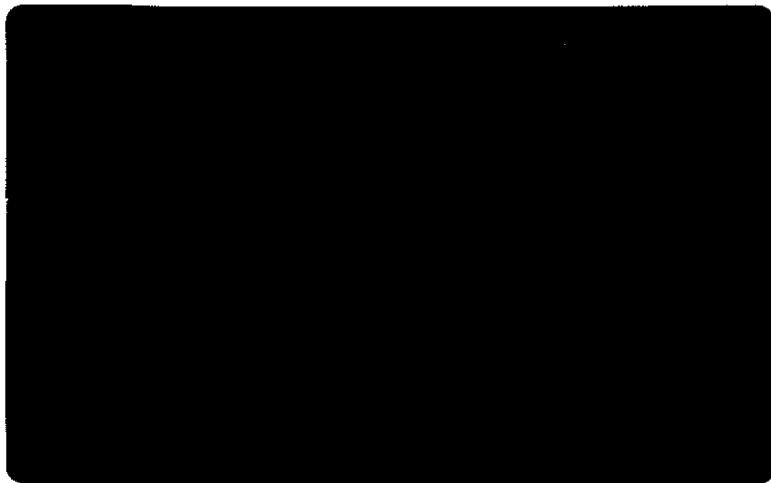


ENVIRONMENTAL
PROTECTION

06 APR 9 11:10:20

ENVIRONMENTAL
PROTECTION
APR - 9 11:10:20



**Results of a Soil and Ground-Water Investigation
in the Vicinity of the
Former Underground Storage Tanks
at the Beach Street Area at the
Yerba Buena/East Baybridge Project Site,
Oakland, California**

**April 8, 1996
LF 1649.95-25**

Prepared for
Catellus Development
201 Mission Street, Second Floor
San Francisco, California 94121



April 8, 1996

LF 1649.95-025

Ms. Susan Hugo
Alameda County Health Care Services Agency
80 Swan Way, Suite 200
Oakland, California 94621

Subject: Results of a Soil and Ground-Water Investigation in the Vicinity of the Former
Underground Storage Tanks at the Beach Street Area, Yerba Buena/East Baybridge
Project Site, Oakland, California

Dear Ms. Hugo:

The enclosed report presents the results of soil and ground-water investigation conducted west of two fuel underground storage tanks formerly located in the northwest portion of the Yerba Buena/East Baybridge project site in Oakland, California.

The scope of the investigation was conducted in accordance with the document entitled, "Work Plan to Install One Monitoring Well and Two Soil Borings in the Beach Street Area Yerba Buena/East Baybridge Project Site, Oakland, California" dated March 31, 1994. This work was performed in response to a request by the Alameda County Health Care Services Agency in a letter dated February 22, 1994 to Ms. Kimberly Brandt of Catellus Development Corporation, the property owners.

If you have any questions, please contact Ron Goloubow.

Sincerely,



Ron E. Goloubow
Senior Project Geologist

Enclosure

cc: Mr. James Adams, Catellus Development

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- B Water-Quality Sampling Information
- C Analytical Reports for Soil and Ground-Water Samples

CERTIFICATION

All hydrogeologic and geologic information, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by a Levine•Fricke California Registered Geologist.



Donald T. Bradshaw
Principal Hydrogeologist
California Registered Geologist (5300)

4/8/94
Date

1.0 INTRODUCTION

This report describes the results of soil and ground-water samples collected west and downgradient from two fuel underground storage tanks (USTs) formerly located in the northwest portion (Beach Street area) of the Yerba Buena/East Bay Bridge Project Site ("the Site") in Oakland, California (Figures 1 and 2). The samples were collected during the installation of one ground-water monitoring well (MW-12R) and two soil borings (EB-1 and EB-2). Levine-Fricke performed this work in response to a request by the Alameda County Health Care Services Agency (ACHA) in letter dated February 22, 1994 to Catellus Development Corporation, the property owners and in accordance with the "Work Plan to Install One Monitoring Well and Two Soil Borings in the Beach Street Area Yerba Buena/East Baybridge Project Site, Oakland, California" dated March 31, 1994. The work plan was approved by the ACHA in a letter to Catellus dated June 10, 1994.

2.0 BACKGROUND

During excavation of petroleum-affected soil identified during previous investigations conducted by Levine-Fricke, two 12,000-gallon fuel USTs were encountered in the northwestern portion of the Site (Figure 2). The USTs were removed and disposed of by a licensed hazardous waste transportation company under a hazardous waste manifest in August 1993. Inspection of the USTs after removal indicated several holes at the bottom and top of each UST.

Approximately 6,000 cubic yards (cy) of petroleum-affected soil were removed from the UST excavation and in the vicinity of the USTs. Soil samples collected from the final excavation bottom and sidewalls indicated that concentrations of petroleum hydrocarbons were reduced to cleanup goals for the Site, with the exception of approximately 90 cy of soil along the western property boundary. This material was left in place because of geotechnical considerations concerning stability of the excavation sidewalls adjacent to Beach Street and the sidewalk.

The area of on-site affected soil is located at a depth of 7.5 to 15 feet below ground surface (bgs), and extends from the western property line approximately 5.5 feet east. The excavation was backfilled in October 1993. A report describing UST removal and soil remediation activities was prepared by Levine-Fricke and submitted to the ACHA and Regional Water Quality Control Board (RWQCB) for review (Levine-Fricke 1993). In that report, Levine-Fricke recommended that one well be installed downgradient (west) from the former USTs to assess the potential effect of petroleum hydrocarbons on shallow ground-water quality. It was proposed that ground-water samples be collected from the monitoring well for analysis of petroleum hydrocarbons on a quarterly basis for at least one year. In addition, in response to the ACHA request, it was proposed that two soil borings (EB-1 and EB-2) be drilled west of the former USTs

to assess the possible lateral extent of petroleum-affected soil in the vicinity of the USTs.

3.0 OBJECTIVE

The objective of the work was to assess the extent of petroleum-affected soil and shallow ground water downgradient from the former USTs. To meet this objective, soil and ground-water samples were collected and submitted for analysis from soil borings EB-1 and EB-2 and ground-water monitoring well MW-12R.

4.0 SCOPE OF WORK

In order to meet the objective of this investigation, the following scope of work was implemented:

- drilling of two soil borings and the installation of one shallow ground-water monitoring well
- analysis of soil and ground-water samples
- preparation of this summary report

5.0 FIELD INVESTIGATION

Soil boring, soil sampling, well installation, and ground-water sampling conducted during this investigation are presented in this section. Before conducting the field work, an excavation permit was obtained from the City of Oakland Public Works Department, and a drilling permit was obtained from the Alameda County Flood Control District, Zone 7. Lithology logs and well completion details are included in Appendix A. Drilling and sampling equipment were steam cleaned before the start of work and also after completion of each boring to reduce the potential for cross contamination.

5.1 Soil Borings

On December 14 and 18, 1995, Levine-Fricke retained Gregg Drilling Company ("Gregg") to drill two soil borings using a truck-mounted drill rig equipped with hollow-stem augers at the locations shown on Figure 2. Each boring was drilled to approximately 9 feet bgs and were backfilled to grade with Portland-cement grout.

5.2 Soil and Grab Ground-Water Sampling

Soil samples were collected on a continuous basis using a split-spoon sampler, lined with brass tubes from approximately 4 feet bgs to the total depth of each boring. A

photoionization detector (PID) was used in the field to screen soil samples for the presence of volatile organic compounds (VOCs). Results of the PID screening were recorded on the boring logs and are presented in Appendix A.

One soil sample was submitted for chemical analysis from borings EB-1 and MW-12R. Three soil samples were submitted for chemical analysis from boring EB-2. Sample depths ranged from 6.5 to 11.5 feet bgs. Samples were stored in a cooled ice chest and transported under chain-of-custody procedures to American Environmental Network (AEN), a state-certified analytical laboratory located in Pleasant Hill, California.

Two grab ground-water samples (one from each soil boring) were collected and analyzed. Grab ground-water samples were obtained by drilling each soil boring until ground water was observed at a depth of 5 to 8 feet bgs in each soil boring. A disposable Teflon bailer was then lowered into the borehole and used to obtain the ground-water sample. Ground-water samples were stored in a cooled ice chest and transported under chain-of-custody procedures to AEN.

5.3 Monitoring Well Installation, Development, Purging, and Sampling

On December 14, 1995, shallow ground-water monitoring well MW-12R was completed using Schedule 40, 2-inch diameter to a depth of 15.5 feet bgs. Factory-slotted 0.02-inch screen was installed from 15.5 to 5.5 feet bgs in MW-12R. A sand pack of No. 3 Monterey sand was installed adjacent to the screened interval from the well bottom to approximately six inches above the top of the screened interval. A seal of bentonite pellets, one foot thick, was placed over the top of the sand pack. The remaining annular space was backfilled with a Portland-type cement to grade surface. The well was finished with flush-mounted monument and a locking waterproof cap.

Approximately two weeks after well installation, MW-12R was developed using a centrifugal pump to remove water and fine sediments inside the well casing. Development continued until field characteristics (i.e., pH, temperature, and turbidity) stabilized and water was relatively free of suspended sediments. Following development a ground-water sample was collected from well MW-12R using a Teflon bailer.

Well development and ground-water sampling data were recorded by Levine·Fricke field personnel. These data are presented in Appendix B.

5.4 Monitoring Well Location and Elevation Survey

Kier and Wright, a licensed surveyor, surveyed the top of casing elevation of monitoring well MW-12R on December 21, 1995. An elevation of 10.42 feet above mean sea level was measured for the top of casing at well MW-12R.

5.5 Ground-Water Occurrence and Flow Direction

On December 19, 1995 ground-water elevations of monitoring and extraction wells at the East Baybridge Center were measured by Levine-Fricke personnel. Depth to water at well MW-12R was measured at 10.69 feet below the top of casing. A ground-water contour map was prepared using ground-water elevation data collected on December 19, 1995 (Figure 2). This ground-water elevation contour map indicates that in the Beach Street Area ground-water flow direction is to the west. Saturated sediments at boring EB-1 were observed at 8 feet bgs and between 5 and 8 feet bgs at boring EB-2.

6.0 ANALYTICAL RESULTS

Analytical results for the soil and ground-water samples collected during this investigation are presented in this section. A total of five soil samples was analyzed for total petroleum hydrocarbons as gasoline (TPHg), using EPA Modified Method 8015, TPH as diesel and oil (TPHd and TPHo) using EPA Method 3510, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Method 8020. Grab ground-water samples from soil borings EB-1 and EB-2 and a ground-water sample from MW12R were also analyzed for TPHg, BTEX, TPHd, and TPHo using EPA Methods 8015/8020 and 3510, respectively. Analytical results for the soil and ground-water samples are summarized on Table 1.

6.1 Soil Samples

TPHo was detected each soil sample (Table 1). Concentrations of TPHo ranged from 7 parts per million (ppm) in well MW-12R at a depth of 11.5 feet bgs to 3,400 ppm in soil boring EB-1 at a depth of 7 feet bgs. TPHd was detected in soil samples from EB-1 and EB-2 at concentrations ranging from 40 to 1,900 ppm. Three samples from soil boring EB-2 contained detectable concentrations of TPHg ranging from 7.5 ppm at 6.5 feet bgs to 20 ppm at 8 feet bgs. BTEX was not present above detection limits for any of the soil samples.

6.2 Ground-Water Samples

TPHd was detected in the four ground-water samples collected during this investigation (Table 1).

- TPHd was detected in EB-1, EB-2, and MW-12R at concentrations of 0.2 to 3.8 ppm.
- TPHg was detected in samples collected from borings EB-1 and EB-2 at 0.1 and 0.52 ppm, respectively. TPHg was not present above analytical detection limits in the sample collected from well MW-12R.

- TPHo was detected in the sample collected from boring EB-2 at 3.4 ppm. TPHo was not present above analytical detection limits in the samples collected from well MW-12R or boring EB-1.
- Low concentrations (near detection limits) of benzene (0.0005 ppm) and toluene (0.0006 ppm) were detected in sample EB-1. BTEX were not present above detection limits in samples collected from boring EB-2 or well MW-12R. Certified analytical reports are included in Appendix C.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Results of this investigation indicated that petroleum hydrocarbons have affected the soil and ground-water west and downgradient from the former USTs. Since 6,000 cy of affected soil were removed near the source of the former USTs, Levine·Fricke does not recommend any additional remediation in the vicinity of the former USTs. Given the relatively low concentrations of TPHd (up to 3.8 ppm) detected in the ground-water samples collected during this investigation, no additional investigation is warranted at this Site.

It is recommended that well MW-12R be incorporated into the quarterly monitoring program for the East Baybridge Center Development for one year. In addition to water levels measured at this well, samples collected from this well will be analyzed for TPHd, TPHg, and BTEX. Results will be included in the quarterly monitoring report which is submitted to the RWQCB and ACHA. After one year of monitoring, ground-water quality data collected from well MW-12R will be evaluated to determine if further monitoring is warranted at well MW-12R.

Table 1
Analytical Results for Soil and Ground-Water Samples Collected Near Former UST Location,
Beach Street Area, East Baybridge Center, Oakland, California
(Concentrations expressed in parts per million [mg/l])

Sample ID (ft bgs)	Date Sampled	Sample Type	Lab	TPHg	TPHd	TPHo	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-12R (11.5)	14-Dec-95	Soil	AEN	<0.2	<1	7	<0.005	<0.005	<0.005	<0.005
EB-1 (7)	18-Dec-95	Soil	AEN	<0.2	70	3,400	<0.005	<0.005	<0.005	<0.005
EB-2 (6.5)	18-Dec-95	Soil	AEN	7.5	40	200	<0.010	<0.010	<0.010	<0.030
EB-2 (8)	18-Dec-95	Soil	AEN	20	840	1,100	<0.020	<0.020	<0.020	<0.060
EB-2 (9.5)	18-Dec-95	Soil	AEN	19	1,900	2,400	<0.020	<0.020	<0.020	<0.060
EB-1GGW	18-Dec-95	Water	AEN	0.1	0.5	<0.2	0.0005	0.0006	<0.0005	<0.002
EB-2GGW	18-Dec-95	Water	AEN	0.52	3.8	3.4	<0.0005	<0.0005	<0.0005	<0.002
MW-12R	27-Dec-95	Water	AEN	NA	0.2	<0.2	NA	NA	NA	NA
MW-12R	26-Feb-96	Water	AEN	<0.05	0.36	<0.2	<0.0005	<0.0005	<0.0005	<0.0005

Data entered by PCA 29-Mar-96. Proofed by REG.

Notes:

TPHg - total petroleum hydrocarbons as gasoline

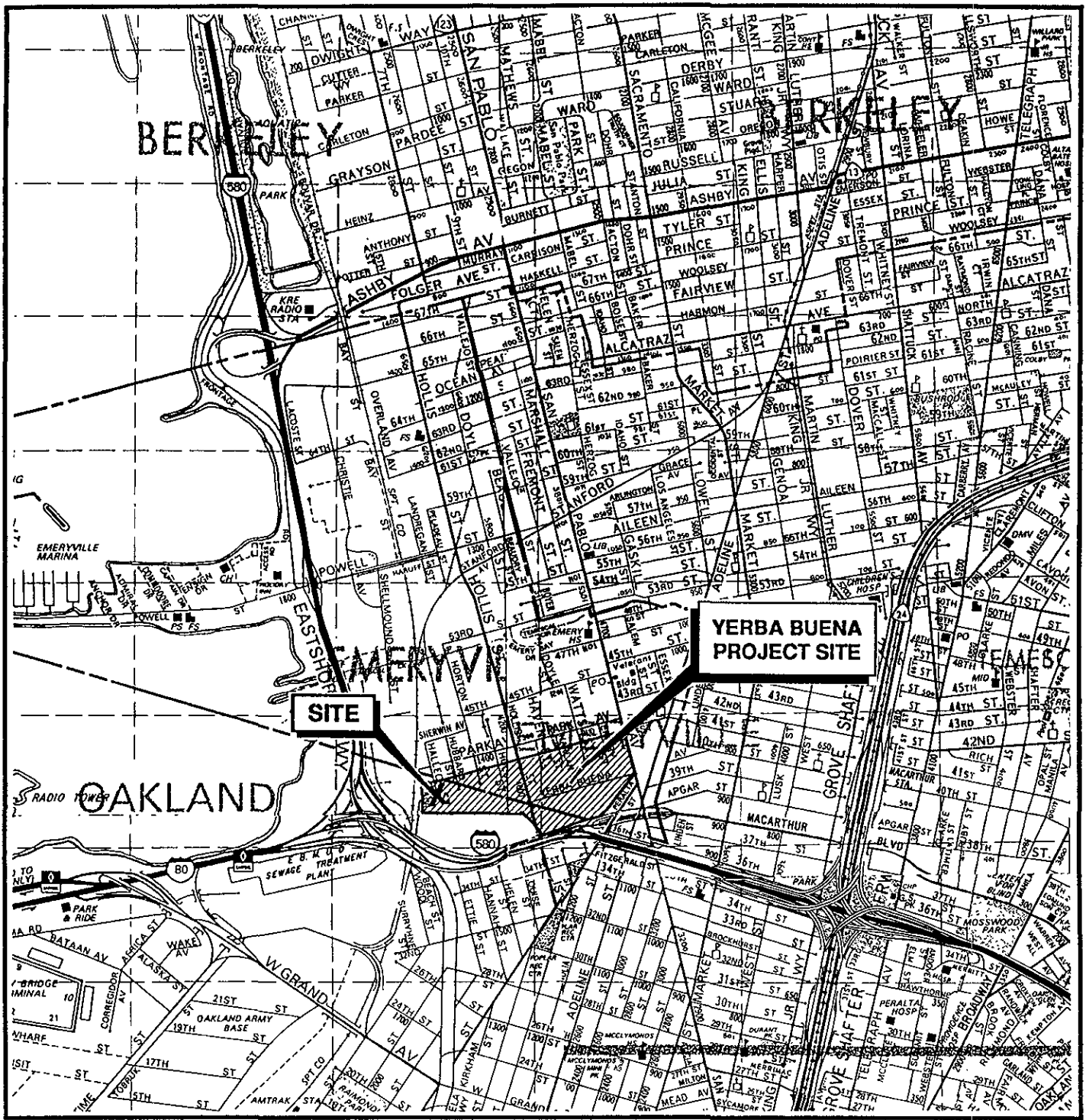
TPHd - total petroleum hydrocarbons as diesel

TPHo - total petroleum hydrocarbons as oil

NA - not analyzed

ft bgs = feet below ground surface

GGW = grab ground water

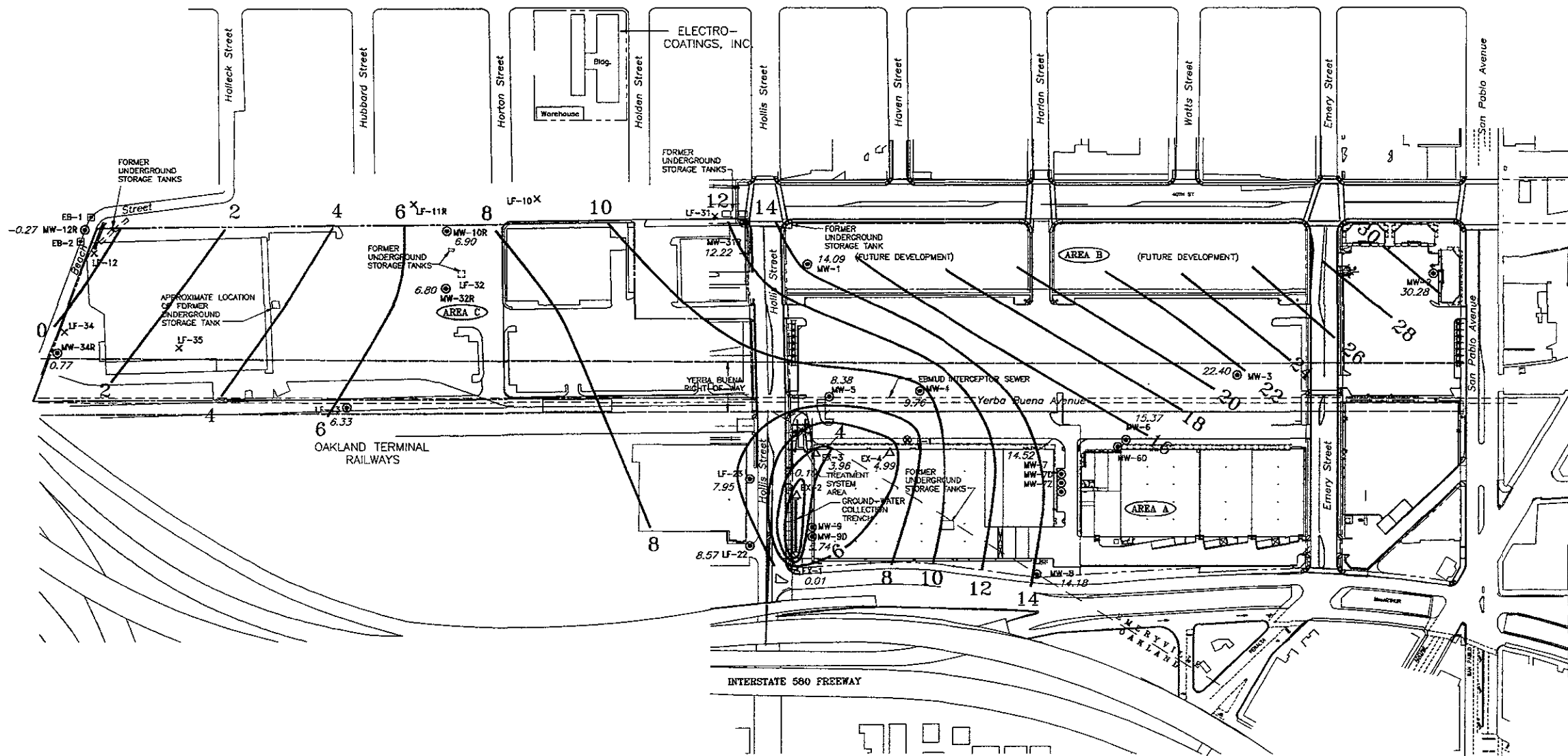


MAP SOURCE:
 Thomas Bros. Map
 Alameda and Contra Costa Counties
 1992 EDITION

Figure 1: SITE LOCATION MAP



- EXPLANATION
- ⊙ MONITORING WELL LOCATION
 - △ EXTRACTION WELL
 - × ABANDONED GROUND WATER MONITORING WELL
 - ⊠ SOIL BORING LOCATION
 - APPROXIMATE AREA OF VOC-AFFECTED GROUND WATER
 - APPROXIMATE PROPERTY LINE
 - 8.57 GROUND-WATER ELEVATION
 - 12 GROUND-WATER ELEVATION CONTOUR (FEET, MSL)



REVISION	DESIGN	DRAWN	CHECKED	DATE

SCALE
DESIGN
DRAWN
CHECKED

LEVINE • FRICKE
 ENGINEERS, HYDROLOGISTS & APPLIED SCIENTISTS
 Emeryville, California

CATELLUS DEVELOPMENT CORPORATION

YERBA BUENA/EAST BAYBRIDGE DEVELOPMENT

Figure 2
 SITE PLAN SHOWING GROUND-WATER ELEVATIONS IN SHALLOW WELLS, DECEMBER 19, 1995, AND LOCATIONS OF NEW SOIL BORINGS EB-1 AND EB-2 AND MONITORING WELL MW-12R

Project No	1649
Date	JAN. 96
Sheet	of

APPENDIX A

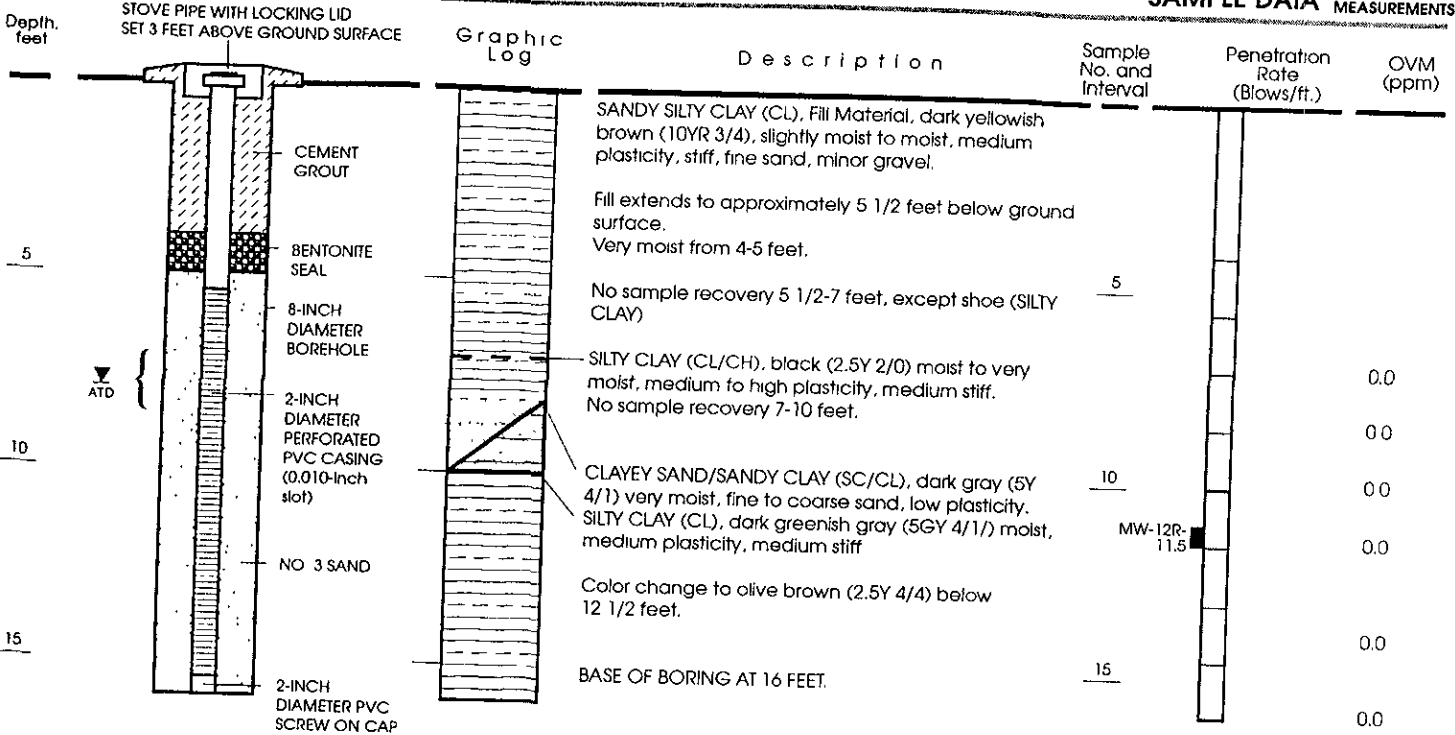
WELL CONSTRUCTION AND LITHOLOGY LOGS

WELL CONSTRUCTION

LITHOLOGY

SAMPLE DATA

HEADSPACE MEASUREMENTS



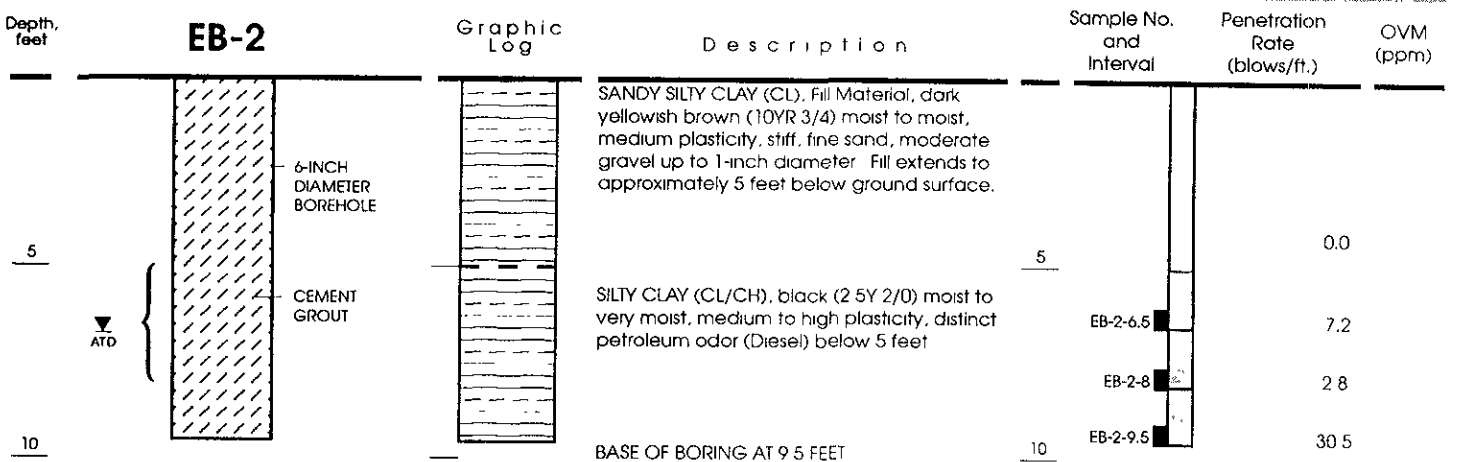
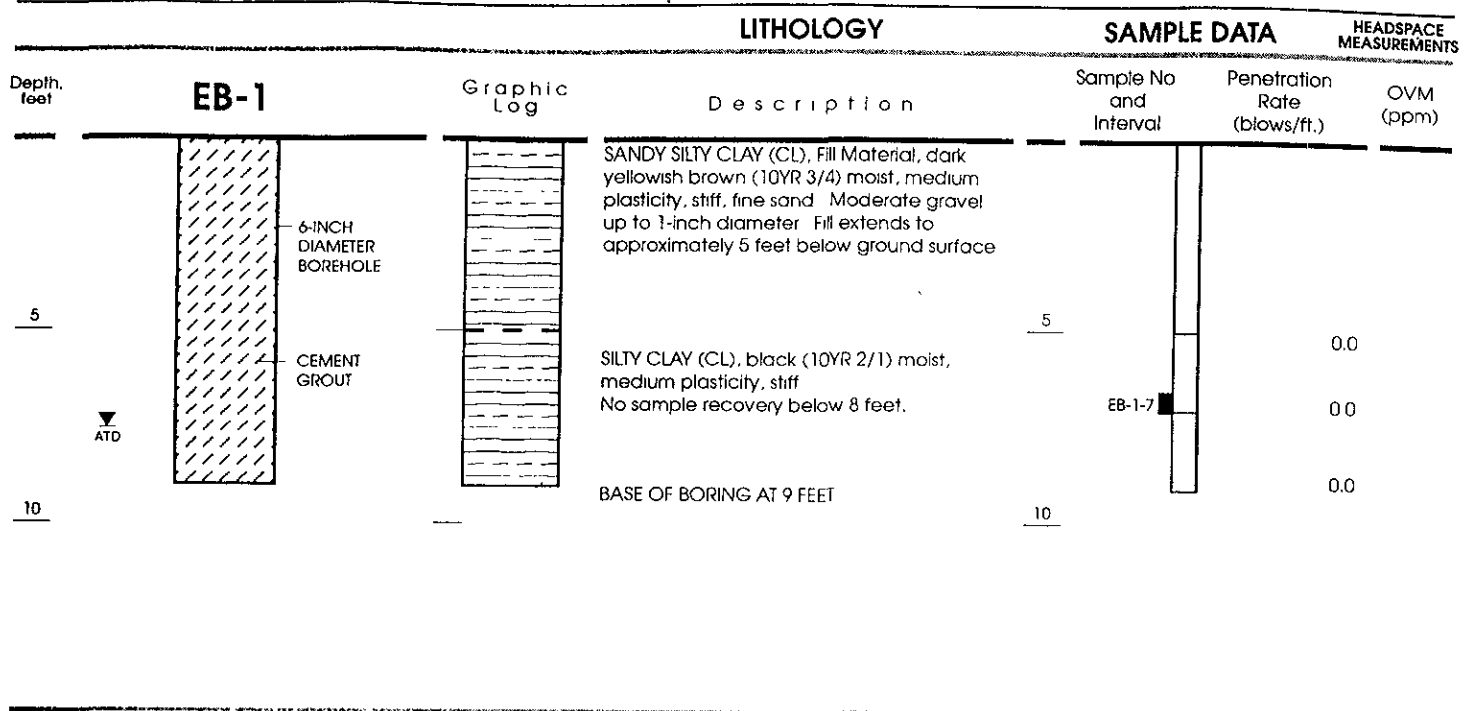
Well Permit No 95630
 Well elevation 10 42
 Date well drilled December 14, 1995
 Drilling company Gregg
 Driller Rich/Eric
 Sampling Method California Modified Sampler
 LF Geologist Larry Lapuyade

- EXPLANATION**
- Clay
 - Silt
 - Sand
 - Gravel

- Hand Augered
- Modified California Sampler
- Sample retained for chemical analysis
- Ground-water encountered in sediments at time of drilling
- Ground-water encountered between 7 and 8 1/2 feet

Approved by: *Dorey / Budden* RG 5300

Figure A1 : WELL CONSTRUCTION AND LITHOLOGY FOR WELL MW-12R



Well Permit No 95630
 Date soil borings drilled December 18, 1995
 Drilling company Gregg
 Driller: Treavor/Eric
 Sampling Method: California Modified Sampler
 LF Geologist Larry Lapuyade

EXPLANATION

- Clay
- Silt
- Sand
- Gravel

- Hand Augered
- Modified California Sampler
- Sample retained for chemical analysis
- Ground-water encountered in sediments at time of drilling
- Ground-water encountered between 5 and 8 feet

Approved by: *Daniel J. Buehler* R.G. 5300

Figure A2 : LITHOLOGY AND SAMPLE DATA FOR SOIL BORING EB-1 AND EB-2

APPENDIX B

WATER-QUALITY SAMPLING INFORMATION

WATER-QUALITY SAMPLING INFORMATION

Project No.: 1649.95.02
 Project Name: EAST BAY BRIDGE
 Sample Location: MW-12R
 Samplers Name: JCK
 Sampling Plan Prepared By: JCK
 Sampling Method: _____

Date: 12/27/95
 Sample No.: MW-12R
 FB: _____
 DUP: _____

- | | |
|--|---|
| <input checked="" type="checkbox"/> Centrifugal Pump | <input type="checkbox"/> Disposable Bailer |
| <input type="checkbox"/> Submersible Pump | <input checked="" type="checkbox"/> Teflon Bailer |
| <input type="checkbox"/> Hand Bail | <input type="checkbox"/> _____ |

Analyses Requested: EPA 8010
TPH-D + O

Number and Types of Bottle used: 3 VOA
2 L GL

18.55
 10.94

 7.61
 .16

 4566
 761

 12176

7.61 18.55
 .8 6.09

 6088 12.46

80% DTW 12.46

Method of Shipment: AEN
 (Lab Name)

Courier _____
 Hand Deliver: _____

Well Number: MW-12R Well Diameter: _____
 Depth of Water: 10.94
 Well Depth: 18.55
 Height of Water Column: 7.61
 Volume in Well: 1.22

2" (0.16 Gallon/Feet)
 4" (0.65 Gallon/Feet)
 5" (1.02 Gallon/Feet)
 6" (1.47 Gallon/Feet)

TIME	Depth to Water	Volume Purged (Gallons)	Totalizer Reading	Temperature °C	pH (SU)	Cond (mohs)	Turbidity (NTU)	Remarks
11:07								START
11:08		2		19.4	7.15	11110		TURBID; BLOTCHES OF SNEE
11:09		4		19.3	6.95	13850		TURBID BLOTCHES
11:10		7		19.6	6.88	16750		TURBID
11:12	DEWATER	9		20.2	6.93	16670		TURBID / OFF
11:17								ON
11:18	DEWATER	11		22.4	6.95	17890		TURBID
11:21	DEWATER	13		20.6	6.70	19020		TURBID / OFF
11:25								
11:26		15		22.0	6.91	18790		TURBID
11:32	DEWATER	17		21.7	6.91	19630		TURBID
11:35								ON/OFF TURBID
11:55								SAMPLE (11:45 ON LABEL)

Inlet Depth: _____

Comments: FIRST 2 VOLUMES SHOWED BLOTCHES OF SNEE WHICH WAS NOT PRESENT IN TANKER 101. IN FC

WTR.QTY.SAMPLING.INFO.02JUL94RYL

APPENDIX C

ANALYTICAL REPORTS FOR SOIL AND GROUND-WATER SAMPLES

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

LEVINE-FRICKE
1900 POWELL ST. 12TH FL.
EMERYVILLE, CA 94608

REPORT DATE: 01/12/96

DATE(S) SAMPLED: 12/18/95

DATE RECEIVED: 12/18/95

AEN WORK ORDER: 9512236

ATTN: LARRY LAPUYADE
CLIENT PROJ. ID: 1649.25
CLIENT PROJ. NAME: EAST BAY BRIDG
C.O.C. NUMBER: 19222

PROJECT SUMMARY:

On December 18, 1995, this laboratory received 6 (2 water & 4 soil) sample(s).

Client requested sample(s) be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.


Larry Klein
Laboratory Director

LEVINE - FRICKE

SAMPLE ID: EB-1GGW
 AEN LAB NO: 9512236-01
 AEN WORK ORDER: 9512236
 CLIENT PROJ. ID: 1649.25

DATE SAMPLED: 12/18/95
 DATE RECEIVED: 12/18/95
 REPORT DATE: 01/12/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	0.5 *	0.5	ug/L	12/26/95
Toluene	108-88-3	0.6 *	0.5	ug/L	12/26/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	12/26/95
Xylenes, Total	1330-20-7	ND	2	ug/L	12/26/95
Purgeable HCs as Gasoline	5030/GCFID	0.1 *	0.05	mg/L	12/26/95
#Extraction for TPH	EPA 3510	-		Extrn Date	12/29/95
TPH as Diesel	GC-FID	0.5 *	0.05	mg/L	12/30/95
TPH as Oil	GC-FID	ND	0.2	mg/L	12/30/95

ND = Not detected at or above the reporting limit
 * = Value at or above reporting limit

LEVINE-FRICKE

SAMPLE ID: EB-2GGW
 AEN LAB NO: 9512236-02
 AEN WORK ORDER: 9512236
 CLIENT PROJ. ID: 1649.25

DATE SAMPLED: 12/18/95
 DATE RECEIVED: 12/18/95
 REPORT DATE: 01/12/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	12/26/95
Toluene	108-88-3	ND	0.5	ug/L	12/26/95
Ethylbenzene	100-41-4	ND	0.5	ug/L	12/26/95
Xylenes, Total	1330-20-7	ND	2	ug/L	12/26/95
Purgeable HCs as Gasoline	5030/GCFID	0.52 *	0.05	mg/L	12/26/95
#Extraction for TPH	EPA 3510	-		Extrn Date	12/29/95
TPH as Diesel	GC-FID	3.8 *	0.05	mg/L	12/30/95
TPH as Oil	GC-FID	3.4 *	0.2	mg/L	12/30/95

ND = Not detected at or above the reporting limit
 * = Value at or above reporting limit

LEVINE-FRICKE

SAMPLE ID: EB-2-6.5
 AEN LAB NO: 9512236-03
 AEN WORK ORDER: 9512236
 CLIENT PROJ. ID: 1649.25

DATE SAMPLED: 12/18/95
 DATE RECEIVED: 12/18/95
 REPORT DATE: 01/12/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	10	ug/kg	12/19/95
Toluene	108-88-3	ND	10	ug/kg	12/19/95
Ethylbenzene	100-41-4	ND	10	ug/kg	12/19/95
Xylenes, Total	1330-20-7	ND	30	ug/kg	12/19/95
Purgeable HCs as Gasoline	5030/GCFID	7.5 *	2	mg/kg	12/19/95
#Extraction for TPH	EPA 3550	-		Extrn Date	12/31/95
TPH as Diesel	GC-FID	40 *	5	mg/kg	01/02/96
TPH as Oil	GC-FID	200 *	30	mg/kg	01/02/96

RLs elevated for gas/BTEX and diesel due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit
 * = Value at or above reporting limit

LEVINE-FRICKE

SAMPLE ID: EB-2-8
 AEN LAB NO: 9512236-04
 AEN WORK ORDER: 9512236
 CLIENT PROJ. ID: 1649.25

DATE SAMPLED: 12/18/95
 DATE RECEIVED: 12/18/95
 REPORT DATE: 01/12/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	20 ug/kg		12/19/95
Toluene	108-88-3	ND	20 ug/kg		12/19/95
Ethylbenzene	100-41-4	ND	20 ug/kg		12/19/95
Xylenes, Total	1330-20-7	ND	60 ug/kg		12/19/95
Purgeable HCs as Gasoline	5030/GCFID	20 *	4 mg/kg		12/19/95
#Extraction for TPH	EPA 3550	-	Extrn Date		12/31/95
TPH as Diesel	GC-FID	840 *	10 mg/kg		01/02/96
TPH as Oil	GC-FID	1,100 *	50 mg/kg		01/02/96

RLs elevated for gas/BTEX and diesel due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit
 * = Value at or above reporting limit

LEVINE-FRICKE

SAMPLE ID: EB-2-9.5
 AEN LAB NO: 9512236-05
 AEN WORK ORDER: 9512236
 CLIENT PROJ. ID: 1649.25

DATE SAMPLED: 12/18/95
 DATE RECEIVED: 12/18/95
 REPORT DATE: 01/12/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	20 ug/kg		12/19/95
Toluene	108-88-3	ND	20 ug/kg		12/19/95
Ethylbenzene	100-41-4	ND	20 ug/kg		12/19/95
Xylenes, Total	1330-20-7	ND	60 ug/kg		12/19/95
Purgeable HCs as Gasoline	5030/GCFID	19 *	4 mg/kg		12/19/95
#Extraction for TPH	EPA 3550	-		Extrn Date	12/31/95
TPH as Diesel	GC-FID	1,900 *	10 mg/kg		01/02/96
TPH as Oil	GC-FID	2,400 *	50 mg/kg		01/02/96

RLs elevated for gas/BTEX and diesel due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit
 * = Value at or above reporting limit

LEVINE - FRICKE

SAMPLE ID: EB-1-7
 AEN LAB NO: 9512236-06
 AEN WORK ORDER: 9512236
 CLIENT PROJ. ID: 1649.25

DATE SAMPLED: 12/18/95
 DATE RECEIVED: 12/18/95
 REPORT DATE: 01/12/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5 ug/kg		12/20/95
Toluene	108-88-3	ND	5 ug/kg		12/20/95
Ethylbenzene	100-41-4	ND	5 ug/kg		12/20/95
Xylenes, Total	1330-20-7	ND	5 ug/kg		12/20/95
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2 mg/kg		12/20/95
#Extraction for TPH	EPA 3550	-		Extrn Date	12/31/95
TPH as Diesel	GC-FID	70 *	50 mg/kg		01/04/96
TPH as Oil	GC-FID	3,400 *	300 mg/kg		01/04/96

RL elevated for diesel due to high levels of target compounds. Sample run at dilution.

ND = Not detected at or above the reporting limit
 * = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9512236

CLIENT PROJECT ID: 1649.25

Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 3510 GCFID

AEN JOB NO: 9512236
AEN LAB NO: 1229-BLANK
DATE EXTRACTED: 12/29/95
DATE ANALYZED: 12/30/95
INSTRUMENT: C
MATRIX: WATER

Method Blank

Analyte	Result (mg/L)	Reporting Limit (mg/L)
Diesel	ND	0.05
Oil	ND	0.2

QUALITY CONTROL DATA
METHOD: EPA 3510 GCFID

AEN JOB NO: 9512236
DATE EXTRACTED: 12/29/95
INSTRUMENT: C
MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery n-Pentacosane
12/30/95	EB-1GGW	01	101
12/30/95	EB-2GGW	02	107
QC Limits:			59-118

DATE EXTRACTED: 12/31/95
DATE ANALYZED: 01/02/96
SAMPLE SPIKED: DI WATER
INSTRUMENT: C

Method Spike Recovery Summary

Analyte	Spike Added (mg/L)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Diesel	2.03	72	1	58-107	15

QUALITY CONTROL DATA
METHOD: EPA 3550 GCFID

AEN JOB NO: 9512236
AEN LAB NO: 1231-BLANK
DATE EXTRACTED: 12/31/95
DATE ANALYZED: 01/02/96
INSTRUMENT: A
MATRIX: SOIL

Method Blank

Analyte	Result (mg/kg)	Reporting Limit (mg/kg)
Diesel	ND	1
Oil	ND	5

QUALITY CONTROL DATA

METHOD: EPA 3550 GCFID

AEN JOB NO: 9512236
 DATE EXTRACTED: 12/31/95
 INSTRUMENT: A
 MATRIX: SOIL

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery	
			n-Pentacosane	
01/02/96	EB-2-6.5	03	92	
01/02/96	EB-2-8	04	87	
01/02/96	EB-2-9.5	05	94	
01/04/96	EB-1-7	06	D	
QC Limits:			45-110	

D: Surrogates diluted out.

DATE EXTRACTED: 12/28/95
 DATE ANALYZED: 12/28/95
 SAMPLE SPIKED: 9512292-37
 INSTRUMENT: A

Matrix Spike Recovery Summary

Analyte	Spike Added (mg/kg)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Diesel	41.2	74	2	44-108	13

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9512236
AEN LAB NO: 1226-BLANK
DATE ANALYZED: 12/26/95
INSTRUMENT: F
MATRIX: WATER

Method Blank

	CAS #	Result (ug/L)	Reporting Limit (ug/L)
Benzene	71-43-2	ND	0.5
Toluene	108-88-3	ND	0.5
Ethylbenzene	100-41-4	ND	0.5
Xylenes, Total	1330-20-7	ND	2
HCs as Gasoline		ND mg/L	0.05 mg/L

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9512236
 INSTRUMENT: F
 MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery	
			Fluorobenzene	
12/26/95	EB-1GGW	01	92	
12/26/95	EB-2GGW	02	93	
QC Limits:			70-130	

DATE ANALYZED: 12/26/95
 SAMPLE SPIKED: LCS
 INSTRUMENT F

Laboratory Control Sample Recovery

Analyte	Spike Added (ug/L)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Benzene	17.9	80	13	60-120	20
Toluene	53.9	87	10	60-120	20
Hydrocarbons as Gasoline	500	98	5	60-120	20

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9512236
AEN LAB NO: 1219-BLANK
DATE ANALYZED: 12/19/95
INSTRUMENT: E
MATRIX: SOIL

Method Blank

Analyte	CAS #	Result (ug/kg)	Reporting Limit (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5
HCs as Gasoline		ND mg/kg	0.2 mg/kg

AEN LAB NO: 1220-BLANK
DATE ANALYZED: 12/20/95
INSTRUMENT: E

Method Blank

Analyte	CAS #	Result (ug/kg)	Reporting Limit (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5
HCs as Gasoline		ND mg/kg	0.2 mg/kg

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9512236
 INSTRUMENT: E
 MATRIX: SOIL

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery	
			Fluorobenzene	
12/19/95	EB-2-6.5	03	107	
12/19/95	EB-2-8	04	106	
12/19/95	EB-2-9.5	05	105	
12/20/95	EB-1-7	06	116	
QC Limits:			70-130	

DATE ANALYZED: 12/18/95
 SAMPLE SPIKED: 9512080-14
 INSTRUMENT: E

Matrix Spike Recovery Summary

Analyte	Spike Added (ug/kg)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Benzene	36.1	99	16	79-113	26
Toluene	103	97	11	84-110	20
Hydrocarbons as Gasoline	1000	101	13	60-126	20

END OF REPORT

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

9512236

Project No.: 1649.25 Field Logbook No.: Date: 12-18-95 Serial No.: No 19222
 Project Name: EAST BAY BRIDGE Project Location: Oakland

Sampler (Signature): *Larry Lapuyade* Analytes: EPA BOLS TRIA, EPA BOLS BTEX, EPA BOLS TRIA/BTEX
 Hold: Rush: Samplers: LPL

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	EPA BOLS TRIA	EPA BOLS BTEX	EPA BOLS TRIA/BTEX	HOLD	RUSH	REMARKS
EB-166W	12-18	1330	D1A-E	5	Ground Water	X	X	X			RESULTS TO LARRY LAPUYADE ANALYSIS TPH GASOLINE AND BTEX USING MODIFIED EPA BOLS/8020
EB-266W		1230	D2A-E	5	↓						
EB-2-6.5		-	D3A	1	Soil						
EB-2-8		-	D4A		↓						
EB-2-9.5		-	D5A		↓						
EB-1-7		↓	D6A		↓						
											TPH diesel / TPH oil motor oil
											USING EPA method 3550
											NORMAL TURNAROUND TIME

RELINQUISHED BY: (Signature) <i>Larry Lapuyade</i>	DATE 12-18-95	TIME 1548	RECEIVED BY: (Signature) <i>Michael E. ...</i>	DATE 12/18/95	TIME 16:05
RELINQUISHED BY: (Signature) <i>Michael E. ...</i>	DATE 12/18/95	TIME 16:55	RECEIVED BY: (Signature) <i>Sara M. Bell...</i>	DATE 12/18/95	TIME 16:55
RELINQUISHED BY: (Signature)	DATE	TIME	RECEIVED BY: (Signature)	DATE	TIME
METHOD OF SHIPMENT: Courier	DATE	TIME	LAB COMMENTS:		

Sample Collector: LEVINE-FRICKE
 1900 Powell Street, 12th Floor
 Emeryville, California 94608
 (510) 652-4500

Analytical Laboratory: *ASNY*

American Environmental Network

Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

LEVINE-FRICKE
1900 POWELL ST. 12TH FL.
EMERYVILLE, CA 94608

REPORT DATE: 12/28/95

DATE(S) SAMPLED: 12/14/95

DATE RECEIVED: 12/15/95

AEN WORK ORDER: 9512214

ATTN: LARRY LAPUYADE
CLIENT PROJ. ID: 1649.25
CLIENT PROJ. NAME: EAST BAY BRIDG
C.O.C. NUMBER: 19221

PROJECT SUMMARY:

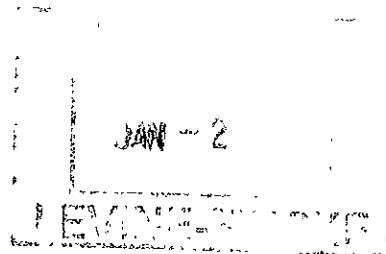
On December 15, 1995, this laboratory received 1 soil sample(s).

Client requested sample(s) be analyzed for organic parameters. Results of analysis are summarized on the following page(s). Please see quality control report for a summary of QC data pertaining to this project.

Samples will be stored for 30 days after completion of analysis, then disposed of in accordance with State and Federal regulations. Samples may be archived by prior arrangement.

If you have any questions, please contact Client Services at (510) 930-9090.


Larry Klein
Laboratory Director



LEVINE-FRICKE

SAMPLE ID: MW-12R-11.5
 AEN LAB NO: 9512214-01
 AEN WORK ORDER: 9512214
 CLIENT PROJ. ID: 1649.25

DATE SAMPLED: 12/14/95
 DATE RECEIVED: 12/15/95
 REPORT DATE: 12/28/95

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	5 ug/kg		12/18/95
Toluene	108-88-3	ND	5 ug/kg		12/18/95
Ethylbenzene	100-41-4	ND	5 ug/kg		12/18/95
Xylenes, Total	1330-20-7	ND	5 ug/kg		12/18/95
Purgeable HCs as Gasoline	5030/GCFID	ND	0.2 mg/kg		12/18/95
#Extraction for TPH	EPA 3550	-	Extrn Date		12/20/95
TPH as Diesel	GC-FID	ND	1 mg/kg		12/20/95
TPH as Oil	GC-FID	7 *	5 mg/kg		12/20/95

ND = Not detected at or above the reporting limit
 * = Value at or above reporting limit

AEN (CALIFORNIA)
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9512214

CLIENT PROJECT ID: 1649.25

Quality Control Summary

All laboratory quality control parameters were found to be within established limits.

Definitions

Laboratory Control Sample (LCS)/Method Spike(s): Control samples of known composition. LCS and Method Spike data are used to validate batch analytical results.

Matrix Spike(s): Aliquot of a sample (aqueous or solid) with added quantities of specific compounds and subjected to the entire analytical procedure. Matrix spike and matrix spike duplicate QC data are advisory.

Method Blank: An analytical control consisting of all reagents, internal standards, and surrogate standards carried through the entire analytical process. Used to monitor laboratory background and reagent contamination.

Not Detected (ND): Not detected at or above the reporting limit.

Relative Percent Difference (RPD): An indication of method precision based on duplicate analysis.

Reporting Limit (RL): The lowest concentration routinely determined during laboratory operations. The RL is generally 1 to 10 times the Method Detection Limit (MDL). Reporting limits are matrix, method, and analyte dependent and take into account any dilutions performed as part of the analysis.

Surrogates: Organic compounds which are similar to analytes of interest in chemical behavior, but are not found in environmental samples. Surrogates are added to all blanks, calibration and check standards, samples, and spiked samples. Surrogate recovery is monitored as an indication of acceptable sample preparation and instrumental performance.

D: Surrogates diluted out.

#: Indicates result outside of established laboratory QC limits.

QUALITY CONTROL DATA

METHOD: EPA 3550 GCFID

AEN JOB NO: 9512214
AEN LAB NO: 1220-BLANK
DATE EXTRACTED: 12/20/95
DATE ANALYZED: 12/20/95
INSTRUMENT: A
MATRIX: SOIL

Method Blank

Analyte	Result (mg/kg)	Reporting Limit (mg/kg)
Diesel	ND	1
Oil	ND	5

QUALITY CONTROL DATA
 METHOD: EPA 3550 GCFID

AEN JOB NO: 9512214
 DATE EXTRACTED: 12/20/95
 INSTRUMENT: A
 MATRIX: SOIL

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery	
			n-Pentacosane	
12/20/95	MW-12R-11.5	01	88	
QC Limits:			45-110	

DATE EXTRACTED: 12/15/95
 DATE ANALYZED: 12/17/95
 SAMPLE SPIKED: 9512115-01
 INSTRUMENT: A

Matrix Spike Recovery Summary

Analyte	Spike Added (mg/kg)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Diesel	41.2	82	10	44-108	13

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9512214
AEN LAB NO: 1218-BLANK
DATE ANALYZED: 12/18/95
INSTRUMENT: E
MATRIX: SOIL

Method Blank

Analyte	CAS #	Result (ug/kg)	Reporting Limit (ug/kg)
Benzene	71-43-2	ND	5
Toluene	108-88-3	ND	5
Ethylbenzene	100-41-4	ND	5
Xylenes, Total	1330-20-7	ND	5
HCs as Gasoline		ND mg/kg	0.2 mg/kg

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9512214
 INSTRUMENT: E
 MATRIX: SOIL

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
12/18/95	MW-12R-11.5	01	103
QC Limits:			70-130

DATE ANALYZED: 12/17/95
 SAMPLE SPIKED: LCS
 INSTRUMENT E

Laboratory Control Sample Recovery

Analyte	Spike Added (ug/kg)	Average Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Benzene	36.1	95	6	60-120	20
Toluene	103	98	7	60-120	20
Hydrocarbons as Gasoline	1000	113	7	60-120	20

*** END OF REPORT ***

CHAIN OF CUSTODY / ANALYSES REQUEST FORM

R-7, S-L 9512214

Project No.: 1649-25 Field Logbook No.: Date: 12-15-95 Serial No.: No 19221
 Project Name: EAST Bay Bridge Project Location: OAKLAND

Sampler (Signature) [Signature] ANALYSES Hold RUSH Samplers: LPC

SAMPLE NO.	DATE	TIME	LAB SAMPLE NO.	NO. OF CON-TAINERS	SAMPLE TYPE	ANALYSES			HOLD	RUSH	REMARKS
						EPA 8015	EPA 8020	EPA 3530			
MW-22-115	12-14	-	OIA	1	Sol	X	X	X			No pump turn down results to Larry LeVande
											Analysis TPH gasoliner Modified B015/B020 BTX modified B015/B020 TPH diesel/TPH oil EPA B015

RELINQUISHED BY: [Signature]	DATE: 12-15-95	TIME: 7:30	RECEIVED BY: [Signature]	DATE: 12/15/95	TIME: 16:10
RELINQUISHED BY: [Signature]	DATE: 12/15/95	TIME: 17:35	RECEIVED BY: [Signature]	DATE: 12/15/95	TIME: 17:35
RELINQUISHED BY: [Signature]	DATE:	TIME:	RECEIVED BY: [Signature]	DATE:	TIME:
METHOD OF SHIPMENT: Courier	DATE:	TIME:	LAB COMMENTS:		

Sample Collector: LEVINE-FRICKE
 1900 Powell Street, 12th Floor
 Emeryville, California 94608
 (510) 652-4500

Analytical Laboratory: AEA

LEVINE-FRICKE

SAMPLE ID: MW-12R
 AEN LAB NO: 9512385-02
 AEN WORK ORDER: 9512385
 CLIENT PROJ. ID: 1649.95.02

DATE SAMPLED: 12/27/95
 DATE RECEIVED: 12/28/95
 REPORT DATE: 01/16/96

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
#Extraction for TPH	EPA 3510	-		Extrn Date	01/05/96
TPH as Diesel	GC-FID	0.2 *	0.05	mg/L	01/09/96
TPH as Oil	GC-FID	ND	0.2	mg/L	01/09/96
EPA 8010 - Water matrix	EPA 8010				
Bromodichloromethane	75-27-4	ND	0.5	ug/L	01/09/96
Bromoform	75-25-2	ND	0.5	ug/L	01/09/96
Bromomethane	74-83-9	ND	2	ug/L	01/09/96
Carbon Tetrachloride	56-23-5	ND	0.5	ug/L	01/09/96
Chlorobenzene	108-90-7	ND	0.5	ug/L	01/09/96
Chloroethane	75-00-3	ND	2	ug/L	01/09/96
2-Chloroethyl Vinyl Ether	110-75-8	ND	0.5	ug/L	01/09/96
Chloroform	67-66-3	ND	0.5	ug/L	01/09/96
Chloromethane	74-87-3	ND	2	ug/L	01/09/96
Dibromochloromethane	124-48-1	ND	0.5	ug/L	01/09/96
1,2-Dichlorobenzene	95-50-1	ND	0.5	ug/L	01/09/96
1,3-Dichlorobenzene	541-73-1	ND	0.5	ug/L	01/09/96
1,4-Dichlorobenzene	106-46-7	ND	0.5	ug/L	01/09/96
Dichlorodifluoromethane	75-71-8	ND	2	ug/L	01/09/96
1,1-Dichloroethane	75-34-3	ND	0.5	ug/L	01/09/96
1,2-Dichloroethane	107-06-2	ND	0.5	ug/L	01/09/96
1,1-Dichloroethene	75-35-4	ND	0.5	ug/L	01/09/96
cis-1,2-Dichloroethene	156-59-2	2 *	0.5	ug/L	01/09/96
trans-1,2-Dichloroethene	156-60-5	ND	0.5	ug/L	01/09/96
1,2-Dichloropropane	78-87-5	ND	0.5	ug/L	01/09/96
cis-1,3-Dichloropropene	10061-01-5	ND	0.5	ug/L	01/09/96
trans-1,3-Dichloropropene	10061-02-6	ND	0.5	ug/L	01/09/96
Methylene Chloride	75-09-2	ND	2	ug/L	01/09/96
1,1,2,2-Tetrachloroethane	79-34-5	ND	0.5	ug/L	01/09/96
Tetrachloroethene	127-18-4	ND	0.5	ug/L	01/09/96
1,1,1-Trichloroethane	71-55-6	ND	0.5	ug/L	01/09/96
1,1,2-Trichloroethane	79-00-5	ND	0.5	ug/L	01/09/96
Trichloroethene	79-01-6	3 *	0.5	ug/L	01/09/96
Trichlorofluoromethane	75-69-4	ND	2	ug/L	01/09/96
1,1,2Trichlorotrifluoroethane	76-13-1	ND	0.5	ug/L	01/09/96
Vinyl Chloride	75-01-4	ND	2	ug/L	01/09/96

ND = Not detected at or above the reporting limit

* = Value at or above reporting limit