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MARKETING DEPARTMENT

ENVIRONMENTAL ENGINEERING

G. D. GIBSON
SENIOR ENVIRONMENTAL ENGINEER

February 6, 1990

Exxon RAS 7-0104
1725 ~~High~~ Park Street
Alameda, California

Mr. Ariu Levy
Alameda County Enviromental Health Department
Hazardous Materials Division
80 Swan Way, Suite 200
Oakland, California 94621

Dear Mr. Levy:

The attached report presents the results of the third round of quarterly monitoring of six groundwater monitoring wells at the referenced site in the City of Alameda. This report, by Harding Lawson Associates of Novato, California, shows elevated levels of hydrocarbons in comparison to the immediately previous sampling events. A work plan to perform a Phase III Groundwater Investigation aquifer testing program was submitted to your office on January 23, 1990 as part of the further work being planned for this site.

Should you have any comments or concerns please contact me at (415) 246-8768. Thank you.

Sincerely,

Gary D. Gibson

GDG:vv
0649E
Attachments

c - w/attachment:
Mr. J. K. Hunter
Mr. S. R. Ritchie - San Francisco Bay Region Water Quality Control Board

w/o attachment:
Mr. J. R. Hastings
Mr. L. W. Lindeen
Ms. S. M. Watson - Harding Lawson Associates

Harding Lawson Associates

January 8, 1990

04167,284.02

Exxon Company, U.S.A.
Post Office Box 4415
Houston, Texas 77210-4415

Attention: Mr. J. Kevin Hunter

Gentlemen:

Third Quarter Ground-Water Sampling
Exxon Station #7-0104
Alameda, California

This letter presents the results of Harding Lawson Associates' (HLA) December 1989 monitoring of six ground-water 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 1, September 18, and December 11, 1989, respectively.

Water-Level Monitoring and Ground-Water Sampling

HLA has been obtaining monthly water level and free phase hydrocarbon measurements from the six monitoring wells on site. All measurements were performed with an oil-interface probe. No free-phase product was measured in any of the wells. Prior to ground-water sample collection, the six monitoring wells were purged a minimum of three well volumes by hand bailing or with a centrifugal pump. The purge water was stored in 55 gallon drums on site. Measurements of pH, conductivity, and temperature were taken during purging of the wells. Copies of HLA's Ground-Water Sampling Forms documenting sampling activities are attached. All water-level measurement and sampling equipment was decontaminated prior to use by steam cleaning.

Ground-water 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 and transported under chain of custody procedures to NET Pacific Laboratory, Santa Rosa, California (NET). NET is a California state-certified laboratory for the analyses requested.

Laboratory Analysis

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

Ground-Water Gradient and Flow Direction

Ground-water elevations from the December 1989 water-level survey are presented in Table 2, along with previously measured ground-water 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. Ground-water contours are shown on Plate 1. As shown, the direction of ground-water 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.

Conclusions

Review of laboratory analytical results indicates that the highest concentrations of petroleum hydrocarbon constituents are in ground-water samples collected from wells located adjacent to and downgradient of the tank field area.

As presented in Table 1, the levels of petroleum hydrocarbon constituents at the site appear to have increased in comparison with concentrations detected 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) are in excess of the California State Department of Health Services (DHS) action levels established for these parameters (0.7, 100, and 620 parts per billion, respectively).

Low levels of BTEX were detected in the field blank obtained at the site. Since the site is an active gasoline station, ambient concentrations of BTEX in the air are not uncommon. The sample analytical results are, in general, several orders of magnitude higher than the concentrations detected in the field blank and therefore sample contamination from volatiles in the ambient air does not appear to be an issue.

The fourth sampling event is scheduled for mid-March 1990. HLA will submit a written report to Exxon following the next quarterly sampling event. The report will include laboratory analytical results and a description of the ground-water conditions at the site. 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
Staff Geologist

Michael L. Siembieda
Associate Geologist - RG 4007

SMW/MLS/ere/F10772-CT

Attachments: Table 1
Table 2
Plate 1
Ground-Water Sampling Forms
Laboratory Analytical Reports

Table 1. Analytical Results
HLA Ground-Water Sampling (ppb)*
Exxon Station #7-0104

Well Number	Date	TPH Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes
MW-1	06/07/88	27,000	5,000	77	1,100	2,700
MW-1	01/17/89	6,800	2,000	91	800	1,600
MW-1	06/01/89	1,700	170	6.9	13	230
MW-1	09/18/89	2,100	9.0	53	18	130
MW-1	12/11/89	5,800	200	42	290	330
MW-2	06/07/88	110,000	12,000	12,000	2,100	12,000
MW-2	01/17/89	30,000	6,600	3,300	1,600	7,700
MW-2	06/01/89	8,700	330	280	680	1,200
MW-2	09/18/89	17,000	580	280	570	220
MW-2	12/11/89	32,000	1,000	850	310	1,200
MW-3	06/07/88	28,000	6,000	80	940	1,900
MW-3	01/17/89	5,300	2,500	230	590	1,100
MW-3	06/01/89	5,400	330	300	570	680
MW-3	09/18/89	12,000	680	170	350	860
MW-3	12/11/89	14,000	1,100	150	670	690
MW-4	01/17/89	19,000	1,000	1,500	360	2,200
MW-4	06/01/89	3,600	180	240	63	810
MW-4	09/18/89	6,000	290	200	28	510
MW-4	12/11/89	13,000	750	910	510	1,200
MW-5	01/17/89	26,000	8,700	3,900	990	5,900
MW-5	06/01/89	5,200	240	220	130	690
MW-5	09/18/89	8,000	340	150	140	460
MW-5	12/11/89	15,000	720	320	450	870
MW-6	01/17/89	38,000	7,400	9,300	2,000	9,900
MW-6	06/01/89	23,000	1,900	2,500	2,000	6,000
MW-6	09/18/89	17,000	650	410	650	320
MW-6	12/11/89	29,000	1,100	810	330	1,500
Field Blank	12/11/89	<50	0.88	0.95	0.62	1.7

* ppb - parts per billion

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

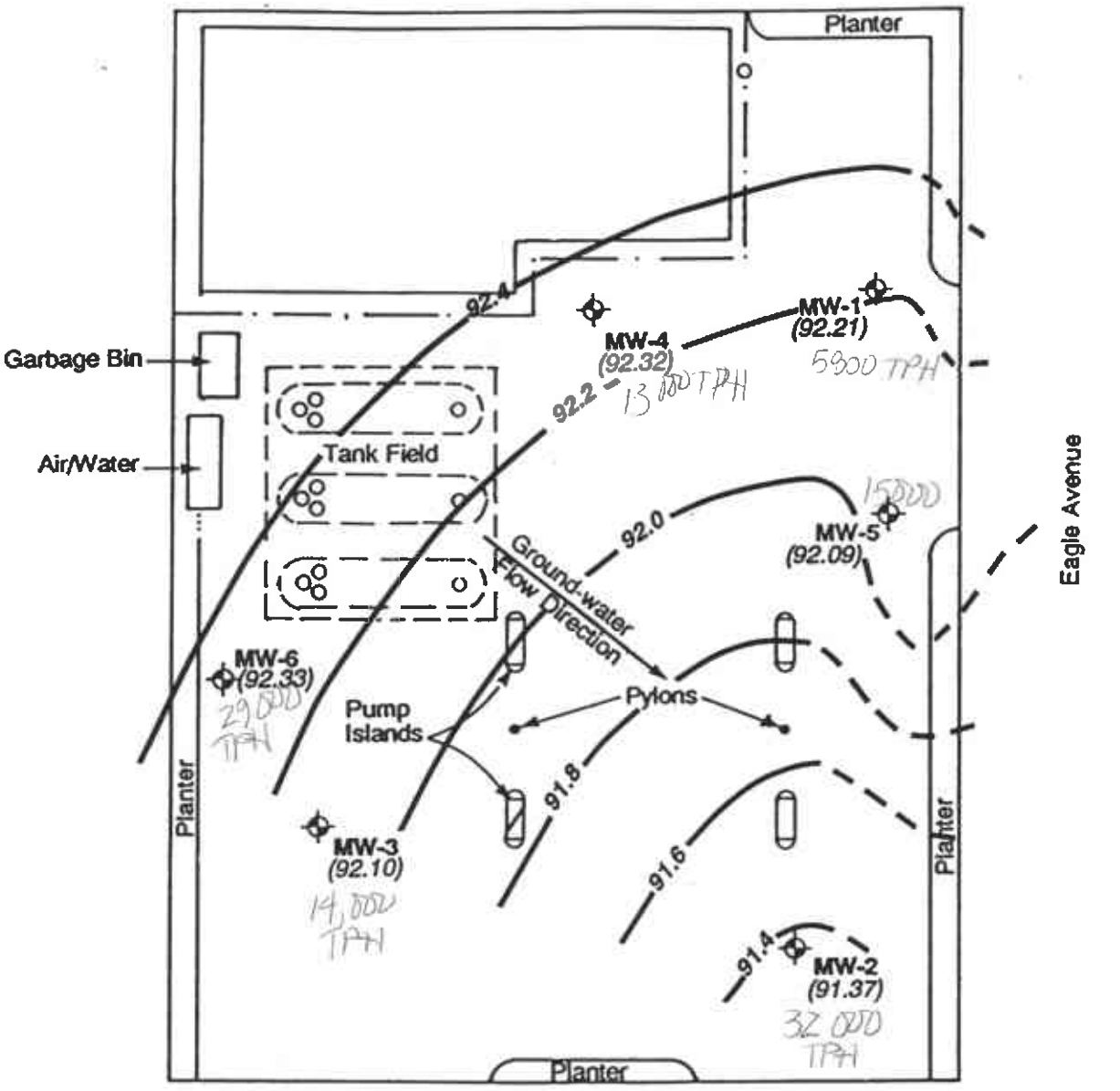
Table 2. Exxon Station R/S #7-0104
Ground-Water Elevations (feet)

Well Number	Elevation Top of Well Casing*	Date	Depth Water BTOC**	Depth to Product	Product Thickness	Ground-water Elevation
MW-1	98.81	06-01-89	6.27	NP	Sheen	92.54
		09-18-89	7.11	NP	NP	91.70
		10-20-89	7.28	NP	NP	91.53
		11-22-89	7.02	NP	NP	91.79
		12-11-89	6.60	NP	NP	92.21
MW-2	97.94	06-01-89	6.32	NP	Sheen	91.62
		09-18-89	6.73	NP	NP	91.21
		10-20-89	6.87	NP	NP	91.07
		11-22-89	6.80	NP	NP	91.14
		12-11-89	6.57	NP	NP	91.37
MW-3	98.47	06-01-89	5.96	NP	NP	92.51
		09-18-89	6.65	NP	NP	91.82
		10-20-89	6.88	NP	NP	91.59
		11-22-89	6.74	NP	NP	91.73
		12-11-89	6.37	NP	NP	92.10
MW-4	98.69	06-01-89	6.01	NP	NP	92.68
		09-18-89	6.80	NP	NP	91.89
		10-20-89	7.08	NP	NP	91.61
		11-22-89	6.82	NP	NP	91.87
		12-11-89	6.37	NP	NP	92.32
MW-5	98.30	06-01-89	5.83	NP	Sheen	92.47
		09-18-89	6.52	NP	NP	91.78
		10-20-89	6.72	NP	NP	91.58
		11-22-89	6.54	NP	NP	91.76
		12-11-89	6.21	NP	NP	92.09
MW-6	98.96	06-01-89	6.25	NP	Sheen	92.71
		09-18-89	6.95	NP	NP	92.01
		10-20-89	7.24	NP	NP	91.72
		11-22-89	7.05	NP	NP	91.91
		12-11-89	6.63	NP	NP	92.33

* Elevations surveyed relative to an assumed common datum of 100 feet

** BTOC - Below top of casing

NP: No product



EXPLANATION

Monitoring Well

91.6 — Ground-water Elevation and Contour, dashed where approximate

N

0 20 40

APPROXIMATE SCALE IN FEET

Harding Lawson Associates
Engineering and Environmental Services

December 1989 Ground-water Elevations
Phase II Evaluation of Petroleum Hydrocarbons
Exxon
Alameda, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
MOI	4167,284.02		1/90		

Harding Lawson Associates
Engineers and Geoscientists

GROUND-WATER SAMPLING FORM

Job Name Exxon Alameda
Job Number 04167 284 02
Recorded by [signature] (Signature)

Well No. MW-1
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 12 11 89 Time 1555
Sampled by GMC (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): 20.5
Water Level Depth (WL in feet BTOC): 6.60
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

(20.5 TD (feet) − 6.60 WL (feet)) X 4 D (inches)^2 X 3 # Vols X 0.0408 = 27.2 Calculated Purge Volume gallons

PURGE TIME

1425 Start 1445 Stop ____ Elapsed

PURGE RATE

Initial 2 gpm Final ____ gpm

ACTUAL PURGE VOLUME

22 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other NTU
0 Gals	5.8	600	18	7100
10	5.9	600	20	7100
20	6.0	600	21	65
22	6.0	600	21	60

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	YSI #15855	PH # 2862		

Observations During Purging (Well Condition, Turbidity, Color, Odor): Yellow Brn w/ product odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other Drum @ site

WELL SAMPLING

SAMPLING METHOD

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

SAMPLE DISTRIBUTION

Sample Series: 8912

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1107	3 VOA's	TPH-L BTXE	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 12 11 89 Time 1510
Sampled by (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): 16
Water Level Depth (WL in feet BTOC): 6.57
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

$(16 - 6.57) \times 4^2 \times 3 \times 0.0408 = 18.5$ gallons

(16 = TD (feet); 6.57 = WL (feet); 4 = D (inches); 3 = # Vols; 18.5 = Calculated Purge Volume)

PURGE TIME

1215 Start 1225 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 Gals	6.7	800	20	7100
9	6.5	800	19	7100
13	6.5	800	18	7100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	YSI #15855		PH #2862	

Observations During Purging (Well Condition, Turbidity, Color, Odor): Turbid w/ product odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other Drum @ site

WELL SAMPLING

SAMPLING METHOD

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

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

SAMPLE DISTRIBUTION

Sample Series: 8912

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1102	3 VOA's	TPH-L BTXE	None	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

RL004

OFFICE COPY

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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
Date 12 11 89 Time 1520
Sampled by GMC (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): 14
Water Level Depth (WL in feet BTOC): 6.37
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 (feet) − 6.37 WL (feet)) × 4 D (Inches)^2 × 3 # Vols × 0.0408 = 14.9 Calculated Purge Volume gallons

PURGE TIME

1235 Start 1250 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 Gals	6.2	>50	18.5	49
8	6.2	750	17.5	7100
13	6.2	700	~~20~~ 18.5	7100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	YSI # 25853		pH # 2867	

Observations During Purging (Well Condition, Turbidity, Color, Odor): ~~Clear~~ w/ product odor Turbid
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other Drum @ Site

WELL SAMPLING

SAMPLING METHOD

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

SAMPLE DISTRIBUTION

Sample Series: 8912

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
MW3	3 VOA's	TPH L BTXE	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-4
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 12 11 89 Time 1635
Sampled by GMC (Initials) 1535

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): 6.37
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

$(18 \text{ TD (feet)} - 6.37 \text{ WL (feet)}) \times 4^2 \text{ D (inches)} \times 3 \text{ \# Vols} \times 0.0408 = 22.8$ gallons
Calculated Purge Volume

PURGE TIME

1355 Start 1403 Stop Elapsed

PURGE RATE

Initial 2 gpm Final gpm

ACTUAL PURGE VOLUME

16 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other NTU
0 Gals	5.8	600	19	61
10	5.8	600	21	>100
16	5.9	600	21	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	YSI # 15855	PH # 2862		

Observations During Purging (Well Condition, Turbidity, Color, Odor): clear w/ product odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other Drum @ site

WELL SAMPLING

SAMPLING METHOD

☑ Bailer - Type: PP 55
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:

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

SAMPLE DISTRIBUTION

Sample Series: 8912

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1105	3 VOA's	TPH-L BTXE	None	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.
Field	89121106

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 12/4/89 Time 1500
Sampled by CWK (Initials)

Job Name Exxon Hayward
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): 19
Water Level Depth (WL in feet BTOC): 6.21
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 18.5'
Depth in feet (BTOC): Screen Interval in feet (BTOC): from to

PURGE VOLUME CALCULATION

(19 TD (feet) − 6.21 WL (feet)) × 4 D (inches)^2 × 3 # Vols × 0.0408 = 25.0 Calculated Purge Volume gallons

PURGE TIME

1140 Start 1158 Stop Elapsed

PURGE RATE

Initial ~2 gpm Final 5.5 gpm

ACTUAL PURGE VOLUME

17 gallons

FIELD PARAMETER MEASUREMENT

dry @ 17 gals

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other NTU
0 Gals	6.0	900	17.5	82
10	6.2	850	20	29
17	6.2	850	20	7100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	YSI #15855	pH # 2862		

Observations During Purging (Well Condition, Turbidity, Color, Odor): clear product odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other Drum @ site

WELL SAMPLING

SAMPLING METHOD

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

SAMPLE DISTRIBUTION

Sample Series: 5912

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1101	3 VOA's	TPHL BTXE	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

Job Name Exxon Alameda
Job Number 04167.28402
Recorded by _____ (Signature)

Well No. MW-6
Well Type: ☑ Monitor ☐ Extraction ☐ Other _____
Well Material: ☑ PVC ☐ St. Steel ☐ Other _____
Date 12/11/89 Time 1330
Sampled by GMC (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): 18.5
Water Level Depth (WL in feet BTOC): 6.63
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 18'
Depth in feet (BTOC): _____ Screen Interval in feet (BTOC): from _____ to _____

PURGE VOLUME CALCULATION

$(18.5 - 6.63) \times 4^2 \times 3 \times 0.0408 = 23.7$ gallons

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

PURGE TIME

1310 Start 1323 Stop _____ Elapsed

PURGE RATE

Initial 2 gpm Final 5.5 gpm

ACTUAL PURGE VOLUME

23 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other µIU
0 Gals	6.3	500	+416	7100
10	6.2	550	20	7100
18	6.2	600	20	>100
23	6.2	650	23	>100

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	YSI #15855	PH 382		

Observations During Purging (Well Condition, Turbidity, Color, Odor): Foaming w/ product odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other Drum @ site

WELL SAMPLING

SAMPLING METHOD

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

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

SAMPLE DISTRIBUTION

Sample Series: 8912

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1104	3 VOA's	TPH L BTXE	None	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples

Original Sample No.	Duplicate Sample No.

Blank Samples

Type	Sample No.

Other Samples

Type	Sample No.

OFFICE COPY

0746

NATIONAL ENVIRONMENTAL TESTING, INC.

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

DEC 89 10: 09

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

Date: 12-20-89
NET Client Acct. No: 281
NET Pacific Log No: 8897
Received: 12-11-89 1550

Client Reference Information

EXXON, Alameda

Dear Ms. Watson:

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)

SAMPLE DESCRIPTION: 89121104 12-11-89 1330
LAB Job No: (-41707)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		10	
DATE ANALYZED		12-19-89	
METHOD GC FID/5030			
as Gasoline	0.05	29	mg/L
METHOD 602		--	
Benzene	0.5	1,100	ug/L
Ethylbenzene	0.5	330	ug/L
Toluene	0.5	810	ug/L
Xylenes, total	0.5	1,500	ug/L

SAMPLE DESCRIPTION: 89121101 12-11-89 1500
LAB Job No: (-41708)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		10	
DATE ANALYZED		12-19-89	
METHOD GC FID/5030		--	
as Gasoline	0.05	15	mg/L
METHOD 602		--	
Benzene	0.5	720	ug/L
Ethylbenzene	0.5	450	ug/L
Toluene	0.5	320	ug/L
Xylenes, total	0.5	870	ug/L

SAMPLE DESCRIPTION: 89121102 12-11-89 1510
LAB Job No: (-41709)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		10	
DATE ANALYZED		12-19-89	
METHOD GC FID/5030		--	
as Gasoline	0.05	32	mg/L
METHOD 602		--	
Benzene	0.5	1,000	ug/L
Ethylbenzene	0.5	310	ug/L
Toluene	0.5	850	ug/L
Xylenes, total	0.5	1,200	ug/L

SAMPLE DESCRIPTION: 89121103 12-11-89 1520
LAB Job No: (-41710)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		10	
DATE ANALYZED		12-19-89	
METHOD GC FID/5030		--	
as Gasoline	0.05	14.0	mg/L
METHOD 602		--	
Benzene	0.5	1,100	ug/L
Ethylbenzene	0.5	670	ug/L
Toluene	0.5	150	ug/L
Xylenes, total	0.5	690	ug/L

SAMPLE DESCRIPTION: 89121105 12-11-89 1535
LAB Job No: (-41711)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		10	
DATE ANALYZED		12-19-89	
METHOD GC FID/5030		--	
as Gasoline	0.05	13	mg/L
METHOD 602		--	
Benzene	0.5	750	ug/L
Ethylbenzene	0.5	510	ug/L
Toluene	0.5	910	ug/L
Xylenes, total	0.5	1,200	ug/L

SAMPLE DESCRIPTION: 89121106 12-11-89 1545
LAB Job No: (-41712)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		12-16-89	
METHOD GC FID/5030		--	
as Gasoline	0.05	ND	mg/L
METHOD 602		--	
Benzene	0.5	0.88	ug/L
Ethylbenzene	0.5	0.62	ug/L
Toluene	0.5	0.95	ug/L
Xylenes, total	0.5	1.7	ug/L

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SAMPLE DESCRIPTION: 89121107 12-11-89 1555
LAB Job No: (-41713)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		5	
DATE ANALYZED		12-19-89	
METHOD GC FID/5030		--	
as Gasoline	0.05	5.8	mg/L
METHOD 602		--	
Benzene	0.5	200	ug/L
Ethylbenzene	0.5	290	ug/L
Toluene	0.5	42	ug/L
Xylenes, total	0.5	330	ug/L

QUALITY CONTROL RESULTS - TOTAL PETROLEUM HYDROCARBONS (water)

Parameter	Reporting Limits	Units	Blank Results	Lab No. Spike and Spike Replicate Results (% Recovery) (-41545S)	(-41545SR)	RPD
Benzene	0.5	ug/L	ND	88	90	2
Toluene	0.5	ug/L	ND	89	93	4
Ethylbenzene	1.5	ug/L	ND	90	95	5
Xylenes	1.5	ug/L	ND	92	100	8
Gasoline	0.05	mg/L	ND	99	103	2

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KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column 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

CHAIN OF CUSTODY FORM

8807

Lab: NET

Samplers: A.M. Carber

Job Number: 04167 284 02

Name/Location: Exxon Hameada

Project Manager: Michelle Watson

Recorder: _____ (Signature Required)

SOURCE CODE	MATRIX: Water	Sediment	Soil	Oil	#CONTAINERS & PRESERV.: Unpres.	H_2SO_4	HNO_3	SAMPLE NUMBER OR LAB NUMBER: Yr	Wk	Seq	DATE: Yr	Mo	Dy	Time	STATION DESCRIPTION/ NOTES	EPA 601/8010	EPA 602/8020	EPA 624/8240	EPA 625/8270	Priority Pllnt. Metals	Benzene/Toluene/Xylene	Total Petrol. Hydrocarb.
23	X				3			89	12	1104	891211			1330							X	X
23	X				3			89	12	1101	891211			1500							X	X
23	X				3			89	12	1102	891211			1510							X	X
23	X				3			89	12	1103	891211			1520							X	X
23	X				3			89	12	1105	891211			1535							X	X
23	X				3			89	12	1106	891211			1545							X	X
23	X				3			89	12	1107	891211			1555							X	X

LAB NUMBER: Yr	Wk	Seq	DEPTH IN FEET	COL MTD CD	QA CODE	MISCELLANEOUS

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature)	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) DATE/TIME: 121189 1600	RECEIVED FOR LAB BY: (Signature)	DATE/TIME: 12/8/89 1550

METHOD OF SHIPMENT: In cooler w/ Ice

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

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