

# Woodward-Clyde

Engineering & sciences applied to the earth & its environment

January 8, 1998  
941114NA

Ms. Susan Hugo  
Hazardous Materials Specialist  
Department of Environmental Health  
Alameda County Health Agency  
1131 Harbor Bay Parkway, 2nd Floor  
Alameda, California 94502

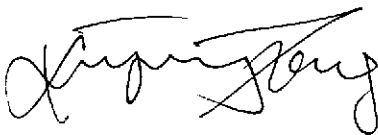
Subject: Transmittal of 4th Quarter 1997 Groundwater Monitoring Results  
and Summary of Groundwater Pumping Activities at the  
Former Celi's Alliance Gas Station Site, Emeryville, CA

Dear Ms. Hugo:

On behalf of the City of Emeryville Redevelopment Agency, transmitted herewith are the subject site quarterly groundwater monitoring results for the fourth quarter 1997 and groundwater pumping activities. This is the second monitoring event of an one-year quarterly groundwater monitoring program. The monitoring and groundwater pumping activities were performed in accordance with the Closure Workplan (Woodward-Clyde, September 1996), which was submitted to and approved by the Alameda County Department of Environmental Health.

Please feel free to call me at (510) 874-3060 or Mr. Ignacio Dayrit of the City of Emeryville Redevelopment Agency at (510) 596-4356 for questions and comments.

Sincerely,



Xinggang Tong, P.E.  
Project Manager

enclosures.

cc: Ignacio Dayrit, City of Emeryville

# FOURTH QUARTER 1997 GROUNDWATER MONITORING RESULTS

THE FORMER CELI'S  
ALLIANCE GAS STATION  
AT 4000 SAN PABLO AVENUE  
EMERYVILLE, CALIFORNIA

*Prepared for*

City of Emeryville Redevelopment Agency  
2200 Powell Street, 12th Floor  
Emeryville, California 94608

January 8, 1998

**Woodward-Clyde**



Woodward-Clyde Consultants  
500 12th Street, Suite 200  
Oakland, CA 94607-4014  
(510) 893-3600  
Project 941114NA

**FOURTH QUARTER 1997 GROUNDWATER MONITORING RESULTS  
THE FORMER CELP'S ALLIANCE GAS STATION  
4000 SAN PABLO AVENUE,  
EMERYVILLE, CALIFORNIA**

Groundwater samples were collected from the on-site monitoring well EW-1 and the off-site, downgradient monitoring well LF-4 on December 5, 1997. Samples were delivered to American Environmental Network (AEN) Pleasant Hill Laboratory for the analysis of Total Petroleum Hydrocarbons (TPH) as gasoline (TPH-g), diesel (TPH-d), and motor oil (TPH-mo); Benzene, Toluene, Ethylbenzene, & Xylenes (BTEX), Methyl Tertiary Butyl Ether (MTBE); polyaromatic hydrocarbons (PAHs); and total lead. Results are summarized in Table 1.

Concentrations of motor oil and total lead were below their respective laboratory reporting limits for both wells and naphthalene was the only PAH detected in EW-1 (0.42 mg/l). Water samples from EW-1 exhibited significant detectable levels of TPH-g (41 mg/l), TPH-d (4.7 mg/l), benzene (2.1 mg/l), toluene (1.8 mg/l), ethylbenzene (2.5 mg/l) and total xylenes (10 mg/l). However, when compared with the third quarter monitoring results concentrations of these constituents decreased significantly in the fourth quarter 1997. TPH-d showed the most dramatic decrease, from 180 mg/l in the third quarter to 4.7 mg/l in the fourth quarter. This indicates that the weekly groundwater pumping from EW-1, which was started on September 12, 1997, may have removed a significant portion of limited quantity of the impacted groundwater. Concentrations of petroleum hydrocarbons in LF-4 continued the trend of decreasing and were generally about one to two orders of magnitude lower than that of corresponding constituents in EW-1. BTEX concentrations in LF-4 had 30 to 130 fold reduction from January 1994 to December 1997. These results suggest that natural attenuation, including intrinsic bioremediation, is reducing the contaminant mass of the plume.

MTBE was detected for the first time in low concentrations from both wells. In a telephone discussion the laboratory indicated that MTBE usually has higher frequencies of false positive identification at low concentrations as compared to BTEX under the current GC analytical protocol. The detection of MTBE may not be of concern at this time, but will be followed in the next two quarterly monitoring events. Because lead was not detected above the laboratory detection limit in the past two consecutive quarters and has never been detected in groundwater before, we do not plan to measure lead in groundwater in the next two quarterly monitoring events.

Woodward-Clyde retained Environmental Sampling Services to perform field sampling activities. Prior to purging, the depth from the top of well casing to water surface was measured using a Solinst electronic water level meter. Each of the two wells were then purged by manually bailing out at least 3 well casing volumes of groundwater using a new disposable PVC bailer. Temperature, pH, and conductivity of the purged water were monitored during the well purging. The well monitoring data sheet is included with this report. After the water level recovered to about 80% of the static water level and water parameters stabilized, a new disposable bailer was gently lowered into a well approximately half its length past the air-water interface. The bailer was retrieved and the water was promptly transferred to appropriate sample containers supplied by the laboratory. Sample containers were promptly capped, labeled, placed in an ice-cooled container, and delivered to the AEN Pleasant Hill Laboratory under chain-of-custody in the same day the samples were collected. For quality control, a trip blank was included in the container and was analyzed for TPH-g and BTEX.

The water level in well MW-2 was also measured for the purpose of estimating groundwater flow direction in the area. Well MW-2 was installed by Levine-Fricke for monitoring other contamination not related to this site. Elevations of the three wells were surveyed by PLS Surveys, Inc. of Oakland on July 10, 1997. Groundwater elevations are summarized in Table 1 and are shown on Figure 2. The water level was at about 6 feet below ground surface on December 5, 1997, and was approximately 2 feet higher than that measured last quarter. Based on this quarter measured groundwater elevations, the groundwater flow direction is generally toward the southwest under a hydraulic gradient of approximately 0.01 ft/ft. The local groundwater flow direction may have been influenced by the groundwater extraction activities near the intersection of Hollis Street and Yerba Buena Street, which is about 3,000 feet Southwest of this site.

The purged water was placed in a 4,900-gallon storage tank and left on site for future disposal. Weekly extracted groundwater from EW-1 is also stored in the same tank. The weekly groundwater pumping activities continued through December 5, 1997.

TABLE 1  
GROUNDWATER MONITORING DATA  
THE FORMER CELLI'S ALLIANCE GAS STATION SITE  
4000 SAN PABLO AVE., EMERYVILLE, CA

Sample ID	Date Sampled	Water level		TPH as gasoline (mg/l)	TPH as diesel (mg/l)	TPH as motor oil (mg/l)	TRPH (mg/l)	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Total Xylenes (ug/l)	MTBE (ug/l)	Total Lead (ug/l)	PAHs (ug/l)
		TOC (ft)	MSL (ft)											
EW-1	12/5/97	6.00	33.04	41	4.7	ND (2)	NA	2100	1800	2500	10000	340	ND (40)	naphthalene = 420
EW-1	9/26/97	8.06	30.98	110	180	ND (20)	NA	2800	4900	3100	12000	ND (500)	ND (40)	naphthalene = 1,000
LF-4	12/5/97	6.28	31.80	1.4	0.15	ND (0.2)	NA	26	14	30	140	20	ND (40)	ND (10)
LF-4	9/26/97	8.25	29.83	3.2	0.48	ND (0.2)	NA	44	6.6	49	180	ND (5)	ND (40)	naphthalene = 17
LF-4	1/28/94	6.77	31.31	18	1.4	0.16	NA	1000	1900	880	4700	NA	NA	NA
LF-4dup	1/28/94	6.77	31.31	21	2.2	0.21	NA	1100	2000	800	4200	NA	NA	NA
Trip Blan	12/5/97			ND (0.05)	NA	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (2)	ND (5)	NA	NA
Trip blank	9/26/97			ND (0.05)	NA	NA	NA	ND (0.5)	ND (0.5)	ND (0.5)	ND (2)	ND (5)	NA	NA
MW-2	12/5/97	6.78	30.49	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2	9/26/97	8.11	29.16	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LF-1AG	8/7/93	9.40	29.55	100	41	ND (2.5)	11	13000	9400	3100	14000	NA	NA	NA
LF-2AG	8/7/93	7.97	32.28	13	0.095	ND (0.5)	ND (5)	2400	2900	500	2000	NA	NA	NA
LF-3AG	8/7/93	8.90	30.45	11	0.78	ND (0.25)	ND (5)	1500	170	2900	5100	NA	NA	NA
GWEB1	1/28/94	NA	NA	ND (0.05)	0.081	ND (0.05)	NA	ND (0.5)	0.57	ND (0.5)	2.6	NA	NA	NA

Notes: NA - not analyzed; ND - not detected at or above the detection limit given in parentheses.

TOC - water level measured to top of well casing; MSL - mean sea level.

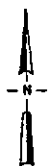
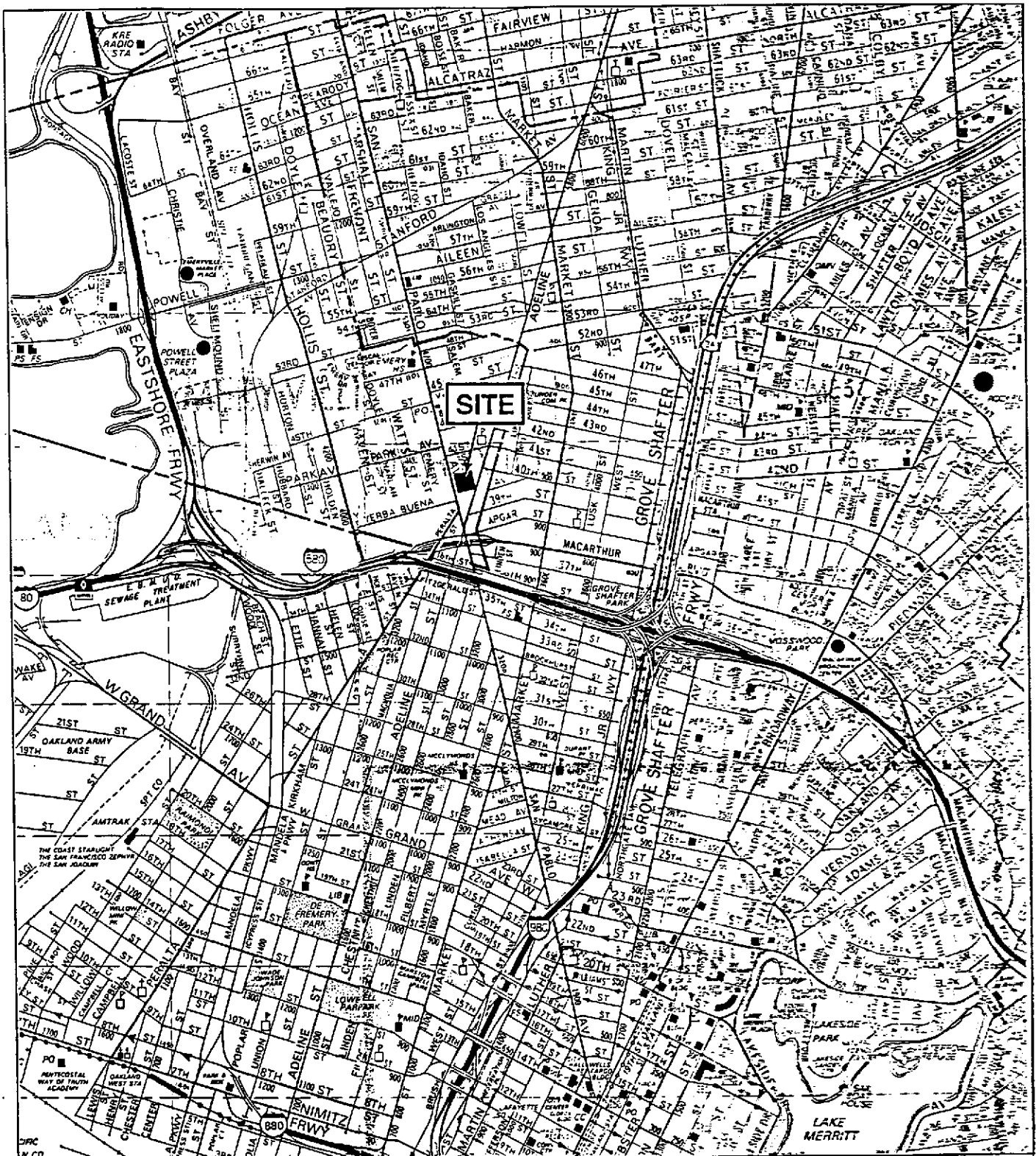
TPH gas, diesel, and motor oil are quantified by modified EPA Method 8015.

Benzene, toluene, ethylbenzene, xylenes, and MTBE are quantified by EPA Method 8020.

TRPH - total recoverable petroleum hydrocarbons quantified by Standard Method 5520 E&F.

Lead - quantified by EPA Method 3010/6010.

PAHs - polyaromatic hydrocarbons quantified by EPA Method 3520/8270.



0 1/2  
mile

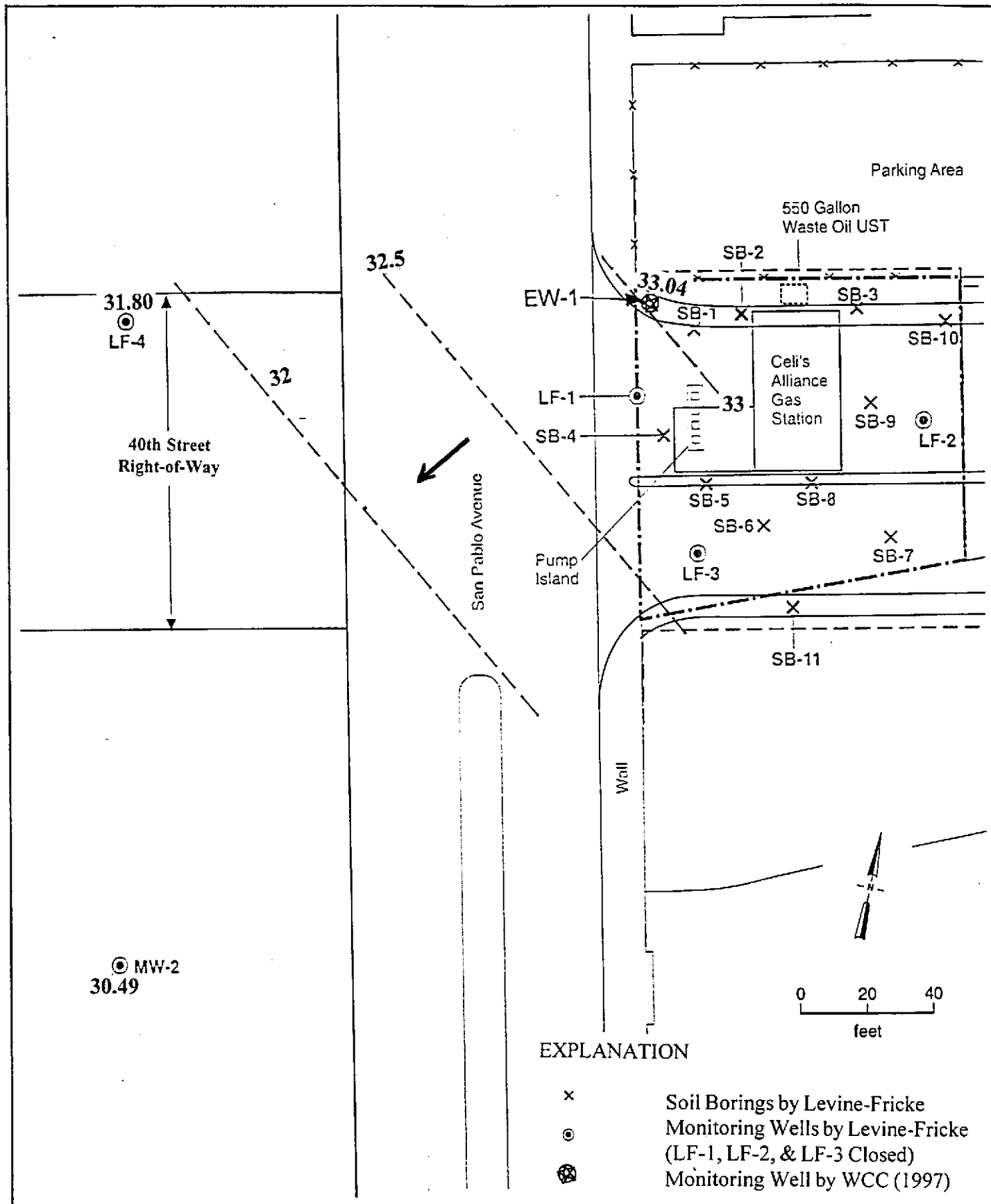
Project No.  
941114NA

40th Street UST

Woodward-Clyde Consultants

SITE LOCATION MAP  
CELI'S ALLIANCE GAS STATION SITE

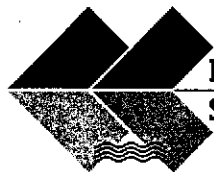
Figure  
1



**EXPLANATION**

- x Soil Borings by Levine-Fricke
- ⊙ Monitoring Wells by Levine-Fricke (LF-1, LF-2, & LF-3 Closed)
- ⊗ Monitoring Well by WCC (1997)

Project No. 94114NA	40th Street Right-of-Way (Former Celis Gas Station)	<b>SHALLOW GROUNDWATER ELEVATIONS (in feet, MSL)</b> December 5, 1997	Figure 2
<b>Woodward-Clyde Consultants</b>			



**Environmental  
Sampling Services**

**WELL SAMPLE LOG SHEET** Well Identification: LF-4 Date: 12/5/97

Project Name: 40th St. OST Client Project Number: 941114NA

Well Description: 2" 4" 5" 6" 8" Well Type: PVC Stainless Steel

Is well secured? YES / NO Type of lock / lock number: Master lock

Observations/Comments: 15/16" wrench to open well cover

Purge Method: Teflon Disposable Bailer Centrifugal pump GRUNDFOS Redi-flow pump Other: \_\_\_\_\_

Pump lines: NEW/CLEANED/DEDICATED Bailer lines: NEW / CLEANED

Method of cleaning pump: Alconox Liquidnox Tap Water DI Rinse Other: \_\_\_\_\_

Method of cleaning bailer: Alconox Liquidnox Tap Water DI Rinse Other: \_\_\_\_\_

Sampling Method: Teflon Disp. Tef. bailer Disp. PVC bailer Redi-Flow 2 pump Other: \_\_\_\_\_

pH Meter Serial Number: 330089 Specific Conductance Meter Serial Number: 9610203AB

Date(s) Calibrated: 12/5/97 @ 10:35 (4) (10) Specific Conductance Meter: \_\_\_\_\_ @ 100 umhos/cm @ \_\_\_\_\_ °C

Method to measure water level: Solinst ESS#1 Specific Conductance Meter: \_\_\_\_\_ @ 1000 umhos/cm @ \_\_\_\_\_ °C

Water Level at Start (DTW): 6.28 Water Level Prior to Sampling: 6.32

TD = 18.16 - 6.28 (DTW) x "k" = 1.9 gallons/casing volume x 3 = 5.7 gallons for 3 casing volumes  
 ("k" = 0.163 (2" well) "k" = 0.653 (4" well) "k" = 1.02 (5" well) "k" = 1.46 (6" well) "k" = 2.61 (8" well)

**FIELD WATER QUALITY PARAMETERS**

Date	Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance ms (uS)	Turbidity (NTU's)	Color	Comments
12/5/97	1101	1	6.46	20.0	706	Low	Cloudy Lt Brn.	Slight odor
	1103	2	6.45	20.6	689	"	Cloudy gray	" "
	1105	3	6.48	20.8	692	"	"	" "
	1107	4	6.51	20.7	691	"	"	" "
	1109	5	6.54	20.7	694	"	"	" "
	1111	6	6.55	20.7	691	"	"	" "
12/5/97	1118	Aft. Sampl	6.63	20.6	691	Very Low	Slightly Cloudy	Slight odor

Total Discharge: 6 gallons Casing Volumes Removed: 3.2

Method of disposal of discharged water: 5,000 gallon poly Tank onsite

Date/Time sampled: 12/5/97 @ 1115 Analysis: 3 vOAs w Hcl (TPH, BTEX, MTBE) 2 Liters  
(TPH dissolved motor oil) 2 Liters (2370 PAH only) 1 250 ml poly w HNO3 (Lead)

Comments: \_\_\_\_\_

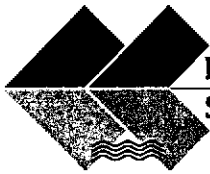
QA/QC: \_\_\_\_\_ @ \_\_\_\_\_ as Eq. Blank Duplicate MS/MSD Split

Sampled By: S. Penman / J. Lee

Environmental Sampling Services  
 6680 Alhambra Ave. Martinez, CA 94553  
 Tel/Fax: (510) 372-8108







**Environmental  
Sampling Services**

**WELL SAMPLE LOG SHEET** Well Identification: EW-1 Date: 12/5/97  
 Project Name: 40<sup>th</sup> St. 1951 Emeryville Client Project Number: 94114NA  
 Well Description: 2" (4) 5" 6" 8" Well Type: (PVC) Stainless Steel  
 Is well secured? (YES) / NO Type of lock / lock number: Dolphin  
 Observations/Comments: \_\_\_\_\_

Purge Method: Teflon Disposable Bailer (Centrifugal pump) GRUNDFOS Redi-flow pump Other: Dedicated System-Spigot  
 Pump lines: NEW/CLEANED (DEDICATED) Bailer lines: (NEW) / CLEANED  
 Method of cleaning pump: Alconox Liquidnox Tap Water DI Rinse Other: Dedicated Hose/foot Valve  
 Method of cleaning bailer: Alconox Liquidnox Tap Water (DI Rinse) Other: \_\_\_\_\_  
 Sampling Method: Teflon Disp. Tef. bailer (Disp. PVC bailer) Redi-Flow 2 pump Other: \_\_\_\_\_  
 pH Meter Serial Number: 330089 Specific Conductance Meter Serial Number: 96H0203AB  
 Date(s) Calibrated: 12/5/97 (4) (7) (0) Specific Conductance Meter: SELF @ 100 umhos/cm @ \_\_\_\_ °C  
 Method to measure water level: Oil/water Meter Specific Conductance Meter: \_\_\_\_ @ 1000 umhos/cm @ \_\_\_\_ °C  
 Water Level at Start (DTW): 6.00 Water Level Prior to Sampling: 17.83  
 TD = 20.68 - 6.00 (DTW) x "k" = 9.58 gallons/casing volume x 3 = 28.7 gallons for 3 casing volumes  
 "k" = 0.163 (2" well) (k = 0.653 (4" well)) "k" = 1.02 (5" well) "k" = 1.46 (6" well) "k" = 2.61 (8" well)

**FIELD WATER QUALITY PARAMETERS**

Date	Time	Cam Meter Discharge (gallons)	pH	Temp. (°C)	Specific Conductance ms (uS)	Turbidity (NTU's)	Color	Comments
<u>12/5/97</u>	<u>12:36</u>	<u>2048.5</u>	<u>6.14</u>	<u>23.6</u>	<u>1464</u>	<u>clear</u>	<u>none</u>	<u>slight petrol odor</u>
	<u>12:43</u>	<u>2053.2</u>	<u>6.29</u>	<u>22.4</u>	<u>1418</u>	"	"	"
	<u>12:50</u>	<u>2060.3</u>	<u>6.24</u>	<u>22.0</u>	<u>1399</u>	"	"	"
	<u>12:55</u>	<u>2063.2</u>	<u>6.32</u>	<u>21.4</u>	<u>1394</u>	"	"	"
<u>12/5/97</u>	<u>1305</u>	<u>Aft. Sampl</u>	<u>6.31</u>	<u>20.7</u>	<u>1352</u>	"	"	"

Total Discharge: \_\_\_\_\_ gallons Casing Volumes Removed: \_\_\_\_\_  
 Method of disposal of discharged water: Baker Tank  
 Date/Time sampled: 12/5/97 1300 Analysis: TPH(g)/BTEX + MTBE, TPH(O) + Motor Oil, EPA 8270

Comments: \_\_\_\_\_  
 QA/QC: NONE @ \_\_\_\_\_ as Eq. Blank Duplicate MS/MSD Split  
 Sampled By: JLEE/SPENMAN  
 Environmental Sampling Services  
 6680 Alhambra Ave. Martinez, CA 94553  
 Tel/Fax: (510) 372-8108



## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1 Top of the well casing is at 39.04 ft MSL

Date: 12/5/97 Pumping starts at: 09:47 ended at: 13:59

Volume of groundwater extracted: <sup>200.5</sup> 200 gallons / 205.5 after draining hose

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
top of casing		(ft)					
6.00		NONE					

Notes:

**At the end of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
top of casing		(ft)					
AFT SAMPL.		NONE	6.31	20.7	Yes	1352	NONE
AFT PUMPING	17.60	NONE					

Notes:

MU-2 6.78

# American Environmental Network

## Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

WOODWARD-CLYDE CONSULTANTS  
500 12TH STREET, STE. 100  
OAKLAND, CA 94607

REPORT DATE: 12/19/97

DATE(S) SAMPLED: 12/05/97

DATE RECEIVED: 12/05/97

ATTN: XINGGANG TONG  
CLIENT PROJ. ID: 941114NA  
CLIENT PROJ. NAME: 40TH ST. UST

AEN WORK ORDER: 9712080

### PROJECT SUMMARY:

On December 5, 1997, this laboratory received 3 water sample(s).

Client requested sample(s) be analyzed for chemical 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

## WOODWARD-CLYDE CONSULTANTS

SAMPLE ID: EW-1  
 AEN LAB NO: 9712080-01  
 AEN WORK ORDER: 9712080  
 CLIENT PROJ. ID: 941114NA

DATE SAMPLED: 12/05/97  
 DATE RECEIVED: 12/05/97  
 REPORT DATE: 12/19/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
<b>BTEX &amp; Gasoline HCs</b>	<b>EPA 8020</b>				
Benzene	71-43-2	2,100 *	5 ug/L		12/15/97
Toluene	108-88-3	1,800 *	5 ug/L		12/15/97
Ethylbenzene	100-41-4	2,500 *	5 ug/L		12/15/97
Xylenes, Total	1330-20-7	10,000 *	20 ug/L		12/15/97
Purgeable HCs as Gasoline	5030/GCFID	41 *	0.5 mg/L		12/15/97
Methyl t-Butyl Ether	1634-04-4	340 *	50 ug/L		12/15/97
<b>#Extraction for TPH</b>	<b>EPA 3510</b>	-		Extrn Date	12/15/97
TPH as Diesel	GC-FID	4.7 *	0.5 mg/L		12/17/97
TPH as Oil	GC-FID	ND	2 mg/L		12/17/97
<b>#Digestion, Metals by ICP</b>	<b>EPA 3010</b>	-		Prep Date	12/09/97
Lead	EPA 6010	ND	0.04 mg/L		12/10/97
<b>#Extraction for PNAs</b>	<b>EPA 3520</b>	-		Extrn Date	12/09/97
<b>PNAs by EPA 8270</b>	<b>EPA 8270</b>				
Acenaphthene	83-32-9	ND	50 ug/L		12/17/97
Acenaphthylene	208-96-8	ND	50 ug/L		12/17/97
Anthracene	120-12-7	ND	50 ug/L		12/17/97
Benzo(a)anthracene	56-55-3	ND	50 ug/L		12/17/97
Benzo(b)fluoranthene	205-99-2	ND	50 ug/L		12/17/97
Benzo(k)fluoranthene	207-08-9	ND	50 ug/L		12/17/97
Benzo(g,h,i)perylene	191-24-2	ND	50 ug/L		12/17/97
Benzo(a)pyrene	50-32-8	ND	50 ug/L		12/17/97
Chrysene	218-01-9	ND	50 ug/L		12/17/97
Dibenzo(a,h)anthracene	53-70-3	ND	50 ug/L		12/17/97
Fluoranthene	206-44-0	ND	50 ug/L		12/17/97
Fluorene	86-73-7	ND	50 ug/L		12/17/97
Indeno(1,2,3-cd)pyrene	193-39-5	ND	50 ug/L		12/17/97
Naphthalene	91-20-3	420 *	50 ug/L		12/17/97
Phenanthrene	85-01-8	ND	50 ug/L		12/17/97
Pyrene	129-00-0	ND	50 ug/L		12/17/97

WOODWARD-CLYDE CONSULTANTS

SAMPLE ID: EW-1  
AEN LAB NO: 9712080-01  
AEN WORK ORDER: 9712080  
CLIENT PROJ. ID: 941114NA

DATE SAMPLED: 12/05/97  
DATE RECEIVED: 12/05/97  
REPORT DATE: 12/19/97

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ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
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Reporting limits for PNA by EPA 8270 elevated 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

## WOODWARD-CLYDE CONSULTANTS

SAMPLE ID: LF-4  
 AEN LAB NO: 9712080-02  
 AEN WORK ORDER: 9712080  
 CLIENT PROJ. ID: 941114NA

DATE SAMPLED: 12/05/97  
 DATE RECEIVED: 12/05/97  
 REPORT DATE: 12/19/97

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	26 *	0.5 ug/L		12/14/97
Toluene	108-88-3	14 *	0.5 ug/L		12/14/97
Ethylbenzene	100-41-4	30 *	0.5 ug/L		12/14/97
Xylenes, Total	1330-20-7	140 *	2 ug/L		12/14/97
Purgeable HCs as Gasoline	5030/GCFID	1.4 *	0.05 mg/L		12/14/97
Methyl t-Butyl Ether	1634-04-4	20 *	5 ug/L		12/14/97
#Extraction for TPH	EPA 3510	-		Extrn Date	12/15/97
TPH as Diesel	GC-FID	0.15 *	0.05 mg/L		12/17/97
TPH as Oil	GC-FID	ND	0.2 mg/L		12/17/97
#Digestion, Metals by ICP	EPA 3010	-		Prep Date	12/09/97
Lead	EPA 6010	ND	0.04 mg/L		12/10/97
#Extraction for PNAs	EPA 3520	-		Extrn Date	12/09/97
PNAs by EPA 8270	EPA 8270				
Acenaphthene	83-32-9	ND	10 ug/L		12/12/97
Acenaphthylene	208-96-8	ND	10 ug/L		12/12/97
Anthracene	120-12-7	ND	10 ug/L		12/12/97
Benzo(a)anthracene	56-55-3	ND	10 ug/L		12/12/97
Benzo(b)fluoranthene	205-99-2	ND	10 ug/L		12/12/97
Benzo(k)fluoranthene	207-08-9	ND	10 ug/L		12/12/97
Benzo(g,h,i)perylene	191-24-2	ND	10 ug/L		12/12/97
Benzo(a)pyrene	50-32-8	ND	10 ug/L		12/12/97
Chrysene	218-01-9	ND	10 ug/L		12/12/97
Dibenzo(a,h)anthracene	53-70-3	ND	10 ug/L		12/12/97
Fluoranthene	206-44-0	ND	10 ug/L		12/12/97
Fluorene	86-73-7	ND	10 ug/L		12/12/97
Indeno(1,2,3-cd)pyrene	193-39-5	ND	10 ug/L		12/12/97
Naphthalene	91-20-3	ND	10 ug/L		12/12/97
Phenanthrene	85-01-8	ND	10 ug/L		12/12/97
Pyrene	129-00-0	ND	10 ug/L		12/12/97

ND = Not detected at or above the reporting limit

\* = Value at or above reporting limit

## WOODWARD-CLYDE CONSULTANTS

SAMPLE ID: TRIP BLANK  
AEN LAB NO: 9712080-03  
AEN WORK ORDER: 9712080  
CLIENT PROJ. ID: 941114NA

DATE SAMPLED: 12/05/97  
DATE RECEIVED: 12/05/97  
REPORT DATE: 12/19/97

---

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	ND	0.5	ug/L	12/16/97
Toluene	108-88-3	ND	0.5	ug/L	12/16/97
Ethylbenzene	100-41-4	ND	0.5	ug/L	12/16/97
Xylenes, Total	1330-20-7	ND	2	ug/L	12/16/97
Purgeable HCs as Gasoline	5030/GCFID	ND	0.05	mg/L	12/16/97
Methyl t-Butyl Ether	1634-04-4	ND	5	ug/L	12/16/97

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

AEN (CALIFORNIA)  
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9712080  
CLIENT PROJECT ID: 941114NA

Quality Control and Project Summary

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

Definitions

Laboratory Control Sample (LCS)/Method Spikes(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 analyses.

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 behaviour, 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 instrument performance.

D: Surrogates diluted out.

I: Interference.

!: Indicates result outside of established laboratory QC limits.



WORK ORDER: 9712080

QUALITY CONTROL REPORT

PAGE QR-2

ANALYSIS: Metals Scan by ICP

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank  
 INSTRUMENT: TJA Enviro 36  
 UNITS: mg/L  
 METHOD:

LAB ID: IFW\_PBW\_A  
 PREPARED:  
 ANALYZED: 12/10/97

INSTR RUN: ICP\971210161900/1/  
 BATCH ID: IFW120997-A  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Ag Silver	ND		0.005						
Al Aluminum	ND		0.1						
As Arsenic	ND		0.04						
Ba Barium	ND		0.01						
Be Beryllium	ND		0.002						
Ca Calcium	ND		0.2						
Cd Cadmium	ND		0.005						
Co Cobalt	ND		0.005						
Cr Chromium	ND		0.01						
Cu Copper	ND		0.01						
Fe Iron	ND		0.1						
K Potassium	ND		0.1						
Mg Magnesium	ND		0.04						
Mn Manganese	ND		0.005						
Mo Molybdenum	ND		0.01						
Na Sodium	ND		0.5						
Ni Nickel	ND		0.01						
Pb Lead	ND		0.04						
Sb Antimony	ND		0.02						
Se Selenium	ND		0.07						
Tl Thallium	ND		0.05						
V Vanadium	ND		0.005						
Zn Zinc	ND		0.01						

LABORATORY CONTROL SAMPLES

SAMPLE TYPE: Spike-Method/Media blank  
 INSTRUMENT: TJA Enviro 36  
 UNITS: mg/L  
 METHOD:

LAB ID: IFW\_LCD\_A  
 PREPARED:  
 ANALYZED: 12/10/97

INSTR RUN: ICP\971210161900/3/1  
 BATCH ID: IFW120997-A  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Ag Silver	0.0245	ND	0.005	0.0250	98.0	72	127		
Al Aluminum	1.04	ND	0.1	1.00	104	89	116		
As Arsenic	0.443	ND	0.04	0.400	111	75	125		
Ba Barium	1.06	ND	0.01	1.00	106	91	120		
Be Beryllium	0.0264	ND	0.002	0.0250	106	82	119		
Ca Calcium	10.6	ND	0.2	10.0	106	80	120		
Cd Cadmium	0.0518	ND	0.005	0.0500	104	84	120		
Co Cobalt	0.280	ND	0.005	0.250	112	96	120		
Cr Chromium	0.105	ND	0.01	0.100	105	85	128		
Cu Copper	0.130	ND	0.01	0.125	104	86	123		
Fe Iron	0.515	ND	0.1	0.500	103	84	133		
K Potassium	10.2	ND	0.1	10.0	102	80	120		
Mg Magnesium	10.3	ND	0.04	10.0	103	80	120		
Mn Manganese	0.282	ND	0.005	0.250	113	93	122		
Mo Molybdenum	0.213	ND	0.01	0.200	107	89	117		
Na Sodium	10.1	ND	0.5	10.0	101	80	120		
Ni Nickel	0.263	ND	0.01	0.250	105	92	121		
Pb Lead	0.554	ND	0.04	0.500	111	90	122		
Sb Antimony	0.530	ND	0.02	0.500	106	82	113		
Se Selenium	0.515	ND	0.07	0.500	103	75	125		
Tl Thallium	0.541	ND	0.05	0.500	108	85	115		
V Vanadium	0.270	ND	0.005	0.250	108	91	118		
Zn Zinc	0.262	ND	0.01	0.250	105	90	121		

WORK ORDER: 9712080

QUALITY CONTROL REPORT

PAGE QR-3

ANALYSIS: Metals Scan by ICP

MATRIX: Water

LABORATORY CONTROL SAMPLES

SAMPLE TYPE: Spike-Method/Media blank  
 INSTRUMENT: TJA Enviro 36  
 UNITS: mg/L  
 METHOD:

LAB ID: IFW\_LCS\_A  
 PREPARED:  
 ANALYZED: 12/10/97

INSTR RUN: ICP\971210161900/2/1  
 BATCH ID: IFW120997-A  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Ag Silver	0.0227	ND	0.005	0.0250	90.8	72	127		
Al Aluminum	0.994	ND	0.1	1.00	99.4	89	116		
As Arsenic	0.405	ND	0.04	0.400	101	75	125		
Ba Barium	1.03	ND	0.01	1.00	103	91	120		
Be Beryllium	0.0261	ND	0.002	0.0250	104	82	119		
Ca Calcium	10.3	ND	0.2	10.0	103	80	120		
Cd Cadmium	0.0488	ND	0.005	0.0500	97.6	84	120		
Co Cobalt	0.273	ND	0.005	0.250	109	96	120		
Cr Chromium	0.0991	ND	0.01	0.100	99.1	85	128		
Cu Copper	0.127	ND	0.01	0.125	102	86	123		
Fe Iron	0.494	ND	0.1	0.500	98.8	84	133		
K Potassium	9.92	ND	0.1	10.0	99.2	80	120		
Mg Magnesium	9.99	ND	0.04	10.0	99.9	80	120		
Mn Manganese	0.274	ND	0.005	0.250	110	93	122		
Mo Molybdenum	0.202	ND	0.01	0.200	101	89	117		
Na Sodium	9.85	ND	0.5	10.0	98.5	80	120		
Ni Nickel	0.255	ND	0.01	0.250	102	92	121		
Pb Lead	0.534	ND	0.04	0.500	107	90	122		
Sb Antimony	0.506	ND	0.02	0.500	101	82	113		
Se Selenium	0.480	ND	0.07	0.500	96.0	75	125		
Tl Thallium	0.505	ND	0.05	0.500	101	85	115		
V Vanadium	0.264	ND	0.005	0.250	106	91	118		
Zn Zinc	0.255	ND	0.01	0.250	102	90	121		

LABORATORY CONTROL DUPLICATES

SAMPLE TYPE: Method Spike Sample Duplicate  
 INSTRUMENT: TJA Enviro 36  
 UNITS: mg/L  
 METHOD:

LAB ID: IFW\_LCR\_A  
 PREPARED:  
 ANALYZED: 12/10/97

INSTR RUN: ICP\971210161900/4/2  
 BATCH ID: IFW120997-A  
 DILUTION: 1.000000

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Ag Silver	0.0245	0.0227	0.005					7.63	10
Al Aluminum	1.04	0.994	0.1					4.52	10
As Arsenic	0.443	0.405	0.04					8.96	15
Ba Barium	1.06	1.03	0.01					2.87	10
Be Beryllium	0.0264	0.0261	0.002					1.14	10
Ca Calcium	10.6	10.3	0.2					2.87	15
Cd Cadmium	0.0518	0.0488	0.005					5.96	10
Co Cobalt	0.280	0.273	0.005					2.53	10
Cr Chromium	0.105	0.0991	0.01					5.78	10
Cu Copper	0.130	0.127	0.01					2.33	10
Fe Iron	0.515	0.494	0.1					4.16	10
K Potassium	10.2	9.92	0.1					2.78	10
Mg Magnesium	10.3	9.99	0.04					3.06	10
Mn Manganese	0.282	0.274	0.005					2.88	10
Mo Molybdenum	0.213	0.202	0.01					5.30	10
Na Sodium	10.1	9.85	0.5					2.51	10
Ni Nickel	0.263	0.255	0.01					3.09	10
Pb Lead	0.554	0.534	0.04					3.68	10
Sb Antimony	0.530	0.506	0.02					4.63	10
Se Selenium	0.515	0.480	0.07					7.04	15
Tl Thallium	0.541	0.505	0.05					6.88	10
V Vanadium	0.270	0.264	0.005					2.25	10
Zn Zinc	0.262	0.255	0.01					2.71	10

WORK ORDER: 9712080

QUALITY CONTROL REPORT

PAGE QR-4

ANALYSIS: PNAs by EPA 8270

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank  
 INSTRUMENT: HP-5890 for Semi-volatiles  
 UNITS: ug/L  
 METHOD:

LAB ID: BLNK 1209  
 PREPARED: 12/09/97  
 ANALYZED: 12/12/97

INSTR RUN: GCMS10\971209080000/10/  
 BATCH ID: BNAW120997  
 DILUTION: 1.00

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Nitrobenzene-d5 (surr)	74.3			100	74.3	58	109		
2-Fluorobiphenyl (surr)	72.5			100	72.5	62	133		
Terphenyl-d14 (surr)	84.1			100	84.1	59	135		
Acenaphthene	ND								
Pyrene	ND								
Acenaphthylene	ND								
Anthracene	ND								
Benzo(a)anthracene	ND								
Benzo(b)fluoranthene	ND								
Benzo(k)fluoranthene	ND								
Benzo(g,h,i)perylene	ND								
Benzo(a)pyrene	ND								
Chrysene	ND								
Dibenzo(a,h)anthracene	ND								
Fluoranthene	ND								
Fluorene	ND								
Indeno(1,2,3-cd)pyrene	ND								
Naphthalene	ND								
Phenanthrene	ND								

LABORATORY CONTROL SAMPLES

SAMPLE TYPE: Laboratory Control Spike  
 INSTRUMENT: HP-5890 for Semi-volatiles  
 UNITS: ug/L  
 METHOD:

LAB ID: LCD 1209  
 PREPARED: 12/09/97  
 ANALYZED: 12/12/97

INSTR RUN: GCMS10\971209080000/12/10/  
 BATCH ID: BNAW120997  
 DILUTION: 1.00

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Nitrobenzene-d5 (surr)	84.8	74.3		100	84.8	58	109		
2-Fluorobiphenyl (surr)	82.8	72.5		100	82.8	62	133		
Terphenyl-d14 (surr)	88.4	84.1		100	88.4	59	135		
Acenaphthene	75.8	ND		100	75.8	58	139		
Pyrene	79.2	ND		100	79.2	40	130		

SAMPLE TYPE: Laboratory Control Spike  
 INSTRUMENT: HP-5890 for Semi-volatiles  
 UNITS: ug/L  
 METHOD:

LAB ID: LCS 1209  
 PREPARED: 12/09/97  
 ANALYZED: 12/12/97

INSTR RUN: GCMS10\971209080000/11/10/  
 BATCH ID: BNAW120997  
 DILUTION: 1.00

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Nitrobenzene-d5 (surr)	85.4	74.3		100	85.4	58	109		
2-Fluorobiphenyl (surr)	83.5	72.5		100	83.5	62	133		
Terphenyl-d14 (surr)	90.6	84.1		100	90.6	59	135		
Acenaphthene	74.6	ND		100	74.6	58	139		
Pyrene	79.7	ND		100	79.7	40	130		

LABORATORY CONTROL DUPLICATES

SAMPLE TYPE: Laboratory Control Sample Duplicate  
 INSTRUMENT: HP-5890 for Semi-volatiles  
 UNITS: ug/L  
 METHOD:

LAB ID: LCR 1209  
 PREPARED: 12/09/97  
 ANALYZED: 12/12/97

INSTR RUN: GCMS10\971209080000/13/11/  
 BATCH ID: BNAW120997  
 DILUTION: 1.00

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD (%)	RPD LIMIT (%)
						LOW	HIGH		
Nitrobenzene-d5 (surr)	84.8	85.4		100	84.8	58	109		
2-Fluorobiphenyl (surr)	82.8	83.5		100	82.8	62	133		
Terphenyl-d14 (surr)	88.4	90.6		100	88.4	59	135		

WORK ORDER: 9712080

QUALITY CONTROL REPORT

PAGE QR-5

ANALYSIS: PNAs by EPA 8270

MATRIX: Water

LABORATORY CONTROL DUPLICATES

SAMPLE TYPE: Laboratory Control Sample Duplicate		LAB ID: LCR 1209		INSTR RUN: GCMS10\971209080000/13/11				
INSTRUMENT: HP-5890 for Semi-volatiles		PREPARED: 12/09/97		BATCH ID: BNAW120997				
UNITS: ug/L		ANALYZED: 12/12/97		DILUTION: 1.00				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD LIMIT (%)
						LOW	HIGH	
Acenaphthene	75.8	74.6		100				1.60
Pyrene	79.2	79.7		100				0.629
								30
								30

SAMPLE SURROGATES

SAMPLE TYPE: Sample-Client		LAB ID: 9712080-01G		INSTR RUN: GCMS10\971209080000/8/				
INSTRUMENT: HP-5890 for Semi-volatiles		PREPARED: 12/09/97		BATCH ID: BNAW120997				
UNITS: ug/L		ANALYZED: 12/17/97		DILUTION: 5.00				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD LIMIT (%)
						LOW	HIGH	
Nitrobenzene-d5 (surr)	104			100	104	58	109	
2-Fluorobiphenyl (surr)	105			100	105	62	133	
Terphenyl-d14 (surr)	114			100	114	59	135	

SAMPLE TYPE: Sample-Client		LAB ID: 9712080-02G		INSTR RUN: GCMS10\971209080000/7/				
INSTRUMENT: HP-5890 for Semi-volatiles		PREPARED: 12/09/97		BATCH ID: BNAW120997				
UNITS: ug/L		ANALYZED: 12/12/97		DILUTION: 1.00				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD LIMIT (%)
						LOW	HIGH	
Nitrobenzene-d5 (surr)	90.8			100	90.8	58	109	
2-Fluorobiphenyl (surr)	89.0			100	89.0	62	133	
Terphenyl-d14 (surr)	91.2			100	91.2	59	135	

WORK ORDER: 9712080

QUALITY CONTROL REPORT

PAGE QR-6

ANALYSIS: TPH as Diesel

MATRIX: Water

METHOD BLANK SAMPLES

SAMPLE TYPE: Blank-Method/Media blank		LAB ID: BLNK-1215-1		INSTR RUN: GC C\971215000000/1/				
INSTRUMENT: HP 5890		PREPARED: 12/15/97		BATCH ID: DSEW121597-1				
UNITS: mg/L		ANALYZED: 12/15/97		DILUTION: 1.000000				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD (%)	RPD LIMIT (%)
						LOW HIGH		
Diesel	ND		0.05					
Motor Oil	ND		0.2					
n-Pentacosane (surr)	100.8			100	101	65 125		

LABORATORY CONTROL SAMPLES

SAMPLE TYPE: Laboratory Control Spike		LAB ID: LCDW-1215-1		INSTR RUN: GC C\971215000000/3/1				
INSTRUMENT: HP 5890		PREPARED: 12/15/97		BATCH ID: DSEW121597-1				
UNITS: mg/L		ANALYZED: 12/15/97		DILUTION: 1.000000				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD (%)	RPD LIMIT (%)
						LOW HIGH		
Diesel	1.71	ND	0.05	2.00	85.5	60 110		
n-Pentacosane (surr)	101.1	100.8		100	101	65 125		

SAMPLE TYPE: Laboratory Control Spike		LAB ID: LCSW-1215-1		INSTR RUN: GC C\971215000000/2/1				
INSTRUMENT: HP 5890		PREPARED: 12/15/97		BATCH ID: DSEW121597-1				
UNITS: mg/L		ANALYZED: 12/15/97		DILUTION: 1.000000				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD (%)	RPD LIMIT (%)
						LOW HIGH		
Diesel	1.76	ND	0.05	2.00	88.0	60 110		
n-Pentacosane (surr)	99.1	100.8		100	99.1	65 125		

LABORATORY CONTROL DUPLICATES

SAMPLE TYPE: Laboratory Control Sample Duplicate		LAB ID: LCRW-1215-1		INSTR RUN: GC C\971215000000/4/2				
INSTRUMENT: HP 5890		PREPARED: 12/15/97		BATCH ID: DSEW121597-1				
UNITS: mg/L		ANALYZED: 12/15/97		DILUTION: 1.000000				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD (%)	RPD LIMIT (%)
						LOW HIGH		
Diesel	1.71	1.76	0.05	2030			2.88	15
Motor Oil	ND	ND	0.2	200			0	
n-Pentacosane (surr)	101.1	99.1			2.00	65 125		

SAMPLE SURROGATES

SAMPLE TYPE: Sample-Client		LAB ID: 9712080-01E		INSTR RUN: GC C\971215000000/12/				
INSTRUMENT: HP 5890		PREPARED: 12/15/97		BATCH ID: DSEW121597-1				
UNITS: mg/L		ANALYZED: 12/19/97		DILUTION: 1.000000				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD (%)	RPD LIMIT (%)
						LOW HIGH		
n-Pentacosane (surr)	66.1			100	66.1	65 125		

SAMPLE TYPE: Sample-Client		LAB ID: 9712080-02E		INSTR RUN: GC C\971215000000/13/				
INSTRUMENT: HP 5890		PREPARED: 12/15/97		BATCH ID: DSEW121597-1				
UNITS: mg/L		ANALYZED: 12/17/97		DILUTION: 1.000000				
METHOD:								
ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)	RPD (%)	RPD LIMIT (%)
						LOW HIGH		
n-Pentacosane (surr)	104			100	104	65 125		

WORK ORDER: 9712080

QUALITY CONTROL REPORT

PAGE QR-7

ANALYSIS: TPH as Diesel

MATRIX: Water

SAMPLE SURROGATES

-----  
SAMPLE TYPE: Sample-Client                      LAB ID: 9712080-02E                      INSTR RUN: GC C\971215000000/13/  
INSTRUMENT: HP 5890                              PREPARED: 12/15/97                      BATCH ID: DSEW121597-1  
UNITS: mg/L    ANALYZED: 12/17/97                      DILUTION: 1.000000  
METHOD:    -----

ANALYTE	RESULT	REF RESULT	REPORTING LIMIT	SPIKE VALUE	RECOVERY (%)	REC LIMITS (%)		RPD LIMIT (%)
						LOW	HIGH	

QUALITY CONTROL DATA

METHOD: EPA 8020, 5030 GCFID

AEN JOB NO: 9712080  
 INSTRUMENT: F  
 MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
12/15/97	EW-1	01	97
12/14/97	LF-4	02	95
12/16/97	TRIP BLANK	03	99
QC Limits:			70-130

DATE ANALYZED: 12/14/97  
 SAMPLE SPIKED: LCS  
 INSTRUMENT: H

Laboratory Control Sample Recovery

Analyte	Spike Added (ug/L)	Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Benzene	100	88	1	70-130	20
Toluene	100	97	1	70-130	20
Ethylbenzene	100	100	2	70-130	20
Total Xylenes	300	101	2	70-130	20

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

\*\*\* END OF REPORT \*\*\*

**Woodward-Clyde Consultants**

500 12th Street, Suite 100, Oakland, CA 94607-4014  
(510) 893-3600

**Chain of Custody Record**

R-3,S-1  
C-3,S-1  
R-1,S-H

9712080

ABC EF D GH

PROJECT NO. 40th St. UST 94114NA Emeryville			Sample Matrix (Soil, Water, Air)	ANALYSES							Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)	
DATE	TIME	SAMPLE NUMBER		EPA Method	EPA Method	EPA Method	EPA Method	TPH gas, BTEX & MTBE	TPH diesel & motor oil	Lead (EPA 600)			EPA 8270, PAHs only
SAMPLERS: (Signature)													
12/3/97	1300	EW-1	W					X	X	X	X	8	Questions/Results To Xinggang Tong (510) 874-3060  7-day TAT
12/5/97	1115	LF-4	W					X	X	X	X	8	
12/5/97	0915	Trip Blank	W					X				2	
										TOTAL NUMBER OF CONTAINERS	18		

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
	12/5/97 1143				
METHOD OF SHIPMENT:	SHIPPED BY: (Signature)		COURIER: (Signature)		RECEIVED FOR LAB BY: (Signature)
Delivered					
					DATE/TIME



# SUMMARY OF GROUNDWATER PUMPING ACTIVITIES

AT THE FORMER CELI'S  
ALLIANCE GAS STATION,  
4000 SAN PABLO AVENUE  
EMERYVILLE, CALIFORNIA

*Prepared for*

City of Emeryville Redevelopment Agency  
2200 Powell Street, 12th Floor  
Emeryville, California 94608

January 8, 1998

**Woodward-Clyde** 

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Project 941114NA

**SUMMARY OF GROUNDWATER PUMPING ACTIVITIES  
AT THE FORMER CELIS ALLIANCE GAS STATION  
4000 SAN PABLO AVENUE  
EMERYVILLE, CALIFORNIA**

The groundwater pumping and product recovery activities summarized here were performed in accordance with *the CLOSURE WORKPLAN FOR THE FORMER CELIS ALLIANCE FUEL STATION* (Woodward-Clyde, September 1996), which was submitted to and approved by the Alameda County Department of Environmental Health (ACDEH). Section 3.3.2 of the Workplan presented scope and procedures of the pumping activities. The purpose of the work is to remove the limited amount, if any, of free petroleum product that may exist in an area immediately surrounding the location of the former well LF-1 (Figure 2).

The 4"-diameter extraction well EW-1 was installed on March 24, 1997, on the pedestrian sidewalk of the 40th Street, approximately 25 feet north of the former well LF-1 (Figure 2). Detailed well construction information has been presented in *the WELL CONSTRUCTION REPORT FOR WELL EW-1* (Woodward-Clyde, November 1997).

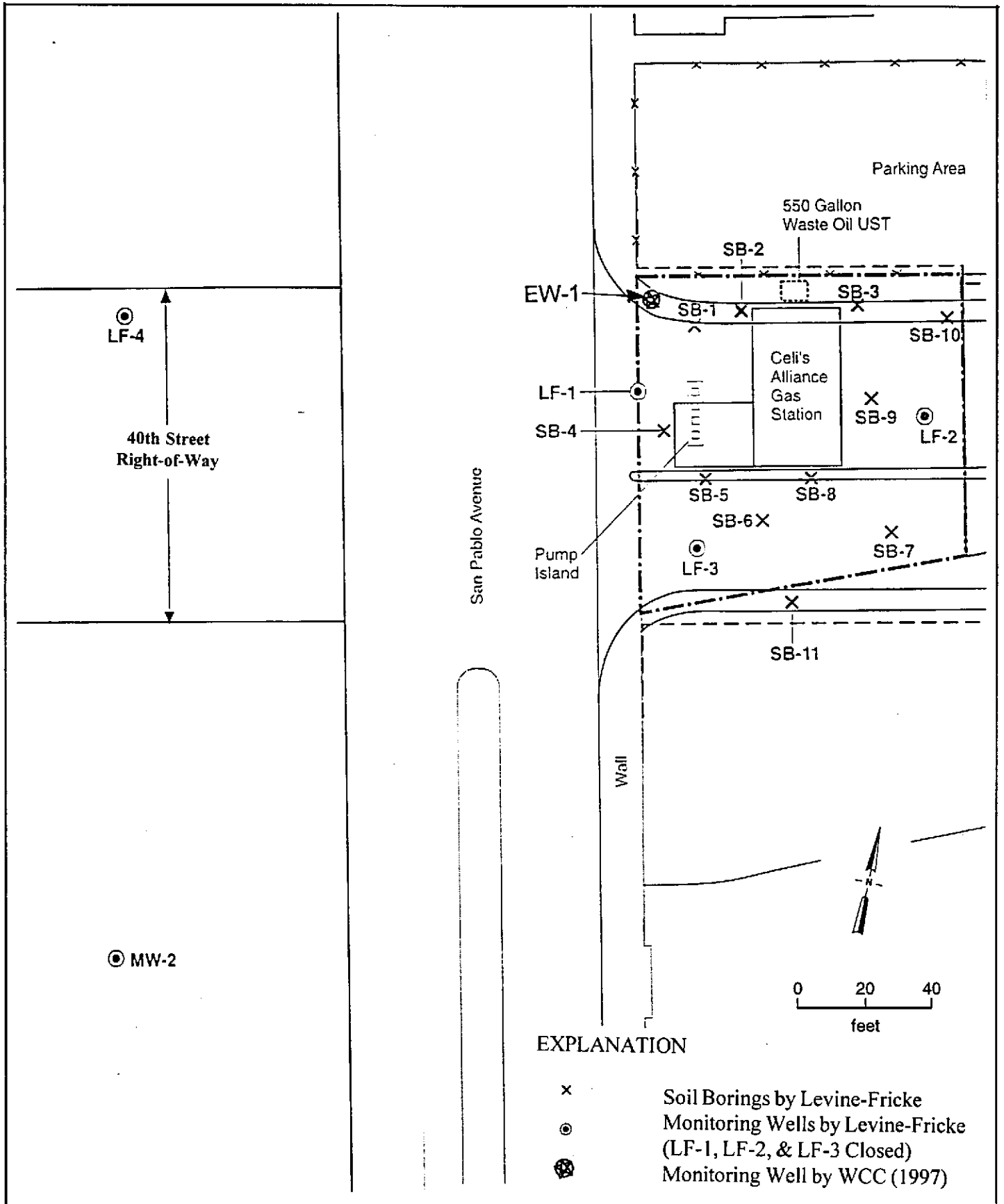
Weekly groundwater pumping started on September 12 and continued through December 5, 1997, for a total of 13 weeks. Groundwater was extracted from EW-1 continuously for 4 hours each Friday (except two weeks, one in Wednesday and the other in Thursday) using a portable jet pump. The extracted water was held in a 4,900-gallon tank on site. Water level and floating product thickness were measured before and at the end of each pumping event. The data are summarized in Table 1. Free floating product was never measured at the start of each pumping cycle. However, free product was measured up to 0.33 feet in thickness in six of the 13 pumping events when groundwater level in the well had been drawn down substantially. Free product, when detected, was removed with groundwater. It appears that floating product has been removed since it was not detected in the last four pumping events. The 13 pumping events have removed a total of 2,035 gallons of groundwater. The volume of free product removed was not accounted separately because it was removed with groundwater together.

At the end of this pumping project, a water sample was taken inside the holding tank and was analyzed for total petroleum hydrocarbons as gasoline (TPH-g) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Because benzene level was at 0.18 mg/l, which did not exceed the 0.5 mg/l hazardous waste level, the extracted groundwater was disposed off site as non-hazardous wastewater by Americlean, Inc. A copy of wastewater disposal *BILL OF LADING* is included.

- Enclosures:
1. Table 1 - Summary of Weekly Groundwater Pumping Data
  2. Site Location Maps
  3. Weekly Pumping Records
  4. Bill of Lading for Wastewater Disposal
  5. Laboratory Analytical Report

**TABLE 1**  
**SUMMARY OF WEEKLY GROUNDWATER PUMPING AT WELL EW-1**  
**AT THE FORMER CELIS ALLIANCE FUEL STATION**  
**4000 SAN PABLO AVENUE, EMERYVILLE, CA**

Date	Week	Before the Start of Pumping		At the End of Pumping		Volume of Water extracted (gallons)
		Water *	Product	Water *	Product	
		Level (ft)	Thickness (ft)	Level (ft)	Thickness (ft)	
9/12/97	1	7.83	0	14.67	0.05	118.4
9/19/97	2	7.47	0	18.86	0.09	156.3
9/26/97	3	8.06	0	20.50	0.2	152.1
10/2/97	4	7.93	0	17.45	0	136.4
10/10/97	5	7.33	0	17.97	0.01	145.6
10/17/97	6	7.12	0	15.25	0	134.7
10/24/97	7	7.39	0	11.96	0	86.4
10/31/97	8	7.74	0	19.00	0.33	177.4
11/7/97	9	7.89	0	18.55	0.01	171.1
11/14/97	10	7.47	0	16.39	0	165.4
11/21/97	11	6.60	0	17.00	0	178.3
11/26/97	12	7.85	0	17.20	0	207.6
12/5/97	13	6.00	0	17.60	0	205.5
					<b>TOTAL</b>	<b>2035.2</b>
* measured to top of well casing						



**EXPLANATION**

- x Soil Borings by Levine-Fricke
- ⊙ Monitoring Wells by Levine-Fricke (LF-1, LF-2, & LF-3 Closed)
- ⊗ Monitoring Well by WCC (1997)

Project No. 94114NA	40th Street Right-of-Way (Former Celis Gas Station)	<b>SOIL BORING AND MONITORING WELL LOCATIONS EMERYVILLE, CALIFORNIA</b>	Figure 2
<b>Woodward-Clyde Consultants</b>			

## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1 Top of the well casing is at 39.04 ft MSL

Date: 12/5/97 Pumping starts at: 09:47 ended at: 13:59

Volume of groundwater extracted: <sup>200.5</sup> 200 gallons / 205.5 after draining hose

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
	top of casing	(ft)					
	6.00	NONE					

Notes:

**At the end of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
	top of casing	(ft)					
AFT SAMPL.		NONE	6.31	20.7	Yes	1352	NONE
AFT PUMPING	17.60	NONE					

Notes:

MU-2 6.78

Weekly Data Collection for 40th Street, Emeryville.

Extraction Well: EW-1

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons
12/5/97	0935	1912.50	6.00	NONE		
	0947					Start
	10:00	1919.6	8.50	NONE		
	10:33	1946.9	12.82	NONE		
	10:54	1960.5	12.73	NONE		
	<del>11:07</del>	<del>1999.</del>				
	11:51	1991.4	14.81	NONE		
	12:13	2025.0	15.40	NONE		
	12:30	2043.6	17.93	NONE		
	13:17	2079.4	17.70	NONE		
	13:50		17.60	NONE		4-17.60
	14:00	2113.0				
	14:05	2118.0				Act. draining here
	14:45					OFFSITE

## WEEKLY GROUNDWATER PUMPING RECORD


Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1      Top of the well casing is at 39.04 ft MSL

Date: 11/26/97      Pumping starts at: 10:20      ended at: 1420

Wednesday

Volume of groundwater extracted: 201.5 gals @ end of test; 207.6 gals after draining hose line.

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
top of casing		(ft)					
	7.05	NONE					

Notes:

**At the end of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
top of casing		(ft)					
14:20	17.20	NONE					

Notes:

Weekly Data Collection for 40th Street, Emeryville.  
 Extraction Well: EW-1

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons
11/24/97	10:18	1704.9	7.85	NONE	~	
	10:20				~20	
	10:30	1715.0	9.60	NONE	~1.0	
	11:00	1741.4	13.16	NONE	0.8	
	11:30	1762.8	13.57	NONE		
	12:00	1793.4	16.55	NONE		
	12:30	1815.6	15.83	NONE		
	13:00	1849.8	16.10	NONE		
	1330	1863.0	15.90	NONE		
	14:00	1888.8	17.15	NONE		
	1420	1905.5	17.20	NONE		
	1422	1906.4	—	—		
		1912.5				
	1445					

*start pumping*

*SHOT OFF PUMP  
 AFTER DRAINING LINE  
 OFFSITE*



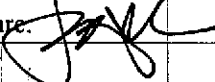
## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1      Top of the well casing is at 39.04 ft MSL

Date: 11/20/97      Pumping starts at: 09:14      ended at: 13:10

Volume of groundwater extracted: 171g <sup>W</sup>/<sub>o</sub> draining hose / 170.3 gals after draining

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
top of casing		(ft)					
6.60		NONE					

Notes:

**At the end of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
top of casing		(ft)					
17.00		NONE					

Notes:

Weekly Data Collection for 40th Street, Emeryville.

Extraction Well: EW-1

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons
11-21-97	0907	1526.6	6.60	NONE		
	0914		6.60			
	0930	1542.6	11.63	NONE		
	10:00	1558.7	12.13	NONE		
	10:30	1573.8	12.30	NONE		
	11:00	1593.8	13.71	NONE		
	1130	1618.8	13.74	NONE		
	1200	1637.8	15.75	NONE		
	1230	1661.7	17.07	NONE		
	1300	1684.4	17.22	trace, not	measurable	
	130315	1697.6	17.00	NONE		
		1704.9				
	1345					OFFLINE

start pumping

STOP PUMPING  
empty cist  
↙


## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1 Top of the well casing is at 39.04 ft MSL

Date: 11/14/97 Pumping starts at: 9:52 ended at:

Volume of groundwater extracted: 147.85 gals @ End of test; 165.35 after emptying hose

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
top of casing		(ft)					
7.47		NONE					

Notes:

Dark oil present inside hose.

**At the end of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
top of casing		(ft)					
16.39		NONE					

Notes:

Weekly Data Collection for 40th Street, Emeryville.  
 Extraction Well: EW-1

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons
11/14/97	9:49	1361.15	7.47	NONE		
	9:52				~0.9-1.0	
	10:15	1373.5	10.79	NONE		
	10:30	1384.6	12.45	NONE		
	11:00	1402.4	12.94	NONE		
	11:30	1416.5	12.74	NONE		
	12:00	<del>1439.8</del>	14.79	NONE		
	12:30	1461.4	15.70	NONE		
	13:00	1482.3	15.50	NONE		
	13:30	1503.4	16.35	NONE		
	13:52	<del>1503.4</del>	16.39	NONE		
		1519.18				
		1526.5				
	1415	OFF SITE				

9:15 MOB  
 Start pumping  
 ↑ pump rate  
 PUMP OFF  
 AFTER DRAINING


## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1      Top of the well casing is at 39.04 ft MSL

Date: 11/7/97      Pumping starts at: 10:20      ended at: 14:20

Volume of groundwater extracted: 171.9 gallons

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product		Electrical			
Depth to	MSL	thickness	pH	Tempt	Odor	Conductivi	Turbidity
	top of casing	(ft)					
10:02	7.89	NONE					

Notes:

**At the end of pumping:**

Water Level (ft)		Product		Electrical			
Depth to	MSL	thickness	pH	Tempt	Odor	Conductivi	Turbidity
	top of casing	(ft)					
	18.55	0.01					

Notes:

Weekly Data Collection for 40th Street, Emeryville.

Extraction Well: EW-1

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons
11/7/97	10:02	<del>7.99</del> 1190.0	7.89	NONE		
	10:20					
	10:30	1199.8	12.86	none		
	11:00	1221.4	14.12	none		
	11:30	1245.0	15.96	none		
	12:00	1262.3	15.55	"		
	12:30	1285.7	16.70	"		
	1300	1301.8	16.39	"		
	1330	1320.2	16.55	"		
	1400	1342.7	16.47	"		
	14:20	1356.1	18.55	18.54		
		BRKDOWN	DRAIN LINE			
	1434	1361.1				
	1445	OFFSITE				

start pumping

PUMP OFF

## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1      Top of the well casing is at 39.04 ft MSL

Date: 10/31/97      Pumping starts at: 11:47      ended at:

Volume of groundwater extracted: 173.9 gals / 177.4 gals after draining hose

Operator's Signature: *[Handwritten Signature]*

**Before the start of pumping:**

Water Level (ft)	Product	Electrical
Depth to MSL	thickness pH	Conductivity Turbidity
top of casing	(ft)	
7.74	NONE	

Notes:

**At the end of pumping:**

Water Level (ft)	Product	Electrical
Depth to MSL	thickness pH	Conductivity Turbidity
top of casing	(ft)	
19.0 f	0.33	

Notes:

Weekly Data Collection for 40th Street, Emeryville.  
Extraction Well: EW-1

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons	
10/31/97	11:41	<del>1018.3</del> 1012.3	7.74	none			
	11:47				~0.7	start pumping	
	12:07	1035.4	13.80	none	~0.9		
	12:30	1057.7	16.73	none			
	13:00	<del>1077.4</del> 1079.4	16.97	none	~0.8		
	13:30	1102.9	18.52	none	~0.75		
	14:06	1123.1	19.72	18.72	~0.7	18.65-18.72 oil	
	14:30	1142.5	19.70	18.61	~0.5	18.61-18.70 oil	
	15:00	1162.2	19.42	19.15	~0.55	19.15-19.42 oil	
	15:30	1180.7	19.45	19.12	~0.7	0.33	
	15:47						
	15:38	pumped well dry 19.01; turned pump to max throttle; no water. Definite presence of oil in hose. Pump OFF.					
	15:38	1186.2					
		DRAINING	lines				
		1189.7					
	16:00	OFFSITE					

← correct reading

18.65-18.72 oil  
18.61-18.70 oil  
19.15-19.42 oil  
0.33



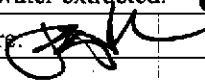
## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1 Top of the well casing is at 39.04 ft MSL

Date: 10/24/97 Pumping starts at: 09:57 ended at: 14:00

Volume of groundwater extracted: 64.3 gals / 86.4g after draining hose line + down well.

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Tempt	Odor	Conductivi	Turbidity
top of casing		(ft)					
9:51	7.39	none					

Notes: 9:15-9:42 MOB; SETUP TIL 9:56

**At the end of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Tempt	Odor	Conductivi	Turbidity
top of casing		(ft)					
14:00	11.96	none					

Notes:

Weekly Data Collection for 40th Street, Emeryville.

Extraction Well: EW-1

oil/water Meter

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons
10/24/97	9:51	932.5	7.39	NONE		
	9:57					
	10:15	939.0	9.71	none	~0.3	
	10:30	943.0	9.86	none		
	10:45	946.6	9.92	none		
	11:15	954.1	9.98	none		
	11:45	960.2	9.68	none	~0.45	
	12:17	966.8	9.43	none	~0.35	
	12:50	978.1	10.62	none	~0.25	
	13:30	994.6	11.87	none	~0.35	
	<del>14:00</del>					
	14:00	1006.9	11.96	none		
	14:10	1018.9				
	14:10	DECON, ARKBOWN				
	14:20	OFFSITE				

Initial start pumping

Swit pump. after emptying line

## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1 Top of the well casing is at 39.04 ft MSL

Date: 10/17/97 Pumping starts at: 09:34 ended at: 13:35

Volume of groundwater extracted: 133.9 gals / 134.7 after draining hose line

Operator's Signature: *[Handwritten Signature]*

**Before the start of pumping:**

	Water Level (ft)		Product		Tempt	Odor	Electrical	
	Depth to	MSL	thickness	pH			Conductivi	Turbidity
	top of casing	(ft)						
9:25	7.12		NONE					

Notes:

No visible signs of oil in hose.

**At the end of pumping:**

	Water Level (ft)		Product		Tempt	Odor	Electrical	
	Depth to	MSL	thickness	pH			Conductivi	Turbidity
	top of casing	(ft)						
1335	15.25		NONE					

Notes:

Weekly Data Collection for 40th Street, Emeryville  
 Extraction Well: EW-1

*w/ oil/water meter*  
*Determined by meter*

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons
10-17-97	9:25	798.0	7.12	NONE		
	9:34					
	9:45	804.5	9.78	NONE	~0.5	
	10:00	<del>808.6</del>	9.85	NONE	0.4	
	10:15	816.2	10.92	NONE	0.4	
	10:30	<del>825.4</del>	12.22	NONE	~0.7	
	10:45	832.3	12.33	NONE	0.4	
	11:00	839.9	12.42	NONE	~0.5	
	11:15	847.1	12.41	NONE	~0.45	
	11:30	853.4	12.50	NONE	~0.45	
	11:45	860.1	12.54	NONE	~0.3	
	12:00	871.3	14.06	NONE	~0.45	
	12:15	881.9	14.81	NONE	0.65	
	12:30	890.6	14.66	NONE	~0.6	
	12:45	<del>890.7</del>	15.00	NONE	~0.6	
	13:00	<del>908.6</del>	14.61	NONE	~0.7	
	13:15	919.2	15.28	NONE	~0.7	
	<del>13:30</del>	929.3	15.41	NONE	~0.7	
	<del>13:45</del>					
	<del>14:00</del>					
	13:25	931.9	15.25	NONE	—	
		932.5				
	14:00					

8:30 MOB  
 9:15 MOB  
 start pumping  
 Meter = 808.6  
 ↑  
 ↑ pump rate  
 ↑ pump rate  
 pump off  
 BRKDOWN  
 aft. draining hose  
 OFFSITE

## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1 Top of the well casing is at 39.04 ft MSL

Date: 10/10/99 Pumping starts at: 10:00 ended at: 14:00

Volume of groundwater extracted: 145.55 gals.

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)	Product	Electrical
Depth to MSL	thickness pH	Conductivi Turbidity
top of casing	(ft)	
7.33	NONE	

Notes:  
9:50 - 9:58 set up + Petroleum odor in well.

**At the end of pumping:**

Water Level (ft)	Product	Electrical
Depth to MSL	thickness pH	Conductivi Turbidity
top of casing	(ft)	
14:00 17.97	0.01	

Notes:

Weekly Data Collection for 40th Street, Emeryville.  
 Extraction Well: EW-1

*Measured w/  
Oil/Water Interface Meter  
set.*

Date	Time	Meter Reading	Water Level	Oil Level	gpm from meter	Total Gallons
10/10/97	9:55	648.05	7.32	NONE		
	10:00					
	10:05				~0.9	
	10:15	654.4	12.04	NONE	~1.0	
	10:30	656.8	14.58	NONE	~0.6	
	10:45	663.2	14.81	NONE	~0.4	
	11:00	668.6	15.00	NONE	~0.35	
	11:15	681.4	17.08	NONE	~0.81	
	11:30	691.1	17.19	NONE	~0.70	
	11:45	700.0	16.95	NONE	~0.50	
	12:00	710.3	17.48	NONE	~0.60	
	12:15	720.8	17.66	NONE	~0.60	
	12:30	730.3	17.42	NONE	0.50	
	12:45	740.7	17.85	NONE	~0.60	
	13:00	750.8	17.85	NONE	~0.69	
	13:15	766.2	17.81	17.80	~0.55	
	13:30	776.6	17.81	17.80	~0.59	
	13:45	782.8	18.29	18.27	~0.79	
	14:00	792.3	17.97	17.96	0.50	
	14:02	793.6	Ending Meter			
	14:03 -	797.75		Well Developmt.		
	14:13 -	797.75		After draining hole		
	14:13-14:25		RI	Decon + GRABW		
	14:25	OFFSITE				

Initial  
START PUMPING TEST

@ 11:03 ↑ pump rate slightly.

PUMP OFF

## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

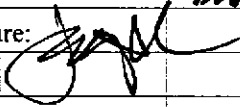
Onsite 9:25

Oil Residue inside hose dark in color, like oil

Well ID: EW-1 Top of the well casing is at 39.04 ft MSL

Date: 10/02/97, THURSDAY Pumping starts at: 09:37 ended at: ~~13:46~~ 13:46

Volume of groundwater extracted: ~~100%~~ @ end of pumping test, 136.4 gallons

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Tempt	Odor	Conductivi	Turbidity
top of casing		(ft)	—	—	—	—	—
	7.93	NONE					

Notes:

**At the end of pumping:**

Water Level (ft)		Product			Electrical		
Depth to	MSL	thickness	pH	Tempt	Odor	Conductivi	Turbidity
top of casing		(ft)					
	17.45	NONE	—	—	—	—	—

Notes:

Weekly Data Collection for 40th Street, Emeryville.  
 Extraction Well: EW-1

← measured w/oil/water  
 Indicator ← det from  
 meter

Date	Time	Meter Reading	Water Level	Oil Level	gpm	Total Gallons	
10/02/97	09:30	496.2	7.93	NONE			
	09:37				~1.2 gpm		
	09:47	515.5	NM	NM	~0.8 gpm		
	10:00	~520.5	17.65	NONE	~0.9		
	10:15	532.45	20.32	NONE	~0.5		
	10:30	540.9	20.40	.38			
	10:45	548.5	19.96	0.05	~.8		
	11:00	Start Pump off	no water coming out		N.L. 15'		
	11:15	559.8	16.20	NONE	0.6		
	11:30	567.5	16.47	NONE	0.5		
	11:45	574.5	16.30	NONE	0.3		
	12:00	582.5	16.89	NONE	~0.5		
	12:15	589.6	16.40	NONE	0.5		
	12:30	597.3	17.35	NONE	0.6		
	12:45	604.3	17.44	NONE	0.5		
	13:00	610.1	17.37	NONE	~0.5		
	13:15	618.4	17.48	NONE	0.5		
	13:30	625.6	17.43	NONE	0.5		
	13:46	632.6	17.45	NONE			
		637.7	after de-aer & draining hose line.				
	1405	OFFSITE					

Initial  
 Start pumping

20.12 - 20.40  
 see oily residue in hose 19.76-19.91  
 on again @ 11:03; flowing @ 11:09

Flow (gpm)

NM = Not Measured




## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1      Top of the well casing is at 39.04 ft MSL

Date: 9/26/97      Pumping starts at: 08:52      ended at: 12:55

Volume of groundwater extracted: 149.70 end of pumping test; 152.1 gallons after devt + breakdown.

Operator's Signature: 

**Before the start of pumping:**

Water Level (ft)		Product		Electrical		
Depth to	MSL	thickness	pH	Tempt	Odor	Conductivi Turbidity
	top of casing	(ft)				
	8.06	NONE				

**Notes:**

Collected groundwater samples during this pumping event. Oil layer evident during collection of samples.

**At the end of pumping:**

Water Level (ft)		Product		Electrical		
Depth to	MSL	thickness	pH	Tempt	Odor	Conductivi Turbidity
	top of casing	(ft)				
13:52	20.50'	0.20				

**Notes:**

MW-2      8.11 @ 08:00  
LF-4      8.25, TD = 17.80 + 3.36 = 18.16 @ 08:15

Weekly Data Collection for 40th Street, Emeryville.  
 Extraction Well: EW-1

Date	Time	Meter Reading	Water Level (Surface)	Oil Level	gpm, det by meter	Total Gallons
9/26/97	8:50	343.9	9.21	NONE		
	8:52					START PUMPING
	8:59		9.12	NR		
	9:00	346.2		NR	1.0	
	9:15	354.2	11.40	NR	~0.9	
	9:30	364.6	13.37	NR	~.45	
	9:45	378.4	16.35	NONE	.60	< 378.4 = Meter Reading
	10:00	388.9	17.20	NR	~.9	
	10:16	400.0	17.82	NR	~.6	
	10:30	~409.8	17.85	NR	~.6	
	10:45	~419.8	18.55	NR	~.6	
	11:00	missed sampling well				
	11:15	436.0	19.0	.01		12.62 - 12.85 = oil
	11:30	444.9	19.6	NR	~.6	12.87 - 12.93 = oil
	11:45	454.0	19.7	0.14	~.6	
	12:00	462.6	NR	0.17	~0.6	12.44 - 12.61 = oil
	12:15	471.2	19.82	0.21	0.5	12.47 - 12.68 = oil
	12:30	489.7	20.00	0.18	~0.55	12.57 - 12.75 = oil
	12:52	492.0	20.50	0.20	~0.6	12.57 - 12.87 = oil
	12:55	493.6				PUMP OFF. END OF TEST
	12:58	495.85				END OF DEVELOP. WELL
	12:58 -	496.00	← after all water out of line			BRKDOWN
	13:15	OPPOSITE				

NR = NOT RECORDED, MEASURED


## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1      Top of the well casing is at 39.04 ft MSL

Date: 9-19-97      Pumping starts at: 9:35 AM      ended at:

Volume of groundwater extracted: 156.25 gallons

Operator's Signature: 

**Before the start of pumping:**

	Water Level (ft)	Product			Electrical			
	Depth to	MSL	thickness	pH	Tempt	Odor	Conductivity	Turbidity
	top of casing		(ft)					
08:08	7.47		NONE					

Notes:

**At the end of pumping:**

	Water Level (ft)	Product			Electrical			
	Depth to	MSL	thickness	pH	Tempt	Odor	Conductivity	Turbidity
	top of casing		(ft)					
13:35	18.96		0.09					

Notes:

Weekly Data Collection for 40th Street, Emeryville.  
 Extraction Well: EW-1

Date	Time	Meter Reading	Water Level	Oil Thickness Level	gpm-det. by meter	Total Gallons	
9/19/97	08:08	187.6	7.47	NONE			
	09:35 → 09:38				~2.5		
	09:38		13.35 ↓	NR		↓ pump rate	
	09:45		14.40	NR	1.0		
	10:00	204.1	15.63	NONE	.7		
	10:15		18.15	NR	1.5/1.2		
	10:32						
	10:37	pumping again				went to restroom, came back pump not pumping. 226.2 gal	
	10:45	236.3	18.95	NR	~.9		
	11:00	246.5	18.21	NONE	.6		
	11:15	255.1	18.17	NR	.5		
	11:30	264.4	18.25	NR	.6		
11:50	12:45	276.9	18.59	NR	.6		
	12:00	282.9	18.65	.01	.6	18.98-18.49-oil	
	12:17	293.2	—	NR	—		
	12:30	300.4	18.76	NR 0.08	0.55	18.60-18.68'-oil	
	12:45	308.2?	18.77	NR 0.09	0.55	18.65-18.69-oil	
	13:00	317.7	18.92	0.09	0.60	18.68-18.69 18.79-18.88-oil	
	13:15	326.1	18.87	NR	0.60		
	13:30	—	—	NR	—		
	13:35	338.2	18.86	0.09	.60	18.64-18.73-oil	
	13:39	340.6	PUMPOFF				
		Developing well; shut off					
	13:41	343.7				156.1	
		Broken				156.25	
		343.85	remove top from hose (-1.5 gals)				
	14:10	OFFSITE					

Initial start pumping  
 ↓ pump rate  
 ↑ adjusting throttle thruout

went to restroom, came back pump not pumping. 226.2 gal

18.98-18.49-oil

18.60-18.68'-oil

18.65-18.69-oil

18.68-18.69 18.79-18.88-oil

18.64-18.73-oil

NR= No Reading Taken

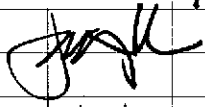
## WEEKLY GROUNDWATER PUMPING RECORD

Site Location: 4000 San Pablo Avenue (former Celis Alliance Fuel Station)  
Emeryville, California

Well ID: EW-1 Top of the well casing is at 39.04 ft MSL

Date: 9/12/97 Pumping starts at: 1245 ended at: 16:45

Volume of groundwater extracted: 118.4

Operator's Signature: 

**Before the start of pumping:**

	Water Level (ft)		Product		Electrical			
	Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
	top of casing		(ft)					
Initial	7.83		none					
12:50	12.01							

Notes:

beg. Meter: 5050.0

~~1987 DATA~~

**At the end of pumping:**

	Water Level (ft)		Product		Electrical			
	Depth to	MSL	thickness	pH	Temp	Odor	Conductivity	Turbidity
	top of casing		(ft)					
16:45	14.67		0.05	(14.62' - 14.57')				

Notes:

Ending Meter:

EW-1

Date	Time	Water Level	Beginning Meter Reading	Ending Meter Reading	Gals/Min pH	Total Specified Gallons Conductance	Temp Product Collected
9/12/97	1245	7.83	50.0	—			
	1255	12.75	63.5		.8		
	1304	13.05	69.0		.7		
	1307	13.6	70		.4	20	NONE
	1322	14.5	80.4		.6		
	1342	14.95	88.7		.935		
1hr	1345	—	90.0		.43	40	
	1400	14.94	96.9		.46	50g @ 14:07:15	
	1415	14.84	103.4		.43	60g @ 14:39:07	
	1430	14.85	110.3		.43		
2	1445	14.88	116.8		.43		
	1500	14.83	123.3		.43		
	1515	15.01	130.1		.45	80g @ 15:14:30	
	1530	14.69	136.2		.41 .46		refill gas tank almost empty
3	1545	15.03	143.1		.46		
	1600	14.73	149.4		.92	100g @ 16:01:40	
	1615	14.75	155.2		.38		
	1630	14.67	162.0		.45		
4	1645	14.67	168.4	177.3			2.14.57-14.62
<p>Note after readings taken @ 1645; increase pump to maximum flow; to remove silt/sediment from well.</p> <p>2 gallons of pumped wtr (in hose) &amp; decan wtr into kaker tank.</p>							

14.75 min per 10 gals

refill gas tank almost empty

# AMERICLEAN, INC.

CALIFORNIA: Formerly ALLIED OIL/PUMPING (ROUTE) SALES PH: 800-545-3330  
(CA HAZ WASTE HAULER REGISTRATION # 3493)

NEVADA: dba PETROLEUM RECOVERY-NV MAIL: P.O. BOX 3299, CARSON CITY, NV 89702  
(FACILITY) 2430 ALMOND DR., SILVER SPRINGS, NV 89429 PH. 702-577-9001  
ADMINISTRATION 702-882-6900 FAX: 702-577-9199 (NEVADA ID# NVD982358483)

**MANIFEST RECEIPT (BILL OF LADING) INVOICE**      No: **18374**

<b>JOB LOCATION</b>	<b>BILLING INFORMATION</b>	<b>BY DRIVER</b> <i>Billy D</i>
<b>COMPANY NAME</b> <i>Woodward &amp; Clyde</i>	<b>COMPANY NAME</b>	<b>DATE</b> <i>12-10-97</i>
<b>ADDRESS</b> <i>500 12th st 3760 #100</i>	<b>ADDRESS</b> <i>4000 San Pablo @ 40th st.</i>	<b>JOB #</b>
<b>CITY</b> <i>OAKLAND</i> <b>STATE</b> <b>ZIP</b> <i>94607</i>	<b>CITY</b> <i>Emeryville</i> <b>STATE</b> <b>ZIP</b>	<b>PO#</b>
<b>PHONE</b> <i>(510) 876-3760</i>	<b>PHONE</b> ( )	<b>FAX</b> ( )

**CONTACT** *Xinggang Tong*      **CONTACT**

PRODUCT/SERVICES	WASTE CODE	MANIFEST #	QUANTITY	UNITS	\$ PRICE	\$ TOTAL
Used oil, Non-RCRA      Lubricating				Gal		
Waste, Liquid      Industrial	CA221			Gal		
Used Auto Antifreeze, Non-RCRA						
Hazard Waste, Liquid	CA134			Gal		
Waste Petro Oil NOS Combustible Liquid						
UN 1270 III	CA221			Gal		
Oil & Water, Non-RCRA Haz Waste Liquid	CA221			Gal		
Waste Solids & Sludges				Gal		
Wash-out				Each		
Drained Used Oil Filters				Drum		
Non-RCRA Haz Waste Solids (oil waste)	CA223			Drum		
Empty Drums				Drum		
Transportation			4	Hours	65	260
Other: <i>NON Hazardous Water</i>			2000		.25	500
Other:						
Other:						
Other:						
<b>SOURCE:</b> (circle) Collection Station    Government    Marine    Agricultural    Industrial    Other:						
<b>TEST:</b>	PASS	FAIL	PPM:	*\$ <b>760</b>		
<b>TEST:</b>	PASS	FAIL	PPM:			

**\* PAY FROM THIS INVOICE AND SEND CHECK WITH INVOICE NUMBER TO:  
AMERICLEAN, INC., P.O. BOX 3299 CARSON CITY, NV 89702**

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of the waste. All relevant information regarding known or suspected hazards associated with the waste has been disclosed. This further serves as notification that the above liquid wastes are banned from land disposal pursuant to Title 22, Section 66268.7 (aX10).

*Xinggang Tong*  
\_\_\_\_\_  
CUSTOMER / GENERATOR      DATE

*Billy De Rego*    *12-10-97*  
\_\_\_\_\_  
DRIVER      DATE

ROUTE # \_\_\_\_\_ TRUCK# *6*

(write clearly and firmly - the last copy is yours!)

# American Environmental Network

## Certificate of Analysis

DOHS Certification: 1172

AIHA Accreditation: 11134

PAGE 1

WOODWARD-CLYDE CONSULTANTS  
500 12TH STREET, STE. 100  
OAKLAND, CA 94607

REPORT DATE: 12/13/97

DATE(S) SAMPLED: 12/05/97

DATE RECEIVED: 12/05/97

ATTN: XINGGANG TONG  
CLIENT PROJ. ID: 941114NA  
CLIENT PROJ. NAME: 40TH ST. UST

AEN WORK ORDER: 9712078

### PROJECT SUMMARY:

On December 5, 1997, this laboratory received 1 water sample(s).

Client requested sample(s) be analyzed for chemical 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



## WOODWARD-CLYDE CONSULTANTS

SAMPLE ID: IN-TANK  
AEN LAB NO: 9712078-01  
AEN WORK ORDER: 9712078  
CLIENT PROJ. ID: 941114NA

DATE SAMPLED: 12/05/97  
DATE RECEIVED: 12/05/97  
REPORT DATE: 12/13/97

---

ANALYTE	METHOD/ CAS#	RESULT	REPORTING LIMIT	UNITS	DATE ANALYZED
BTEX & Gasoline HCs	EPA 8020				
Benzene	71-43-2	180 *	3 ug/l		12/08/97
Toluene	108-88-3	110 *	3 ug/l		12/08/97
Ethylbenzene	100-41-4	150 *	3 ug/l		12/08/97
Xylenes, Total	1330-20-7	680 *	10 ug/l		12/08/97
Purgeable HCs as Gasoline	5030/GCFID	3.8 *	0.3 mg/L		12/08/97
Methyl t-Butyl Ether	1634-04-4	90 *	30 ug/l		12/08/97

---

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

AEN (CALIFORNIA)  
QUALITY CONTROL REPORT

AEN JOB NUMBER: 9712078

CLIENT PROJECT ID: 941114NA

Quality Control and Project 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 8020, 5030 GCFID

AEN JOB NO: 9712078  
 INSTRUMENT: F  
 MATRIX: WATER

Surrogate Standard Recovery Summary

Date Analyzed	Client Id.	Lab Id.	Percent Recovery Fluorobenzene
12/08/97	IN-TANK	01	97
QC Limits:			70-130

DATE ANALYZED: 12/08/97  
 SAMPLE SPIKED: LCS  
 INSTRUMENT: F

Laboratory Control Sample Recovery

Analyte	Spike Added (ug/L)	Percent Recovery	RPD	QC Limits	
				Percent Recovery	RPD
Benzene	100	104	13	70-130	20
Toluene	100	112	12	70-130	20
Ethylbenzene	100	117	13	70-130	20
Total Xylenes	300	119	12	70-130	20

Daily method blanks for all associated analytical runs showed no contamination at or above the reporting limit.

\*\*\* END OF REPORT \*\*\*

**Woodward-Clyde Consultants**

500 12th Street, Suite 100, Oakland, CA 94607-4014  
(510) 893-3600

**Chain of Custody Record**

PROJECT NO. *40th st. UST*  
*941114NA Emeryville*

SAMPLERS: (Signature)  
*[Signature]*

ANALYSES

Number of Containers

REMARKS  
(Sample preservation, handling procedures, etc.)

DATE TIME SAMPLE NUMBER

Sample Matrix  
(Soil, Water, Air)

EPA Method

EPA Method

EPA Method

EPA Method

TPH gas & BTEX

01A-C

*12/5/97*

*1310*

*In-Tank*

*W*

*X*

*3*

*Question/Results  
To Xinggang Tong  
(510) 874-3060*

*48-hr  
TAT*

TOTAL NUMBER OF CONTAINERS

*3*

RELINQUISHED BY :  
(Signature)  
*[Signature]*

DATE/TIME  
*12/5/97 1413*

RECEIVED BY :  
(Signature)  
*Ronald C. Jensen*

RELINQUISHED BY :  
(Signature)

DATE/TIME

RECEIVED BY :  
(Signature)

METHOD OF SHIPMENT :  
*Delivered*

SHIPPED BY :  
(Signature)

COURIER :  
(Signature)

RECEIVED FOR LAB BY :  
(Signature)

DATE/TIME