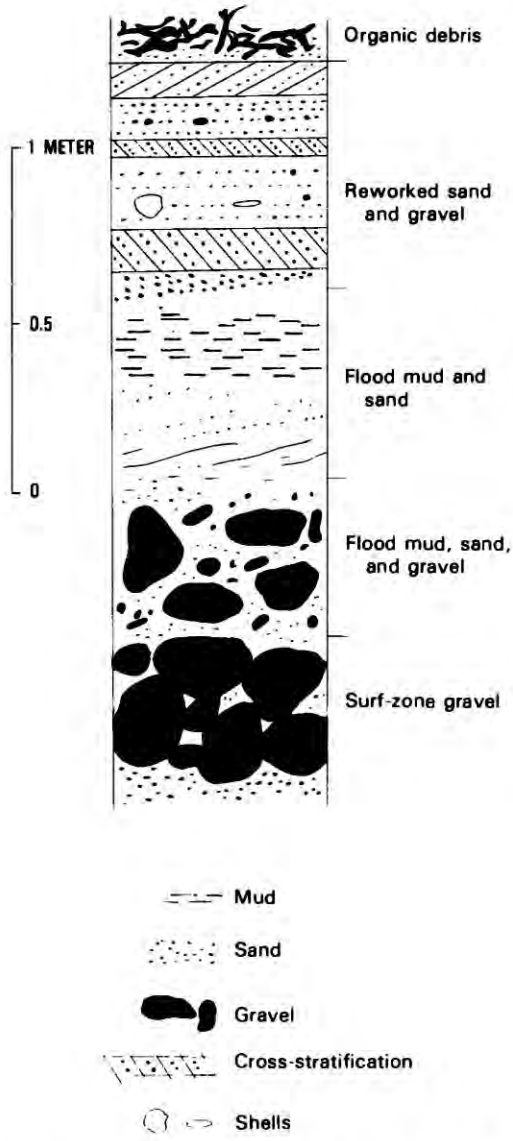


FIGURE 15.11.—Idealized vertical sequence of flood-delta deposits.

SUMMARY AND CONCLUSIONS

An inferred sequence of events at the mouth of Aptos Creek for the January 3–5, 1982, storm, based on the data discussed in this chapter, photographs, and my own observations, is presented in table 15.2.

The following are some of the short-term consequences of a 40-year-recurrence-interval flood on sedimentation at the creek mouth. (1) A cuspate delta was constructed, containing approximately 23,000 m^3 of intertidal sediment. (2) A wide size range of sediment was introduced, including clay and boulders. Mud was deposited on the active shoreface, and gravel was deposited as far as 250 m from the winter shoreline position; the sand fraction appeared to be enriched in lithic grains relative to the beach sand in this area. (3) The flood deposits at the creek mouth constituted a fining-upward sequence consisting of poorly sorted, matrix-supported flood gravel overlain by horizontally laminated and nonlaminated, slightly muddy sand. As flood-derived sediment was introduced to the nearshore, intense reworking by waves was common. (4) Reworked sediment was both horizontally stratified and cross-stratified, and the sand was coarser than the flood sand.

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TABLE 15.2.—*Inferred sequence of storm events at the mouth of Aptos Creek*

[River discharge is adjusted to include entire drainage basin]

Date (Jan. 1982)	Waves	River discharge (m^3/s)	Sedimentation	Geomorphology
3	$\underline{H}_{1/3}$=0.9 m; dominant periods, 10–16 and 4–6 s.	1.4	Very little suspended-sediment transport and even lower bed-load transport.	River mouth open through beach to sea. Beach is essentially linear.
4	$\underline{H}_{1/3}$=3.2 m; dominant period, 4–10 s.	112.6	Increasing amounts of suspended sediment and traction load throughout the day, reaching extremely high amounts. Boulders with median dimensions as large as 0.5 m are transported.	Development of a well-formed cuspate delta. Upstream, creek channel is undergoing significant widening.
5	$\underline{H}_{1/3}$=1.5 m	[1]25.1	Very high sediment discharge still occurring. All but the largest clasts are probably still being transported. Reworking of sediment at creek mouth unable to keep pace with sediment discharge.	Bank caving along stream margins still occurring (at reduced levels). Delta progradation and lateral growth occurring at reduced levels.
6	$\underline{H}_{1/3}$=1.0 m	5.4	Significant amounts of suspended sediment and bedload transport of smaller sizes (probably less than boulder size).	Stream channel has been mostly stabilized. Reworking along delta surface starting to become significant.
7	$\underline{H}_{1/3}$=0.5 m	3.5	Large amounts of suspended-sediment transport, as evidenced by large plumes at river mouth. Observations at beach level indicate movement of pebbles and cobbles.	Branching of distributary channels and an increase in their sinuosity. Development of swash bars on delta flanks.

[1]Rainfall ceased by about 11:00 a.m. P.s.t.; most discharge was from poststorm runoff.

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16. SEDIMENTOLOGIC CONSEQUENCES OF THE STORM IN TOMALES BAY

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ABSTRACT

The January 3–5, 1982, storm caused considerable damage due to increased runoff that resulted in flooding and debris flows in the Tomales Bay area. Sampling in the bay 1 month after the storm showed that flood-derived sediment was generally concentrated near the sources of sediment input (that is, stream mouths). Subsequent sampling 6 to 9 months after the storm showed that this flood layer was still discernible in some areas but totally reworked by organisms in other areas. The absence of a significant amount of sediment overlying the proposed storm layer indicates that major sedimentation in the bay occurs only during such storm events as the one of January 1982.

INTRODUCTION

The flooding associated with the January 3–5, 1982, storm must be considered a major sedimentologic event along the central California coast. The discharge of coastal streams during and immediately after the storm increased tenfold over their normal levels (see chap. 13). This chapter examines the sedimentologic consequences of the storm to one coastal embayment in the area—Tomales Bay. Our goals were to estimate the volume of sediment introduced into the bay by the storm, to delineate the distribution of this sediment, and to assess the importance of storms in the overall pattern of sedimentation within the bay. We present data regarding the extent of physical and biologic reworking of the flood deposits during 6 months following their deposition. We also describe the impact of the storm on the shellfish industry supported by the bay.

SETTING

LOCATION AND MORPHOLOGY

Tomales Bay is in Marin County, Calif., approximately 24 km south of the Russian River mouth and 64 km north of San Francisco (fig. 16.1). The entrance of the bay lies at the southeast end of Bodega Bay. Occupying the rift zone of the San Andreas fault, Tomales Bay is 20.4 km long, ranges from 650 to 2,650 m in width, and encompasses an area of approximately 28.5 km^2 (Daetwyler, 1965). South of Pelican Point, the bay takes the form of a broad trough that is approximately 7 m deep at mean lower low water (MLLW) and shallows to less than a meter southeast of Millerton Point. North of Pelican Point the bay consists of well-defined tidal channels, from 2 to 8 m deep, separated by intertidal or shallow subtidal banks. The depth of the bay averages 3.7 m at MLLW and reaches a maximum of 18.5 m in the main channel west of Hog Island (fig. 16.2).

Tomales Bay supports a small commercial fishing fleet stationed at Marshall and other small communities on its shores. Shellfish are produced from selected places along the east side of the bay, particularly southeast of Toms Point, on the Walker Creek delta, and north of Millerton Point (fig. 16.2).

WAVES AND CURRENTS

Oceanic swell is largely dissipated on the shoals at the mouth of the bay, and so the only waves to influence sediment transport within the bay are generated by local winds. The shape of the bay severely limits the wind fetch in directions other than those approximately parallel to its long axis. The largest wave likely to be generated within the bay (assuming 80-km/h winds) would have a period of about 3.1 s and a height of about 1.1 m (U.S. Army Corps of Engineers, 1973).

Mixed semidiurnal tides drive most of the water movement within Tomales Bay. The mean tidal range is about 0.85 m, and the maximum is 1.6 m (National Climatic Center, 1982, p. 172–173). Johnson and others (1961) found the tidal currents between Toms Point and Pelican Point to have a mean velocity of 37 cm/s and a maximum velocity of 67 cm/s. The tidal currents diminish sharply south of Pelican Point, where the mean velocity is 8 cm/s and the maximum velocity is 27 cm/s (Johnson and others, 1961).

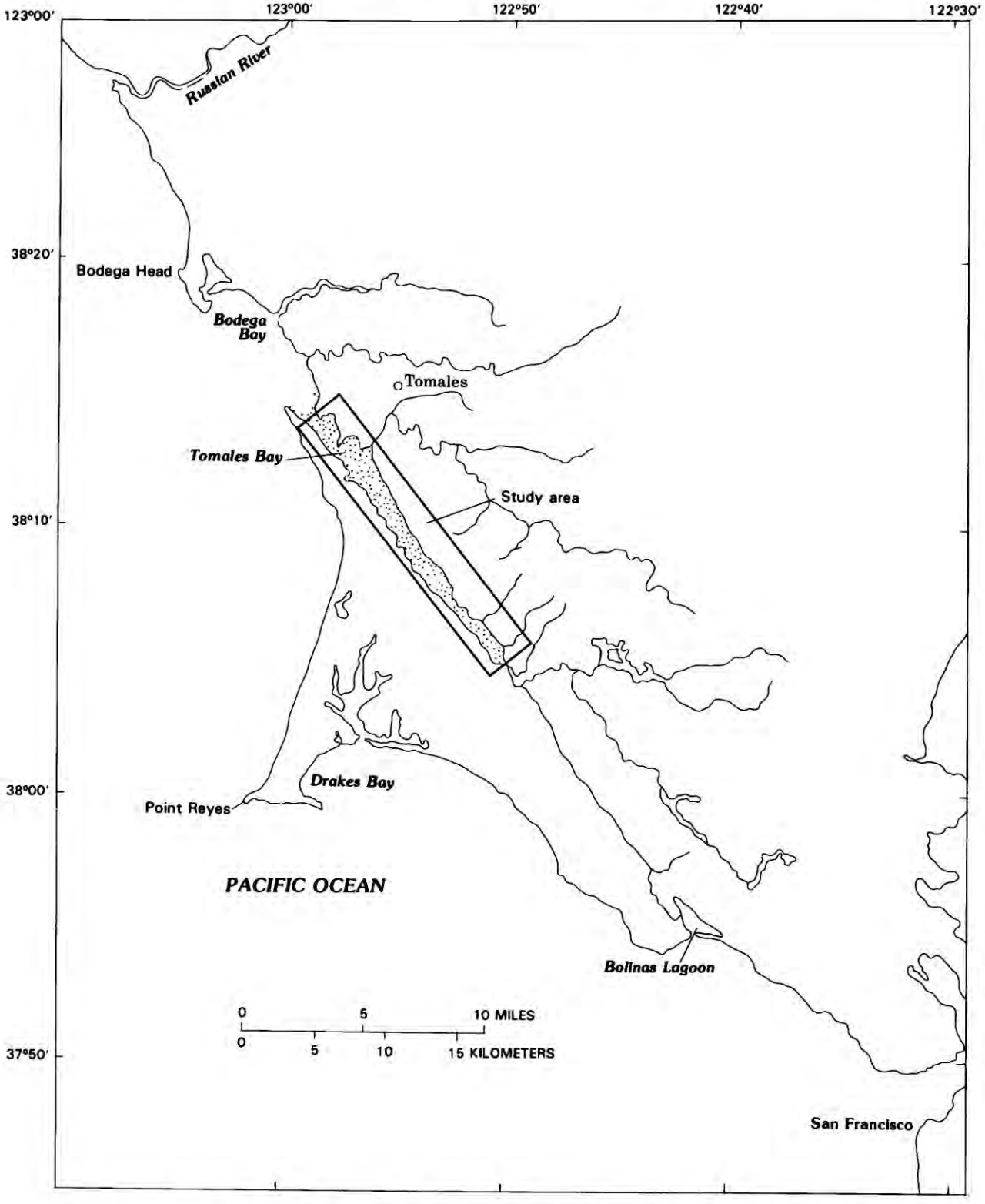


FIGURE 16.1.—Location of Tomales Bay, central California, showing major drainage systems discharging into the bay (from Daetwyler, 1966, fig. 1).

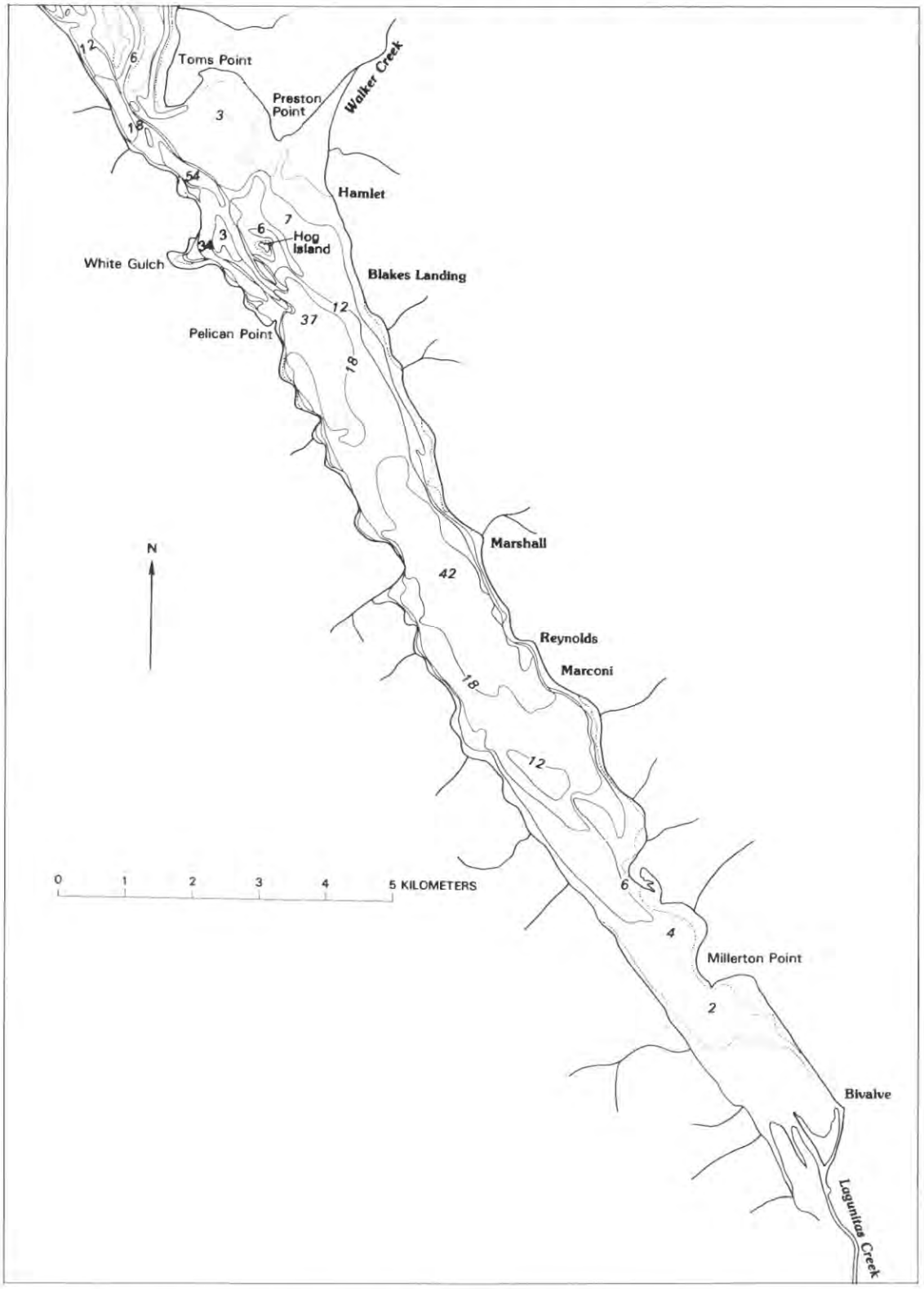


FIGURE 16.2.—Simplified bathymetric map (in feet) of Tomales Bay, showing locations of mouths of Walker and Lagunitas Creeks. Dotted lines mark edge of intertidal flats. Owing to map scale, contours are not traceable in places.

STREAMS

Five ephemeral streams and two perennial streams drain the area surrounding Tomales Bay. The ephemeral streams are Olema, Arroyo, Nicasio, Chileno, and Salmon Creeks. These creeks deposit substantial volumes of sediment that remains near their mouths. Walker Creek, a perennial stream, enters the bay from the east approximately 4.6 km southwest of the bay mouth; it has a drainage area of 96.1 km^2, and a well-defined tidal delta extends from its mouth into the bay (fig. 16.3). This creek, which has been monitored since 1965 from a stream-gaging station located 5.6 km southeast of the town of Tomales, has a mean discharge of 1.212 m^3/s.

Lagunitas Creek, also a perennial stream, supplies conspicuous amounts of sediment to the bay. This stream enters the southeast end of the bay approximately 2 km northwest of the town of Point Reyes Station (fig. 16.4). Of all the streams that enter the bay, Lagunitas Creek drains by far the largest area (211.6 km^2). Flow in Lagunitas Creek is monitored at a stream-gaging station located 2.3 km northwest of Point Reyes Station; the mean discharge is 1.733 m^3/s. Streamflow in the creek is regulated by several artificial lakes (Nicasio Reservoir, Kent Lake, and Alpine Lake).

SEDIMENT

The type of sediment in Tomales Bay differs greatly, depending on its location (fig. 16.5). Daetwyler (1966) summarized the texture of the sediment on the basis of

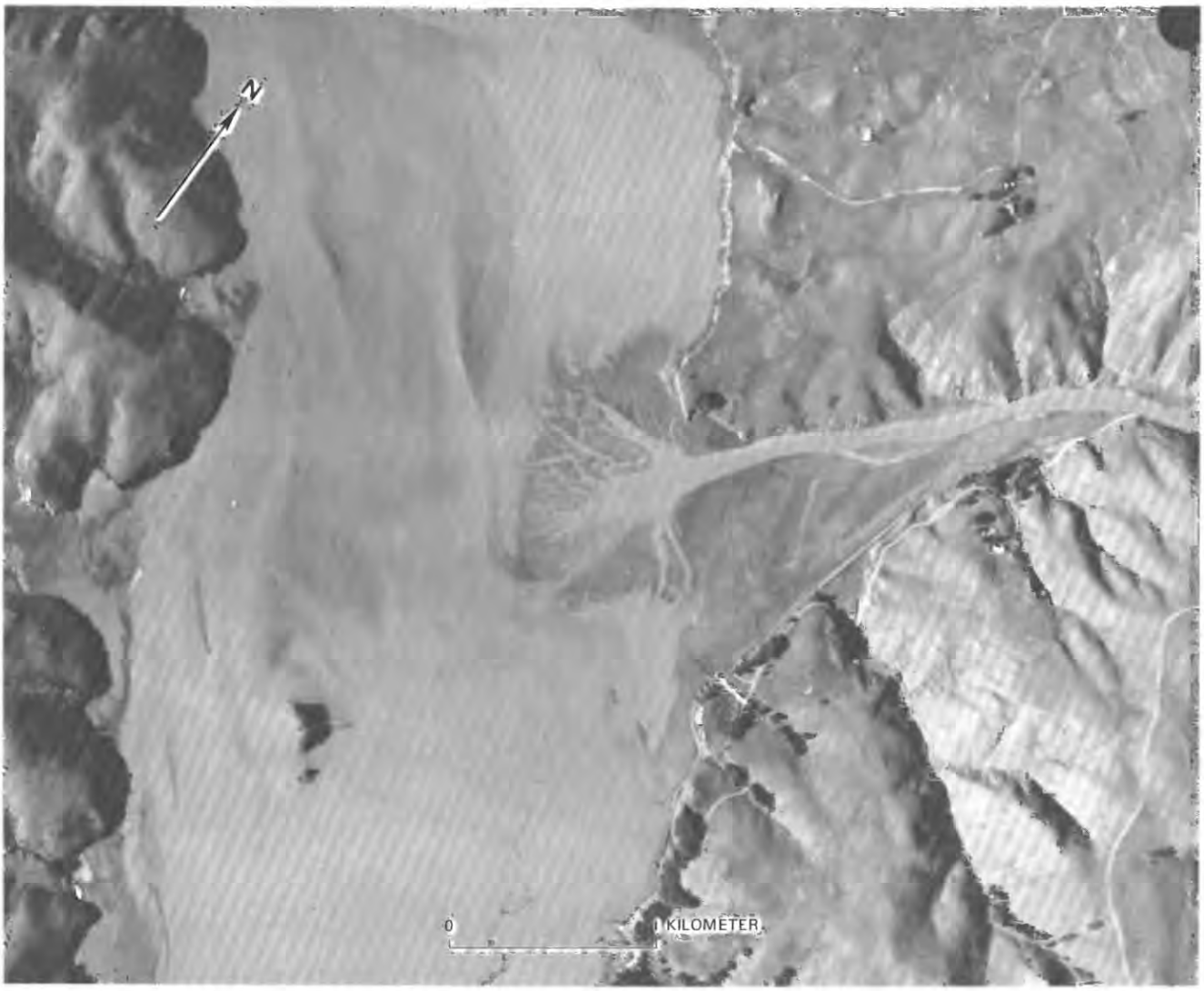


FIGURE 16.3.—Walker Creek delta. Photograph taken 2 days after the January 1982 flood.



FIGURE 16.4.—Lagunitas Creek delta.

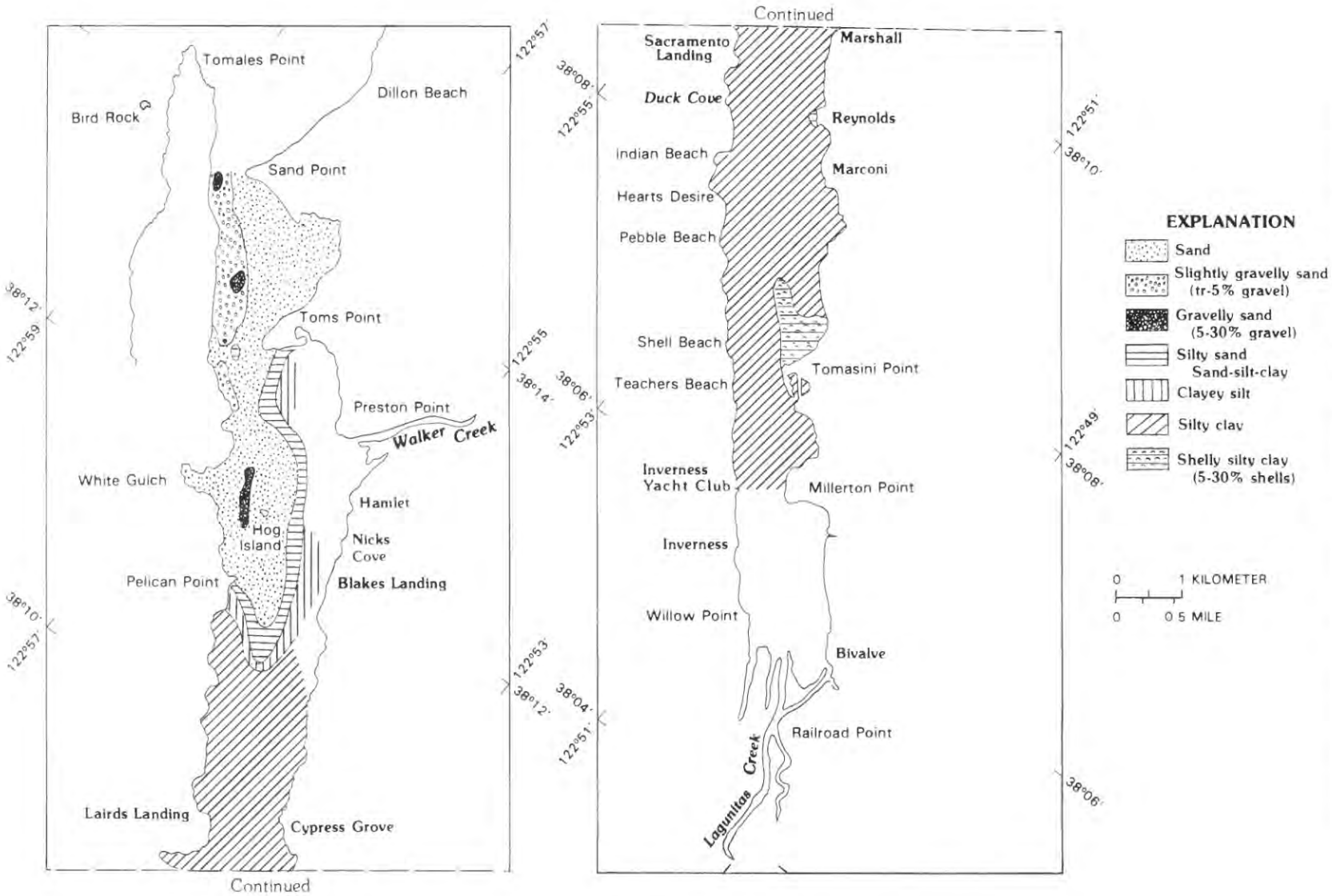


FIGURE 16.5.—Distribution of surface lithologic units in Tomales Bay (modified from Daetwyler, 1965, fig. 16).

more than 100 samples collected within the bay. Within the main body of the bay, from Millerton Point to a short distance south of Pelican Point, the sediment is silty clay and has a median grain size smaller than 3.9 μm. Coarser sediment is present only at the margins of the bay and tidal channels; for example, sand extends offshore for a few tens of meters from sandy beaches on the west side of the bay.

From the vicinity of Pelican Point northward to the mouth of Tomales Bay, the textural distribution is relatively complex. The tidal channels north of Pelican Point are floored by sand that grades from fine to medium and coarse near the mouth of the bay (Daetwyler, 1966, fig. 19). Sandy sediment extends into the bay from a well-defined flood-tidal delta southeast of Pelican Point. Between Toms Point and Blakes Landing, the sediment changes in a northeasterly direction from well-sorted, tidally winnowed sand to a more poorly sorted silty sand or clayey silt. South of Millerton Point, the sediment that floors the bay progressively coarsens and grades from clayey silt to sand on the intertidal part of the Lagunitas Creek delta at the southeast end of the bay.

THE JANUARY 3–5, 1982, STORM

RAINFALL

Rain-gage data collected January 3–5, 1982, varied between stations located inshore and those located near the open coast. Storm totals ranged from 333 mm (13.1 in.) at Point Reyes Station to 131 mm (5.2 in.) at Tomales (Edward Richmond, written commun., 1983). Other stations in the area were: Inverness, which recorded 285 mm (11.2 in.); Nicasio Reservoir, 248 mm (9.8 in.); and Bodega Bay Marine Station, 276 mm (10.9 in.). The rain-gage stations had not been established for previous years, and comparisons with other storms are not possible in terms of actual rainfall amounts; however, stream-discharge records do show relative differences between years of high discharge.

The streams that drain into Tomales Bay quickly responded to the large amounts of rainfall. Discharge in Lagunitas Creek reached 302 m^3/s on January 4, 1982, in contrast to a typical winter discharge of 0.1 to 8.2 m^3/s for the period 1972–82. Earlier records show that streamflow last approached that of the January 1982 storm in December 1955, when it reached 255 m^3/s (U.S. Geological Survey, 1954–82). Although the flood gage on Walker Creek was submerged on January 4 and the recorder fouled, an estimate of slightly more than 230 m^3/s was made by using a slope-area measurement with a normal recession to a measurement made on January 16 of 0.78 m^3/s (Kenneth Markham, written commun., 1983). Before the January 1982 flood, the only other flood to approximate it was in January 1966, when streamflow reached a discharge rate of 153 m^3/s (U.S. Geological Survey, 1959–82). Although discharge data are unavailable for the smaller streams that empty into the bay, the presence of small, well-formed deltas immediately after the storm at the mouth of nearly every valley on the east side of the bay attests to substantial flow in even the smallest streams (fig. 16.6).

The streams generated a high level of turbidity in the bay that persisted for some time after the storm. Turbid plumes issued from the mouth of the bay as ebbtides carried the suspended sediment into the ocean.

LANDSLIDES

The effects of many debris torrents, debris flows, and other landslides were observed along the roadways and hills surrounding Tomales Bay (pl. 5). Steven L. Reneau (see Inverness area case study, chap. 6) investigated the area around Inverness, which was extensively damaged by landslides and floods. Our observations that few landslides reached the bay itself are supported by Reneau's. The only major landslide entering the bay was a log surge at Redwood Avenue (see figs. 6.7, 6.8). One landslide along the canyon onshore of Shell Beach (fig. 16.6), which Reneau did not investigate, moved debris approximately 500 m toward the bay but stopped 10 m short of the bay where the canyon widens. Reneau observed such features as erosion of soil and vegetation from a 15- to 20-m-wide swath, pileup of 1 to 2 m of mud and woody debris on the upstream side of trees within this swath, pressing down of vegetation and orientation of stems downcanyon, and banking of piles of woody debris around bends in the channel, higher on one side of the drainage axis than on the other. Many of these same features also were noted along the Shell Beach landslide. The sediment that did enter the bay accumulated in small deltas formed partly by runoff from these landslides.

METHODS

To identify the depositional effects of the January 1982 storm, we sampled surficial sediment in the northern and central parts of Tomales Bay about a month after the storm and in the southernmost part of the bay 3 weeks later (fig. 16.7). Several types of cores were taken. A total of 31 gravity cores, 8 cm in diameter and as much as 123 cm long, were taken in the muddier sediment; by using a tensiometer, we ensured that the core barrel only partly penetrated the sediment, so that its uppermost layers were preserved. Where the sediment was sandier, a Smith-McIntire sampler, capable of engulfing and removing 9 L of sediment, was employed. Hinged flaps

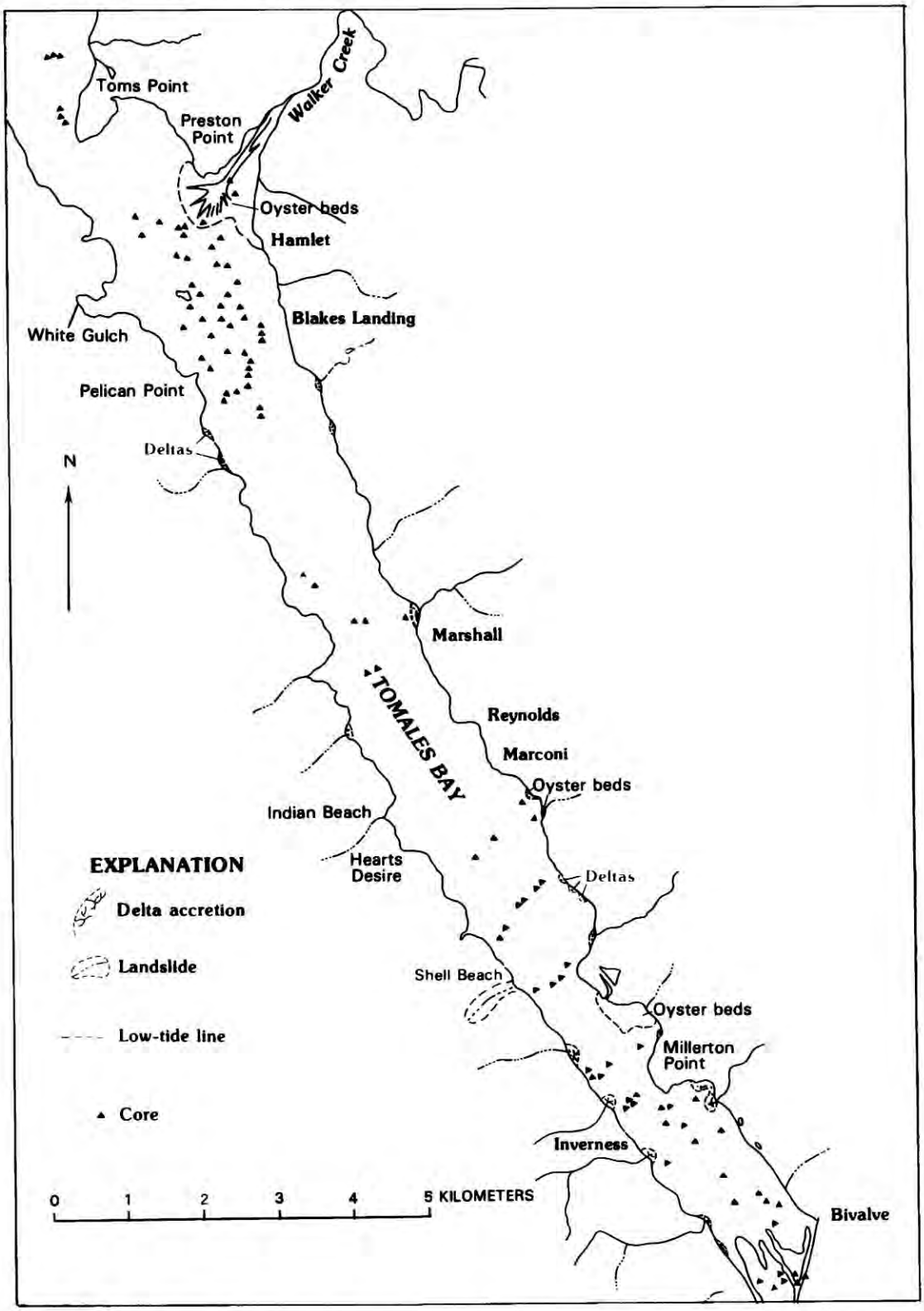


FIGURE 16.6.—Tomales Bay, showing locations of cores, shellfishing grounds, and areas of major and minor delta accretion due to the January 1982 storm.

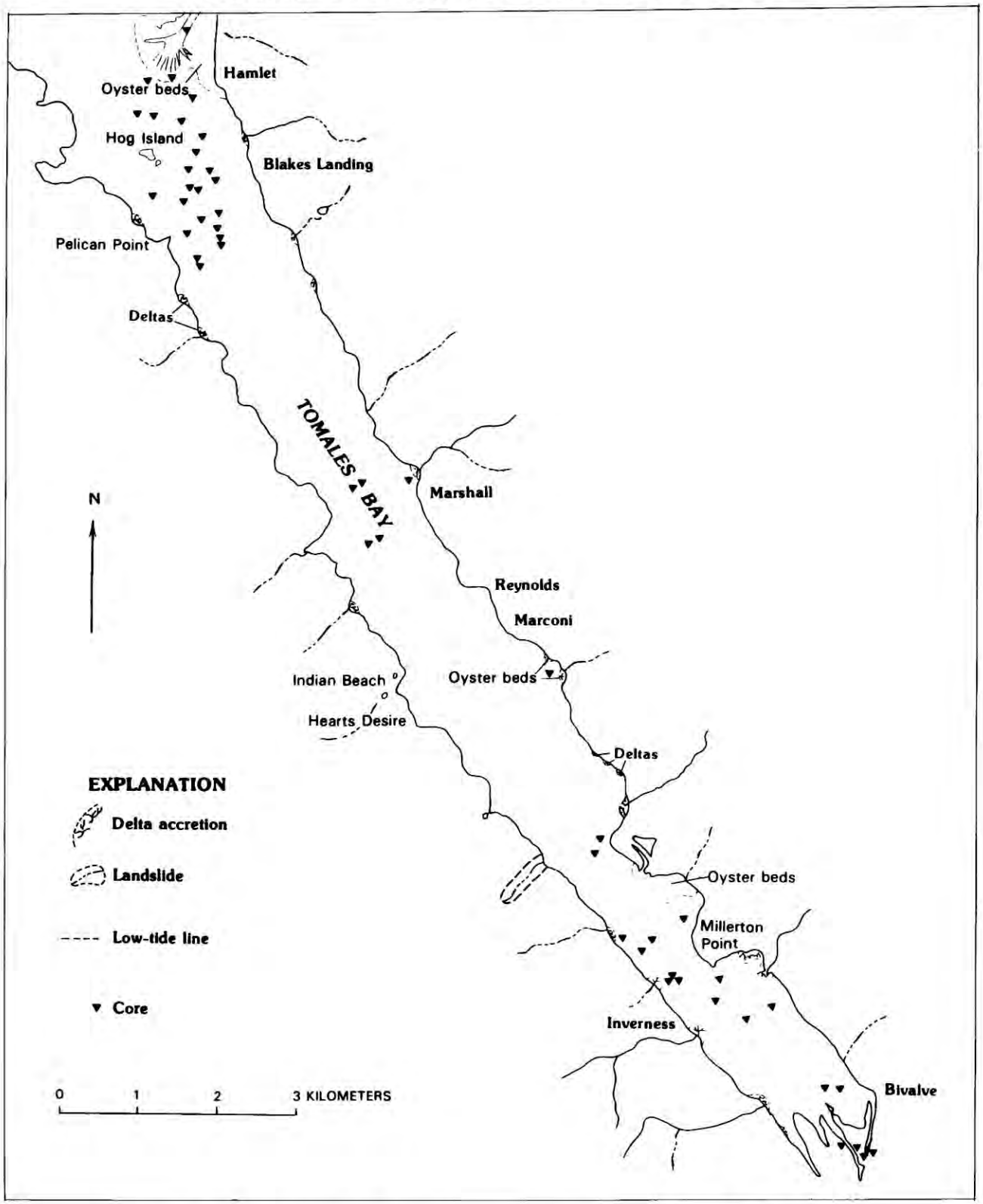


FIGURE 16.7.—Tomales Bay, showing locations of cores taken in February and March 1982.

on the top of the sampler provided access for examining the sediment surface (which typically was undisturbed) and for taking small box cores (surface area, 40 cm^2) and pipe cores (2.5 cm diam) to a depth of 10 to 15 cm from the sediment enclosed in the sampler. The resulting cores were split in the laboratory, where photographs and X-ray radiographs were taken. Samples were extracted from the cores for textural and mineralogic analysis.

Samples were wet-sieved and prepared for grain-size analysis, according to the method of Thiede and others (1976). Sediment between 200 and 63 mm in size was analyzed by a rapid sediment analyzer (RSA; Thiede and others, 1976, p. 45). The remaining sediment of less than 63 mm size was analyzed with a hydrophotometer (Jordan and others, 1971).

The standard X-ray-diffraction method (Hein and others, 1975) was used for clay mineralogic analysis. Preparation of the sample was similar to the method used for grain size, and only the clay-size material was used. However, variations in clay mineralogy between the storm and nonstorm layers were not found.

A second round of sampling in June, July, and September 1982 provided a basis for examining the degree of reworking of probable storm deposits by physical and biologic processes (fig. 16.8). Cores collected during this sampling were processed similarly to those in the first set.

FLOOD DEPOSITS

Many of the cores taken in Tomales Bay after the January 1982 storm contain a layer of sediment possibly attributable to the storm. In the absence of this layer (or beneath it) the sediment appeared in the X-ray radiographs to be thoroughly bioturbated. Mollusk shells or shell fragments are common in this bioturbated material.

Three lines of evidence support the inference that the surface layer resulted from the storm. First, on the Walker Creek delta front, blanketing of a surface marked by a concentration of still-green blades of the seagrass *Zostera* by such a layer indicated recent rapid sedimentation. A similar smothering of living saltgrass *Salicornia* was observed on the Lagunitas Creek delta (fig. 16.9). Second, this layer everywhere lacked mollusk shells or shell fragments (except for a few obviously active gastropods at the surface of one core). This general absence of shells suggests rapid deposition of terrigenous detritus derived from a source outside the bay. Third, of the 31 cores taken shortly after the storm, 14 contain a well-defined surficial layer, and 6 others a questionable layer. The appearance of this layer varied. Commonly, it seemed to be texturally graded (fig. 16.10), and in many places it was internally laminated (fig. 16.11). A few burrows are visible within the layer in some X-ray radiographs, but in comparison with the underlying sediment the layer is relatively undisturbed by faunal activity. The base of the layer commonly was sharply defined, and in some cores, burrows in the underlying sediment were truncated by the contact (fig. 16.12).

A few of the cores on the Walker Creek delta contain two layers that may have formed as a result of discharge from the creek. This double layer is best defined in a core taken a short distance off the delta (fig. 16.13). The lower layer, 1.2 cm thick, shows more burrows than does the upper layer, which consists of about 1.5 cm of homogeneous fine mud. The upper surface of the lower layer is marked by a slight concentration of fine sand. The other core containing a probable double layer (fig. 16.14) was taken from the edge of the delta (fig. 16.15). The lower layer in this core consists of crosslaminated sand, is sharply overlain by 4 to 5 cm of graded laminated mud, and contains an articulated open clamshell that may have been redeposited from the top of the delta. Cores taken from the central part of the bay typically contain no surficial layer. Some of these cores show small articulated clamshells within a few millimeters of the sediment-water interface. The presence of these clamshells implies that any storm deposit here was less than a millimeter or so thick and thus too thin to be discernible in the X-ray radiographs.

The composition of the flood deposit varied with location. On the deltas of Walker and Lagunitas Creeks, deposition from bedload predominated. Lagunitas Creek, where it enters the delta, was floored with loosely packed gravel that yielded underfoot when we waded up the stream in March. Figure 16.16 shows a core taken through gravel exposed at the point where the stream bifurcates (fig. 16.17); the absence of bioturbation of this material suggests that it was recently deposited. Thin discontinuous patches of recently deposited sand atop the adjacent salt-marsh surface documents topographically higher deposition of finer material.

Sediment in the bed of Lagunitas Creek fines toward the front of the delta (fig. 16.18). West of the Bivalve area (fig. 16.17), the channel floor consists of coarse sand, and the intertidal sandflats showed evidence of recently deposited sand (fig. 16.19). On the submerged front of the delta, east of Inverness, the bay occupies a flat trough less than a meter deep at low tide. Cores taken here contain a faintly stratified surficial mud layer, 2 to 3 cm thick.

A similar pattern prevails on the Walker Creek delta. On the intertidal surface of the delta, 6 to 7 cm of faintly

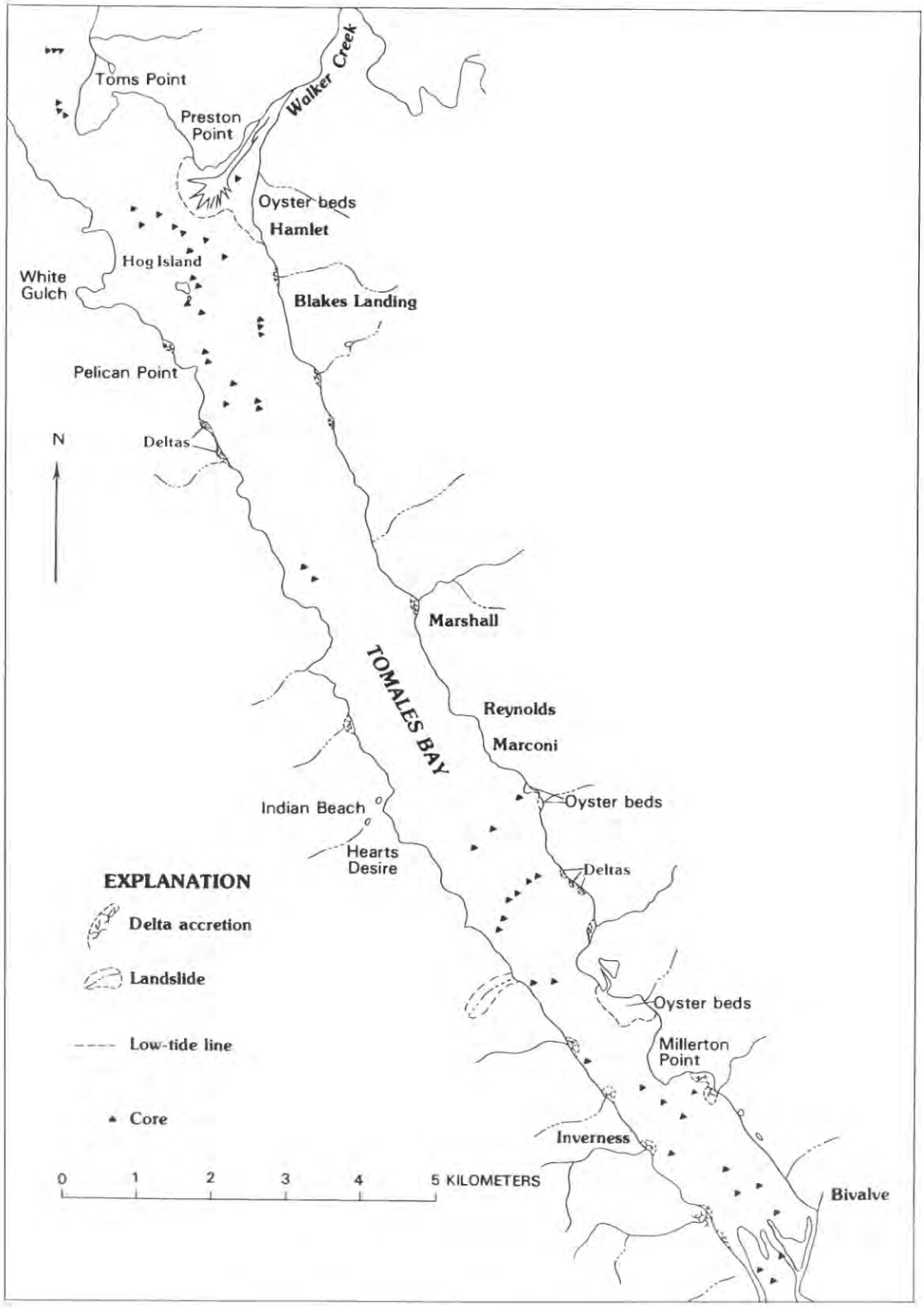


FIGURE 16.8.—Tomales Bay, showing locations of cores taken in June, July, and September 1982.

stratified sandy sediment was deposited atop bioturbated muddy sand containing abundant mollusks. On the subtidal prodelta, cores contained 3 to 12 cm of fine sand, silt, and clay attributable to flood deposition.

The flood deposits remained discernible in cores taken 6 to 9 months after the storm. Most cores showed evidence of biologic reworking, although the degree of bioturbation differed substantially among the various cores. Some cores reflected rapid and intensive colonization by an organism that constructs a U-shaped burrow (fig. 16.20), whereas others showed remarkably little bioturbation (fig. 16.21). The presence of a thin, somewhat mixed sandy layer atop a well-defined layer of clay within a few cores taken in June 1982 off the front of the Walker Creek delta implies introduction of sand by ordinary processes during the 6 months after the storm.



FIGURE 16.9.—X-ray radiograph of core 14 taken along stream margin of Lagunitas Creek, showing blades of saltgrass (*Salicornia*) crossing bedding planes.

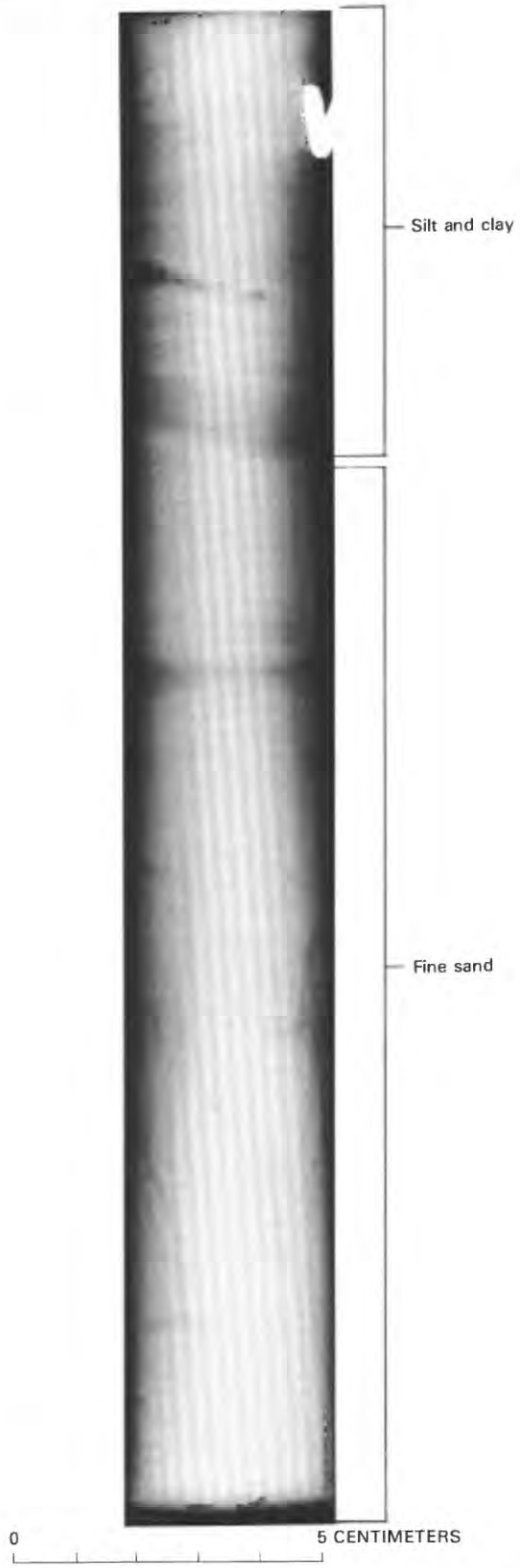


FIGURE 16.10.—X-ray radiograph of core 1 taken near Walker Creek delta, showing textural grading of flood layer.

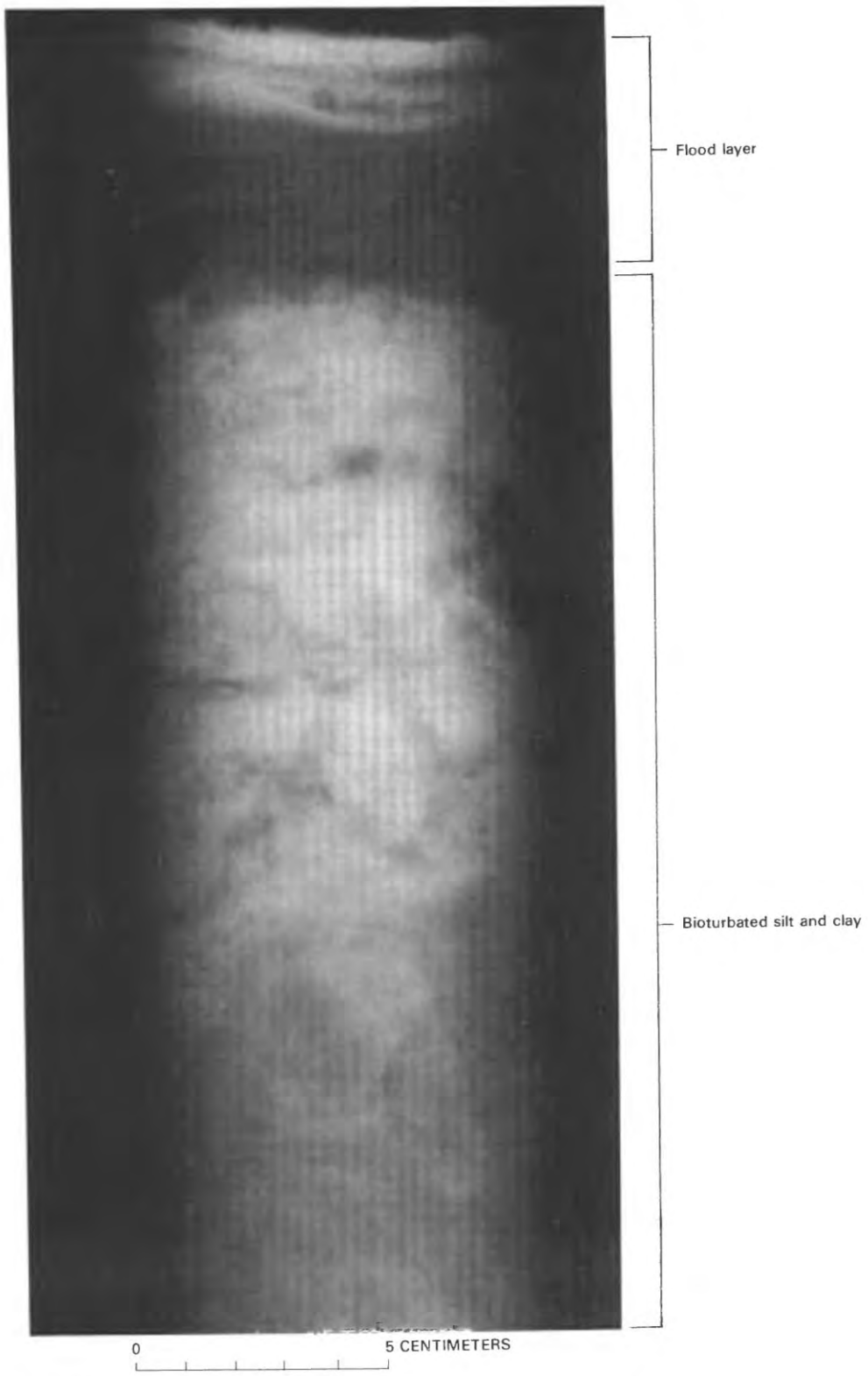


FIGURE 16.11.—X-ray radiograph of core 19 taken near Lagunitas Creek, showing internal lamination of flood layer.

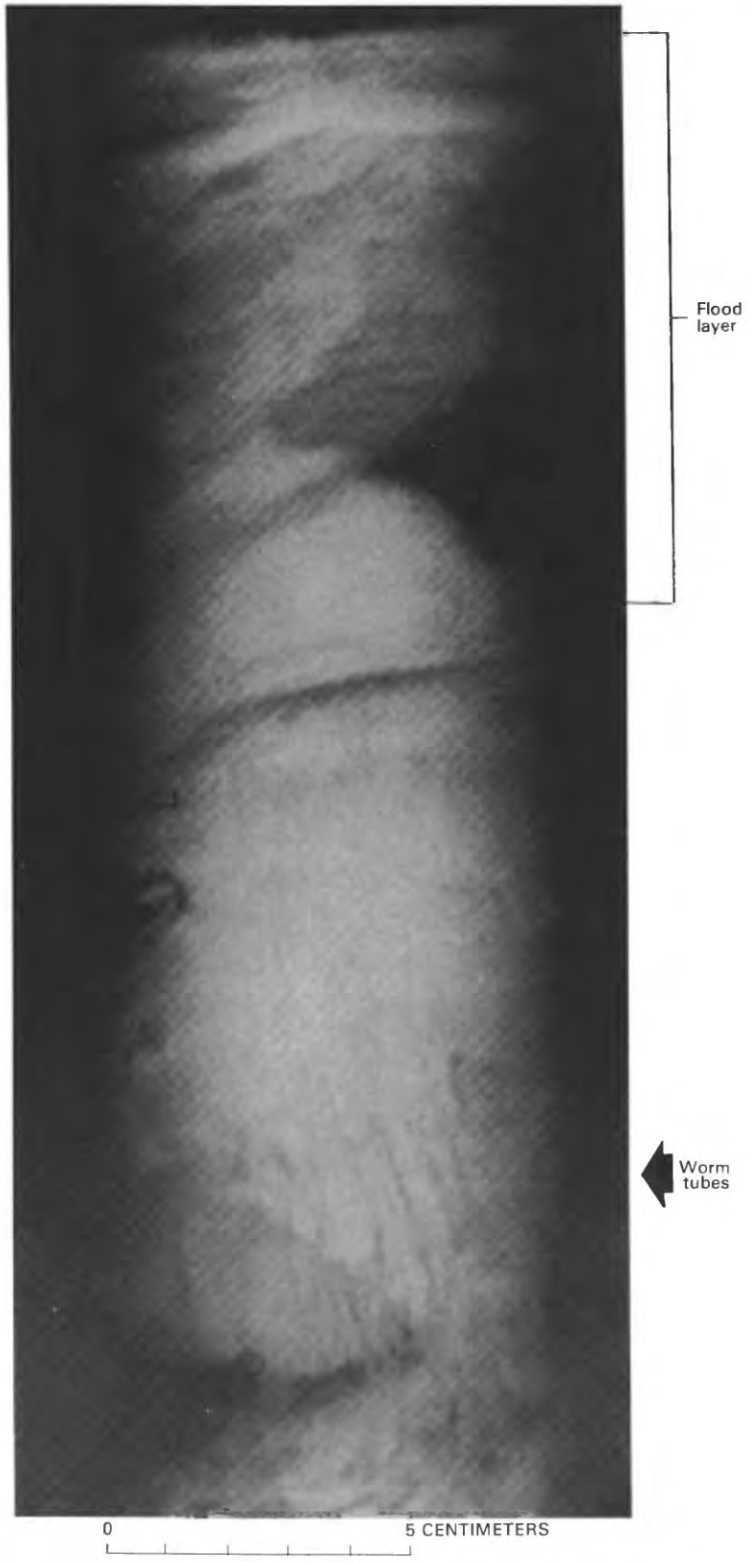


FIGURE 16.12.—X-ray radiograph of core 1 taken near Walker Creek delta, showing truncation of worm tubes by flood layer.

Cores taken 7 months after the flood in the area of Lagunitas Creek also contain remnants of the flood layer. Figure 16.22 shows two cores from the Lagunitas Creek delta. The surface layer is colonized by U-shaped burrowers and has no visible lamination, whereas 4 to 6 cm below this surface layer is a finely laminated layer underlain by intensely bioturbated sediment throughout the rest of the core. This finely laminated layer is inferred to be the remnant flood layer.

DISCUSSION AND CONCLUSION

The January 1982 storm caused a major depositional event in Tomales Bay. Most of the sediment introduced into the bay was derived from Walker and Lagunitas Creeks; the smaller streams that empty into the bay contributed only minor amounts of sediment. The landslides on the west side of the bay, though devastating to property in that area, were only very minor immediate sources of sediment to the bay.

The deposits resulting from the flooding of Walker and Lagunitas Creeks were evident in cores taken shortly after the storm. The texture and thickness of these flood deposits vary. Coarsest on the deltas (or in streambeds leading into the deltas), the flood layers fine progressively bayward from the delta front. Recognizable flood deposits were found only in the vicinity of the deltas, within about a kilometer of the delta fronts. Cores taken in the central part of the bay showed no visible effects of the floods,

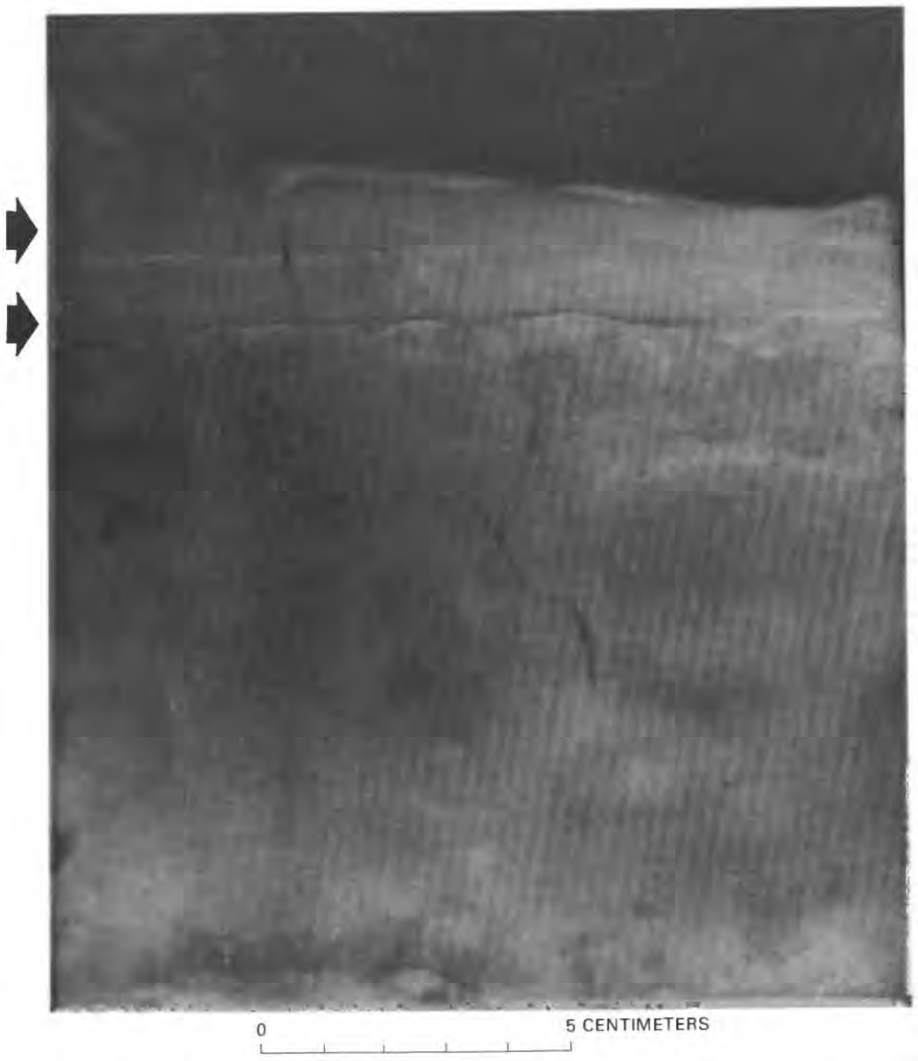


FIGURE 16.13.—X-ray radiograph of core 4 taken off Walker Creek delta, showing double layer (arrows).

and any sediment deposited there was only millimeters or less thick.

Cores taken on the south side of the Walker Creek delta suggest that the flood deposition there may have been somewhat more complex than elsewhere. The double layer shown in figures 16.13 and 16.14 implies either deposition in two phases (bedload followed by suspended load) or interruption of deposition by an interval of erosion, possibly by unusually high waves associated with the storm. A slight concentration of fine sand at the contact between the two layers supports an erosional hypothesis.

The flood layers still remain discernible in cores taken 6 to 9 months after the storm, although these layers underwent varying degrees of bioturbation. Layering attributable to prior floods was absent within the cores. Although floods may contribute the bulk of the sediment that accumulates near the deltas, the stratification associated with these deposits appears to be lost during the intervals between floods.

The only place in the bay where flood layers are likely to be preserved is in the salt marshes at the south end of the bay. Cores taken through the cutbanks of streams crossing these marshes contain alternating layers of sand and mud (figs. 16.23–16.24). The sandy layers probably represent flood accumulations that resemble those left on the present marsh surface by the January 1982 flood.

Some of the cores taken bayward from the Walker Creek delta demonstrate how the flood deposits and tidally generated deposits merge in the bay. Figure 16.25 shows a core taken in this area in June 1982 that contains a homogeneous layer of clay—presumably the result of the January 1982 flood—overlain by a thin layer of fine sand. This sand was clearly introduced during the interval following the storm, probably by tidal currents.

The infauna in the area apparently mixes fines derived from floods with sand brought in by the everyday tidal activity. On the delta fronts, however, the sand likely also accrues during floods.

Thus, deposition in Tomales Bay appears to result from three different mechanisms (fig. 16.26). (1) On and near the deltas of Walker and Lagunitas Creeks (and, to a lesser extent, at the mouths of the smaller ephemeral streams), sedimentation is predominantly episodic, the result of floods like that of January 1982. (2) On the west side of the bay between Toms Point and Pelican

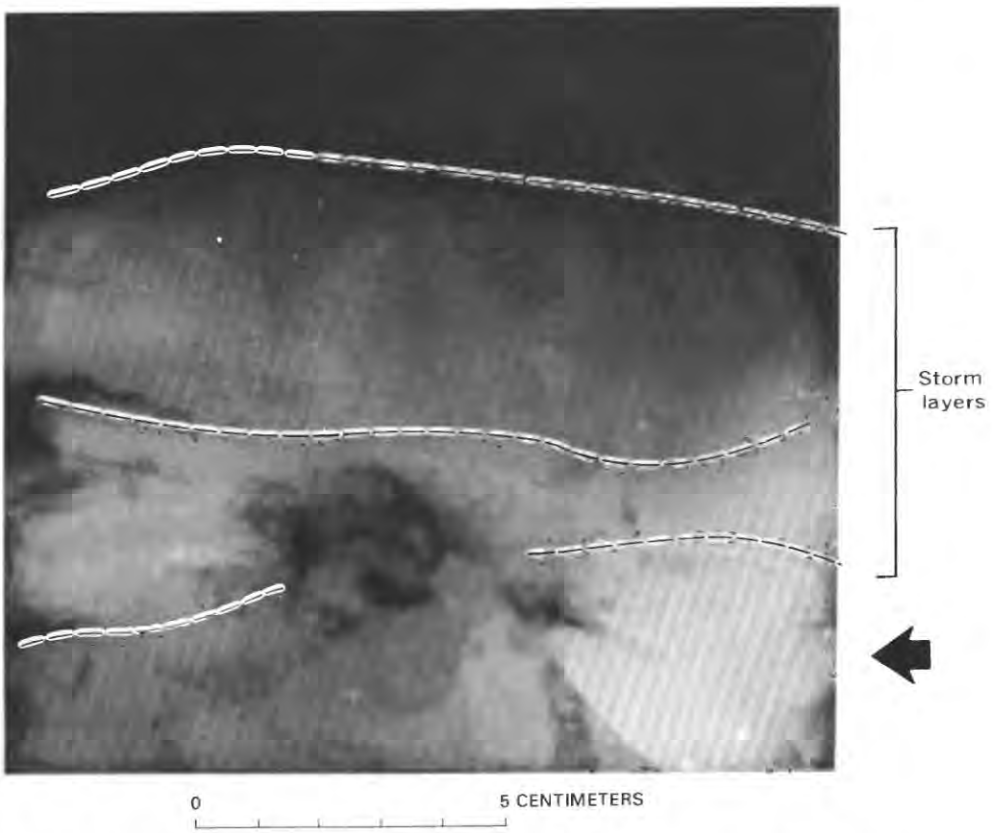


FIGURE 16.14.—X-ray radiograph of core 2 taken from edge of Walker Creek delta, showing probable double storm layer. Lower prestorm layer contains an articulated open clam (arrow).

Point, and northward to the mouth of the bay, sediment accumulation is largely by tidal processes and is essentially nonepisodic (other than the episodicity induced by fluctuations within the tidal range). (3) In the central part of the bay, sedimentation is very slow, and the accumulation of silt and clay probably results from both the episodic addition of small amounts of sediment during floods and the daily fixation of terrigenous fines by filter-feeding benthic organisms.

The limited number of cores taken in the bay after the January 1982 flood and the locally irregular accumulation on the deltas preclude an accurate estimate of the volume of sediment contributed to the bay by this event. The volume of sediment probably exceeded 0.25×10^6 m^3, on the basis of the thickness of the flood layers in the fronts of the Walker and Lagunitas Creek deltas. Daetwyler (1965) used bathymetric changes to infer that 2.6×10^6 m^3 of solid sediment accumulated at the mouth of Walker Creek between 1861 and 1931; most of this deposition probably occurred episodically, as the result of floods.

The January 1982 flood was especially devastating to the shellfishing industry in Tomales Bay. The area of the Walker Creek delta, the site of much of this industry in the bay, was particularly affected. Oyster growers there estimate a complete loss of juvenile stock and a heavy loss of selling stock. Such losses are due to the episodic discharge of large volumes of sediment from the creek and can be anticipated to occur again in this area as the result of future floods.

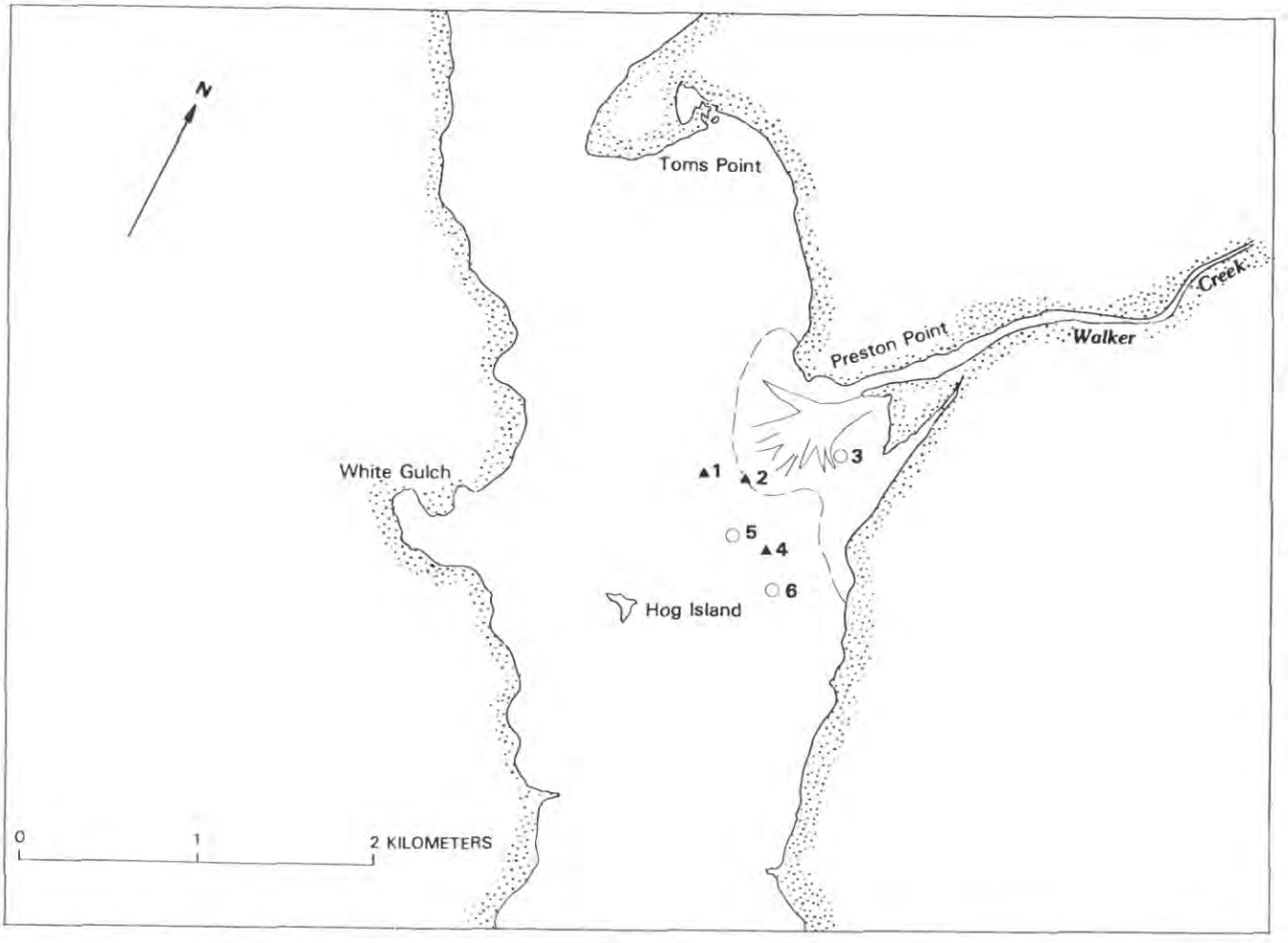


FIGURE 16.15.—Area of Walker Creek delta, showing locations of selected cores taken in February and March 1982 (triangles) and in June-September 1982 (circles). Dashed line, low-tide level.

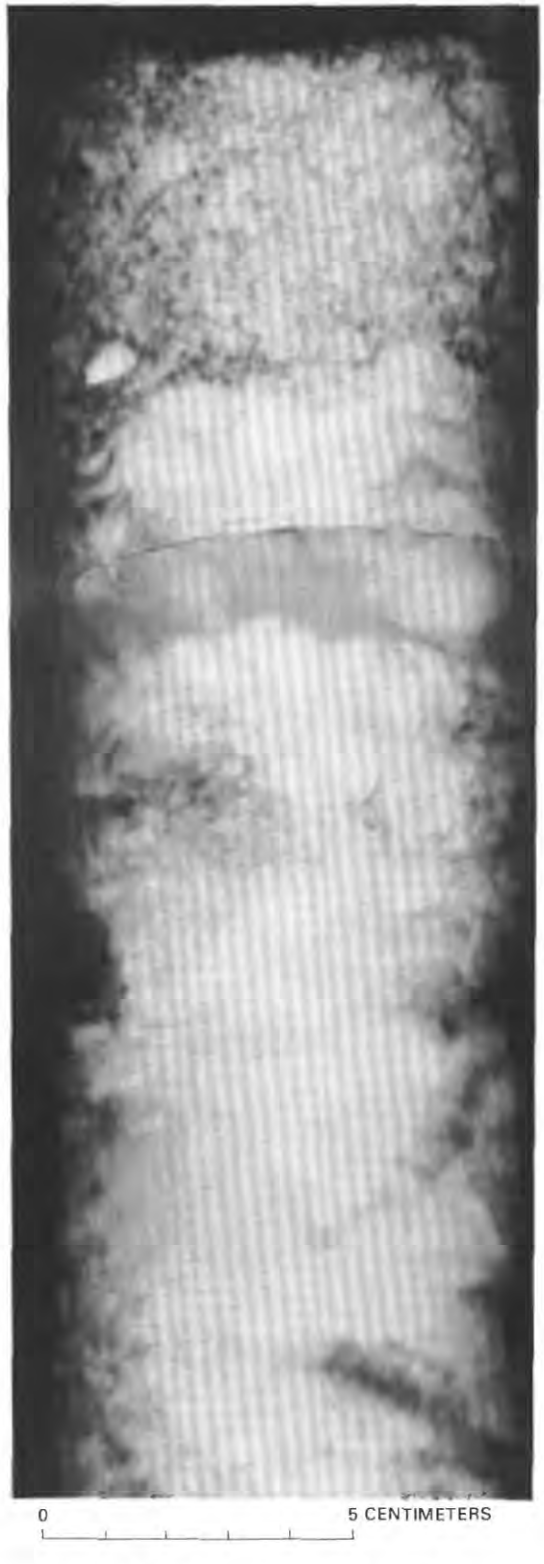


FIGURE 16.16.—X-ray radiograph of core 15 taken through gravel exposed at stream margin of Lagunitas Creek.

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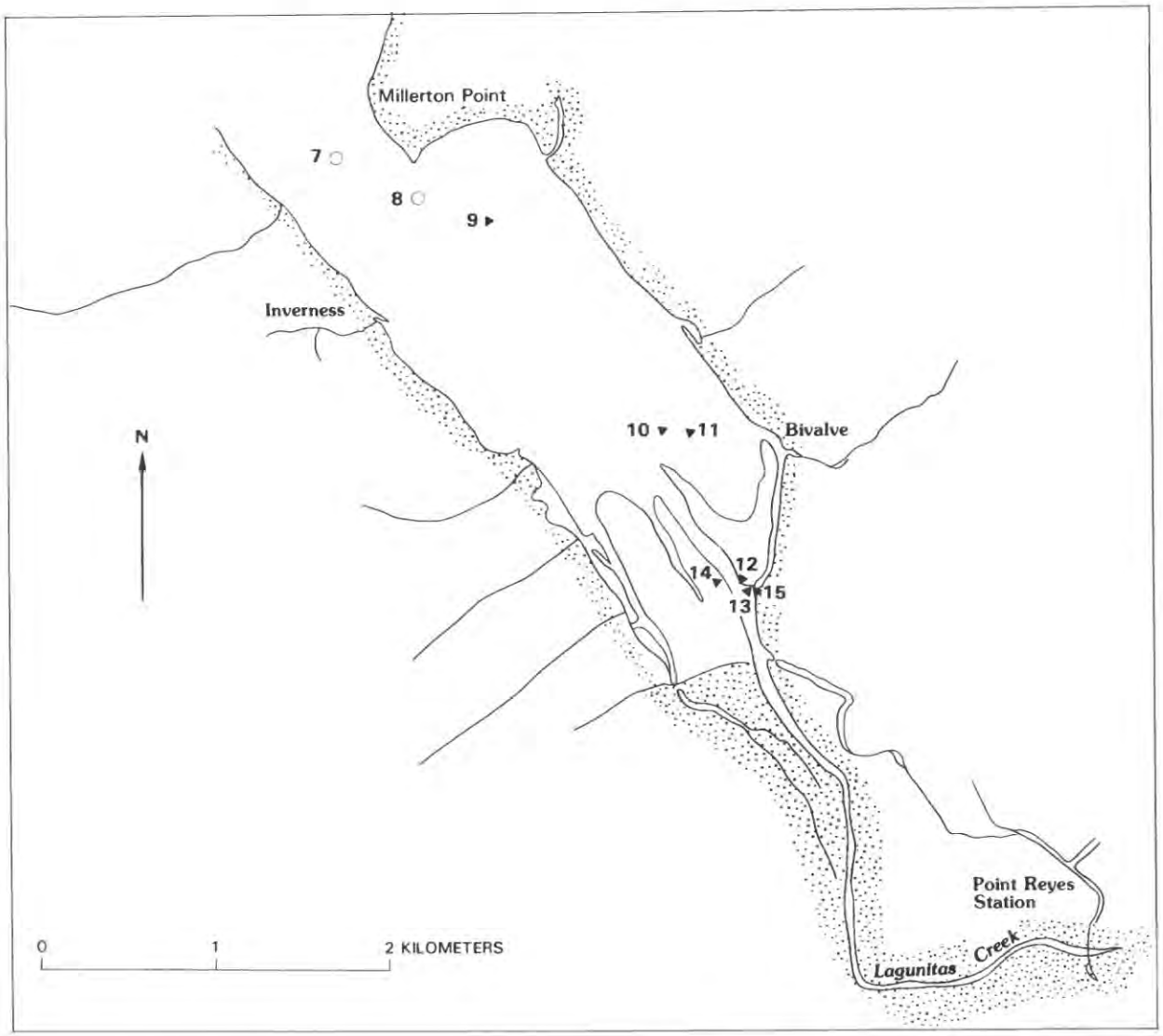


FIGURE 16.17.—Area of Lagunitas Creek, showing locations of selected cores taken in February and March 1982 (triangles) and in June-September 1982 (circles).

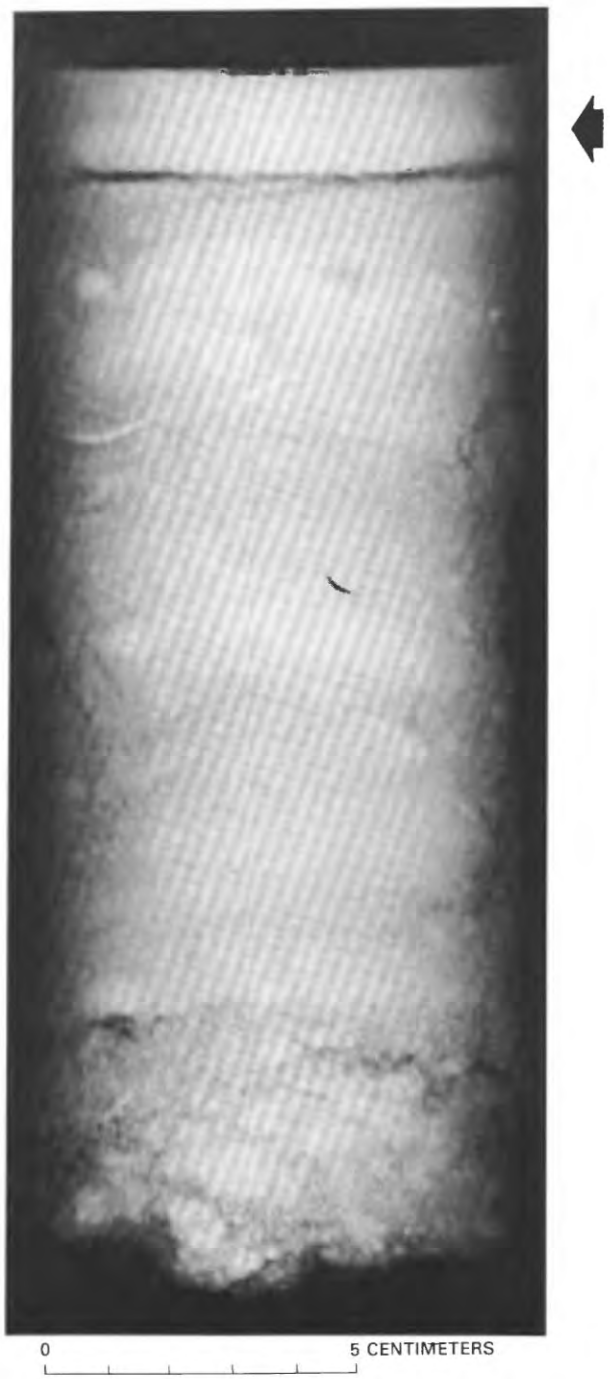


FIGURE 16.18.—X-ray radiograph of core 11 taken at front of Lagunitas Creek delta, showing finer sediment at surface (arrow).

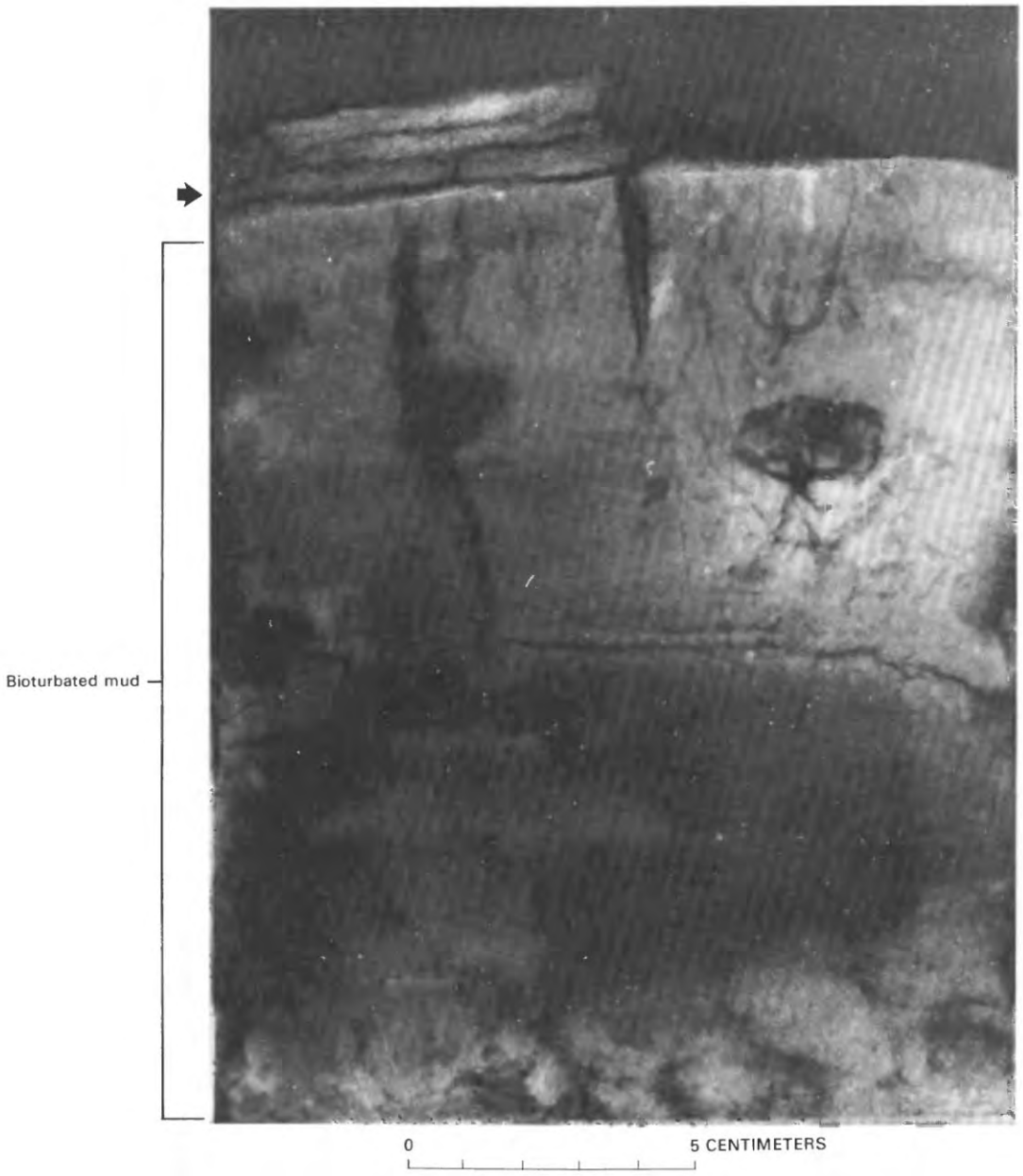


FIGURE 16.19.—X-ray radiograph of core 10 taken on intertidal flats of Lagunitas Creek, showing sand (arrow) at sediment surface.



FIGURE 16.20.—X-ray radiograph of core 3 taken on Walker Creek delta along channel margin in September 1982, showing U-shaped burrows in flood layer. Arrow denotes current direction.



FIGURE 16.21.—X-ray radiograph of core 6 taken near Walker Creek delta in June 1982, showing very little bioturbation.

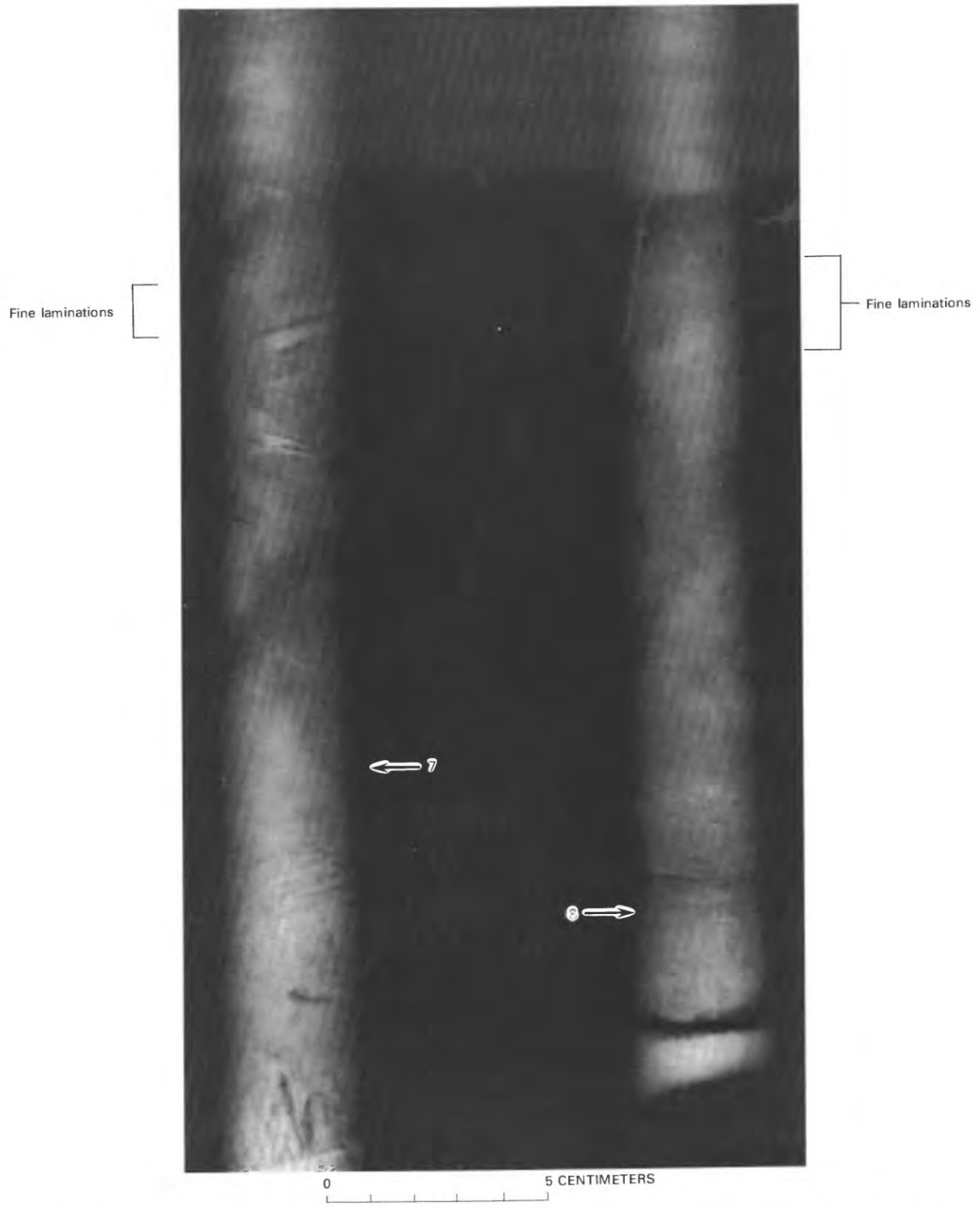


FIGURE 16.22.—X-ray radiographs of cores 7 and 8 taken off Lagunitas Creek in July 1982, showing intense bioturbation in lower sections and a finely laminated layer 4 and 6 cm, respectively, below surface. Surface layer is being colonized by U-shaped burrowers.

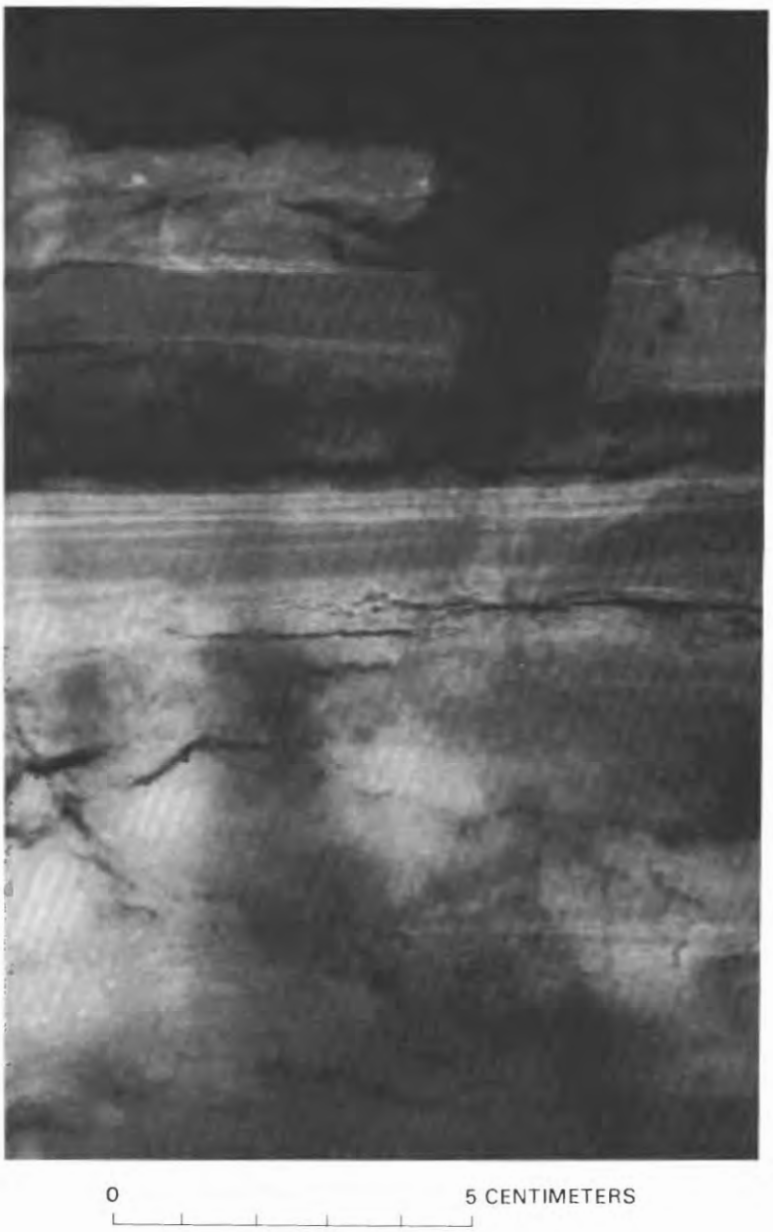


FIGURE 16.23.—X-ray radiograph of core 12 taken through cutbanks of marshes, showing alternating layers of sand (light) and mud (dark). These layers were probably formed by past flood accumulations similar to those left by the January 1982 flood.

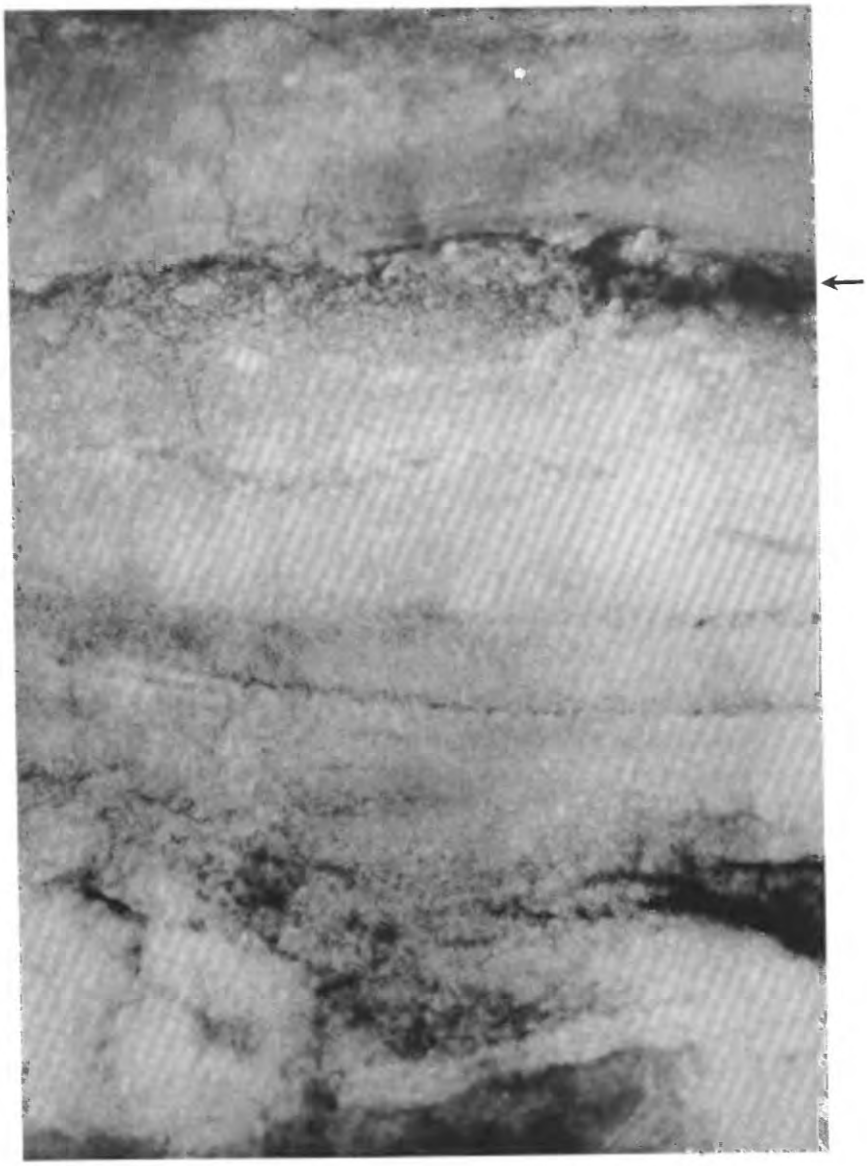


FIGURE 16.24.—X-ray radiograph of core 13 taken below core 12 on salt marsh, showing coarser sediment (arrow).

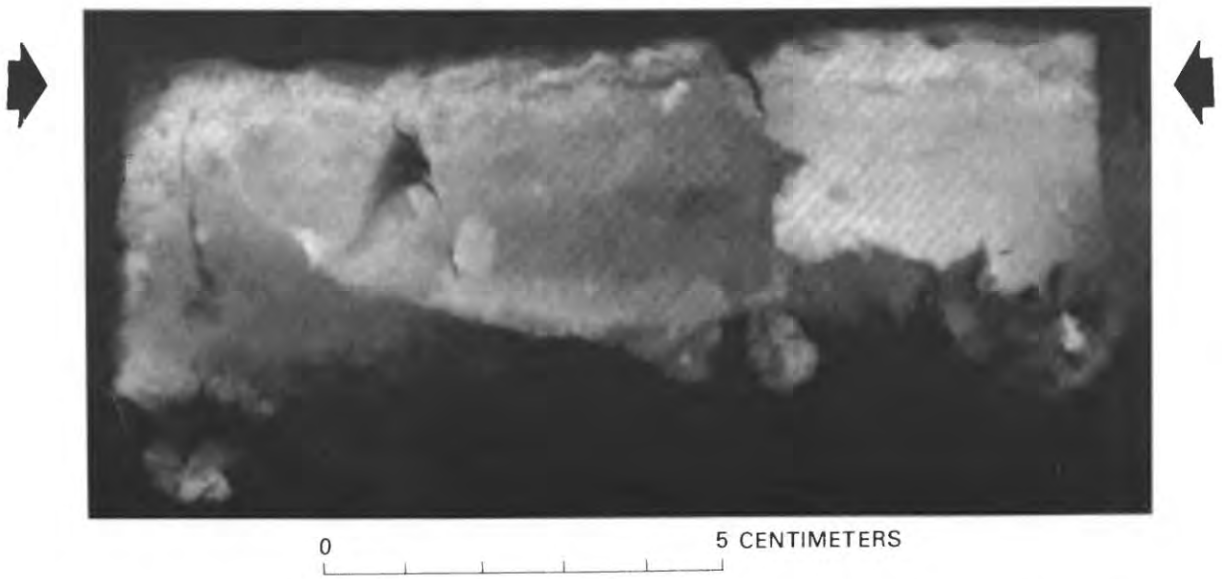


FIGURE 16.25.—X-ray radiograph of core 5 taken in area of Walker Creek in June 1982, showing a homogeneous layer of clay (flood layer) overlain by a thin mixed layer of fine sand (arrows) introduced by tidal currents.

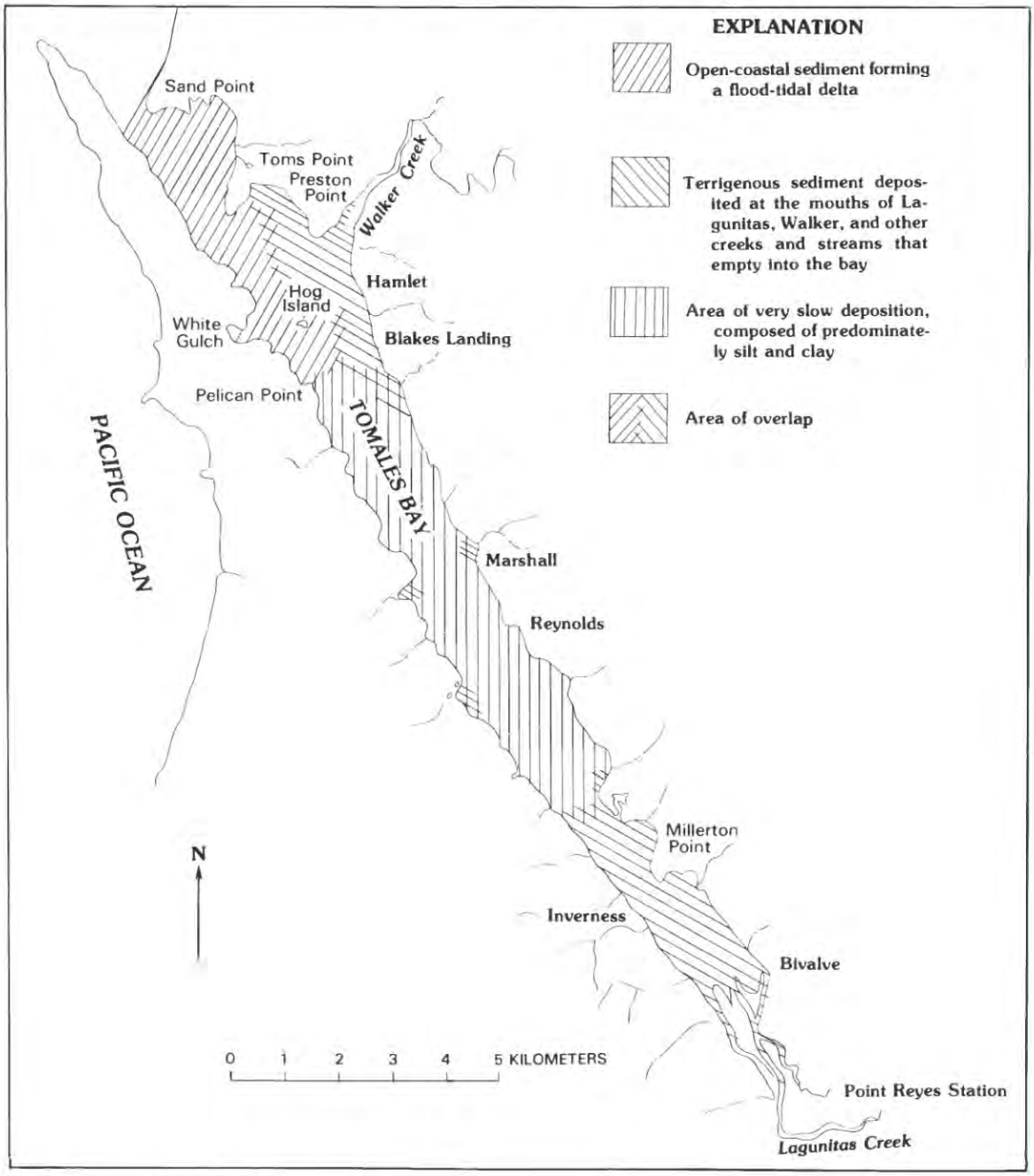


FIGURE 16.26.—Tomales Bay, showing areal distribution of sediment-depositional types.

GPO 585-045/9765

SELECTED SERIES OF U.S. GEOLOGICAL SURVEY PUBLICATIONS

Periodicals

Earthquakes & Volcanoes (issued bimonthly).
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Professional Papers are mainly comprehensive scientific reports of wide and lasting interest and importance to professional scientists and engineers. Included are reports on the results of resource studies and of topographic, hydrologic, and geologic investigations. They also include collections of related papers addressing different aspects of a single scientific topic.

Bulletins contain significant data and interpretations that are of lasting scientific interest but are generally more limited in scope or geographic coverage than Professional Papers. They include the results of resource studies and of geologic and topographic investigations; as well as collections of short papers related to a specific topic.

Water-Supply Papers are comprehensive reports that present significant interpretive results of hydrologic investigations of wide interest to professional geologists, hydrologists, and engineers. The series covers investigations in all phases of hydrology, including hydrogeology, availability of water, quality of water, and use of water.

Circulars present administrative information or important scientific information of wide popular interest in a format designed for distribution at no cost to the public. Information is usually of short-term interest.

Water-Resources Investigations Reports are papers of an interpretive nature made available to the public outside the formal USGS publications series. Copies are reproduced on request unlike formal USGS publications, and they are also available for public inspection at depositories indicated in USGS catalogs.

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Maps

Geologic Quadrangle Maps are multicolor geologic maps on topographic bases in 7 1/2- or 15-minute quadrangle formats (scales mainly 1:24,000 or 1:62,500) showing bedrock, surficial, or engineering geology. Maps generally include brief texts; some maps include structure and columnar sections only.

Geophysical Investigations Maps are on topographic or planimetric bases at various scales; they show results of surveys using geophysical techniques, such as gravity, magnetic, seismic, or radioactivity, which reflect subsurface structures that are of economic or geologic significance. Many maps include correlations with the geology.

Miscellaneous Investigations Series Maps are on planimetric or topographic bases of regular and irregular areas at various scales; they present a wide variety of format and subject matter. The series also includes 7 1/2-minute quadrangle photogeologic maps on planimetric bases which show geology as interpreted from aerial photographs. Series also includes maps of Mars and the Moon.

Coal Investigations Maps are geologic maps on topographic or planimetric bases at various scales showing bedrock or surficial geology, stratigraphy, and structural relations in certain coal-resource areas.

Oil and Gas Investigations Charts show stratigraphic information for certain oil and gas fields and other areas having petroleum potential.

Miscellaneous Field Studies Maps are multicolor or black-and-white maps on topographic or planimetric bases on quadrangle or irregular areas at various scales. Pre-1971 maps show bedrock geology in relation to specific mining or mineral-deposit problems; post-1971 maps are primarily black-and-white maps on various subjects such as environmental studies or wilderness mineral investigations.

Hydrologic Investigations Atlases are multicolored or black-and-white maps on topographic or planimetric bases presenting a wide range of geohydrologic data of both regular and irregular areas; principal scale is 1:24,000 and regional studies are at 1:250,000 scale or smaller.

Catalogs

Permanent catalogs, as well as some others, giving comprehensive listings of U.S. Geological Survey publications are available under the conditions indicated below from the U.S. Geological Survey, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, CO 80225. (See latest Price and Availability List.)

"Publications of the Geological Survey, 1879-1961" may be purchased by mail and over the counter in paperback book form and as a set of microfiche.

"Publications of the Geological Survey, 1962-1970" may be purchased by mail and over the counter in paperback book form and as a set of microfiche.

"Publications of the U.S. Geological Survey, 1971-1981" may be purchased by mail and over the counter in paperback book form (two volumes, publications listing and index) and as a set of microfiche.

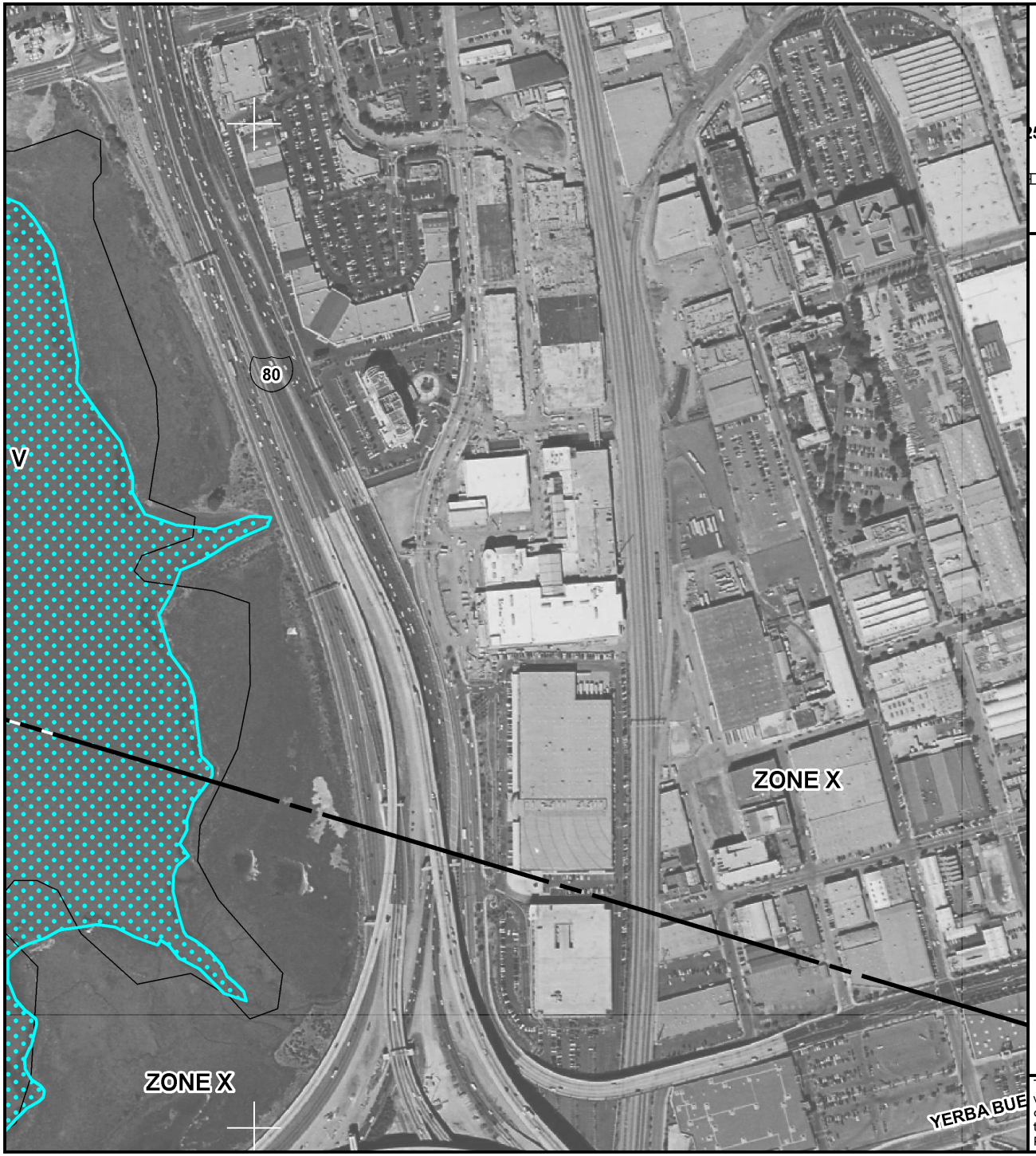
Supplements for 1982, 1983, 1984, 1985, 1986, and for subsequent years since the last permanent catalog may be purchased by mail and over the counter in paperback book form.

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Note.--Prices of Government publications listed in older catalogs, announcements, and publications may be incorrect. Therefore, the prices charged may differ from the prices in catalogs, announcements, and publications.



MAP SCALE 1" = 500'

250 0 500 1000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0058G

FIRM

FLOOD INSURANCE RATE MAP

ALAMEDA COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 58 OF 725

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EMERYVILLE, CITY OF	060005	0058	G
OAKLAND, CITY OF	065048	0058	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06001C0058G

EFFECTIVE DATE
AUGUST 3, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

BERKELEY, CALIFORNIA

Period of Record General Climate Summary - Precipitation

Station:(040693) BERKELEY														
From Year=1893 To Year=2012														
	Precipitation											Total Snowfall		
	Mean	High	Year	Low	Year	1 Day Max.		>= 0.01 in.	>= 0.10 in.	>= 0.50 in.	>= 1.00 in.	Mean	High	Year
	in.	in.	-	in.	-	in.	dd/yyyy or yyyymmdd	# Days	# Days	# Days	# Days	in.	in.	-
January	4.98	15.99	1911	0.22	1984	6.98	04/1982	11	8	4	1	0.1	6.0	1922
February	4.07	14.49	1998	0.00	1953	3.20	13/2000	10	7	3	1	0.0	1.0	1976
March	3.27	11.74	1983	0.03	1923	3.20	22/1899	9	6	2	1	0.0	0.8	1942
April	1.64	6.06	1958	0.00	1933	2.49	24/1896	6	4	1	0	0.0	0.0	1899
May	0.75	5.26	1915	0.00	1909	2.16	01/1905	3	2	0	0	0.0	0.0	1910
June	0.19	1.24	1907	0.00	1893	1.16	28/2011	1	1	0	0	0.0	0.0	1910
July	0.03	1.50	1974	0.00	1893	1.40	08/1974	0	0	0	0	0.0	0.0	1910
August	0.06	1.33	1976	0.00	1893	0.84	30/1896	1	0	0	0	0.0	0.0	1912
September	0.26	2.62	1959	0.00	1905	2.52	18/1959	1	1	0	0	0.0	0.0	1911
October	1.26	7.05	1962	0.00	1905	3.93	13/2009	4	2	1	0	0.0	0.0	1911
November	2.79	11.47	1973	0.00	1929	3.89	05/1994	7	5	2	1	0.0	0.0	1911
December	4.11	15.04	1955	0.00	1989	4.73	13/2002	10	7	3	1	0.0	0.1	1972
Annual	23.41	48.42	1983	9.89	1929	6.98	19820104	63	42	16	6	0.1	6.0	1922
Winter	13.15	29.46	1998	2.93	1976	6.98	19820104	30	22	10	4	0.1	6.0	1922
Spring	5.67	16.23	1983	0.48	2008	3.20	18990322	18	12	4	1	0.0	0.8	1942

Summer	0.27	1.59	1974	0.00	1893	1.40	19740708	2	1	0	0	0.0	0.0	1913
Fall	4.31	13.90	1973	0.08	1929	3.93	20091013	13	8	3	1	0.0	0.0	1911

Table updated on Oct 31, 2012
For monthly and annual means, thresholds, and sums:
Months with 5 or more missing days are not considered
Years with 1 or more missing months are not considered
Seasons are climatological not calendar seasons
Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May
Summer = Jun., Jul., and Aug. Fall = Sep., Oct., and Nov.

Western Regional Climate Center, wrcc@dri.edu

BERKELEY, CALIFORNIA

Period of Record General Climate Summary - Temperature

Station:(040693) BERKELEY															
From Year=1893 To Year=2012															
	Monthly Averages			Daily Extremes				Monthly Extremes				Max. Temp.		Min. Temp.	
	Max.	Min.	Mean	High	Date	Low	Date	Highest Mean	Year	Lowest Mean	Year	>= 90 F	<= 32 F	<= 32 F	<= 0 F
	F	F	F	F	dd/yyyy or yyyymmdd	F	dd/yyyy or yyyymmdd	F	-	F	-	# Days	# Days	# Days	# Days
January	55.9	42.7	49.3	77	26/1899	25	21/1937	53.9	1970	42.0	1937	0.0	0.0	0.6	0.0
February	59.1	45.1	52.2	80	18/1899	29	12/1905	57.3	1963	46.7	1894	0.0	0.0	0.1	0.0
March	61.4	46.0	53.7	87	17/1914	33	03/1966	60.0	2004	47.8	1897	0.0	0.0	0.0	0.0
April	64.0	47.6	55.8	95	27/2004	36	19/1896	59.5	1989	49.8	1967	0.1	0.0	0.0	0.0
May	66.6	50.0	58.3	101	31/2001	36	09/1922	64.2	1997	53.6	1933	0.3	0.0	0.0	0.0
June	70.0	52.5	61.3	107	15/2000	40	16/1913	66.6	1981	56.6	1965	0.6	0.0	0.0	0.0
July	70.3	53.8	62.0	99	23/2006	40	05/1953	66.3	2006	58.3	1944	0.2	0.0	0.0	0.0
August	70.1	54.4	62.3	104	25/2010	42	18/1916	67.2	2003	58.4	1928	0.2	0.0	0.0	0.0
September	71.8	54.7	63.2	106	16/1913	38	27/1916	68.5	1984	58.3	1910	1.1	0.0	0.0	0.0
October	69.6	52.4	61.0	99	01/1980	38	26/1919	65.2	1959	55.4	1916	0.4	0.0	0.0	0.0
November	63.2	48.0	55.6	86	04/1921	33	28/1905	60.5	1932	50.7	1994	0.0	0.0	0.0	0.0
December	56.7	43.7	50.2	80	12/1942	25	09/1972	55.7	1958	45.5	1908	0.0	0.0	0.3	0.0
Annual	64.9	49.2	57.1	107	20000615	25	19370121	59.3	1959	55.2	1893	2.9	0.0	1.1	0.0
Winter	57.2	43.9	50.6	80	18990218	25	19370121	55.0	1970	45.0	1949	0.0	0.0	1.1	0.0
Spring	64.0	47.9	55.9	101	20010531	33	19660303	60.2	2004	53.1	1929	0.3	0.0	0.0	0.0

Summer	70.1	53.6	61.8	107	20000615	40	19130616	65.6	1997	59.0	1924	1.0	0.0	0.0	0.0
Fall	68.2	51.7	59.9	106	19130916	33	19051128	62.6	1959	56.8	1910	1.5	0.0	0.0	0.0

Table updated on Oct 31, 2012
For monthly and annual means, thresholds, and sums:
Months with 5 or more missing days are not considered
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Seasons are climatological not calendar seasons
Winter = Dec., Jan., and Feb. Spring = Mar., Apr., and May
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