Chevron

July 5, 1994

Chevron U.S.A. Products Company
2410 Camino Ramon
San Ramon, CA 94583
P.O. Box 5004
San Ramon, CA 94583-0804

Marketing Department
Phone 510 842 9500

Ms. Jennifer Eberle
Alameda County Health Care Services
Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94501

Re: Former Chevron Service Station #9-4816
301 14th Street, Oakland, CA

Dear Ms. Eberle:

Enclosed is the Subsurface Investigation report dated June 23, 1994, prepared by our consultant Sierra Environmental Services for the above referenced site. Two soil borings were advanced and completed as ground water monitor well MW-11 and soil vapor extraction well MW-12. Monitor well MW-11 was installed to further characterize down gradient soil and ground water conditions.

Due to limited access between the treatment system enclosure and the adjacent building, monitor well C-5 could not be reconstructed as an extraction well. Therefore, monitor well MW-12 installed in the immediate vicinity of C-5 to further enhance the remediation system. The new well location was selected under advice from Weiss Associates and is expected to provide sufficient hydrocarbon containment.

Soil samples collected from the drill cuttings were submitted to Superior Precision Analytical, Inc. (SPA) for analysis. Laboratory results indicate concentrations of TPH-G and BTEX were below method detection limits in samples collected from MW-11. Concentrations of these constituents detected in samples collected from MW-12 were low to below method detection limits.

Ground water samples collected were also sent to SPA for analysis. Benzene was detected in monitor wells MW-11 and MW-12 at concentrations of 1.4 and 69000 ppb, respectively. The presence of benzene in monitor well MW-11 and the absence of TPH-G and the other BTEX constituents indicates this well defines the down gradient edge of the dissolved hydrocarbon plume.

Construction of the remediation system modifications began on June 28 and is expected to be complete by July 8. We expect the system to be operational by the end of July, pending EBMUD permits.

If you have any questions or comments, please do not hesitate to contact me at (510) 842-8134.

Sincerely,
CHEVRON U.S.A. PRODUCTS COMPANY

Mark A. Miller
Site Assessment and Remediation Engineer

Enclosure

cc: Mr. Kevin Graves, RWQCB - Bay Area
Mr. Mike Cooke, Weiss Associates
Mr. J.N. Robbins, CHVPK/V1156
Ms. B.C. Owen

Ms. Beth D. Castleberry
Gray, Cary, Ware & Freidenrich
400 Hamilton Avenue
Palo Alto, CA 94301-1825

File: 9-4816 SES SA1

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Environmental Services

June 23, 1994

Mark Miller
Chevron USA Products Company
P.O. Box 5004
San Ramon, California

Re: Former Chevron SS#9-4816
301 14th Street
Oakland, California
SES Project #1-378-00

Dear Mr. Miller:

This report presents the results of the subsurface investigation conducted by Sierra Environmental Services (SES) at the above-referenced site (Figure 1, Appendix A).

1. INTRODUCTION

1.1 Scope of Work

The objective of the SES investigation was to drill and install one ground water monitoring well to determine the presence or absence of hydrocarbons in soil and ground water downgradient of the site and to drill and install one four-inch diameter vapor extraction well on-site. SES conducted the work in accordance with the Work Plan for Additional Site Assessment prepared by Groundwater Technology, Inc., dated January 27, 1994. The locations of the monitoring wells are shown on Figure 2 (Appendix A). The following outlines the scope of work for this investigation.

1. Obtain all required permits to conduct the monitoring well installation.

2. Drill one on-site and one off-site soil boring. Survey soil samples from the borings with an organic vapor meter (OVM) to determine whether organic vapors are present in the samples. Use OVM readings and field observations to select soil samples from the borings for analysis. Analyze selected soil samples from the borings for total purgeable petroleum hydrocarbons as gasoline [TPPH(G)], and benzene, toluene, ethylbenzene and xylene (BTEX).

3. Install a 2-inch diameter ground water monitoring well in the off-site boring and a 4-inch diameter vapor extraction well in the on-site boring.

4. Develop and sample the two new monitoring wells. Analyze ground water samples for TPPH(G), and BTEX.

5. Survey the top of casing elevations of the new wells and measure the depth to water and free-phase hydrocarbon thickness (if present).

6. Report the results.

2. SUBSURFACE INVESTIGATION

On April 27, 1994 Soils Exploration Services of Vacaville, California drilled two soil borings and installed two ground water monitoring wells (MW-11 and MW-12) at the site using a CME-55 truck-mounted hollow-stem auger drill rig. The monitoring well locations are shown on Figure 2 (Appendix A).

2.1 Soil Borings

Soil samples were collected during drilling in accordance with SES Standard Operating Procedure - Soil Sampling (Appendix C). The borings were logged in accordance with SES Standard Operating Procedure - Logging Method (Appendix C). Soil samples were screened for organic vapors during drilling in accordance with SES Standard Operating Procedure - OVM Readings (Appendix C).

Soils encountered during drilling consisted of high-permeability poorly graded sand/silty sand; and moderate to low-permeability sandy silt. The ASTM Soil Classification System used to classify soils is included in Appendix D. Detailed descriptions of subsurface sediments, sampling depths and OVM field measurements are shown on the boring logs (Appendix D).

Drill cuttings were temporarily stored on-site pending receipt of analytic results. Soil cuttings were placed on and covered by visqueen.

2.2 Monitoring Well Installation

Ground water was encountered during drilling at approximately 20 feet below ground surface. Water levels stabilized at approximately 21 feet below grade after development. Water levels and well construction details are shown on the boring logs in Appendix D and are tabulated in Table 3 (Appendix B).

The ground water monitoring wells were constructed in the borings in accordance with SES Standard Operating Procedure - Monitoring Well Design and Construction (Appendix C). The wells were constructed using 0.020-inch slotted well screen and #3 sand.

3. WELL DEVELOPMENT AND GROUND WATER SAMPLING

Monitoring wells MW-11 and MW-12 were developed on May 10, 1994 by SES personnel using a vented surge block and steam-cleaned PVC bailers in accordance with SES Standard Operating Procedure - Monitoring Well Development (Appendix C).

The monitoring wells (MW-11 and MW-12) were sampled on May 16, 1994 in accordance with the SES Standard Operating Procedure - Water Sampling (Appendix C).

Monitoring well development and purge water were transported in a truck-mounted tank to the Chevron Refinery in Richmond, California for disposal.

4. SURVEYING AND GROUND WATER GRADIENT

The top of casing elevations of the two new monitoring wells were surveyed to within 0.01 foot by Ron Miller, Professional Engineer #15816, on May 12, 1994. Water levels were measured to within 0.01 foot in the two wells on May 16, 1994. Free-phase hydrocarbons were not present

in the site wells. Water level measurements, top of casing elevations and ground water elevations are shown in Table 3 (Appendix B). The ground water flow direction in the site vicinity is assumed to be north-northwesterly, based on topography.

5. ANALYTIC RESULTS

Field observations, OVM readings and ground water depths were used to select soil samples for analyses. Selected soil and ground water samples from the borings/wells were analyzed for TPPH(G) by EPA Method 8015/5030, and BTEX by EPA Method 8020.

Analytic results for soil and ground water are shown in Tables 1 and 2, (Appendix B). Chain of Custody documents and laboratory analytic reports are included as Appendix E. SES is not responsible for laboratory omissions or errors.

5.1 Analytic Results for Soil

Hydrocarbons as gasoline and BTEX were not detected in soil samples collected from monitoring well MW-11 or from the sample collected from MW-12 at 15 feet below grade. The highest concentration of TPPH(G) detected in soil was collected from boring/well MW-12 at 20 feet below grade (5 ppm). BTEX was detected in the soil sample analyzed from well MW-12 at 20.0 feet at concentrations ranging from 0.007 to 0.84 ppm.

5.2 Analytic Results for Ground Water

Hydrocarbons as gasoline were not detected in ground water samples collected from monitoring well MW-11. Benzene and xylene were detected in ground water collected from MW-11 at 1.4 and 0.6 ppb, respectively. Hydrocarbons as gasoline were detected in ground water collected from MW-12 at 160,000 ppb. BTEX constituents were detected in ground water samples from well MW-12 at concentrations ranging from 1,900 to 69,000 ppb.

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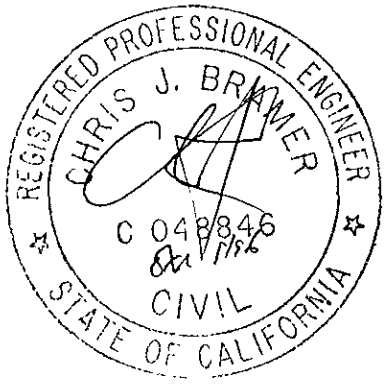
Thank you for the opportunity to provide environmental consulting services to Chevron USA Products Company. Please call if you have any questions or comments regarding this investigation.



Sincerely,
Sierra Environmental Services

Carol Eaton
Project Environmental Scientist

Chris Bramer
Professional Engineer #C48846

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Attachments:

Appendix A - Figures
Appendix B - Tables
Appendix C - SES Standard Operating Procedures
Appendix D - ASTM Soil Classification Chart and Boring Logs
Appendix E - Chain of Custody Documents and Laboratory Reports

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APPENDIX A
FIGURES

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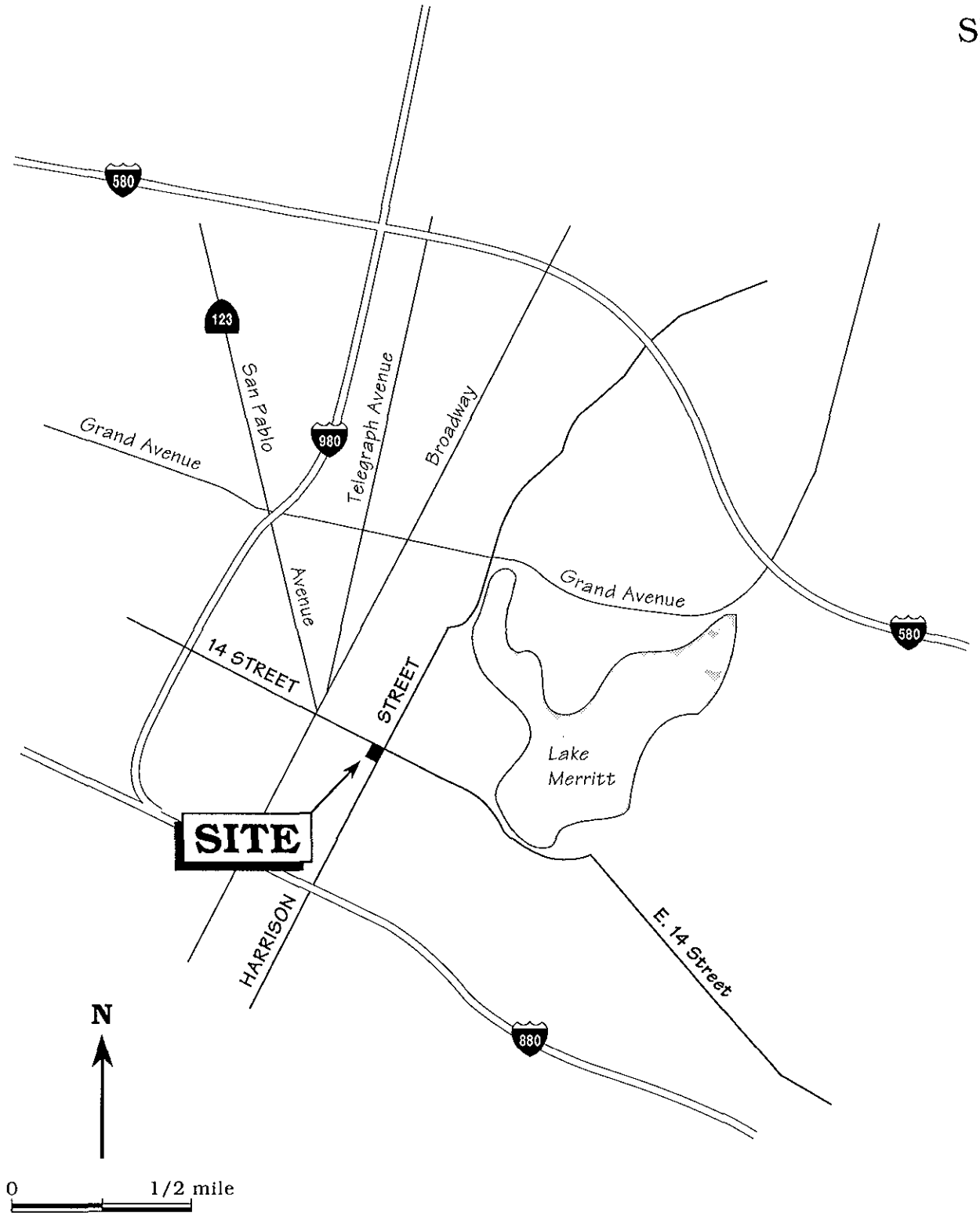

Base map ref: Thomas Bros.

Figure 1. Site Location Map - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

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APPENDIX B
TABLES

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Table 1. Analytic Results for **Soil** - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

Sample ID	Depth (ft)	Date Sampled	Analytic Lab	Analytic Method	TPPH(G)	B	T	E	X
					<----------ppm---------->				
MW-11	20.0	4/27/94	SPA	8015/8020	<1	<.005	<.005	<.005	<.005
MW-12	15.0	4/27/94	SPA	8015/8020	<1	<.005	<.005	<.005	<.005
	20.00	4/27/94	SPA	8015/8020	5	0.007	0.016	0.011	0.84

EXPLANATION:

TPPH(G) = Total Purgeable Petroleum Hydrocarbons as Gasoline
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
ppm = Parts per million
--- = Not analyzed/not applicable

ANALYTIC METHODS:

8015 = EPA Method 8015/5030 for TPPH(G)
8020 = EPA Method 8020 for BTEX

ANALYTIC LABORATORY:

SPA = Superior Precision Analytical Laboratory of Martinez, California

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Table 2. Analytic Results for **Ground Water** - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

Well ID	Date Sampled	Analytic Lab	Analytic Method	TPPH(G)	B	T	E	X
				<----------*ppb*---------->				
MW-11	5/16/94	SPA	8015/8020	<50	1.4	<0.5	<0.5	0.6
MW-12	5/16/94	SPA	8015/8020	160,000	69,000	16,000	1,900	7,600
TB-LB (Trip Blank)	5/16/94	SPA	8015/8020	<50	<0.5	<0.5	<0.5	<0.5

EXPLANATION:

TPPH(G) = Total Purgeable Petroleum Hydrocarbons as Gasoline
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
ppb = Parts per billion
--- = Not analyzed/Not applicable

ANALYTIC METHODS:

8015 = EPA Method 8015/5030 for TPPH(G)
8020 = EPA Method 8020 for BTEX

ANALYTIC LABORATORY:

SPA = Superior Precision Analytical Laboratory of Martinez, California

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Table 3. Water Level Data and Well Construction Details - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

Well ID	Date Measured	DTW (ft)	TOC (ft)	GWE (msl)	Product Thickness* (ft)	Screen Interval	Sand Pack Interval	Bentonite/Grout Interval
						<----------*feet below grade*---------->		
MW-11	5/16/94	20.58	33.02	12.44	0	15 - 30	14 - 30	0 - 14
MW-12	5/16/94	21.27	33.90	12.63	0	20 - 30	18 - 30	0 - 18

EXPLANATION:

DTW = Depth to water
TOC = Top of casing elevation
GWE = Ground water elevation
msl = Measurements referenced relative to mean sea level
--- = Not applicable

NOTES:

Top of casing elevations of MW-11 and MW-12 were surveyed on May 12, 1994 by Ron Miller, Professional Engineer #15816.

* Product thickness was measured with an MMC flexi-dip interface probe.

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WELL MW-11

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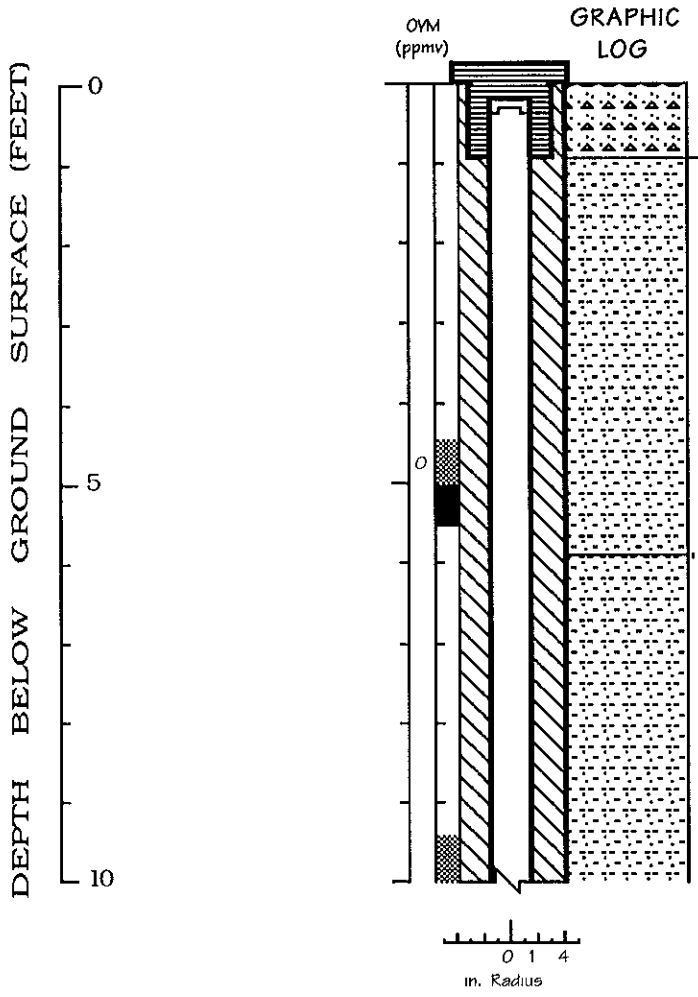


12" Asphalt/concrete

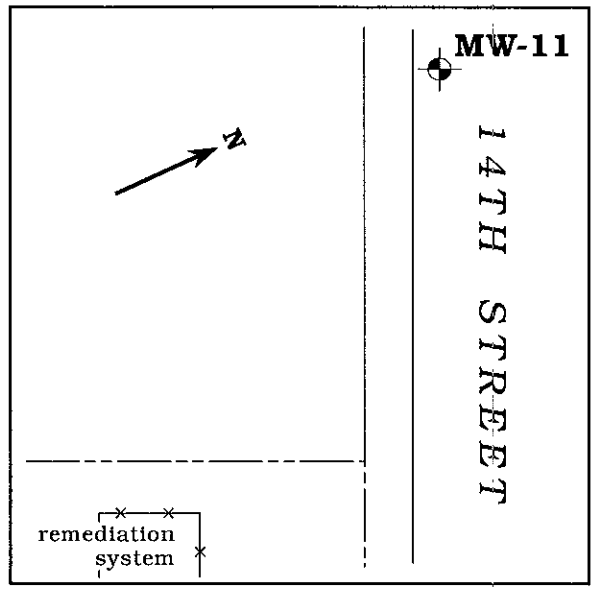
Silty SAND (SM): reddish brown; damp; loose; ~10% clay; 20-30% silt; 60-70% fine to medium, poorly-graded sand; moderate est K

Silty SAND (SM): reddish brown; medium dense; 20-30% silt; 70-80% poorly graded fine to medium sand; moderate est K

Well Construction and Boring Log - Well MW-11

Former Chevron Service Station
#9-4816
301 14th Street
Oakland, California

Logged by:	Carol Eaton
Supervisor:	C. Bramer P.E. #C48846
Drilling Company:	Soils Exploration Services
C-57#:	582696
Driller:	Mike Duffy
Drilling Method:	Hollow stem auger
Date Drilled:	April 27, 1994
Well Head Completion:	Locking cap & traffic-rated vault
Type of sampler:	Split barrel (2" ID)



WELL MW-11

(continued)

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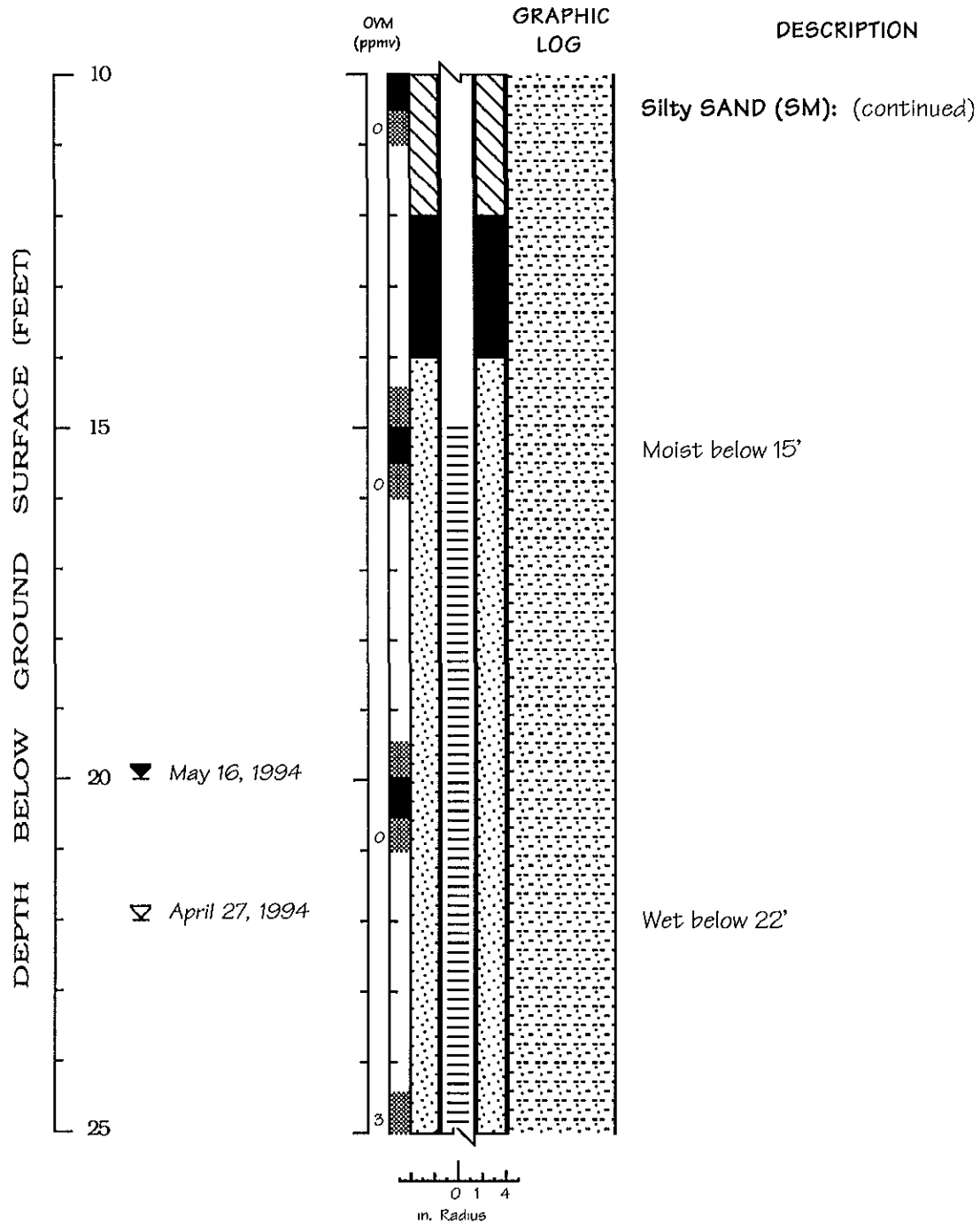

Well Construction and Boring Log - Well MW-11

Former Chevron Service Station #9-4816
301 14th Street
Oakland, California

WELL MW-11

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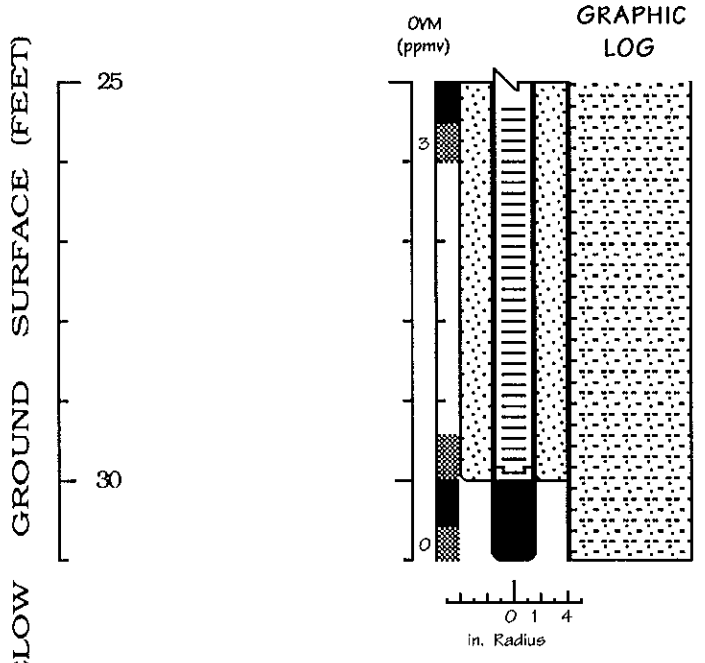

Well Construction and Boring Log - Well MW-11

Former Chevron Service Station #9-4816
301 14th Street
Oakland, California

WELL MW-12

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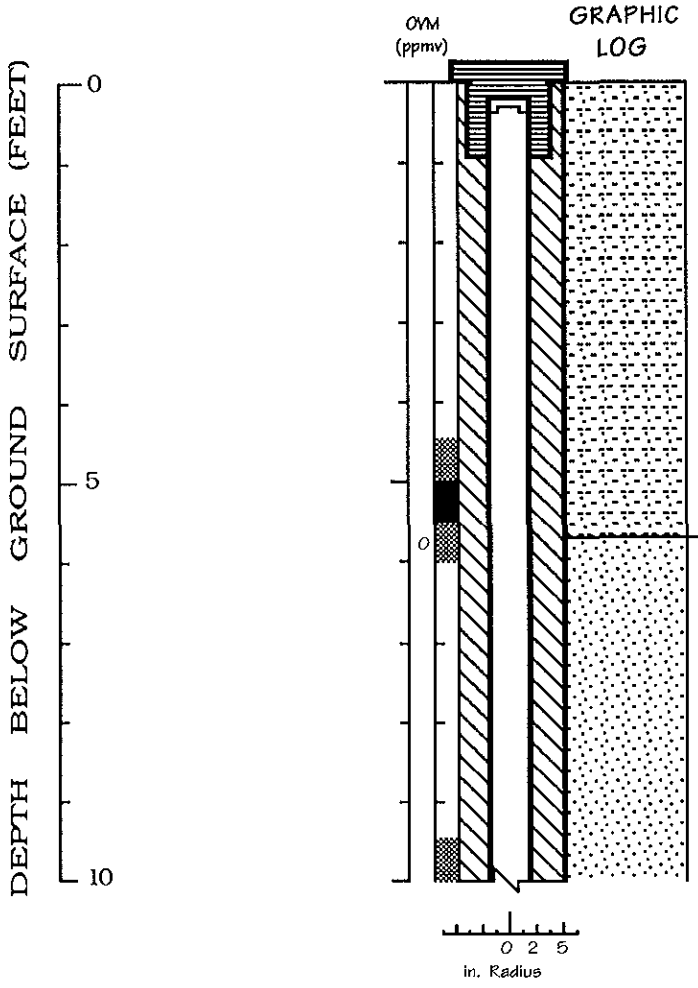


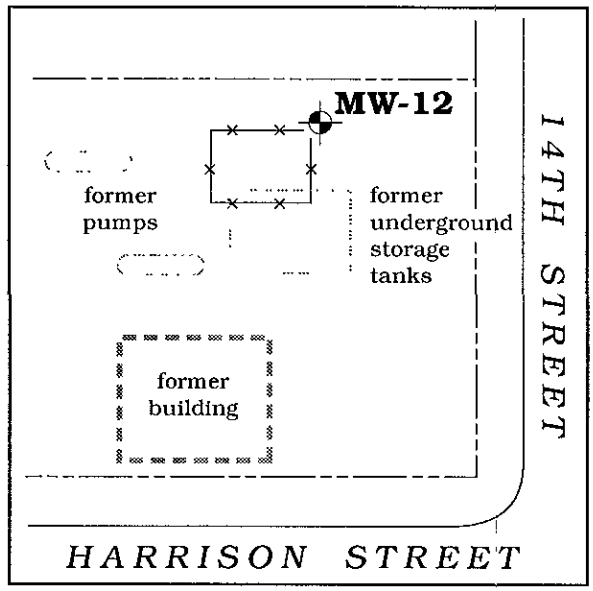
Silty SAND (SM): brown; damp; medium dense; ~10% clay; 20-30% silt; 60-70% poorly graded medium sand; moderate est K

SAND with Silt (SM): reddish brown; moist; medium dense; ~20% silt; ~80% poorly graded fine to medium sand; moderate est K

Well Construction and Boring Log - Well MW-12

Former Chevron Service Station
#9-4816
301 14th Street
Oakland, California

Logged by:	Carol Eaton
Supervisor:	C. Bramer P.E. #C48846
Drilling Company:	Soils Exploration Services
C-57#:	582696
Driller:	Mike Duffy
Drilling Method:	Hollow stem auger
Date Drilled:	April 27, 1994
Well Head Completion:	Locking cap & traffic-rated vault
Type of sampler:	Split barrel (2" ID)



WELL MW-12

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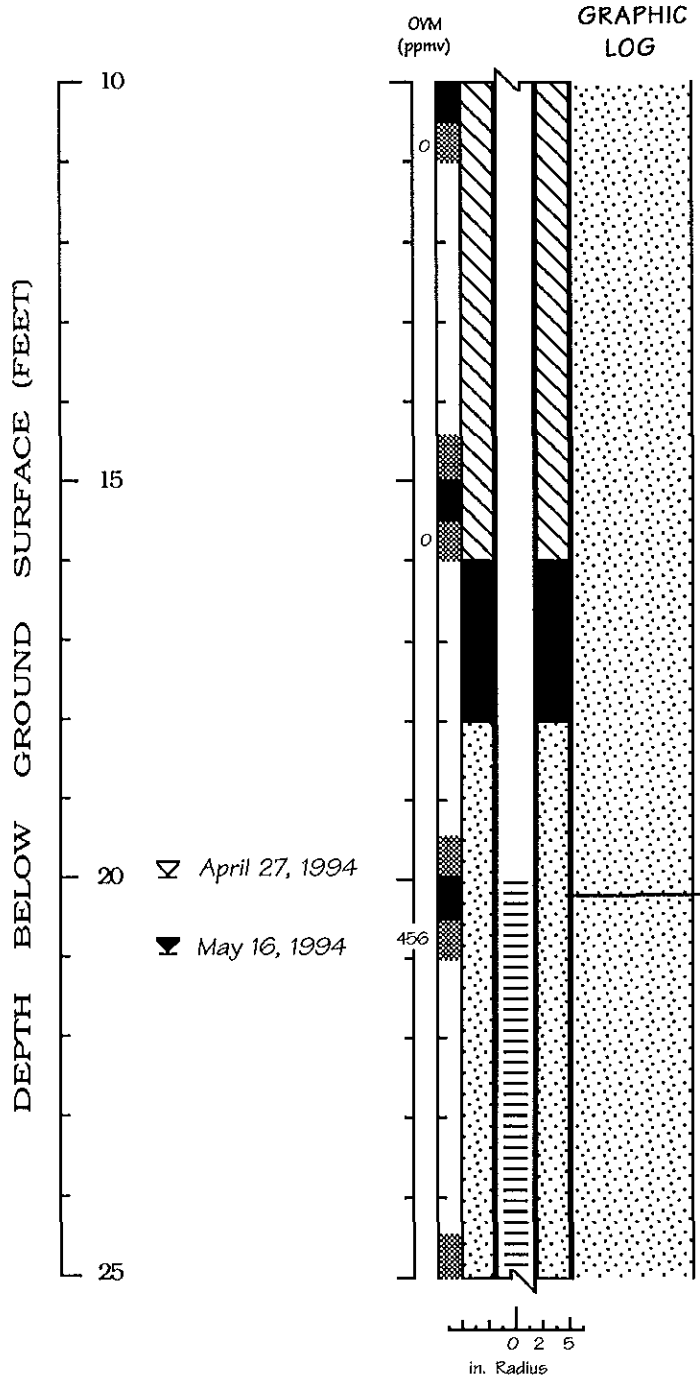

SAND with Silt (SM): (continued)

Poorly graded SAND (SP-SM): olive-brown; medium dense; ~10% silt; ~90% fine to medium, poorly graded sand; moderate hydrocarbon odor below 20'

Well Construction and Boring Log - Well MW-12

Former Chevron Service Station #9-4816
301 14th Street
Oakland, California

WELL MW-12

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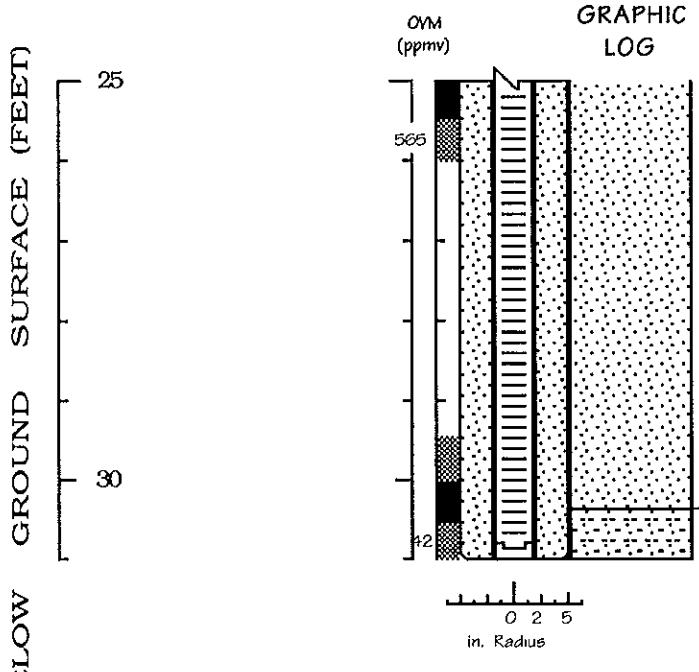


Well Construction and Boring Log - Well MW-12

Former Chevron Service Station #9-4816
301 14th Street
Oakland, California

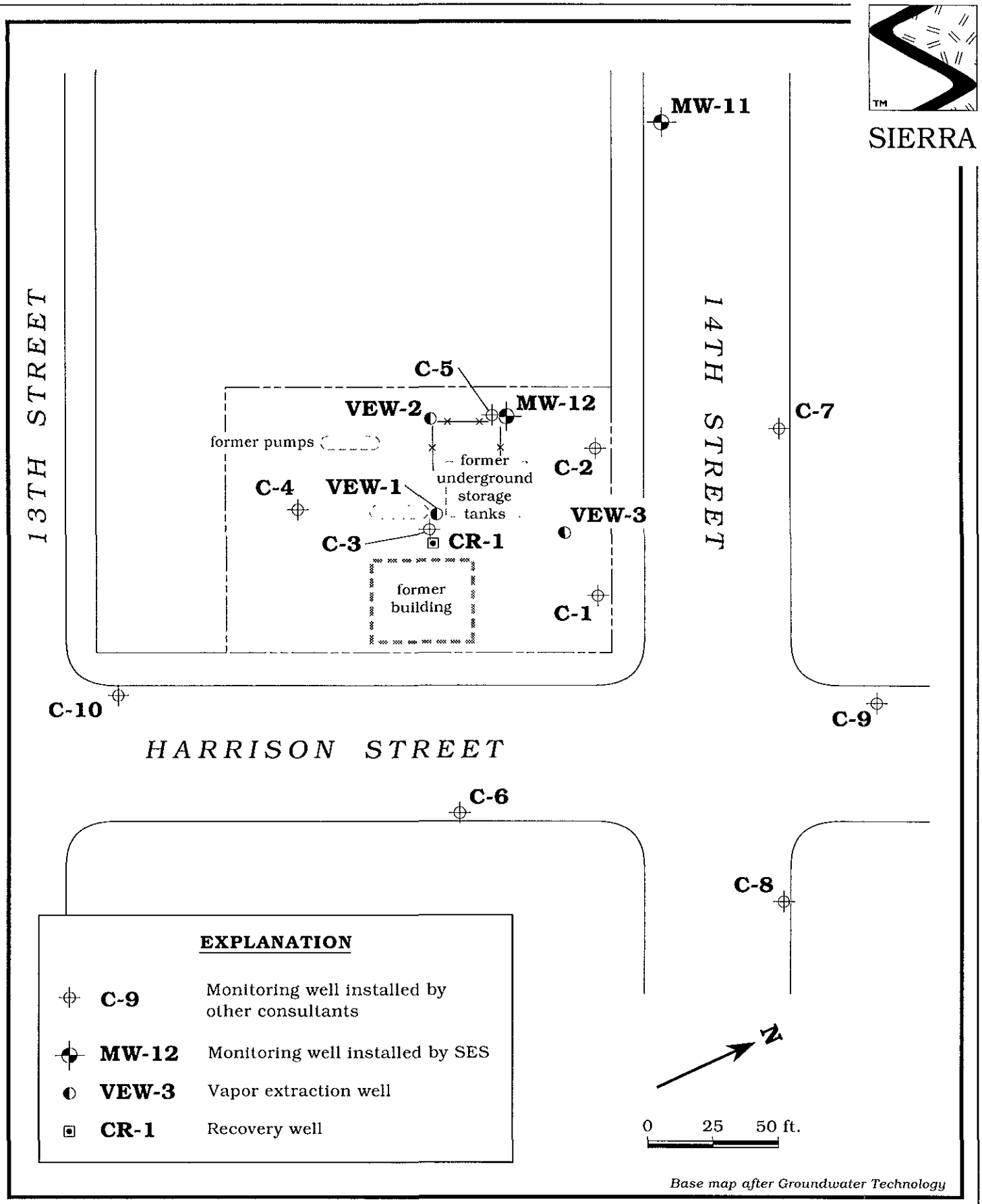
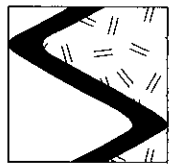


Figure 1. Monitoring, Vapor Extraction and Recovery Well Locations - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

6/23/94



APPENDIX C
SIERRA ENVIRONMENTAL SERVICES
STANDARD OPERATING PROCEDURES

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SES STANDARD OPERATING PROCEDURE

SOIL SAMPLING

The following describes sampling procedures used by SES field personnel to collect, handle, and transport soil samples. Before samples are collected, careful consideration is given to the type of analysis to be performed so that precautions are taken to prevent loss of volatile components or contamination of the sample, and to preserve the sample for subsequent analysis.

All drilling and sampling equipment is steam-cleaned between boreholes to prevent cross-contamination. The sampler is washed with an EPA approved detergent (such as liquinox or trisodium phosphate) between sample collection. Collection methods specific to soil sampling are presented below.

Soil samples are collected at pre-specified depth intervals or at a sediment/lithologic change for hydrogeologic description and possible chemical analysis. Samples are collected using a modified California split-spoon sampler lined with 2- or 2.5-inch I.D. x 4- or 6-inch long steam-cleaned or new stainless steel or brass tubes. The sampler is lowered into the borehole and driven 18 inches, using a 140-pound hammer. The drilling contractor provides the SES field personnel with the number of blows required to drive the sampler for each 6 inches of penetration.

The sampler is then extracted from the borehole and the middle or bottom brass tube is carefully removed for possible analysis. The soil material is immediately trimmed flush with the tube ends, and sealed with Teflon tape beneath polyethylene end caps. The caps are hermetically sealed to the brass tube with duct tape. The sample is then labeled to include the date, boring number, depth of sample, project number, SES, and the SES field personnel's initials. The samples are put into a plastic "zip-lock" type bag and placed into an ice chest maintained below 4°C with blue ice or dry ice, for transport under chain of custody to the laboratory. The chain-of-custody form includes the project number, analysis requested, sample ID, date analysis and the SES field personnel's name. The form is signed, dated and timed by each person who yields or receives the samples beginning with the field personnel and ending with the laboratory personnel.

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SES STANDARD OPERATING PROCEDURE

LOGGING METHOD

Unconsolidated soil is classified and described by trained SES field personnel. All available information is used, including the following: soil recovered in the sampler, including the soil visible on both ends of the sample retained for possible analysis; soil cuttings generated during drilling; and the drilling contractor's observations of the drill rig's behavior.

Classification and description of unconsolidated soil is accomplished using the American Society of Testing and Materials (ASTM) Methods D2487-85 (Unified Soil Classification System (USCS)) and/or D2488-69 (Description and Identification of Soils (Visual-Manual Procedure)).

The soil classification and description is recorded on the field log sheet by SES field personnel and includes the following information:

1) Soil type;
2) Soil classification;
3) Soil color, including mottling;
4) Moisture content;
5) Plasticity and consistency (fine-grained material) or density (coarse-grained material);
6) Percentages of clay, silt, sand and gravel;
7) Grain size range of sands and gravels;
8) Angularity and largest diameter of gravel component;
9) Estimated permeability;
10) Odor; and
11) Any other observations which would assist in the interpretation of the depositional environment and/or differentiation between the various geologic units expected to be encountered.

In addition to the above, the ground water levels encountered during drilling and measured after the water stabilized is also recorded on the field log.

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SES STANDARD OPERATING PROCEDURE

OVM READINGS

SES uses an organic vapor meter (OVM) to determine the presence or absence of volatile organic compounds (VOCs), including benzene, toluene, ethylbenzene, and xylenes in soil samples chosen for field screening. The OVM uses a photoionization detector (PID) and is calibrated daily to 100 parts per million of 1-liter of isobutylene. The OVM, which measures in parts per million by volume (ppmv), is used for qualitative, not quantitative, assessment because the correlation between the volume measurements of the OVM and the weight measurements of the laboratory instruments is not well defined.

A field screen sample is obtained from the brass tube immediately above or below the brass tube containing the sample selected for possible analysis. The soil to be screened is removed from the brass tube, and is placed in a pre-cleaned brass tube with aluminum foil and a polyethylene cap on one end. The brass tube is loosely filled to approximately 1/2 full. Another square of aluminum foil is placed on the open end and a polyethylene cap with crossed slits is placed over it.

The field screen sample is allowed to temperature equilibrate for approximately 15 to 30 minutes in the sun, allowing any VOCs which might be present in the soil to volatilize out into the brass tube's headspace. The OVM nozzle is then placed inside the sealed brass tube, through the slits in the cap, in order to measure the VOCs present, if any, in the headspace. The nozzle should remain inside the brass tube for approximately 15 to 30 seconds or until the maximum reading has been recorded on the OVM readout panel.

The depth from which the sample came and the corresponding OVM reading is recorded on the original field log sheet. Field observations, OVM and (odor and staining) readings are used in determining which soil samples are to be analyzed in the laboratory.

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SES STANDARD OPERATING PROCEDURE

MONITORING WELL DESIGN AND CONSTRUCTION

Where possible, information from published and unpublished reports is reviewed prior to installation of monitoring wells. Relevant data includes highest and lowest anticipated ground water elevations, aquifer materials, aquifer yield and contaminants expected. This information is used to aid the field geologist rather than to predetermine how the wells will be constructed. Well construction is based on *site specific conditions* and is determined in the field after discussion with the senior geologist.

The wells are screened to monitor the first water-bearing zone encountered. If high ground water conditions exist the top of the well screen may be set at static water level or below static water level.

Fifteen feet of well screen will be used in the wells (five feet above static ground water and ten feet below static water) unless a five foot clay layer is encountered. If a clay layer is encountered, it will be confirmed by sampling. The sampling hole into the underlying confining layer will be sealed with bentonite pellets and the well screen will terminate 0 to 1 foot into the clay layer. When field observations indicate that low permeability materials are acting as an aquitard to prevent movement of contaminants less screen may be used.

Monitoring wells are constructed with flush-threaded, 2-inch or 4-inch diameter, slotted PVC, stainless steel or teflon well screen and PVC, stainless steel or teflon blank casing. Number 3 or #212 sand is used in the annular space around the well screen. The sand is placed into the annular space around the well screen to approximately 2 feet above the top of the well screen. If high ground water conditions exist, the sand may be placed 0 to 1 foot above the top of the well screen. Two feet of bentonite pellets are used to separate the sand from the sanitary surface seal (grout). If high ground water conditions exist 1/2 foot of bentonite may be used to separate the sand from the sanitary surface seal.

The grout (Portland cement with approximately 3-5% bentonite powder) is poured into the annular space above the bentonite pellets. If the surface seal is greater than 5 feet thick, grout consisting of cement mixed with 3-5% bentonite powder will be tremied or pumped into the

annular space above the bentonite pellets to prevent the infiltration of surface water into the well. If the surface seal is less than 5 feet thick, the grout will be poured from the surface. The resulting seal will be checked for shrinkage within 24 hours and additional grout will be added, if necessary. The surface seal is used to prevent infiltration of surface water into the well.

The monitoring well(s) is locked with a stovepipe or cap and covered with a traffic-rated vault if it is located in a developed area. The well ID is clearly marked on the cap or casing.

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SES STANDARD OPERATING PROCEDURE

WELL DEVELOPMENT

SES develops ground water monitoring wells not less than 48 hours after placement of the surface seal (grouting) to allow sufficient time for the cement grout to set. The wells are developed to restore the natural hydraulic conductivity of the formation(s) to be monitored, and to remove all sand and as much fine-grained material as possible. Well development consists of several cycles of surging (using a vented surge block) and over pumping of the well.

Prior to development, SES field personnel measure the depth to water and the total depth of the well. The total depth measurement is compared to the well completion diagram shown on the field log and any discrepancies are noted.

SES begins development by carefully lowering a pre-cleaned stainless steel vented surge block into the well casing to a position approximately three feet below the top of the well screen or the air/water interface, whichever is deepest. Surging begins with a slow upward stroke motion of the surge block at a stroke length not exceeding three feet. The stroke rate and length is progressively increased as surging continues for 10 to 15 minutes to loosen sand and fine-grained material from the screened interval. The surge block is then removed and placed in a clean 5-gallon bucket for future use.

During over pumping, the pump is run at the maximum flow rate to evacuate approximately two well casing volumes of ground water from the well. Over pumping will remove any sediment accumulated in the bottom of the well and any fine-grained material suspended in the water.

After a cycle of surging and over pumping has been completed SES field personnel record the time spent on each task, approximate discharge flow rate, and approximate volume of water evacuated. SES field personnel measure the depth to water, immediately after pumping and at various intervals, to approximate the recovery rate of the well.

Development shall continue until the turbidity of the water is less than 5 NTUs, or when ten well volumes have been removed, whichever occurs first.

SIERRA

After development is completed, the total depth of the well is remeasured and compared to the total depth noted on the field log. The two depths should be approximately the same. All data measured during the procedures described herein are recorded on the SES Well Development Form, which is part of the project file.

The water is taken to Chevron's Richmond Refinery for disposal.

WELLDVLP.CHE

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SES STANDARD OPERATING PROCEDURE

GROUND WATER SAMPLING

The following describes sampling procedures used by SES field personnel to collect and handle ground water samples. Before samples are collected, careful consideration is given to the type of analysis to be performed so that precautions are taken to prevent loss of volatile components or contamination of the sample, and to preserve the sample for subsequent analysis. Wells will be sampled no less than 24 hours after well development. Collection methods specific to ground water sampling are presented below.

Prior to sampling, each well is checked for the presence of free-phase hydrocarbons using an MMC flexi-dip interface probe. Product thickness (measured to the nearest 0.01 foot) is noted on the sampling form. Water level measurements are also made using either a water level meter or the interface probe. The water level measurements are also noted on the sampling form.

Prior to sampling, each well is purged of a minimum of four well casing volumes of water using a steam-cleaned PVC bailer, or a pre-cleaned pump. Temperature, pH and electrical conductivity are measured at least three times during purging. Purging is continued until these parameters have stabilized (i.e., changes in temperature, pH or conductivity do not exceed ±0.5°F, 0.1 or 5%, respectively).

The purge water is taken to Chevron's Richmond Refinery for disposal.

Ground water samples are collected from the wells with steam-cleaned Teflon bailers. The water samples are decanted into the appropriate container for the analysis to be performed. Pre-preserved sample containers may be used or the analytic laboratory may add preservative to the sample upon arrival. Duplicate samples are collected from each well as a back-up sample and/or to provide quality control. The samples are labeled to include the project number, sample ID, date, preservative, and the field person's initials. The samples are placed in polyethylene bags and in an ice chest (maintained at 4°C with blue ice or ice) for transport under chain of custody to the laboratory.

The chain of custody form includes the project number, analysis requested, sample ID, date analysis and the SES field person's name. The form is signed and dated (with the transfer time) by each person who yields or receives the samples beginning with the field personnel and ending with the laboratory personnel.

A trip blank and bailer blank accompanies each sampling set, or 5% trip blanks and 5% bailer blanks are included for sets of greater than 20 samples. The bailer blank is prepared by pouring previously boiled water into a steam-cleaned Teflon bailer prior to sampling a well. The trip and bailer blanks are analyzed for some or all of the same compounds as the ground water samples.

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APPENDIX D
SOIL CLASSIFICATION SYSTEM CHART
AND BORING LOGS

					Group Symbol				Group Name
>50% Sand & Gravel	GRAVEL % gravel > % sand	≤5% fines	Well-graded		GW	<15% sand			Well-graded GRAVEL
						≥15% sand			Well-graded GRAVEL with Sand
			Poorly graded		GP	<15% sand			Poorly graded GRAVEL
						≥15% sand			Poorly graded GRAVEL with Sand
		10% fines	Well-graded	fines=ML or MH	GW-GM	<15% sand			Well-graded GRAVEL with Silt
						≥15% sand			Well-graded GRAVEL with Silt and Sand
				fines=CL or CH	GW-GC	<15% sand			Well-graded GRAVEL with Clay
						≥15% sand			Well-graded GRAVEL with Clay and Sand
			Poorly graded	fines=ML or MH	GP-GM	<15% sand			Poorly graded GRAVEL with Silt
						≥15% sand			Poorly graded GRAVEL with Silt and Sand
				fines=CL or CH	GP-GC	<15% sand			Poorly graded GRAVEL with Clay
						≥15% sand			Poorly graded GRAVEL with Clay and Sand
		≥15% fines		fines=ML or MH	GM	<15% sand			Silty GRAVEL
						≥15% sand			Silty GRAVEL with Sand
				fines=CL or CH	GC	<15% sand			Clayey GRAVEL
						≥15% sand			Clayey GRAVEL with Sand
	SAND % sand ≥ % gravel	≤5% fines	Well-graded		SW	<15% gravel			Well-graded SAND
						≥15% gravel			Well-graded SAND with Gravel
			Poorly graded		SP	<15% gravel			Poorly graded SAND
						≥15% gravel			Poorly graded SAND with Gravel
		10% fines	Well-graded	fines=ML or MH	SW-SM	<15% gravel			Well-graded SAND with Silt
						≥15% gravel			Well-graded SAND with Silt and Gravel
				fines=CL or CH	SW-SC	<15% gravel			Well-graded SAND with Clay
						≥15% gravel			Well-graded SAND with Clay and Gravel
			Poorly graded	fines=ML or MH	SP-SM	<15% gravel			Poorly graded SAND with Silt
						≥15% gravel			Poorly graded SAND with Silt and Gravel
				fines=CL or CH	SP-SC	<15% gravel			Poorly graded SAND with Clay
						≥15% gravel			Poorly graded SAND with Clay and Gravel
		≥15% fines		fines=ML or MH	SM	<15% gravel			Silty SAND
						≥15% gravel			Silty SAND with Gravel
				fines=CL or CH	SC	<15% gravel			Clayey SAND
						≥15% gravel			Clayey SAND with Gravel
>50% or More Fines	Low-Plasticity Clay				CL	<30% sand & gravel	<15% Sand and Gravel		Lean CLAY
							15-25% sand & gravel	% sand ≥% gravel	Lean CLAY with Sand
								% sand <% gravel	Lean CLAY with Gravel
						≥30% sand & gravel	% sand ≥% of gravel	<15% gravel	Sandy lean CLAY
								≥15% gravel	Sandy lean CLAY with Gravel
							% sand <% gravel	<15% sand	Gravelly lean CLAY
								≥15% sand	Gravelly lean CLAY with Sand
	Low-Permeability Silt				ML	<30% sand & gravel	<15% sand & gravel		SILT
							15-25% sand & gravel	% sand ≥% gravel	SILT with Sand
								% sand <% gravel	SILT with Gravel
						≥30% sand & gravel	% sand ≥% of gravel	<15% gravel	Sandy SILT
								≥15% gravel	Sandy SILT with Gravel
							% sand <% gravel	<15% sand	Gravelly SILT
								≥15% sand	Gravelly SILT with Sand
	Plastic Clay				CH	<30% sand & gravel	<15% sand & gravel		Fat CLAY
							15-25% sand & gravel	% sand ≥% gravel	Fat CLAY with Sand
								% sand <% gravel	Fat CLAY with Gravel
						≥30% sand & gravel	% sand ≥% of gravel	<15% gravel	Sandy fat CLAY
								≥15% gravel	Sandy fat CLAY with Gravel
							% sand <% gravel	<15% sand	Gravelly fat CLAY
								≥15% sand	Gravelly fat CLAY with Sand
	Plastic Silt				MH	<30% sand & gravel	<15% sand & gravel		Elastic SILT
							15-25% sand & gravel	% sand ≥% gravel	Elastic SILT with Sand
								% sand <% gravel	Elastic SILT with Gravel
						≥30% sand & gravel	% sand ≥% of gravel	<15% gravel	Sandy elastic SILT
								≥15% gravel	Sandy elastic SILT with Gravel
							% sand <% gravel	<15% sand	Gravelly elastic SILT
								≥15% sand	Gravelly elastic SILT with Sand
	Organics (Peat or Bay Mud)				OL/OH	<30% sand & gravel	<15% sand & gravel		Organic SOIL
							15-25% sand & gravel	% sand ≥% gravel	Organic SOIL with Sand
								%sand <% gravel	Organic SOIL with Gravel
						≥30% sand & gravel	% sand ≥% gravel	<15% gravel	Sandy Organic SOIL
								≥15% gravel	Sandy Organic SOIL with Gravel
							% sand <% gravel	<15% sand	Gravelly Organic SOIL
								≥15% sand	Gravelly Organic SOIL with Sand

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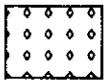
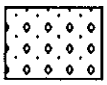
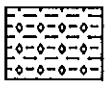
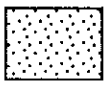
EXPLANATION FOR SES BORING LOGS

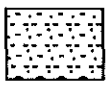

GRAVEL


Sandy GRAVEL

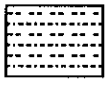

Silty GRAVEL

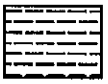

Clayey GRAVEL

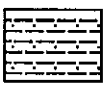

SAND

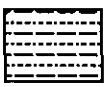

Silty SAND/Sandy SILT

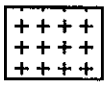

Clayey SAND


SILT

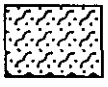

CLAY

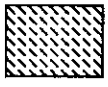

Sandy CLAY

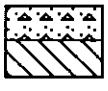

Silty CLAY/Clayey SILT


Organics


Hard Rock


Slough


Asphalt


Concrete
Cement/Grout

K = Field estimation of soil hydraulic conductivity

Drive sample interval

Drive sample collected for possible chemical analysis

Contact between sedimentary or lithologic units; dotted where approximate, dashed where uncertain, hatched where gradational

Initial water level measured during drilling (date in italics)

Static water level, measured after well development (date in italics)

Note. Soils are logged using ASTM D2487 Soil Classification System

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APPENDIX E
CHAIN OF CUSTODY DOCUMENTS AND
LABORATORY ANALYTIC REPORTS

Fax copy of Lab Report and COC to Chevron Contact: ☐ No 3 04 14

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number 9-4816
Facility Address 301 14th St., Oakland, CA.
Consultant Project Number 1-378-00
Consultant Name Sierra Environmental Services
Address P.O. Box 2546 Martinez, CA
Project Contact (Name) Ed Morales
(Phone) 370-1280 (Fax Number) 370-7959

Chevron Contact (Name) Mark Miller
(Phone) (510) 842-8134
Laboratory Name Superior Precision Analytical
Laboratory Release Number 7140670
Samples Collected by (Name) Carol Eaton
Collection Date 4/27/94
Signature Carol Eaton

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)	Remarks
MW-11 @ 5.0		2"x6"	S	D	15:30	None	Y									Hold
10.0																
15.0																
20.0								✓								Analyze
25.0																Hold
30.0					16:40											
MW-12 @ 5.0					13:00											
10.0																
15.0								✓								Analyze
20.0								✓								Analyze
25.0																Hold
30.0					14:15											

Please Initial: DW
Samples Stored in ice. ga SC
Appropriate containers ga
Samples preserved N/A
VOA's without headspace N/A
Comments:

Note:
Do Not Bill
TB-LB Samples

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Carol Eaton	SES	4/28/94 11:00			
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time
			R Vanegas		4-28 11:00 am

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
5 Days
10 Days
As Contracted

COC-3.DWG/03 91/HCH

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

Sierra Environmental
Attn: ED MORALES

Project 1-378-00
Reported 05/06/94

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
30462- 4	MW-11 20.0	04/27/94	05/04/94	Soil
30462- 9	MW-12 15.0	04/27/94	05/04/94	Soil
30462-10	MW-12 20.0	04/27/94	05/04/94	Soil

RESULTS OF ANALYSIS

Laboratory Number:	30462- 4	30462- 9	30462-10
Gasoline:	ND<1	ND<1	5
Benzene:	ND<.005	ND<.005	0.007
Toluene:	ND<.005	ND<.005	0.016
Ethyl Benzene:	ND<.005	ND<.005	0.011
Total Xylenes:	ND<.005	ND<.005	0.84
Concentration:	mg/kg	mg/kg	mg/kg

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 30462

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
mg/kg = parts per million (ppm)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Soil: 50mg/kg

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Soil: 1mg/kg

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Soil: 1mg/kg

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Soil: 0.005mg/kg

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	103/78	28%	70-130
Benzene:	99/104	5%	70-130
Toluene:	103/104	1%	70-130
Ethyl Benzene:	109/108	1%	70-130
Total Xylenes:	109/109	0%	70-130

Senior Chemist

Fax copy of Lab Report and COC to Chevron Contact: ☐ Yes ☐ No 30502

Chain-of-Custody-Record

Chevron U.S.A. Inc.
P.O. BOX 5004
San Ramon, CA 94583
FAX (415)842-9591

Chevron Facility Number: 9-4816
Facility Address: 301 14th St. OAKland, CA.
Consultant Project Number: 1-378'-00
Consultant Name: Sierra Environmental Services
Address: P.O. Box 2546, Martinez, CA
Project Contact (Name): Ed Morales
(Phone) 370-1280 (Fax Number) 370-7959

Chevron Contact (Name): MARK MILLER
(Phone) (510) 842-8134
Laboratory Name: Superior Precision Analytical
Laboratory Release Number: 714070
Samples Collected by (Name): Joe Carter
Collection Date: 5/16/94
Signature: Joe Carter

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil W = Water A = Air C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	Analyses To Be Performed: BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)					Remarks
TB-LB		2	W	G	—	HCl	Y	✓												ANALYZES
MW-11		3		G	335pm	HCl	Y	✓												↓
MW-12		3	↓	G	415pm	HCl	Y	✓												

Note:
Do Not Bill
TB-LB Samples

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Joe Carter	SES	5/16/94			
Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature)		Date/Time
					5/16/94 6:10

Turn Around Time (Circle Choice)
24 Hrs.
48 Hrs.
5 Days
10 Days
As Contracted

5/16/94

COC-3.DWG/03 91/MCH

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 ▪ Martinez, California 94553 ▪ (510) 229-1512 / fax (510) 229-1526

Sierra Environmental
Attn: ED MORALES

Project 1-378-00
Reported 05/30/94

TOTAL PETROLEUM HYDROCARBONS

Lab #	Sample Identification	Sampled	Analyzed	Matrix
30502- 1	TB-LB	05/16/94	05/26/94	Water
30502- 2	MW-11	05/16/94	05/23/94	Water
30502- 3	MW-12	05/16/94	05/23/94	Water

RESULTS OF ANALYSIS

Laboratory Number:	30502- 1	30502- 2	30502- 3
Gasoline:	ND<50	ND<50	160000
Benzene:	ND<0.5	1.4	69000
Toluene:	ND<0.5	ND<0.5	16000
Ethyl Benzene:	ND<0.5	ND<0.5	1900
Total Xylenes:	ND<0.5	0.6	7600
Concentration:	ug/L	ug/L	ug/L

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 30502

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	88/89	1%	70-130
Benzene:	120/119	1%	70-130
Toluene:	92/92	0%	70-130
Ethyl Benzene:	77/76	1%	70-130
Total Xylenes:	103/102	1%	70-130

Ahsan L. Sahipour
Senior Chemist