Harding Lawson Associates

May 1, 1990

04167,284.02

Exxon Company, U.S.A.
Post Office Box 4032
Concord, California 94520

Attention: Mr. Gary D. Gibson
Senior Environmental Engineer

Gentlemen:

First Quarter Groundwater Sampling
Exxon Station #7-0104
Alameda, California

This letter presents the results of Harding Lawson Associates' (HLA) March 1990 monitoring of seven groundwater monitoring wells at Exxon Station 7-0104, 1725 Park Street, Alameda, California (site). The site history and detailed monitoring well sampling procedures are described in HLA's *Phase II Evaluation of Petroleum Hydrocarbons, Exxon Service Station R/S #7-0104, 1725 Park Street, Alameda, California*, dated March 21, 1989. The first, second, and third rounds of quarterly sampling were conducted on June 21, September 18, and December 11, 1989, respectively. The fourth sampling event was conducted during the first quarter of the year on March 13, 1990.

Water-Level Monitoring and Groundwater Sampling

HLA has been obtaining monthly water-level and free-phase hydrocarbon measurements from the seven monitoring wells onsite. All measurements were performed with a chalked steel tape. The water was visually checked for the presence of free phase petroleum product using a clear Lucite bailer. No free-phase product was measured in any of the wells. On March 13, 1990, prior to groundwater sample collection, the seven monitoring wells were purged a minimum of three well volumes by hand bailing or with a centrifugal pump. The purged water was stored in 55 gallon drums on site. Measurements of pH, conductivity, and temperature of the purged water were taken during purging of the wells. Copies of HLA's Groundwater Sampling Forms documenting sampling activities are attached. All water-level measurement and sampling equipment was decontaminated prior to use by steam cleaning.

Groundwater samples from each of the monitoring wells were collected using a stainless steel bailer and decanted into 40-milliliter volatile organic analysis (VOA) vials. The samples were labeled, placed in a cooler with blue ice, and transported under chain of custody procedures to NET Pacific Laboratory (NET), Santa Rosa, California. NET is a state-certified hazardous waste laboratory.

Laboratory Analyses

The groundwater samples were analyzed for total petroleum hydrocarbons (TPH) calibrated to gasoline, and for benzene, toluene, ethylbenzene, and xylenes (BTEX). Groundwater analytical results are listed in Table 1, along with analytical results from HLA's previous groundwater sampling rounds. Copies of the original laboratory reports are attached.

Groundwater Gradient and Flow Direction

Groundwater elevations from the March 1990 water-level survey are presented in Table 2, along with previously measured groundwater elevations. In comparison to previous measurements, water-level elevations at the site have increased over the past three months. The water table appears to be fluctuating in response to seasonal precipitation and precipitation induced recharge. Groundwater contours are shown on Plate 1. As shown, the direction of groundwater flow is toward the east at a gradient of approximately 0.01 ft/ft. This flow direction is consistent with previous water-level data obtained throughout this investigation.

Laboratory Analytical Results

Review of laboratory analytical results indicates that the highest concentrations of petroleum hydrocarbon constituents are in groundwater samples collected from wells located adjacent to and downgradient of the tank field area (Wells MW-6 and MW-2, respectively).

As presented in Table 1, the concentrations of TPH as gasoline have remained roughly analogous to samples collected during the previous sampling event. The concentrations of benzene, toluene, and xylenes detected in all monitoring wells at the site (with the exception of toluene in MW-1 and xylenes in MW-1 and MW-7) are in excess of the California State Department of Health Services (DHS) action levels established for these parameters (0.7, 100, and 620 micrograms per liter (μg/l), respectively). Concentrations of ethylbenzene detected in Wells MW-2, MW-3, and MW-6 exceed the DHS drinking water action level of 680 μg/l.

HLA is in the process of designing a soil and groundwater remediation program for the site. Quarterly sampling and monthly groundwater level measurements will continue. HLA recommends that this report be submitted to the Regional Water Quality Control Board and the Alameda County Health Agency.

Please call us at 415/892-0821 if you have any questions.

Yours very truly,

HARDING LAWSON ASSOCIATES

S. Michelle Watson

S. Michelle Watson
Project Geologist

Michael L. Siembieda
Associate Geologist - RG 4007

REGISTERED GEOLOGIST
MICHAEL L. SIEMBIEDA
No: 4007
STATE OF CALIFORNIA

SMW/MLS/ere/D11910-CT

Attachments: Table 1
Table 2
Plate 1
Groundwater Sampling Forms
Laboratory Analytical Reports

Table 1. Summary of Chemical Results
Groundwater Samples

Well Number	Date	TPH Gasoline mg/l[1]	Benzene µg/l[2]	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l	Total Dissolved Solids mg/l
DHS Action Levels			0.7	100	680	620	3000
MW-1	06/07/88	27	5,000	77	1,100	2,700	NT[3]
MW-1	01/17/89	6.8	2,000	91	800	1,600	NT
MW-1	06/01/89	1.7	170	6.9	13	230	NT
MW-1	09/18/89	2.1	9.0	53	18	130	NT
MW-1	12/11/89	5.8	200	42	290	330	NT
MW-1	03/07/90	NT	NT	NT	NT	NT	910
MW-1	03/13/90	2.3	430	14	16	220	NT
MW-2	06/07/88	110	12,000	12,000	2,100	12,000	NT
MW-2	01/17/89	30	6,600	3,300	1,600	7,700	NT
MW-2	06/01/89	8.7	330	280	680	1,200	NT
MW-2	09/18/89	17	580	280	570	220	NT
MW-2	12/11/89	32	1,000	850	310	1,200	NT
MW-2	03/13/90	39	3,500	1,500	2,100	3,900	NT
MW-3	06/07/88	28	6,000	80	940	1,900	NT
MW-3	01/17/89	5.3	2,500	230	590	1,100	NT
MW-3	06/01/89	5.4	330	300	570	680	NT
MW-3	09/18/89	12	680	170	350	860	NT
MW-3	12/11/89	14	1,100	150	670	690	NT
MW-3	03/13/90	18	6,300	200	1,100	1,100	NT
MW-4	01/17/89	19	1,000	1,500	360	2,200	NT
MW-4	06/01/89	3.6	180	240	63	810	NT
MW-4	09/18/89	6.0	290	200	28	510	NT
MW-4	12/11/89	13	750	910	510	1,200	NT
MW-4	03/07/90	NT	NT	NT	NT	NT	370
MW-4	03/13/90	12	1,500	1,500	470	2,800	NT
MW-5	01/17/89	26	8,700	3,900	990	5,900	NT
MW-5	06/01/89	5.2	240	220	130	690	NT
MW-5	09/18/89	8.0	340	150	140	460	NT
MW-5	12/11/89	15	720	320	450	870	NT
MW-5	03/13/90	10	3,400	220	280	800	NT

Table 1. Summary of Chemical Results
Groundwater Samples (continued)

Well Number	Date	TPH Gasoline mg/l[1]	Benzene µg/l[2]	Toluene µg/l	Ethyl-benzene µg/l	Xylenes µg/l	Total Dissolved Solids mg/l
DHS Action Levels			0.7	100	680	620	3000
MW-6	01/17/89	38	7,400	9,300	2,000	9,900	NT
MW-6	06/01/89	23	1,900	2,500	2,000	6,000	NT
MW-6	09/18/89	17	650	410	650	320	NT
MW-6	12/11/89	29	1,100	810	330	1,500	NT
MW-6	03/13/90	38	12,000	15,000	2,500	12,000	NT
MW-7	01/09/90	17	380	180	330	1,300	NT
MW-7	03/13/90	16	360	270	83	460	NT
Field Blank	12/11/89	<50	0.88	0.95	0.62	1.7	NT

1 mg/l: milligrams per liter (parts per million)

2 µg/l: micrograms per liter (parts per billion)

3 NT: Not tested

<: Numbers preceded by "<" indicate that sample was below the indicated detection limit.

Table 2. Groundwater Elevations and Product Thickness Measurements

Harding Lawson Associates

Well Number	Elevation Top of Well Casing[1]	Date	Depth to Water BTOC[2] (feet)	Depth to Product BTOC (feet)	Product Thickness (feet)	Potentiometric Surface Elevation (feet above MSL)
MW-1	17.35	06-10-88	6.35	NP[3]	NP	11.00
		01-17-89	5.81	NP	NP	11.54
		01-24-89	5.16	NP	NP	12.19
		06-01-89	6.27	NP	Sheen	11.08
		09-18-89	7.11	NP	NP	10.24
		10-20-89	7.28	NP	NP	10.07
		11-22-89	7.02	NP	NP	10.33
		12-11-89	6.60	NP	NP	10.75
		02-13-90	6.02	NP	NP	11.33
		03-13-90	5.91	NP	NP	11.44
MW-2	16.67	06-10-88	6.20	NP	NP	10.47
		01-17-89	5.96	NP	NP	10.71
		01-24-89	5.04	NP	NP	11.63
		06-01-89	6.32	NP	Sheen	10.35
		09-18-89	6.73	NP	NP	9.94
		10-20-89	6.87	NP	NP	9.80
		11-22-89	6.80	NP	NP	9.87
		12-11-89	6.57	NP	NP	10.10
		02-13-90	6.12	NP	NP	10.55
		03-13-90	6.02	NP	NP	10.65
MW-3	17.11	06-10-88	6.05	NP	NP	11.06
		01-17-89	5.49	NP	NP	11.62
		01-24-89	5.38	NP	NP	11.73
		06-01-89	5.96	NP	NP	11.15
		09-18-89	6.65	NP	NP	10.46
		10-20-89	6.88	NP	NP	10.23
		11-22-89	6.74	NP	NP	10.37
		12-11-89	6.37	NP	NP	10.74
		02-13-90	5.58	NP	NP	11.53
		03-13-90	5.48	NP	NP	11.63

Table 2. Groundwater Elevations and Product Thickness Measurements

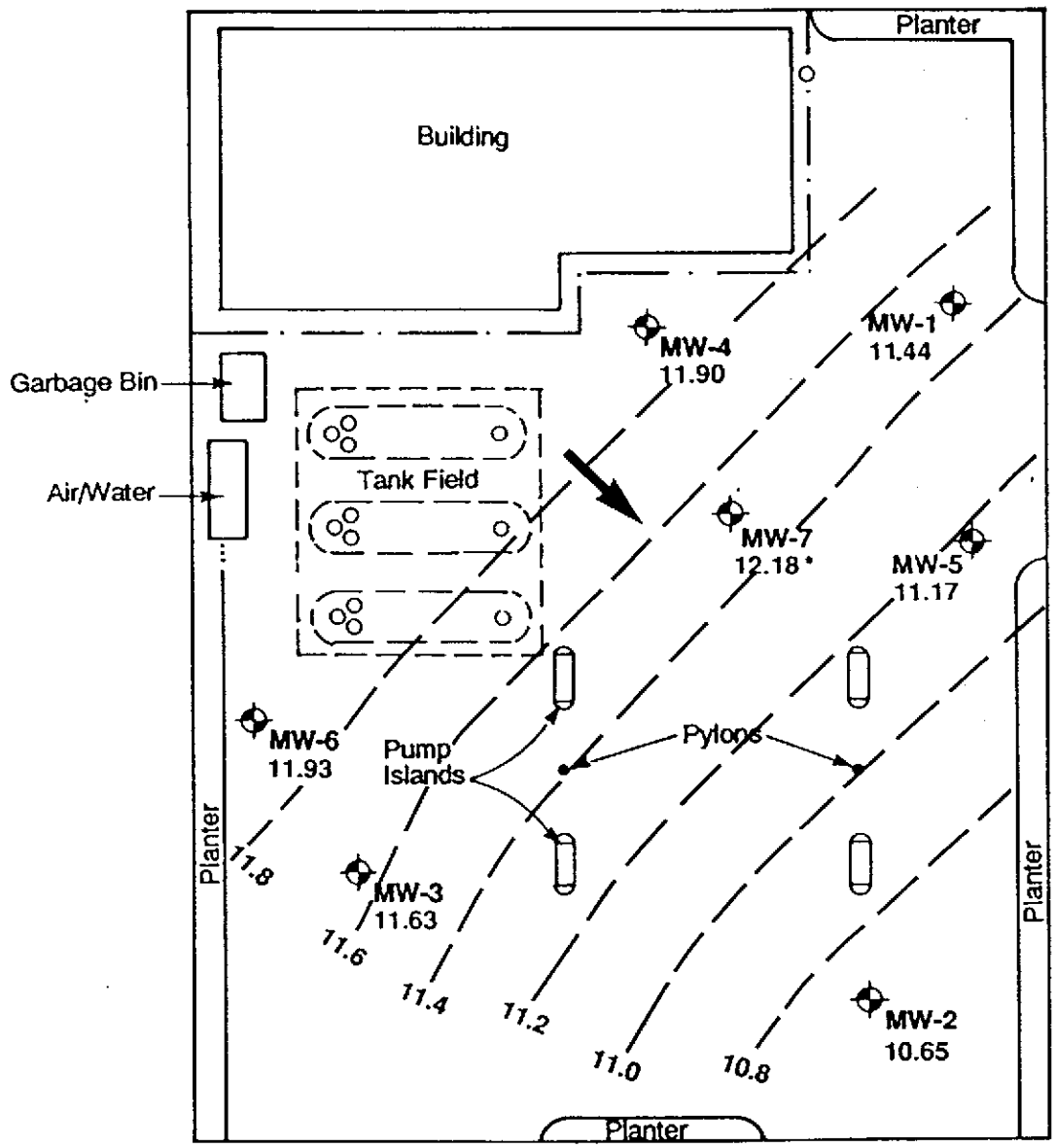
Harding Lawson Associates

Well Number	Elevation Top of Well Casing[1]	Date	Depth to Water BTOC[2] (feet)	Depth to Product BTOC (feet)	Product Thickness (feet)	Potentiometric Surface Elevation (feet above MSL)
MW-4	17.34	01-17-89	5.36	NP	NP	11.98
		01-24-89	5.46	NP	NP	11.88
		06-01-89	6.01	NP	NP	11.33
		09-18-89	6.80	NP	NP	10.54
		10-20-89	7.08	NP	NP	10.26
		11-22-89	6.82	NP	NP	10.52
		12-11-89	6.37	NP	NP	10.97
		02-13-90	5.49	NP	NP	11.85
		03-13-90	5.44	NP	NP	11.90
MW-5	16.71	01-17-89	5.39	NP	NP	11.32
		01-24-89	5.51	NP	NP	11.20
		06-01-89	5.83	NP	Sheen	10.88
		09-18-89	6.52	NP	NP	10.19
		10-20-89	6.72	NP	NP	9.99
		11-22-89	6.54	NP	NP	10.17
		12-11-89	6.21	NP	NP	10.50
		02-13-90	5.60	NP	NP	11.11
		03-13-90	5.54	NP	NP	11.17
MW-6	17.56	01-17-89	5.59	NP	NP	11.97
		01-24-89	5.27	NP	NP	12.29
		06-01-89	6.25	NP	Sheen	11.31
		09-18-89	6.95	NP	NP	10.61
		10-20-89	7.24	NP	NP	10.32
		11-22-89	7.05	NP	NP	10.51
		12-11-89	6.63	NP	NP	10.93
		02-13-90	5.70	NP	NP	11.86
		03-13-90	5.63	NP	NP	11.93
MW-7	17.12	02-13-90	4.98	NP	NP	12.14
		03-13-90	4.94	NP	NP	12.18

1 Elevations surveyed to mean sea level.

2 BTOC - Below top of casing.

3 NP: No product.



EXPLANATION

MW-1 ⊕ Monitoring Well Location

11.65 Potentiometric Surface Elevation in Feet Above Mean Sea Level

11.6 Potentiometric Surface Elevation Contour

Approximate Direction of Local Ground-Water Flow

★ Elevation not used for contouring

N

0 20 40

APPROXIMATE SCALE IN FEET

Harding Lawson Associates
Engineering and Environmental Services

Generalized Potentiometric Surface Contour Map - March 13, 1990
Phase III Evaluation of Petroleum Hydrocarbons
Exxon Station #7-0104
Alameda, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
CVD	4167,284.02		3/90		

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-1
Well Type: ☒ Monitor ☐ Extraction ☐ Other ____
Well Material: ☒ PVC ☐ St. Steel ☐ Other ____
Date 3-13-90 Time 12:15
Sampled by DME (Initials)

Job Name Exxon Alameda
Job Number 0467.284.02
Recorded by David M Evans (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other ____
Total Depth of Casing (TD in feet BTOC): 20.5
Water Level Depth (WL in feet BTOC): 5.91
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other ____

PURGE METHOD

☒ Bailer - Type: PVC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: ____
☐ Other - Type: ____

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☒ Other ____
Depth in feet (BTOC): ____ Screen Interval in feet (BTOC): from ____ to ____

PURGE VOLUME CALCULATION

(20.5 (TD feet) − 5.91 (WL feet)) X 4 (D inches)^2 X 3 (# Vols) X 0.0408 = 28.5 gallons (Calculated Purge Volume)

PURGE TIME

1145 Start 1206 Stop ____ Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL PURGE VOLUME

____ gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other NTU
0	7.1	600	19	41
10	7.0	575	19	>100
20	7.0	575	19.5	>100
25	7.0	600	19.5	>100
28.5	7.0	600	20.0	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other ____
Meter Nos.	PH 4666 Cond 3385 Tur 3399			

Observations During Purging (Well Condition, Turbidity, Color, Odor): Clear, no odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drums

WELL SAMPLING

SAMPLING METHOD

☐ Same As Above
☐ Bailer - Type: SS
☐ Grab - Type: ____
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: ____
☐ Other - Type: ____

SAMPLE DISTRIBUTION

Sample Series: 9003

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1305	3 VOAs	TPHL / BTXE	HCL NONE	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-2
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date 3-13-90 Time 10:35
Sampled by DME (Initials)

Job Name Exxon Alameda
Job Number 04167.284.02
Recorded by David M Evans (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 16'
Water Level Depth (WL in feet BTOC): 6.02
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: PVC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☒ Other
Depth in feet (BTOC): Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION:

(16' (TD) - 6.02 (WL)) x 4 (D, inches)^2 x 3 (# Vols) x 0.0408 = 20 gallons (Calculated Purge Volume)

PURGE TIME

10:05 Start 10:20 Stop Elapsed

PURGE RATE

Initial gpm Final gpm

ACTUAL PURGE VOLUME

14 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other NTU
0	6.5	730	19	56
10	6.9	725	19	>100
20 14	6.9	725	18.5	>100 — Dry

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	PH 4666	Cond 3385	Turb 3379	

Observations During Purging (Well Condition, Turbidity, Color, Odor): Clear, odor, fine sand
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: SS
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9003

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
13	3 VOAs	TPHL / BTXE	~~HCL~~ NONE	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-3

Well Type: ☒ Monitor ☐ Extraction ☐ Other _____

Well Material: ☒ PVC ☐ St. Steel ☐ Other _____

Job Name Exxon Alameda

Job Number 04167,284,02

Recorded by David M Evans (Signature)

Date 3-13-90 Time 09:35

Sampled by DME (Initials)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):

☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other _____

Total Depth of Casing (TD in feet BTOC): 14'

Water Level Depth (WL in feet BTOC): 5.48'

Number of Well Volumes to be purged (# Vols)

☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other _____

PURGE METHOD

☒ Bailer - Type: PVC

☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: _____

☐ Other - Type: _____

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other _____

Depth in feet (BTOC): _____ Screen Interval in feet (BTOC): from _____ to _____

PURGE VOLUME CALCULATION:

(14' (TD) - 5.48 (WL)) x 4 (D, inches)^2 x 3 (# Vols) x 0.0408 = 17 gallons (Calculated Purge Volume)

PURGE TIME

0910 Start 0918 Stop _____ Elapsed

PURGE RATE

Initial _____ gpm Final _____ gpm

ACTUAL PURGE VOLUME

13 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other NTU
0	6.8	650	16	49
10	6.8	650	17	>100
13-dry	6.8	625		>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	PH4666	Cond 3385	Tur 3399	

Observations During Purging (Well Condition, Turbidity, Color, Odor): clear, slight odor fine sand

Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: GS

☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: _____

☐ Same As Above

☐ Grab - Type: _____

☐ Other - Type: _____

SAMPLE DISTRIBUTION

Sample Series: 9003

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
13	3 VOAs	TPHL/BTXE	HCL	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-4
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date 3-13-90 Time 12:55
Sampled by DME (Initials)

Job Name Exxon Alameda
Job Number 04167,284,02
Recorded by (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 18'
Water Level Depth (WL in feet BTOC): 5.44
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☐ Bailer - Type:
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☐ Other
Depth in feet (BTOC): Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION:

(18' (TD feet) - 5.44 (WL feet)) X 4 (D inches)^2 X 3 (# Vols) X 0.0408 = 25 gallons (Calculated Purge Volume)

PURGE TIME

12:26 Start 12:41 Stop Elapsed

PURGE RATE

Initial gpm Final gpm

ACTUAL PURGE VOLUME

gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other NTU
0	6.9	550	20.5	53
10	6.8	525	20	>100
20	6.9	525	20.5	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	PH 4666	Cond 3385	Turb 3379	

Observations During Purging (Well Condition, Turbidity, Color, Odor): Clear, slight odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: SS
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:

☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9009

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
13	3 VOAs	TPHL/BTXE	~~HCL~~ NONE	NET Pacific	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-5
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date 3-13-90 Time 1115
Sampled by DME (Initials)

Job Name Exxon Alameda
Job Number 04167,284.02
Recorded by David M Evans (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 19'
Water Level Depth (WL in feet BTOC): 5.54
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: PVC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☒ Other
Depth in feet (BTOC): ____ Screen Interval in feet (BTOC): from ____ to ____

PURGE VOLUME CALCULATION:

$(19.0' - 5.54) \times 4^2 \times 3 \times 0.0408 = 26.4$ gallons

(TD (feet) − WL (feet)) × D (inches)² × # Vols × 0.0408 = Calculated Purge Volume

PURGE TIME

1045 Start 11:01 Stop ____ Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL PURGE VOLUME

____ gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other NTU
0	6.3	725	18	33
10	6.6	725	17	>100
20	6.8	725	18	>100
22-dry	6.9	725	18	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	PH 4666	Cond 3385	Tur 3399	

Observations During Purging (Well Condition, Turbidity, Color, Odor): clear, strong odor, fine sand
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☐ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: SS
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9003

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1304	3 VOAs	TPH-L/BTXE	~~HCl~~ NONE	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-6
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date 3-13-90 Time 08:55
Sampled by DNE (Initials)

Job Name Exxon Alameda
Job Number 04167.284.02
Recorded by David M Evans (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 18.5
Water Level Depth (WL in feet BTOC): 5.63
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: PVC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☒ Other
Depth in feet (BTOC): ____ Screen Interval in feet (BTOC): from ____ to ____

PURGE VOLUME CALCULATION:

(18.5' (TD feet) − 5.63 (WL feet)) × 4 (D inches)^2 × 3 (# Vols) × 0.0408 = 25.2 gallons (Calculated Purge Volume)

PURGE TIME

08:26 Start 08:39 Stop ____ Elapsed

PURGE RATE

Initial ____ gpm Final ____ gpm

ACTUAL PURGE VOLUME

____ gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other NTU
0	6.4	480	14.5	87
10	6.7	460	15.5	>100
20 19	6.8	465	16.0	>100 — Dry
25.2				

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	PH 4666	Cond 3385	TUV 3574	

Observations During Purging (Well Condition, Turbidity, Color, Odor): Clear. Slight odor. fine sand
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal Drum

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: SS
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:

☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9003

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1301	3 VOAs	TPH L /BTXE	HCL	~~NET~~ NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Well No. MW-7
Well Type: ☒ Monitor ☐ Extraction ☐ Other
Well Material: ☒ PVC ☐ St. Steel ☐ Other
Date 3-13-90 Time 13:45
Sampled by DME (Initials)

Job Name Exxon Alameda
Job Number 04167284.02
Recorded by David M Evans (Signature)

WELL PURGING

PURGE VOLUME

Casing Diameter (D in inches):
☐ 2-inch ☒ 4-inch ☐ 6-inch ☐ Other
Total Depth of Casing (TD in feet BTOC): 17.5'
Water Level Depth (WL in feet BTOC): 4.94
Number of Well Volumes to be purged (# Vols)
☒ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE METHOD

☒ Bailer - Type: PVC
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Other - Type:

PUMP INTAKE SETTING

☐ Near Bottom ☐ Near Top ☒ Other
Depth in feet (BTOC): Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION:

(17.5 TD (feet) − 4.94 WL (feet)) X 4 D (inches)^2 X 3 # Vols X 0.0408 = 25 gallons
Calculated Purge Volume

PURGE TIME

13:13 Start 13:28 Stop Elapsed

PURGE RATE

Initial gpm Final gpm

ACTUAL PURGE VOLUME

25 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other NTU
0	6.4	400	20.5	>100
10	7.0	345	18	>100
20	7.0	330	17.5	>100
25	6.9	325	18.0	>100
			~~19.0~~	~~>100~~

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	pH 4666	Cond 9385	Tur 3399	

Observations During Purging (Well Condition, Turbidity, Color, Odor): Cloudy grey, slight odor turbid fine sand
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other 55 gal drum

WELL SAMPLING

SAMPLING METHOD

☒ Bailer - Type: SS
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:
☐ Same As Above
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9003

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
13	3 VOAs	TPHL/BTXE	~~HCL~~ NONE	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Michelle Watson
Harding Lawson Associates
7655 Redwood Blvd.
PO Box 578
Novato, CA 94948

Date: 03-30-90
NET Client Acct No: 281
NET Pacific Log No: 1121
Received: 03-13-90 1525

Client Reference Information

EXXON, Alameda; Job: 04167,284.02

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

Ref: EXXON, Alameda; Job: 04167,284.02

Parameter	Reporting Limit	Descriptor, Lab No. and Results 90031301 03-13-90 0855 48521	 90031302 03-13-90 0935 48522	 90031303 03-13-90 1035 48523	Units
PETROLEUM HYDROCARBONS		--	--	--	
VOLATILE (WATER)		--	--	--	
DILUTION FACTOR *		10	100	100	
DATE ANALYZED		03-21-90	03-23-90	03-21-90	
METHOD GC FID/5030		--	--	--	
as Gasoline	0.05	38	18	39	mg/L
METHOD 602		--	--	--	
Benzene	0.5	12,000	6,300	3,500	ug/L
Ethylbenzene	0.5	2,500	1,100	2,100	ug/L
Toluene	0.5	15,000	200	1,500	ug/L
Xylenes, total	0.5	12,000	1,100	3,900	ug/L

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 1121

Date: 03-30-90
Page: 3

Ref: EXXON, Alameda; Job: 04167,284.02

Parameter	Reporting Limit	Descriptor, Lab No. and Results 90031304 03-13-90 1115 48524	 90031305 03-13-90 1215 48525	 90031306 03-13-90 1255 48526	Units
PETROLEUM HYDROCARBONS		--	--	--	
VOLATILE (WATER)		--	--	--	
DILUTION FACTOR *		10	1	10	
DATE ANALYZED		03-22-90	03-21-90	03-22-90	
METHOD GC FID/5030		--	--	--	
as Gasoline	0.05	10	2.3	12	mg/L
METHOD 602		--	--	--	
Benzene	0.5	3,400	430	1,500	ug/L
Ethylbenzene	0.5	280	16	470	ug/L
Toluene	0.5	220	14	1,500	ug/L
Xylenes, total	0.5	800	220	2,800	ug/L

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 1121

Date: 03-30-90
Page: 4

Ref: EXXON, Alameda; Job: 04167,284.02

Parameter	Reporting Limit	Descriptor, Lab No. and Results 90031307 03-13-90 1345 48527	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		10	
DATE ANALYZED		03-21-90	
METHOD GC FID/5030		--	
as Gasoline	0.05	16	mg/L
METHOD 602		--	
Benzene	0.5	360	ug/L
Ethylbenzene	0.5	83	ug/L
Toluene	0.5	270	ug/L
Xylenes, total	0.5	460	ug/L

Ref: EXXON, Alameda; Job: 04167,284.02

QUALITY CONTROL RESULTS - TOTAL PETROLEUM HYDROCARBONS (water)

Parameter	Reporting Limits	Units	Blank Results	Lab No. Spike and Spike Replicate Results (% Recovery) (-48874S)	(-48874SR)	RPD
as Gasoline	0.05	mg/L	ND	92	87	6
Benzene	0.5	ug/L	ND	100	94	6
Toluene	0.5	ug/L	ND	100	98	2

Parameter	Reporting Limits	Units	Blank Results	Lab No. Spike and Spike Replicate Results (% Recovery) (-49350S)	(-49350SR)	RPD
as Gasoline	0.05	mg/L	ND	90.1	90.5	0.5
Benzene	0.5	ug/L	ND	107.2	108.4	1.1
Toluene	0.5	ug/L	ND	107.2	109.8	2.4

Parameter	Reporting Limits	Units	Blank Results	Lab No. Spike and Spike Replicate Results (% Recovery) (-49289S)	(-49289SR)	RPD
as Gasoline	0.05	mg/L	ND	74.8	67.8	9.9
Benzene	0.5	ug/L	ND	116.4	113.3	2.6
Toluene	0.5	ug/L	ND	120.7	120.2	0.7

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results colum indicates analyte not detected at the value following, which supercedes the listed reporting limit.
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

Harding Lawson Associates
200 Rush Landing Road
P.O. Box 6107
Novato, California 94948
415/892-0821
Telecopy: 415/892-1586

1121

CHAIN OF CUSTODY FORM

Lab: Net Pacific

Samplers: David M Evans

Job Number: 04167,284.02

Name/Location: Exxon Alameda

Project Manager: Michelle Watson

Recorder: David M Evans (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	[redacted]	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES
RW	X							3	90	03	1301	90	03	13	0855	
RW	X							3	90	03	1302	90	03	13	0935	
RW	X							3	90	03	1303	90	03	13	1035	
RW	X							3	90	03	1304	90	03	13	1115	
RW	X							3	90	03	1305	90	03	13	1215	
RW	X							3	90	03	1306	90	03	13	1255	
RW	X							3	90	03	1307	90	03	13	1345	

ANALYSIS REQUESTED

EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene E	Total Petrol. Hydrocarb. E
					X	X
					X	X
					X	X
					X	X
					X	X
					X	X
					X	X

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS
						Regular turnaround time. Please call SMW w/result

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) David M Evans	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
RELINQUISHED BY: (Signature)	RECEIVED BY: (Signature)	DATE/TIME
DISPATCHED BY: (Signature) David M Evans — DATE/TIME 3/13/90 15:24	RECEIVED FOR LAB BY: (Signature) [illegible] — DATE/TIME 3/13/90 1525	

METHOD OF SHIPMENT: Hand delivered in cooler w/ice

Laboratory Copy White — Project Office Copy Yellow — Field or Office Copy Pink

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