



ENVIRONMENTAL
PROTECTION

PORT OF OAKLAND

95 APR 19 PM 12:58

April 18, 1995

Jennifer Eberle
Department of Environmental Health
Alameda County Health Care Services Agency
1131 Harbor Bay Pkwy #250
Alameda, CA 94502-6522

**SUBJECT: GROUNDWATER SAMPLING REPORT AT THE AMERICAN PRESIDENT LINES
TERMINAL, 1395 MIDDLE HARBOR ROAD, OAKLAND, CALIFORNIA**

Dear Jennifer:

Enclosed please find the 1994 fourth quarter groundwater sampling report for the American President Lines Terminal. This site was the location of an underground storage tank removal and is the County's project # STID 3777.

The results of the last 4 quarters of sampling indicate that the level of TPH-G and BETX are ^{NA}ND in MW-2 and TPH-G, TOG and BETX are ND in MW-3. Therefore we would like to change the sample protocol to only analyse the samples at MW-1 for TPH-G, TPH-D, BETX and VOC (EPA Method 8010), MW-2 for TPH-D and VOC (EPA Method 8010), and MW-3 for TPH-D and VOC (EPA Method 8010).

We are also requesting that the frequency of future sampling be either semi-annually or annually given the low levels of the above constituents in the groundwater and the groundwater is not a potential drinking water source.

If you have any questions or need additional information, please contact me at 272-1118.

Sincerely,

Susa Gates
Associate Environmental Scientist

SG/jb

cc: Neil Werner
John DeGeorge (Alisto Engineering)

pc:\wp51\files\susa\1995\jeberle.ltr

100 Pine Street, 10th Floor
San Francisco, CA 94111
(415) 434-9400 • FAX (415) 434-1366

PORT OF OAKLAND
ENVIRONMENTAL DEPT.



6 April 1995
Project No. 2026

95 APR 18 9:51

RECEIVED

Ms. Susa Gates
Port of Oakland
530 Water Street
Oakland, California 94607

Subject: Groundwater Sampling
American President Lines Terminal
1395 Middle Harbor Road
Port of Oakland
Oakland, California

Dear Ms. Gates:

This letter report presents the results of the fourth quarter groundwater sampling event for 1994 performed by Geomatrix Consultants, Inc. (Geomatrix) on 4 November 1994 at the American President Lines Terminal (APL), 1395 Middle Harbor Road, at the Port of Oakland (Port; Figure 1). The work was conducted in accordance with our October 1992 Work Plan and in response to the 13 November 1992 Alameda County Health Care Services Agency letter to the Port. This sampling event represents the eighth quarter of groundwater sampling.

For the quarterly monitoring program, Geomatrix performed water-level measurements and groundwater sampling. These activities and the results are described below.

WATER-LEVEL MEASUREMENTS

Geomatrix measured water levels in the three shallow groundwater monitoring wells (Figure 2) on 4 November 1994 before groundwater was sampled. Water levels were measured to the nearest 0.01 foot using a steel tape. The measurements were used to calculate water-level elevations at each of the wells; the elevations are shown on Figure 2 and are presented in Table 1.

Water-level elevations measured on 4 November 1994 ranged from 6.33 to 6.85 feet Mean Lower Low Water (MLLW; Port datum). The water-level elevations are 0.19 to 0.20 feet lower than those measured during the previous quarter. The horizontal gradient, as in previous quarters, is very flat; horizontal flow direction was southwesterly, toward the Oakland Inner Harbor.

Ms. Susa Gates
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6 April 1995
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GROUNDWATER SAMPLING

Geomatrix collected groundwater samples from the three on-site monitoring wells on 4 November 1994 (Figure 2). All equipment used in the wells was washed with a laboratory-grade detergent (Alconox) and rinsed with deionized water. Before being sampled, the wells were purged using a stainless steel bailer. To obtain groundwater representative of the aquifer screened by the well, the wells were purged until the temperature, pH, and specific conductance of the purged groundwater stabilized and at least four casing volumes were removed. Groundwater purged from the site was contained in a labeled 55-gallon drum which is being temporarily stored on site.

After the wells were purged, groundwater samples were collected from the approximate mid-point of the screened interval using a disposable bailer. The samples were decanted from the bailer directly into the appropriate containers. The samples were labeled and placed in an ice-cooled chest for delivery under Geomatrix chain-of-custody to Clayton Environmental Consultants, Inc. (Clayton) of Pleasanton, California, a state-certified analytical laboratory retained by the Port. A copy of the chain-of-custody record is included in Attachment A.

Groundwater samples were analyzed by Clayton for total petroleum hydrocarbons as gasoline (TPHg) by modified U.S. Environmental Protection Agency (EPA) Method 8015; total petroleum hydrocarbons as diesel (TPHd) by EPA Method 8015; total oil and grease by Standard Method 5520 C and F; halogenated volatile organic compounds (VOCs) by EPA Method 8010; and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8020. A copy of the analytical laboratory report is included in Attachment A.

ANALYTICAL RESULTS

The analytical results for the groundwater samples are summarized in Tables 2 (attached). Benzene, toluene, and total xylenes were reported in the groundwater samples from monitoring well MW-1 at concentrations of 15.0, 2.4, and 11.2 micrograms per liter ($\mu\text{g/l}$), respectively. 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), and 1,2-dichloroethene (1,2-DCE) were also reported in the samples from well MW-1 at concentrations of 2.2 and 0.8 $\mu\text{g/l}$ respectively. Vinyl chloride was detected in the groundwater samples from well MW-1 at a concentration of 0.7 $\mu\text{g/l}$. TPHd and total oil and grease were also detected in the samples from well MW-1 at concentrations of 1,600 and 1 $\mu\text{g/l}$ respectively. 1,4-dichlorobenzene (1,4-DCB) and 1,2-DCE were reported in the groundwater samples from well MW-2 at concentrations of 0.9 and 2.2 $\mu\text{g/l}$ respectively.

Ms. Susa Gates
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6 April 1995
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TPHd was detected in the groundwater samples from well MW-2 at a concentration of 1,400 $\mu\text{g/l}$. TPHd was the only compound detected in the samples collected and analyzed from MW-3 at a concentration of 630 $\mu\text{g/l}$.

The analytical laboratories have noted that the material reported as diesel does not match the diesel pattern but is more like oil. These data indicate that the material is likely either highly degraded diesel or oil which includes hydrocarbon compounds which fall within the diesel range.

SUMMARY OF RESULTS AND RECOMMENDATIONS

Two years of quarterly water levels and water quality data have been collected in the three wells in the vicinity of the former underground storage tanks. Water-level elevations have been relatively consistent, with two of the three wells (MW-2 and MW-3) having elevation changes of less than 0.9 feet over the last two years and the third well (MW-1) having an elevation change of less than 1.2 feet over the last two years. The horizontal gradient is relatively flat and the flow directions have been southerly toward the Oakland Inner Harbor during six of the last eight quarters; flow was to the north during the last two quarters of 1993.

Groundwater samples were analyzed for TPHd, TPHg, TOG, BTEX, and VOCs during the past eight quarters; total oil and grease was also monitoring in wells MW-1 and MW-2. All monitoring well samples were also analyzed for TDS and total oil and grease during the first four quarters.

TPH as diesel has generally been reported in all three wells, with higher concentrations typically in MW-1, the upgradient well. The analytical laboratories have noted that the material reported as diesel does not match the diesel pattern but is more likely oil. Low levels of TPH as gasoline have been reported only in the upgradient well, MW-1. After the first quarter of monitoring, benzene, toluene, ethylbenzene and xylene have been reported only in MW-1; only benzene is present at levels slightly above its California maximum contaminant level (MCL) of 1 $\mu\text{g/l}$. Several other volatile organic compounds have been detected sporadically at low concentrations in all three wells. TDS concentrations have varied significantly in all three wells.

The water-level elevations indicate the hydraulic gradient at the site is flat. TDS concentrations have varied; however, generally the TDS results indicate that the water is brackish and not a potential drinking water source. Only benzene has been detected in the

Ms. Susa Gates
Port of Oakland
6 April 1995
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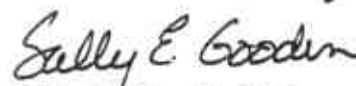
upgradient well at concentrations slightly above its MCL. Based on these results, it appears that groundwater has not been significantly impacted as a result of leakage from the USTs. We recommend that monitoring be performed annually and that the analyses include TPH as diesel and EPA Method 8010 for all wells and TPH as gasoline and BTEX for well MW-1.

Sincerely yours,

GEOMATRIX CONSULTANTS, INC.



James M. Abitz
Staff Engineer



Sally E. Goodin R.G.
Principal Geologist

2026\QTR1-95.LTR
JMA/SEG/lam

Attachments: Tables (3)
Figures (2)
Attachment A - Chain-of-Custody Record and Analytical Laboratory Report

TABLE 1

WATER-LEVEL ELEVATIONS
American President Lines Terminal
1395 Middle Harbor Road
Port of Oakland
Oakland, California

Water-Level Elevations in Feet (MLLW)

Measuring Date	MW-1	MW-2	MW-3
8 March 1993	7.07	6.58	6.76
11 May 1993	7.08	6.79	6.95
19 August 1993	6.27	6.30	6.34
24 November 1993	5.89	6.02	6.05
24 February 1994	6.86	6.54	6.76
14 June 1994	6.83	6.34	6.43
23 August 1994	7.05	6.52	6.62
4 November 1994	6.85	6.38	6.33

TABLE 2

SUMMARY OF COMPOUNDS DETECTED IN GROUNDWATER SAMPLES

American President Lines Terminal
 1395 Middle Harbor Road
 Port of Oakland
 Oakland, California

Concentrations in parts per billion (µg/l)

Well No.	Date	TPH as Gasoline	TPH as Diesel	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Total Xylenes	EPA Method 8010
MW-1	2/5/93	1800	4700	5000	9.2	1.6	8.9	2.7	1,1-DCA 0.8
	5/11/93	260	4800	7000	3.2	2.3	0.7	0.5	1,1-DCA 0.6
	8/19/93	60	2300	ND	9.0	ND	ND	ND	1,1-DCA 2.0 1,1-DCE 2.0
	11/24/93	50	280	ND	8.8	1.5	ND	3.0	1,1-DCA 0.7
	2/24/94	360	2000	NA	12	ND	2	ND	1,1-DCA 2.0
	6/14/94	ND	ND	ND	9.4	ND	ND	0.7	1,1-DCA 1.0
	8/23/94	80	3000	ND	13.0	2.4	ND	9.0	1,1-DCA 2.3 1,2-DCA 0.3 1,2-DCE 0.4 VC 1.1
	11/4/94	ND ✓	1600 ↘	1 and ND	15 ↘	2.4	ND	11.2	1,1-DCA 2.2 1,2-DCA 0.8 VC 0.7
MW-2	2/5/93	ND	840	2000	ND	ND	ND	ND	ND
	5/11/93	ND	3700	ND	ND	ND	ND	ND	ND
	8/19/93	ND	620	ND	ND	ND	ND	ND	1,4-DCB 3.0 1,2-DCB 1.0
	11/24/93	ND	80	ND	ND	ND	ND	ND	ND
	2/2/94	ND	ND	NA	ND	ND	ND	ND	1,4-DCB 1.0

TABLE 2

SUMMARY OF COMPOUNDS DETECTED IN GROUNDWATER SAMPLES

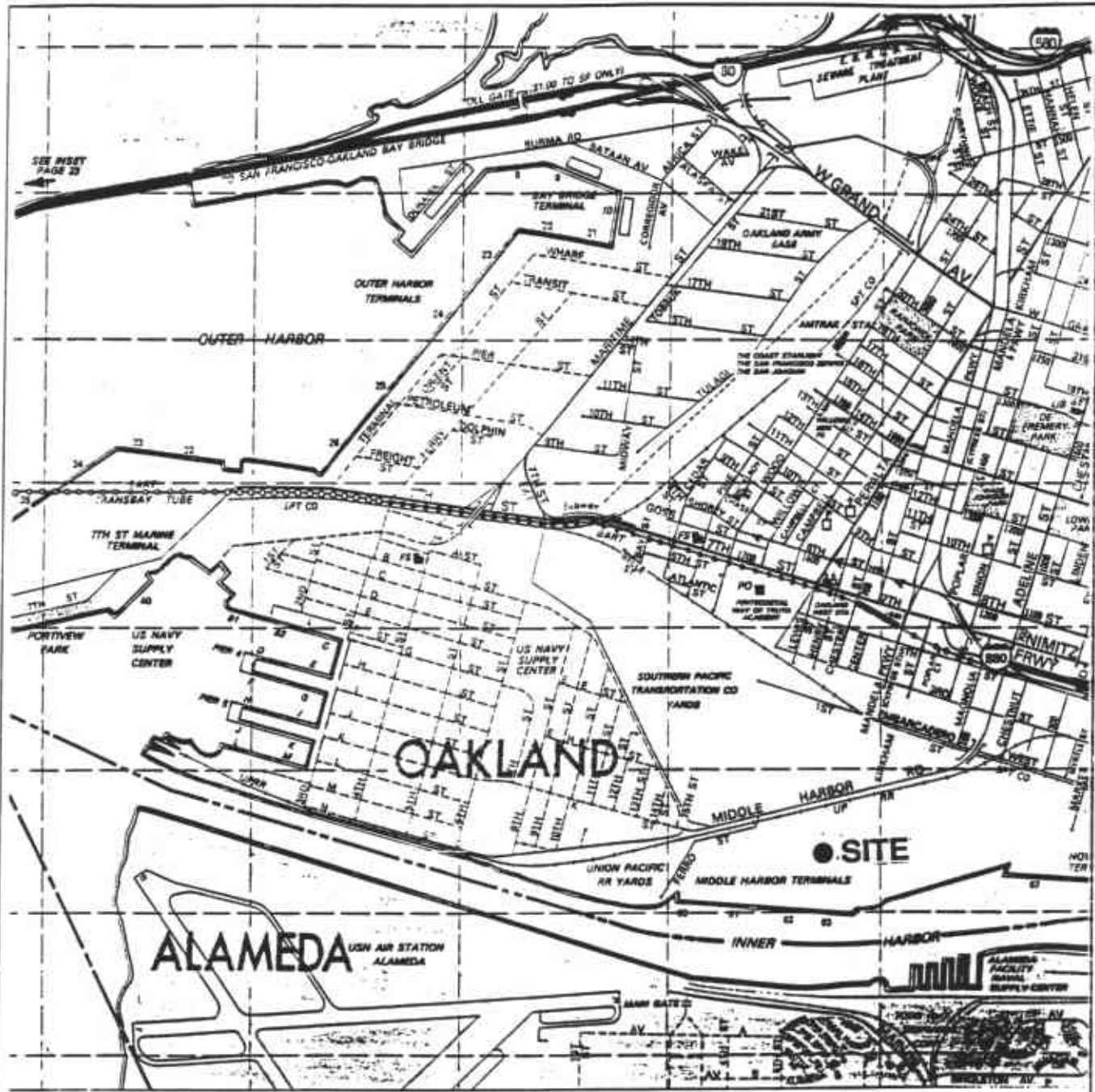
Well No.	Date	TPH as Gasoline	TPH as Diesel	Total Oil and Grease	Benzene	Toluene	Ethylbenzene	Total Xylenes	EPA Method 8010
MW-2 (con't)	6/14/94	NA	ND	ND	NA	NA	NA	NA	1,4-DCB 0.8
	8/23/94	NA	620	ND	NA	NA	NA	NA	1,4-DCB 1.3 1,2-DCE 0.4
	11/4/94	NA	1400	ND	NA	NA	NA	NA	1,4-DCB 0.9 1,2-DCE 2.2
MW-3	2/5/93	ND	3400	2000	2.1	0.9	1.7	3.1	Cis-1,2-DCE 0.4
	5/11/93	ND	3300	ND	ND	ND	ND	ND	ND
	8/19/93	ND	840	ND	ND	ND	ND	ND	1,4-DCB 1.0
	11/24/93	ND	100	ND	ND	ND	ND	ND	ND
	2/2/94	ND	890	NA	ND	ND	ND	ND	ND
	8/23/94	NA	440	ND	ND	ND	ND	ND	1,4-DCB 0.6
	6/14/94	NA	ND	ND	ND	ND	ND	ND	ND
11/4/94	NA	630	ND	ND	ND	ND	ND	ND	

Notes:

1 Samples collected by Geomatrix Consultants, Inc. and analyzed by Curtis & Tomkins, Ltd., of Berkeley, California, Dames & Moore of Novato, California, and Clayton Environmental Consultants, Inc., of Pleasanton, California, for TPH as gasoline by modified EPA Method 8015; TPH as diesel by EPA Method 8015; total oil and grease by Standard Method 5520 C and F; benzene, toluene, ethylbenzene, and total xylenes by EPA Method 8020; and halogenated volatile organic compounds by EPA Method 8010.

- 2 DCA = dichloroethane
- DCB = dichlorobenzene
- DCE = dichloroethene
- VC = vinyl chloride
- TPH = total petroleum hydrocarbons
- NA = not analyzed
- ND = not detected at or above detection limit

⊗ not typical of diesel



Reference: Thomas Brothers Maps
 Alameda County
 1990

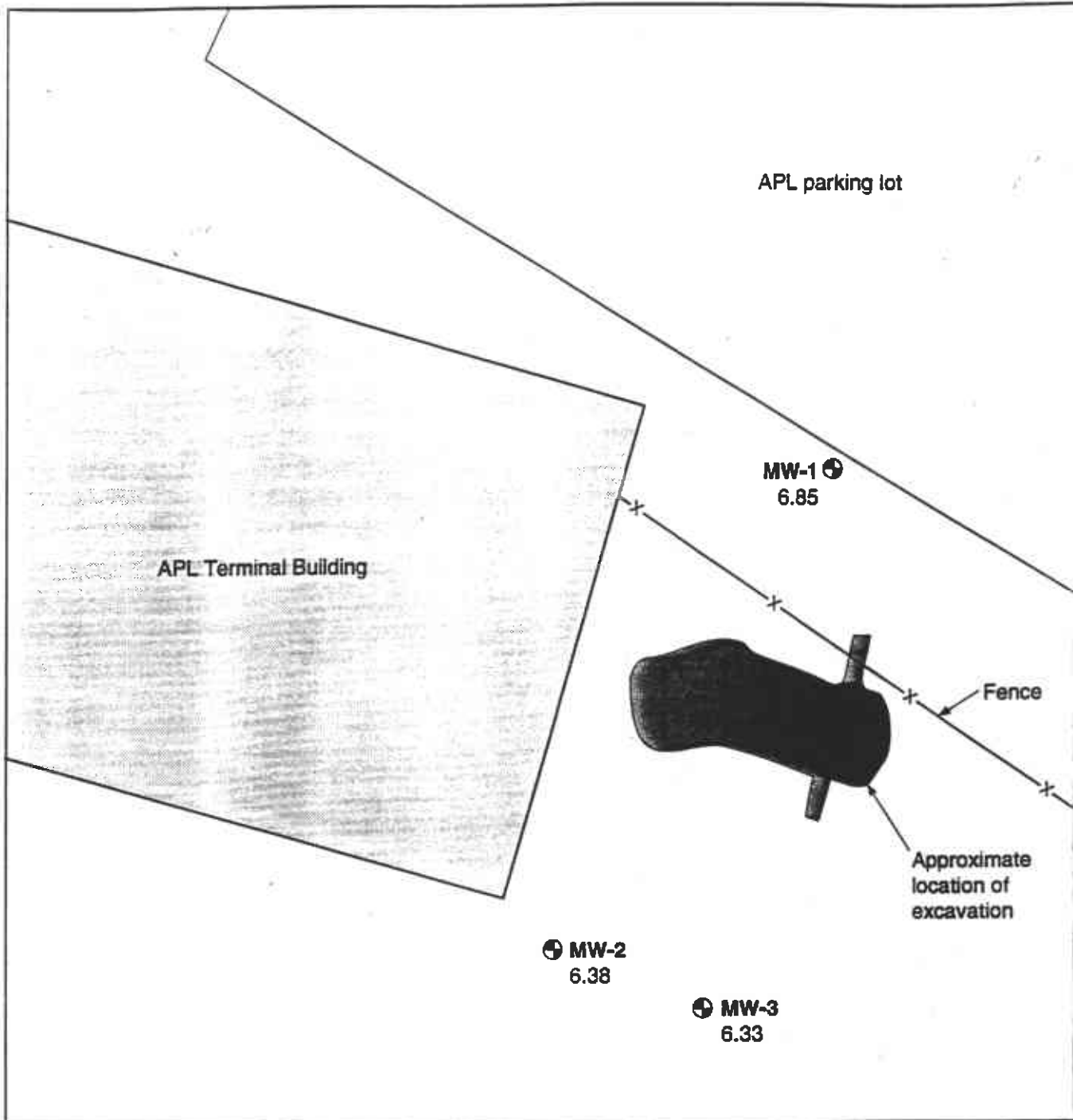


0 2200 Feet



SITE LOCATION MAP
 American President Lines Terminal
 1395 Middle Harbor Road
 Oakland, California

Figure
 1
 Project No.
 2026



EXPLANATION

- MW-2 ⊕ Monitoring well
- 6.52 Water-level elevation, in feet



0 50 Feet

Based on figure provided by the Port of Oakland.
 Elevations referenced to Mean Lower Low Water Port Datum.



WATER-LEVEL ELEVATIONS - 4 NOVEMBER 1994
 American President Lines Terminal
 1395 Middle Harbor Road
 Oakland, California

Figure
 2
 Project No.
 2026

Western Operations

1252 Quarry Lane
P.O. Box 9019
Pleasanton, CA 94566
(510) 426-2600
Fax (510) 426-0106

Clayton
ENVIRONMENTAL
CONSULTANTS

November 21, 1994

Mr. Jamie Abitz
GEOMATRIX CONSULTANTS
100 Pine Street, 10th Floor
San Francisco, CA 94111

Client Ref.: 2026I
Clayton Project No.: 94110.74

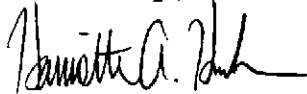
Dear Mr. Abitz:

Attached is our analytical laboratory report for the samples received on November 4, 1994. A copy of the Chain-of-Custody form acknowledging receipt of these samples is attached.

Please note that any unused portion of the samples will be disposed of after December 21, 1994, unless you have requested otherwise.

We appreciate the opportunity to be of assistance to you. If you have any questions, please contact Suzanne Haus, Client Services Supervisor, at (510) 426-2657.

Sincerely,



Harriotte A. Hurley, CIH
Director, Laboratory Services
Western Operations

HAH/tjb

Attachments

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	MW-2	Date Sampled:	11/04/94 ✓
Lab Number:	9411074-01A	Date Received:	11/04/94
Sample Matrix/Media:	WATER	Date Prepared:	11/13/94
Preparation Method:	EPA 5030	Date Analyzed:	11/13/94
Method Reference:	EPA 8010	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Halocarbons</u>			
Bromodichloromethane	75-27-4	ND	0.7
Bromoform	75-25-2	ND	0.7
Bromomethane	74-83-9	ND	0.7
Carbon tetrachloride	56-23-5	ND	0.6
Chlorobenzene	108-90-7	ND	0.7
Chloroethane	75-00-3	ND	0.5
2-Chloroethylvinyl ether	110-75-8	ND	1
Chloroform	67-66-3	ND	0.5
Chloromethane	74-87-3	ND	0.6
Dibromochloromethane	124-48-1	ND	0.6
1,2-Dichlorobenzene	95-50-1	ND	0.5
1,3-Dichlorobenzene	541-73-1	ND	0.5
1,4-Dichlorobenzene	106-46-7	0.9 ✓	0.5
Dichlorodifluoromethane	75-71-8	ND	1
1,1-Dichloroethane	75-34-3	ND	0.4
1,2-Dichloroethane	107-06-2	ND	0.3
1,1-Dichloroethene	75-35-4	ND	0.2
cis-1,2-Dichloroethene	156-59-2	2.2 ✓	0.4
trans-1,2-Dichloroethene	156-60-5	ND	0.4
1,2-Dichloropropane	78-87-5	ND	0.5
cis-1,3-Dichloropropene	10061-01-5	ND	0.5
trans-1,3-dichloropropene	10061-02-6	ND	0.6
Freon 113	76-13-1	ND	2
Methylene chloride	75-09-2	ND	2
1,1,2,2-Tetrachloroethane	79-34-5	ND	0.5
Tetrachloroethene	127-18-4	ND	0.5
1,1,1-Trichloroethane	71-55-6	ND	0.5
1,1,2-Trichloroethane	79-00-5	ND	0.6
Trichloroethene	79-01-6	ND	0.3
Trichlorofluoromethane	75-69-4	ND	0.4

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	MW-2	Date Sampled:	11/04/94
Lab Number:	9411074-01A	Date Received:	11/04/94
Sample Matrix/Media:	WATER	Date Prepared:	11/13/94
Preparation Method:	EPA 5030	Date Analyzed:	11/13/94
Method Reference:	EPA 8010	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Halocarbons (Continued)</u>			
Vinyl chloride	75-01-4	ND ✓	0.5
<u>Surrogates</u>		<u>Recovery (%)</u>	<u>OC Limits (%)</u>
1-Chloro-2-methylpropene	513-37-1	74	70 - 130

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	MW-3	Date Sampled:	11/04/94
Lab Number:	9411074-02A	Date Received:	11/04/94
Sample Matrix/Media:	WATER	Date Prepared:	11/15/94
Preparation Method:	EPA 5030	Date Analyzed:	11/15/94
Method Reference:	EPA 8010	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Halocarbons</u>			
Bromodichloromethane	75-27-4	ND	1
Bromoform	75-25-2	ND	1
Bromomethane	74-83-9	ND	1
Carbon tetrachloride	56-23-5	ND	1
Chlorobenzene	108-90-7	ND	1
Chloroethane	75-00-3	ND	1
2-Chloroethylvinyl ether	110-75-8	ND	2
Chloroform	67-66-3	ND	1
Chloromethane	74-87-3	ND	1
Dibromochloromethane	124-48-1	ND	1
1,2-Dichlorobenzene	95-50-1	ND	1
1,3-Dichlorobenzene	541-73-1	ND	1
1,4-Dichlorobenzene	106-46-7	ND	1
Dichlorodifluoromethane	75-71-8	ND	2
1,1-Dichloroethane	75-34-3	ND	0.8
1,2-Dichloroethane	107-06-2	ND	0.6
1,1-Dichloroethene	75-35-4	ND	0.4
cis-1,2-Dichloroethene	156-59-2	ND	0.8
trans-1,2-Dichloroethene	156-60-5	ND	0.8
1,2-Dichloropropane	78-87-5	ND	1
cis-1,3-Dichloropropene	10061-01-5	ND	1
trans-1,3-dichloropropene	10061-02-6	ND	1
Freon 113	76-13-1	ND	4
Methylene chloride	75-09-2	ND	4
1,1,2,2-Tetrachloroethane	79-34-5	ND	1
Tetrachloroethene	127-18-4	ND	1
1,1,1-Trichloroethane	71-55-6	ND	1
1,1,2-Trichloroethane	79-00-5	ND	1
Trichloroethene	79-01-6	ND	0.6
Trichlorofluoromethane	75-69-4	ND	0.8

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification: MW-3	Date Sampled: 11/04/94
Lab Number: 9411074-02A	Date Received: 11/04/94
Sample Matrix/Media: WATER	Date Prepared: 11/15/94
Preparation Method: EPA 5030	Date Analyzed: 11/15/94
Method Reference: EPA 8010	Analyst: NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Halocarbons (Continued)</u>			
Vinyl chloride	75-01-4	ND	1
<u>Surrogates</u>		<u>Recovery (%)</u>	<u>QC Limits (%)</u>
1-Chloro-2-methylpropene	513-37-1	100	70 - 130

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	MW-1	Date Sampled:	11/04/94
Lab Number:	9411074-03A	Date Received:	11/04/94
Sample Matrix/Media:	WATER	Date Prepared:	11/15/94
Preparation Method:	EPA 5030	Date Analyzed:	11/15/94
Method Reference:	EPA 8010	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Halocarbons</u>			
Bromodichloromethane	75-27-4	ND	0.7
Bromoform	75-25-2	ND	0.7
Bromomethane	74-83-9	ND	0.7
Carbon tetrachloride	56-23-5	ND	0.6
Chlorobenzene	108-90-7	ND	0.7
Chloroethane	75-00-3	ND	0.5
2-Chloroethylvinyl ether	110-75-8	ND	1
Chloroform	67-66-3	ND	0.5
Chloromethane	74-87-3	ND	0.6
Dibromochloromethane	124-48-1	ND	0.6
1,2-Dichlorobenzene	95-50-1	ND	0.5
1,3-Dichlorobenzene	541-73-1	ND	0.5
1,4-Dichlorobenzene	106-46-7	ND	0.5
Dichlorodifluoromethane	75-71-8	ND	1
1,1-Dichloroethane	75-34-3	2.2 ✓	0.4
1,2-Dichloroethane	107-06-2	0.8 ✓	0.3
1,1-Dichloroethene	75-35-4	ND	0.2
cis-1,2-Dichloroethene	156-59-2	ND	0.4
trans-1,2-Dichloroethene	156-60-5	ND	0.4
1,2-Dichloropropane	78-87-5	ND	0.5
cis-1,3-Dichloropropene	10061-01-5	ND	0.5
trans-1,3-dichloropropene	10061-02-6	ND	0.6
Freon 113	76-13-1	ND	2
Methylene chloride	75-09-2	ND	2
1,1,2,2-Tetrachloroethane	79-34-5	ND	0.5
Tetrachloroethene	127-18-4	ND	0.5
1,1,1-Trichloroethane	71-55-6	ND	0.5
1,1,2-Trichloroethane	79-00-5	ND	0.6
Trichloroethene	79-01-6	ND	0.3
Trichlorofluoromethane	75-69-4	ND	0.4

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification: MW-1	Date Sampled: 11/04/94
Lab Number: 9411074-03A	Date Received: 11/04/94
Sample Matrix/Media: WATER	Date Prepared: 11/15/94
Preparation Method: EPA 5030	Date Analyzed: 11/15/94
Method Reference: EPA 8010	Analyst: NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Halocarbons (Continued)</u>			
Vinyl chloride	75-01-4	0.7 ✓	0.5
<u>Surrogates</u>		<u>Recovery (%)</u>	<u>QC Limits (%)</u>
1-Chloro-2-methylpropene	513-37-1	101	70 - 130

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9411074-04A	Date Received:	--
Sample Matrix/Media:	WATER	Date Prepared:	11/13/94
Preparation Method:	EPA 5030	Date Analyzed:	11/13/94
Method Reference:	EPA 8010	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Halocarbons</u>			
Bromodichloromethane	75-27-4	ND	0.7
Bromoform	75-25-2	ND	0.7
Bromomethane	74-83-9	ND	0.7
Carbon tetrachloride	56-23-5	ND	0.6
Chlorobenzene	108-90-7	ND	0.7
Chloroethane	75-00-3	ND	0.5
2-Chloroethylvinyl ether	110-75-8	ND	1
Chloroform	67-66-3	ND	0.5
Chloromethane	74-87-3	ND	0.6
Dibromochloromethane	124-48-1	ND	0.6
1,2-Dichlorobenzene	95-50-1	ND	0.5
1,3-Dichlorobenzene	541-73-1	ND	0.5
1,4-Dichlorobenzene	106-46-7	ND	0.5
Dichlorodifluoromethane	75-71-8	ND	1
1,1-Dichloroethane	75-34-3	ND	0.4
1,2-Dichloroethane	107-06-2	ND	0.3
1,1-Dichloroethene	75-35-4	ND	0.2
cis-1,2-Dichloroethene	156-59-2	ND	0.4
trans-1,2-Dichloroethene	156-60-5	ND	0.4
1,2-Dichloropropane	78-87-5	ND	0.5
cis-1,3-Dichloropropene	10061-01-5	ND	0.5
trans-1,3-dichloropropene	10061-02-6	ND	0.6
Freon 113	76-13-1	ND	2
Methylene chloride	75-09-2	ND	2
1,1,2,2-Tetrachloroethane	79-34-5	ND	0.5
Tetrachloroethene	127-18-4	ND	0.5
1,1,1-Trichloroethane	71-55-6	ND	0.5
1,1,2-Trichloroethane	79-00-5	ND	0.6
Trichloroethene	79-01-6	ND	0.3
Trichlorofluoromethane	75-69-4	ND	0.4

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9411074-04A	Date Received:	--
Sample Matrix/Media:	WATER	Date Prepared:	11/13/94
Preparation Method:	EPA 5030	Date Analyzed:	11/13/94
Method Reference:	EPA 8010	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Halocarbons (Continued)</u>			
Vinyl chloride	75-01-4	ND	0.5
<u>Surrogates</u>		<u>Recovery (%)</u>	<u>QC Limits (%)</u>
1-Chloro-2-methylpropene	513-37-1	95	70 - 130

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	MW-3	Date Sampled:	11/04/94
Lab Number:	9411074-02C	Date Received:	11/04/94
Sample Matrix/Media:	WATER	Date Prepared:	11/15/94
Preparation Method:	EPA 5030	Date Analyzed:	11/15/94
Method Reference:	EPA 8020	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Aromatics</u>			
Benzene	71-43-2	ND	0.8
Chlorobenzene	108-90-7	ND	0.6
1,2-Dichlorobenzene	95-50-1	ND	1
1,3-Dichlorobenzene	541-73-7	ND	0.6
1,4-Dichlorobenzene	106-46-7	ND	1
Ethylbenzene	100-41-4	ND	0.6
Toluene	108-88-3	ND	0.6
o-Xylene	95-47-6	ND	0.8
p,m-Xylenes	--	ND	0.8
<u>Surrogates</u>		<u>Recovery (%)</u>	<u>QC Limits (%)</u>
1,4-Difluorobenzene	540-36-3	101	70 - 130

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Note: Detection limits increased due to matrix interference.

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	MW-1	Date Sampled:	11/04/94
Lab Number:	9411074-03C	Date Received:	11/04/94
Sample Matrix/Media:	WATER	Date Prepared:	11/15/94
Preparation Method:	EPA 5030	Date Analyzed:	11/15/94
Method Reference:	EPA 8020	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Aromatics</u>			
Benzene	71-43-2	15	0.4
Chlorobenzene	108-90-7	ND	0.3
1,2-Dichlorobenzene	95-50-1	ND	0.5
1,3-Dichlorobenzene	541-73-7	ND	0.3
1,4-Dichlorobenzene	106-46-7	ND	0.5
Ethylbenzene	100-41-4	ND	0.3
Toluene	108-88-3	2.4	0.3
o-Xylene	95-47-6	4.5	0.4
p,m-Xylenes	--	6.7	0.4
<u>Surrogates</u>		<u>Recovery (%)</u>	<u>QC Limits (%)</u>
1,4-Difluorobenzene	540-36-3	119	70 - 130

ND: Not detected at or above limit of detection

--: Information not available or not applicable

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification:	METHOD BLANK	Date Sampled:	--
Lab Number:	9411074-04A	Date Received:	--
Sample Matrix/Media:	WATER	Date Prepared:	11/15/94
Preparation Method:	EPA 5030	Date Analyzed:	11/15/94
Method Reference:	EPA 8020	Analyst:	NAN

Analyte	CAS #	Concentration (ug/L)	Method Detection Limit (ug/L)
<u>Purgeable Aromatics</u>			
Benzene	71-43-2	ND	0.4
Chlorobenzene	108-90-7	ND	0.3
1,2-Dichlorobenzene	95-50-1	ND	0.5
1,3-Dichlorobenzene	541-73-7	ND	0.3
1,4-Dichlorobenzene	106-46-7	ND	0.5
Ethylbenzene	100-41-4	ND	0.3
Toluene	108-88-3	ND	0.3
o-Xylene	95-47-6	ND	0.4
p,m-Xylenes	--	ND	0.4
<u>Surrogates</u>		<u>Recovery (%)</u>	<u>QC Limits (%)</u>
1,4-Difluorobenzene	540-36-3	101	50 - 150

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification: See Below
Lab Number: 9411074
Sample Matrix/Media: WATER
Extraction Method: SM 5520F
Method Reference: SM 5520C

Date Received: 11/04/94
Date Extracted: 11/09/94
Date Analyzed: 11/17/94

Lab Number	Sample Identification	Date Sampled	Hydrocarbons (mg/L)	Method Detection Limit (mg/L)
-01	MW-2	11/04/94	ND	1
-02	MW-3	11/04/94	ND	1
-03	MW-1	11/04/94	ND	1
-04	METHOD BLANK	--	ND	1

oil + grease

ND: Not detected at or above limit of detection
--: Information not available or not applicable

Analytical Results
for
Geomatrix Consultants
Client Reference: 2026I
Clayton Project No. 94110.74

Sample Identification: See Below
 Lab Number: 9411074
 Sample Matrix/Media: WATER
 Extraction Method: EPA 3510
 Method Reference: EPA 8015 (Modified)

Date Received: 11/04/94
 Date Extracted: 11/09/94
 Date Analyzed: 11/14/94

Lab Number	Sample Identification	Date Sampled	TPH-D (ug/L)	Method Detection Limit (ug/L)
-01	MW-2	11/04/94	1400 a	50
-02	MW-3	11/04/94	630 a	50
-03	MW-1	11/04/94	1600 a	50
-04	METHOD BLANK	--	ND	50

ND: Not detected at or above limit of detection
 --: Information not available or not applicable

TPH-D = Extractable petroleum hydrocarbons from C10 to C42 quantitated as diesel.
 a Unidentifiable hydrocarbons do not match the typical diesel pattern.

Analytical Results
 for
 Geomatrix Consultants
 Client Reference: 2026I
 Clayton Project No. 94110.74

Sample Identification: See Below	Date Received: 11/04/94
Lab Number: 9411074	Date Prepared: 11/09/94
Sample Matrix/Media: WATER	Date Analyzed: 11/09/94
Preparation Method: EPA 5030	
Method Reference: EPA 8015 (Modified)	

Lab Number	Sample Identification	Date Sampled	TPH-G (ug/L)	Method Detection Limit (ug/L)
-03	MW-1	11/04/94	ND	50
-04	METHOD BLANK	--	ND	50

ND: Not detected at or above limit of detection

--: Information not available or not applicable

TPH-G = Volatile petroleum hydrocarbons from C6 to C10 quantitated as gasoline.

Analytical Results
 for
 Geomatrix Consultants
 Client Reference: 2026I
 Clayton Project No. 94110.74

Sample Identification: See Below
 Lab Number: 9411074
 Sample Matrix/Media: WATER
 Extraction Method: SM 5520B
 Method Reference: SM 5520C

Date Received: 11/04/94
 Date Extracted: 11/09/94
 Date Analyzed: 11/17/94

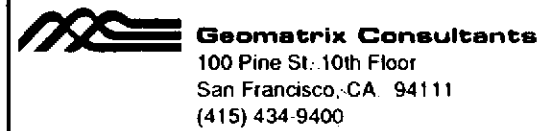
Lab Number	Sample Identification	Date Sampled	Total Oil and Grease (mg/L)	Method Detection Limit (mg/L)
-01	MW-2	11/04/94	ND	1
-02	MW-3	11/04/94	ND	1
-03	MW-1	11/04/94	1	1
-04	METHOD BLANK	--	ND	1

ND: Not detected at or above limit of detection
 --: Information not available or not applicable

9411074

Chain-of-Custody Record			No. 4573		Date: 11/4/94		Page 1 of 1								
Project No.: 2026 I			ANALYSES						REMARKS						
Samplers (Signatures): <i>Charlie Rome</i>			EPA Method 8010	EPA Method 8020	EPA Method 8240	EPA Method 8270	TPH as gasoline 8015	TPH as diesel 8015	TPH as BTEX	Total oil + grease	Cooled	Soil (S) or water (W)	Acidified	Number of containers	Additional comments
Date	Time	Sample Number													
11/4/94	1210	MW-2	X	X	X	X	X	X	X	X	Y	W	Y	4	1) Analyze Total oil and grease by 5520 C & F. O1A-D 2x 81L, 2x 40ml O2A-F 2x 81L, 4x 40ml O3A-J 2x 81L, 8x 40ml
	1245	MW-3	X	X	X	X	X	X	X	X	Y	W	Y	6	
	1340	MW-1	X	X	X	X	X	X	X	X	Y	W	Y	10	

			Turnaround time: Standard			Results to: Janis Abitz			Total No. of containers: 20						
Relinquished by:		Date:	Relinquished by:		Date:	Relinquished by:		Date:	Method of shipment:						
<i>Charlie Rome</i>		11/4/94	<i>D. Rushfeldt</i>		11/4	<i>[Signature]</i>		11/4/94	Pick up						
Signature:			Signature:			Signature:			Laboratory comments and Log No.:						
Printed name: Charles Rome			Diana Rushfeldt			AERO DELIVERY									
Company: Geomatrix		Company: Geomatrix		Company: AERO DELIVERY											
Received by:		Time:	Received by:		Time:	Received by:		Time:							
<i>Diana Rushfeldt</i>		3:50	<i>[Signature]</i>		3:50	<i>[Signature]</i>		6:12 PM							
Signature:			Signature:			Signature:									
Printed name: Diana Rushfeldt			Printed name:			Printed name: TRACY B Bullock									
Company: Geomatrix		Company: AERO DELIVERY		Company: CLAYTON ENV CON.											



Quality Assurance Results Summary
Matrix Spike/Matrix Spike Duplicate Results
for
Clayton Project No. 94110.74

Quality Assurance Results Summary
for
Clayton Project No. 94110.74

Clayton Lab Number: 9411074-LCS
Ext./Prep. Method: SM5520B
Date: 11/09/94
Analyst: HYT
Std. Source: E940825-01W
Sample Matrix/Media: WATER

Analytical Method: SM5520C
Instrument ID: 00000
Date: 11/17/94
Time: 13:01
Analyst: CTS
Units: MG/L

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
OIL&GREASE(IR)	ND	5.06	4.74	94	4.83	95	95	78	121	1.9	20

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection

LCL = Lower Control Limit

UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Quality Assurance Results Summary
for
Clayton Project No. 94110.74

Clayton Lab Number: 9411076-LCS
Ext./Prep. Method: EPA 5030
Date: 11/13/94
Analyst: NAN
Std. Source: V940927-02W
Sample Matrix/Media: WATER

Analytical Method: EPA601_2/801020
Instrument ID: 02857
Date: 11/13/94
Time: 05:08
Analyst: NAN
Units: UG/L

Analyte		Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
1,1-DICHLOROETHENE	(HALL)	ND	20.0	18.2	91	18.8	94	93	65	131	3.2	22
BENZENE	(PID)	ND	20.0	19.6	98	20.0	100	99	76	134	2.0	20
CHLOROBENZENE	(PID)	ND	20.0	19.1	96	19.6	98	97	75	127	2.6	20
CHLOROBENZENE	(HALL)	ND	20.0	18.0	90	18.8	94	92	79	132	4.3	20
TOLUENE	(PID)	ND	20.0	20.2	101	20.8	104	103	71	125	2.9	20
TRICHLOROETHENE	(HALL)	ND	20.0	19.0	95	19.7	99	97	69	133	3.6	20

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection

LCL = Lower Control Limit

UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Quality Assurance Results Summary
for
Clayton Project No. 94110.74

Clayton Lab Number: 9411048-LCS
Ext./Prep. Method: EPA3510
Date: 11/09/94
Analyst: HYT
Std. Source: G941109-01W
Sample Matrix/Media: WATER

Analytical Method: EPA8015
Instrument ID: 02883
Date: 11/13/94
Time: 23:42
Analyst: AMN
Units: UG/L

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
DIESEL	ND	1,000	1,260	126	1,290	129	128	40	140	2.4	40

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection

LCL = Lower Control Limit

UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.

Quality Assurance Results Summary
for
Clayton Project No. 94110.74

Clayton Lab Number: 9411064-07C
Ext./Prep. Method: EPA5039
Date: 11/09/94
Analyst: WAS
Std. Source: V941024-04W
Sample Matrix/Media: WATER

Analytical Method: EPA8015 8020
Instrument ID: 05587
Date: 11/09/94
Time: 13:56
Analyst: WAS
Units: UG/L

Analyte	Sample Result	Spike Level	Matrix Spike Result	MS Recovery (%)	Matrix Spike Duplicate Result	MSD Recovery (%)	Average Recovery (% R)	LCL (% R)	UCL (% R)	RPD (%)	UCL (%RPD)
BENZENE	(PID) ND	11.1	12.9	116	12.1	109	113	81	118	6.4	20
ETHYLBENZENE	(PID) ND	10.2	11.2	110	10.4	102	106	81	114	7.4	20
GASOLINE	(FID) ND	500	460	92	430	86	89	80	150	6.7	25
TOLUENE	(PID) ND	51.7	55.6	108	50.1	97	102	84	118	10	20
TOTAL XYLENE	(PID) ND	62.2	63.9	103	59.6	96	99	85	115	7.0	20

LCS = Laboratory Control Sample
ND = Not detected at or above limit of detection

LCL = Lower Control Limit

UCL = Upper Control Limit
SOR = Spike out of range due to high sample concentration.