



RECEIVED
APR 15 PM 3:19

April 13, 1998

Mr. Scott Seery
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

RE: Monitoring Well Installation Work Plan
Former Shell Service Station
15275 Washington Avenue
San Leandro, California
WIC #204-6852-1108

Dear Mr. Seery:

This work plan has been prepared by Cambria Environmental Technology, Inc. (Cambria) on behalf of Shell Oil Products Company (Shell) to further investigate the extent of petroleum hydrocarbons in soil and ground water at the above referenced site (Plates 1 and 2). This investigation was initiated based on Alameda County Health Care Services Agency (ACHCSA) correspondence dated January 12, 1998. The scope of work presented in this document will comply with Regional Water Quality Control Board (RWQCB) and ACHCSA guidelines.

Site Description and Background

A corrective action plan (CAP) was submitted for this site on June 24, 1997. This CAP summarized site investigation activities to date, which included over-excavation and sampling during removal of the underground storage tanks, installation of eighteen ground water monitoring wells and one recovery well, and performance of a soil vapor survey. Subsequent to submittal of the CAP, additional soil vapor investigation and a soil vapor extraction pilot test were performed. The CAP was approved by ACHCSA in correspondence dated January 12, 1998, with the stipulation that an additional monitoring well would be installed within the adjacent mobile home park to monitor ground water conditions in the vicinity of hydrocarbons identified during the soil gas survey.

CAMBRIA
ENVIRONMENTAL
TECHNOLOGY, INC.
270 PERKINS STREET,
P.O. Box 259
SONOMA,
CA 95476
PH: (707) 935-4850
FAX: (707) 935-6649

Technical Rationale for Proposed Scope of Work

- Benzene has been detected in soil vapor samples collected from Boring SG-5 at a concentration of 20,000 ug/m³.
- Benzene concentrations were not detected in soil vapor samples collected from Borings SG-10 through SG-13 with the exception of 16 ug/m³ detected in Boring SG-12.
- One ground water monitoring well is proposed in the vicinity of Boring SG-5 to evaluate and monitor ground water conditions in the area in which benzene was detected in soil vapor samples.

Work Tasks

Task 1 Permits

Appropriate permits for drilling will be obtained from the Alameda County Public Works Agency

Task 2 Health and Safety Plan

A site-specific Health and Safety Plan will be prepared for field work.

Task 3 Utility Clearance

The proposed drilling location will be marked and its location cleared through Underground Services Alert (USA) prior to drilling.

Task 4 Site Investigation

One exploratory boring is proposed as shown on Plate 2. The exploratory boring will be drilled using hollow-stem auger drilling techniques. A Cambria geologist will supervise the drilling and describe encountered soils using the Unified Soil Classification System (USCS). Soil samples will be collected at five foot intervals and/or significant lithologic changes for lithologic description. Soil samples will be screened in the field for organic vapor by measuring head-space vapors using an organic vapor meter. An exploratory boring log will be prepared for the boring. Head-space vapor measurements will be recorded on the log.

Soil samples collected from the boring will be labeled, entered onto a chain-of-custody record, and preserved in a cooler with ice for transport to a State of California certified laboratory.

The boring will be completed as a ground water monitoring well using 2-inch diameter PVC well casing and 2-inch diameter PVC screened casing (0.020-inch slots). The screened interval will extend from approximately 3 to 15 feet below grade, based on historical ground water data. Solid well casing will be placed above the screened interval to grade. A filter pack consisting of Lonestar #3 sand will be placed across the entire screened interval extending approximately 1 foot above the top of the screened interval. A bentonite transitional seal will be placed above the sand pack and cement grout seal will be placed above the transitional seal up to grade.

The well head will be secured with a locking plug and protected by a traffic rated vault box. After completion of the well, a State of California land surveyor will survey the elevation of the top of the well casing and the top of the vault box using the same datum used in prior surveys at the site.

Task 5 Chemical Analysis

Selected soil samples will be analyzed for TPH by EPA Method 8015 (Modified), benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl-tertiary-butyl-ether (MTBE) by EPA Method 8020. If MTBE is detected in the soil samples by EPA Method 8020, a confirmation analysis using EPA Method 8260 will be performed on the soil sample containing the highest level of MTBE (detected by EPA Method 8020).

Ground water samples will be analyzed for TPH, BTEX, and MTBE.

Task 6 Report Preparation

Following the receipt of analytical results from the laboratory, Cambria will prepare a written report which will include a description of field procedures, laboratory results, boring logs, and findings.

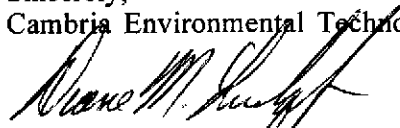
The scope of work described in this work plan will be performed under the supervision of a registered professional engineer.

Schedule

Cambria is prepared to begin this investigation upon approval of this work plan by the ACHCSA and receipt of appropriate permits.

If you have any questions regarding the scope of work outlined in this work plan, please call.

Sincerely,
Cambria Environmental Technology, Inc.



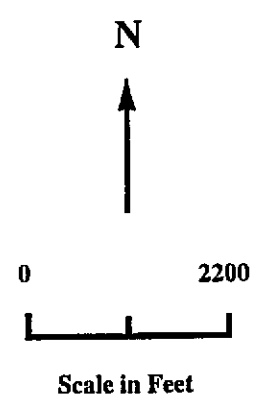
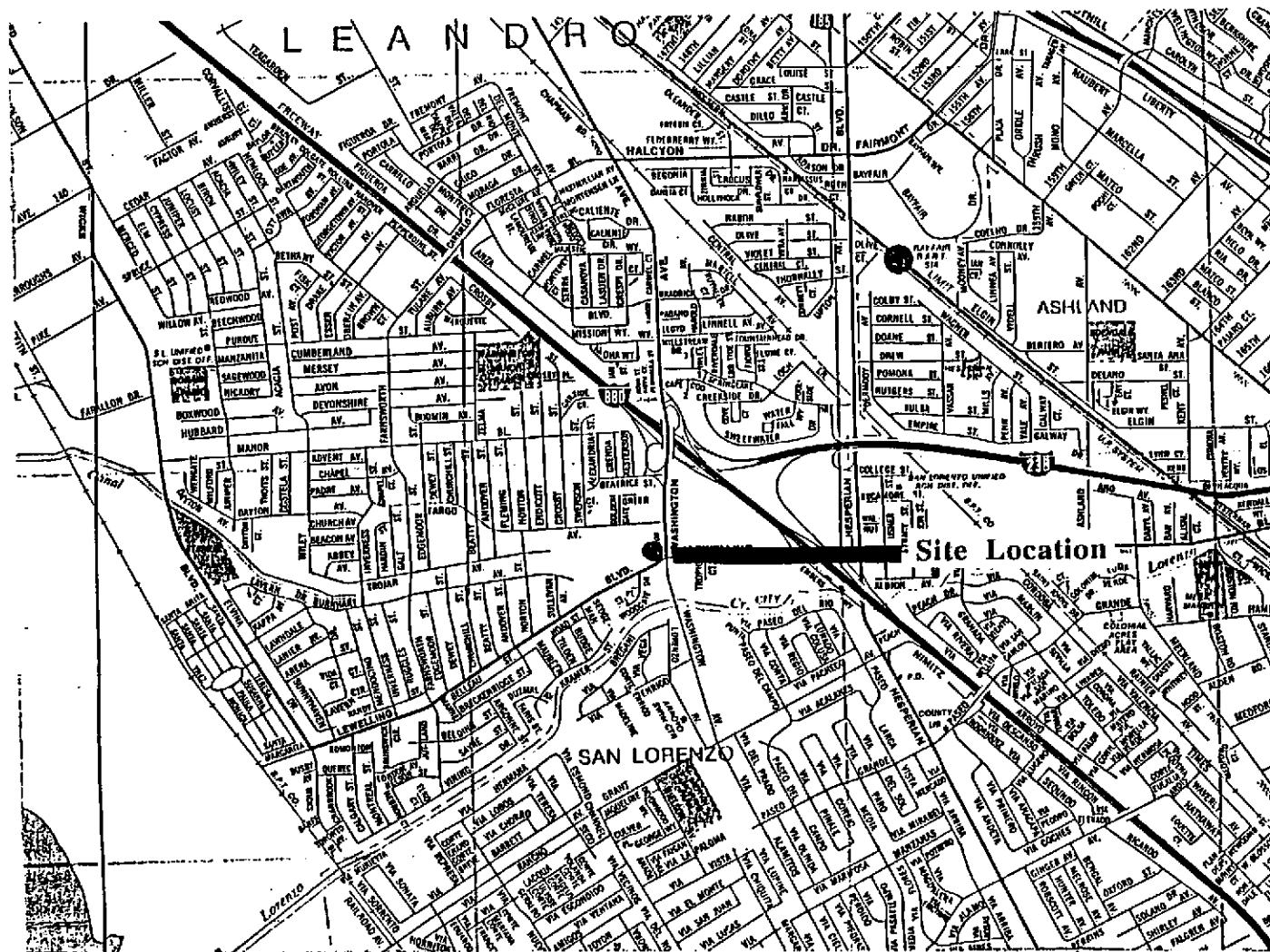
Diane M. Lundquist, P.E.
Principal Engineer
C46725



Attachments

- Plate 1. Site Vicinity Map
- Plate 2. Proposed Ground Water Monitoring Well Location

- cc: Mr. Alex Perez, Shell Oil Products Company
Mr. Mike Bakaldin, San Leandro Fire Department
Mr. John Verber, Larson and Burnham
Mr. Jonathan W. Redding, Fitzgerald, Abbott & Beardsley LLP
Mr. Richard P. Waxman, Wendell, Rosen, Black, and Dean



Note: Vicinity Map taken from California State Automobile Association Map.

<p>PLATE 1</p>	<p>SITE VICINITY MAP Shell Oil Company 15275 Washington Avenue San Leandro, California</p>
<p>Drawn By: JLP</p>	<p>Date: 3-23-95</p>
<p>Approved By: <i>[Signature]</i></p>	<p>Date: 4-10-96</p>

CAMBRIA
240-0933

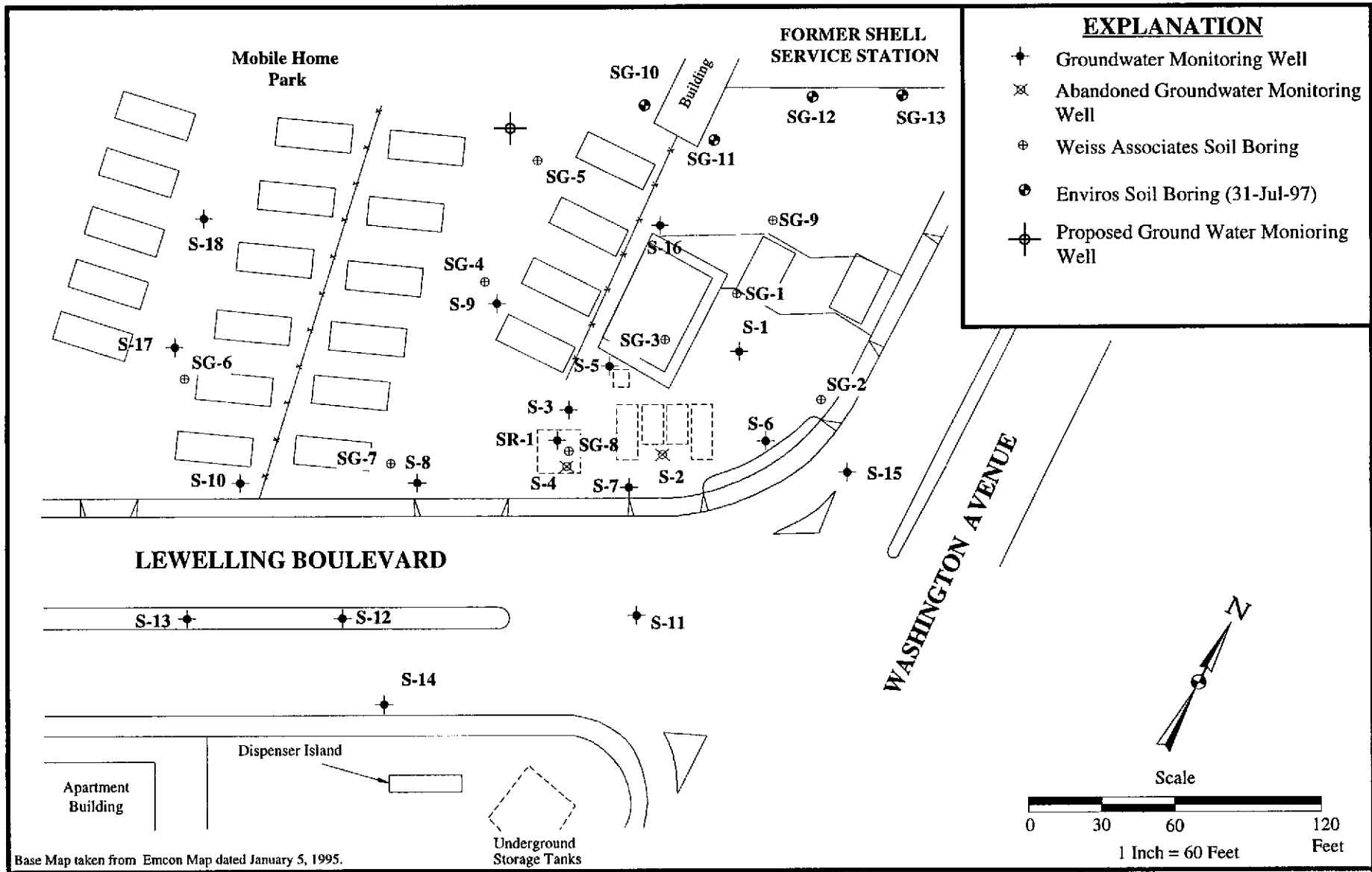
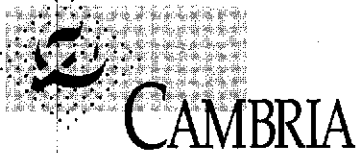


PLATE 2 **PROPOSED GROUND WATER MONITORING WELL LOCATION**
 Shell Oil Products Company
 15275 Washington Avenue
 San Leandro, California

CAMBRIA
 0933

Drawn By: DML Date: 4-10-98

Approved By: *[Signature]* Date: 4-10-98



ENVIRONMENTAL
PROTECTION

98 MAY 20 AM 10:53

May 14, 1998

Mr. Scott Seery
Alameda County Health Care Services Agency
Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: **Well Installation Report**
Former Shell Service Station
15275 Washington Avenue
San Leandro, California
WIC# 204-6852-1108
Cambria Project # 240-0933

Dear Mr. Seery:

On behalf of Shell Oil Products Company (Shell), Cambria Environmental Technology, Inc. (Cambria) is submitting this report summarizing the installation of one remediation well conducted on April 1, 1998 at the site referenced above. The remediation well was constructed in accordance with the June 24, 1997 Corrective Action Plan (CAP), submitted by Enviro, Inc. of Sonoma, California and approved in the Alameda County Health Care Services Agency (ACHCSA) January 12, 1998 letter to Shell. Presented below are the well installation procedures, analytical results, and a summary of proposed future activities.

WELL INSTALLATION PROCEDURES

The location of remediation well SV-1 was based upon the location of former hydrocarbon source areas located near the former dispenser islands and underground storage tanks (USTs) (Figure 1). The procedures for the well installation are summarized below. Analytical results for soil samples are included as Attachment A. The boring log and well construction diagram is included in Attachment B. Cambria's standard field procedures for remediation wells are included in Attachment C. The Alameda County Public Works Agency (ACPWA) well permit is included in Attachment D.

CAMBRIA
ENVIRONMENTAL
TECHNOLOGY, INC.
1144 65TH STREET,
SUITE B
OAKLAND,
CA 94608
PH: (510) 420-0700
FAX: (510) 420-9170

Field Activities

- Personnel Present:** Cambria Project Scientist, Darryk Ataide, conducted the field activities under the supervision of registered Civil Engineer Diane Lundquist.
- Drilling Date:** April 1, 1998.
- Permit:** ACPWA Permit # 98WR138 (Attachment D).
- Drilling Company:** Gregg Drilling of Martinez, California (C-57 License #485165).
- Drilling Method:** Hollow-stem auger.
- Number of Borings:** One (SV-1, Figure 1).
- Boring Depth:** 20 feet (ft) (Attachment B).
- Remediation Well:** One soil vapor extraction (SVE)/biosparge well was constructed (Attachment B).
- Ground Water Depth:** Ground water was encountered in the boring at approximately six feet below grade.
- Sediment Lithology:** The site is underlain primarily by clayey silts of low estimated permeability (Attachment B).
- Chemical Analyses:** Two soil samples were collected from soil boring SV-1 and analyzed for the following constituents:
- total petroleum hydrocarbons as gasoline (TPHg) by modified EPA Method 8015;
 - methyl tert-butyl ether (MTBE), benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020;
- Waste Handling:** The soil generated from the drilling of boring SV-1 will be combined with soil generated during future construction activities associated with the installation of the SVE system. After construction of the SVE system, a four-point composite sample will be collected from the combined stockpile. The composite sample will be analyzed per Shell's Waste Management Procedures as outlined in Attachment E.

Mr. Scott Seery
May 14, 1998

CAMBRIA

ANALYTICAL RESULTS

6,500 milligrams per kilogram (mg/kg) TPHg were detected in the soil sample collected at 6.5 ft depth. 13 mg/kg benzene was detected in the soil sample collected at 6.5 ft depth. 2.4 mg/kg TPHg were detected in the soil sample collected at 10 ft depth. No benzene was detected in the soil sample collected at 10 ft depth. No MTBE was detected in either of the two soil samples analyzed.

FUTURE ACTIVITIES

Monitoring Well Installation: Cambria submitted a work plan dated April 13, 1998 for the installation of one additional monitoring well to be completed in proximity to soil boring SG-5. The installation of this monitoring well is in accordance with the ACHCS January 12, 1998 letter to Shell.

Remediation System Installation: Construction of the soil vapor extraction (SVE) system was initiated during mid-April 1998 in accordance with the June 24, 1997 CAP submitted by Enviros, Inc. Startup of the SVE system is scheduled for mid-May 1998.

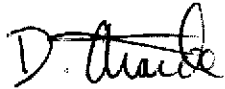
Mr. Scott Seery
May 14, 1998

CAMBRIA

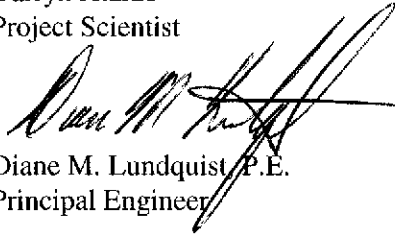
CLOSING

We appreciate your continued assistance with this project. Please call if you have any questions or comments.

Sincerely,
Cambria Environmental Technology, Inc.



Darryk Ataide
Project Scientist



Diane M. Lundquist, P.E.
Principal Engineer



G:\Sn115275\WellinstallRpt.wpd

- Attachments:
- A - Analytical Reports for Soil Samples
 - B - Soil Boring Log and Well Construction Diagram
 - C - Standard Field Procedures for Remediation Wells
 - D - Well Drilling Permit
 - E - Shell's Waste Management Procedures

- cc:
- Mr. Alex Perez, Shell Oil Products Company, P.O. Box 8080, Martinez, CA 94553
 - Mr. John Verber, Larson and Burnham, 1901 Harrison St., 11th Floor, Oakland, CA 94604
 - Mr. Jonathan W. Redding, Fitzgerald, Abbott and Beardsley, 1221 Broadway, 21st Floor, Oakland, CA 94612
 - Mr. Richard P. Waxman, Wendel, Rosen, Black and Dean, 1111 Broadway, 24th Floor, Oakland, CA 94607
 - Mr. Mike Bakaldin, San Leandro Fire Department, 835 E. 14th St., San Leandro, CA 94577

Former Shell Service Station
 15275 Washington Avenue
 San Leandro, California

Site Plan

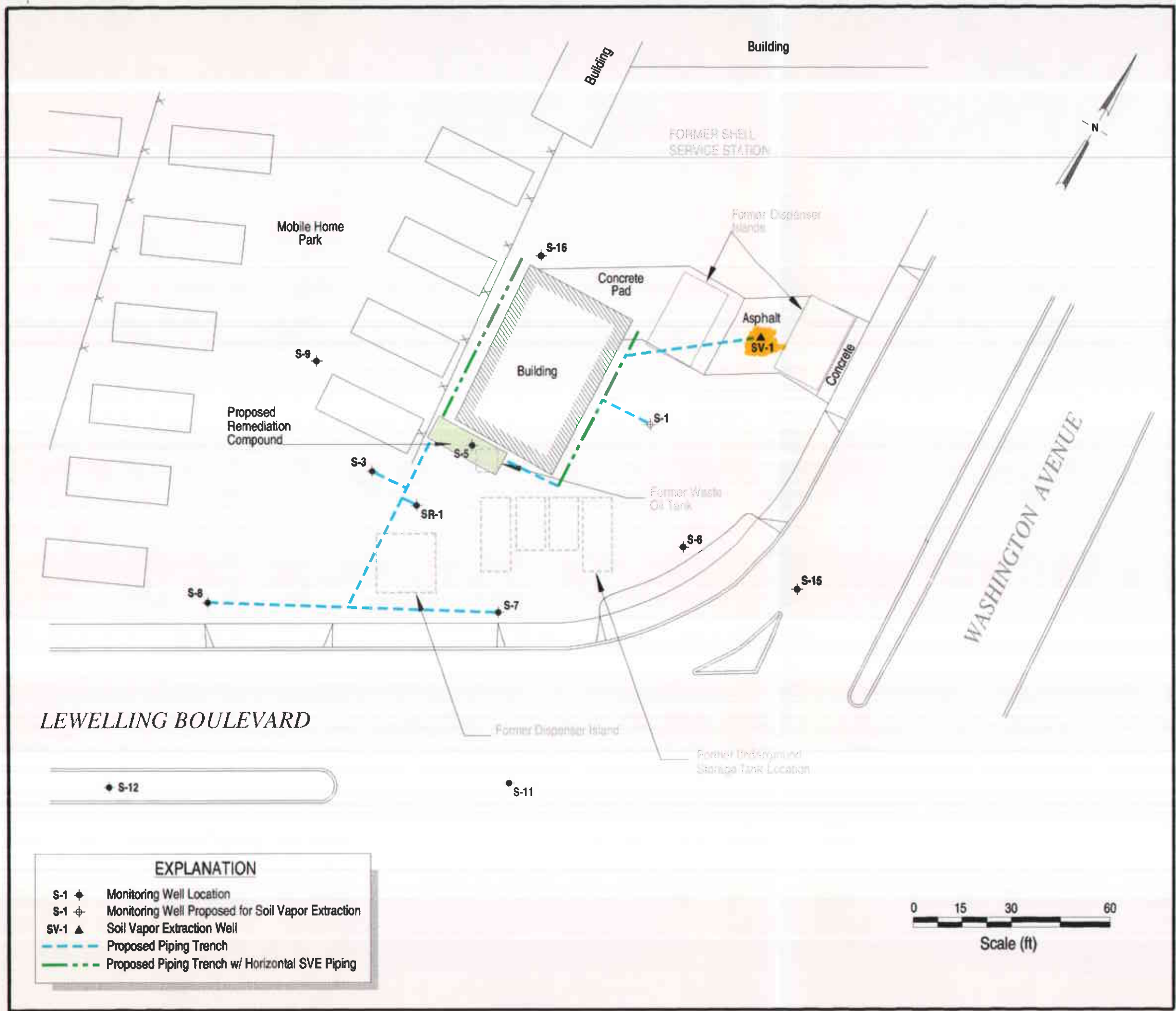


FIGURE 1

Attachment A
Analytical Report For Soil Samples



Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834

(650) 364-9600
(510) 988-9600
(916) 921-9600

FAX (650) 364-9233
FAX (510) 988-9673
FAX (916) 921-0100

Cambria
1144 65th St. Suite C
Oakland, CA 94608
Attention: Darryle Atarde

Project: 15275 Washington, San Leandro

Enclosed are the results from samples received at Sequoia Analytical on April 3, 1998.
The requested analyses are listed below:

<u>SAMPLE #</u>	<u>SAMPLE DESCRIPTION</u>	<u>DATE COLLECTED</u>	<u>TEST METHOD</u>
9804263 -01	SOLID, SV-1, 6.5'	04/01/98	Purgeable TPH/BTEX/MTBE
9804263 -02	SOLID, SV-1, 10.0'	04/01/98	Purgeable TPH/BTEX/MTBE

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Project Manager





Cambria 1144 65th St. Suite C Oakland, CA 94608	Client Proj. ID: 15275 Washington, San Leandro Sample Descript: SV-1, 6.5' Matrix: SOLID Analysis Method: 8015Mod/8020 Lab Number: 9804263-01	Sampled: 04/01/98 Received: 04/03/98 Extracted: 04/07/98 Analyzed: 04/13/98 Reported: 04/14/98
Attention: Darryle Atarde		

QC Batch Number: GC040798BTEXEXB
Instrument ID: GCHP18

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	500	6500
Methyl t-Butyl Ether	12	N.D.
Benzene	2.5	13
Toluene	2.5	27
Ethyl Benzene	2.5	85
Xylenes (Total)	2.5	420
Chromatogram Pattern:		GAS
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70	130
4-Bromofluorobenzene	60	140

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Richard Herling

For

Richard Herling
Project Manager





Cambria 1144 65th St. Suite C Oakland, CA 94608	Client Proj. ID: 15275 Washington, San Leandro Sample Descript: SV-1, 10.0' Matrix: SOLID Analysis Method: 8015Mod/8020 Lab Number: 9804263-02	Sampled: 04/01/98 Received: 04/03/98 Extracted: 04/07/98 Analyzed: 04/08/98 Reported: 04/14/98
Attention: Darryle Atarde		

QC Batch Number: GC040798BTEXEXB
Instrument ID: GCHP07

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit mg/Kg	Sample Results mg/Kg
TPPH as Gas	1.0	2.4
Methyl t-Butyl Ether	0.025	N.D.
Benzene	0.0050	N.D.
Toluene	0.0050	N.D.
Ethyl Benzene	0.0050	0.022
Xylenes (Total)	0.0050	0.096
Chromatogram Pattern: Weathered Gas		C6-C12
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70	130
4-Bromofluorobenzene	60	140

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Richard Herling For

Richard Herling
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834

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(510) 988-9600
(916) 921-9600

FAX (650) 364-9233
FAX (510) 988-9673
FAX (916) 921-0100

Cambria Environmental Tech.
1144 65th St., Ste. C
Oakland, CA 94608
Attention: Darryle Atarde

Client Project ID: 15275 Washington, San Leandro
Matrix: Solid

Work Order #: 9804263 01, 02

Reported: Apr 16, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Gas
QC Batch#:	GC040798BTEXEXB	GC040798BTEXEXB	GC040798BTEXEXB	GC040798BTEXEXB	GC040798BTEXEXB
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015M
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030

Analyst:	J. Minkel	J. Minkel	J. Minkel	J. Minkel	J. Minkel
MS/MSD #:	980418101	980418101	980418101	980418101	980418101
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Prepared Date:	4/7/98	4/7/98	4/7/98	4/7/98	4/7/98
Analyzed Date:	4/7/98	4/7/98	4/7/98	4/7/98	4/7/98
Instrument I.D.#:	GCHP22	GCHP22	GCHP22	GCHP22	GCHP22
Conc. Spiked:	0.20 mg/Kg	0.20 mg/Kg	0.20 mg/Kg	0.60 mg/Kg	1.2 mg/Kg
Result:	0.19	0.18	0.19	0.57	1.6
MS % Recovery:	95	90	95	95	133
Dup. Result:	0.20	0.19	0.20	0.61	1.7
MSD % Recov.:	100	95	100	102	142
RPD:	5.1	5.4	5.1	6.8	6.1
RPD Limit:	0-25	0-25	0-25	0-25	0-25

LCS #:	BLK040798	BLK040798	BLK040798	BLK040798	BLK040798
Prepared Date:	4/7/98	4/7/98	4/7/98	4/7/98	4/7/98
Analyzed Date:	4/7/98	4/7/98	4/7/98	4/7/98	4/7/98
Instrument I.D.#:	GCHP22	GCHP22	GCHP22	GCHP22	GCHP22
Conc. Spiked:	0.20 mg/Kg	0.20 mg/Kg	0.20 mg/Kg	0.60 mg/Kg	1.2 mg/Kg
LCS Result:	0.21	0.19	0.20	0.60	1.2
LCS % Recov.:	105	95	100	100	100

MS/MSD	60-140	60-140	60-140	60-140	60-140
LCS	70-130	70-130	70-130	70-130	70-130
Control Limits					

Please Note:

The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Richard Herling
Project Manager

** MS=Matrix Spike, MSD=MS Duplicate, RPD=Relative % Difference

9804263.CCC <1>





**Sequoia
Analytical**

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
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(650) 364-9600
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(707) 792-1865

FAX (650) 364-9233
FAX (510) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Cambria 1144 65th St. Suite C Oakland, CA 94608 Attention: Darryle Atarde	Client Proj. ID: 15275 Washington, San Leandro Lab Proj. ID: 9804263	Received: 04/03/98 Reported: 04/14/98
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LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 6 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

TPGBMS: Sample 263-1 4-BFB diluted low.

SEQUOIA ANALYTICAL

Richard Herling For

Richard Herling
Project Manager





Site Address: 15275 Washington, San Leandro
 WIC#: 204-6852-1108
 Shell Engineer: Alex Perez Phone No.:
 Consultant Name & Address: CAMBRIA ENVIRONMENTAL
 1114 65th St. Suite C, Oakland, CA 94608
 Consultant Contact: Darryk Ataide Phone No.: 510
 420-0700 Fax #: 420-9170
 Comments:

Analyses Required

TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/8022)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020	Asbestos	Container Size	Preparation Used	Composite Y/N
					MTBE				

LAB: Sequoia

CHECK ONE (1) BOX ONLY	CI/DI	TURNS AROUND TIME
G.W. Monitoring <input type="checkbox"/>	4441	24 hours <input type="checkbox"/>
SRA Investigation <input checked="" type="checkbox"/>	4441	48 hours <input type="checkbox"/>
Soil Classify/Disposal <input type="checkbox"/>	4442	15 days <input checked="" type="checkbox"/> (Normal)
Water Classify/Disposal <input type="checkbox"/>	4443	Other <input type="checkbox"/>
Soil/Air Rem. or Sys. O & M <input type="checkbox"/>	4452	
Water Rem. or Sys. O & M <input type="checkbox"/>	4453	
Other <input type="checkbox"/>		

NOTE: Notify Lab as soon as possible of 24/48 hrs. LAT.

Sampled by: Maureen Fenema
 Printed Name: Maureen Fenema

Sample ID	Date	Sludge	Soil	Water	Air	No. of cants.
SV-1-6.5'	4/1		X			1
SV-1-10.0'	4/1		X			1
SV-1-15'	4/1		X			1
SV-1-20'	4/1		X			1
SP-1	4/1		X			1
SP-2	4/1		X			1
SP-3	4/1		X			1
SP-4	4/1		X			1

TEST AGENCY:

MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
	3 5
	Hold
	Hold
4:1 Composite Test for disposal HOLD FOR NOW, Do Not Test	

Relinquished By (signature): Maureen Fenema
 Printed Name: Maureen Fenema
 Relinquished By (signature):
 Printed Name:
 Relinquished By (signature):
 Printed Name:

Date: 4/1/98
 Received (signature):
 Received (signature):
 Received (signature): Kevin Koser

Printed Name: LANCE DAVIDSON
 Date: 6-2-98
 Time: 2:30
 Date: 4/3/98
 Time: 12:48

DRILLING LOG

Client: **Shell Oil Products Company**

Project No: **240-0933**

Phase

Task

Well ID **SV-1**

Boring ID

SV-1

Location **15275 Washington, San Leandro, California**

Surface Elev. **NA ft,**

Page **1** of **1**

Depth (feet)	Blow Count	Sample Interval	Lithologic Description	PID (ppm)	Graphic Log	Well Construction Graphics	Depth (feet)	Well Construction Details
0	Ground Surface						0	T.O.C. Elev.
0-5			ASPHALT Sandy gravelly SILT, FILL: brown; soft; dry; 50% silt, 25% sand, 25% gravel; medium plasticity; moderate estimated permeability.				0-5	
5-10	4 2 2		Clayey SILT: (MH); grey; soft; damp to wet; 15% clay, 85% silt; high to medium plasticity; low estimated permeability.				5-10	water encountered at 6 feet static water level
10-15	10 6 3		medium stiff; 20% clay, 80% silt.				10-15	
15-20	20 15 10		brown; stiff.				15-20	
20-25	20 10 10		light brown				20-25	bottom of well at twenty feet

Driller **Gregg Drilling**
 Logged By **Darryk Ataide**
 Drilling Started **4/1/98**
 Drilling Completed **4/1/98**
 Construction Completed **4/1/98**
 Development Completed **NA**
 Water Bearing Zones **NA**

Development Yield **NA**
 Well Casing **2"** Dia. **0.5'** to **4'**
 Casing Type **Schedule 40 PVC**
 Well Screen **2"** Dia. **4'** to **20'**
 Screen Type **Schedule 40 PVC**
 Slot Size **0.010"**
 Drilling Mud **NA**
 Grout Type **Portland I/II**

Bentonite Seal **2' to 3'**
 Sand Pack **3' to 20'**
 Sand Pack Type **#2/12 Sand**
 Static Water Level **6.02** ft Depth
 Date **4/15/98**

Notes: _____

Attachment C

Standard Field Procedures for Remediation Wells

STANDARD FIELD PROCEDURE FOR REMEDIATION WELLS

This document presents standard field methods for drilling and sampling soil borings and installing remediation wells. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

SOIL BORING AND SAMPLING

Objectives

Soil samples are collected to characterize subsurface lithology, assess whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and to collect samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG).

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or push technologies such as the Geoprobe. Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

Sampling tubes chosen for analysis are trimmed of excess soil and capped with Teflon tape and plastic end caps. Soil samples are labeled and stored at or below 4°C on either crushed or dry ice, depending upon local regulations. Samples are transported under chain-of-custody to a State-certified analytic laboratory.

Field Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the field observations, odors, stratigraphy and ground water depth to select soil samples for analysis.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe.

REMEDATION WELL INSTALLATION

Well Construction

Remediation wells are installed for soil vapor extraction (SVE), ground water extraction (GWE), oxygenation, air sparging (AS) and for vapor monitoring (VM). Well depths and screen lengths will vary depending upon several factors including the intended use of the well, ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines.

Well casing and screen are typically one to four inch diameter flush-threaded Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I,II cement. Well-heads are typically connected remediation piping set in traffic-rated vaults finished flush with the ground surface. Typical well screen intervals for each type of well are as follows:

SVE Wells: SVE wells are screened in the vadose zone targeting horizons with the highest hydrocarbon concentrations. SVE wells are also occasionally screened as concurrent soil vapor and ground water extraction wells with screen interval above and below the water table.

GWE Wells: Ground water extraction wells are typically screened ten to fifteen ft below the first water-bearing zone encountered. The well screen may or may not be screened above the water table depending upon whether the water bearing zone is unconfined or confined.

Oxygenation Wells: Oxygenation wells are installed above or below the water table to supply oxygen and enhance naturally occurring hydrocarbon biodegradation. Oxygenation wells installed in the vadose zone typically have well screens that are two to ten feet long and target horizons with the highest hydrocarbon concentrations. Oxygenation wells installed below the water table typically have a two foot screen interval set ten to fifteen ft below the water table.

AS Wells: Air sparging wells are installed below the water table and typically have a two foot screen interval set ten to fifteen ft below the water table.

VM Wells: Vapor monitoring wells are installed in the vadose zone to check for hydrocarbon vapor migration during air injection. The wells are typically constructed with short screens to target horizons through which hydrocarbon vapor migration could occur. These wells can also be constructed in borings drilled using push technologies such as the Geoprobe by using non-collapsible Teflon tubing set in small sand packed regions overlain by grout.

Well Development

Ground water extraction wells are generally developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing, pumping and/or reverse air-

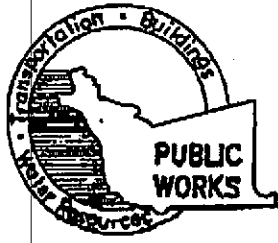
CAMBRIA

lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

Attachment D

Well Drilling Permit



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
951 TURNER COURT, SUITE 300, HAYWARD, CA 94548-2651
PHONE (510) 670-5575 ANDREAS GODFREY FAX (510) 670-5262
(510) 670-5248 ALVIN KAN

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 15295 Washington Ave.
San Leandro, CA

California Coordinates Source _____ ft. Accuracy ± _____ ft.
CCN _____ ft. CCE _____ ft.
APN _____

CLIENT
Name Shell Oil Products Company
Address P.O. Box 8080 Phone (510) 738-9027
City Alameda Zip 94557

APPLICANT
Name Cambria Environmental Technology
Darouk Attide Fax (510) 470-9170
Address 1144 65th St. Phone (510) 470-0700
City Oakland Zip 94608

TYPE OF PROJECT
Well Construction Geotechnical Investigation
Cathodic Protection General
Water Supply Contamination
Monitoring/ year Well Destruction
Extraction

PROPOSED WATER SUPPLY WELL USE
New Domestic Replacement Domestic
Municipal Irrigation
Industrial Other _____

DRILLING METHOD:
Mud Rotary Air Rotary Auger
Cable Other

DRILLER'S LICENSE NO. 485165 ex. 2000

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum _____
Casing Diameter 2 in. Depth _____ ft.
Surface Seal Depth 1.5 ft. Number 1

GEOTECHNICAL PROJECTS
Number of Borings _____ Maximum _____
Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE April 1, 1998
ESTIMATED COMPLETION DATE April 1, 1998

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

APPLICANT'S SIGNATURE D. Attide DATE 3/10/98

FOR OFFICE USE

PERMIT NUMBER 98WR138
WELL NUMBER _____
APN _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

- (A) GENERAL**
 1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
 2. Submit to ACPWA 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 logs and location sketch for geotechnical projects.
 3. Permit is void if project not begun within 90 days of approval date.
- B. WATER SUPPLY WELLS**
 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.
- (C) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS**
 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.
- D. 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.
- E. CATHODIC**
Fill hole above anode zone with concrete placed by tremie.
- F. WELL DESTRUCTION**
See attached.
- G. SPECIAL CONDITIONS**

APPROVED Alvin Kan DATE 3/25/98

Attachment E

Shell's Waste Management Procedures

ISSUED DATE: 05/23/97
CANCELS ISSUE: 03/05/97
ISSUED BY: RLG

**MATERIAL: MINIMUM SOIL ANALYSIS FOR UST SOIL WITH
GASOLINE OR DIESEL CONTAMINATION**

USE FOR ARIZONA , CALIFORNIA AND NEVADA WASTE ONLY!!!

NOTE: ANALYSES ARE BASED ON CHARACTERIZATION MINIMUM. YOU MUST BE SURE THAT THE FACILITY WILL TAKE THE FOLLOWING AS ACCEPTANCE. FURTHER ANALYSIS MAY BE REQUIRED FOR CHARACTERIZATION UPON REVIEW BY THE WASTE TEAM MEMBER OR TO MEET DISPOSAL SITE REQUIREMENTS. IF THE MATERIAL IS RETURNED TO CONSULTANT, COPIES OF ALL TRANSPORTATION DOCUMENTS MUST BE SENT TO THE WASTE DISPOSAL COORDINATOR FOR RECORDING WHEN PROJECT IS COMPLETE.

MINIMUM REQUIRED TESTING

Note: If material is to be sent to a BFI facility EPA METHOD 8010 must be run IN ADDITION to the following analysis prior to requesting profile approval:

TPH = TOTAL PETROLEUM HYDROCARBONS, DHS GC-FID MOD 8015
GASOLINE OR DIESEL AS REQUIRED.

BTXE = EPA 8020

CAM METALS = TTLC LEAD, STLC LEAD IF TTLC => 50 MG/KG AND/OR
ORGANIC LEAD IF TTLC => 13 MG/KG

AQUATIC BIOASSAY (FISH TOX) IS ONLY TO BE RUN ON SAMPLES WITH
GREATER THAN 5000 PPM TPH. COMPOSITE A MAXIMUM OF 4 SAMPLES.

AQUATIC BIOASSAY (FISH TOX) = PART 800 OF "STANDARD METHODS FOR
THE EXAMINATION OF WATER AND WASTEWATER (15TH EDITION)"

LABORATORY INSTRUCTIONS (MINIMUM GUIDELINES ONLY)

- 8015/8020 TO BE BILLED AS "COMBO" WITHOUT EXCEPTION
- TPH REQUIRED FOR ALL SAMPLES.
- ALL OTHER TESTS REQUIRED TO BE RUN ON COMPOSITE(S). MAXIMUM 4 SAMPLES PER COMPOSITE.
- STLC REQUIRED FOR METALS WITH TTLC VALUE 10 X STLC MAXIMUM.
- ORGANIC ANALYSIS REQUIRED FOR TTLC LEAD OF 13 MG/KG OR GREATER.
- LABORATORY IS TO SUPPLY QA/QC INFORMATION WITH ALL ANALYTICAL REPORTS.
- MAIL OR FAX ALL ANALYSIS TO PERSON REQUESTING ANALYSIS.

PROCEDURE ORIGINAL DATE: 07/10/90
PROCEDURE REVISED DATE: 03/05/97