

**REPORT FOR FIRST QUARTER 1999
GROUNDWATER MONITORING AT**

**A&C Auto Service
186 E. Lewelling Boulevard
San Lorenzo, California**

**Prepared for
Mr. Carl Graffenstatte
Graffenstatte Property**

**Prepared by
Sierra Environmental, Inc.**

**April 29, 1999
Project 99-137.01**



Sierra Environmental, Inc.
Environmental Consultants

April 29, 1999
Project 99-137.01

Mr. Carl Graffenstatte
P.O. Box 97397
Tacoma, WA 98497

Subject: Report for First Quarter 1999 Groundwater Monitoring at A&C Auto Service, 186 E. Lewelling Boulevard, San Lorenzo, California

Dear Mr. Graffenstatte:

Sierra Environmental, Inc. (Sierra) is pleased to submit this report summarizing the results of the first quarter 1999 groundwater monitoring event which we conducted at the subject location, hereafter, referred to as Site. Site location is shown in Figure 1. This monitoring event was requested by Alameda County Health Care Services (ACHCS) in a letter dated January 4, 1999. As part of a case closure procedure, ACHCS requested that quarterly groundwater monitoring shall be resumed at the Site. The purpose of the groundwater monitoring is to determine whether gasoline constituents in groundwater beneath the Site remain stable and decrease with natural attenuation.

Sierra obtained and recorded groundwater data, and collected groundwater samples from three groundwater monitoring wells (MW1 through MW3) at the Site for chemical analysis. Sierra submitted the samples to Entech Analytical Labs, Inc. (Entech) of Sunnyvale, California. Entech is a State-certified analytical laboratory (ELAP # I-2346).

BACKGROUND

On September 5, 1990, three underground storage tanks (USTs) were removed from the Site. The USTs consisted of two 4,000-gallon gasoline and one 350-gallon waste oil tanks. The approximate location of the USTs are shown in Figure 2. After removal, four soil samples were collected from beneath the gasoline tanks. One soil sample was also collected from beneath the waste oil tank.

Up to 4,000 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPHG) and 1.3 ppm benzene were detected in the soil samples collected from beneath the gasoline tanks.

On June 14 and 15, 1994, CET Environmental Services, Inc. (CET) constructed groundwater monitoring wells MW1, MW2, and MW3 to evaluate groundwater condition beneath the Site. The last groundwater monitoring event was performed by CET in September 11, 1995. The results "Third Quarter 1995 Groundwater Monitoring Report" indicated that groundwater depths ranged between 15.37 to 16.20 feet below top of well casings with a west/northwesterly flow direction. Analytical results showed 0.05 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPHG), 39 ppm TPHG, and 49 ppm TPHG in groundwater samples collected from MW1 through MW3, respectively.

Sierra understands that CET has recently performed an off-site soil and groundwater investigation as part of delineating groundwater impact at the Site. CET could not provide the results of the investigation to Sierra. ACHCS did not have any information regarding this investigation in their files.

GROUNDWATER MONITORING

On April 16, 1999, Sierra's field personnel measured the groundwater levels at MW1 through MW3 using an electronic sounder. Depth of groundwater in MW1 was 12.01 feet below top of the well casing (TOC); groundwater was measured at 12.30 feet below TOC in MW2. Groundwater depth at MW3 was 13.02 feet below TOC. Table I presents the groundwater measurement data.

Sierra's field personnel purged the wells using bailers. pH, temperature, and conductivity of groundwater was recorded during the purging activities to affirm that groundwater in the wells have stabilized. After completion of the purging, groundwater samples MW1 through MW3 were collected from the wells. After collection, the groundwater from each well was transferred into clean volatile organic analysis (VOA) vials. The VOAs were sealed with Teflon[®]-septum screw caps, labeled, placed in a cooler, and delivered to Entech with chain-of-custody documentation.

All sampling and measurement equipment were washed with Liqui-Nox[®] (a phosphate free laboratory detergent), and rinsed with tap water at each measurement and sampling interval. Purged and wash water were stored in a 55-gallon drum at a designated location at the Site. Sierra's quality control/quality assurance (QA/QC) protocol is presented in Appendix A.

CHEMICAL ANALYSIS

The samples were analyzed for TPHG using the United States Environmental Protection Agency (EPA) modified method 8015, and for benzene, toluene, ethyl benzene, and total xylenes (BTEX) using EPA method 602. Additionally, the samples were analyzed for methyl tertiary butyl ether (MTBE) using EPA method 8260.

Certified analytical results and chain-of-custody documentation are presented in Appendix B.

ANALYTICAL RESULTS

The analytical result for the water sample collected from MW1 showed 0.16 ppm TPHG. No BTEX or MTBE was detected in the sample. 50 ppm and 16 ppm TPHG were detected in the samples collected from MW2 and MW3, respectively. 25 parts per billion (ppb) and 10 ppb benzene, 1900 ppb and 2300 ppb ethylbenzene, and 8000 ppb and 940 ppb total xylenes were also detected in samples collected from MW2 and MW3, respectively. 110 ppb toluene was detected in water sample collected from MW2. No toluene was detected in the sample collected from MW3. No MTBE was detected in any of the samples. Table II presents Summary of the analytical results.

CONCLUSION AND RECOMMENDATIONS

Groundwater has been monitored at the Site since 1994. The historical data have indicated that TPHG concentrations ranging from ND to 93 ppm detected in groundwater beneath the Site. Benzene concentrations in the groundwater has ranged between ND to 550 ppb. The highest concentration of gasoline constituents were detected in groundwater samples collected from MW2 and MW3.

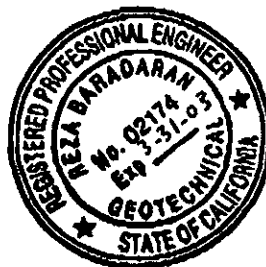
The April 1999, groundwater monitoring event has shown no detectable concentrations of MTBE in the groundwater samples. Benzene concentrations were one order of magnitude less than the previous groundwater analytical results for the samples collected from MW2 and MW3.

Based on the historical, and the recent groundwater monitoring data, it appears that (1) concentrations of aromatic hydrocarbon compounds (BTEX) have been reduced in the groundwater beneath the Site, possibly due to natural attenuation, (2) gasoline constituents have not migrated north of the Site in the direction of MW1, and (3) groundwater beneath the Site was not impacted with MTBE.

In the absence of detectable MTBE in the groundwater samples collected during this monitoring event, Sierra recommends no further groundwater analysis for MTBE. Sierra will make its recommendations regarding a case closure process for the Site, after reviewing the CET's off-site investigation results.

Sierra appreciates the opportunity of serving you on this project. Please call us if you have questions.

Very Truly Yours,
Sierra Environmental, Inc.




Reza Baradaran, PE, RGE
Senior Environmental Engineer


Mitch Hajiaghai, REA, CAC
Principal

Attachments:

- Table I - Groundwater Elevation Data
- Table II - Analytical Results for Groundwater Samples
- Figure 1 - Site Location Map
- Figure 2 - Site Plan
- Figure 3 - Groundwater Elevations and Gradient
- Appendix A - QA/QC Protocol
- Appendix B - Certified Analytical Results and Chain-of-Custody Documentation

cc: Ms. Juliet Shin, Alameda County Environmental Health (1 Copy)
Mr. Craig Ellis (1 Copy)

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TABLE I
GROUNDWATER ELEVATION DATA

Well ID	Measurement Date	Well Casing Diameter (in)	Well Casing Elevation (ft)	Depth to Water (ft)	Water Table ² Elevation (ft)	Groundwater Flow Direction
MW1	6-23-94	2	44.88	17.37	27.51	NW
	3-15-95			13.47	31.41	W-SW
	6-01-95			13.35	31.53	W-NW
	9-11-95			15.37	29.51	W-NW
	4-16-99			12.05	32.83	W-SW
MW2	6-23-94	2	45.26	16.75	28.51	NW
	3-15-95			13.74	31.52	W-SW
	6-1-95			13.52	31.74	W-NW
	9-11-95			15.58	29.68	W-NW
	4-16-99			12.30	32.96	W-SW
MW3	6-23-94	2	45.81	16.55	29.26	NW
	3-15-95			14.43	31.38	W-SW
	6-1-95			14.16	31.65	W-NW
	9-11-95			16.20	29.61	W-NW
	4-16-99			13.02	32.79	W-SW

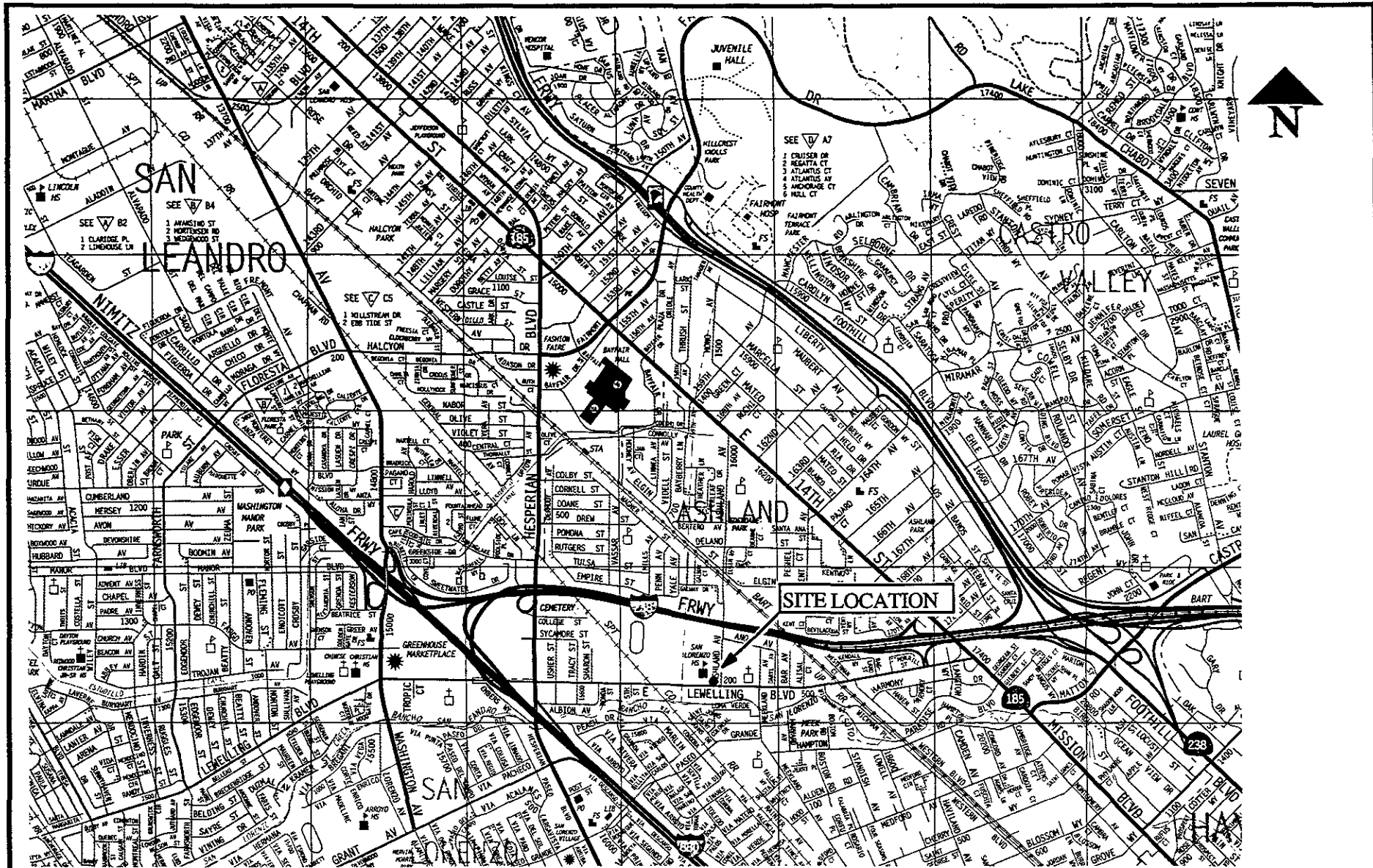
1. Depths to groundwater were measured to the top of the well casings
2. Water table elevations were measured in relation to the mean sea level (MSL)

NOTE: Top of the well casings were surveyed relative to a known benchmark referenced to mean sea level (MSL) by CET.

**TABLE II
ANALYTICAL RESULTS FOR
GROUNDWATER SAMPLES**

Sample ID	Sample Date	TPHG ¹ ppm ³	Benzene ppb ⁴	Toluene ppb	Ethylbenzene ppb	Xylenes ppb	MTBE ² ppb
MW1	6-23-94	3.6	<0.5	<0.5	7.2	2.6	NA ⁵
	3-15-95	<0.05	<0.5	<0.5	<0.5	<0.5	NA
	6-1-95	0.10	<0.5	<0.5	<0.5	<0.5	NA
	9-11-95	0.05	<0.5	<0.5	<0.5	<0.5	NA
	4-16-99	0.16	ND ⁶	ND	ND	ND	ND
MW2	6-23-94	71	310	710	2600	4600	NA
	3-15-95	35	150	1000	2100	10000	NA
	6-1-95	49	210	1300	2900	11000	NA
	9-11-95	39	150	1000	2900	13000	NA
	4-16-99	50	25	110	1900	8000	ND
MW3	6-23-94	93	550	130	3300	7500	NA
	3-15-95	46	330	94	3800	10000	NA
	6-1-95	42	270	230	3400	10000	NA
	9-11-95	49	190	330	4000	12000	NA
	4-16-99	16	10	ND	2300	940	ND

1. TPHG = Total Petroleum Hydrocarbons as Gasoline
2. MTBE = Methyl-tertiary-Butyl Ether
3. ppm = Parts Per Million (mg/l)
4. ppb = Parts Per Billion (µg/l)
5. NA = Not Analyzed
6. ND = Below Laboratory Detection Limit



Source: The Thomas Guide®, 1997



SIERRA ENVIRONMENTAL, INC.
Environmental Consultants

2084 Alameda Way, Suite 201, San Jose, CA 95126
 Phone [408] 248-3700 • Fax [408] 248-4700

Site Location Map

**Report for First Quarter 1999 Groundwater Monitoring
 A & C Auto Service**

186 E. Lewelling Boulevard • San Lorenzo • California

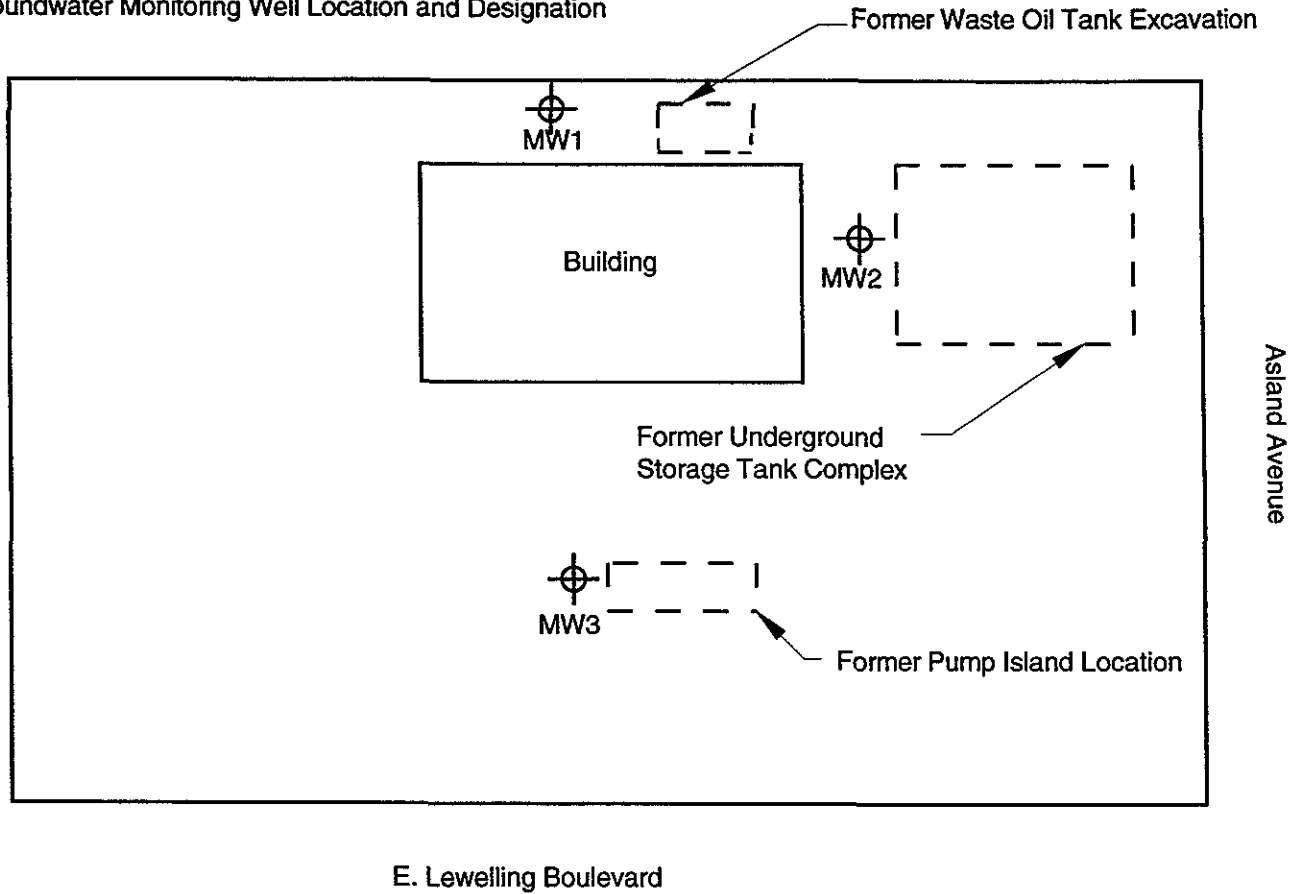
FIGURE

1

April 1999
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LEGEND

 MW1 Goundwater Monitoring Well Location and Designation



Approximate Scale: 1' = 20'

Site Plan

**Report for First Quarter 1999 Groundwater Monitoring
A & C Auto Service**

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FIGURE

2

April 1999
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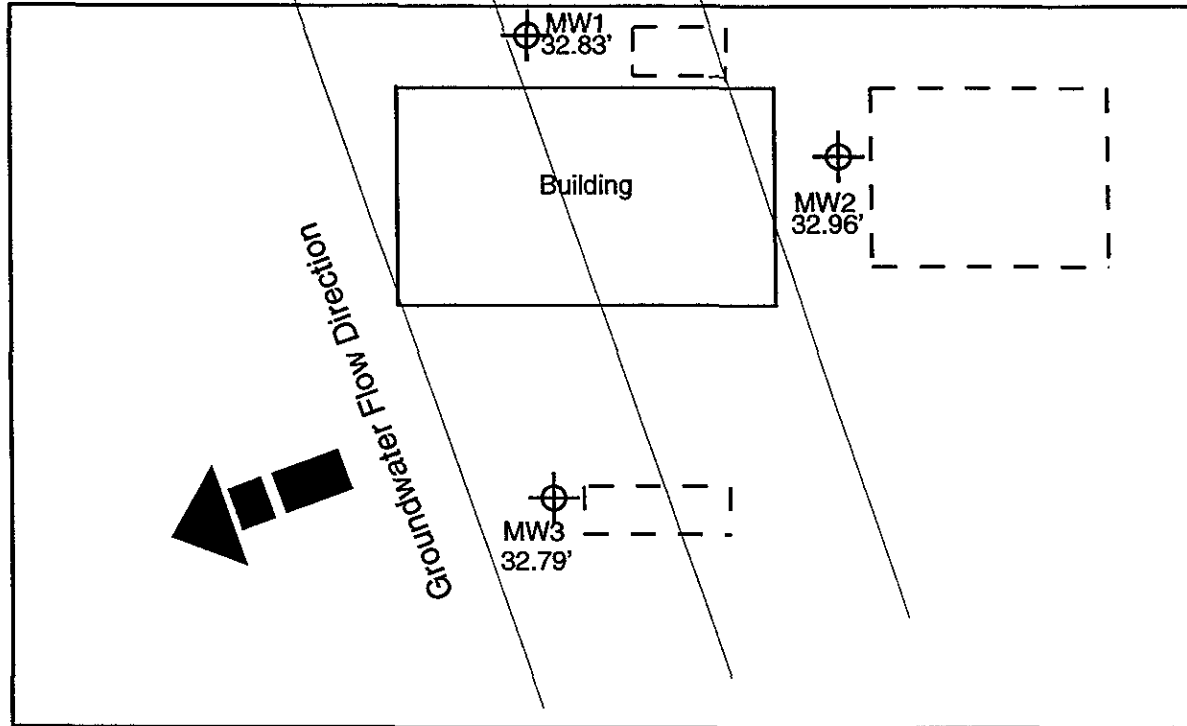


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LEGEND

- ⊕ MW1 Groundwater Monitoring Well Location and Designation
- 32.96' Groundwater Elevation in Relation with Mean Sea Level



E. Lewelling Boulevard

Asland Avenue

Approximate Scale: 1' = 20'



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Groundwater Elevations and Gradient

**Report for First Quarter 1999 Groundwater Monitoring
A & C Auto Service**

186 E. Lewelling Boulevard • San Lorenzo • California

FIGURE

3

April 1999
Project 99-137.01

Appendix A
QA/QC PROTOCOL

QA/QC PROTOCOL

Groundwater Level and Well Depth Measurements

Groundwater level and well depths are measured using electrical sounder. An electrical sounder consists of a reel, two-conductor cable, a water sensor, and a control panel with a buzzer. To measure groundwater level, the sensor is lowered into a well. A low current circuit is completed when the sensor makes contact with water. The current in the circuit is then amplified and activate a buzzer which produce an audible signal. Cable markings are divided at 0.05-foot increments. Well depths are measured to the nearest 0.01 foot. Groundwater levels are measured before and after sample collection to ensure data accuracy.

Well Purging

Low flow submersible electrical pumps or bailers are used to purge groundwater monitoring wells. Approximately 3 to 5 well casing volume of water is removed from the well as a measure to stabilize natural, and representative groundwater in each well. pH, electrical conductivity, and temperature of the purged water is measured and recorded at approximately each casing volume interval. Purge water is stabilized when pH is recorded within 0.5 unit, electrical conductivity is within 5 percent, and temperature is within 1.0 degree Celsius.

Groundwater Sampling

Groundwater samples are transferred into appropriate containers provided by certified analytical laboratories. The containers include proper preservatives, and labels with appropriate project information. Groundwater is transferred into the containers with as little agitation as possible. After collection, containers are sealed and checked to ensure that no head space or air bubbles are present in the sample.

After collection, if required, samples are kept in a cooler to be delivered to analytical laboratory with chain-of-custody documentation.

Equipment Decontamination

All sampling equipment are washed with Liqui-Nox[®] (a phosphate free laboratory detergent), and rinsed with tap and deionized water before each sampling event, and at each sampling interval. To reduce the risk of cross contamination, wells which have shown lower levels of contamination historically are purged and sampled first.

Analytical Procedures

Samples are analyzed by an accredited State-certified analytical laboratory using procedures prescribed by United State Environmental Protection Agency (EPA) and other Federal, State, and Local agencies. At minimum a field blank is analyzed with each group of samples for quality assurance measures. At minimum two qualified personnel review analytical results and compare them with historical data for consistency and accuracy.

Field Reports

All field observations are documented in field reports. A field report contain project information, climatic condition, contractor/subcontractor information, field observation, discussions and communications during each particular field activity. Field reports are stored in appropriate project files. Project managers review field reports to obtain necessary information regarding the status of each project on daily basis.

Appendix B
CERTIFIED ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY
DOCUMENTATION

Entech Analytical Labs, Inc.

CA ELAP# I-2346

525 Del Rey Avenue, Suite E • Sunnyvale, CA 94086 • (408) 735-1550 • Fax (408) 735-1554

Sierra Environmental, Inc.
 2084 Alameda Way, Suite 201
 San Jose, CA 95126
 Attn: Mitch Hajiaghai

Date: 4/26/99
 Date Received: 4/19/99
 Project: 99-137.01
 PO #:
 Sampled By: Client

Certified Analytical Report

Water Sample Analysis:

Sample ID	MW1			MW2			MW3				
Sample Date	4/16/99			4/16/99			4/16/99				
Sample Time											
Lab #	G9481			G9482			G9483				
	Result	DF	DLR	Result	DF	DLR	Result	DF	DLR	PQL	Method
Results in µg/Liter:											
Analysis Date	4/22/99			4/22/99			4/23/99				
TPH-Gas	160 ^x	1.0	50	50,000	40	2000	16,000	10	500	50	8015M
MTBE	ND	1.0	5.0	ND	40	200	ND	10	50	5.0	8020
Benzene	ND	1.0	0.50	25	40	20	10	10	5.0	0.50	8020
Toluene	ND	1.0	0.50	110	40	20	ND	10	5.0	0.50	8020
Ethyl Benzene	ND	1.0	0.50	1,900	40	20	2,300	10	5.0	0.50	8020
Xylenes (total)	ND	1.0	0.50	8,000	40	20	940	10	5.0	0.50	8020
Analysis Date	4/21/99			4/21/99			4/21/99				
MTBE	ND	1.0	5.0	ND ¹	5.0	25	ND ¹	10	50	5.0	8260

DF=Dilution Factor ND= None Detected above DLR PQL=Practical Quantitation Limit DLR=Detection Reporting Limit

1. Sample diluted due to high concentrations of non-target hydrocarbons
2. Analysis performed by Entech Analytical Labs, Inc. (CA ELAP #I-2346)


 Michelle L. Anderson, Lab Director

525 Del Rey Avenue, Suite E • Sunnyvale, CA 94086 • (408) 735-1550 • Fax (408) 735-1554

STANDARD LAB QUALIFIERS July, 1998

All Entech lab reports now reference standard lab qualifiers. These qualifiers are noted in the adjacent column to the analytical result and are adapted from the U.S. EPA CLP program. The current qualifier list is as follows:

Qualifier	Description
U	Compound was analyzed for but not detected
J	Estimated valued for tentatively identified compounds or if result is below PQL but above MDL
N	Presumptive evidence of a compound (for Tentatively Identified Compounds)
B	Analyte is found in the associated Method Blank
E	Compounds whose concentrations exceed the upper level of the calibration range
D	Multiple dilutions reported for analysis; discrepancies between analytes may be due to dilution
X	Results within quantitation range; chromatographic pattern not typical of fuel

Entech Analytical Labs, Inc.

525 Del Rey Ave., Suite E
Sunnyvale, CA 94086

QUALITY CONTROL RESULTS SUMMARY

Volatile Organic Compounds

QC Batch #: WGCMS990420

Matrix: Water

Units: $\mu\text{g/L}$

Date analyzed: 04/20/99

Spiked Sample: Blank Spike

PARAMETER	Method #	SA	SR	SP	SP	SPD	SPD	RPD	QC LIMITS	
		$\mu\text{g/L}$	$\mu\text{g/L}$	$\mu\text{g/L}$	%R	$\mu\text{g/L}$	%R		RPD	%R
1,1- Dichloroethene	8240/8260	25	ND	26	103	27	108	5.3	25	50-150
Methyl-tert-butyl ether	8240/8260	25	ND	27	108	24	95	12.6	25	50-150
Benzene	8240/8260	25	ND	28	112	29	115	3.2	25	50-150
Trichloroethene	8240/8260	25	ND	29	116	31	122	4.7	25	50-150
Toluene	8240/8260	25	ND	28	113	29	114	1.1	25	50-150
Chlorobenzene	8240/8260	25	ND	27	106	27	110	3.0	25	50-150

Definition of Terms:

na: Not Analyzed in QC batch

SA: Spike Added

SR: Sample Result

RPD(%): Duplicate Analysis - Relative Percent Difference

SP Spike Result

SP (%R) Spike % Recovery

SPD: Spike Duplicate Result

SPD (%R) Spike Duplicate % Recovery

NC: Not Calculated

Entech Analytical Labs, Inc.

525 Del Rey Avenue, Suite E
Sunnyvale, CA 94086

QUALITY CONTROL RESULTS SUMMARY

METHOD: Gas Chromatography

QC Batch #: GBG4990422

Matrix: Water

Units: µg/L

Date Analyzed: 04/22/99

Quality Control Sample: Blank Spike

PARAMETER	Method #	MB µg/L	SA µg/L	SR µg/L	SP µg/L	SP % R	SPD µg/L	SPD %R	RPD	QC LIMITS RPD	QC LIMITS %R
Benzene	8020	<0.50	40	ND	38	96	37	93	3.2	25	83-108
Toluene	8020	<0.50	40	ND	38	94	36	91	3.7	25	65-112
Ethyl Benzene	8020	<0.50	40	ND	37	91	35	88	3.2	25	82-110
Xylenes	8020	<0.50	120	ND	110	92	108	90	2	25	83-109
Gasoline	8015	<50.0	500	ND	483	97	478	96	1.0	25	73-129

Note: LCS and LCSD results reported for the following Parameters:

All

Definition of Terms:

na: Not Analyzed in QC batch

MB: Method Blank

SA: Spike Added

SR: Sample Result

RPD(%): Duplicate Analysis - Relative Percent Difference

SP: Spike Result

SP (%R): Spike % Recovery

SPD: Spike Duplicate Result

SPD (%R): Spike % Recovery

NC: Not Calculated

Entech Analytical Labs, Inc.

525 Del Rey Avenue, Suite E
Sunnyvale, CA 94086

QUALITY CONTROL RESULTS SUMMARY

METHOD: Gas Chromatography
Laboratory Control Sample

QC Batch #: GBG4990423

Matrix: Water

Units: µg/Liter

Date Analyzed: 04/23/99

Quality Control Sample: Blank Spike

PARAMETER	Method #	MB µg/Liter	SA µg/Liter	SR µg/Liter	SP µg/Liter	SP % R	SPD µg/Liter	SPD %R	RPD	QC LIMITS	
										RPD	%R
Benzene	8020	<0.50	40	ND	41	103	44	111	7.4	25	70-130
Toluene	8020	<0.50	40	ND	41	102	45	112	8.8	25	70-130
Ethyl Benzene	8020	<0.50	40	ND	40	99	43	107	7.7	25	70-130
Xylenes	8020	<0.50	120	ND	122	102	134	112	9.0	25	70-130
Gasoline	8015	<50.0	500	ND	474	95	457	91	3.6	25	70-130

Definition of Terms:

na: Not Analyzed in QC batch

MB: Method Blank

SA: Spike Added

SR: Sample Result

RPD(%): Duplicate Analysis - Relative Percent Difference

SP: Spike Result

SP (%R): Spike % Recovery

SPD: Spike Duplicate Result

SPD (%R): Spike % Recovery

nc: Not Calculated



SIERRA ENVIRONMENTAL, INC.
Environmental Consultants

CHAIN OF CUSTODY

Project Name: A & C Auto Service Project No: 99-137-01 Date: 4-16-99
 Project Location: 186 E. Lewelling Ave Client: Carl Graffenstaetter Sampler: M. Hajiyah

Sample ID	Date Sampled	Sampling Time	Matrix	N° of Containers	Analysis Requested							Turnaround Time		
					8015/8020 TPHG & BTEX, MTBE	8015 TPHD	418.1 TRPH	8010 VOCs	8270 SVOCs	8020 MTBE BTEX	8260 MTBE	24-hour Other	Normal	
MW1	4/16/99			G9481	X							X	24-hour Other 48 hr	Normal
MW2	↓			G9482	↓							↓	24-hour Other 48 hr	Normal
MW3	↓			G9483	↓							↓	24-hour Other 48 hr	Normal
	per M. Hajiyah												24-hour Other	Normal
													24-hour Other	Normal
													24-hour Other	Normal
													24-hour Other	Normal

Remarks:

Relinquished by <u>[Signature]</u>	Date <u>4-19-99</u>	Time <u>14:15</u>	Received by <u>[Signature]</u>	Date <u>4/19/99</u>	Time <u>2:15pm</u>
Relinquished by	Date	Time	Received by	Date	Time