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MARKETING DEPARTMENT

ENVIRONMENTAL ENGINEERING

G. D. GIBSON
SENIOR ENVIRONMENTAL ENGINEER

July 27, 1990

Exxon RAS 7-0104
1725 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:

Attached for your review and comment is the letter report on Second Quarter Groundwater Sampling for the above referenced site in the City of Alameda. This report is by Harding Lawson Associates of Novato, California. We are currently in the process of designing a remediation system for this site; details of this system will be forwarded to your office in the near future.

Should you have any questions or concerns after your review, please contact me at (415) 246-8768. Thank you.

Sincerely,

Gary D. Gibson

GDG:rh
1407E
Attachment

c - w/attachment:
Mr. L. Feldman - San Francisco Bay Region Water Quality Control Board

w/o attachment:
Mr. P. J. Brininstool
Mr. J. R. Hastings
Mr. J. K. Hunter
Mr. L. W. Lindeen
Mr. M. Thomson - Alameda County District Attorney's Office
Ms. S. M. Watson - Harding Lawson Associates

Harding Lawson Associates

July 9, 1990

04167,326.02

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

Attention: Mr. Gary D. Gibson
Senior Environmental Engineer

Gentlemen:

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

This letter presents the results of Harding Lawson Associates' (HLA) June 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 sampling round was conducted on June 14, 1990, and represents HLA's fifth sampling event and the first of a renewed year-long monitoring program.

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 an electric oil-water interface probe. The water was also visually inspected 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 June 14, 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 onsite. 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 June 1990 water-level survey are presented in Table 2, along with previously measured groundwater elevations. Water-level elevations at the site have decreased slightly over the past three months from the previous measurements. 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 an approximate gradient of 0.01 ft/ft. This flow direction is consistent with previous water-level data obtained during 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 concentrations detected during the previous sampling event with the exception of Well MW-1. The detected TPH concentrations range from 12 to 38 milligrams per liter (mg/l). The concentration of TPH as gasoline has increased in Well MW-1 from 2.3 to 32 mg/l. The concentrations of benzene, toluene, and xylenes detected in all monitoring wells at the site (with the exception of toluene and xylenes in Well 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 micrograms per liter (μg/l), respectively). Concentrations of ethylbenzene detected in Wells MW-2, MW-4, 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.

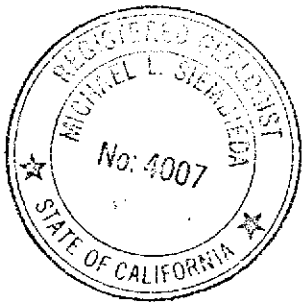
Please call us at 415/892-0821 if you have any questions.

Yours very truly,

HARDING LAWSON ASSOCIATES

S. Michelle Watson
Project Geologist

Michael L. Siembieda
Associate Geologist - RG 4007



SMW/MLS/ere/H13088-H

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

Table 1. Summary of Chemical Results of 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	
MW-1	06/07/88	27	5,000	77	1,100	2,700	NT[3]
	01/17/89	6.8	2,000	91	800	1,600	NT
	06/01/89	1.7	170	6.9	13	230	NT
	09/18/89	2.1	9.0	53	18	130	NT
	12/11/89	5.8	200	42	290	330	NT
	03/07/90	NT	NT	NT	NT	NT	910
	03/13/90	2.3	430	14	16	220	NT
	06/14/90	32	1,400	19	<5[4]	120	NT
MW-2	06/07/88	110	12,000	12,000	2,100	12,000	NT
	01/17/89	30	6,600	3,300	1,600	7,700	NT
	06/01/89	8.7	330	280	680	1,200	NT
	09/18/89	17	580	280	570	220	NT
	12/11/89	32	1,000	850	310	1,200	NT
	03/13/90	39	3,500	1,500	2,100	3,900	NT
	06/14/90	34	3,800	730	1,600	3,900	NT
MW-3	06/07/88	28	6,000	80	940	1,900	NT
	01/17/89	5.3	2,500	230	590	1,100	NT
	06/01/89	5.4	330	300	570	680	NT
	09/18/89	12	680	170	350	860	NT
	12/11/89	14	1,100	150	670	690	NT
	03/13/90	18	6,300	200	1,100	1,100	NT
	06/14/90	9.5	1,300	880	310	1,800	NT
MW-4	01/17/89	19	1,000	1,500	360	2,200	NT
	06/01/89	3.6	180	240	63	810	NT
	09/18/89	6.0	290	200	28	510	NT
	12/11/89	13	750	910	510	1,200	NT
	03/07/90	NT	NT	NT	NT	NT	370
	03/13/90	12	1,500	1,500	470	2,800	NT
	06/14/90	12	5,700	400	1,300	760	NT

Table 1. Summary of Chemical Results of 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-5	01/17/89	26	8,700	3,900	990	5,900	NT
	06/01/89	5.2	240	220	130	690	NT
	09/18/89	8.0	340	150	140	460	NT
	12/11/89	15	720	320	450	870	NT
	03/13/90	10	3,400	220	280	800	NT
	06/14/90	12	3,300	160	350	730	NT
MW-6	01/17/89	38	7,400	9,300	2,000	9,900	NT
	06/01/89	23	1,900	2,500	2,000	6,000	NT
	09/18/89	17	650	410	650	320	NT
	12/11/89	29	1,100	810	330	1,500	NT
	03/13/90	38	12,000	15,000	2,500	12,000	NT
	06/14/90	38	9,100	7,800	2,900	12,000	NT
MW-7	01/09/90	17	380	180	330	1,300	NT
	03/13/90	16	360	270	83	460	NT
	06/14/90	14	1,200	2,800	75	930	NT
Field Blank	12/11/89	<0.5	0.88	0.95	0.62	1.7	NT
Trip Blank	06/14/90	<0.5	<0.5	<0.5	<0.5	<0.5	NT

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

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

3 NT: Not tested

4 <: 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
		04-18-90	6.18	NP	NP	11.17
		05-23-90	6.29	NP	NP	11.06
		06-14-90	6.19	NP	NP	11.28
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
		04-18-90	6.35	NP	NP	10.32
		05-23-90	6.28	NP	NP	10.39
		06-14-90	6.14	NP	NP	10.53
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
		04-18-90	6.01	NP	NP	11.10
		05-23-90	6.14	NP	NP	10.97
		06-14-90	5.83	NP	NP	11.28

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
		04-18-90	6.14	NP	NP	11.20
		05-23-90	6.22	NP	NP	11.12
		06-14-90	5.92	NP	NP	11.42
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
		04-18-90	5.75	NP	NP	10.76
		05-23-90	5.98	NP	NP	10.73
		06-14-90	5.81	NP	NP	10.90
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
		04-18-90	6.26	NP	NP	11.30
		05-23-90	6.42	NP	NP	11.14
		06-14-90	6.19	NP	NP	11.37

Table 2. Groundwater Elevations and Product Thickness Measurements

Harding Lawson Associates

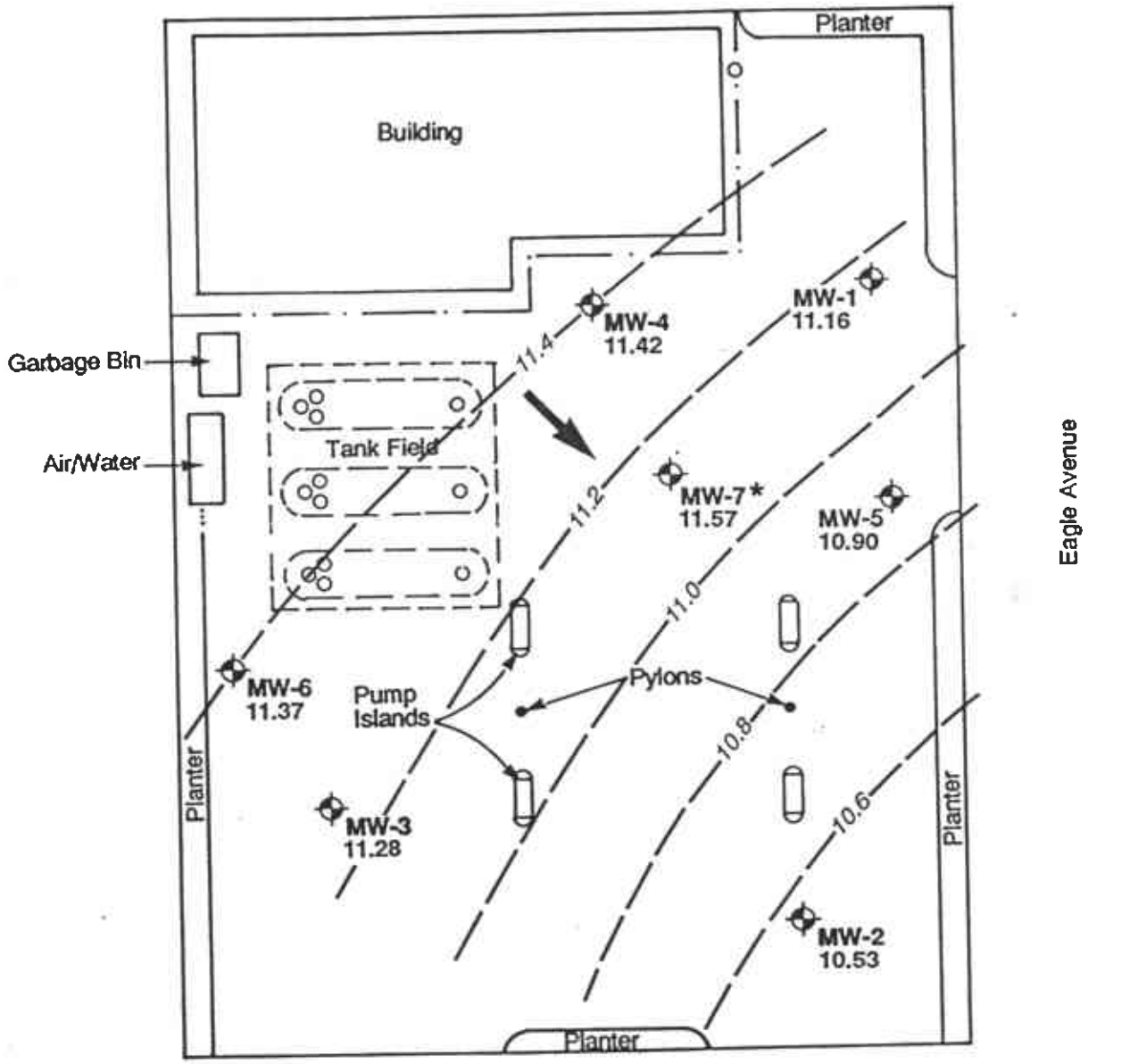
Well Number	Elevation Top of Well Casing[1]	Date	Depth to Water BTOC[2] (feet)	Depth to Product BTOC (feet)	Product Thickness (feet)	Potentiometric Surface Elevation (feet above MSL)
MW-7	17.12	02-13-90	4.98	NP	NP	12.14
		03-13-90	4.94	NP	NP	12.18
		05-23-90	5.87	NP	NP	11.25
		06-14-90	5.55	NP	NP	11.57

1 Elevations surveyed to mean sea level.

2 BTOC - Below top of casing.

3 NP: No product.

18750



EXPLANATION

MW-1 ⊕ Monitoring Well Location

11.28 Potentiometric Surface Elevation in Feet Above Mean Sea Level

11.4 Potentiometric Surface Elevation Contour

Approximate Direction of Local Ground-Water Flow

★ Elevation not used for contouring

N

0 20 40

APPROXIMATE SCALE IN FEET

HLA Harding Lawson Associates
Engineering and Environmental Services

Generalized Potentiometric Surface Contour Map - June 14, 1990
Phase III Evaluation of Petroleum Hydrocarbons
Exxon Station #7-0104
Alameda, California

PLATE **1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
CVD	04167,326.02	SMW	7/90		

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 6/14/90 Time 8:00
Sampled by TSN (Initials)

Job Name EXXON ALAMEDA
Job Number 4167.326.02
Recorded by Thomas Nett (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): 6.19
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): 20.5 Screen Interval in feet (BTOC): from ____ to ____

PURGE VOLUME CALCULATION:

(20.5 TD (feet) - 6.19 WL (feet)) x 4 D (inches)^2 x 3 # Vols x 0.0408 = 28.03 gallons Calculated Purge Volume

PURGE TIME

7:43 Start 757 Stop ____ Elapsed

PURGE RATE

Initial 4 gpm Final 4 gpm

ACTUAL PURGE VOLUME

30 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other TURB
initial	6.7	582	16.0	>100
7 gal	6.8	581	18.8	>100
14 gal	6.9	702	19.8	37
21 gal	7.0	668	17.8	15
30 gal	7.0	664	17.6	14

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐ °C ☐ °F	Other
Meter Nos.	pH 4927, Turb. 2987, Cond. 5359			

Observations During Purging (Well Condition, Turbidity, Color, Odor): rusty orange, no sheen, no odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other Stored in drum onsite

WELL SAMPLING

SAMPLING METHOD

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

SAMPLE DISTRIBUTION

Sample Series: 9006

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1401	3 VOAs	BTEX, TPH-G	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 6/14/90 Time 9:50
Sampled by TSN (Initials)

Job Name EXXON ALAMEDA
Job Number 4167.326.02
Recorded by Thomas Nitt (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): 16.0
Water Level Depth (WL in feet BTOC): 6.14
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:

(16.0 TD (feet) − 6.14 WL (feet)) × 4² D (inches) × 3 # Vols × 0.0408 = 19.4 gallons Calculated Purge Volume

PURGE TIME

920 Start 945 Stop 25 Elapsed

PURGE RATE

Initial gpm Final gpm

ACTUAL PURGE VOLUME

20.0 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other TURB
initial	6.8	2920	22.0	10
7 gal	6.8	2930	20.9	
14 gal	7.1	2990	19.7	
20 gal	7.2	2860	20.7	>100

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): Strong HC odor, sheen, bluish, sand
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other ONSITE IN DRUM

WELL SAMPLING

SAMPLING METHOD

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

SAMPLE DISTRIBUTION

Sample Series: 9006

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1403	3 VOAs	BTEX, TPH-G	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
Date 6/14/90 Time 10:50
Sampled by TSN (Initials)

Job Name EXXON ALAMEDA
Job Number 4167.326.02
Recorded by Thomas Nett (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): 14.20
Water Level Depth (WL in feet BTOC): 5.83
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:

(14.2 TD (feet) - 5.83 WL (feet)) x 4 D (inches)^2 x 3 # Vols x 0.0408 = 16.4 gallons Calculated Purge Volume

PURGE TIME

10:12 Start 10:38 Stop 29 Elapsed

PURGE RATE

Initial gpm Final gpm

ACTUAL PURGE VOLUME

17.0 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐°C ☐°F	Other TURB
Initial	6.8	2450	23.3	11
6	6.8	2580	21.6	
12	6.9	2440	20.7	
17	6.9	4330	21.2	52

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): No sheen, clear, strong H.C. odor
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other ONSITE IN DRUM

WELL SAMPLING

SAMPLING METHOD

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

SAMPLE DISTRIBUTION

Sample Series: 9006

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1404	3 VOAs	BTXE, TAH-L	NOA E	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 6/14/90 Time 13:30
Sampled by TSN (Initials)

Job Name EXXON ALAMEDA
Job Number 4167,326.02
Recorded by Thomas Nutt (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): 18.1
Water Level Depth (WL in feet BTOC): 5.92
Number of Well Volumes to be purged (# Vols)
☑ 3 ☐ 4 ☐ 5 ☐ 10 ☐ Other

PURGE VOLUME CALCULATION:

$(18.1 - 5.92) \times 4^2 \times 3 \times 0.0408 = 23.9$ gallons

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

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 TIME

Start 13:25 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 TURB
INITIAL	6.7	4540	22.8	9
9	6.7	11,150	20.3	18
18	7.0	11,140	21.1	66
24	7.1	11,120	21.5	72

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): H.C. odor, no sheen
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ~~☑ Other~~ ONSITE IN DRUM

WELL SAMPLING

SAMPLING METHOD

☐ Same As Above
☐ Bailer - Type:
☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.: 9006
☐ Grab - Type:
☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series:

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1407	3 VOAs	BTEX-TPH-L	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-5
Well Type: ☑ Monitor ☐ Extraction ☐ Other
Well Material: ☑ PVC ☐ St. Steel ☐ Other
Date 6/14/90 Time 9:00
Sampled by TSN (Initials)

Job Name EXXON ALAMEDA
Job Number 4167,326.02
Recorded by Thomas Snell (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): 19.0
Water Level Depth (WL in feet BTOC): 5.81
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): 19.0 Screen Interval in feet (BTOC): from ____ to ____

PURGE VOLUME CALCULATION:

(19.0 TD (feet) − 5.81 WL (feet)) × 4 D (inches)^2 × 3 # Vols × 0.0408 = 25.9 gallons Calculated Purge Volume

PURGE TIME

8:31 Start 8:55 Stop ____ Elapsed

PURGE RATE

Initial 6 gpm Final 6 gpm

ACTUAL PURGE VOLUME

26.0 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other TURB
initial	7.3	711	18.9	44
9 gal	6.8	1263	19.4	82
18 gal	7.0	2850	18.6	53
26 gal — waited for recovery	Went dry after		18 gal	

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☑ °C ☐ °F	Other TURB
26 gal	7.0	2733	18.4	41
Meter Nos.				

Observations During Purging (Well Condition, Turbidity, Color, Odor): Strong HC odor, bluish color
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other in DRUM, ONSITE

WELL SAMPLING

SAMPLING METHOD

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

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

SAMPLE DISTRIBUTION

Sample Series: 9006

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1402	3 VOAs	BTEX TPH-L	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

Job Name EXXON ALAMEDA

Job Number 4167328.02

Recorded by Thomas Nott (Signature)

Date 6/14/90 Time 11:45

Sampled by TSN (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): 18.60

Water Level Depth (WL in feet BTOC): 6.19

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:

(18.60 (TD feet) − 6.19 (WL feet)) × 4 (D inches)^2 × 3 (# Vols) × 0.0408 = 24.4 gallons (Calculated Purge Volume)

PURGE TIME

11:15 Start 1140 Stop ____ Elapsed

PURGE RATE

Initial 2 gpm Final 4 gpm

ACTUAL PURGE VOLUME

25 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☐°C ☐°F	Other TUKB
Initial	6.9	5290	25.6	>100
8 gal	6.9	4440	21.7	
16	6.9	4430	22.3	
25				

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): Strong HC odor, no sheen

Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☑ Other ONSITE IN DRUM

WELL SAMPLING

SAMPLING METHOD

☐ Same As Above

☐ Bailer - Type:

☐ Grab - Type:

☐ Submersible ☐ Centrifugal ☐ Bladder; Pump No.:

☐ Other - Type:

SAMPLE DISTRIBUTION

Sample Series: 9006

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1405	3 VOA,	BTEX TPH-g	NONE	NET	

QUALITY CONTROL SAMPLES

Duplicate Samples		Blank Samples		Other Samples	
Original Sample No.	Duplicate Sample No.	Type	Sample No.	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 6/14/90 Time 12:30
Sampled by TSN (Initials)

Job Name EXXON ALAMEDA
Job Number 4167,326.02
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): 17.0
Water Level Depth (WL in feet BTOC): 5.55
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:

(17.0 TD (feet) − 5.55 WL (feet)) × 4² D (inches) × 3 # Vols × 0.0408 = 22.5 gallons Calculated Purge Volume

PURGE TIME

12:15 Start 12:29 Stop 14 Elapsed

PURGE RATE

Initial gpm Final gpm

ACTUAL PURGE VOLUME

24 gallons

FIELD PARAMETER MEASUREMENT

Minutes Since Pumping Began	pH	Cond. (µmhos/cm)	T ☒ °C ☐ °F	Other TURB
Initial	7.1	3940	22.4	>100
8	6.9	3750	21.2	>100
16	7.0	3730	21.6	>100
23	6.8	3670	21.8	

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

Observations During Purging (Well Condition, Turbidity, Color, Odor): MURKY, STRONG HC. ODOR, SHEEN
Discharge Water Disposal: ☐ Sanitary Sewer ☐ Storm Sewer ☒ Other ONSITE IN DRUM

WELL SAMPLING

SAMPLING METHOD

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

SAMPLE DISTRIBUTION

Sample Series: 9006

Sample No.	Volume/Cont.	Analysis Requested	Preservatives	Lab	Comments
1406	3 VOAs	BTEX, TPH-G	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

7 JUN 90 8:17

Michelle Watson
Harding Lawson Associates
200 Rush Landing
Novato, CA 94947

Date: 06-28-90
NET Client Acct No: 281
NET Pacific Log No: 2458
Received: 06-14-90 1800

Client Reference Information

Exxon, Alameda; Job: 4167,326.02

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)

Client Acct: 281
Client Name: Harding Lawson Associates
NET Log No: 2458

Date: 06-28-90
Page: 2

Ref: Exxon, Alameda; Job: 4167,326.02

Parameter	Reporting Limit	Descriptor, Lab No. and Results 90061401 06-14-90 0800 55460	 90061402 06-14-90 0900 55461	Units
PETROLEUM HYDROCARBONS		--	--	
VOLATILE (WATER)		--	--	
DILUTION FACTOR *		10	25	
DATE ANALYZED		06-25-90	06-25-90	
METHOD GC FID/5030		--	--	
as Gasoline	0.05	32	12	mg/L
METHOD 602		--	--	
DILUTION FACTOR *		1	250	
DATE ANALYZED		06-25-90	06-25-90	
Benzene	0.5	1,400	3,300	ug/L
Ethylbenzene	0.5	ND	350	ug/L
Toluene	0.5	19	160	ug/L
Xylenes, total	0.5	120	730	ug/L

Ref: Exxon, Alameda; Job: 4167,326.02

Parameter	Reporting Limit	Descriptor, Lab No. and Results 90061403 06-14-90 0950 55462	 90061404 06-14-90 1050 55463	Units
PETROLEUM HYDROCARBONS		--	--	
VOLATILE (WATER)		--	--	
DILUTION FACTOR *		100	10	
DATE ANALYZED		06-23-90	06-23-90	
METHOD GC FID/5030		--	--	
as Gasoline	0.05	34	12	mg/L
METHOD 602		--	--	
DILUTION FACTOR *		100	100	
DATE ANALYZED		06-23-90	06-25-90	
Benzene	0.5	3,800	5,700	ug/L
Ethylbenzene	0.5	1,600	1,300	ug/L
Toluene	0.5	730	400	ug/L
Xylenes, total	0.5	3,900	760	ug/L

Ref: Exxon, Alameda; Job: 4167,326.02

Parameter	Reporting Limit	Descriptor, Lab No. and Results 90061405 06-14-90 1145 55464	 90061406 06-14-90 1230 55465	Units
PETROLEUM HYDROCARBONS		--	--	
VOLATILE (WATER)		--	--	
DILUTION FACTOR *		25	50	
DATE ANALYZED		06-25-90	06-25-90	
METHOD GC FID/5030		--	--	
as Gasoline	0.05	38	14	mg/L
METHOD 602		--	--	
DILUTION FACTOR *		500	50	
DATE ANALYZED		06-25-90	06-25-90	
Benzene	0.5	9,100	1,200	ug/L
Ethylbenzene	0.5	2,900	75	ug/L
Toluene	0.5	7,800	2,800	ug/L
Xylenes, total	0.5	12,000	930	ug/L

Ref: Exxon, Alameda; Job: 4167,326.02

Parameter	Reporting Limit	Descriptor, Lab No. and Results 90061407 06-14-90 1330 55466	 90061408 06-14-90 1430 55467	Units
PETROLEUM HYDROCARBONS		--	--	
VOLATILE (WATER)		--	--	
DILUTION FACTOR *		25	1	
DATE ANALYZED		06-25-90	06-23-90	
METHOD GC FID/5030		--	--	
as Gasoline	0.05	9.5	ND	mg/L
METHOD 602		--	--	
DILUTION FACTOR *		25	1	
DATE ANALYZED		06-25-90	06-23-90	
Benzene	0.5	1,300	ND	ug/L
Ethylbenzene	0.5	310	ND	ug/L
Toluene	0.5	880	ND	ug/L
Xylenes, total	0.5	1,800	ND	ug/L

Ref: Exxon, Alameda; Job: 4167,326.02

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Gasoline	0.05	mg/L	109	ND	98	108	9.4
Benzene	0.5	ug/L	92	ND	91	94	3.4
Toluene	0.5	ug/L	98	ND	94	96	2.7

COMMENT: Blank Results were ND on other analytes tested.

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Gasoline	0.05	mg/L	109	ND	100	103	2.9
Benzene	0.5	ug/L	94	ND	100	103	3.1
Toluene	0.5	ug/L	98	ND	94	96	2.6

COMMENT: Blank Results were ND on other analytes tested.

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	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 (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
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 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

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.

SM: see "Standard Methods for the Examination of Water & Wastewater, 16th Edition, APHA, 1985.

Harding Lawson Associates
7655 Redwood Boulevard
P.O. Box 578
Novato, California 94948
415/892-0821
Telecopy: 415/892-0831
Telex: 340523

CHAIN OF CUSTODY FORM

2458

Lab: NET

Samplers: TomNett

Job Number: 4167.326.02

Name/Location: EXXON ALAMEDA

Project Manager: MICHELLE WATSON

Recorder: ThomasNett
(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
23	X				3			90061401	900606	14	0800				
23	X				3			90061402	900606	14	0900				
23	X				3			90061403	900606	14	0950				
23	X				3			90061404	900606	14	1050				
23	X				3			90061405	900606	14	1145				
23	X				3			90061406	900606	14	1230				
23	X				3			90061407	900606	14	1330				
23	X				2			90061408	900606	14	1430				

ANALYSIS REQUESTED

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

CHAIN OF CUSTODY RECORD

RELINQUISHED BY: (Signature) ThomasNett	RECEIVED BY: (Signature) Joseph M. Bell	DATE/TIME 6-14-90 16:00
RELINQUISHED BY: (Signature) Joseph M. Bell	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	RECEIVED FOR LAB BY: (Signature)	DATE/TIME 6-14-90 1800
METHOD OF SHIPMENT		

6533

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