NPDES Self-Monitoring Report for the Groundwater Extraction and Treatment System for the Annual Period January 1 to December 31, 1998 and the Quarterly Period October 1 to December 31, 1998

General Waste Discharge Requirements
Order No. 94-087
National Pollution Discharge Elimination System
(NPDES) No. CAG912003

Sherwin-Williams Coatings Plant
Emeryville, California

January 29, 1999
2616.98-102

Prepared for
The Sherwin-Williams Company
101 Prospect Avenue, N.W.
Cleveland, Ohio 44115-1075

LFR
LEVINE • FRICKE

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January 29, 1999 2616.98-102

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

Subject: NPDES Self-Monitoring Report for the Groundwater Extraction and Treatment System, for the Annual Period from January 1 to December 31, 1998 and the Quarterly Period from October 1 to December 31, 1998, Sherwin-Williams Facility, Emeryville, California

Dear Larry:

Enclosed is the final copy of the subject report. We have incorporated your comments and finalized the report. We will also forward two copies to the Regional Water Quality Control Board and distribute other copies to the appropriate parties.

If you have any questions or comments, please call Mark Knox or me at (510) 652-4500.

Sincerely,

Gene A. Barry

Gene Barry
Senior Project Engineer

Enclosure

SHERWIN WILLIAMS

COATINGS

The Sherwin-Williams Company
1450 Sherwin Avenue
Emeryville, California 94608
Phone: (510) 420-7200
Facsimile: (510) 654-7997

January 29, 1999

Mr. Mark Johnson
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, California 94612

Subject: Annual Period from January 1 to December 31, 1998 and the Quarterly Period from October 1 to December 31, 1998, NPDES Self-Monitoring Report for the Groundwater Extraction and Treatment System, General Waste Discharge Requirements Order No. 94-087, NPDES No. CAG912003, Sherwin-Williams Facility, Emeryville, California

Dear Mr. Johnson:

Attached is the annual and fourth quarter 1998 National Pollutant Discharge Elimination System (NPDES) Self-Monitoring Report for the groundwater extraction and treatment system (GWETS) at the Sherwin-Williams facility in Emeryville, California ("the Site"). The enclosed combined annual and quarterly report summarizes operations and monitoring data for the GWETS at the Site during the January 1 to December 31, 1998, and October 1 to December 31, 1998 reporting periods, respectively. During the fourth quarter, as well as for the three previous reporting quarters, the GWETS complied with all NPDES effluent limitations.

Between February and July 1998, the extensive efforts to modify the groundwater treatment system (GWTS), revise operation and maintenance procedures, and adjust treatment system operation parameters have resulted in a greater rate of mass removal. Due to these improvements, the volume of water processed by the GWTS during 1998 was approximately 1.4 million gallons, which exceeded previous yearly totals of 706,000 gallons in 1996 and 490,000 gallons in 1997. In 1998, the actual volume of groundwater extracted by the groundwater extraction system (GWES) from within the slurry wall was approximately 1.0 million gallons of groundwater. The difference between the volume of water processed by the GWTS and the volume of groundwater extracted is due to the occasional recirculation of treated water within the GWTS and the treatment of the groundwater and rainwater mixture accumulated on site in early 1998.

Approximately 370 pounds of arsenic and 53 pounds of total volatile organic compounds (VOCs) were processed by the GWTS from groundwater extracted from within the slurry wall area in 1998. For comparison, previous yearly totals for mass of arsenic and total VOCs removed from within the slurry wall area were 224 pounds and 23 pounds, respectively, in 1996, and 172 pounds and 17 pounds, respectively, in 1997. As a result, the increase in the rate of extraction and treatment has significantly improved the performance of the interim remedial measures. In January 1998,

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totalizers were installed on each of the extraction wells. The mass of arsenic and VOCs removed in 1998 was calculated using the total volume of groundwater extracted from the wells. In previous years, the mass removed was calculated using volume of water processed by the GWTS.

As part of the GWES expansion, seven new extraction wells (EX-4 through EX-10) were brought on line in pairs for initial arsenic and flow measurements beginning on December 16, 1998. Extraction wells with lower arsenic concentrations were brought on line with wells with higher arsenic concentrations. Each extraction well pair was brought on line for 24 hours to measure how groundwater flow rates changed over the period. An LFR Levine·Fricke (LFR) field technician measured and recorded flow rates every 2 to 3 hours (during normal business hours, Monday through Friday between 7 am and 5 pm). At the end of each 24-hour period, one water sample was collected from each extraction well and analyzed for arsenic. The original three extraction wells, EX-1, EX-2, and EX-3, remained on line during this initial testing.

After reviewing the arsenic concentration and flow rate data, extraction wells EX-1, EX-2, EX-3, EX-7, EX-8, EX-9, and EX-10 were brought on line on December 28, 1998. These extraction wells were selected because they are expected to be the most beneficial to maintaining an inward gradient across the slurry wall and extracting surface water infiltration along the railroad tracks. Although the additional extraction wells were brought on line, the maximum flow rate through the treatment system did not exceed 7 gallons per minute (gpm) during December 1998.

A letter from the Regional Water Quality Control Board (RWQCB) was issued on December 1, 1998, authorizing Sherwin-Williams to discharge treated groundwater at 30 gpm using the MSE system, under the requirements of the existing Order No. 94-087, NPDES No. CAG912003. Construction for the new MSE groundwater treatment system began during the reporting quarter. This new treatment system was selected to replace the Andco system to handle increased flow rates expected as a result of GWES expansion. The new treatment system is expected to be brought on line in January 1999. As previously discussed with the RWQCB, the existing Andco system will remain on line to treat the MSE system effluent during the initial startup of the new treatment system. On December 15, 1998 Sherwin-Williams submitted the notice of intent for the NPDES individual discharge permit for the new 30 gpm GWTS being installed at the Site.

I certify under penalty of law that I am informed that this document and all attachments are prepared by qualified personnel who properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed these personnel, or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SHERWIN WILLIAMS

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If you have any questions, please call Gene Barry of LFR at (510) 652-4500 or Larry Mencin, the Environmental Project Manager for The Sherwin-Williams Company, at (216) 566-1768.

Sincerely,

George Stavnes
Plant Manager

Enclosure

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CERTIFICATION

All information, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by an LFR Levine·Fricke (LFR) California Professional Engineer.

Mark D. Knox 1/29/99

Mark D. Knox
Principal Engineer
California Professional Engineer (33194)

Date

1.0 INTRODUCTION AND SYSTEM DESCRIPTION

On behalf of The Sherwin-Williams Company ("Sherwin-Williams"), LFR Levine·Fricke (LFR) has prepared this National Pollutant Discharge Elimination System (NPDES) report for the groundwater extraction and treatment system (GWETS) at the Sherwin-Williams Coatings Plant located at 1450 Sherwin Avenue in Emeryville, California ("the Site"; Figure 1). The report presents the following:

- Quarterly NPDES Self-Monitoring Report for the GWETS, submitted pursuant to the California Regional Water Quality Control Board's (RWQCB's) General Waste Discharge Requirements Order No. 94-087, NPDES No. CAG912003, issued March 15, 1995, describing activities at the Site from October 1 to December 31, 1998 ("the reporting quarter").
- Annual NPDES Self-Monitoring Report for the GWETS, submitted pursuant to the RWQCB's General Waste Discharge Requirements Order No. 94-087. NPDES No. CAG912003, issued March 15, 1995, describing activities at the Site from January 1 to December 31, 1998 ("the annual reporting period").

The original GWETS consisted of an extraction system (three pneumatic extraction pumps and associated conveyance piping) that pumps groundwater into the groundwater treatment system (GWTS). In order to meet the objective of establishing an inward hydraulic gradient along the entire length of the slurry wall, Sherwin-Williams began construction for expansion of the groundwater extraction system (GWES) in October 1998, after receiving permits from the City of Emeryville. Installation of the seven new extraction wells (EX-4 through EX-10) and associated conveyance piping was completed in mid December 1998.

In the GWTS, heavy metals are first removed from the influent using an electrochemical co-precipitation treatment system ("the Andco system"); then, volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH) are removed using aqueous-phase granular activated carbon ("the carbon system").

Figure 2 presents a site plan of the GWETS between October 1995 and mid December 1998, including the locations of GWETS components. Figure 3 presents a simplified process flow diagram that indicates the major components of the Andco and carbon systems, including the locations of system sampling points. Figure 4 presents a site plan of the expanded GWES brought on line on December 16, 1998.

1.1 The Andco System

Extracted groundwater is pumped from extraction wells to a 2,000-gallon influent tank at the Andco system, from which it is pumped to two electrochemical cells. GWTS influent samples are collected between the influent tank and the electrochemical cells, at sample point W-I1 (see Figure 3). In the electrochemical cells, heavy metals in the

groundwater adsorb to ferric ions (Fe III), which are released into solution by an electric current across the electrodes. Approximately 85 percent of the water from the electrochemical cells is recirculated back into the influent tank. The remainder of the water flows into a reactor tank, where hydrogen peroxide is added to oxidize the arsenic into the more insoluble arsenate (arsenic [V] or AsO_4^-) form. The water then flows through a retention tank and a pH correction tank before entering a clarifier, where a polymer is added, and solids containing the heavy metals flocculate and settle out. The solids underflow is pumped into a slurry tank and then into a filter press, where a dewatered filter cake is generated. The filter cake is appropriately disposed of off site.

Supernatant liquid from the slurry tank flows by gravity back to the clarifier. Treated overflow water from the clarifier flows into a pumping tank. This water is then pumped through two multimedia filters. The water is pumped through the carbon system before discharge. Andco System effluent samples are collected directly after the multimedia filters, at sample point W-ANDEFF.

1.2 The Carbon System

The carbon system consists of nine 200-pound aqueous-phase carbon drums arranged in three parallel series of three carbon drums each. Water from the final three carbon drums in the three series flows into a 500-gallon holding tank, from which it is normally discharged into the storm drain that discharges into Temescal Creek, along the northern boundary of the Site. Throughout the reporting quarter, the temporary GWTS effluent pumping system that was installed during the fourth quarter of 1997 to bypass the storm-drain system continued to discharge treated effluent from the effluent pumping tank (500-gallon holding tank) at the GWTS directly to Temescal Creek. Final effluent samples are collected between the final carbon drums in the series and the 500-gallon holding tank (sample point W-E1).

1.3 Receiving Water Sampling Points

Receiving water samples are collected annually (typically in September) at Temescal Creek at points 50 feet upstream (W-R1) and 150 feet downstream (W-R2) from the point at which GWTS effluent discharges into the creek.

2.0 QUARTERLY NPDES SELF-MONITORING REPORT

2.1 Groundwater Treatment System Sampling and Laboratory Analyses

During the reporting quarter, treatment system sampling was conducted in accordance with the GWTS sampling and analysis schedule presented in Table 1A, using the approved laboratory analysis methods presented in Table 1B. As requested by the RWQCB in its November 5, 1996 letter (file numbers 2211.00 and 2246.00), analytical

laboratory reports and chain-of-custody forms for these samples are not presented in this report. These data are kept on file at LFR's office at 1900 Powell Street in Emeryville, California. Tables 2A and 2B summarize quality assurance/quality control (QA/QC) data for sampling and analysis during the reporting quarter. Common reporting limits for effluent analyses are presented in Appendix A.

In accordance with the RWQCB self-monitoring program, this report includes the following quarterly data summaries:

- influent concentrations (Table 3)
- effluent concentrations (Table 4)
- NPDES monitoring results (Table 5)
- treatment system flow data (Table 6)
- estimated VOC mass removal (Table 7)
- compliance evaluation for the treatment system effluent and receiving waters (Table 8)
- summary of additional analyses performed during 1998 (Table 9)

Treatment system flow rates and other system performance data were recorded during the reporting quarter on daily field operations sheets. As also requested by the RWQCB in its November 5, 1996 letter, field operations sheets are not presented in this report, but are kept on file at LFR's offices. Temperature, pH, dissolved oxygen, and other physical and inorganic parameters were also recorded on the field sheets. Details of field visits and maintenance were noted in the "Additional Comments" section of the field sheets. Field measurements and samples for laboratory analysis were collected in accordance with NPDES requirements.

2.1.1 Results of Treatment System Sampling and Laboratory Analyses

From October to December 1998, LFR used Curtis & Tompkins, Ltd. of Berkeley, California, for all laboratory analyses.

Monthly Sampling. During the reporting quarter, the GWETS complied with all NPDES effluent limitations. Section 2.2 describes in greater detail the operation of the GWETS during the reporting quarter.

The GWTS effluent for arsenic was less than the NPDES permit limit of 25 micrograms per liter (μg/l). Arsenic was analyzed by EPA Method 6010.

VOCs, analyzed using EPA Methods 8010 and 8020, were effectively removed by the GWTS during the reporting quarter. Halogenated VOCs, benzene, toluene, ethylbenzene, and xylenes (BTEX) were not detected in the effluent samples collected during the reporting quarter.

TPH as gasoline (TPHg) and TPH as diesel (TPHd), analyzed using modified EPA Method 8015, were not detected in the effluent sample during the reporting quarter.

Measurements of discharge flow rate, effluent pH, and effluent temperature collected during the reporting quarter were within NPDES limits. Standard observations of the effluent and results of effluent turbidity analyses also indicated that the GWTS effluent was suitable for discharge into Temescal Creek.

Quarterly Sampling. In addition to the monthly sampling, results of laboratory analysis performed for total dissolved solids (TDS) in the effluent indicated that the GWTS effluent met the criteria for discharge into Temescal Creek.

Additional Sampling. Additional sampling was conducted during the reporting quarter to assess and optimize treatment system effectiveness. Samples were collected at various points of the treatment process and submitted to analytical laboratories for iron and other analyses.

Additional field testing and monitoring of treatment system parameters were performed by the Sherwin-Williams internal quality control (QC) laboratory and Curtis & Tompkins during the reporting quarter to assess and optimize treatment system effectiveness. The results of additional field testing and monitoring data are included in Table 9. Samples collected between the final carbon drums in the series and the 500-gallon holding tank that were analyzed by the Sherwin-Williams internal QC laboratory are identified as W-CARBEFF rather than W-E1. This is to differentiate between samples submitted to the analytical laboratory used to monitor compliance with NPDES discharge limitations and those sent to the Sherwin-Williams internal QC laboratory.

2.2 Groundwater Extraction and Treatment System Operation

Routine GWETS operation and maintenance tasks performed during the reporting quarter included monitoring and adjusting treatment processes and operational parameters to optimize system performance; maintaining field records; acid washing the electrochemical cells; preparing acid and polymer solutions; replacing spent chemicals; neutralizing spent acid solution; emptying the Andco system filter press; backwashing the multimedia filters; changing out spent carbon drums; adjusting process chemical feed rates; recording extraction well flow data; calibrating the hydrogen peroxide controller and other treatment system equipment; and performing periodic housekeeping.

Nonroutine GWETS operation and maintenance tasks performed in the reporting quarter included changing out electrodes in the electrochemical cells; repairing a sump pump for the carbon drum secondary containment system; repairing and reinstalling the mixer blade for T-701; conducting arsenic and flow measurements of the seven new extraction

wells; and treating groundwater generated during water-quality sampling and monitoring events.

As part of the GWES expansion, the seven new extraction wells were brought on line in pairs for initial arsenic and flow measurements beginning on December 16, 1998. Extraction wells with lower arsenic concentrations were brought on line with wells with higher arsenic concentrations. Each extraction well pair was brought on line for 24 hours to measure how groundwater flow rates changed over the period. An LFR field technician measured and recorded flow rates every 2 to 3 hours (during normal business hours, Monday through Friday between 7 am and 5 pm). At the end of each 24-hour period, one water sample was collected from each extraction well and analyzed for arsenic. The original three extraction wells, EX-1, EX-2, and EX-3, remained on line during this initial testing. After receiving the arsenic concentration and flow rate data, extraction wells EX-1, EX-2, EX-3, EX-7, EX-8, EX-9, and EX-10 were brought on line on December 28, 1998. These extraction wells were selected because they are expected to be the most beneficial to maintaining an inward gradient across the slurry wall and extracting surface water infiltration along the railroad tracks.

2.2.1 Corrective Actions

LFR has expended considerable effort to identify and resolve problems associated with the electrochemical treatment system performance during previous quarters. Specifically, LFR has modified and redesigned the Andco electrochemical system to improve the Andco design that previously limited the system from continuously meeting the low discharge limit of 25 μg/l. The Andco system successfully met the 25 μg/l discharge limit during the entire reporting quarter. Technician staffing was reduced from two shifts to one for the entire reporting quarter.

LFR has focused its corrective efforts on retrofitting the Andco system with feedback loop control systems for each of three main controllable parameters (system flow rate, hydrogen peroxide injection rate, and amperage levels across the electrochemical cells that control iron concentration), to provide the precise monitoring and control systems essential to meet the required treatment concentration for arsenic, which is very close to the concentration technically feasible.

Construction for the new MSE reductive precipitation treatment system began during the reporting quarter. This new treatment system was selected to replace the Andco system to handle increased flow rates expected as a result of GWES expansion. The new treatment system is expected to be brought on line in January 1999.

2.2.2 Treatment System Flow Rates

Flow measurements from the effluent totalizer indicated that 274,759 gallons of water were treated and discharged during the reporting quarter (Table 6). This total represents an average flow rate of approximately 2.07 gallons per minute (gpm) during days of

normal operation during the reporting quarter. Although the additional extraction wells were brought on line, the maximum flow rate through the treatment system did not exceed 7 gpm during December 1998. Purge water from quarterly well sampling events was processed through the treatment system before discharge, and represents a small part of the total gallons discharged. Days of operation exclude periods of down-time for periodic maintenance when the GWTS was returned to service within one day.

3.0 ANNUAL NPDES SELF-MONITORING REPORT

The following annual NPDES Self-Monitoring Report summarizes GWETS monitoring data for the annual reporting period from January 1 through December 31, 1998. This summary is submitted pursuant to the RWQCB's General Waste Discharge Requirements Order No. 94-087, NPDES No. CAG912003, issued March 15, 1995.

In addition to quarterly data summaries, the following tables include recent historical data generated during the annual reporting period, in accordance with the RWQCB Self-Monitoring Program:

- influent concentrations (Table 3)
- effluent concentrations (Table 4)
- NPDES miscellaneous monitoring results (Table 5)
- treatment system flow data (Table 6)
- estimated VOC mass removal (Table 7)
- compliance evaluation for the treatment system effluent and receiving waters (Table 8)

3.1 Effluent

During the annual reporting period, the GWETS complied with all NPDES effluent limitations.

The following corrective actions were taken during 1998 in addition to the tasks discussed above to improve and maintain arsenic treatment efficiency.

- The GWETS was periodically operated in recirculation mode to re-treat groundwater stored at the GWETS until a suitable effluent arsenic concentration was reached for discharge into Temescal Creek.
- Sherwin-Williams pilot-tested three proprietary arsenic-removal technologies developed by MSE Technology Applications, Inc. at the Sherwin-Williams facility. The third technology evaluated, reductive precipitation, was effective in reducing arsenic concentrations from 60 milligrams per liter (mg/l; equivalent to parts per million [ppm]) to less than 25 ppb.

- More frequent changeouts of the electrochemical cell electrodes than recommended by Andco were performed.
- Increases were made to field technician coverage during off-hours to adjust treatment system operation parameters and to operating time of the GWES and GWTS.
- The relationships among hydrogen peroxide, iron, and arsenic concentrations at various points in the treatment process were observed and compared to theoretical values.

3.2 Receiving Water

Upstream and downstream receiving water samples were collected and analyzed in September, as required by the NPDES permit. Samples were collected and analyzed for TDS and hardness. Measurements were also taken for upstream and downstream receiving water pH, dissolved oxygen, and temperature. Standard observations were made during the annual receiving water sampling event.

The annual measurements of receiving water pH were within the 6.5 to 8.5 range required by the NPDES permit. The annual measurements of dissolved oxygen were above the 5.0 μg/l and 80% saturation minima.

Data from the annual receiving water sampling event indicated that the discharge of the GWETS effluent did not have a significant effect on the receiving water during the annual reporting period.

3.3 Flow Rate for 1998

Flow measurements from the effluent totalizer indicated that approximately 1,377,125 gallons of groundwater were treated and discharged throughout 1998 (Table 6). The total represents an average flow rate of approximately 3.08 gpm during periods of normal operation during the annual reporting period. The yearly total includes treatment of approximately 300,000 gallons of the groundwater on site in portable tanks during early 1998. In addition, during rainfall events in the reporting period, rainwater collected in the secondary containment areas was processed through the treatment system before discharge, and represents part of the total gallons treated. Purge water from quarterly well sampling events and water generated by various other activities that took place at the Site, such as piezometer installation and hydroflushing of the on-site storm-drain piping, were processed through the treatment system before discharge, and also represent part of the total gallons discharged.

Table 1A
Annual Calendar for Sampling and Analyses
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

Frequency	Location	Measurement/Analyses
Weekly	Effluent	Flow rate
Monthly	Influent	pH, arsenic (EPA Method 6010), VOCs (EPA Methods 601 and 8020 or 8260), and TPH gasoline and diesel (EPA 8015 and 8015M)
Monthly	Effluent	Turbidity, pH, standard observations, temperature, arsenic (EPA Method 7060), VOCs (EPA Methods 601 and 8020 or 8260), and TPH gasoline and diesel (EPA 8015 and 8015M)
Quarterly (1)	Effluent	Total dissolved solids
Annually (2)	Effluent	96-hr bioassay (aquatic toxicity), total and unionized ammonia as nitrogen (analysis performed if bioassay testing result is less than 90% survival), hardness, metals (cadmium, total chromium, copper, lead, nickel, selenium, silver, zinc, mercury), VOCs (EPA Method 8240 or 8260) and Semi-Volatile Organic Compounds (EPA Method 8270)
Annually (2)	Receiving Waters	Total dissolved solids, pH, dissolved oxygen, standard observations, temperature, and hardness

Notes:

(1) Quarterly sampling periods = March, June, September, December

(2) Annual sampling period = September

Table 1B
List of Laboratory Analysis Methods
Approved by California Department of Health Services
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

Method	Analyte(s)
EPA Method 601/8010	Halogenated Volatile Organic Compounds
EPA Method 602/8020	Aromatic Volatile Organic Compounds
EPA Method 8015	Total Petroleum Hydrocarbons as Gasoline
EPA Method 8015M	Total Petroleum Hydrocarbons as Diesel
EPA Method 624/8240	Volatile Organic Compounds (includes EPA Methods 601/8010 and 602/8020 compounds and ketones)
EPA Method 625/8270	Semivolatile Organic Compounds (includes phenols and polynuclear aromatic compounds)
EPA Methods 206.2, 213.2, 239.2, and 270.2	Arsenic, Cadmium, Lead, and Selenium
EPA Method 200.7	Total Chromium, Copper, Nickel, Silver, and Zinc
EPA Method 7470/7471	Mercury
EPA Method 160.1	Total Dissolved Solids
EPA Method 180.1	Turbidity
EPA Method 130.2	Hardness
Aquatic Toxicity Bioassay	96-hour static test using rainbow trout
EPA Method 350.2/350.3	Unionized Ammonia as Nitrogen

Notes:

Ketones include acetone, methyl ethyl ketone, and methyl isobutyl ketone.

Polynuclear Aromatic Hydrocarbons include acenaphthene, acenapthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene, benzo(a)pyrene, chrysene, fluorene, naphthalene, phenanthrene, and pyrene.

Phenols include phenol, 2-methylphenol, 4-methylphenol, methyl phenol, 2,4-dimethylphenol, 2,4,6-trichlorophenol, and pentachlorophenol.

Table 2A

Summary of Sampling QA/QC		
Site Name: **Sherwin-Williams** **(2616.98)**	**Site Address:** **1450 Sherwin Avenue** **Emeryville, CA, 94608**	**Monitoring Period Covered:** **Oct-98 through Dec-98**

Sampling performed by: Steve Thornton
Firm name: Levine-Fricke-Recon
Firm address: 1900 Powell Street, Emeryville CA 94608
Firm contact: Gene Barry/Alex Jenkins
Firm phone number: (510) 652-4500

Were chain-of-custody forms completed for all samples?	☒ Yes	☐ No
Were field parameters stabilize prior to taking sample?	☒ 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 ABT. QA/QC by GAB

Table 2B

Site Name:	Site Address:	Monitoring Period Covered:
Sherwin-Williams (2616.98)	1450 Sherwin Avenue Emeryville, CA, 94608	Oct-98 through Dec-98

Analysis performed by:
Lab name: Curtis & Tompkins, Ltd., Analytical Laboratories
Lab address: 2323 Fifth Street, Berkeley, CA 94710
Lab contact: Tracy Babjar
Lab phone number: (510) 486-0900

Analytical method used: (check applicable methods)

- [x] Total Dissolved Solids by EPA Method 160.1
- [ ] Bioassay 96-hr % survival by Standard Method _____
- [x] Turbidity (NTU) by EPA Method 180.1
- [ ] Hardness (mg/l CaCO3) by EPA Method _____
- [ ] Iron by EPA Method _____
- [x] Arsenic by EPA Method 6010 A
- [ ] Cadmium by EPA Method _____
- [ ] Chromium (total) by EPA Method _____
- [ ] Chromium (hexavalent) EPA Method _____
- [ ] 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 _____
- [x] Halogenated Volatile Organics by EPA Method 601 or 8010 or 8260
- [x] Aromatic and Unsaturated Volatile Organics by EPA 602 or 8020 or 8260
- [ ] 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
- [x] TPH gasoline by EPA Method 8015 modified
- [x] TPH diesel by EPA Method 8015 modified
- [ ] Chlorinated Hydrocarbons by EPA Method 8120

Is the lab state-certified for the above analytical method(s)?	[x] Yes [ ] No
Was analysis 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

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

Data entered by ABT. QA/QC by GAB

* The explanation should describe any modifications to standard methods and whether approved by Board staff, and describe corrective actions taken in response to any QA/QC results that fall outside acceptance criteria.

Table 3
Summary of Influent Monitoring
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

Sample Date	Lab	Notes	Influent Concentrations (micrograms per liter)							
			Arsenic	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPHg	TPHd	Halogenated VOCs by EPA Method 601/8010/8260
Recent Historical										
30-Jan-98	AEN		47	<0.5	1.9	0.7	4	<50	<50	(1)
25-Feb-98	AEN		11,000	17	2,000	460	2,000	6,900	570	(2)
23-Mar-98	AEN		13,000	13	2,500	38	2,000	6,100	620	ND
8-Apr-98	CT		8,000	NA	NA	NA	NA	NA	NA	NA
10-Apr-98	CT		9,800	NA	NA	NA	NA	NA	NA	NA
14-Apr-98	CT		5,800	NA	NA	NA	NA	NA	NA	NA
29-Apr-98	QUAN	(3)	8,500	<10	500	<10	680	3,800	<300	(4)
28-May-98	QUAN	(5)	38,500	<25	1,000	56	610	5,300	<50	(2)
18-Jun-98	QUAN	(6)	61,800	<2.5	25	<2.5	320	1,000	<50	(7)
28-Jul-98	QUAN	(3)	28,600	<5.0	140	<5.0	360	1,700	<50	(8)
13-Aug-98	QUAN	(9)(10)	58,500	<0.5	<0.5	<0.5	26	<50	<50	ND
25-Sep-98	CT		81,000	<0.5	<0.5	<0.5	11.5	89	700	(11)
Current Quarter										
15-Oct-98	CT		91,000	1	37	6.2	81	330	510	(12)
18-Nov-98	CT	(15)	62,000	0.89	94	3.6	290	1,100	1,200	(13)
29-Dec-98	CT	(16)	49,000	10	1,100	5.1	1,310	5,900	1,600	(14)

Data entered by KLF. Proofed by ABT.

Notes :

Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8020 unless otherwise noted.

AEN = American Environmental Network, Pleasant Hill, California

CT = Curtis & Tompkins, Ltd., Analytical Laboratories, Berkeley, California

QUAN = Quanterra Incorporated, West Sacramento, California

NA = not analyzed

Table 3
Summary of Influent Monitoring
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

ND = not detected for all constituents. Reporting limits for halogenated VOCs for 601/8010 are shown in Appendix A tables.

TPHg = total petroleum hydrocarbons as gasoline

TPHd = total petroleum hydrocarbons as diesel

VOCs = volatile organic compounds

(1) Detected chloroform at 0.7 μg/L.

(2) Detected cis-1,2-dichloroethene at 1.3 μg/L.

(3) The hydrocarbon pattern present in the TPHd sample represented an unknown mixture atypical of diesel fuel in the range of n-C8 to n-C32 at 1,500 μg/L. Quantitation of TPHd reported above was based on a diesel reference between n-C10 and n-C24 only.

(4) Detected cis-1,2-dichloroethene at 1.9 μg/L and chloroform at 1.6 μg/L.

(5) The hydrocarbon pattern present in the TPHd sample represented an unknown mixture atypical of diesel fuel in the range of n-C8 to n-C32 at 900 μg/L. Quantitation of TPHd reported above was based on a diesel reference between n-C10 and n-C24 only.

(6) The hydrocarbon pattern present in the TPHd sample represented an unknown mixture atypical of diesel fuel in the range of n-C8 to n-C32 at 1,200 μg/L. Quantitation of TPHd reported above was based on a diesel reference between n-C10 and n-C24 only.

(7) Detected cis-1,2-dichloroethene at 0.90 μg/L.

(8) Detected cis-1,2-dichloroethene at 0.67 ug/l.

(9) The hydrocarbon pattern present in the TPHd sample represented an unknown mixture atypical of diesel found in the range of n-C8 to n-C38 at 720 ug/l. Quantitation of TPHd reported above was based on a diesel reference between n-C10 to n-C24 only.

(10) The hydrocarbon pattern present in the TPHg sample represented an unknown mixture atypical of gasoline in the range of n-C9 to n-C12 at 140 ug/l. Quantitation was based on a gasoline reference in the range of n-C7 to n-C12 only.

(11) 2-butanone was detected at 6.5 ug/l.

(12) Detected cis-1,2-dichloroethene at 0.8 ug/L and 1,2-dicholorethane at 0.6 ug/L.

(13) Detected cis-1,2-dichloroethene at 1.0 ug/L and 1,2-dicholorethane at 1.2 ug/L.

(14) Detected cis-1,2-dichloroethene at 3.0 μg/L.

(15) Benzene note: presence of this compound confirmed by second column, however the confirmation concentration differed from the reported result by more than a factor or two. TPHg sample exhibits fuel pattern which does not resemble standard.
The hydrocarbon pattern present in the TPHd sample represented an unknown mixture atypical of diesel found in the range of n-C8 to n-C38 at 1,200 mg/L. Quantitation of TPHd reported above was based on a diesel reference between n-C10 to n-C24 only.

(16) The hydrocarbon pattern present in the TPHd sample represented an unknown mixture atypical of diesel found in the range of n-C8 to n-C38 at 1,600 mg/L. Quantitation of TPHd reported above was based on a diesel reference between n-C10 to n-C24 only.

Table 4
Summary of Effluent Monitoring
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

Sample Date	Lab	Notes	Effluent Concentrations (micrograms per liter)							
			Arsenic	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPHg	TPHd	Halogenated VOCs by EPA Method 601/8010/8260
Recent Historical										
30-Jan-98	AEN		<5.0	<0.5	<0.5	<0.5	<2	<50	<50	ND
25-Feb-98	AEN		<5.0	<0.5	<0.5	<0.5	<2	<50	<50	ND
23-Mar-98	AEN		12	<0.5	<0.5	<0.5	<2	<50	<50	ND
8-Apr-98	CT	(1)	13	NA	NA	NA	NA	NA	NA	NA
10-Apr-98	CT	(1)	43	NA	NA	NA	NA	NA	NA	NA
14-Apr-98	CT	(2)	32	NA	NA	NA	NA	NA	NA	NA
16-Apr-98	CT		<5.0	NA	NA	NA	NA	NA	NA	NA
21-Apr-98	CT		<5.0	NA	NA	NA	NA	NA	NA	NA
29-Apr-98	QUAN		5.0	<0.50	<0.50	<0.50	<2.0	<50	<50	ND
22-May-98	CT	(3)	<5.0	NA	NA	NA	NA	NA	NA	NA
28-May-98	QUAN		<5.0	<0.50	<0.50	<0.50	<2.0	<50	<50	ND
18-Jun-98	QUAN		<5.0	<0.50	<0.50	<0.50	<2.0	<50	<50	ND
28-Jul-98	QUAN		<5.0	<0.5	<0.5	<0.5	<2.0	<50	<50	ND
13-Aug-98	QUAN		<5.0	<0.5	<0.5	<0.5	<2.0	<50	<50	ND
25-Sep-98	CT		<5.0	<0.5	<0.5	<0.5	<2.0	<50	<50	ND
Current Quarter										
15-Oct-98	CT		<5.0	<1.0	<1.0	<1.0	<2.0	<50	<50	ND
18-Nov-98	CT		<5.0	<0.5	<0.5	<0.5	<1.0	<50	<50	ND
29-Dec-98	CT		13	<0.5	<0.5	<0.5	<1.0	<50	<50	ND

Data entered by KLF. Proofed by ABT.

Notes :

Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8020 unless otherwise noted.

AEN = American Environmental Network, Pleasant Hill, California

CT = Curtis & Tompkins, Ltd., Analytical Laboratories, Berkeley, California

QUAN = Quanterra Incorporated, West Sacramento, California

Table 4
Summary of Effluent Monitoring
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

NA = not analyzed

ND = not detected for all constituents. Reporting limits for halogenated VOCs for 601/8010 are shown in Appendix A tables.

TPHg = total petroleum hydrocarbons as gasoline

TPHd = total petroleum hydrocarbons as diesel

VOCs = volatile organic compounds

(1) Effluent from the groundwater treatment system was directed to on-site storage tanks for recirculation. No treated groundwater was discharged to Temescal Creek.

(2) The groundwater treatment system was operated in recirculation mode. No treated groundwater was discharged to Temescal Creek.

(3) Sample mistakenly labeled W-CARBEFF.

Table 5
Summary of NPDES Monitoring: Miscellaneous Sampling Results
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

Date	Sampling Station (1)	Total Dissolved Solids (mg/L)	Bioassay (% Survival)	Total and Unionized Ammonia as Nitrogen (mg/L)	Turbidity (NTUs)	pH (2) (units)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (3) (% Saturation)	Temperature (2) (°C)	Hardness (mg/L CaCO3)	Other Metals (mg/L)	Semi-VOCs by EPA Method 8270
Recent Historical												
Jan-98	I-1	(4)	(4)	(4)	(4)	(8)	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	(6)	(5)	(7)	(8)	7.05	(4)	(4)	14.7	(5)	(5)	(5)
Feb-98	I-1	(4)	(4)	(4)	(4)	(8)	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	(6)	(5)	(7)	0.10	(8)	(4)	(4)	(8)	(5)	(5)	(5)
Mar-98	I-1	(4)	(4)	(4)	(4)	(8)	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	850	(5)	(7)	(8)	(8)	(4)	(4)	(8)	(5)	(5)	(5)
Apr-98	I-1	(4)	(4)	(4)	(4)	(8)	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	990	(5)	(7)	<1.0	(8)	(4)	(4)	(8)	(5)	(5)	(5)
May-98	I-1	(4)	(4)	(4)	(4)	5.89	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	(6)	(5)	(7)	<1.0	6.57	(4)	(4)	18.2	(5)	(5)	(5)
Jun-98	I-1	(4)	(4)	(4)	(4)	6.05	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	1,320	(5)	(7)	<1.0	6.53	(4)	(4)	21.9	(5)	(5)	(5)
Jul-98	I-1	(4)	(4)	(4)	(4)	5.92	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	(6)	(5)	(7)	(8)	6.54	(4)	(4)	21.1	(5)	(5)	(5)
Aug-98	I-1	(4)	(4)	(4)	(4)	5.98	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	1,680	(5)	(7)	<1.0	6.56	(4)	(4)	21.1	(5)	(5)	(5)
Sep-98	I-1	(4)	(4)	(4)	(4)	5.90	(4)	(4)	(4)	(4)	(4)	(9)
	E-1	1,470	95	(7)	(8)	6.50	(4)	(4)	17.1	590	(10)	ND
	R-1	1,230	(4)	(4)	(4)	7.70	10	100%	17.6	380	(4)	(4)
	R-2	1,420	(4)	(4)	(4)	7.69	10	100%	17.6	410	(4)	(4)
Current Quarter												
Oct-98	I-1	(4)	(4)	(4)	(4)	5.96	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	(6)	(5)	(7)	1.1	7.36	(4)	(4)	18.9	(5)	(5)	(5)
Nov-98	I-1	(4)	(4)	(4)	(4)	6.04	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	(6)	(5)	(7)	0.23	6.75	(4)	(4)	17.2	(5)	(5)	(5)
Dec-98	I-1	(4)	(4)	(4)	(4)	5.64	(4)	(4)	(4)	(4)	(4)	(5)
	E-1	1,760	(5)	(7)	0.27	6.85	(4)	(4)	14.0	(5)	(5)	(5)

Data entered by KLF. Proofed by ABT.

Notes :

Table 5
Summary of NPDES Monitoring: Miscellaneous Sampling Results
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

ND - Not detected for all constituents. Reporting limits for SVOCs are shown in Appendix A tables.

W-I1 - Water System Influent

W-E1 - Water System Effluent

W-R1 - Receiving water; Temescal Creek, at a point 50 feet upstream from point of discharge.

W-R2 - Receiving water; Temescal Creek, at a point 150 feet downstream from point of discharge

(1) Receiving water samples are taken annually as required by NPDES permit.

(2) Average pH and temperature for the month during normal operation.

(3) Dissolved oxygen saturation assumed at 10 mg/L.

(4) Not required by NPDES permit.

(5) Not sampled; analysis required annually by NPDES permit.

(6) Not sampled; analysis required quarterly by NPDES permit.

(7) Not required by NPDES permit; sample taken at the same sampling station and on the same day as the bioassay sampling event; analysis held pending bioassay results

(8) Not measured due to administrative error.

(9) Benzyl alcohol detected at 24 ug/l. 2,4-Dimethyphenol detected at 9.2 ug/l. Di-n-butylphthalate detected at 24 ug/l.

(10) Barium detected at 19 ug/l.

Table 6
Treatment System Flow Data
Sherwin-Williams Facility, Emeryville, California

Date of Meter Reading	Notes	Number of Discharging Days between Measurements [1]	Volume of Groundwater Discharged (gallons) [2]	Avg. Effluent Flow Rate for Period [2] (gpm)
Recent Historical				
7-Jan-98	(3)	7	41,880	4.15
14-Jan-98	(3)	7	17,565	1.74
22-Jan-98	(3)	8	40,950	3.55
31-Jan-98	(4)	5	26,650	3.70
6-Feb-98	(3)	6	38,300	4.43
13-Feb-98	(5)	5	22,500	3.13
20-Feb-98	(6)	7	12,724	1.26
23-Feb-98	(7)	3	8,496	1.97
28-Feb-98	(8)	5	28,432	3.95
7-Mar-98	(8)	7	53,412	5.30
15-Mar-98	(8)	8	32,106	2.79
23-Mar-98	(8)	8	69,520	6.03
31-Mar-98	(8)	8	54,190	4.70
9-Apr-98	(9)	0	0	0.00
13-Apr-98	(10)	0	0	0.00
15-Apr-98	(11)	0	0	0.00
22-Apr-98		7	60,040	5.96
29-Apr-98		7	40,607	4.03
7-May-98	(12)	7	40,483	4.02
13-May-98		6	33,270	3.85
23-May-98	(13)	6	30,250	3.50
31-May-98		8	55,270	4.80
7-Jun-98		7	57,020	5.66
14-Jun-98		7	42,060	4.17
22-Jun-98		8	30,966	2.69
30-Jun-98	(12)	7	32,172	3.19
6-Jul-98	(12)	5	18,232	2.53
13-Jul-98	(12)	6	18,840	2.18
20-Jul-98	(12)	6	16,039	1.86
31-Jul-98	(14)	9	28,281	2.18
8-Aug-98	(12)	7	24,350	2.42
16-Aug-98		8	19,468	1.69
24-Aug-98	(12)	7	19,358	1.92
31-Aug-98		7	26,654	2.64
3-Sep-98	(12)	2	8,610	2.99
14-Sep-98	(15)	3	12,188	2.82
21-Sep-98		7	19,440	1.93
30-Sep-98	(14)	7	22,043	2.19
Current Quarter				
5-Oct-98		5	12,788	1.78
15-Oct-98		10	31,961	2.22
23-Oct-98		8	14,639	1.27
30-Oct-98		7	15,846	1.57
6-Nov-98		7	20,153	2.00
13-Nov-98	(16)	6	20,662	2.39
19-Nov-98		6	16,680	1.93
29-Nov-98	(16)	9	26,920	2.08

Table 6
Treatment System Flow Data
Sherwin-Williams Facility, Emeryville, California

Date of Meter Reading	Notes	Number of Discharging Days between Measurements [1]	Volume of Groundwater Discharged (gallons) [2]	Avg. Effluent Flow Rate for Period [2] (gpm)
19-Nov-98		6	16,680	1.93
29-Nov-98	(16)	9	26,920	2.08
4-Dec-98	(16)	4	13,158	2.28
14-Dec-98	(16)	9	32,474	2.51
23-Dec-98	(17)	8	43,298	3.76
31-Dec-98	(18)	4	26,180	4.55
Current Quarter Summary				
Total		83	274,759	2.30
Annual Summary				
Total		311	1,377,125	3.08

Data entered by KLF. Proofed by ART.

Notes:

1998 Notes

(1) Calculated by subtracting downtime from total days between measurements.

(2) During rainfall events, rainwater collected in secondary containment areas at the treatment system is processed through the treatment system before discharge, and represents part of the total gallons treated and the calculated average flow rate.

(3) The extraction system was off line during this entire period. Most of the water treated and discharged during this period came from the Rain-for-Rent tanks in the employee parking lot. Transfer of water from Rain-for-Rent tanks in the employee parking lot to the Rain-for-Rent tank at the treatment system began on November 8, 1997.

(4) The extraction system was off line during this entire period. The treatment system was off line (and no water was discharged) for four days during this period. Most of the water treated and discharged during this period came from the Rain-for-Rent tanks in the employee parking lot.

(5) The extraction system was off line during this entire period. The treatment system was off line (and no water was discharged) for two days during this period. Most of the water treated and discharged during this period came from the Rain-for-Rent tanks in the employee parking lot.

(6) The extraction system was off line during this period. Most of the water treated and discharged during this period came from the Rain-for-Rent tanks in the employee parking lot and water previously stored in the Tri-Bio biological treatment system.

(7) Extraction well EX-2 was returned to service on February 20, 1998 as the source of water for the treatment system. Extraction wells EX-1 and EX-3 remained off line.

(8) Extraction well EX-1 was returned to service on February 23, 1998. The treatment system was operated with EX-1 and EX-2 as the source of water. Extraction well EX-3 remained off line.

(9) No water was discharged during this period. The extraction system and treatment system were off line for seven days during this period. The treatment system was operated with groundwater were extracted and treated during this period.

(10) No water was discharged during this period. The treatment system was operated with EX-1 and EX-2 as the source of water for two days during this period. At this time, treated groundwater was stored in tanks at the treatment system. 7,970 gallons of groundwater were extracted and treated during this period.

(11) No water was discharged during this period. The treatment system was operated in recirculation mode.

(12) The extraction system and the treatment system were off line for one day during this period.

(13) The extraction system and the treatment system were off line for four days during this period. Extraction well EX-3 was returned to service on May 19, 1998.

(14) The extraction system and the treatment system were off line for 2 days during this period.

(15) The system was offline for 8 days during this period due to a transducer failure.

(16) The system was offline for 1 day due to construction/system expansion.

(17) The system was offline for 1 day for repair of the mixer blade in T-701 and acid supply tank required refilling.

(18) The system was offline for 4 days due to an air supply problem.

Table 7
Estimated Mass Removal of VOCs
Groundwater Treatment System
Sherwin-Williams Facility, Emeryville, California

Date of Flow Measurement	Notes	Number of Operating Days Between Measurements [1]	Average Flow Rate (gpm)	VOC Influent Concentration (mg/L) [2]	Pounds Removed (lbs/day)	Pounds Removed (lbs)	Cumulative Pounds Removed Since Startup (lbs)
Recent Historical							
31-Jan-98	(3)	27	3.27	0.01	0.00	0.01	55.96
20-Feb-98	(3)	18	2.84	0.01	0.00	0.00	55.96
28-Feb-98		8	3.21	4.48	0.17	1.38	57.34
31-Mar-98		31	4.69	4.55	0.26	7.95	65.29
29-Apr-98	(4)	20	4.20	1.18	0.06	1.19	66.49
31-May-98		27	4.10	1.67	0.08	2.22	68.70
30-Jun-98		29	3.88	0.35	0.02	0.47	69.17
31-Jul-98	(5)	26	2.17	0.50	0.01	0.34	69.51
31-Aug-98	(6)	29	2.15	0.03	0.00	0.02	69.53
30-Sep-98	(7)	19	2.28	0.02	0.00	0.01	69.54
Current Quarter							
30-Oct-98		30	1.74	0.13	0.00	0.08	69.62
29-Nov-98	(6)	28	2.09	0.39	0.01	0.28	69.89
31-Dec-98	(8)	25	3.20	2.43	0.09	2.33	72.23
Current Quarter Summary							
Total		83				2.69	72.23
Average			1.95	0.98	0.03		
Annual Summary							
Total	(9)	317				16.27	72.23
Average			2.46	1.21	0.05		

Data entered by KLR. Proofed by ABT.

Notes:

gpm = gallons per minute

mg/L = milligrams per liter

lbs/day = pounds per day

(1) Calculated by subtracting downtime from total days between measurements. Calculated operating days may include days when no treated groundwater was discharged.

(2) VOCs reported include benzene, toluene, ethylbenzene, total xylenes, and compounds analyzed by EPA Method 8010/8260. The organic concentrations are measured at the equalization tank at the influent of the treatment system.

(3) The extraction system was off line throughout January and most of February 1998, until extraction well EX-2 was returned to service on February 20, 1998. Most of the water treated and discharged during this period came from the Rain-for-Rent tanks in the employee parking lot. The VOC influent concentration from January 30, 1998 is used to calculate VOC mass removal through February 20, 1998.

(4) Treated effluent from the groundwater extraction and treatment system was directed to on-site storage tanks for a total of six days during April 1998.

(5) The extraction and treatment system were off line for 5 days during this period.

(6) The extraction and treatment system were off line for 2 days.

(7) The extraction and treatment system were off line for 11 days.

(8) The extraction and treatment system were off line for 7 days.

(9) The total number of operating days for 1998 is higher than the total number of discharging days in Table 6 because the system operated in recirculation mode for 6 days.

Table 8
Compliance Evaluation Summary (1)
Groundwater Extraction and Treatment System
Sherwin-Williams Facility, Emeryville, California

	EFFLUENT										RECEIVING WATERS						
Parameter	Flow Rate	Toxicity (96-hour Bioassay)	pH	Arsenic	Other Metals	Halogenated VOCs	BTEX	SVOCs	TPHg	TPHd	pH	Dissolved Oxygen	Temperature	Particulate Matter or Foam	Bottom Deposits or Aquatic Growths	Turbidity or Discoloration	Products of Petroleum Origin
Permit Limit	12 gpm	(2)	6.5 - 8.5	(3)	(4)	(5)	(6)	5.0 ug/l	50.0 ug/l	50.0 ug/l	6.5 - 8.5	(7)	(8)	Absence	Absence	Absence	Absence
Recent Historical																	
Jan-98	0/24	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Feb-98	0/26	0/0	0/0	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Mar-98	0/28	0/0	0/0	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Apr-98	0/18	0/0	0/0	0/3	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
May-98	0/23	0/0	0/1	0/2	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Jun-98	0/29	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Jul-98	0/17	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Aug-98	0/20	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Sep-98	0/18	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
Current Quarter																	
Oct-98	0/19	0/0	0/3	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Nov-98	0/17	0/0	0/2	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Dec-98	0/17	0/0	0/3	0/1	0/0	0/1	0/1	0/0	0/1	0/1	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Current Quarter Summary																	
Oct - Dec 98	0/53	0/0	0/8	0/3	0/0	0/3	0/3	0/0	0/3	0/3	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Annual Summary																	
Jan - Dec 98	0/256	0/1	0/14	0/15	0/1	0/12	0/12	0/1	0/12	0/12	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Data entered by KLF. Proofed by ABT.

Notes :

(1) For each entry, the first number indicates the number of times the appropriate limitation was exceeded, and the second number indicates the number of times analyzed

(2) Three sample median of 90% survival ; survival not < 70%

(3) NPDES arsenic limit = 25 ug/l

(4) Cadmium = 2.2 ug/l ; total chromium = 22.0 ug/l ; copper = 23.6 ug/l ; lead = 6.4 ug/l ; nickel = 320.0 ug/l; selenium = 10.0 ug/l ; zinc = 220.0 ug/l ; mercury = 1gram/day

(5) 1,2-dichloroethane and vinyl chloride = 0.5 ug/l; any other = 5.0 ug/l

(6) Benzene = 1.0 ug/l ; toluene, ethylbenzene, and total xylenes = 5.0 ug/l.

(7) 5.0 mg/l minimum; median for three consecutive months not < 80 %.

(8) The discharge of the effluent shall not cause the temperature of the receiving water to be increased by more than 2.8 degrees C above natural receiving water temperature.

Table 9
Summary of Additional Analyses Performed During Annual Reporting Period
January 1 through December 31, 1998
Sherwin-Williams Facility
Emeryville, California

Sample ID	Notes	Sample Date	Lab	Analyte	Concentration (micrograms per liter)
W-WELLS		25-Feb-98	AEN	Arsenic	13,000
W-I1		30-Jan-98	AEN	Iron	51,000
		25-Feb-98	AEN	Iron	260,000
		23-Mar-98	AEN	Iron	55,000
		29-Apr-98	QUAN	Iron	69,100
		28-May-98	QUAN	Iron	490,000
		18-Jun-98	QUAN	Iron	495,000
		08-Jul-98	QUAN	Iron	252,000
		03-Aug-98	QUAN	Iron	545,000
		25-Sep-98	CT	Iron	450,000
		15-Oct-98	CT	Iron	710,000
		18-Nov-98	CT	Iron	330,000
		29-Dec-98	CT	Iron	360,000
W-ECELLEFF		30-Jan-98	AEN	Iron	77,000
		25-Feb-98	AEN	Iron	290,000
		23-Mar-98	AEN	Iron	73,000
		08-Apr-98	CT	Iron	750,000
		14-Apr-98	CT	Iron	230,000
		29-Apr-98	QUAN	Iron	81,000
		28-May-98	QUAN	Iron	509,000
		18-Jun-98	QUAN	Iron	520,000
		28-Jul-98	QUAN	Iron	285,000
		13-Aug-98	QUAN	Iron	706,000
		25-Sep-98	CT	Iron	700,000
		15-Oct-98	CT	Iron	1,100,000
		18-Nov-98	CT	Iron	420,000
		29-Dec-98	CT	Iron	410,000
W-ANDEFF		30-Jan-98	AEN	Benzene	<0.5
		30-Jan-98	AEN	Toluene	<0.5
		30-Jan-98	AEN	Ethylbenzene	<0.5
		30-Jan-98	AEN	Total Xylenes	<2
		30-Jan-98	AEN	TPHg	<50
		30-Jan-98	AEN	TPHd	<50
		30-Jan-98	AEN	Arsenic	<5
		24-Feb-98	SW	Arsenic	15.54
		25-Feb-98	AEN	Benzene	<0.5
		25-Feb-98	AEN	Toluene	<0.5
		25-Feb-98	AEN	Ethylbenzene	<0.5
		25-Feb-98	AEN	Total Xylenes	<2
		25-Feb-98	AEN	TPHg	<50
		25-Feb-98	AEN	TPHd	<50
		25-Feb-98	AEN	Arsenic	9
		25-Feb-98	SW	Arsenic	6.31
		05-Mar-98	SW	Arsenic	23.22
		12-Mar-98	SW	Arsenic	8.45
		16-Mar-98	SW	Arsenic	54.37

Table 9
Summary of Additional Analyses Performed During Annual Reporting Period
January 1 through December 31, 1998
Sherwin-Williams Facility
Emeryville, California

Sample ID	Notes	Sample Date	Lab	Analyte	Concentration (micrograms per liter)
		23-Mar-98	AEN	Benzene	<0.5
		23-Mar-98	AEN	Toluene	<0.5
		23-Mar-98	AEN	Ethylbenzene	<0.5
		23-Mar-98	AEN	Total Xylenes	<2
		23-Mar-98	AEN	TPHg	<50
		23-Mar-98	AEN	TPHd	<50
		23-Mar-98	AEN	Arsenic	50
		23-Mar-98	AEN	Halogenated VOCs by EPA Method 601	ND
		23-Mar-98	SW	Arsenic	35.13
		08-Apr-98	SW	Arsenic	24.06
		08-Apr-98	CT	Arsenic	23
		10-Apr-98	CT	Arsenic	42
		14-Apr-98	SW	Arsenic	1.50
		14-Apr-98	CT	Arsenic	<5.0
		15-Apr-98	SW	Arsenic	1.30
		16-Apr-98	SW	Arsenic	0.20
		16-Apr-98	CT	Arsenic	<5.0
		17-Apr-98	SW	Arsenic	5.98
		21-Apr-98	SW	Arsenic	14.65
		21-Apr-98	CT	Arsenic	<5.0
		28-Apr-98	SW	Arsenic	27.77
		29-Apr-98	SW	Arsenic	16.58
		29-Apr-98	QUAN	Arsenic	18
		29-Apr-98	QUAN	Benzene	<0.50
		29-Apr-98	QUAN	Toluene	<0.50
		29-Apr-98	QUAN	Ethylbenzene	<0.50
		29-Apr-98	QUAN	Total Xylenes	<2.0
		29-Apr-98	QUAN	TPHg	<50
		29-Apr-98	QUAN	TPHd	<50
		29-Apr-98	QUAN	Halogenated VOCs by EPA Method 601/8010	(1)
		05-May-98	SW	Arsenic	10.52
		13-May-98	SW	Arsenic	10.53
		19-May-98	SW	Arsenic	17.43
		20-May-98	SW	Arsenic	17.74
		20-May-98	SW	Arsenic	15.59
		20-May-98	SW	Arsenic	15.70
		20-May-98	SW	Arsenic	14.64
		20-May-98	SW	Arsenic	7.09
		22-May-98	SW	Arsenic	10.77
		22-May-98	SW	Arsenic	20.73
		22-May-98	SW	Arsenic	11.13
		26-May-98	SW	Arsenic	8.06
		27-May-98	SW	Arsenic	9.58
		28-May-98	SW	Arsenic	6.25
		28-May-98	QUAN	Arsenic	8.5
		28-May-98	QUAN	Benzene	<0.50
		28-May-98	QUAN	Toluene	<0.50
		28-May-98	QUAN	Ethylbenzene	<0.50

Table 9
Summary of Additional Analyses Performed During Annual Reporting Period
January 1 through December 31, 1998
Sherwin-Williams Facility
Emeryville, California

Sample ID	Notes	Sample Date	Lab	Analyte	Concentration (micrograms per liter)
		28-May-98	QUAN	Total Xylenes	<2.0
		28-May-98	QUAN	TPHg	<50
		28-May-98	QUAN	TPHd	<50
		02-Jun-98	SW	Arsenic	12.49
		04-Jun-98	SW	Arsenic	4.63
		10-Jun-98	SW	Arsenic	6.84
		11-Jun-98	SW	Arsenic	4.64
		15-Jun-98	SW	Arsenic	10.75
		16-Jun-98	SW	Arsenic	3.69
		18-Jun-98	SW	Arsenic	3.34
		18-Jun-98	QUAN	Arsenic	<5.0
		18-Jun-98	QUAN	Benzene	<0.50
		18-Jun-98	QUAN	Toluene	<0.50
		18-Jun-98	QUAN	Ethylbenzene	<0.50
		18-Jun-98	QUAN	Total Xylenes	<2.0
		18-Jun-98	QUAN	TPHg	<50
		18-Jun-98	QUAN	TPHd	<50
		18-Jun-98	QUAN	Halogenated VOCs by EPA Method 601/8010	ND
		23-Jul-98	SW	Arsenic	10.66
		28-Jul-98	SW	Arsenic	15.19
		28-Jul-98	QUAN	Arsenic	13
		28-Jul-98	QUAN	Benzene	<0.5
		28-Jul-98	QUAN	Toluene	<0.5
		28-Jul-98	QUAN	Ethylbenzene	<0.5
		28-Jul-98	QUAN	Total Xylenes	<2.0
		28-Jul-98	QUAN	TPHg	<50
		28-Jul-98	QUAN	TPHd	<50
		12-Aug-98	SW	Arsenic	7.80
		13-Aug-98	SW	Arsenic	7.04
		13-Aug-98	QUAN	Arsenic	7.2
		13-Aug-98	QUAN	Benzene	<0.5
		13-Aug-98	QUAN	Toluene	<0.5
		13-Aug-98	QUAN	Ethylbenzene	<0.5
		13-Aug-98	QUAN	Total Xylenes	<2.0
		13-Aug-98	QUAN	TPHg	<50
		13-Aug-98	QUAN	TPHd	<50
		23-Aug-98	SW	Arsenic	7.74
		23-Sep-98	SW	Arsenic	5.76
		25-Sep-98	CT	Benzene	<0.5
		25-Sep-98	CT	Toluene	<0.5
		25-Sep-98	CT	Ethylbenzene	<0.5
		25-Sep-98	CT	Total Xylenes	<0.5
		25-Sep-98	CT	TPHg	<50
		25-Sep-98	CT	TPHd	<50
		25-Sep-98	CT	Halogenated VOCs by EPA Method 8260	2.6
		25-Sep-98	CT	Arsenic	13
		06-Oct-98	SW	Arsenic	10.48
		14-Oct-98	SW	Arsenic	6.89

Table 9
Summary of Additional Analyses Performed During Annual Reporting Period
January 1 through December 31, 1998
Sherwin-Williams Facility
Emeryville, California

Sample ID	Notes	Sample Date	Lab	Analyte	Concentration (micrograms per liter)
		15-Oct-98	SW	Arsenic	5.59
		15-Oct-98	CT	Benzene	<1.0
		15-Oct-98	CT	Toluene	<1.0
		15-Oct-98	CT	Ethylbenzene	<1.0
		15-Oct-98	CT	Total Xylenes	<2.0
		15-Oct-98	CT	TPHg	<50
		15-Oct-98	CT	TPHd	<50
		02-Nov-98	SW	Arsenic	3.93
		18-Nov-98	CT	Benzene	<0.5
		18-Nov-98	CT	Toluene	<0.5
		18-Nov-98	CT	Ethylbenzene	<0.5
		18-Nov-98	CT	Total Xylenes	<1.0
		18-Nov-98	CT	TPHg	<50
		18-Nov-98	CT	TPHd	<50
		19-Nov-98	SW	Arsenic	13.08
		29-Dec-98	CT	Benzene	<0.5
		29-Dec-98	CT	Toluene	<0.5
		29-Dec-98	CT	Ethylbenzene	<0.5
		29-Dec-98	CT	Total Xylenes	<1.0
		29-Dec-98	CT	TPHg	<50
		29-Dec-98	CT	TPHd	<50
W-BC1		30-Jan-98	AEN	Benzene	<0.5
		30-Jan-98	AEN	Toluene	<0.5
		30-Jan-98	AEN	Ethylbenzene	<0.5
		30-Jan-98	AEN	Total Xylenes	<2
		30-Jan-98	AEN	TPHg	<50
		30-Jan-98	AEN	TPHd	<50
		30-Jan-98	AEN	Arsenic	<5
		25-Feb-98	AEN	Benzene	<0.5
		25-Feb-98	AEN	Toluene	<0.5
		25-Feb-98	AEN	Ethylbenzene	<0.5
		25-Feb-98	AEN	Total Xylenes	<2
		25-Feb-98	AEN	TPHg	<50
		25-Feb-98	AEN	TPHd	<50
		25-Feb-98	AEN	Arsenic	<5
		23-Mar-98	AEN	Benzene	<0.5
		23-Mar-98	AEN	Toluene	<0.5
		23-Mar-98	AEN	Ethylbenzene	<0.5
		23-Mar-98	AEN	Total Xylenes	<2
		23-Mar-98	AEN	TPHg	<50
		23-Mar-98	AEN	TPHd	<50
		23-Mar-98	AEN	Arsenic	33
		23-Mar-98	AEN	Halogenated VOCs by EPA Method 601	ND
		15-Apr-98	SW	Arsenic	6.27
		16-Apr-98	CT	Arsenic	7.8
		21-Apr-98	CT	Arsenic	<5.0
		29-Apr-98	QUAN	Arsenic	5.2
		29-Apr-98	QUAN	Benzene	<0.50

Table 9
Summary of Additional Analyses Performed During Annual Reporting Period
January 1 through December 31, 1998
Sherwin-Williams Facility
Emeryville, California

Sample ID	Notes	Sample Date	Lab	Analyte	Concentration (micrograms per liter)
		29-Apr-98	QUAN	Toluene	<0.50
		29-Apr-98	QUAN	Ethylbenzene	<0.50
		29-Apr-98	QUAN	Total Xylenes	<2.0
		29-Apr-98	QUAN	TPHg	<50
		29-Apr-98	QUAN	TPHd	<50
		29-Apr-98	QUAN	Halogenated VOCs by EPA Method 601/8010	ND
		28-May-98	QUAN	Arsenic	<5.0
		28-May-98	QUAN	Benzene	<0.50
		28-May-98	QUAN	Toluene	<0.50
		28-May-98	QUAN	Ethylbenzene	<0.50
		28-May-98	QUAN	Total Xylenes	<2.0
		28-May-98	QUAN	TPHg	<50
		28-May-98	QUAN	TPHd	<50
		18-Jun-98	QUAN	Arsenic	<5.0
		18-Jun-98	QUAN	Benzene	<0.50
		18-Jun-98	QUAN	Toluene	<0.50
		18-Jun-98	QUAN	Ethylbenzene	<0.50
		18-Jun-98	QUAN	Total Xylenes	<2.0
		18-Jun-98	QUAN	TPHg	<50
		18-Jun-98	QUAN	TPHd	<50
		18-Jun-98	QUAN	Halogenated VOCs by EPA Method 601/8010	ND
		28-Jul-98	QUAN	Arsenic	8.1
		28-Jul-98	QUAN	Benzene	<0.5
		28-Jul-98	QUAN	Toluene	<0.5
		28-Jul-98	QUAN	Ethylbenzene	<0.5
		28-Jul-98	QUAN	Total Xylenes	<2.0
		28-Jul-98	QUAN	TPHg	<50
		28-Jul-98	QUAN	TPHd	<50
		13-Aug-98	QUAN	Arsenic	<5.0
		13-Aug-98	QUAN	Benzene	<0.5
		13-Aug-98	QUAN	Toluene	<0.5
		13-Aug-98	QUAN	Ethylbenzene	<0.5
		13-Aug-98	QUAN	Total Xylenes	<2.0
		13-Aug-98	QUAN	TPHg	<50
		13-Aug-98	QUAN	TPHd	<50
		25-Sep-98	CT	Arsenic	6.0
		25-Sep-98	CT	Benzene	<0.5
		25-Sep-98	CT	Toluene	<0.5
		25-Sep-98	CT	Ethylbenzene	<0.5
		25-Sep-98	CT	Total Xylenes	<0.5
		25-Sep-98	CT	TPHg	<50
		25-Sep-98	CT	TPHd	<50
		25-Sep-98	CT	Halogenated VOCs by EPA Method 8260	ND
		15-Oct-98	CT	Arsenic	<5.0
		15-Oct-98	CT	Benzene	<1.0
		15-Oct-98	CT	Toluene	<1.0
		15-Oct-98	CT	Ethylbenzene	<1.0
		15-Oct-98	CT	Total Xylenes	<1.0

Table 9
Summary of Additional Analyses Performed During Annual Reporting Period
January 1 through December 31, 1998
Sherwin-Williams Facility
Emeryville, California

Sample ID	Notes	Sample Date	Lab	Analyte	Concentration (micrograms per liter)
		15-Oct-98	CT	TPHg	<50
		15-Oct-98	CT	TPHd	<50
		18-Nov-98	CT	Arsenic	<5.0
		18-Nov-98	CT	Benzene	<0.5
		18-Nov-98	CT	Toluene	<0.5
		18-Nov-98	CT	Ethylbenzene	<0.5
		18-Nov-98	CT	Total Xylenes	<0.5
		18-Nov-98	CT	TPHg	<50
		18-Nov-98	CT	TPHd	<50
		29-Dec-98	CT	Arsenic	14
		29-Dec-98	CT	Benzene	<0.5
		29-Dec-98	CT	Toluene	<0.5
		29-Dec-98	CT	Ethylbenzene	<0.5
		29-Dec-98	CT	Total Xylenes	<0.5
		29-Dec-98	CT	TPHg	<50
		29-Dec-98	CT	TPHd	<50
W-BC2		30-Jan-98	AEN	TPHd	<50
		30-Jan-98	AEN	Arsenic	<5
		25-Feb-98	AEN	TPHd	<50
		25-Feb-98	AEN	Arsenic	<5
		23-Mar-98	AEN	TPHd	<50
		23-Mar-98	AEN	Arsenic	19
		15-Apr-98	SW	Arsenic	6.17
		16-Apr-98	CT	Arsenic	<5.0
		29-Apr-98	QUAN	Arsenic	<5.0
		29-Apr-98	QUAN	TPHd	<50
		28-May-98	QUAN	Arsenic	<5.0
		28-May-98	QUAN	TPHd	<50
		18-Jun-98	QUAN	Arsenic	<5.0
		18-Jun-98	QUAN	TPHd	<50
		28-Jul-98	QUAN	Arsenic	<5.0
		28-Jul-98	QUAN	TPHd	<50
		13-Aug-98	QUAN	Arsenic	5.4
		13-Aug-98	QUAN	TPHd	<50
		25-Sep-98	CT	TPHd	<50
		15-Oct-98	CT	Arsenic	<5.0
		15-Oct-98	CT	TPHd	<50
		18-Nov-98	CT	Arsenic	<5.0
		18-Nov-98	CT	TPHd	<50
		29-Dec-98	CT	Arsenic	16
W-CARBEFF		24-Feb-98	SW	Arsenic	0.44
		25-Feb-98	SW	Arsenic	0.73
		05-Mar-98	SW	Arsenic	0.54
		12-Mar-98	SW	Arsenic	0.81
		16-Mar-98	SW	Arsenic	1.54
		23-Mar-98	SW	Arsenic	10.10
		08-Apr-98	SW	Arsenic	10.42

Table 9
Summary of Additional Analyses Performed During Annual Reporting Period
January 1 through December 31, 1998
Sherwin-Williams Facility
Emeryville, California

Sample ID	Notes	Sample Date	Lab	Analyte	Concentration (micrograms per liter)
		29-Apr-98	SW	Arsenic	5.66
		05-May-98	SW	Arsenic	4.46
		13-May-98	SW	Arsenic	5.45
		22-May-98	SW	Arsenic	4.83
		28-May-98	SW	Arsenic	3.03
		18-Jun-98	SW	Arsenic	3.13
		28-Jul-98	SW	Arsenic	6.47
		12-Aug-98	SW	Arsenic	4.52
		13-Aug-98	SW	Arsenic	5.36
		23-Sep-98	SW	Arsenic	1.34
		25-Sep-98	SW	Arsenic	4.03
		06-Oct-98	SW	Arsenic	3.81
		14-Oct-98	SW	Arsenic	3.24
		15-Oct-98	SW	Arsenic	2.68
		02-Nov-98	SW	Arsenic	2.66
		19-Nov-98	SW	Arsenic	4.74

Data entered by KLF. Proofed by ABT.

Notes :

W-I1 = groundwater treatment system influent prior to electrochemical cells

W-ECELLEFF = electrochemical cell effluent

W-ANDEFF = Andco system effluent

W-BC1 = between first and second set of carbon vessels

W-BC2 = between second and third set of carbon vessels

W-CARBEFF = effluent from third (final) set of carbon vessels prior to 500-gallon holding tank analyzed by the Sherwin-Williams Internal Quality Control Laboratory

AEN = American Environmental Network

CT = Curtis & Tompkins, Ltd., Analytical Laboratories, Berkeley, California

QUAN = Quanterra Incorporated, West Sacramento, California

SW = Sherwin-Williams Internal Quality Control Laboratory

TPHg = total petroleum hydrocarbons as gasoline

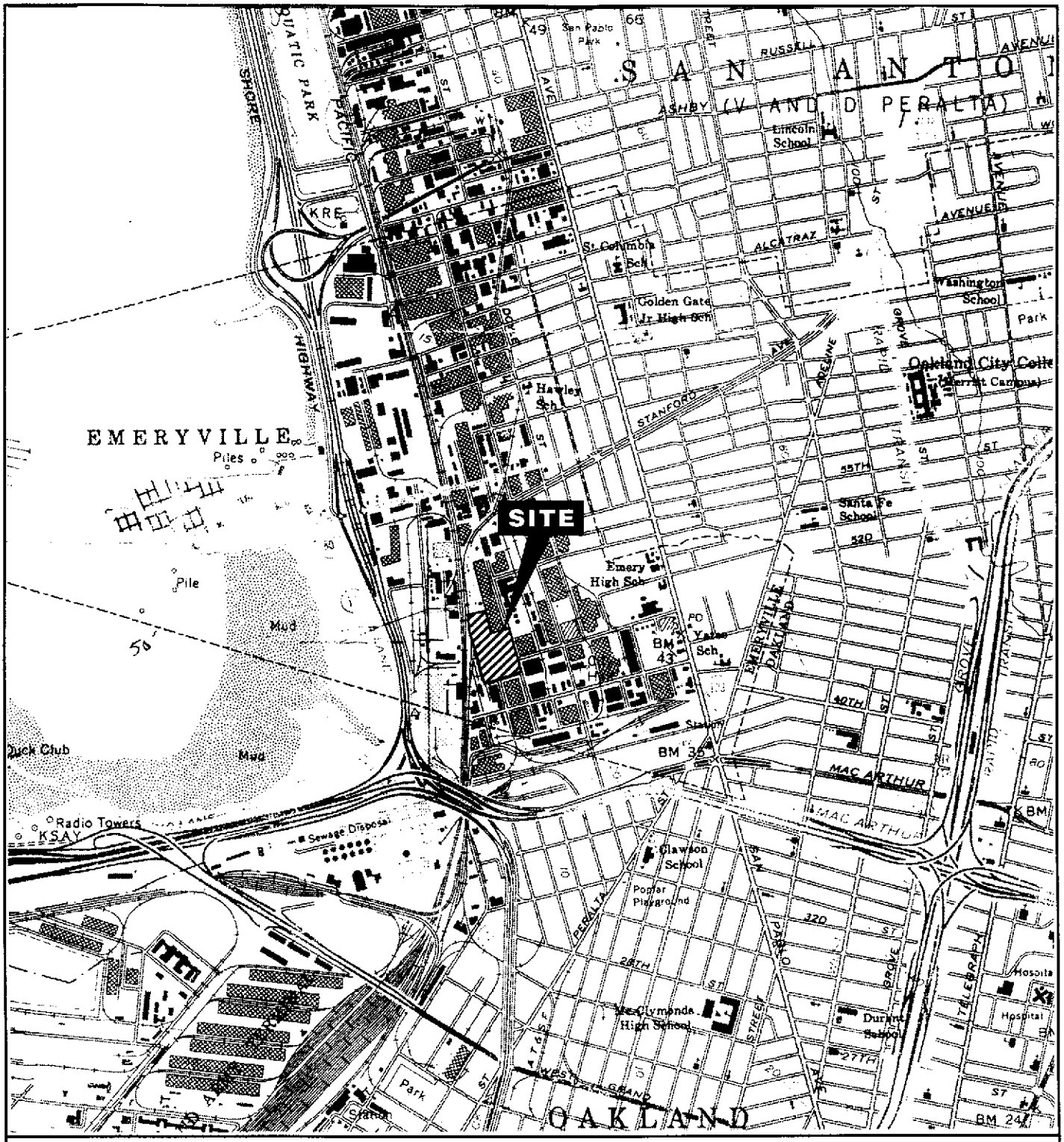
TPHd = total petroleum hydrocarbons as diesel

VOCs = volatile organic compounds

ND = not detected for all constituents. Reporting limits for halogenated VOCs are shown in Appendix A tables.

(1) Detected chloroform at 1.3 micrograms per liter (μg/l)

(2) The groundwater treatment system was operated in recirculation mode. No treated groundwater was discharged to Temescal Creek during the period. This water was discharged to a temporary on-site storage tank (RFR-C) and eventually re-treated prior to discharge to Temescal Creek.



Map Source:
U.S.G.S. Oakland West Quadrangle,
Oakland West, California
7.5 Minute Series

0 1/2 1 MILE

SHERWIN-WILLIAMS COMPANY

Site Location Map

LFR LEVINE • FRICKE

Figure 1

2616SV01.CDR 01/29/99

HORTON STREET

FORMER
RIFKIN PROPERTY

(PARKING LOT)

TEMPORARY GROUNDWATER TREATMENT
SYSTEM EFFLUENT DISCHARGE LINE

WELL EX-3

WAREHOUSE
BLDG. 31

ARCADE

WAREHOUSE/OFFICE
BLDG. 1

SHOP
BLDG. 38

BOILER
BLDG. 12

RAMP

YARD "A1"

YARD "A2"

BLDG.
34

MANUFACTURING
BLDG. 28

BLDG. 4

PACKAGING/LAB
BLDG. 2

ANDCO GROUNDWATER
TREATMENT SYSTEM

WAREHOUSE
OFFICE

MANUFACTURING
BLDG. 35

LOADING PLATFORM

EFFLUENT DISCHARGE POINT
NPDES OUTFALL #1

WELL EX-1

CONVEYANCE PIPING

WELL EX-2

TEMESCAL CREEK

"OVED TEMESCAL CREEK

GATE

EMPLOYEE PARKING LOT

GATE
"A"

GATE
"B"

RAMP

RAMP

SHERWIN WILLIAMS
PROPERTY

SHERWIN AVENUE

SOUTHERN PACIFIC RAILROAD

TEMESCAL CREEK

20' 0 20' 40'
SCALE IN FEET

LEGEND

ABOVEGROUND TANKS

EXTRACTION WELL

EX-2

RAILROAD TRACKS

FENCE

PROPERTY LINE

SLURRY WALL

EXTRACTION WELL CONVEYANCE PIPING

TEMPORARY GROUNDWATER TREATMENT
SYSTEM EFFLUENT DISCHARGE LINE

SHERWIN-WILLIAMS COMPANY, EMERYVILLE, CALIFORNIA

Groundwater Extraction and Treatment System (October 1995 Through December 1998)

LFR LEVINE•FRICKE

Figure 2

ANDCO SYSTEM SECONDARY CONTAINMENT AREA

FROM WELL #1
FROM WELL #2
FROM WELL #3
INFLUENT
RECYCLE
RECYCLED H_2O
H_2
H_2
H_2O_2 ADDED
FLOOR SUMP
POLYMER
CLARIFIER
FILTER FEED PUMP P-1201
SAMPLE POINT T-1201
PROCESS PUMP P-301
2,000 GALLON EQUALIZATION TANK T-301
SAMPLE POINT W-I1
ELECTROCHEMICAL CELLS
SAMPLE POINT W-ECELLEFF
800 GALLON REACTOR TANK T-701
800 GALLON RETENTION TANK T-401
800 GALLON pH ADJUST TANK T-601
375 GALLON PUMPING TANK T-1201
SLURRY TRANSFER PUMP P-501
SLURRY TANK OVERFLOW
MULTIMEDIA FILTERS
FILTRATE
FILTER PRESS
2,200 GALLON SLURRY TANK T-501
FILTER PRESS PUMP P-502
TRI-BIO SYSTEM SECONDARY CONTAINMENT AREA
SAMPLE POINT W-BC2
SAMPLE POINT W-BC1
SAMPLE POINT W-ANDEFF
SLUDGE TO DRUMS
FLOOR SUMP
55-GALLON LIQUID-PHASE CARBON DRUMS
CITY WATER SUPPLY
12,000 GALLON HOLDING TANK T-1301 (MULTIMEDIA FILTER BACKWASH WATER)
MULTIMEDIA BACKWASH PUMP
EFFLUENT DISCHARGE
SAMPLE POINT W-E1 AND W-CARBEFF
500 GAL EFFLUENT HOLDING TANK
TRI-BIO SYSTEM

SHERWIN-WILLIAMS COMPANY

Process Flow Diagram
Groundwater Treatment System

LFR LEVINE-FRICKE

Figure 3

10/15/1998 2:20 P.M. LTScale: 0.63 Drawing File(.DWG): J:\ENGCAD\SHERWIN\2616\PID-2.DWG

HORTON STREET

FORMER
RIFKIN PROPERTY

(PARKING LOT)

TEMPORARY GROUNDWATER TREATMENT
SYSTEM EFFLUENT DISCHARGE LINE

OLD TEMESCAL CREEK

"MOVED TEMESCAL CREEK"

EFFLUENT DISCHARGE POINT
NPDES OUTFALL #1

GATE

WELL EX-1

WELL EX-2

CONVEYANCE PIPING

WELL EX-3

WELL EX-4

WELL EX-5

WELL EX-6

WELL EX-7

WELL EX-8

WELL EX-9

WELL EX-10

EMPLOYEE PARKING LOT

GATE "A"

GATE "B"

SOUTHERN PACIFIC RAILROAD

TEMESCAL CREEK

WAREHOUSE
BLDG. 31

ARCADE

WAREHOUSE/OFFICE
BLDG. 1

SHOP
BLDG. 38

BOILER
BLDG. 12

RAMP

YARD "A1"

YARD "A2"

BLDG.
34

MSE GROUNDWATER
TREATMENT SYSTEM

MANUFACTURING
BLDG. 28

BLDG. 4

PACKAGING/LAB
BLDG. 2

ANDCO GROUNDWATER
TREATMENT SYSTEM

LOADING PLATFORM

WAREHOUSE
OFFICE

MANUFACTURING
BLDG. 35

RAMP

RAMP

SHERWIN WILLIAMS
PROPERTY

SHERWIN AVENUE

20' 0 20' 40'
SCALE IN FEET

LEGEND

- ABOVEGROUND TANKS
- EXTRACTION WELL
- EX-2
- RAILROAD TRACKS
- FENCE
- PROPERTY LINE
- SLURRY WALL
- EXTRACTION WELL CONVEYANCE PIPING
- TEMPORARY GROUNDWATER TREATMENT SYSTEM EFFLUENT DISCHARGE LINE

SHERWIN-WILLIAMS COMPANY, EMERYVILLE, CALIFORNIA

Expanded Groundwater Extraction System

LFR LEVINE•FRICKE

Figure 4

APPENDIX A

Common Reporting Limits for Effluent Analyses
Groundwater Treatment System

EPA 601: Purgeable Halocarbons	CAS #	American Environmental Network Reporting Limits
Bromodichloromethane	75-27-4	0.5 µg/l
Bromoform	75-25-2	0.5 µg/l
Bromomethane	74-83-9	2 µg/l
Carbon Tetrachloride	56-23-5	0.5 µg/l
Chlorobenzene	108-90-7	0.5 µg/l
Chloroethane	75-00-3	2 µg/l
2-Chloroethyl Vinyl Ether	110-75-8	0.5 µg/l
Chloroform	67-66-3	0.5 µg/l
Chloromethane	74-87-3	2 µg/l
Dibromochloromethane	124-48-1	0.5 µg/l
1,2-Dichlorobenzene	95-50-1	0.5 µg/l
1,3-Dichlorobenzene	541-73-1	0.5 µg/l
1,4-Dichlorobenzene	106-46-7	0.5 µg/l
Dichlorodifluoromethane	75-71-8	2 µg/l
1,1-Dichloroethane	75-34-3	0.5 µg/l
1,2-Dichloroethane	107-06-2	0.5 µg/l
1,1-Dichloroethene	75-35-4	0.5 µg/l
trans-1,2-Dichloroethene	156-60-5	0.5 µg/l
1,2-Dichloropropane	78-87-5	0.5 µg/l
cis-1,3-Dichloropropene	10061-01-5	0.5 µg/l
trans-1,3-Dichloropropene	10061-02-6	0.5 µg/l
Methylene Chloride	75-09-2	2 µg/l
1,1,2,2-Tetrachloroethane	79-34-5	0.5 µg/l
Tetrachloroethene	127-18-4	0.5 µg/l
1,1,1-Trichloroethane	71-55-6	0.5 µg/l
1,1,2-Trichloroethane	79-00-5	0.5 µg/l
Trichloroethene	79-01-6	0.5 µg/l
Trichlorofluoromethane	75-69-4	2 µg/l

EPA 601: Purgeable Halocarbons	CAS #	American Environmental Network Reporting Limits
Vinyl Chloride	75-01-4	0.5 µg/l
1,1,2-Trichlorotrifluoroethane	76-13-1	0.5 µg/l
cis-1,2-Dichloroethene	156-59-2	0.5 µg/l

EPA 8010: Halogenated Volatile Organics	CAS #	Curtis & Tompkins Reporting Limits	Qanterra Reporting Limits
Bromodichloromethane	75-27-4	0.5 µg/l	0.5 µg/l
Bromoform	75-25-2	0.5 µg/l	5.0 µg/l
Bromomethane	74-83-9	1.0 µg/l	2.0 µg/l
Carbon tetrachloride	56-23-5	0.5 µg/l	0.5 µg/l
Chlorobenzene	108-90-7	0.5 µg/l	0.5 µg/l
Chloroethane	75-00-3	1.0 µg/l	2.0 µg/l
Chloroform	67-66-3	1.0 µg/l	0.5 µg/l
Chloromethane	74-87-3	1.0 µg/l	2.0 µg/l
Dibromochloromethane	124-48-1	0.5 µg/l	0.5 µg/l
1,2-Dichlorobenzene	95-50-1	0.5 µg/l	0.5 µg/l
1,3-Dichlorobenzene	541-73-1	0.5 µg/l	0.5 µg/l
1,4-Dichlorobenzene	106-46-7	0.5 µg/l	0.5 µg/l
Dichlorodifluoromethane (Freon 12)	75-71-8	2.0 µg/l	2.0 µg/l
1,1-Dichloroethane	75-34-3	0.5 µg/l	0.5 µg/l
1,2-Dichloroethane	107-06-2	0.5 µg/l	0.5 µg/l
1,1-Dichloroethene	75-35-4	0.5 µg/l	0.5 µg/l
trans-1,2-Dichloroethene	156-60-5	0.5 µg/l	0.5 µg/l
1,2-Dichloropropane	78-87-5	0.5 µg/l	0.5 µg/l
cis-1,3-Dichloropropene	10061-01-5	0.5 µg/l	0.5 µg/l
trans-1,3-Dichloropropene	10061-02-6	0.5 µg/l	0.5 µg/l
Methylene chloride	75-09-2	2.0 µg/l	20 µg/l
1,1,2,2-Tetrachloroethane	79-34-5	0.5 µg/l	0.5 µg/l
Tetrachloroethene	127-18-4	0.5 µg/l	0.5 µg/l

EPA 8010: Halogenated Volatile Organics	CAS #	Curtis & Tompkins Reporting Limits	Qanterra Reporting Limits
1,1,1-Trichloroethane	71-55-6	0.5 µg/l	0.5 µg/l
1,1,2-Trichloroethane	79-00-5	0.5 µg/l	1.0 µg/l
Trichloroethene	79-01-6	0.5 µg/l	0.5 µg/l
Trichlorofluoromethane	75-69-4	0.5 µg/l	Not on target analyte list
Vinyl chloride	75-01-4	1.0 µg/l	0.5 µg/l
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	1.0 µg/l	0.5 µg/l
cis-1,2-Dichloroethene	156-59-2	0.5 µg/l	0.5 µg/l

EPA 8015 (Modified): Total Petroleum Hydrocarbons (TPH)	CAS #	Reporting Limits
TPH as Diesel		50 µg/l
TPH as Gasoline		50 µg/l

EPA 8020: Aromatic Volatile Organics	CAS #	Reporting Limits
Benzene	71-43-2	1.0 µg/l
Toluene	108-88-3	1.0 µg/l
Ethylbenzene	100-41-4	1.0 µg/l
m,p-Xylenes	1330-20-7	1.0 µg/l
o-Xylene	95-47-6	1.0 µg/l

EPA 8240: Volatile Organic Compounds	CAS #	Reporting Limits
Acetone	67-64-1	20 µg/l
Benzene	71-43-2	5 µg/l
Bromodichloromethane	75-27-4	5 µg/l
Bromoform	75-25-2	5 µg/l
Bromomethane	74-83-9	10 µg/l
2-Butanone	78-93-3	10 µg/l

EPA 8240: Volatile Organic Compounds	CAS #	Reporting Limits
Carbon disulfide	75-15-0	5 µg/l
Carbon tetrachloride	56-23-5	5 µg/l
Chlorobenzene	108-90-7	5 µg/l
Chloroethane	75-00-3	10 µg/l
2-Chloroethyl Vinyl Ether	110-75-8	10 µg/l
Chloroform	67-66-3	5 µg/l
Chloromethane	74-87-3	10 µg/l
Dibromochloromethane	124-48-1	5 µg/l
1,1-Dichloroethane	75-34-3	5 µg/l
1,2-Dichloroethane	107-06-2	5 µg/l
1,1-Dichloroethene	75-35-4	5 µg/l
cis-1,2-Dichloroethene	156-59-2	5 µg/l
trans-1,2-Dichloroethene	156-60-5	5 µg/l
1,2-Dichloropropane	78-87-5	5 µg/l
cis-1,3-Dichloropropene	10061-01-5	5 µg/l
trans-1,3-Dichloropropene	10061-02-6	5 µg/l
Ethylbenzene	100-41-4	5 µg/l
2-Hexanone	591-78-6	10 µg/l
Methylene chloride	75-09-2	20 µg/l
4-Methyl-2-pentanone	108-10-1	10 µg/l
Styrene	100-42-5	5 µg/l
1,1,2,2-Tetrachloroethane	79-34-5	5 µg/l
Tetrachloroethene	127-18-4	5 µg/l
Toluene	108-88-3	5 µg/l
1,1,1-Trichloroethane	71-55-6	5 µg/l
1,1,2-Trichloroethane	79-00-5	5 µg/l
Trichloroethene	79-01-6	5 µg/l
Trichlorofluoromethane	75-69-4	5 µg/l
1,1,2-Trichlorotrifluoroethane (Freon 113)	76-13-1	5 µg/l
Vinyl acetate	108-05-4	50 µg/l

EPA 8240: Volatile Organic Compounds	CAS #	Reporting Limits
Vinyl chloride	75-01-4	10 µg/l
Xylenes, Total	1330-20-7	10 µg/l

EPA 8260: Volatile Organic Compounds	CAS #	Reporting Limits
Acetone	67-64-1	10 µg/l
Benzene	71-43-2	1.0 µg/l
Bromobenzene	108-86-1	1.0 µg/l
Bromochloromethane	74-97-5	1.0 µg/l
Bromodichloromethane	75-27-4	1.0 µg/l
Bromoform	75-25-2	1.0 µg/l
Bromomethane	74-83-9	1.0 µg/l
2-Butanone	78-93-3	10 µg/l
n-Butylbenzene	104-51-8	1.0 µg/l
Sec-Butylbenzene	135-98-8	1.0 µg/l
Tert-Butylbenzene	98-06-6	1.0 µg/l
Carbon disulfide	75-15-0	1.0 µg/l
Carbon tetrachloride	56-23-5	1.0 µg/l
Chlorobenzene	108-90-7	1.0 µg/l
Chloroethane	75-00-3	1.0 µg/l
Chloroform	67-66-3	1.0 µg/l
Chloromethane	74-87-3	1.0 µg/l
2-Chlorotoluene	95-49-8	1.0 µg/l
4-Chlorotoluene	106-43-4	1.0 µg/l
Dibromochloromethane	124-48-1	1.0 µg/l
1,2-Dibromo-3-chloropropane	96-12-8	1.0 µg/l
1,2-Dibromoethane (EDB)	106-93-4	1.0 µg/l
Dibromomethane	74-95-3	1.0 µg/l
1,2-Dichlorobenzene	95-50-1	1.0 µg/l
1,3-Dichlorobenzene	541-73-1	1.0 µg/l
1,4-Dichlorobenzene	106-46-7	1.0 µg/l

EPA 8260: Volatile Organic Compounds	CAS #	Reporting Limits
1,1-Dichloroethane	75-34-3	1.0 µg/l
1,2-Dichloroethane	107-06-2	1.0 µg/l
1,1-Dichloroethene	75-35-4	1.0 µg/l
Cis-1,2-Dichloroethene	156-59-2	1.0 µg/l
Trans-1,2-Dichloroethene	156-60-5	1.0 µg/l
1,2-Dichloropropane	78-87-5	1.0 µg/l
1,3-Dichloropropane	142-28-9	1.0 µg/l
2,2-Dichloropropane	594-20-7	1.0 µg/l
1,1-Dichloropropene	563-58-6	1.0 µg/l
Cis-1,3-Dichloropropene	10061-01-5	1.0 µg/l
Trans-1,3-Dichloropropene	10061-02-6	1.0 µg/l
Ethylbenzene	100-41-4	1.0 µg/l
Freon 12	76-13-1	2.0 µg/l
Freon 113	76-13-1	5.0 µg/l
Hexachlorobutadiene	87-68-3	1.0 µg/l
2-Hexanone	591-78-6	10 µg/l
Isopropylbenzene	98-82-8	1.0 µg/l
Para-Isopropyl Toluene	99-87-6	1.0 µg/l
Methylene chloride	75-09-2	10 µg/l
4-Methyl-2-Pentanone	108-10-1	10 µg/l
Naphthalene	91-20-3	1.0 µg/l
Propylbenzene	103-65-1	1.0 µg/l
Styrene	100-42-5	1.0 µg/l
1,1,1,2-Tetrachloroethane	630-20-6	1.0 µg/l
1,1,2,2-Tetrachloroethane	79-34-5	1.0 µg/l
Tetrachloroethene	127-18-4	1.0 µg/l
Toluene	108-88-3	1.0 µg/l
1,2,3-Trichlorobenzene	87-61-6	1.0 µg/l
1,2,4-Trichlorobenzene	120-82-1	1.0 µg/l
1,1,1-Trichloroethane	71-55-6	1.0 µg/l

EPA 8260: Volatile Organic Compounds	CAS #	Reporting Limits
1,1,2-Trichloroethane	79-00-5	1.0 µg/l
Trichloroethene	79-01-6	1.0 µg/l
Trichlorofluoromethane	75-69-4	1.0 µg/l
1,2,3-Trichloropropane	96-18-4	1.0 µg/l
1,2,4-Trimethylbenzene	95-63-6	1.0 µg/l
1,3,5-Trimethylbenzene	108-67-8	1.0 µg/l
Vinyl acetate	108-05-4	10 µg/l
Vinyl chloride	75-01-4	1.0 µg/l
m,p-Xylenes	1330-20-7	1.0 µg/l
o-Xylene	95-47-6	1.0 µg/l

EPA 8270: Semivolatile Organics	CAS #	Reporting Limits
Acenaphthene	83-32-9	10 µg/l
Acenaphthylene	208-96-8	10 µg/l
Anthracene	120-12-7	10 µg/l
Azobenzene	103-33-3	10 µg/l
Benzidine	92-87-5	50 µg/l
Benzoic Acid	65-85-0	50 µg/l
Benzo(a)anthracene	56-55-3	10 µg/l
Benzo(b,k)fluoranthene	205-99-2	10 µg/l
Benzo(g,h,i)perylene	191-24-2	10 µg/l
Benzo(a)pyrene	50-32-8	10 µg/l
Benzyl alcohol	100-51-6	10 µg/l
Bis(2-chloroethoxy)methane	111-91-1	10 µg/l
Bis(2-chloroethyl)ether	111-44-4	10 µg/l
Bis(2-chloroisopropyl)ether	108-60-1	10 µg/l
Bis(2-ethylhexyl)phthalate	117-81-7	10 µg/l
4-Bromophenyl phenylether	101-55-3	10 µg/l
Butylbenzylphthalate	85-68-7	10 µg/l
4-Chloroaniline	106-47-8	10 µg/l

EPA 8270: Semivolatile Organics	CAS #	Reporting Limits
2-Chloronaphthalene	91-58-7	10 µg/l
4-Chloro-3-methylphenol	59-50-7	10 µg/l
2-Chlorophenol	95-57-8	10 µg/l
4-Chlorophenyl phenylether	7005-72-3	10 µg/l
Chrysene	218-01-9	10 µg/l
Dibenzo(a,h)anthracene	53-70-3	10 µg/l
Dibenzofuran	132-64-9	10 µg/l
Di-n-butylphthalate	84-74-2	10 µg/l
1,2-Dichlorobenzene	95-50-1	10 µg/l
1,3-Dichlorobenzene	541-73-1	10 µg/l
1,4-Dichlorobenzene	106-46-7	10 µg/l
3,3'-Dichlorobenzidine	91-94-1	50 µg/l
2,4-Dichlorophenol	120-82-2	10 µg/l
Diethylphthalate	84-66-2	10 µg/l
2,4-Dimethylphenol	105-67-9	10 µg/l
Dimethylphthalate	131-11-3	10 µg/l
4,6-Dinitro-2-methylphenol	534-52-1	50 µg/l
2,4-Dinitrophenol	51-28-5	50 µg/l
2,4-Dinitrotoluene	121-14-2	10 µg/l
2,6-Dinitrotoluene	606-20-2	10 µg/l
Di-n-octylphthalate	117-84-0	10 µg/l
Fluoranthene	206-44-0	10 µg/l
Fluorene	86-73-7	10 µg/l
Hexachlorobenzene	118-74-1	10 µg/l
Hexachlorobutadiene	87-68-3	10 µg/l
Hexachlorocyclopentadiene	77-47-4	50 µg/l
Hexachloroethane	67-72-1	10 µg/l
Indeno(1,2,3-cd)pyrene	193-39-5	10 µg/l
Isophorone	78-59-1	10 µg/l
2-Methylnaphthalene	91-57-6	10 µg/l

EPA 8270: Semivolatile Organics	CAS #	Reporting Limits
2-Methylphenol	95-48-7	10 µg/l
3,4-Methylphenol	1319-77-3	10 µg/l
Naphthalene	91-20-3	10 µg/l
2-Nitroaniline	88-74-4	50 µg/l
3-Nitroaniline	99-09-2	50 µg/l
4-Nitroaniline	100-01-6	50 µg/l
Nitrobenzene	98-95-3	10 µg/l
2-Nitrophenol	88-75-5	10 µg/l
4-Nitrophenol	100-02-7	50 µg/l
n-Nitrosodimethylamine	62-75-9	10 µg/l
n-Nitrosodiphenylamine	86-30-6	10 µg/l
n-Nitroso-di-n-propylamine	621-64-7	10 µg/l
Pentachlorophenol	87-86-5	10 µg/l
Phenanthrene	85-01-8	10 µg/l
Phenol	108-95-2	10 µg/l
Pyrene	129-00-0	10 µg/l
1,2,4-Trichlorobenzene	120-82-1	10 µg/l
2,4,5-Trichlorophenol	95-95-4	50 µg/l
2,4,6-Trichlorophenol	88-06-2	10 µg/l

Inorganics	Method	Reporting Limits
Arsenic	EPA 206.2	0.005 mg/l
Arsenic	EPA 6010	0.005 mg/l
Arsenic	EPA SW 7060	0.005 mg/l
Cadmium	EPA 6010	0.005 mg/l
Chromium	EPA 6010	0.01 mg/l
Copper	EPA 6010	0.01mg/l
Iron	EPA 6010	0.1 mg/l
Lead	EPA 6010	0.003 mg/l
Mercury	EPA 7470	0.0002 mg/l

Inorganics	Method	Reporting Limits
Nickel	EPA 6010	0.02 mg/l
Selenium	EPA 6010	0.005 mg/l
Silver	EPA 6010	0.005 mg/l
Zinc	EPA 6010	0.02 mg/l
Chromium, Hexavalent	SM 307B	0.01 mg/l
Ammonia-Nitrogen, Total	EPA 350.3	0.05 mg/l
Un-ionized Ammonia-N	EPA 350.3 calc	0.0003 mg/l
Hardness (mg/l CaCO3)	SMWW 17:2340B	3.3 mg/l
Total Dissolved Solids	EPA 160.1	10 mg/l
Turbidity	EPA 180.1	0.05 NTU