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SUPPLEMENTAL ENVIRONMENTAL INVESTIGATION


at
Exxon Service Station 7-0236
6630 East 14th Street
Oakland, California

Feb 14, 94

Report Prepared for:

Exxon Company, U.S.A.
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RESNA Project. 170079.06

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For Exxon Company, U.S.A.

1.0 INTRODUCTION

At the request of Exxon Company U.S.A. (Exxon), RESNA Industries Inc. (RESNA) conducted an environmental investigation at Exxon Service Station 7-0236, 6630 East 14th Street, Oakland, California. Exxon requested that RESNA perform this investigation to further evaluate the source and lateral extent of hydrocarbons in the soil and groundwater, evaluate the effective radius of influence and anticipated hydrocarbon concentrations for a vapor extraction system, and assess the hydraulic properties of the upper water bearing zone. This investigation was conducted in response to the detection of residual hydrocarbons in soil and dissolved hydrocarbons in groundwater during previous environmental work at the site.

Specific tasks associated with this investigation included drilling five soil borings into first encountered groundwater, collecting soil samples from the borings, collecting groundwater samples from two of the borings, installing vapor extraction wells in three of the borings, analyzing selected soil and groundwater samples, conducting a step drawdown test to evaluate the pumping rate of the aquifer, and conducting a vapor extraction test (VET).

2.0 SITE DESCRIPTION

Exxon Station 7-0236 is an operating retail gasoline station located on the northern side of East 14th Street between Havenscourt Boulevard and 66th Avenue in Oakland, California, as depicted on the Site Vicinity Map (Plate 1). Structures at the site include a service station building with two

3.0 INVESTIGATION OF SOIL AND GROUNDWATER

Work at the site was performed in accordance with RESNA's Work Plan 170079.06 dated October 13, 1993. Field work performed at the site was conducted in accordance with a site safety plan prepared for the site. RESNA performed field work at the site according to the procedures outlined in Appendix A. Well permits were acquired from the Alameda County Department of Environmental Health. Copies of permits are contained in Appendix B.

3.1 Soil Boring and Sampling

A RESNA field geologist observed Kvilhaug Well Drilling & Pump Company, Inc. of Concord, California, drill three 11.25-inch diameter soil borings (VE-1, VE-2, and VE-3) and two 8.5-inch diameter soil borings (B-1 and B-2) on November 23 and 29, 1993. Borings were drilled using a B-61 drill rig equipped with hollow stem augers. Borings B-1 and B-2 were terminated at approximately 11.5 and 15.0 feet below grade, and borings VW-1, VW-2, and VW-3 were terminated at approximately 12 and 16.5 feet below grade. Groundwater was encountered at a depth of approximately 12 feet. The locations of the borings are shown on Plate 2.

During drilling, soil samples were collected from the borings at approximately 5-foot intervals. The samples were identified by manual and visual methods, and classified according to the Unified Soil Classification System. Construction details and descriptions of the materials encountered are presented in the Logs of Borings (Appendix C). Sediments consisted of clay, silty clay, and gravely silt. The soil samples were screened for the presence of hydrocarbon vapors with a field photoionization detector (PID). Readings recorded in the field are shown on the Logs of Borings and were subsequently used as a basis for selecting soil samples for laboratory analyses. The site geologist initiated Chain of Custody Records in the field; these records accompanied the samples to the laboratory.

Borings B-1 and B-2 were grouted to ground surface using a cement bentonite slurry. Cuttings generated during drilling were stockpiled onsite and covered with plastic. At the request of Exxon, a composite soil sample (four brass sleeves) was collected from the cuttings to characterize

hydrocarbon concentrations for disposal. On January 21, 1994, Dillard Trucking, Inc. of Byron, California transported the soil cuttings to BFI Landfill in Livermore, California.

3.2 Well Construction

Vapor extraction wells VE-1 through VE-3 were constructed in the 11.25-inch borings. Details of well construction are shown on the Logs of Borings (Appendix C) and discussed in Appendix A.

3.3 Groundwater Sampling

Water samples were collected from borings VE-2 and B-2 using a Hydropunch sampling device. Field methods are described in Appendix A.

3.4 Laboratory Analyses and Results

Soil samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg) using Environmental Protection Agency (EPA) Method 8015 (modified for gasoline), total petroleum hydrocarbons as diesel (TPHd) using EPA Method 3550/8015, and benzene, toluene, ethylbenzene, and total xylene isomer (BTEX) using EPA Method 8020. The soil samples from the drill cuttings were also analyzed for lead. Groundwater samples were analyzed for TPHg using EPA Method 8015 (modified for gasoline), TPHd using EPA Method 3510, and BTEX using EPA Method 602. Samples were analyzed by PACE Incorporated (Pace) in Novato, California (Hazardous Waste Testing Laboratory Certificate. 1282). Laboratory analysis reports and Chain of Custody Records are contained in Appendix D.

Results of analyses indicated concentrations of TPHg, TPHd, and BTEX were not detected in soil samples from boring B-1, drilled near the UST's; and only low concentrations of TPHd in soil samples collected from boring VE-2, drilled near the pump islands. Residual gasoline and/or diesel hydrocarbons (TPHg, TPHd, and BTEX) were detected in borings VE-1, VE-3, and B-2 (near the pump islands). TPHg concentrations ranged from 1.7 parts per million (ppm) to 200 ppm, and TPHd concentrations ranged from 7.2 ppm to 150 ppm. The highest hydrocarbon

concentrations were detected in the capillary fringe. A map showing the analytical results of each soil sample is presented in Plate 3.

Water samples from the borings near the pump islands contained concentrations of TPHg at 1,300 parts per billion (ppb) and 6,800 ppb, TPHd at 1,300 ppb and 330 ppb, and benzene at 0.5 ppb and 35 ppb. A map showing the analytical results of each groundwater sample is presented in Plate 4.

A summary of the results of the analyses of soil and groundwater samples is presented in Table 1.

4.0 VAPOR EXTRACTION TEST

4.1 Purpose

RESNA performed a VET on December 1, 1993. Notification was given to the Bay Area Air Quality Management District prior to conducting the test. The purpose of the 1-day VET was to evaluate the feasibility of using vapor extraction as a remediation alternative for vadose zone soil. The VET had three main objectives: evaluate the air flowrates that can be achieved from the vapor extraction wells; measure hydrocarbon concentrations of the extracted vapors; and estimate an effective radius of influence for the vapor extraction wells for future engineering design, if applicable.

4.2 VET Equipment and Protocol

The VET equipment consisted of a six-cylinder internal combustion (I.C.) engine with a motor-driven vacuum blower and instrumentation for measuring air velocity, air pressure/vacuum, air temperature, and volatile organic compound concentrations. The vapor extraction wells were connected to the I.C. engine using polyvinyl chloride (PVC) piping, fittings, and wellhead connections. The I.C. engine and blower were used to apply a vacuum to the vapor extraction wells and induce air flow through subsurface soils. The extracted petroleum hydrocarbon vapors were burned as fuel inside the I.C. engine. The exhaust gas was discharged to the atmosphere following additional treatment through a catalytic converter.

Five existing wells (VE-1 through VE-3, MW-1, and MW-2) were used as either extraction wells or monitoring points during the VET. The locations of these wells are shown on Plate 2. Information regarding well diameters, available screen zone, and depths to groundwater are summarized in Table 2. The VET was conducted in three parts. A 4-hour test was first performed on well VE-1 to collect representative influent vapor samples and to measure vacuum response at selected wells. Two 30-minute tests were then performed on wells VE-2 and VE-3 to collect representative influent and effluent vapor samples and measure vacuum response in selected wells.

Vapor samples were collected from a sample port on the influent side of the I.C. engine using a sample pump and mylar sample bags. Air flowrates were measured from the wellhead using an averaging pitot tube and magnehelic gauge installed in a 4-inch PVC pipe manifold connecting the wellhead to the I.C. engine. Applied vacuum at the wellhead was measured using a magnehelic pressure gauge placed in the manifold piping. Extracted vapors were screened for organic vapor concentrations using a PID. Vacuum response at each observation well was monitored with a magnehelic gauge.

4.3 VET Field Data

While extracting from well VE-1 at a flowrate of 31 actual cubic feet per minute (acfm), negligible vacuum responses were observed at wells VE-2, VE-3 and MW-2 (0.00 to 0.02 inches of water column). A low positive pressure (0.17 to 0.32 inches of water column) was observed in MW-1 at the 31 acfm flowrate. At an increased flowrate of 79 acfm from VE-1, vacuum responses were only slightly increased in VE-2 and VE-3 (0.03 to 0.15 inches of water column) while positive pressure increased in MW-1 and MW-2.

While extracting from well VE-2 at a flowrate of 31 acfm, negligible vacuum and positive pressure responses were observed in VE-3, MW-1, and MW-2. Well VE-1 exhibited the highest vacuum response observed during the VET (0.1 to 0.22 inches of water column). While extracting from VE-3 at a flowrate of 31 acfm, negligible vacuum and positive pressure responses were observed in all observation wells.

4.4 Laboratory Analysis

RESNA initiated a Chain of Custody Record that accompanied the vapor samples to a State-certified laboratory. The vapor samples were analyzed by PACE Incorporated for TPHg and BTEX using modified EPA Methods 8015 and 8020, respectively. The results of the laboratory analyses and other VET monitoring data are recorded in Table 3. Copies of the laboratory reports and Chain of Custody Records are included in Appendix E.

The highest TPHg vapor concentrations measured during the VET ranged from 22,000 to 60,000 mg/m³ in samples collected from VE-1 and exhibited higher values at a higher flowrate. Extraction well VE-1 is located approximately five feet from the existing USTs. TPHg vapor concentration measured from VE-2 and VE-3 ranged from 170 to 15,000 mg/m³. Extraction wells VE-2 and E-3 are located approximately 33 and 35 feet, respectively from the existing USTs.

4.5 Radius of Influence

Utilizing the induced vacuum and distance measurements obtained during a VET, an effective radius of influence can typically be estimated for the site. The effective radius of influence is defined as the radial distance from a vapor extraction well within which recorded vacuum levels suggest that subsurface air flow is sufficient to allow for the extraction of residual TPHg.

Methods for estimating an effective radius of influence vary due to the complexity of modeling the vapor extraction process and limited case-study information. RESNA generally assumes that an induced vacuum of 0.25 to 0.50 inches of water column should be sufficient to induce subsurface airflow within the zone of influence, depending on soil type. Air-modeling studies conducted by others suggest that the distance from the extraction well at which 1 percent of the applied well-head vacuum occurs can be interpreted as an effective radius of influence. This method is based upon theoretical model predictions, which project that approximately 90 percent of the total air extracted from the well, flows through soils within a radius of influence that is established using a 1 percent wellhead vacuum cut-off.

The majority of the vacuum responses observed during the VET were less than 0.1 inches of water column. In addition, the responses did not vary appreciably as a function of distance from the extraction wells. Because most vacuum responses were generally negligible and did not appear to vary with distance, an effective radius of influence cannot be accurately evaluated.

The vacuum response in VE-1 (while extracting from VE-2) was approximately an order of magnitude higher than all other vacuum responses observed during the VET. However, the lack of adequate vacuum responses at multiple distances from extraction wells does not allow for an extrapolation of radius of influence as a function of minimum vacuum response. Based on the limited data available RESNA concludes that the effective radius of influence for VE-2 cannot be accurately evaluated.

The relatively low extraction wellhead vacuums observed (3 to 21 inches of water column), low vacuum response, and the high achievable flowrates (31 to 79 acfm), suggest that short circuiting of the air stream through the nearby UST cavity and possibly the product pipe trenches is occurring in the vicinity of wells VE-1 and VE-3.

5.0 GROUNDWATER PUMPING TEST

5.1 Purpose and Scope

On December 29, 1993, RESNA recorded static water-level measurements and performed a step rate groundwater pumping test at the site to evaluate aquifer transmissivity, optimum long-term discharge rates for a constant rate discharge test, and hydrologic and extraction well conditions. The objective of the testing was to provide baseline information for the design and operation of a groundwater remedial action program. The testing program typically consists of a step drawdown test and a constant rate discharge test intended to provide several types of information. If the optimum long-term discharge rates estimated from the step draw-down test are below 0.14 gallons per minute (equivalent to 200 gallons per day), then the constant rate discharge test is generally not performed.

5.2 Test Instrumentation/Format

RESNA performed a step-drawdown test utilizing well MW-2 which was outfitted with a variable flow 2-inch submersible pump that was plumbed through a flow meter to 55 gallon drums. RESNA controlled and recorded the discharge rate manually. Drawdown in pumping well MW-2 was recorded both manually with a water-level probe and automatically using a data logger/pressure transducer system. Pumping well MW-2 was constructed of 4-inch inner-diameter PVC casing, with 0.020-inch wide slots.

RESNA performed the step-drawdown test using well MW-2 at discharge rates of 0.1, 0.2, and 0.3 gallons per minute (gpm). The pumping duration of the first two steps was approximately 60 minutes; the 0.3 gpm step was terminated after 30 minutes. The 0.2 gpm and 0.3 gpm steps both resulted in excessive drawdown in the pumping well. The plotted data of water column height in pumping well MW-2 versus time for the three pumping rates is shown in Appendix E. All water pumped from the wells was stored onsite in 55-gallon drums.

5.3 Test Interpretation

The short term step test showed significant decline in well productivity (pumping rate/ft of drawdown) with increasing discharge rate. Data gathered during the step-drawdown test indicated the sustainable discharge rate from well MW-2 is approximately 0.1 gpm or 144 gallons per day. The low discharge rate is supported by the presence of low permeability silty clay material encountered beneath the site. Therefore, because of the low sustainable discharge rate observed during the step-drawdown test, RESNA did not perform a long-duration groundwater pumping test.

6.0 SUMMARY AND CONCLUSIONS

Results of our investigation indicated the following:

- Sediments beneath the site consist of low permeability clay, silty clay, and gravely silt.
- Residual gasoline and diesel hydrocarbons (TPHg, TPHd, and BTEX) were not detected in soil samples from boring B-1 (drilled near the underground storage tanks) and only low concentrations of TPHd were detected in soil samples collected from boring VE-2. Residual gasoline and/or diesel hydrocarbons (TPHg, TPHd, and BTEX) were detected in borings VE-1, VE-3, and B-2 (drilled near the pump islands). The maximum concentration of TPHg was 200 parts per million (ppm), and the maximum concentration of TPHd was 150 ppm. The highest concentrations were detected in the capillary fringe.
- Water samples from the borings near the pump islands contained concentrations of TPHg at 1,300 parts per billion (ppb) and 6,800 ppb, TPHd at 1,300 ppb and 330 ppb, and benzene at 0.5 ppb and 35 ppb.
- Results of the VET indicated that the maximum achievable flowrates from wells VE-1, VE-2, and VE-3 ranged from 31 to 79 actual cubic feet per minute (acfm).
- The vacuum responses observed were either negligible or too low for use in radius of influence (ROI) evaluation.
- Wells VE-1 and VE-3 appear to be short circuiting due to the nearby presence of tank and/or product line backfill material.
- Well VE-2 is suitable for vapor extraction purposes.
- The distribution of TPHg vapor measured in soil gas suggests that the majority of source TPHg exists beneath the existing USTs.
- Data gathered during the step drawdown test performed at the site indicated that the sustainable flowrate is approximately 0.1 gallons per minute (gpm) or 144 gallons per day (gpd), which is below the minimum 200 gpd specified in the Regional Water Quality Control Board-San Francisco Bay Region's Internal Memo (November 20, 1992) to consider groundwater as suitable, or potentially suitable, for municipal or domestic water supply. Because of the low sustainable flowrate observed during the step draw-down test, RESNA concludes that groundwater pumping is not a feasible remedial alternative for removing dissolved petroleum hydrocarbons from groundwater. Furthermore the low flowrate may qualify the site for less stringent groundwater cleanup standards.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the investigation pumping and treating groundwater from beneath the site does not appear to be a feasible remediation technique and vapor extracting residual hydrocarbons in soil beneath the site will have limited practical application. Also, the available data indicates that relatively low concentrations of residual hydrocarbons beneath the site appear to be limited to soil beneath the USTs and near the pump islands. Therefore RESNA recommends meeting with the California Regional Quality Control Board-San Francisco Bay Region to discuss the findings of the step drawdown test, and if the site should be considered for alternative points of compliance.

RESNA also recommend that copies of this report be forwarded to the following:

Ms. Eva Chu
Alameda County Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

and to

Mr. Eddy So
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

8.0 REFERENCES

California Regional Water Quality Control Board, San Francisco Bay Region. August 10, 1990. Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites.

Exxon Company, U.S.A. June 1991. Phase II Environmental Investigation Scope of Work-Amendments Specific to California.

Alton Geoscience. April 29, 1991. Preliminary Site Investigation Report, Exxon Service Station No. 7-0236, 6630 E. 14th Street, Oakland, California.

California Regional Water Quality Control Board, San Francisco Bay Region. November 20, 1992. Internal Memo from Steven Ritchie.

Alton Geoscience. June 17, 1992. Supplemental Site Investigation Final Report, Exxon RAS No. 7-0236, 6630 E. 14th Street, Oakland, California.

RESNA Industries Inc. October 13, 1993. Work Plan for Supplemental Environmental Investigation at Exxon Station 7-0236, 6630 E. 14th Street, Oakland, California. Plan 170079-06.
RESNA Industries Inc. December 23, 1993. Groundwater Monitoring Report, Exxon Station 7-0236, 6630 E. 14th Street, Oakland, California, RESNA Project. 170079.01.

Table 1
 RESULTS OF ANALYSES OF SOIL AND GROUNDWATER SAMPLES
 Exxon Service Station 7-0236
 6630 East 14th Street
 Oakland, California

Sample Designation	Date	TPHg	TPHd	Benzene	Ethyl-Toluene	Total benzene	Xylenes	Lead
Soil Samples(1)								
S6.2B-1	11/29/93	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	NA
S11.5B-1	11/29/93	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	NA
S8.0B2	11/23/93	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	NA
S11.0B2	11/23/93	4.6	<5.0	<0.005	<0.005	<0.005	<0.005	NA
S8.0VE-1	11/29/93	4.8	8.5	0.024	0.014	0.057	0.023	NA
S11.3VE-1	11/29/93	200	47	<0.005	<0.005	<0.005	2.5	NA
S6.0VE2	11/23/93	<1.0	7.2	<0.005	<0.005	<0.005	<0.005	NA
S11.2VE2	11/23/93	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	NA
S6.0VE3	11/23/93	<1.0	<5.0	<0.005	<0.005	<0.005	<0.005	NA
S11.3VE3	11/23/93	1.7	150	<0.005	<0.005	<0.005	<0.005	NA
Cuttings C-ABCD*	11/29/93	11.0	42	<0.005	<0.005	0.18	0.035	<1.0
Cuttings D-ABCD*	11/29/93	1.4	<5.0	<0.005	<0.005	11	12	<1.0
Water Samples(2)								
B-2	11/23/93	6800	1300	35	16	340	36	NA
VE-2	11/23/93	1300	330	0.5	17	1.9	23	NA

Notes:

(1) Soil sample results in parts per million

(2) Water sample results in parts per billion

TPHg: Total petroleum hydrocarbons as gasoline

TPHd: Total petroleum hydrocarbons as diesel

NA: Not applicable

Sample designation:

S30.3VE-1: S=Soil, 30.3=Sample depth (feet), VE-1=Sample location

* = Drill Cuttings composite samples

TABLE 2
SUMMARY OF VAPOR EXTRACTION TEST INFORMATION
Exxon Service Station 7-0236
6630 East 14th Street, Oakland, California
December 1, 1993

Well No.	Well Diameter (inches)	Well Screen Slot Size (inches)	Well Depth ⁽¹⁾ (feet)	Well Screen Interval ⁽¹⁾ (feet)	Initial Depth to Water ⁽²⁾ (feet)	Exposed Screen ⁽¹⁾ (feet)	Final Depth to Water ⁽³⁾ (feet)
MW-1	4	0.02	26	6 - 26	12.30	6.30	12.28
MW-2	4	0.02	25	5 - 25	12.05	7.05	12.02
VE-1	4	0.02	12	3 - 12	NA	9	NA
VE-2	4	0.02	12	3 - 12	NA	9	NA
VE-3	4	0.02	12	3 - 12	NA	9	NA

Notes:

- (1) Well depths, screened intervals and exposed screen are measured from surface grade
 - (2) Initial depth to water measured from top of casing before start of vapor extraction test
 - (3) Final depth to water measured from top of casing immediately after completion of vapor extraction test
- NA: Not applicable
NM: Not measured

Table 3
VAPOR EXTRACTION TEST MONITORING DATA
Exxon Service Station 7-0236
6630 East 14th Street, Oakland, California
December 1, 1993
(Page 1 of 2)

Extraction Well VE-1 Data			Observation Well Vacuum Response (in H ₂ O)				Vapor Sample Analysis		
Time	Flowrate (cfm)	Vacuum (in H ₂ O)	VE-2	VE-3	MW-1	MW-2	Sample ID	TPHg (mg/m ³)	Benzene (mg/m ³)
9:30	31	3	0.00	0.00	-0.24	-0.24	--	--	--
10:00	31	3	0.01	0.00	-0.17	0.02	--	--	--
10:30	31	3	0.00	0.00	-0.32	0.02	V-1201-INF-1	22,000	<0.5
10:45	79	22	0.15	0.05	-0.32	0.00	--	--	--
11:00	79	21	0.15	0.05	-0.32	0.00	--	--	--
11:30	79	20	0.09	0.03	-0.45	0.02	V-1201-INF-2	60,000	<0.5
12:00	79	21	0.05	0.04	-0.40	-0.06	--	--	--
12:30	79	20	0.04	0.00	-0.65	-0.10	--	--	--
13:00	79	21	0.05	0.03	-0.65	-0.06	--	--	--
13:30	79	21.5	0.03	0.03	-0.79	-0.04	V-1201-INF-3	37,000	<0.5
Distance from Extraction well (ft)			32	36	57	14			

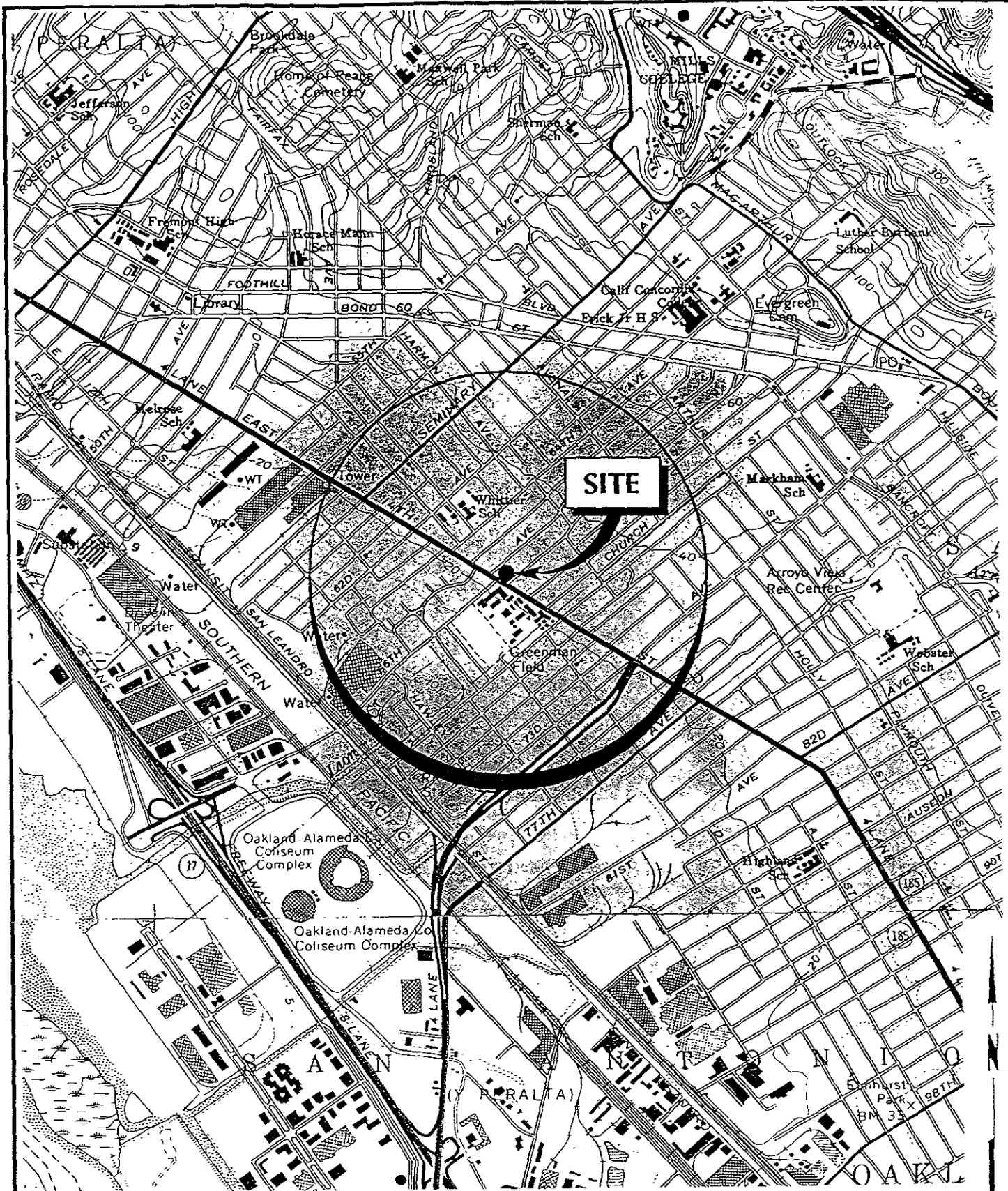
Extraction Well VE-2 Data			Observation Well Vacuum Response (in H ₂ O)				Vapor Sample Analysis		
Time	Flowrate (cfm)	Vacuum (in H ₂ O)	VE-1	VE-3	MW-1	MW-2	Sample ID	TPHg (mg/m ³)	Benzene (mg/m ³)
14:00	31	1.5	0.22	-0.02	-0.66	0.05	--	--	--
14:15	31	2.0	0.12	-0.03	-0.75	-0.08	V-1201-EFF-1	<50	2.8
14:30	31	2.0	0.10	0.04	-0.04	0.00	V-1201-INF-4	15,000	<0.5
Distance from Extraction well (ft)			32	17	34	43			

TABLE 3
 VAPOR EXTRACTION TEST MONITORING DATA
 Exxon Service Station 7-0236
 6630 East 14th Street, Oakland, California
 December 1, 1993
 (Page 2 of 2)

Extraction Well VE-3 Data			Observation Well Vacuum Response (in H ₂ O)				Vapor Sample Analysis		
Time	Flowrate (cfm)	Vacuum (in H ₂ O)	VE-1	VE-2	MW-1	MW-2	Sample ID	TPHg (mg/m ³)	Benzene (mg/m ³)
15:00	31	4.0	0.06	0.00	-0.065	-0.01	-	-	-
15:15	31	4.0	0.05	0.01	-0.46	0.00	-	-	-
15:30	31	4.0	0.03	0.02	-0.48	0.00	V-1201-INF-5	170	<0.5
Distance from Extraction well (feet)			36	17	19	49			

Notes:

cfm: cubic feet per minute
 in H₂O: inches of water column
 mg/m³: milligrams per cubic meter



Source USGS Topographic Map, 7.5 minute series, Oakland East, Calif and San Leandro Calif quadrangles 1980

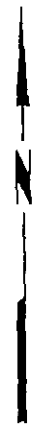
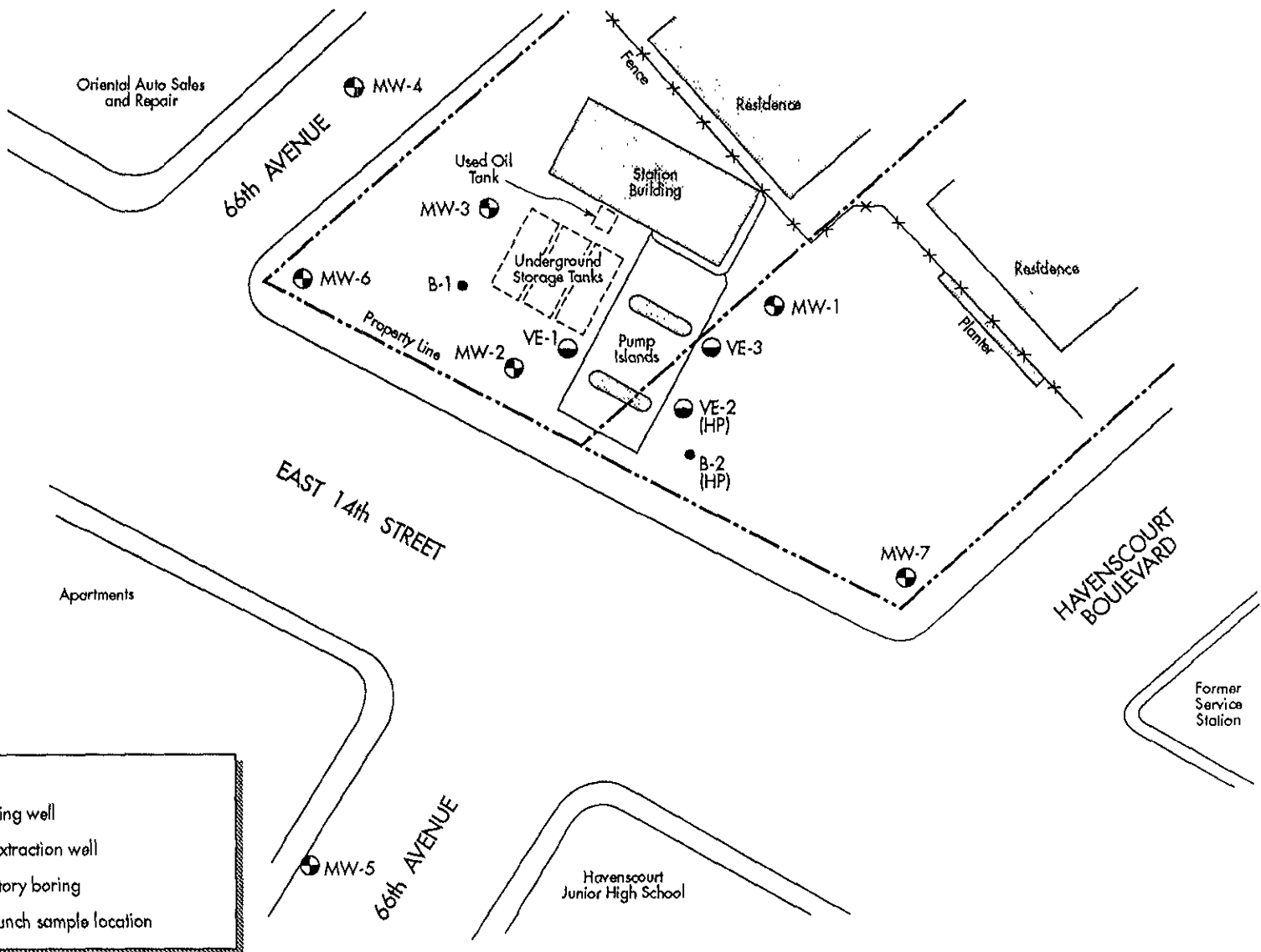
SITE VICINITY MAP
 Exxon Service Station No. 7-0236
 6630 East 14th Street
 Oakland, California

PLATE
1



PROJECT NO. 170079.06

1/94



EXPLANATION	
	MW-1 Monitoring well
	VE-2 Vapor extraction well
	B-2 Exploratory boring
	(HP) Hydropunch sample location



Map Source. Site Plan by Alton Geoscience, 1992

RESNA

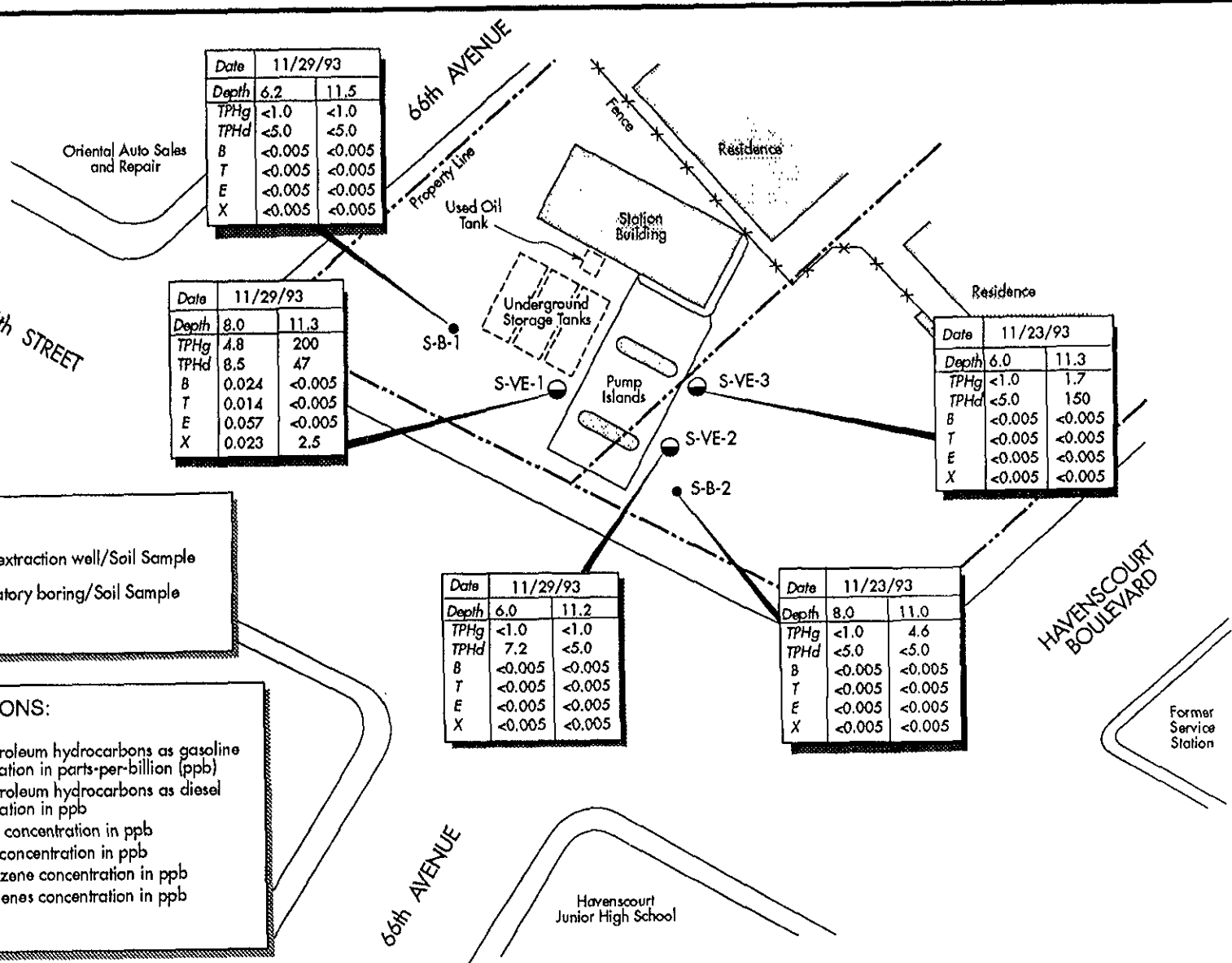
PROJECT NO. 170079.06

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GENERALIZED SITE PLAN

Exxon Service Station No. 7-0236
 6630 East 14th Street
 Oakland, California

PLATE
2



Date	11/29/93	
Depth	6.2	11.5
TPHg	<1.0	<1.0
TPHd	<5.0	<5.0
B	<0.005	<0.005
T	<0.005	<0.005
E	<0.005	<0.005
X	<0.005	<0.005

Date	11/29/93	
Depth	8.0	11.3
TPHg	4.8	200
TPHd	8.5	47
B	0.024	<0.005
T	0.014	<0.005
E	0.057	<0.005
X	0.023	2.5

Date	11/23/93	
Depth	6.0	11.3
TPHg	<1.0	1.7
TPHd	<5.0	150
B	<0.005	<0.005
T	<0.005	<0.005
E	<0.005	<0.005
X	<0.005	<0.005

Date	11/29/93	
Depth	6.0	11.2
TPHg	<1.0	<1.0
TPHd	7.2	<5.0
B	<0.005	<0.005
T	<0.005	<0.005
E	<0.005	<0.005
X	<0.005	<0.005

Date	11/23/93	
Depth	8.0	11.0
TPHg	<1.0	4.6
TPHd	<5.0	<5.0
B	<0.005	<0.005
T	<0.005	<0.005
E	<0.005	<0.005
X	<0.005	<0.005

EXPLANATION

- VE-2 Vapor extraction well/Soil Sample
- B-2 Exploratory boring/Soil Sample

CONCENTRATIONS:

- TPHg = Total petroleum hydrocarbons as gasoline concentration in parts-per-billion (ppb)
- TPHd = Total petroleum hydrocarbons as diesel concentration in ppb
- B = Benzene concentration in ppb
- T = Toluene concentration in ppb
- E = Ethylbenzene concentration in ppb
- X = Total Xylenes concentration in ppb



Map Source: Site Plan by Alton Geoscience, 1992

CONCENTRATIONS OF RESIDUAL HYDROCARBONS IN SOIL SAMPLES – November 1993

Exxon Service Station No. 7-0236
6630 East 14th Street
Oakland, California

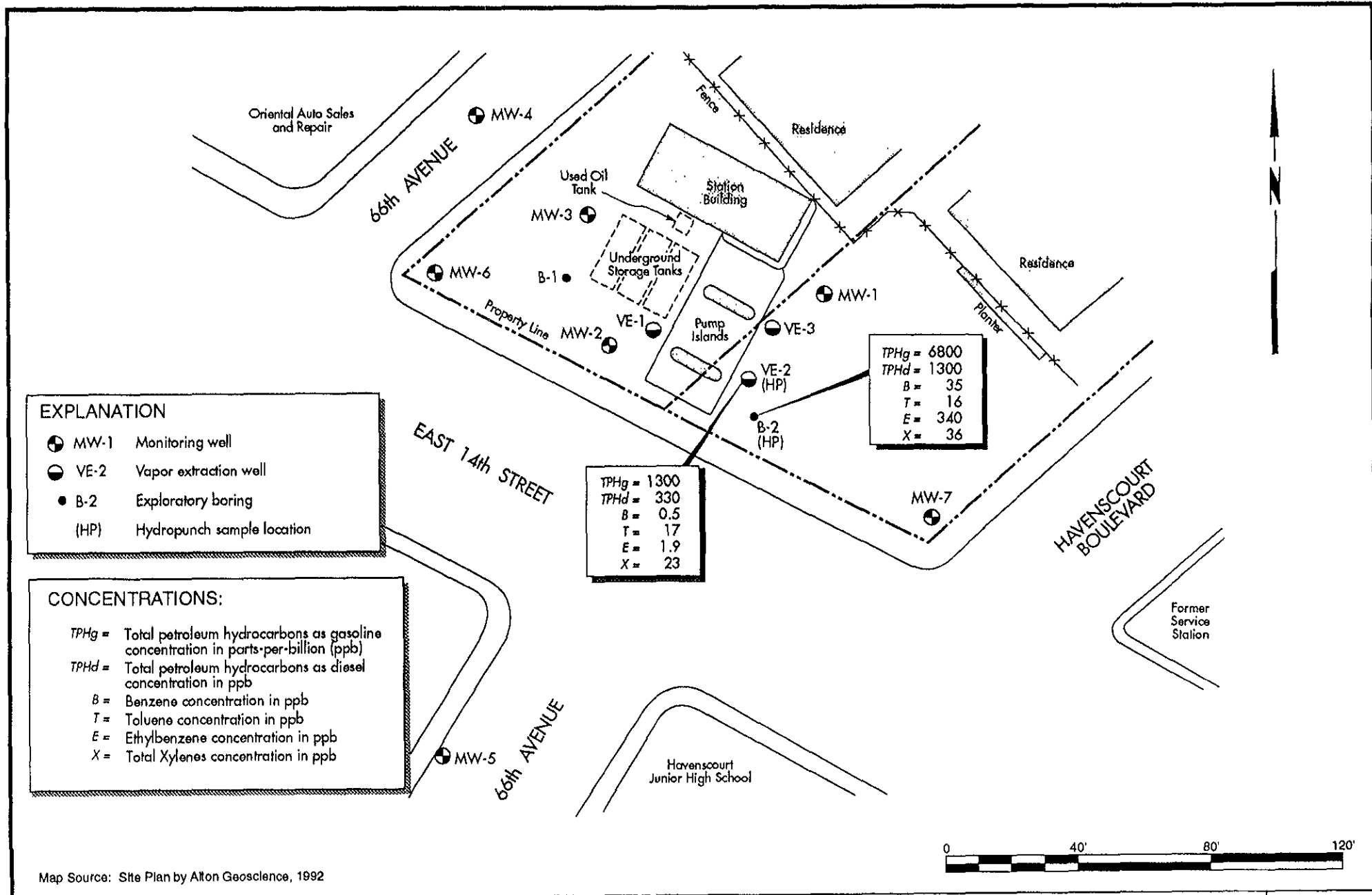
PLATE

3



PROJECT NO. 170079.06

1/94



Map Source: Site Plan by Alton Geoscience, 1992

**CONCENTRATIONS OF DISSOLVED HYDROCARBONS IN
GROUNDWATER SAMPLES -- November 23, 1993**

Exxon Service Station No. 7-0236
6630 East 14th Street
Oakland, California

PLATE

4

RESNA

PROJECT NO. 170079.06

1/94

APPENDIX A
FIELD PROCEDURES

FIELD PROCEDURES

Site Safety Plan

The Site Safety Plan describes the safety requirements for the evaluation of gasoline hydrocarbons in soil, groundwater, and the vadose-zone at the site. The Site Safety Plan is applicable to personnel of RESNA Industries and its subcontractors. RESNA Industries personnel and subcontractors of RESNA Industries scheduled to perform the work at the site are briefed on the contents of the Site Safety Plan before work begins. A copy of the Site Safety Plan is available for reference by appropriate parties during the work. A Site Safety Officer is assigned to the project.

Soil Borings

Prior to the drilling of borings for wells, permits are acquired from the appropriate agency. In addition to the above-mentioned permits, encroachment permits from the City or State are acquired if drilling of borings offsite on City or State property is necessary. Copies of the permits are included in the appendix of the project report. Prior to drilling, Underground Service Alert is notified of our intent to drill, and known underground utility lines and structures are approximately marked.

The borings are drilled by a truck-mounted drill rig equipped with 6-, 8-, or 10-inch diameter hollow-stem augers. Other methods such as rotary or casing hammer may be used if special conditions are encountered. The augers, sampling equipment and other equipment that comes into contact with the soil are steam-cleaned prior to drilling each boring to minimize the possibility of cross-contamination. Sampling equipment is cleaned with a trisodium phosphate solution and rinsed clean with clean water between samples. Borings not converted to wells are backfilled to the ground surface with a neat-cement grout with bentonite.

Drill Cuttings

Drill cuttings subjectively evaluated as containing gasoline hydrocarbons at levels greater than 100 parts per million (ppm) are separated from those subjectively evaluated as containing gasoline hydrocarbons at levels less than 100 ppm. Evaluation is based either on subjective evidence of soil discoloration, or on measurements made using a field calibrated organic vapor meter (OVM) or similar instrument. Readings are taken by placing a soil sample into a ziplock-type plastic bag and allowing volatilization to occur. The intake probe of the OVM is then inserted into the headspace created in the plastic bag immediately after opening it. The drill cuttings from the borings are placed in labeled 55-gallon drums approved by the Department of Transportation, or on plastic at the site, and covered with plastic. The cuttings remain the responsibility of the client.

Soil Sampling in Borings

Soil samples are collected at no greater than 5-foot intervals from the ground surface to the total depth of the borings. The soil samples are collected by advancing the boring to a point immediately above the sampling depth, and then driving a California-modified, split-spoon sampler containing brass sleeves through the hollow center of the augur into the soil. (A standard penetrometer, which does not contain liners, may be used to collect samples when laboratory analysis for volatile components is not an issue. The sampler and brass sleeves are laboratory-cleaned, steam-cleaned, or washed thoroughly with a laboratory-grade and water, prior to each use. The sampler is driven with a 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each successive six inches are counted and recorded to evaluate the

relative consistency of the soil. When necessary, the sampler may be pushed by the drill rig hydraulics. In this case, the pressure exerted (in pounds per square inch) is recorded.

The samples selected for laboratory analysis are removed from the sampler and quickly sealed in their brass sleeves with Teflon tape, plastic caps, and plastic zip-lock bags. The samples are then labeled, promptly placed in iced storage, and delivered to a laboratory certified by the State of California to perform the analyses requested.

One of the samples in brass sleeves not selected for laboratory analysis at each sampling interval is tested in the field using an OVM that is field calibrated at the beginning of each day it is used. This testing is performed by inserting the intake probe of the OVM into the headspace in the plastic bag containing soil sample as described in Drill Cuttings section above. The OVM readings are presented in Logs of Borings included in the project report.

Logging of Borings

A geologist is present to log the soil cuttings and samples using the Unified Soil Classification System. Samples not selected for chemical analysis, and the soil in the sampler shoe, are extruded in the field for inspection. Logs include texture, color, moisture, plasticity, consistency, blow counts, and any other characteristics noted. Logs also include subjective evidence for the presence of gasoline hydrocarbons, such as soil staining, noticeable or obvious product odor, and OVM readings.

Groundwater Sampling from a Boring

Borings are drilled to just above groundwater and a Hydropunch sampling device is driven into groundwater. A water sample is then retrieved from the boring.

Well Construction

Vapor extraction wells and monitoring wells are constructed in the borings using 2- or 4-inch-diameter, thread-jointed, Schedule 40 PVC casing. No chemical cements, glues, or solvents are used in well construction. Each casing bottom is sealed with a threaded end-plug, and each casing top with a locking plug. The screened portions of the wells are constructed of slotted PVC casing with 0.020-inch-wide (typical) slots for initial wells. Slot size for subsequent wells may be based on sieve analysis and/or well development data. The screened sections in monitoring wells are placed to allow monitoring during seasonal fluctuations of groundwater levels.

The annular space of each well is backfilled with No. 2 by 12 sand or similar sorted sand (pea gravel for vapor extraction wells) to approximately 2 feet above the top of the screened casing. The sand pack grain size for subsequent wells may be based on sieve analysis and/or well development data. A 1- to 2-foot bentonite plug is placed above the sand as a seal against cement entering the filter pack. The remaining annulus is then backfilled with a slurry of water, neat cement, and bentonite to approximately 1 foot below the ground surface.

An aluminum utility box with a PVC apron is placed over each well head and is set in concrete placed flush with the surrounding ground surface. Each wellhead cover has a seal to protect the well against surface water infiltration and requires a special wrench to open. The design discourages vandalism and reduces the possibility of accidental disturbance of the well.

Groundwater Monitoring Well Development

The monitoring wells are developed by bailing or over-pumping and surge-block techniques. The wells are either bailed or pumped, allowed to recharge, and bailed or pumped again until the water removed from the wells is clear. Turbidity measurements are recorded during well development and are used in evaluating well development. The turbidity measurement, volume of water removed, observations, and other pertinent field data are recorded. The wells are allowed to equilibrate for at least 48 hours after development before sampling. Water generated during well development is stored in 17E Department of Transportation (DOT) 55-gallon drums onsite; water remains the responsibility of the client.

Groundwater Sampling

The static water level in each well is measured to the nearest 0.01 foot using a Solinst electric water-level sounder or oil/water interface probe (if the well contains floating product) cleaned with a laboratory-grade detergent and water before used in each well. The depth of each well is also measured. The liquid in the wells is examined for visual evidence of gasoline hydrocarbons by gently lowering approximately half the length of a Teflon bailer (cleaned with a laboratory-grade detergent and water) past the air/water interface. The sample is then retrieved and inspected for floating product, sheen, emulsion, color, sediment, and clarity. Obvious product odor is recorded if noted. If floating product is present in the well, the thickness is measured using an oil/water interface probe and is recorded to the nearest 0.01 foot. Floating product is removed from wells on site visits.

Groundwater samples are collected in approximate order of increasing product concentration, as best known or estimated. Wells that do not contain floating product are purged using a submersible pump. Equipment that comes in contact with the interior of the wells or groundwater is cleaned with a laboratory-grade detergent and deionized or distilled water before use in each well. The wells are purged until withdrawal is of sufficient duration to result in stabilized pH, temperature, and electrical conductivity of the water. These parameters are measured using portable meters calibrated daily to a buffer and conductivity standard according to the manufacturer's specifications.

A minimum of four wells volumes is purged from each well. If the well becomes dewatered, the water level is allowed to recover to at least 80 percent of the initial water level. When recovery of the water level has not reached at least 80 percent of the static water level after 2 hours, a groundwater sample will be collected when sufficient volume is available to fill the sample container. Before collecting each groundwater sample, the Teflon bailer is cleaned with a laboratory-grade detergent and rinsed with tap water and deionized water, and the sampler changes their latex gloves. Hydrochloric acid (or other appropriate chemical) is added to the sample vials as a preservative. Sample containers remain sealed until usage at the site. A sample of the formation water is then collected from the surface of the water in each of the wells using the Teflon bailer. The water samples are then gently poured into laboratory-cleaned containers (as required by specific laboratory analysis), sealed with Teflon-lined caps, and inspected for air bubbles to check for headspace, which would allow volatilization to occur.

The samples are then labeled and promptly placed in iced storage, and the wellhead is secured. A field log documenting sampling procedures and parameter monitoring is maintained. Water generated by purging is stored in 17E DOT 55-gallon drums, and floating product bailed from the wells is stored in double containment onsite; the water and product remains the responsibility of the client.

Vadose-Zone Monitoring and Vapor Well Purging

Vapor readings are made with field-calibrated OVM, which has a lower detection limit of 0.1 ppm. After the OVM is turned on, it is allowed sufficient warm-up time for stabilization. Prior to purging each vadose-zone monitoring well, a well cap with a hose barb drilled and tapped into the well cap is secured to the well. The inlet of the vacuum pump is connected to the hose barb with tubing. OVM readings are taken from the exhaust port of the vacuum pump as the well is purged. Each well is purged for approximately 2 to 5 minutes or until about five well volumes of air have been removed. Ambient readings of the air at the site are taken with the OVM after each well is purged.

Air Sampling

The vacuum pump is first purged with ambient air. Vadose-zone monitoring is then performed as described above. A new Tedlar sample bag is placed on the outlet port of the vacuum pump with the valve closed. The valve is then opened to allow filling of the bag with an air sample. The valve is closed when the sample bag is 3/4 full (to allow for expansion of gas due to temperature changes), and the bag is removed. The sample pump is purged with ambient air after each sample is taken. A field log documenting sampling procedures is maintained. The samples are transported to the laboratory without exposure to sunlight or cooling, for analysis with 72-hour turnaround.

Sample Labeling and Handling

Sample containers are labeled in the field with the job number, unique sample location, depth, and date, and promptly placed in iced storage for transport to the laboratory. A Chain of Custody Record is initiated by the field geologist and updated throughout handling of the samples and accompanies the samples to a laboratory certified by the State of California for the analyses requested. Samples are transported to the laboratory promptly to help ensure that recommended sample holding times are not exceeded. Samples are properly disposed of after their useful life has expired.

Aquifer Testing

The initial water levels in wells to be used during the test are measured before commencement of pumping. The flowrate of the pump is adjusted to the desired pumping rate, and water levels are allowed to recover to initial levels. Pumping then begins, and the starting time of the pumping is recorded. Drawdown in observation wells is recorded at intervals throughout pumping using pressure transducers and manual methods. Evacuated water is stored in a storage tank at the site and remains the responsibility of the client. After the pump is shut off, recovery measurements are taken in the wells until recovery is 80 percent of the initial water level. Barometric pressure and tidal information (if appropriate) are collected for the time interval of the pumping test to allow evaluation of possible effects of atmospheric pressure and tidal fluctuations on the groundwater levels.

Quality Assurance/Quality Control

The sampling and analysis procedures employed by RESNA for groundwater sampling and monitoring follow regulatory guidance for quality assurance/quality control (QA/QC). Quality control is maintained by site-specific field protocols and quality control checks performed by the laboratory. Laboratory and field handling of samples may be monitored by including QC samples

for analysis. The number and types of QC samples are selected and analyzed on a project specific basis.

Trip blanks - Trips are sent to the project site, and travel with project site samples. They are not opened, and are returned from a project site with the sample for analysis.

Field blank - Prepared in the field using organic-free water. Field blanks accompany project site samples to the laboratory and are analyzed periodically for specific chemical compounds present at the project site where they were prepared.

Duplicates - Duplicate samples are collected from a selected well and project site. They are analyzed at two different laboratories, or at the same laboratory under different labels.

Equipment blank - Periodic QC samples are collected from field equipment rinsate to verify adequate cleaning procedures.

APPENDIX B
PERMITS



ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 (510) 484-2600

DRILLING PERMIT APPLICATION

235

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT Exxon Service Station 7-0236
6630 EAST 14th Street
OAKLAND CA

PERMIT NUMBER 93478

LOCATION NUMBER

CLIENT

Name Exxon Company U.S.A
Address 2300 Clayton Road Phone (510) 246-8768
City Concord CA Zip 94524

PERMIT CONDITIONS

Circled Permit Requirements Apply

APPLICANT

Name RESNA Industries Inc.
Address 73 Digital Drive Phone (415) 382-7400
City Novato CA Zip 94949

TYPE OF PROJECT

Well Construction Geotechnical Investigation
Cathodic Protection General
Water Supply Contamination 2 (Soil Boring)
Monitoring 3 (V.E.) Well Destruction

PROPOSED WATER SUPPLY WELL USE

Domestic Industrial Other
Municipal Irrigation

DRILLING METHOD:

Mud Rotary Air Rotary Auger X
Cable Other

DRILLER'S LICENSE NO. 554979 (WEST HAZMAT)

WELL PROJECTS

V.E. S.B. S.B.
Drill Hole Diameter 10 in. 6" Maximum
Casing Diameter 4 in. - Depth 10 ft. 10'
Surface Seal Depth 3 ft. 10' Number 3 2

GEOTECHNICAL PROJECTS

Number of Borings Maximum
Hole Diameter in. Depth ft.

ESTIMATED STARTING DATE 9/1/93

ESTIMATED COMPLETION DATE 9/10/93

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE

[Signature] Date 8/23/93

- A. GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling log and location sketch for geotechnical projects.
3. Permit is void if project not begun within 30 days of approval date.
B. WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practical or 20 feet.
C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.
D. CATHODIC. Fill hole above anode zone with cement placed by tremie.
E. WELL DESTRUCTION. See attached.

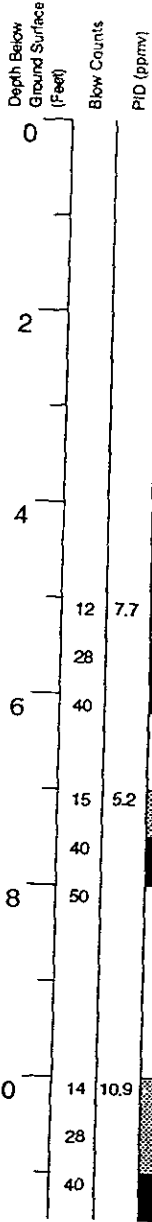
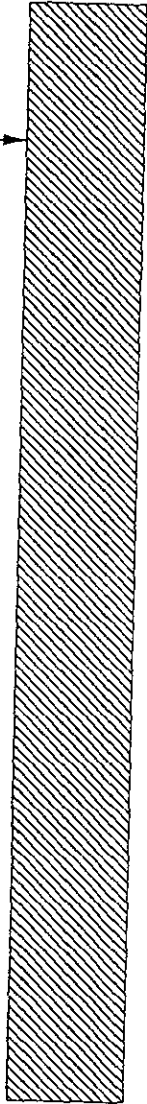
Approved

[Signature] Wyman Hong

Date

**APPENDIX C
LOGS OF BORINGS**

Grout



GRAPHIC LOG

DESCRIPTION

Asphalt

Silty GRAVEL (GM); Fill, brown

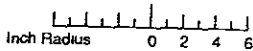
CLAY (CL); black, damp

CLAY (CL); black, damp, trace coarse sand, hard

Silty CLAY (CL); brown with gray mottling, trace fine gravel, hard

Silty CLAY (CL); same as above

T.D. @ 11.5 ft.



EXPLANATION

- Recovered drill sample
- Sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Core sample
- est K Estimated permeability (hydraulic conductivity)
1K = primary 2K = secondary
- NR No recovery
- Water level during drilling
- Water level in completed well

CONTACTS:

- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational

Logged by: Erich Neupert
 Project Mgr: Justin Power
 Dates Drilled: 11-23-93

Drilling Company: Kvilhaug
 Drilling Method: 8 1/2" Hollow Stem Auger
 Driller: Rod Furlow

Well Head Completion: none
 Type of Sampler: 2.5" split barrel
 TD (Total Depth): 11.5 feet



PROJECT NO. 170079.06

1/94

BORING LOG—Boring B-1
 Exxon Service Station No.7-0236
 6630 East 14th Street
 Oakland, California

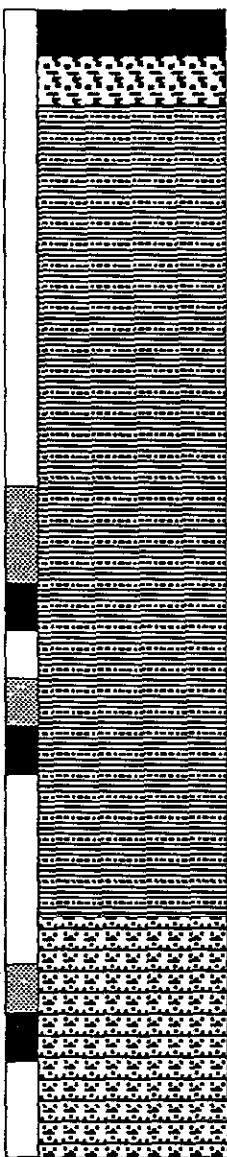
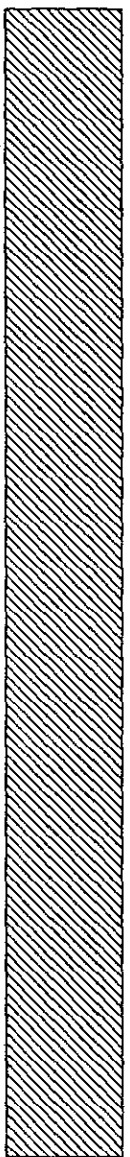
BORING
B-1

Grout →

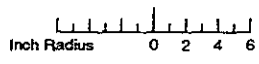
Measured Depth (Feet)
 Blow Counts
 PID (ppmv)

GRAPHIC LOG

DESCRIPTION



0 Asphalt
 Silty GRAVEL (GM); Fill
 2 CLAY (CL); dark gray, damp
 6 11 1.4 CLAY (CL); dark gray, trace coarse sand, damp, hard
 21 30
 9 1.0 Silty Clay (CL) with fine to coarse gravel, brown, damp, hard
 26 35
 8 10 13 16.4 Gravelly SILT (ML); brown, fine to coarse gravel, damp, hard
 27 29
 12



continues

EXPLANATION			CONTACTS:		
	Recovered drill sample	est K	Estimated permeability (hydraulic conductivity)	—	Solid where certain
	Sample sealed for chemical analysis	1K = primary 2K = secondary		Dotted where approximate
	Sieve sample	NR	No recovery	- - -	Dashed where uncertain
	Grab sample	W	Water level during drilling	////	Hachured where gradational
	Core sample	W	Water level in completed well		

Logged by:	Erich Neupert
Project Mgr:	Justin Power
Dates Drilled:	11-23-93
Drilling Company:	Kvilhaug
Drilling Method:	7 1/2" Hollow Stem Auger
Driller:	Mike Crocker
Well Head Completion:	none
Type of Sampler:	2.5" split barrel
TD (Total Depth):	15.0 feet

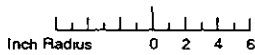
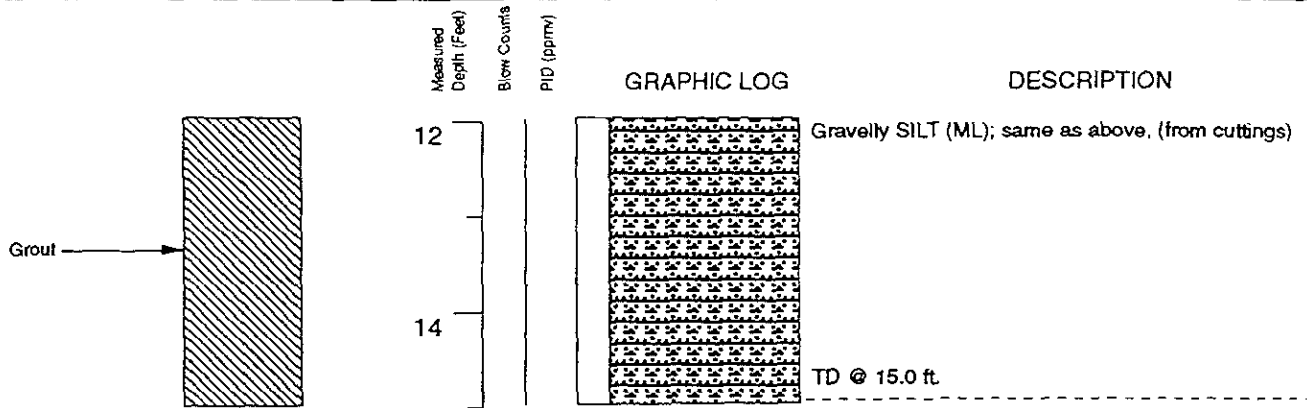


BORING LOG—Boring B-2
 Exxon Service Station No.7-0236
 6630 East 14th Street
 Oakland, California

BORING
B-2

PROJECT NO. 170079.06

1/94



EXPLANATION

- | | | | |
|--|-------------------------------------|-----------------------------|---|
| | Recovered drill sample | est K | Estimated permeability (hydraulic conductivity) |
| | Sample sealed for chemical analysis | 1K = primary 2K = secondary | |
| | Sieve sample | NR | No recovery |
| | Grab sample | ∇ | Water level during drilling |
| | Core sample | ∇ | Water level in completed well |

CONTACTS:

- | | |
|--|----------------------------|
| | Solid where certain |
| | Dotted where approximate |
| | Dashed where uncertain |
| | Hachured where gradational |

RESNA

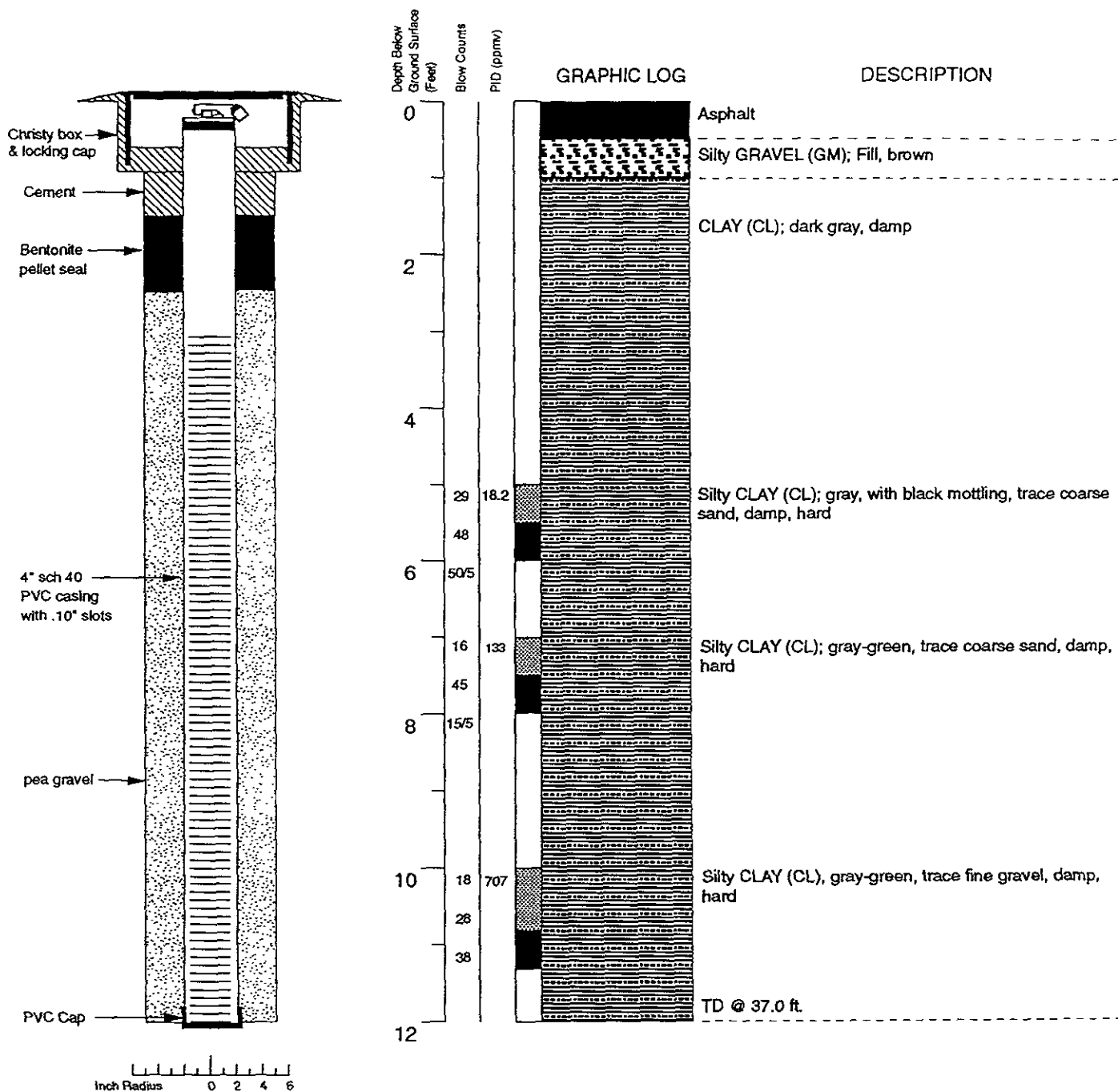
PROJECT NO. 170079.06

1/94

BORING LOG—Boring B-2
 Exxon Service Station No.7-0236
 6630 East 14th Street
 Oakland, California

BORING

B-2



Logged by: Erich Neupert
 Project Mgr: Justin Power
 Dates Drilled: 11-29-93
 Drilling Company: Kvilhaug
 Drilling Method: 1 1/4" Hollow Stem Auger
 Driller: Rod Furlow
 Well Head Completion: Christy box & locking cap
 Type of Sampler: 2.5" split barrel
 TD (Total Depth): 12.0 feet

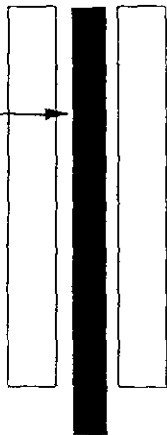


BORING LOG— (Extraction Well VE-1)

Exxon Service Station No.7-0236
 6630 East 14th Street
 Oakland, California

BORING VE-1

Bentonite
pellet seal



Depth Below
Ground Surface
(Feet)

12

14

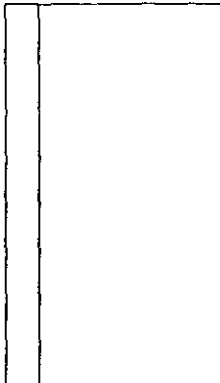
16

Blow Counts

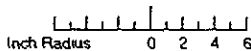
PID (ppmv)

GRAPHIC LOG

DESCRIPTION



TD @ 16.0 ft



EXPLANATION

- | | | | |
|--|-------------------------------------|-------|---|
| | Recovered drill sample | est K | Estimated permeability
(hydraulic conductivity)
1K = primary 2K = secondary |
| | Sample sealed for chemical analysis | | |
| | Sieve sample | NR | No recovery |
| | Grab sample | | Water level during drilling |
| | Core sample | | Water level in completed well |

CONTACTS.

- | | |
|--|----------------------------|
| | Solid where certain |
| | Dotted where approximate |
| | Dashed where uncertain |
| | Hachured where gradational |

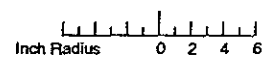
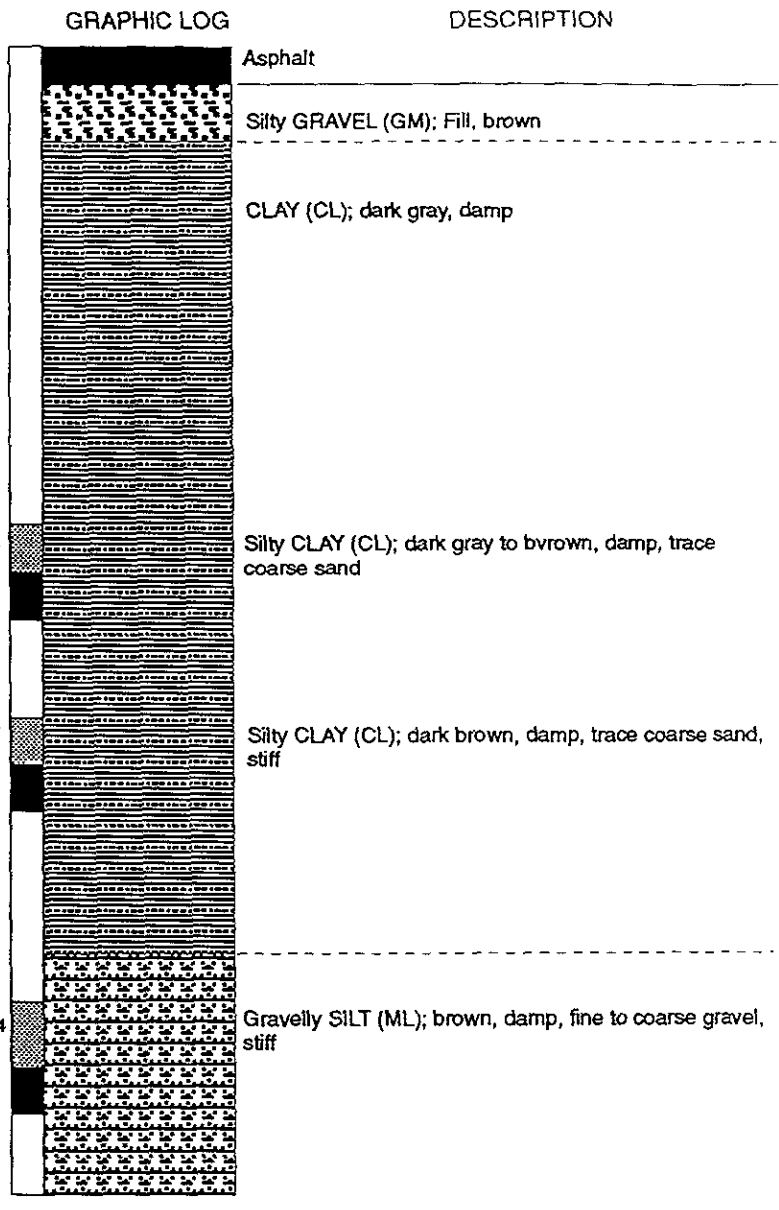
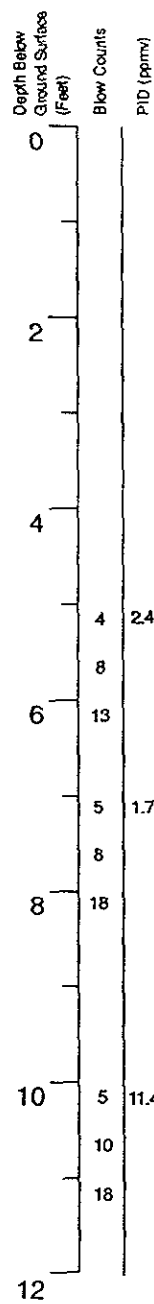
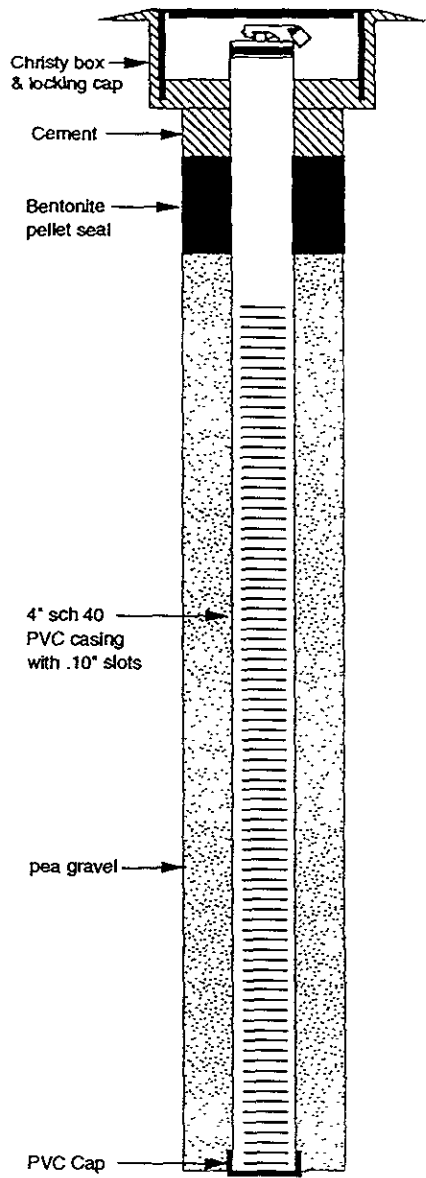


BORING LOG—(Extraction Well VE-2)
Exxon Service Station No.7-0236
6630 East 14th Street
Oakland, California

BORING
VE-2

PROJECT NO. 170079.06

1/94



continues

EXPLANATION	
	Recovered drill sample
	Sample sealed for chemical analysis
	Sieve sample
	Grab sample
	Core sample
est K	Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
NR	No recovery
	Water level during drilling
	Water level in completed well

CONTACTS:	
	Solid where certain
	Dotted where approximate
	Dashed where uncertain
	Hatched where gradational

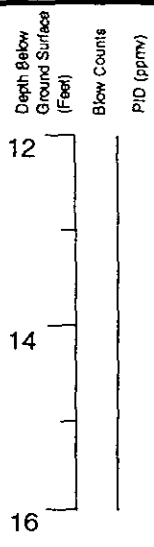
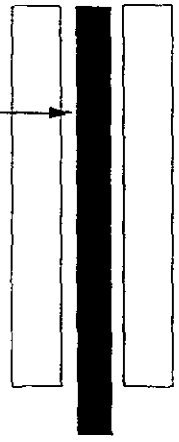
Logged by:	Erich Neupert
Project Mgr:	Justin Power
Dates Drilled:	11-23-93
Drilling Company:	Kvilhaug
Drilling Method:	11- 1/4" Hollow Stem Auger
Driller:	Rod Furlow
Well Head Completion:	Christy box & locking cap
Type of Sampler:	2.5" split barrel
TD (Total Depth):	16.0 feet



BORING LOG— (Extraction Well VE-2)
 Exxon Service Station No.7-0236
 6630 East 14th Street
 Oakland, California

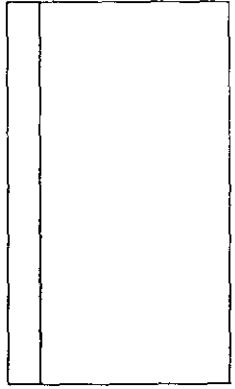
BORING
VE-2

Bentonite
pellet seal

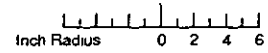


GRAPHIC LOG

DESCRIPTION



TD @ 16.0 ft



EXPLANATION			CONTACTS:		
	Recovered drill sample	est K	Estimated permeability (hydraulic conductivity)		Solid where certain
	Sample sealed for chemical analysis	1K = primary 2K = secondary			Dotted where approximate
	Sieve sample	NR	No recovery		Dashed where uncertain
	Grab sample		Water level during drilling		Hachured where gradational
	Core sample		Water level in completed well		

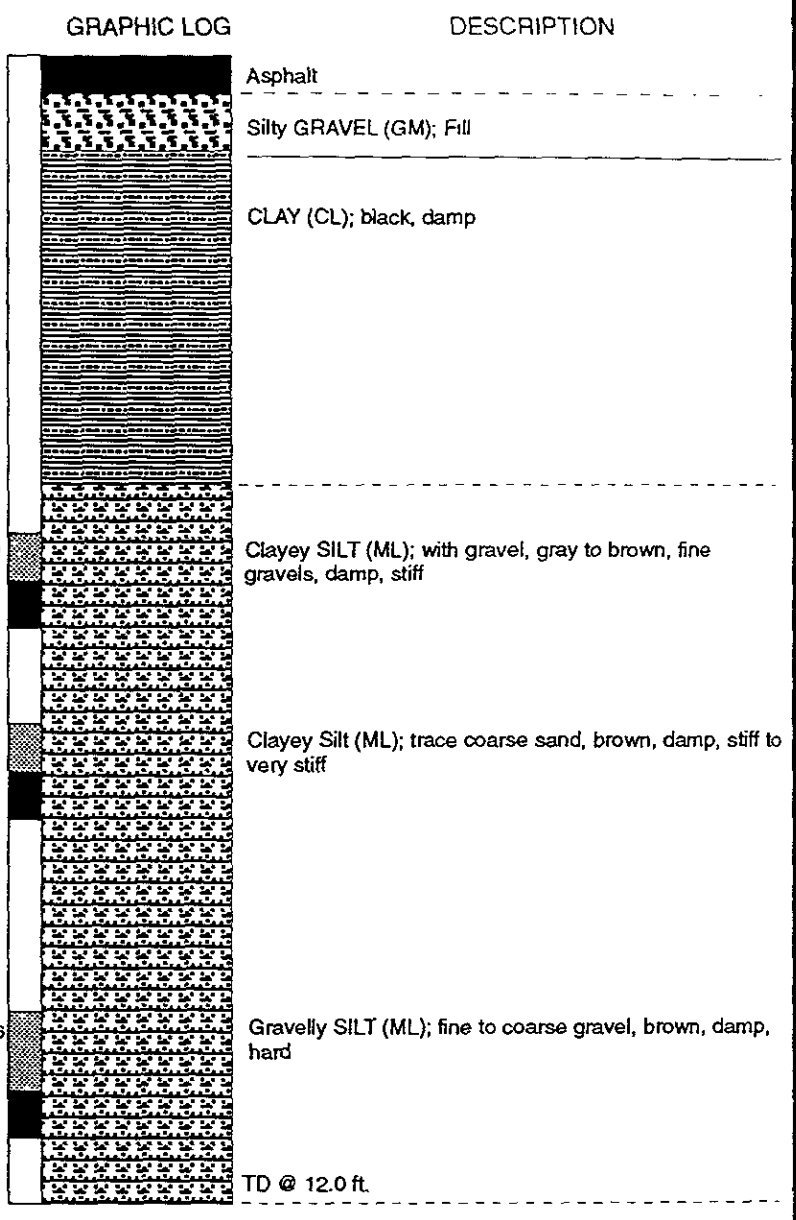
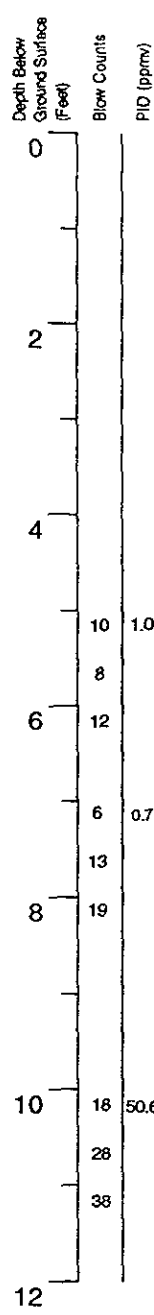
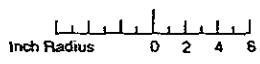
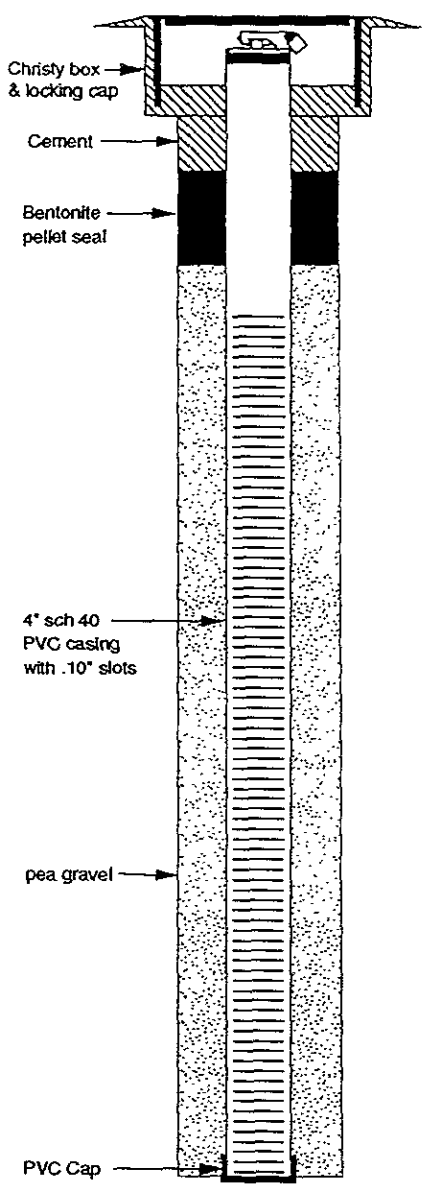


BORING LOG—(Extraction Well VE-2)
 Exxon Service Station No.7-0236
 6630 East 14th Street
 Oakland, California

BORING
VE-2

PROJECT NO. 170079.06

1/94



EXPLANATION		CONTACTS	
	Recovered drill sample		Solid where certain
	Sample sealed for chemical analysis		Dotted where approximate
	Sieve sample		Dashed where uncertain
	Grab sample		Hachured where gradational
	Core sample		
est K	Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary		
NR	No recovery		
	Water level during drilling		
	Water level in completed well		

Logged by: Erich Neupert
 Project Mgr: Justin Power
 Dates Drilled: 11-23-93
 Drilling Company: Kvilhaug
 Drilling Method: 1 1/4" Hollow Stem Auger
 Driller: Rod Furlow
 Well Head Completion: Christy box & locking cap
 Type of Sampler: 2.5" split barrel
 TD (Total Depth): 12.0 feet



BORING LOG— (Extraction Well VE-3)
 Exxon Service Station No.7-0236
 6630 East 14th Street
 Oakland, California

BORING
VE-3

APPENDIX D
LABORATORY ANALYSIS REPORTS
AND
CHAIN OF CUSTODY RECORDS

December 06, 1993

Mr. Justin Power
RESNA
73 Digital Drive
Novato, CA 94949

DEC 09 1993

RE: PACE Project No. 431124.503
Client Reference: Exxon 7-0236 (EE)

Dear Mr. Power:

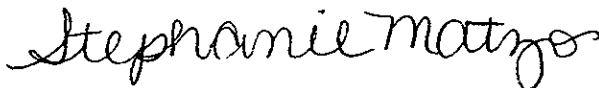
Enclosed is the report of laboratory analyses for samples received November 24, 1993.

Please note a peak eluting earlier than Benzene and suspected to be methyl tert butyl ether was present in your sample B-2.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,



Stephanie Matzo
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

RESNA
73 Digital Drive
Novato, CA 94949

December 06, 1993
PACE Project Number: 431124503

Attn: Mr. Justin Power

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0198887
Date Collected: 11/23/93
Date Received: 11/24/93
B-2

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
<u>ORGANIC ANALYSIS</u>			
PURGEABLE FUELS AND AROMATICS			
TOTAL FUEL HYDROCARBONS, (LIGHT):			12/01/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	250	6800
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			12/01/93
Benzene	ug/L	2.5	35
Toluene	ug/L	2.5	16
Ethylbenzene	ug/L	2.5	340
Xylenes, Total	ug/L	2.5	36
EXTRACTABLE FUELS EPA 3510/8015			
Extractable Fuels, as Diesel	mg/L	0.05	1.3 (H)
Date Extracted			11/29/93

Mr. Justin Power

Page 2

December 06, 1993

PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number:

70 0198895

Date Collected:

11/23/93

Date Received:

11/24/93

Client Sample ID:

VE-2

Parameter

Units

MDL

DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015M) ug/L

50

1300

- 12/01/93

12/01/93

PURGEABLE AROMATICS (BTXE BY EPA 8020M):

Benzene ug/L

0.5

0.5

- 12/01/93

12/01/93

Toluene ug/L

0.5

17

12/01/93

Ethylbenzene ug/L

0.5

1.9

12/01/93

Xylenes, Total

ug/L

0.5

23

12/01/93

EXTRACTABLE FUELS EPA 3510/8015

Extractable Fuels, as Diesel

mg/L

0.06

0.33

11/30/93

Date Extracted

11/29/93



REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
Page 3

December 06, 1993
PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0198925
Date Collected: 11/23/93
Date Received: 11/24/93
Client Sample ID: S 8.0 B2

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/02/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	12/02/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/02/93
Benzene	ug/kg wet	5.0	ND	12/02/93
Toluene	ug/kg wet	5.0	ND	12/02/93
Ethylbenzene	ug/kg wet	5.0	ND	12/02/93
Xylenes, Total	ug/kg wet	5.0	ND	12/02/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	ND	12/01/93
Date Extracted			11/30/93	



REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
Page 4

December 06, 1993
PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number:
Date Collected:
Date Received:
Client Sample ID:
Parameter

70 0198933
11/23/93
11/24/93
S11.0 B2

Units MDL DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	-	12/02/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/02/93
Benzene	ug/kg wet	5.0	ND	12/02/93
Toluene	ug/kg wet	5.0	ND	12/02/93
Ethylbenzene	ug/kg wet	5.0	ND	12/02/93
Xylenes, Total	ug/kg wet	5.0	ND	12/02/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	ND	12/01/93
Date Extracted			11/30/93	

Mr. Justin Power
 Page 5

December 06, 1993
 PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0198941
 Date Collected: 11/23/93
 Date Received: 11/24/93
 Client Sample ID: S 6.0 VE2

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/02/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	12/02/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/02/93
Benzene	ug/kg wet	5.0	ND	12/02/93
Toluene	ug/kg wet	5.0	ND	12/02/93
Ethylbenzene	ug/kg wet	5.0	ND	12/02/93
Xylenes, Total	ug/kg wet	5.0	ND	12/02/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	7.2 (H)	12/02/93
Date Extracted			11/30/93	

REPORT OF LABORATORY ANALYSIS

Mr. Justin Power

Page 6

December 06, 1993

PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number:

70 0198968

Date Collected:

11/23/93

Date Received:

11/24/93

Client Sample ID:

S11.2 VE2

Parameter

Units

MDL

DATE ANALYZED

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):

Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	-	12/02/93
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PURGEABLE AROMATICS (BTXE BY EPA 8020M):			ND	12/02/93
--	--	--	----	----------

Benzene	ug/kg wet	5.0	-	12/02/93
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Toluene	ug/kg wet	5.0	ND	12/02/93
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Ethylbenzene	ug/kg wet	5.0	ND	12/02/93
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Xylenes, Total	ug/kg wet	5.0	ND	12/02/93
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EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	ND	12/01/93
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Date Extracted			11/30/93	
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Mr. Justin Power
 Page 7

December 06, 1993
 PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0198976
 Date Collected: 11/23/93
 Date Received: 11/24/93
 Client Sample ID: S 6.0 VE3

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
------------------	--------------	------------	----------------------

ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/02/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	12/02/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/02/93
Benzene	ug/kg wet	5.0	ND	12/02/93
Toluene	ug/kg wet	5.0	ND	12/02/93
Ethylbenzene	ug/kg wet	5.0	ND	12/02/93
Xylenes, Total	ug/kg wet	5.0	ND	12/02/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	ND	12/01/93
Date Extracted			11/30/93	

Mr. Justin Power
 Page 8

December 06, 1993
 PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0198992
 Date Collected: 11/23/93
 Date Received: 11/24/93
 Client Sample ID: S11.3 VE3

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/02/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	1700	12/02/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/02/93
Benzene	ug/kg wet	5.0	ND	12/02/93
Toluene	ug/kg wet	5.0	ND	12/02/93
Ethylbenzene	ug/kg wet	5.0	ND	12/02/93
Xylenes, Total	ug/kg wet	5.0	ND	12/02/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	150(H)	12/01/93
Date Extracted			11/30/93	

These data have been reviewed and are approved for release.

Darrell C. Cain

Darrell C. Cain
 Regional Director

Mr. Justin Power

FOOTNOTES

December 06, 1993

Page 9

for pages 1 through 8

PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.
(H) Hydrocarbons greater than C22 present in sample.



REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
Page 10

QUALITY CONTROL DATA

December 06, 1993
PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

EXTRACTABLE FUELS EPA 3550/8015

Batch: 70 26755

Samples: 70 0198925, 70 0198933, 70 0198941, 70 0198968, 70 0198976
70 0198992

METHOD BLANK:

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>Method Blank</u>
Extractable Fuels, as Diesel	mg/kg	5.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>Reference Value</u>	<u>Recv</u>	<u>Dupl Recv</u>	<u>RPD</u>
Extractable Fuels, as Diesel	mg/kg	5.0	33.3	78%	74%	5%



REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
Page 11

QUALITY CONTROL DATA

December 06, 1993
PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

EXTRACTABLE FUELS EPA 3510/8015
Batch: 70 26689
Samples: 70 0198887, 70 0198895

METHOD BLANK:

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>Method Blank</u>
Extractable Fuels, as Diesel	mg/L	0.05	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>Reference Value</u>	<u>Recv</u>	<u>Dupl Recv</u>	<u>RPD</u>
Extractable Fuels, as Diesel	mg/L	0.05	1.00	76%	81%	6%

Mr. Justin Power
 Page 12

QUALITY CONTROL DATA

December 06, 1993
 PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PURGEABLE FUELS AND AROMATICS

Batch: 70 26713

Samples: 70 0198925, 70 0198941, 70 0198968, 70 0198976, 70 0198992

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	200	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/kg wet	1.0	ND
Toluene	ug/kg wet	1.0	ND
Ethylbenzene	ug/kg wet	1.0	ND
Xylenes, Total	ug/kg wet	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	200	1000	98%	98%	0%
Benzene	ug/kg wet	1.0	40.0	99%	100%	1%
Toluene	ug/kg wet	1.0	40.0	99%	99%	0%
Ethylbenzene	ug/kg wet	1.0	40.0	104%	102%	1%
Xylenes, Total	ug/kg wet	1.0	120	104%	102%	1%

Mr. Justin Power
 Page 13

QUALITY CONTROL DATA

December 06, 1993
 PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PURGEABLE FUELS AND AROMATICS

Batch: 70 26761
 Samples: 70 0198933

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	200	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/kg wet	1.0	ND
Toluene	ug/kg wet	1.0	ND
Ethylbenzene	ug/kg wet	1.0	ND
Xylenes, Total	ug/kg wet	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	200	1000	102%	103%	0%
Benzene	ug/kg wet	1.0	40.0	98%	89%	9%
Toluene	ug/kg wet	1.0	40.0	98%	89%	9%
Ethylbenzene	ug/kg wet	1.0	40.0	104%	94%	10%
Xylenes, Total	ug/kg wet	1.0	120	104%	94%	10%

Mr. Justin Power
 Page 14

QUALITY CONTROL DATA

December 06, 1993
 PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

PURGEABLE FUELS AND AROMATICS

Batch: 70 26791
 Samples: 70 0198887, 70 0198895

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/L	50	1000	91%	95%	4%
Benzene	ug/L	0.5	100	93%	87%	6%
Toluene	ug/L	0.5	100	87%	87%	0%
Ethylbenzene	ug/L	0.5	100	85%	85%	0%
Xylenes, Total	ug/L	0.5	300	87%	87%	0%



REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
Page 15

FOOTNOTES
for pages 10 through 14

December 06, 1993
PACE Project Number: 431124503

Client Reference: Exxon 7-0236 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.
RPD Relative Percent Difference



EXXON COMPANY, U.S.A.
P.O. Box 4415, Houston, TX 77210-4415
CHAIN OF CUSTODY

431124-503



Novato, CA, 11 Digital Drive, 94949
(415) 883-6100



Huntington Beach, CA, 5702 Bolsa Avenue, 92649
(714) 892-2565

Consultant's Name: <u>RESNA IND, INC.</u>						Page <u>1</u> of <u>1</u>				
Address: <u>73 DIGITAL DR. NOVATO, CA. 94949</u>						Site Location: <u>6630 E. 14TH ST. OAKLAND</u>				
Project #:			Consultant Project #: <u>170079.06</u>			Consultant Work Release #:				
Project Contact: <u>JUSTIN POWER</u>			Phone #: <u>(415) 382-7400</u>		Fax #: <u>382-7415</u>		Laboratory Work Release #:			
EXXON Contact: <u>MARLA GUCASLER</u> <input type="checkbox"/> EE <input type="checkbox"/> C&M			Phone #:		Fax #:		EXXON RAS #: <u>7-0236</u>			
Sampled by (print): <u>ERICH NEUPERT</u>			Sampler's Signature: <u>Erich Neupert</u>							
Shipment Method:			Air Bill #:			Shipment Date:				
TAT. <input type="checkbox"/> 24 hr <input type="checkbox"/> 48 hr <input type="checkbox"/> 72 hr <input checked="" type="checkbox"/> Standard (5 day)			ANALYSIS REQUIRED					Sample Condition as Received Temperature °C: _____ Cooler #: _____ Inbound Seal Yes No Outbound Seal Yes No		
Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015		TPRH EPA 418.1	COMMENTS
B-2	11/23/93	W	HCL	3	19988.7	X				
B-2	11/23/93	W	-	2	↓		X			
VE-2	11/23/93	W	HCL	3	19989.5	X				
VE-2	11/23/93	W	-	2			X			
TR-LB	11/23/93	W	HCL	1	19990.9				HOLD	
Relinquished by/Affiliation			Date	Time	Accepted by/Affiliation			Date	Time	Additional Comments
<u>Erich Neupert</u>			<u>11/24/93</u>	<u>11:05</u>	<u>Bandra Briones - Pace</u>			<u>11/24/93</u>	<u>11:05</u>	<u>9/2</u>
										<u>I/1</u>



EXXON COMPANY, U.S.A.
P.O. Box 4415, Houston, TX 77210-4415
CHAIN OF CUSTODY

431124.503

Novato, CA, 11 Digital Drive, 94949
(415) 883-6100

Huntington Beach, CA, 5702 Bolsa Avenue, 92649
(714) 892-2565

Consultant's Name: <u>RESNA IND. INC.</u>							Page <u>1</u> of <u>1</u>													
Address: <u>73 DIGITAL DR. NOVATO, CA. 94949</u>							Site Location: <u>6630 E. 147th ST OAKLAND</u>													
Project #:			Consultant Project #: <u>170079.06</u>			Consultant Work Release #: <u>09300640</u>														
Project Contact: <u>JUSTIN POWER</u>			Phone #: <u>(415) 382-7400</u>		Fax #: <u>382-7415</u>		Laboratory Work Release #:													
EXXON Contact: <u>MARLA GUNSLER</u> <input type="checkbox"/> EE <input type="checkbox"/> C&M			Phone #:		Fax #:		EXXON RAS #: <u>7-0236</u>													
Sampled by (print): <u>ERICH NEUPERT</u>			Sampler's Signature: <u>Erich Neupert</u>																	
Shipment Method:			Air Bill #:		Shipment Date:															
TAT: <input type="checkbox"/> 24 hr <input type="checkbox"/> 48 hr <input type="checkbox"/> 72 hr <input checked="" type="checkbox"/> Standard (5 day)			ANALYSIS REQUIRED				Sample Condition as Received Temperature ° C: _____ Cooler #: _____ Inbound Seal Yes No Outbound Seal Yes No													
Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1												COMMENTS
S 6.5 B2	11/23/93	S		1	19891.7															HOLD
S 8.0 B2	11/23/93	S		1	19892.5	X	X													
S 11.0 B2	11/23/93	S		1	19893.3	X	X													
S 6.0 VE-2	11/23/93	S		1	19894.1	X	X													
S 8.0 VE-2	11/23/93	S		1	19895.0															HOLD
S 11.2 VE-2	11/23/93	S		1	19896.8	X	X													
S 6.0 VE-3	11/23/93	S		1	19897.6	X	X													
S 8.0 VE-3	11/23/93	S		1	19898.4															HOLD
S 11.3 VE-3	11/23/93	S		1	19899.2	X	X													
Relinquished by/Affiliation			Date	Time	Accepted by/Affiliation			Date	Time	Additional Comments:										
<u>Erich Neupert</u>			<u>11/24/93</u>	<u>11:04</u>	<u>Sandra Onones - Pace</u>			<u>11/24/93</u>	<u>11:07</u>	<u>S/L</u>										

December 08, 1993

Mr. Justin Power
RESNA
73 Digital Drive
Novato, CA 94949

RE: PACE Project No. 431130.503
Client Reference: Exxon 7-0236 (EE)

Dear Mr. Power:

Enclosed is the report of laboratory analyses for samples received November 30, 1993.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,

Stephanie Matzo

Stephanie Matzo
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

RESNA
73 Digital Drive
Novato, CA 94949

December 08, 1993
PACE Project Number: 431130503

Attn: Mr. Justin Power

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0200962
Date Collected: 11/29/93
Date Received: 11/30/93
Client Sample ID: Cuttings
C-A+B+C+D

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>Composite</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/03/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	11000	12/03/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/03/93
Benzene	ug/kg wet	5.0	ND	12/03/93
Toluene	ug/kg wet	5.0	ND	12/03/93
Ethylbenzene	ug/kg wet	5.0	180	12/03/93
Xylenes, Total	ug/kg wet	5.0	35	12/03/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	42(H)	12/02/93
Date Extracted			12/01/93	

REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
 Page 2

December 08, 1993
 PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0200970
 Date Collected: 11/29/93
 Date Received: 11/30/93
 Client Sample ID: Cuttings
 D-A+B+C+D

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>Composite</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS				
TOTAL FUEL HYDROCARBONS, (LIGHT):				
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	-	12/04/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/04/93
Benzene	ug/kg wet	5.0	ND	12/04/93
Toluene	ug/kg wet	5.0	ND	12/04/93
Ethylbenzene	ug/kg wet	5.0	11	12/04/93
Xylenes, Total	ug/kg wet	5.0	12	12/04/93
EXTRACTABLE FUELS EPA 3550/8015				
Extractable Fuels, as Diesel	mg/kg	5.0	ND	12/02/93
Date Extracted			12/01/93	

REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
 Page 3

December 08, 1993
 PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0200989
 Date Collected: 11/29/93
 Date Received: 11/30/93
 Client Sample ID: S 6.2 B-1

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/04/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	12/04/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/04/93
Benzene	ug/kg wet	5.0	ND	12/04/93
Toluene	ug/kg wet	5.0	ND	12/04/93
Ethylbenzene	ug/kg wet	5.0	ND	12/04/93
Xylenes, Total	ug/kg wet	5.0	ND	12/04/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	ND	12/02/93
Date Extracted			12/01/93	

Mr. Justin Power
 Page 4

December 08, 1993
 PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201004
 Date Collected: 11/29/93
 Date Received: 11/30/93
 Client Sample ID: S11.5 B-1

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/04/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	ND	12/04/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/04/93
Benzene	ug/kg wet	5.0	ND	12/04/93
Toluene	ug/kg wet	5.0	ND	12/04/93
Ethylbenzene	ug/kg wet	5.0	ND	12/04/93
Xylenes, Total	ug/kg wet	5.0	ND	12/04/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	ND	12/02/93
Date Extracted			12/01/93	

Mr. Justin Power
 Page 5

December 08, 1993
 PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201020
 Date Collected: 11/29/93
 Date Received: 11/30/93
 Client Sample ID: S 8.0 VE-1

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/04/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	1000	4800	12/04/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/04/93
Benzene	ug/kg wet	5.0	24	12/04/93
Toluene	ug/kg wet	5.0	14	12/04/93
Ethylbenzene	ug/kg wet	5.0	57	12/04/93
Xylenes, Total	ug/kg wet	5.0	23	12/04/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	8.5	12/02/93
Date Extracted			12/01/93	

Mr. Justin Power
 Page 6

December 08, 1993
 PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201039
 Date Collected: 11/29/93
 Date Received: 11/30/93
 Client Sample ID: S11.3 VE-1

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

PURGEABLE FUELS AND AROMATICS

TOTAL FUEL HYDROCARBONS, (LIGHT):			-	12/05/93
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	4000	200000	12/05/93
PURGEABLE AROMATICS (BTXE BY EPA 8020M):			-	12/05/93
Benzene	ug/kg wet	5.0	ND	12/05/93
Toluene	ug/kg wet	5.0	ND	12/05/93
Ethylbenzene	ug/kg wet	20	2500	12/05/93
Xylenes, Total	ug/kg wet	20	ND	12/05/93

EXTRACTABLE FUELS EPA 3550/8015

Extractable Fuels, as Diesel	mg/kg	5.0	47	12/02/93
Date Extracted			12/01/93	

These data have been reviewed and are approved for release.



Darrell C. Cain
 Regional Director

Mr. Justin Power
Page 7

FOOTNOTES
for pages 1 through 6

December 08, 1993
PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.
(H) Hydrocarbons greater than C22 present in sample.

Mr. Justin Power
 Page 8

QUALITY CONTROL DATA

December 08, 1993
 PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

EXTRACTABLE FUELS EPA 3550/8015
 Batch: 70 26701

Samples: 70 0200962, 70 0200970, 70 0200989, 70 0201004, 70 0201020
 70 0201039

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Extractable Fuels, as Diesel	mg/kg	5.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Extractable Fuels, as Diesel	mg/kg	5.0	33.3	73%	72%	1%

Mr. Justin Power
 Page 9

QUALITY CONTROL DATA

December 08, 1993
 PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

PURGEABLE FUELS AND AROMATICS

Batch: 70 26793
 Samples: 70 0200962, 70 0200970, 70 0200989, 70 0201004, 70 0201020
 70 0201039

METHOD BLANK:

Parameter	Units	MDL	Method Blank
TOTAL FUEL HYDROCARBONS, (LIGHT):			-
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	200	ND
PURGEABLE AROMATICS (BTXE BY EPA 8020M)			-
Benzene	ug/kg wet	1.0	ND
Toluene	ug/kg wet	1.0	ND
Ethylbenzene	ug/kg wet	1.0	ND
Xylenes, Total	ug/kg wet	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Purgeable Fuels, as Gasoline (EPA 8015M)	ug/kg wet	200	1000	90%	83%	8%
Benzene	ug/kg wet	1.0	40.0	85%	85%	0%
Toluene	ug/kg wet	1.0	40.0	86%	84%	2%
Ethylbenzene	ug/kg wet	1.0	40.0	91%	87%	4%
Xylenes, Total	ug/kg wet	1.0	120	93%	87%	6%

Mr. Justin Power
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FOOTNOTES
for pages 8 through 9

December 08, 1993
PACE Project Number: 431130503

Client Reference: Exxon 7-0236 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.
RPD Relative Percent Difference



EXXON COMPANY, U.S.A.

P.O. Box 4415, Houston, TX 77210-4415

CHAIN OF CUSTODY

Novato, CA, 11 Digital Drive, 94949
(415) 883-6100

431130.503
Huntington Beach, CA, 5702 Bolsa Avenue, 92649
(714) 892-2565

Consultant's Name: RESNA INC. INC. Page 1 of 2

Address: 73 DIGITAL DR. NOVATO, CA, 94949 Site Location: 6630 E. 14TH ST. OAKL.

Project #: 170079.06 Consultant Project #: _____ Consultant Work Release #: 09300640

Project Contact: JUSTIN POWERS Phone # (415) 382-7400 Fax #: 382-7415 Laboratory Work Release #:

EXXON Contact: MARIA GUANILLER BE C&M Phone #: _____ Fax #: _____ EXXON RAS #: 7-0236

Sampled by (print): ERIC NEUPERT Sampler's Signature: Eric Neupert

Shipment Method: _____ Air Bill #: _____ Shipment Date: _____

TAT: 24 hr 48 hr 72 hr Standard (5 day) ANALYSIS REQUIRED

Sample Condition as Received
Temperature ° C: DIRTY
Cooler #: CARRIED
Inbound Seal Yes No
Outbound Seal Yes No

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1													Sample Condition as Received		
																					Temperature ° C	Cooler #	
CUTTINGS C-A	11/29/93	S		1		X	X																
CUTTINGS C-B				1		X	X																
CUTTINGS C-C				1		X	X																
CUTTINGS C-D				1		X	X																
CUTTINGS D-A				1		X	X																
CUTTINGS D-B				1		X	X																
CUTTINGS D-C				1		X	X																
CUTTINGS D-D				1		X	X																

Please composite into one sample, then analyze as indicated.

Please composite into one sample, then analyze as indicated.

20096.2

20097.0

COMMENTS

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time	Additional Comments:
<u>Eric Neupert</u>	<u>11/20/93</u>	<u>12:10</u>	<u>Justin Powers Pace</u>	<u>11/30/93</u>	<u>12:10</u>	<u>S/3</u>



EXXON COMPANY, U.S.A.

P.O. Box 4415, Houston, TX 77210-4415

CHAIN OF CUSTODY

431130.503



Novato, CA, 11 Digital Drive, 94949
(415) 883-6100



Huntington Beach, CA, 5702 Bolsa Avenue, 92649
(714) 892-2565

Consultant's Name: <u>REGNA IND. INC.</u>															Page <u>2</u> of <u>2</u>	
Address: <u>73 DIGITAL DR. NOVATO, CA. 94949</u>										Site Location: <u>6630 E. 14TH ST. OAKL.</u>						
Project #: <u>170079.06</u>					Consultant Project #:					Consultant Work Release #: <u>09300640</u>						
Project Contact: <u>JUSTIN POWER</u>					Phone #: <u>(415) 382-7400</u>			Fax #: <u>382-7415</u>		Laboratory Work Release #:						
EXXON Contact: <u>MARLA GUENSLER</u> <input type="checkbox"/> EE <input type="checkbox"/> C&M					Phone #:			Fax #:		EXXON RAS #: <u>7-0236</u>						
Sampled by (print): <u>ERICH NEUPERT</u>					Sampler's Signature: <u>Erich Neupert</u>											
Shipment Method:					Air Bill #:					Shipment Date:						
TAT: <input type="checkbox"/> 24 hr <input type="checkbox"/> 48 hr <input type="checkbox"/> 72 hr <input checked="" type="checkbox"/> Standard (5 day)					ANALYSIS REQUIRED										Sample Condition as Received Temperature ° C: <u>CLIENT</u> Cooler #: <u>COURIER</u> Inbound Seal Yes No Outbound Seal Yes No	
Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1							COMMENTS	
<u>S6.2B-1</u>	<u>11/24/93</u>	<u>S</u>		<u>1</u>	<u>20098.9</u>	<u>X</u>	<u>X</u>									
<u>S 8.0B-1</u>	<u>11/24</u>	<u>S</u>		<u>1</u>	<u>20099.7</u>										<u>HOLD</u>	
<u>S11.5B-1</u>	<u>11/24</u>	<u>S</u>		<u>1</u>	<u>20100.4</u>	<u>X</u>	<u>X</u>									
<u>S6.0VE-1</u>	<u>11/29</u>	<u>S</u>		<u>1</u>	<u>20101.2</u>										<u>HOLD</u>	
<u>S8.0VE-1</u>	<u>11/29</u>	<u>S</u>		<u>1</u>	<u>20102.0</u>	<u>X</u>	<u>X</u>									
<u>S11.3VE-1</u>	<u>11/29</u>	<u>S</u>		<u>1</u>	<u>20103.9</u>	<u>X</u>	<u>X</u>									
Relinquished by/Affiliation			Date	Time	Accepted by/Affiliation			Date	Time	Additional Comments: <u>S/3</u>						
<u>Erich Neupert</u>			<u>11/30/93</u>	<u>12:10</u>	<u>Justin Power Pace</u>			<u>11/30/93</u>	<u>12:10</u>							

DEC 21 1993

REPORT OF LABORATORY ANALYSIS

170079 c6

December 20, 1993

Mr. Justin Power
RESNA
73 Digital Drive
Novato, CA 94949

RE: PACE Project No. 431210.509
Client Reference: Exxon 7-0236 (EE)

Dear Mr. Power:

Enclosed is the report of laboratory analyses for samples received December 10, 1993.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,



Stephanie Matzo
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

RESNA
73 Digital Drive
Novato, CA 94949

December 20, 1993
PACE Project Number: 431210509

Attn: Mr. Justin Power

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0209331
Date Collected: 11/29/93
Date Received: 12/10/93
Client Sample ID: Cuttings C
A+B+C+DCAM

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>EXTRACT</u>	<u>DATE ANALYZED</u>
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INORGANIC ANALYSIS

INDIVIDUAL PARAMETERS

Lead (EPA Method 6010/200.7, ICP)	mg/L	1.0	ND	12/17/93
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Mr. Justin Power
Page 2

December 20, 1993
PACE Project Number: 431210509

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number:
Date Collected:
Date Received:
Client Sample ID:

70 0209340
11/29/93
12/10/93
Cuttings D
A+B+C+DCAM

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>EXTRACT</u>	<u>DATE ANALYZED</u>
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INORGANIC ANALYSIS

INDIVIDUAL PARAMETERS

Lead (EPA Method 6010/200.7, ICP)	mg/L	1.0	ND	12/17/93
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These data have been reviewed and are approved for release.



Darrell C. Cain
Regional Director



REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
Page 3

FOOTNOTES
for pages 1 through 2

December 20, 1993
PACE Project Number: 431210509

Client Reference: Exxon 7-0236 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.



REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
Page 4

QUALITY CONTROL DATA

December 20, 1993
PACE Project Number: 431210509

Client Reference: Exxon 7-0236 (EE)

Lead (EPA Method 6010/200.7, ICP)
Batch: 70 27128
Samples: 70 0209331, 70 0209340

METHOD BLANK:

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>Method Blank</u>
Lead (EPA Method 6010/200.7, ICP)	mg/L	1.0	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>Reference Value</u>	<u>Recv</u>	<u>Dupl Recv</u>	<u>RPD</u>
Lead (EPA Method 6010/200.7, ICP)	mg/L	1.0	5.00	106%	100%	5%



REPORT OF LABORATORY ANALYSIS

Mr. Justin Power
Page 5

FOOTNOTES
for page 4

December 20, 1993
PACE Project Number: 431210509

Client Reference: Exxon 7-0236 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.
RPD Relative Percent Difference

FAX TRANSMITTAL

RESNA

RESNA, INC.
73 Digital Drive
Novato, California 94949
415/382-7400 Fax: 415/382-7415

Attn JIM / STEPHANIE

Organization PACE

From ERICH NEUPERT

Date 12/10/93

Project Name/No.

No. Pages (including Transmittal) 1

Enclosed

AS PER OUR TELEPHONE CONVERSATION 12/10/93
PLEASE RUN STLC Pb ANALYSIS ON THE
FOLLOWING CUTTINGS ONLY:

EXXON 7-0236 CUTTINGS C-A } COMPOSITE
 C-B }
 C-C }
 C-D }

CUTTINGS D-A } COMPOSITE
 D-B }
 D-C }
 D-D }

Comments

EXXON 7-0105 CUTTINGS A, B, C, D } COMPOSITE

EXXON 7-4061 CUTTINGS A, B, C, D } COMPOSITE

THANKS - ERICH

If you have any trouble with this transmittal, please contact us at the above telephone number.

9/91



431210.504



EXXON COMPANY, U.S.A.

P.O. Box 4415, Houston, TX 77210-4415

CHAIN OF CUSTODY

Novato, CA, 11 Digital Drive, 94949
(415) 883-6100

431210.509
Huntington Beach, CA, 5702 Bolsa Avenue, 92649
(714) 892-2565

Consultant's Name: Resna Page 1 of 1

Address: Novato Site Location:

Project #: _____ Consultant Project #: _____ Consultant Work Release #: _____

Project Contact: M. Gumbler Phone #: _____ Fax #: _____ Laboratory Work Release #: _____

EXXON Contact: 7-0236 EE C&M Phone #: _____ Fax #: _____ EXXON RAS #: 7-0236

Sampled by (print): Client Sampler's Signature: _____

Shipment Method: _____ Air Bill #: _____ Shipment Date: _____

TAT: 24 hr 48 hr 72 hr Standard (5 day)

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TRPH EPA 418.1	STLC Pb by ICP	ANALYSIS REQUIRED				Sample Condition as Received	
										Leachate #	Leachate #	Leachate #	Leachate #	Temperature °C	Cooler #
cuttings C AIBIC+D Comp	11/29/93	soil		4					X	20931.5				AKA 200962	AKA 200970
										Leachate #	20933.1				
cuttings D AIBIC+D Comp.		soil		4					X	20932.3				analyses requested by Eric Naspett 12/10 JO	
										Leachate #	20934.0				

Comments: AKA 200962
AKA 200970
Leachate # 20933.1
analyses requested by Eric Naspett 12/10 JO
Leachate # 20934.0

Relinquished by/Affiliation: _____ Date: _____ Time: _____

Accepted by/Affiliation: Shren from Pace 12/10/93 1130 Date: _____ Time: _____

Additional Comments: AKA 431130.503
S13

DEC 10 1993

December 08, 1993

Mr. Kin Leung
Resna
73 Digital Dr.
Novato, CA 94949

RE: PACE Project No. 431201.513
Client Reference: Exxon 7-0236 (EE)

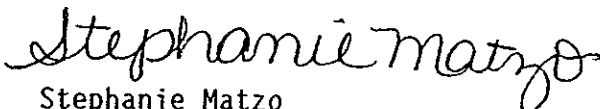
Dear Mr. Leung:

Enclosed is the report of laboratory analyses for samples received December 01, 1993.

Footnotes are given at the end of the report.

If you have any questions concerning this report, please feel free to contact us.

Sincerely,



Stephanie Matzo
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

Resna
73 Digital Dr.
Novato, CA 94949

December 08, 1993
PACE Project Number: 4312015.3

Attn: Mr. Kin Leung

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201659
Date Collected: 12/01/93
Date Received: 12/01/93
Client Sample ID: V-1201-INF

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>-1</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

GASOLINE AND AROMATICS-AIR (M8015/8020)

Non-Methane Hydrocarbons, as n-octane	ug/L	2500	22000	12/02/93
Volatile Aromatic Compounds (EPA M8020)			-	12/02/93
Benzene	ug/L	0.5	ND	12/02/93
Toluene	ug/L	0.5	100	12/02/93
Ethylbenzene	ug/L	0.5	19	12/02/93
Xylenes, Total	ug/L	0.5	8.1	12/02/93



REPORT OF LABORATORY ANALYSIS

Mr. Kin Leung
Page 2

December 08, 1993
PACE Project Number: 431201513

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201667
Date Collected: 12/01/93
Date Received: 12/01/93
Client Sample ID: V-1201-INF

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>-2</u>	<u>DATE ANALYZED</u>
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ORGANIC ANALYSIS

GASOLINE AND AROMATICS-AIR (M8015/8020)

Non-Methane Hydrocarbons, as n-octane	ug/L	2500	60000	12/03/93
Volatile Aromatic Compounds (EPA M8020)			-	12/03/93
Benzene	ug/L	2.5	ND	12/03/93
Toluene	ug/L	2.5	440	12/03/93
Ethylbenzene	ug/L	2.5	250	12/03/93
Xylenes, Total	ug/L	2.5	36	12/03/93



REPORT OF LABORATORY ANALYSIS

Mr. Kin Leung
Page 3

December 08, 1993
PACE Project Number: 431201513

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201675
Date Collected: 12/01/93
Date Received: 12/01/93
Client Sample ID: V-1201-INF
Parameter -3

Units MDL DATE ANALYZED

ORGANIC ANALYSIS

GASOLINE AND AROMATICS-AIR (M8015/8020)

Non-Methane Hydrocarbons, as n-octane	ug/L	2500	37000	12/02/93
Volatile Aromatic Compounds (EPA M8020)			-	12/02/93
Benzene	ug/L	10	ND	12/02/93
Toluene	ug/L	10	180	12/02/93
Ethylbenzene	ug/L	10	73	12/02/93
Xylenes, Total	ug/L	10	37	12/02/93



REPORT OF LABORATORY ANALYSIS

Mr. Kin Leung
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December 08, 1993
PACE Project Number: 4312015.1

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201683
Date Collected: 12/01/93
Date Received: 12/01/93
Client Sample ID: V-1201-EFF

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>-1</u>	<u>DATE ANALYZED</u>
------------------	--------------	------------	-----------	----------------------

ORGANIC ANALYSIS

GASOLINE AND AROMATICS-AIR (M8015/8020)				
Non-Methane Hydrocarbons, as n-octane	ug/L	50	ND	12/02/93
Volatile Aromatic Compounds (EPA M8020)			-	12/02/93
Benzene	ug/L	0.5	2.8	12/02/93
Toluene	ug/L	0.5	0.9	12/02/93
Ethylbenzene	ug/L	0.5	0.8	12/02/93
Xylenes, Total	ug/L	0.5	3.0	12/02/93



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Mr. Kin Leung
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December 08, 1993
PACE Project Number: 431201511

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201691
Date Collected: 12/01/93
Date Received: 12/01/93
Client Sample ID: V-1201-INF

<u>Parameter</u>	<u>Units</u>	<u>MDL</u>	<u>-4</u>	<u>DATE ANALYZED</u>
------------------	--------------	------------	-----------	----------------------

ORGANIC ANALYSIS

GASOLINE AND AROMATICS-AIR (M8015/8020)

Non-Methane Hydrocarbons, as n-octane	ug/L	1250	15000	12/02/93
Volatile Aromatic Compounds (EPA M8020)			-	12/02/93
Benzene	ug/L	0.5	ND	12/02/93
Toluene	ug/L	0.5	ND	12/02/93
Ethylbenzene	ug/L	0.5	6.1	12/02/93
Xylenes, Total	ug/L	0.5	1.7	12/02/93



REPORT OF LABORATORY ANALYSIS

Mr. Kin Leung
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December 08, 1993
PACE Project Number: 4312015.3

Client Reference: Exxon 7-0236 (EE)

PACE Sample Number: 70 0201705
Date Collected: 12/01/93
Date Received: 12/01/93
Client Sample ID: V-1201-INF
Parameter

Units MDL -5 DATE ANALYZED

ORGANIC ANALYSIS

GASOLINE AND AROMATICS-AIR (M8015/8020)				
Non-Methane Hydrocarbons, as n-octane	ug/L	50	170	12/02/93
Volatile Aromatic Compounds (EPA M8020)			-	12/02/93
Benzene	ug/L	0.5	ND	12/02/93
Toluene	ug/L	0.5	0.8	12/02/93
Ethylbenzene	ug/L	0.5	ND	12/02/93
Xylenes, Total	ug/L	0.5	0.6	12/02/93

These data have been reviewed and are approved for release.

Darrell C. Cain
Darrell C. Cain
Regional Director



REPORT OF LABORATORY ANALYSIS

Mr. Kin Leung
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FOOTNOTES
for pages 1 through 6

December 08, 1993
PACE Project Number: 4312015.1

Client Reference: Exxon 7-0236 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.



REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

December 08, 1993
PACE Project Number: 431201513

Client Reference: Exxon 7-0236 (EE)

GASOLINE AND AROMATICS-AIR (M8015/8020)

Batch: 70 26514

Samples: 70 0201659, 70 0201667, 70 0201675, 70 0201683

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Non-Methane Hydrocarbons, as n-octane	ug/L	50	ND
Volatile Aromatic Compounds (EPA M8020)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Non-Methane Hydrocarbons, as n-octane	ug/L	50	496	100%	94%	6%
Benzene	ug/L	0.5	64	97%	95%	2%
Toluene	ug/L	0.5	76	95%	93%	2%
Ethylbenzene	ug/L	0.5	88	97%	91%	6%
Xylenes, Total	ug/L	0.5	268	99%	94%	5%

Mr. Kin Leung
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QUALITY CONTROL DATA

December 08, 1993
 PACE Project Number: 431201513

Client Reference: Exxon 7-0236 (EE)

GASOLINE AND AROMATICS-AIR (M8015/8020)
 Batch: 70 26821
 Samples: 70 0201691, 70 0201705

METHOD BLANK:

Parameter	Units	MDL	Method Blank
Non-Methane Hydrocarbons, as n-octane	ug/L	50	ND
Volatile Aromatic Compounds (EPA M8020)			-
Benzene	ug/L	0.5	ND
Toluene	ug/L	0.5	ND
Ethylbenzene	ug/L	0.5	ND
Xylenes, Total	ug/L	0.5	ND

LABORATORY CONTROL SAMPLE AND CONTROL SAMPLE DUPLICATE:

Parameter	Units	MDL	Reference Value	Recv	Dupl Recv	RPD
Non-Methane Hydrocarbons, as n-octane	ug/L	50	620	102%	102%	0%
Benzene	ug/L	0.5	80	94%	96%	2%
Toluene	ug/L	0.5	98	89%	91%	2%
Ethylbenzene	ug/L	0.5	110	95%	95%	0%
Xylenes, Total	ug/L	0.5	336	97%	96%	1%



REPORT OF LABORATORY ANALYSIS

Mr. Kin Leung
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FOOTNOTES
for pages 8 through 9

December 08, 1993
PACE Project Number: 431201513

Client Reference: Exxon 7-0236 (EE)

MDL Method Detection Limit
ND Not detected at or above the MDL.
RPD Relative Percent Difference



EXXON COMPANY, U.S.A.
 P.O. Box 4415, Houston, TX 77210-4415
CHAIN OF CUSTODY

431201-513



Novato, CA, 11 Digital Drive, 94949
 (415) 883-6100



Huntington Beach, CA, 5702 Bolsa Avenue, 92649
 (714) 892-2565

Consultant's Name: RESNA INDUSTRIAL INC Page 1 of 1

Address: 73 DIGITAL DR NOVATO CA 94949 Site Location:

Project #: _____ Consultant Project #: 170079.05 Consultant Work Release #: 09300640

Project Contact: KIN LEUNG Phone #: _____ Fax #: _____ Laboratory Work Release #: _____

EXXON Contact: MARLA GUENSLER BE C&M Phone #: _____ Fax #: _____ EXXON RAS #: 7-0236

Sampled by (print): MARK BRYE / CHARLIE LAWRENCE Sampler's Signature: [Signatures]

Shipment Method: _____ Air Bill #: _____ Shipment Date: _____

TAT: 24 hr 48 hr 72 hr Standard (5 day) ANALYSIS REQUIRED

Sample Description	Collection Date/Time	Matrix Soil/Water	Prsv	# of Cont	PACE Sample #	TPH/GAS/BTEX EPA 8015/8020	TPH/Diesel EPA 8015	TPRH EPA 418.1	Sample Condition as Received		COMMENTS
									Temperature ° C: _____	Cooler #: _____	
V-1201-1NF-1	<u>12.1.93 1030</u>	<u>✓</u>	<u>-</u>	<u>1</u>	<u>201659</u>	<u>✓</u>					
V-1201-1NF-2	<u>1130</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>20166.7</u>	<u>↓</u>					
V-1201-1NF-3	<u>1330</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>20167.5</u>	<u>↓</u>					
V-1201-EFF-1	<u>1430</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>20168.3</u>	<u>↓</u>					
V-1201-1NF-4	<u>1430</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>20169.1</u>	<u>↓</u>					
V-1201-1NF-5	<u>1530</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>20170.5</u>	<u>↓</u>					

Relinquished by/Affiliation	Date	Time	Accepted by/Affiliation	Date	Time	Additional Comments
<u>Charlie Lawrence</u>	<u>12-1-93</u>	<u>17:05</u>	<u>[Signature]</u>	<u>12/1/93</u>	<u>1705</u>	

APPENDIX E
PUMPING TEST DATA

STEP DRAWDOWN TEST DATA
Exxon Service Statio 7-0236
6630 East 14th Street
Oakland, California

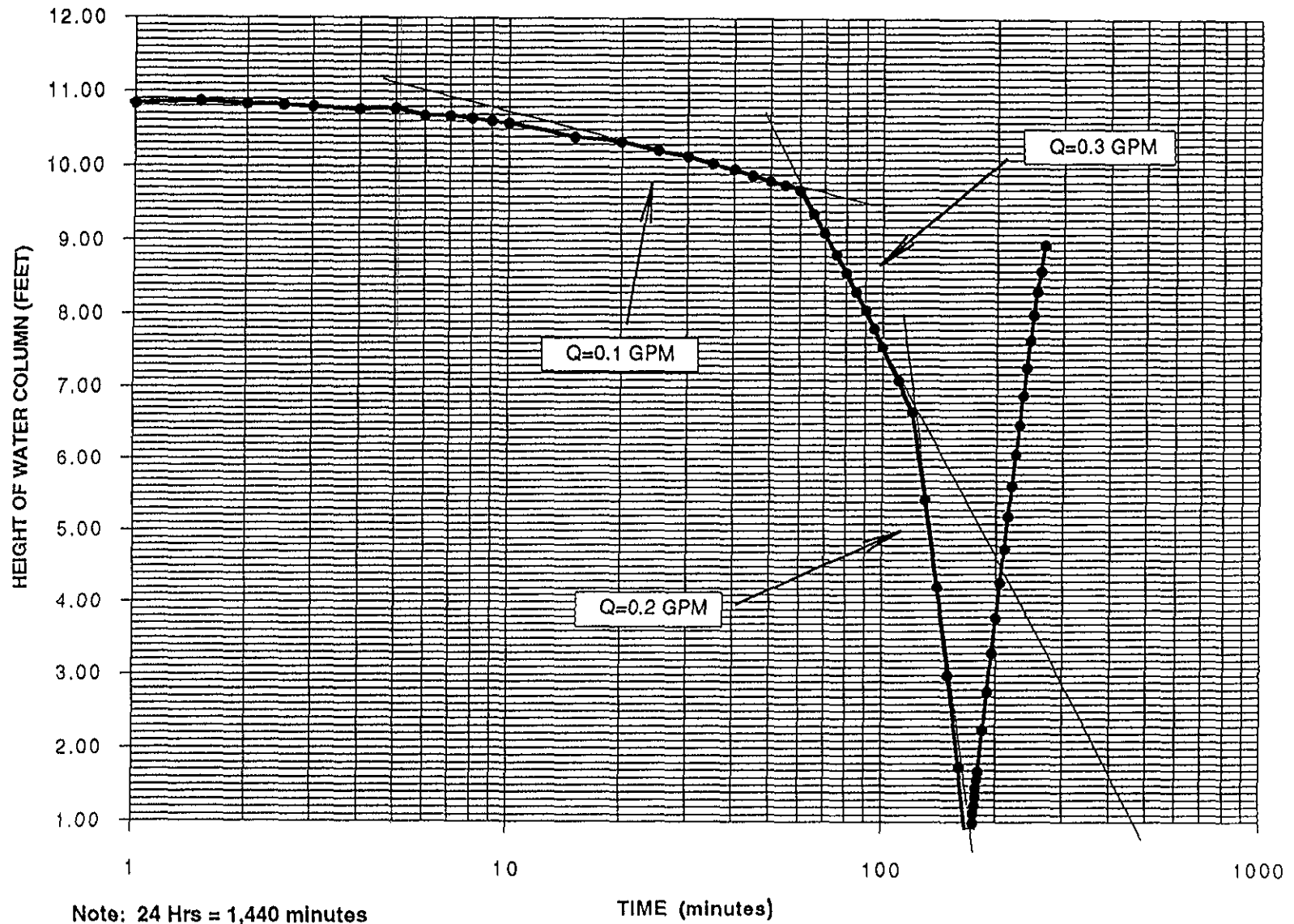
Well ID#	Date	Pump Rate (gpm)	Duration (min)	Total Drawdown (feet)	Flowrate Trend
MW-2	12/29/93	0.1	60	1.8	Sustainable
		0.2	60	4.8	Non-Sustainable
		0.3	30	10.8	Non-Sustainable

Notes:

gpm: gallons per minute

min: minutes

Non-Sustainable: Dewater of well



RESNA

PROJECT No. 170079.06

1/94

STEP-DRAWDOWN TEST DATA
 Exxon Service Station No. 7-0236
 6630 East 14th Street
 Oakland, California

APPENDIX

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