CONESTOGA-ROVERS & ASSOCIATES

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Emeryville, California 94608
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www.CRAworld.com

TRANSMITTAL

DATE: September 16, 2009

REFERENCE NO.: 240781

PROJECT NAME: 2703 Martin Luther King Jr. Way, Oakland

TO: Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

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9:35 am, Sep 21, 2009
Alameda County
Environmental Health

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QUANTITY	DESCRIPTION
1	Revised Remedial Action Plan

- ☐ As Requested
- ☐ For Your Use
- ☒ For Review and Comment
- ☐
- ☐

COMMENTS:
If you have any questions regarding the contents of this document, please contact Peter Schaefer at (510) 420-3319.

Copy to: Denis Brown, Shell Oil Products US, 20945 S. Wilmington Avenue, Carson, CA 90810
Rodney & Janet Kwan, Auto Tech West, 2703 Martin Luther King Jr. Way, Oakland, CA 94612
Scott Merillat, 664 27th Street, Oakland, CA 94612
Monique Oatis, 670 27th Street, Oakland, CA 94612
Jack Chang, 559 9th Avenue, San Francisco, CA 94118-3716

Completed by: Peter Schaefer Signed: Peter Schaefer

Filing: **Correspondence File**

Denis L. Brown
Shell Oil Products US
HSE - Environmental Services
20945 S. Wilmington Ave.
Carson, CA 90810-1039
Tel (707) 865 0251
Fax (707) 865 2542
Email denis.l.brown@shell.com

Jerry Wickham
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: Former Shell Service Station
2703 Martin Luther King Jr. Way
Oakland, California
SAP Code 129449
Incident No. 97093397
ACHCSA Case No. RO0000145

Dear Mr. Wickham:

The attached document is provided for your review and comment. Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached document is true and correct.

If you have any questions or concerns, please call me at (707) 865-0251.

Sincerely,

Denis L. Brown
Project Manager

REVISED REMEDIAL ACTION PLAN

FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY
OAKLAND, CALIFORNIA

SAP CODE	129449
INCIDENT NO.	97093397
AGENCY NO.	RO0000145

Prepared by:
Conestoga-Rovers & Associates

5900 Hollis Street, Suite A
Emeryville, California
U.S.A. 94608

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SEPTEMBER 16, 2009
REF. NO. 240781 (8)
This report is printed on recycled paper.

TABLE OF CONTENTS

LIST OF FIGURES
(Following Text)

LIST OF TABLES
(Following Text)

APPENDICES

1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) prepared this *Revised Remedial Action Plan* on behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell). CRA prepared and submitted a February 5, 2008 *Site Conceptual Model and Feasibility Study/Corrective Action Plan* (February 2008 SCM/FS/CAP) which was approved in Alameda County Environmental Health's (ACEH's) February 28, 2008 letter. The ACEH agreed that onsite excavation followed by bio-sparging is the most appropriate remedial alternative to address subsurface hydrocarbon impacts. CRA's May 12, 2009 *Subsurface Investigation* Report presented results of a shallow soil sampling investigation area of the former waste oil aboveground storage tank (AST). ACEH's July 1, 2009 letter requested an addendum to CRA's May 28, 2008 *Remedial Action Plan* (May 2008 RAP), proposing excavation and confirmation sampling to the area of the former waste oil AST.

The subject site is a former service station located on the northwest corner of the Martin Luther King Jr. Way and 27th Street intersection in a mixed commercial and residential area of Oakland, California (Figure 1). Currently, the site is occupied by Auto Tech West and is used as an automotive repair shop (Figure 2).

A summary of previous work performed at the site is presented in Appendix A.

2.0 REVISED REMEDIATION ACTION PLAN

As detailed in the February 2008 SCM/FS/CAP, excavation with dewatering followed by bio-sparging is the chosen remedial option. Based on soil analytical data (Tables 1 and 2) for the site and San Francisco Bay Regional Water Quality Control Board[1] (RWQCB) environmental screening levels (ESLs), CRA proposed the excavation limits shown on Figure 3 (proposed excavation limits = 20 feet below grade [fbg]). This excavation will require shoring to excavate hydrocarbon impacted soil to approximately 20 fbg.

More recently, shallow fill material impacted with total petroleum hydrocarbons as diesel (TPHd), total petroleum hydrocarbons as motor oil (TPHmo), and polycyclic aromatic hydrocarbons (PAHs) at concentrations above ESLs was found in the area around the former waste oil AST. Analytical results are presented in Table 2 and shown on Figure 2. ACEH has inferred that leaks/spillage from the AST may be the source of these detections. However, these shallow (0.7 to 1.5 fbg) impacts may also be sourced from historical surface asphalting or the property owner's housekeeping practices. Regardless, the excavation has been expanded to include the former waste oil tank area as shown on Figure 3 (proposed initial excavation limits = 2 fbg). CRA proposes excavating this area to 2 fbg.

Additional excavation may be warranted to remove hydrocarbon-impacted shallow fill material on off-site properties north and west of the area of the former AST. Off-site excavation will be predicated on receiving access agreements from the off-site property owners. Additional excavation may not be feasible in some portions of the off-site properties due to safety restrictions and proximity to aboveground structures. In areas where excavation is feasible, field observations and confirmatory sampling will dictate the extent of the excavation.

Multiple underground utilities have been identified in the area of the proposed 20-foot excavation during a previous subsurface utility survey, and they will be removed and replaced, if necessary. The previous subsurface survey also identified possible vapor lines associated with the former underground storage tank (UST) fueling system. If verified, these lines will also be removed during the excavation.

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1 *Screening for Environmental Concerns at Sites With Contaminated Soil and Groundwater,* California Regional Water Quality Control Board, Interim Final - November 2007 [Revised May 2008]

2.1 WORK TASKS - WELL DESTRUCTION AND REPLACEMENT

2.1.1 PERMIT

CRA will obtain appropriate well destruction permits from the Alameda County Public Works Agency (ACPWA).

2.1.2 HEALTH AND SAFETY PLAN (HASP)

CRA will prepare a HASP to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker.

2.1.3 UTILITY CLEARANCE

CRA will mark proposed excavation area, and the area will be cleared through Underground Service Alert prior to digging.

2.1.4 MONITORING WELL DESTRUCTION

CRA proposes to properly destroy five monitoring wells (MW-4 through MW-8) and one soil vapor probe (V-1). The wells and soil vapor probe will be destroyed during the excavation process.

2.1.5 MONITORING WELL REPLACEMENT

The ACEH may require installation of replacement wells. Recommendations for well replacement will be included in the excavation summary report discussed below.

2.2 WORK TASKS - EXCAVATION

2.2.1 PERMITS

The excavation contractor will obtain an excavation permit from the City of Oakland.

2.2.2 HASP

CRA will prepare a HASP to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker.

2.2.3 UTILITY CLEARANCE

CRA will mark proposed excavation area, and the area will be cleared through Underground Service Alert prior to digging. CRA has previously contracted with a private utility locating company which identified possible underground utilities remaining onsite that may have to be either re-routed temporarily and/or replaced after the excavation. As noted above, lines from a former fuel vapor system will be removed during excavation, if they are found.

2.2.4 EXCAVATION

CRA proposes to excavate and dispose of hydrocarbon-impacted soil as shown on Figure 3.

The deep excavation in the west and central portion of the site will be contained onsite to a maximum depth of 20 fbg. Due to the surrounding facilities, including a neighboring building to the west and an onsite building to the east, this work will require appropriate shoring. Also, the onsite building currently has a wooden-frame car port which will be removed and replaced.

The shallow excavation in the northwest corner of the site is anticipated to extend to 2 fbg. Additional exploratory excavation may occur beyond the proposed limits based on field indicators and confirmatory sampling. If additional impacts are observed beyond the proposed excavation limits, the impacts to soil will be removed until excavation constraints, including cost-effectiveness or safety concerns, make it infeasible.

2.2.5 SHORING

Based on the current information available, CRA believes that it is appropriate to excavate the areas using shoring (with the exception of the proposed excavation area to 2 fbg). To remove the soil to approximately 20 fbg and to protect the adjacent structures and any subsurface utilities, the excavation area will require shoring. Due to the

shallow depth of groundwater at the site (4-10 fbg), interlocking or appropriate shoring to reduce the amount of groundwater infiltration is proposed.

2.2.6 CONFIRMATION SAMPLING

Soil samples will be collected from the bottom and sidewalls of the excavation in the vicinity of the former waste oil AST, including a minimum of four samples from the bottom of the excavation and one sample adjacent to each sidewall.

2.2.7 REUSE OF BACKFILL MATERIALS

To control costs of disposal and import of compactable fill material, CRA proposes to reuse any segregated clean overburden or fill material that meets compactable reuse criteria. Due to normal construction processes, it is anticipated that some native impacted material will be mixed in with the former backfill material during the excavation process; however, a CRA representative will be on-site to direct the excavation contractor to screen and segregate to the extent feasible the clean material from impacted material, and to document the field activities and observations.

2.2.8 GROUNDWATER EXTRACTION

The main purpose of the proposed excavation is to remove elevated gasoline-constituent concentrations remaining in soil. An added benefit of excavation is the potential to readily remove non-aqueous-phase and dissolved-phase hydrocarbons from shallow groundwater by groundwater extraction from the open excavation. A holding tank will be mobilized for groundwater storage as the project progresses. CRA will either oversee the off-haul and disposal of hydrocarbon impacted groundwater, or a dewatering system may be mobilized and set-up to extract, treat, and dispose under permit, treated groundwater to the local sanitary agency. If groundwater is present at the completion of excavation, grab groundwater samples will be collected prior to backfilling. Additional samples may be collected for groundwater disposal or discharge requirements. The analytical parameters for groundwater disposal or discharge samples will be dictated by the selected process. If required, a groundwater discharge report will be forwarded to the appropriate agencies and a copy included in the final report.

2.2.9 BACKFILL AND COMPACTION

Upon completion of the excavation and groundwater extraction, the excavation will be backfilled and compacted. Self-compacting or compactable type materials will be placed as necessary to return the site conditions to preconstruction grade. If a compaction report is required, it will be provided and reported accordingly.

2.2.10 CHEMICAL ANALYSES

Grab groundwater samples will be analyzed for total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, and xylenes (collectively BTEX) by EPA Method 8260B. Confirmation soil samples from the shallow fill material around the former waste oil AST will be analyzed for TPHd and TPHmo by EPA Method 8015M and for PAHS by EPA Method 8270C.

2.2.11 SOIL DISPOSAL

Excavated soil and replacement well spoils will be properly profiled, manifested, transported, and disposed of. Documentation of disposal will be provided with the final report.

2.3 WORK TASKS - BIO-SPARGE SYSTEM

During and following excavation, CRA will install a simple bio-sparge curtain to assist biodegradation of the down-gradient dissolved-phase hydrocarbon plume. The bio-sparge curtain would consist of a series of injection wells installed within the excavation's backfill material. Bio-sparging will occur within the backfill material with the intent of dispersing dissolved oxygen through down-gradient native soils at approximately 15 fbg, which is the most likely migration pathway for dissolved-phase impacts.

2.3.1 PERMIT

CRA will obtain appropriate drilling permits from the ACPWA.

2.3.2 HASP

CRA will prepare a HASP to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker.

2.3.3 UTILITY CLEARANCE

CRA will mark proposed drilling locations, and the locations will be cleared through Underground Service Alert prior to drilling.

2.3.4 INJECTION POINT INSTALLATION AND CONSTRUCTION

Six injection wells (AS-1 through AS-6) are proposed at the locations shown on Figure 3. The injection point borings will be drilled using 6-inch-diameter hollow-stem auger equipment and will be converted to injection points. The injection points are located along the western property line and placed at 15-foot spacing.

No logging or sample collection will occur during installation of these injection points as they are being constructed in the clean excavation fill material. The injection points will be constructed using 1- or 2-inch-diameter Schedule 40 PVC casing with a screened interval of approximately 13 to 15 fbg (with 0.010-inch slotted PVC) and a 5-foot sump below the screened interval. The filter pack of #00 silica sand (or equivalent) will be placed from the bottom of the injection point to 1 foot above the screen, followed by a 2-foot-thick bentonite seal, with the remainder of the well annulus filled with a bentonite-cement grout to grade. The injection points will be secured with a locking cap under a traffic-rated well box until bio-sparge wellhead connections are completed.

The oxygen injection points will be installed under the supervision of a Professional Geologist or Engineer.

2.3.5 INJECTION POINT DEVELOPMENT

Blaine Tech Services, Inc. will develop the new injection points no sooner than 72 hours after the points have been completed.

2.3.6 WELLHEAD SURVEY

A licensed surveyor will survey the wellhead elevations relative to mean sea level and the injection points' latitude and longitude.

2.4 WORK TASKS - EQUIPMENT INSTALLATION AND OPERATION

2.4.1 PERMIT

CRA will obtain a construction permit from the City of Oakland to install the bio-sparge system.

2.4.2 HASP

CRA will prepare a HASP to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker.

2.4.3 EQUIPMENT INSTALLATION

An Ingersol-Rand rotary screw air compressor will be used to deliver air to the injection points. A bio-sparge manifold with air solenoid valves and an electrical control panel will be used to pulse air into the injection wells at preset intervals. Oxygen will be conveyed to the wells via separate 1-inch-diameter high-density poly-ethylene (HDPE) flexible piping. Rotameters and pressure gauges will be installed to monitor air delivery to each injection point.

2.4.4 OPERATION

During start-up, oxygen will initially be pulsed at approximately 2 scfm per injection point for 1 hour every 4 hours. Dissolved oxygen (DO) concentrations in adjacent monitoring wells will be monitored with the intent to reach at least 3 milligrams per liter (mg/L). If this DO level is not achieved, pulsing will be increased until the minimum DO criterion is met or until the operating limits of equipment are reached. Once the minimum DO is achieved, CRA will attempt to optimize the system so that a DO concentration of approximately 10 to 12 mg/L is achieved/maintained in adjacent wells.

2.4.5 DATA COLLECTION AND OPTIMIZATION

CRA anticipates conducting monthly operation and maintenance site visits for the system. Data will be collected on site-specific standard forms. During each site visit, CRA will record operating parameters (injection pressure and flow rate) and perform maintenance of mechanical parts as necessary. CRA will also measure depth to water, DO concentrations, and oxidation-reduction potential in the injection points and proximal monitoring wells. Percent of oxygen saturation will also be either measured directly from available instrumentation or calculated from the depth to water and DO measurements. In addition, temperature, conductivity, and pH will be measured quarterly in the injection points and well.

2.4.6 SAMPLE COLLECTION

Baseline groundwater samples will be collected prior to system start-up and quarterly during the first year of operation from the injection points and proximal wells.

2.5 REPORT PREPARATION

Following completion of the well destructions and excavation, CRA will submit a report documenting the activities. A review of the system performance will be conducted quarterly after start-up. Results of these remediation activities will be used to determine if the system is effectively enhancing bio-degradation of dissolved-phase hydrocarbons. Results of the quarterly evaluations will be summarized in the quarterly groundwater monitoring reports.

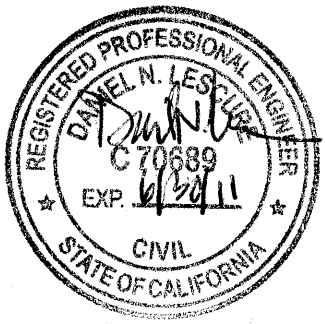
3.0 SCHEDULE

CRA will implement the well destructions, excavation, and bio-sparge system installation upon receipt of appropriate permits and approval of this addendum by ACEH.

All of Which is Respectfully Submitted,
CONESTOGA-ROVERS & ASSOCIATES

Peter Schaefer

Daniel N. Lescure, P.E.



FIGURES

11/03/08

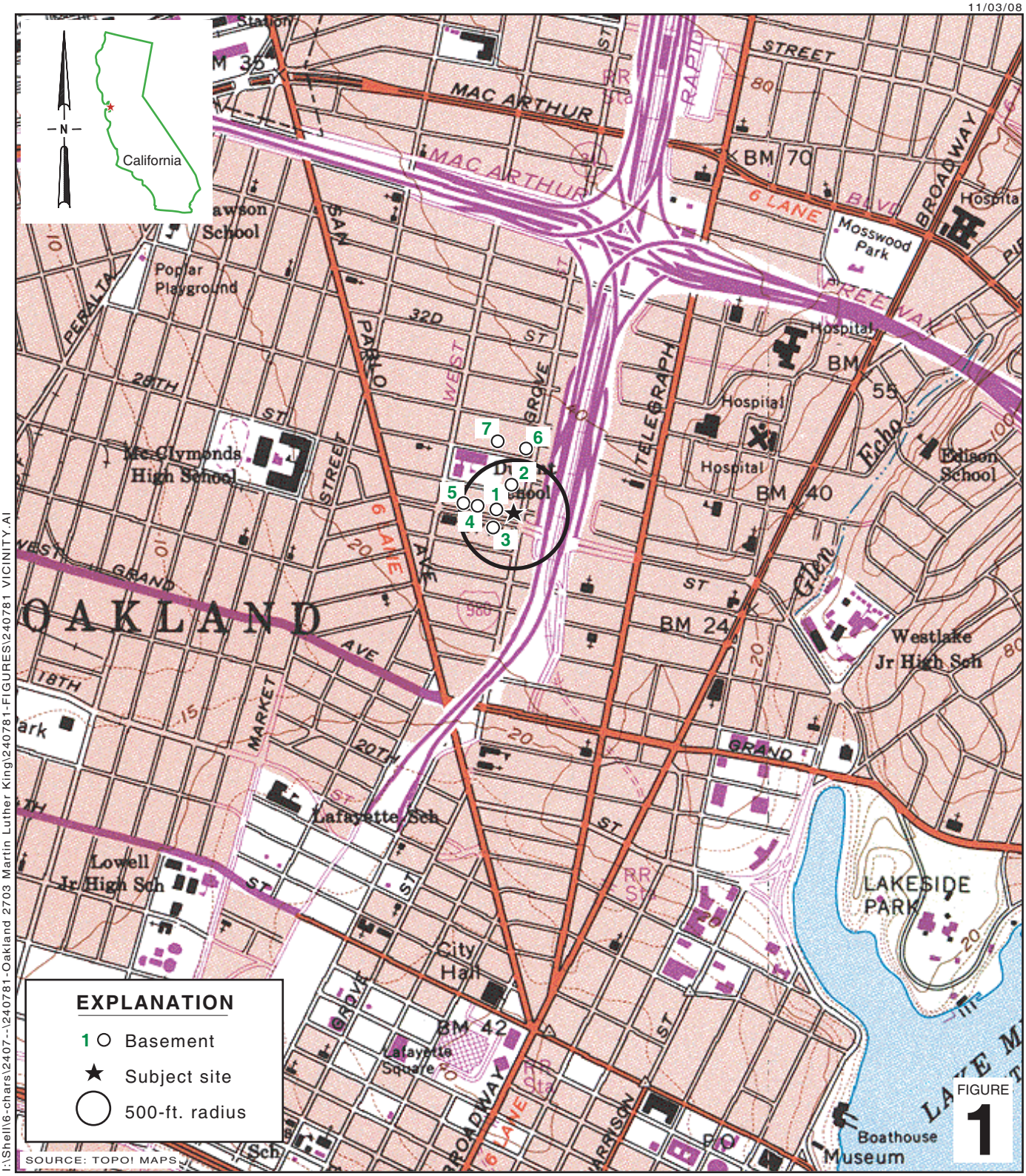


FIGURE 1

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Former Shell Service Station
2703 Martin Luther King Jr. Way
Oakland, California

CONESTOGA-ROVERS & ASSOCIATES

Vicinity Map

05/05/09

Site Plan

EXPLANATION

- HA-1 — Hand auger boring location
- VP-1 — Vapor probe location (1/06, 5-6/07,7/08)
- V-1 — Soil vapor well location (7/96)
- MW-1 — Monitoring well location (7/96-2/06)
- E — Electrical line (E)
- T — Telecommunication line (T)
- G — Gas line (G)
- SAN — Sanitary sewer line (SAN)
- W — Water line (W)

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-1-0.7'	4/8/2009	0.7	24.5	**1,300**	**7,900**
HA-1-1.5'	4/8/2009	1.5	7.73	<5.0	<25
HA-1-5'	4/8/2009	5	7.74	19	97

Soil sample ID and sample date, depth in feet below grade (fbg), and chemical concentrations, in milligrams per kilogram (mg/kg)
<X = Not detected at reporting limit X

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-4-0.7'	4/8/2009	0.7	43.5	**4,500**	**7,800**
HA-4-1.5'	4/8/2009	1.5	10.1	<5.0	<25
HA-4-5'	4/8/2009	5	5.81	<5.0	<25

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-5-0.7'	4/8/2009	0.7	46.0	**700**	**5,800**
HA-5-1.5'	4/8/2009	1.5	8.14	<5.0	<25
HA-5-5'	4/8/2009	5	7.85	<5.0	<25

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-3-0.7'	4/8/2009	0.7	59.9	**570**	**6,300**
HA-3-1.5'	4/8/2009	1.5	20.8	<5.0	50
HA-3-5'	4/8/2009	5	6.65	<5.0	<25

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-2-0.7'	4/8/2009	0.7	44.0	**560**	**6,700**
HA-2-1.5'	4/8/2009	1.5	29.5	<5.0	<25
HA-2-5'	4/8/2009	5	19.4	<5.0	<25

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-1-0.7'	4/8/2009	0.7	24.5	**1,300**	**7,900**
HA-1-1.5'	4/8/2009	1.5	7.73	<5.0	<25
HA-1-5'	4/8/2009	5	7.74	19	97

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-8-0.7'	4/8/2009	0.7	32.8	**810**	**9,600**
HA-8-1.5'	4/8/2009	1.5	**1,060**	11	74
HA-8-5'	4/8/2009	5	19.7	35	190

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-6-0.7'	4/8/2009	0.7	40.3	**1,800**	**7,400**
HA-6-1.5'	4/8/2009	1.5	11.3	**110**	290
HA-6-5'	4/8/2009	5	12.1	**130**	230

Sample ID	Sample Date	Depth (fbg)	Lead (mg/kg)	TPHd (mg/kg)	TPHmo (mg/kg)
HA-7-0.7'	4/8/2009	0.7	37.1	**910**	**11,000**
HA-7-1.5'	4/8/2009	1.5	8.82	<5.0	<25
HA-7-5'	4/8/2009	5	7.45	<5.0	<25

Residential
2719-23 Martin Luther King

W/O AST

HA-1 HA-2 HA-3 HA-4 HA-5 HA-6 HA-7 HA-8 VP-9

VP-1 VP-2 VP-3 VP-4 VP-5 VP-6 VP-8

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8

V-1 V-2

Former Vent Lines

Anode

TRENCH

Wooden Carport

Building

Former USTs

Former Dispensers

Former Dispensers

Former Shell Station
2703 Martin Luther King

Proposed excavation limits
(Depth = 20 fbg)

Gate

Driveway

Residential
670 27th St.

Residential
688 27th St.

Residential
664 27th St.

27TH STREET

MARTIN LUTHER KING JR. WAY

N
W E
S

Groundwater Flow Direction
(2Q00 through 1Q07)

0 7.5 15 30
Scale (ft)

Basemap from Virgil Chavez Land Surveying and Alameda County Assessors Parcel Map

I:\Shell\6-chars\2407--\240781-Oakland 2703 Martin Luther King\240781-FIGURES\240781 ON SITE PLAN (15-SCALE).DWG

CONESTOGA-ROVERS & ASSOCIATES

Former Shell Service Station
2703 Martin Luther King Jr Way
Oakland, California

FIGURE
2

08/31/09

EXPLANATION

- VP-1 — Vapor probe location (1/06, 5-6/07,7/08)
- V-1 — Soil vapor well location (7/96)
- MW-1 — Monitoring well location (7/96-2/06)
- E — Electrical line (E)
- T — Telecommunication line (T)
- G — Gas line (G)
- SAN — Sanitary sewer line (SAN)
- W — Water line (W)
- Proposed Excavation Limits Depth = 20 fbg
- Proposed Excavation Limits Depth = 2 fbg

Proposed Excavation Limits (Depth = 2 fbg)

Proposed Excavation Limits (Depth = 20 fbg)

VP-1, VP-2, VP-3, VP-4, VP-5, VP-6, VP-8, VP-9

V-1, V-2

MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-7, MW-8

Former W/O AST

Former Vent Lines

Anode

TRENCH

Building

Wooden Carport

Former USTs

Former Dispensers

Former Dispensers

Former Shell Station
2703 Martin Luther King

Residential
2719-23 Martin Luther King

Residential
670 27th St.

Residential
688 27th St.

Residential
664 27th St.

MARTIN LUTHER KING JR. WAY

27TH STREET

Gate

Driveway

Gate

Driveway

Driveway

N
W
E
S

Groundwater Flow Direction
(2Q00 through 1Q07)

N

0 7.5 15 30

Scale (ft)

Basemap from Virgil Chavez Land Surveying and Alameda County Assessors Parcel Map

I:\Shell\6-chars\2407--\240781-Oakland 2703 Martin Luther King\240781-FIGURES\240781 ON SITE PLAN (15-SCALE).DWG

Proposed Excavation Limits

CONESTOGA-ROVERS & ASSOCIATES

Former Shell Service Station

2703 Martin Luther King Jr Way
Oakland, California

FIGURE

3

TABLES

TABLE 1

HISTORICAL SOIL ANALYTICAL DATA FOR TPHG, BTEX, FUEL OXYGENATES, AND LEAD
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*TBA*	*DIPE*	*ETBE*	*TAME*	*Lead*
TP-1-N	10/11/1994		**18,000 a,b**	**100**	**870**	**370**	**2,000**	NA	NA	NA	NA	NA	NA
TP-2-S	10/11/1994		**870 a,b**	**2.9**	2.1	**19**	**21**	NA	NA	NA	NA	NA	NA
B-1-5	5/23/1995	5.0	63	<0.1	<0.1	0.4	0.1	NA	NA	NA	NA	NA	NA
B-2-5	5/23/1995	5.0	**260**	**0.6**	<0.1	4.7	10	NA	NA	NA	NA	NA	NA
B-3-6	5/23/1995	6.0	150	<0.1	<0.1	0.9	0.4	NA	NA	NA	NA	NA	NA
B-4-6	5/23/1995	6.0	55	<0.1	<0.1	0.4	0.2	NA	NA	NA	NA	NA	NA
B-5-8	5/23/1995	8.0	**830**	1.8	9.2	**12.0**	**33**	NA	NA	NA	NA	NA	NA
B-6-5	5/23/1995	5.0	130	<0.1	<0.1	1.0	1.1	NA	NA	NA	NA	NA	NA
B-6-10	5/23/1995	10.0	**390**	**0.3**	<0.1	**7.3**	**27**	NA	NA	NA	NA	NA	NA
B-7-5	5/23/1995	5.0	<20	<0.1	<0.1	1.0	1.1	NA	NA	NA	NA	NA	NA
B-7-10	5/23/1995	10.0	53	<0.1	<0.1	0.2	0.3	NA	NA	NA	NA	NA	NA
B-8-10	5/23/1995	10.0	<20	<0.1	<0.1	0.1	<0.1	NA	NA	NA	NA	NA	NA

TABLE 1

HISTORICAL SOIL ANALYTICAL DATA FOR TPHG, BTEX, FUEL OXYGENATES, AND LEAD
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*TBA*	*DIPE*	*ETBE*	*TAME*	*Lead*
TP-3-W	7/17/1996	11.0	**560**	**3.1**	4.1	**11**	**41**	NA	NA	NA	NA	NA	NA
TP-4-E	7/17/1996	11.0	**2,700**	<3.00	**44.0**	**36**	**210**	NA	NA	NA	NA	NA	NA
MW-3-5.0	11/22/2000	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
MW-3-10.5	11/22/2000	10.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
MW-4-5.0	11/22/2000	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
MW-4-10.5	11/22/2000	10.5	**860**	1.1	<0.20	**18**	**66**	<0.20	<2.0	NA	NA	NA	NA
MW-5-5.0	11/22/2000	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
MW-5-10.5	11/22/2000	10.5	**1,300**	**3.3**	**13**	**26**	**140**	<0.20	<2.0	NA	NA	NA	NA
B-17-5.0	11/22/2000	5.0	1.3	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B-17-7.0	11/22/2000	7.0	**2,100**	**0.31**	0.64	**18**	**140**	<0.050	<0.050	NA	NA	NA	NA
B-18-5.0	11/22/2000	5.0	1.2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B-18-7.0	11/22/2000	7.0	42	<0.0050	<0.0050	0.094	<0.0050	0.0070	<0.050	NA	NA	NA	NA
B-19-5.0	11/22/2000	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA
B-19-7.0	11/22/2000	7.0	2.4	0.02	<0.0050	0.025	0.023	<0.0050	<0.020	NA	NA	NA	NA
B-20-4.5	4/11/2002	4.5	1.1	0.0075	<0.005	<0.005	<0.005	<0.5	NA	NA	NA	NA	NA
B-20-7.5	4/11/2002	7.5	22	<0.005	<0.005	0.14	0.027	<0.5	NA	NA	NA	NA	NA

TABLE 1

HISTORICAL SOIL ANALYTICAL DATA FOR TPHG, BTEX, FUEL OXYGENATES, AND LEAD
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*TBA*	*DIPE*	*ETBE*	*TAME*	*Lead*
B-21-3.0	4/11/2002	3.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.5	NA	NA	NA	NA	NA
B-21-8.0	4/11/2002	8.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.5	NA	NA	NA	NA	NA
B-22-3.0	4/11/2002	3.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.5	NA	NA	NA	NA	NA
B-22-8.0	4/11/2002	3.0	**380**	0.17	0.27	**6.1**	**31**	<0.5	NA	NA	NA	NA	NA
GP-1-5.0'	8/29/2005	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
GP-1-10.0'	8/29/2005	10.0	**190 c**	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA
GP-2-4.5'	8/29/2005	4.5	1.5	0.035	<0.0050	0.0063	<0.0050	NA	NA	NA	NA	NA	NA
GP-3-5.0'	8/29/2005	5.0	7.5	0.027	<0.0050	0.085	0.11	NA	NA	NA	NA	NA	NA
GP-3-8.5'	8/29/2005	8.5	**3,300**	**15**	2.7	**91**	**230**	NA	NA	NA	NA	NA	NA
GP-4-4.5'	8/31/2005	4.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
GP-5-4.5'	8/30/2005	4.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
GP-6-5.0'	8/29/2005	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
GP-6-9.5'	8/29/2005	9.5	**260**	<0.50	<0.50	2.1	6.8	NA	NA	NA	NA	NA	NA
GP-7-5.0'	8/30/2005	5.0	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
GP-7-9.5'	8/30/2005	9.5	**440**	<0.50	1.8	**10**	**59**	NA	NA	NA	NA	NA	NA

TABLE 1

HISTORICAL SOIL ANALYTICAL DATA FOR TPHG, BTEX, FUEL OXYGENATES, AND LEAD
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*TBA*	*DIPE*	*ETBE*	*TAME*	*Lead*
GP-8-4.5'	8/30/2005	4.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
GP-9-4.5'	8/31/2005	4.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
GP-10-4.5'	8/31/2005	4.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
MW-6 d	1/4/2006	5.0	<4.9 e	<0.025	<0.025	0.025	0.044	NA	NA	NA	NA	NA	17
MW-6	1/4/2006	10.0	**290**	<1.2 f	<1.2 f	3.1 f	3.2 f	NA	NA	NA	NA	NA	14
MW-6	1/4/2006	15.5	36	<0.62 f	<0.62 f	0.65 f	2.1 f	NA	NA	NA	NA	NA	NA
MW-6 d	1/4/2006	19.5	<1.0 e	0.0090	<0.0050	0.010	0.022	NA	NA	NA	NA	NA	NA
MW-7 d	1/4/2006	5.5	<1.0 e	<0.0050	<0.0050	<0.0050	0.013	NA	NA	NA	NA	NA	11
MW-7 d,g	1/4/2006	11.5	7.1 e	<0.025	<0.025	0.19	5.2 d	NA	NA	NA	NA	NA	8.5
MW-7	1/4/2006	16.5	**340**	<1.2 f	<1.2 f	**7.2 f**	<1.2 f	NA	NA	NA	NA	NA	NA
MW-7 d	1/4/2006	19.5	<1.0 e	<0.0050	<0.0050	<0.0050	0.010	NA	NA	NA	NA	NA	NA
MW-8 d	1/3/2006	6.5	<1.0 e	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	310
MW-8 i	1/3/2006	10.5	**880**	<6.2 f	<6.2 f	**15 f**	**72 f**	NA	NA	NA	NA	NA	5.3
MW-8 i	1/3/2006	19.5	19	**0.63 f**	<0.62 f	<0.62 f	0.8 f	NA	NA	NA	NA	NA	NA
B-23 b	1/3/2006	5.0	<1.0 e	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	9.1
B-23 i	1/3/2006	10.0	**520**	<6.2 f	<6.2 f	**12 f**	**62 f**	NA	NA	NA	NA	NA	5.4
B-23 i	1/3/2006	15.5	**3,800**	**33 f**	**50 f**	**98 f**	**480 f**	NA	NA	NA	NA	NA	NA

TABLE 1

HISTORICAL SOIL ANALYTICAL DATA FOR TPHG, BTEX, FUEL OXYGENATES, AND LEAD
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*TBA*	*DIPE*	*ETBE*	*TAME*	*Lead*
B-23 i	1/3/2006	19.5	**350**	**1.6 f**	1.9 f	**15 f**	**35 f**	NA	NA	NA	NA	NA	NA
MW-12-5	2/28/2006	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
MW-12-10	2/28/2006	10	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
MW-12-15	2/28/2006	15	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
MW-12-19.5	2/28/2006	19.5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
MW-14-5	2/28/2006	5	<1.0	<0.0050	<0.0050	<0.0050	<0.0050	NA	NA	NA	NA	NA	NA
MW-14-10	2/28/2006	10	32	0.0083	<0.0050	0.028	0.0055	<0.0050	<0.025	NA	NA	NA	NA
MW-14-14	2/28/2006	14	**970**	**2.3**	0.18	**19**	**27**	<0.15	<0.70	NA	NA	NA	NA
CPT-6-17	5/17/2007	17	<0.50	0.0020	0.0032	<0.0050	0.0019	NA	NA	NA	NA	NA	NA
VP-7-4.5	6/6/2007	4.5	<0.50	<0.0050	<0.0050	<0.0050	<0.010	NA	NA	NA	NA	NA	NA
VP-8-4.5	5/29/2007	4.5	<0.50	0.00096	0.00084	0.00084	0.0015	NA	NA	NA	NA	NA	NA
VP-9-4.5	7/23/2008	4.5	<0.50	<0.0050	<0.0050	<0.0050	<0.010	<0.0050	<0.050	<0.010	<0.010	<0.010	NA
Shallow Soil (≤10 m bgs) ESL[j]:			180	0.27	9.3	4.7	11	8.4	110	---	---	---	750
Deep Soil (>10 m bgs) ESL[j]:			180	2.0	9.3	4.7	11	8.4	110	---	---	---	750

Notes:

All results in miligrams per kilograms (mg/kg) unless otherwise indicated.

TABLE 1

HISTORICAL SOIL ANALYTICAL DATA FOR TPHG, BTEX, FUEL OXYGENATES, AND LEAD
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*TBA*	*DIPE*	*ETBE*	*TAME*	*Lead*

fbg = Feet below grade
TPHg = Total petroleum hydrocarbons as gasoline analyzed by EPA Method 8015 unless otherwise noted.
Benzene, toluene, ethylbenzene, and xylenes (BTEX) analyzed by EPA Method 8260B; before November 22, 2000, analyzed by EPA Method 8020 unless otherwise noted
MTBE = Methyl tertiary-butyl ether analyzed by EPA Method 8260B
TBA = Tertiary-butanol analyzed by EPA Method 8260B
DIPE = Di-isopropyl ether analyzed by EPA Method 8260B
ETBE = Ethyl tertiary-butyl ether analyzed by EPA Method 8260B
TAME = Tertiary-amyl methyl ether analyzed by EPA Method 8260B
Lead analyzed by EPA Method 3050B
ND = Not analyzed
<x = Not detected at reporting limit x
ESL = Environmental screening level
bgs = Below ground surface
m = Meters
--- = No applicable ESL
Results in bold exceed enviornmental screening level

a = Heavier gasoline range compounds are significant (aged gasoline?).
b = Gasoline range compounds are significant; no recognizable pattern.
c = Quantitiy of unknown hydrocarbon(s) in sample based on gasoline.
d = Extracted out of hold time
e = Analyzed by EPA Method 8260
f = Analyzed by EPA Method 8021
g = Internal standard out of range.
h = Concentration exceeds the calibrations range ar
i = Initial analysis within holding time, but required dilution.
j = San Francisco Bay Regional Water Quality Control Board (SFRWQCB) commercial/industrial ESL for soil where groundwater is not a current or portential source of drinking water. Commercial land use. Ref: Tables B and D of *Screening for Environmental Concerns at Sites With Contaminated Soil and Groundwater*, Interim Final - November 2007 (Revised May 2008).

TABLE 2

HISTORICAL SOIL ANALYTICAL DATA FOR TPHd, TPHmo, PAHs, AND LEAD
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHd*	*TPHmo*	*Naphthalene*	*2-Methylnaphthalene*	*Acenaphthylene*	*Acenaphthene*	*Fluorene*	*Phenanthrene*	*Anthracene*	*Fluoranthene*	*Pyrene*	*Benzo(a) Anthracene*	*Chrysene*	*Benzo(k) Fluoranthene*	*Benzo(b) Fluoranthene*	*Benzo(a) Pyrene*	*Benzo(g,h,i) Perylene*	*Indeno(1,2,3-cd) Pyrene*	*Dibenz(a,h) Anthracene*	*1-Methylnaphthalene*	*Lead*
HA-1-0.7'	4/8/2009	0.7	**1,300** [a]	**7,900**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	**0.18**	<0.040	<0.040	<0.040	<0.040	24.5
HA-1-1.5'	4/8/2009	1.5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	7.73
HA-1-5'	4/8/2009	5	19 [a]	97	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	7.74
HA-2-0.7'	4/8/2009	0.7	**560** [a]	**6,700**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	**0.19**	<0.040	<0.040	<0.040	<0.040	44.0
HA-2-1.5'	4/8/2009	1.5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	29.5
HA-2-5'	4/8/2009	5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	19.4
HA-3-0.7'	4/8/2009	0.7	**570** [a]	**6,300**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.070	<0.040	<0.040	**0.16**	<0.040	<0.040	<0.040	<0.040	59.9
HA-3-1.5'	4/8/2009	1.5	<5.0	50	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	20.8
HA-3-5'	4/8/2009	5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	6.65
HA-4-0.7'	4/8/2009	0.7	**4,500** [a]	**7,800**	1.2	<1.0	<1.0	1.6	1.7	8.5	2.6	7.9	8.1	**3.6**	4.0	**7.1**	<1.0	**4.2**	1.6	**2.2**	<1.0	<1.0	43.5
HA-4-1.5'	4/8/2009	1.5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	10.1
HA-4-5'	4/8/2009	5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	5.81
HA-5-0.7'	4/8/2009	0.7	**700** [a]	**5,800**	<0.040	<0.040	<0.040	<0.040	<0.040	0.25	0.075	0.39	0.98	0.29	0.48	0.61	0.56	**0.51**	0.18	0.16	0.048	<0.040	46.0
HA-5-1.5'	4/8/2009	1.5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	8.14
HA-5-5'	4/8/2009	5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	7.85
HA-6-0.7'	4/8/2009	0.7	**1,800** [a]	**7,400**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.077	<0.040	0.12	<0.040	<0.040	**0.21**	0.077	<0.040	<0.040	<0.040	40.3
HA-6-1.5'	4/8/2009	1.5	**110** [a]	290	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	11.3
HA-6-5'	4/8/2009	5	**130** [a]	230	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	12.1

TABLE 2

HISTORICAL SOIL ANALYTICAL DATA FOR TPHd, TPHmo, PAHs, AND LEAD
FORMER SHELL SERVICE STATION
2703 MARTIN LUTHER KING JR. WAY, OAKLAND, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHd*	*TPHmo*	*Naphthalene*	*2-Methylnaphthalene*	*Acenaphthylene*	*Acenaphthene*	*Fluorene*	*Phenanthrene*	*Anthracene*	*Fluoranthene*	*Pyrene*	*Benzo(a) Anthracene*	*Chrysene*	*Benzo(k) Fluoranthene*	*Benzo(b) Fluoranthene*	*Benzo(a) Pyrene*	*Benzo(g,h,i) Perylene*	*Indeno(1,2,3-cd) Pyrene*	*Dibenz(a,h) Anthracene*	*1-Methylnaphthalene*	*Lead*
HA-7-0.7'	4/8/2009	0.7	**910** [a]	**11,000**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.091	<0.040	<0.040	**0.18**	<0.040	<0.040	<0.040	<0.040	37.1
HA-7-1.5'	4/8/2009	1.5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	8.82
HA-7-5'	4/8/2009	5	<5.0	<25	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	7.45
HA-8-0.7'	4/8/2009	0.7	**810** [a]	**9,600**	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.079	<0.040	<0.040	**0.17**	<0.040	<0.040	<0.040	<0.040	32.8
HA-8-1.5'	4/8/2009	1.5	11 [a]	74	<0.020	<0.020	<0.020	<0.020	<0.020	0.10	0.027	0.29	0.31	0.17	0.18	0.18	0.15	**0.20**	0.045	0.061	<0.020	<0.020	**1,060**
HA-8-5'	4/8/2009	5	35 [a]	190	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	19.7
Shallow Soils (≤10 fbg) ESL [b]			180	2,500	2.8	0.25	13	19	8.9	11	2.8	40	85	1.3	23	1.3	1.3	0.13	27	2.1	0.21	NA	750

Notes:

All results in miligrams per kilograms (mg/kg) unless otherwise indicated.
fbg = feet below grade
Lead analyzed by EPA Method 6010B
TPHd = Total petroleum hydrocarbons as diesel analyzed by EPA Method 8015B
TPHmo = Total petroleum hydrocarbons as motor oil analyzed by EPA Method 8015B (M)
Polycyclic aromatic hydrocarbons (PAHs) analyzed by EPA Method 8270C SIM PAHS. Individual constituents tablulated above.
<x = Not detected at reporting limit x
ESLs = Environmental screening levels
NA = No applicable ESL
Bold values exceed ESLs.

a = The sample chromatographic pattern for TPH does not match the chromatographic pattern of the specified standard. Quantitation of the unknown hydrocarbon(s) in the sample was based upon the specified standard.
water. Commercial land use. Ref: Table A in Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater -Interim Final -November 2007 (Revised May 2008).

APPENDIX A

SITE HISTORY

SITE HISTORY

1994 Underground Storage Tank (UST) Removal: The 2,000-gallon UST was removed on October 11, 1994 by KTW & Associates on behalf of ATW. Two soil samples (TP-1-N and TP-2-S) were collected from beneath the tank. Total petroleum hydrocarbons as gasoline (TPHg) was detected at concentrations ranging from 870 milligrams per kilogram (mg/kg) to 18,000 mg/kg in the samples. Benzene concentrations in these samples ranged from 2.9 to 100 mg/kg.

1995 Phase I Environmental Site Assessment (ESA): In August and September 1995, Enviros Inc. (Enviros) performed a Phase I ESA for this site. Available information collected during this ESA indicates that the subject property was occupied by residential housing prior to approximately 1959. A building permit to erect a building was obtained for Shell Oil Company in February 1959. A building permit to "close lube bays with sheet metal panels" was secured for Shell Oil Company in July 1976.

In 1979, several building permits were secured for Acme to modify existing site structures. Two building permits were secured in 1979 related to the installation of a fuel pump at the site.

During a site survey in conjunction with the Phase I ESA, an excavation was observed near the southwest corner of the service building. The excavation was covered by a blue tarp. This excavation's location is consistent with that of the 2,000-gallon UST removed in 1994 by ATW, and with a large concrete slab observed in aerial photographs taken in 1971 and 1973, and a smaller concrete slab observed in aerial photographs taken in 1981 and 1985. The larger concrete slab observed in the aerial photographs was likely covering the USTs operated by Shell, and the smaller slab was likely covering the UST operated by Acme, confirming that the same location was used for both UST complexes.

1995 Subsurface Investigation: A site assessment was performed by ACC Environmental Consultants on May 23, 1995. This included drilling nine soil borings (B-1 through B-9) using a pneumatic sampling tool in the vicinity of the excavation (which formerly housed both Shell's and Acme's USTs) and the product dispenser islands, and collecting soil and groundwater samples for chemical analysis. TPHg concentrations in soil samples ranged from <20.0 to 830 mg/kg. Benzene concentrations ranged from <1.0 to 1.8 mg/kg. Separate phase hydrocarbons (SPH) were identified in water samples collected from four of the soil borings (B-1, B-5, B-6, and B-9). TPHg concentrations in the non-SPH grab groundwater samples submitted for chemical analysis ranged from <50 to 89,000 micrograms per liter (µg/L). Benzene concentrations in the grab groundwater samples ranged from <0.5 to 21,000 µg/L.

1996 Over-Excavation: Over-excavation and back-filling of Acme's former UST excavation were performed on March 19, 1996. The excavation, originally left open to 9 feet below grade (fbg), was over-excavated to approximately 11 fbg. Two soil samples (TP-3-W and TP-4-E) were collected from the bottom of the over-excavated former UST area. Soil sample TP-3-W, collected from the western end of the excavation, contained 560 mg/kg TPHg, and 3.1 mg/kg benzene. Soil sample TP-4-E, collected from the eastern end of the excavation, contained 2,700 mg/kg TPHg and <3.0 mg/kg benzene. The excavation was back-filled with clean imported fill material. Soil sampling and back-filling activities are documented in Enviros' May 10, 1996 correspondence.

1996 Subsurface Investigation: In July 1996, Enviros performed additional site assessment activities. Six exploratory borings (B-10, B-11, B-12, B-13, V-1, and V-2) were drilled and sampled on July 17 and 19, 1996 using a hollow-stem auger drill rig. Borings B-11 and B-12 were completed as groundwater monitoring wells MW-1 and MW-2, and borings V-1 and V-2 were completed as soil vapor extraction wells V-1 and V-2, respectively. Soil sampling was not performed in boring V-1 due to the fact that it was installed into the back-fill material within the former UST excavation. A soil sample from below the saturated zone in boring V-2 was submitted for physical parameter analyses (porosity, permeability, fractional organic carbon content, and dry bulk density).

TPHg and benzene were not detected in soil samples collected from MW-1 (B-11), MW-2 (B-12), and B-13. TPHg was detected in soil samples collected from B-10 and V-2 at concentrations of 1.7 and 110 mg/kg, respectively. Benzene concentrations in soil samples from B-10 and V-2 were <0.0050 and 0.29 mg/kg, respectively.

Grab groundwater samples were collected from borings B-10, B-12 (MW-2), and B-13 at the depth of first encountered groundwater (approximately 8 to 11 fbg) for chemical analysis. Boring B-11 (MW-1) did not yield sufficient groundwater for grab groundwater sample collection. Monitoring wells MW-1 and MW-2 were developed and sampled on August 2, 1999 by Blaine Tech Services, Inc. (Blaine) of San Jose, CA. TPHg concentrations in the groundwater samples ranged from <50 to 290,000 µg/L. Benzene concentrations ranged from <0.50 to 34,000 µg/L.

1997 Modified Phase I ESA: In February 1997, Enviros performed a modified Phase I ESA for the subject facility. A review of aerial photographs (1952 to 1994), city directories (1967 to 1993) and Sanborn maps (1912 to 1970) did not reveal evidence of an off-site source of petroleum hydrocarbons which would have impacted groundwater onsite. The properties located north and west of the subject facility appear to have been

occupied by residential houses from at least 1912 to the present. The nearest gasoline stations identified in the vicinity of the subject facility were a former Chevron station (740 27th Street at West) approximately 450 feet to the west, a former station (26th Street and Martin Luther King, Jr. Way) approximately 300 feet to the south, and a former Mobil station (554 27th Street) approximately 950 feet to the east.

2000 Sensitive Receptor Survey (SRS): In late 2000, Cambria performed a SRS to identify wells and underground utility conduits. Cambria identified the local sanitary and storm sewer systems as the only utility conduits which may act as preferential pathways for groundwater and soil vapor migration. Conduits identified in the area are located at depths of approximately 3.5 to 9 fbg. Therefore, the potential does exist for groundwater to flow within these conduit trenches. Groundwater depth onsite historically ranges from approximately 4.5 to 10 fbg. However, since the typical groundwater flow direction onsite has generally been to the south, it is likely that any contaminant migration within the utility conduits would be limited, since the utility conduits located to the south of the site are the shallowest of all the conduits identified adjacent to the site at depths of 3.5 to 5.5 fbg.

Cambria also obtained well installation and destruction records from the California Department of Water Resources (DWR) in order to identify any active water producing wells in the vicinity of the site which may be at risk to petroleum hydrocarbon impact due to contaminant migration from the subsurface of the site. DWR records did not identify any existing wells within a ½-mile radius of the site. The SRS results are presented in Cambria's May 16, 2001 *Subsurface Investigation Report.*

2000 Subsurface Investigation: In November 2000, Cambria installed three soil borings (B-17, B-18 and B-19) and three groundwater monitoring wells (MW-3, MW-4 and MW-5). Concentrations up to 2,100 mg/kg TPHg and 3.3 mg/kg benzene were reported in soil samples. Methyl tertiary-butyl ether (MTBE) was detected in one soil sample at a concentration of 0.0070 mg/kg. Tertiary-butyl alcohol (TBA) was detected in two soil samples at concentrations of 0.0079 and 0.0059 mg/kg, respectively.

Grab groundwater samples were collected from borings B-17 through B-19 at first encountered groundwater for analyses during the investigation. TPHg concentrations in grab water samples were up to 190,000 µg/L and benzene concentrations were up to 13,000 µg/L. MTBE was detected at concentrations up to 300 µg/L, and TBA was detected at a concentration of 240 µg/L in one sample. No SPH was observed during the investigation. Results from this investigation are presented in Cambria's May 16, 2001 *Subsurface Investigation Report.*

2001 Oxygen Releasing Compound (ORC) Installation: As approved by the Alameda County Health Care Services Agency (ACHCSA), Blaine installed ORCs in wells V-1 and V-2 during the second quarter monitoring event on May 2, 2001. ORCs were removed during the fourth quarter 2001 monitoring event. MTBE has not been detected in these two wells since the ORCs were installed. Details of the ORC installation activities are presented in Cambria's quarterly groundwater monitoring reports for the second through the fourth quarter of 2001.

2002 Subsurface Investigation: In April 2002, Cambria installed borings B-20 through B-22. Groundwater was first encountered in the borings between 8.0 fbg (B-20) and 8.8 fbg (B-21 and B-22). The maximum TPHg and benzene concentrations detected in soil were 380 and 0.17 mg/kg, respectively, in the soil sample collected from 8.0 fbg in boring B-22, located behind the station building. No TPHg was detected in soil samples collected from boring B-21. No MTBE was detected in any of the analyzed soil samples collected from borings B-20, B-21, or B-22. Up to 160,000 µg/L TPHg and 18,000 µg/L benzene were reported in grab groundwater samples collected from borings B-20, B-21, and B-22. No MTBE was detected in grab groundwater samples collected from the borings. The complete report of findings was included in Cambria's June 21, 2002 *Site Investigation Report*. This document included recommendations for additional activities; however, a response from ACHCSA was never received. Results from this investigation are presented in Cambria's June 21, 2002 *Subsurface Investigation Report.*

2003 - 2005 Oxygen Releasing Compound (ORC) Installation: Although agency approval was not received, Shell proactively installed ORC in wells MW-5 and V-2 during first quarter of 2003. The ORCs were replaced on a semi-annual basis. The use of ORC was discontinued during the first quarter 2005, at Shell's request. Details of the ORC installation activities are presented in Cambria's quarterly groundwater monitoring reports for the first quarter 2003 through the first quarter of 2005.

2005 Agency Meeting: Since no agency response was received to the June 2002 *Site Investigation Report* that contained recommendations for additional investigation, and since monitoring continued to indicate elevated concentrations of volatile constituents in groundwater, Shell authorized Cambria to prepare a work plan to investigate subsurface soil, groundwater, and soil vapor conditions along the property boundaries and at select locations on site. A new case worker was assigned to this project in early 2005, and following a meeting with the new case worker, technical comments and work plan approval were received in ACHCSA correspondence dated June 6, 2005. On August 15, 2005, Cambria submitted correspondence providing responses to the technical comments, notification of field work, and a request for extension for the report of findings. In correspondence dated August 19, 2005, ACHCSA granted the extension.

2005 Soil Vapor Investigation: From August 28 through 31, 2005, Cambria installed 10 soil borings (GP-1 through GP-10). TPHg was detected in soil samples from the borings at concentrations up to 3,300 mg/kg and benzene was detected at concentrations up to 15 mg/kg. TPHg was detected in all groundwater samples at concentrations up to 140,000 µg/L and benzene was also detected in all four groundwater samples at concentrations up to 17,000 µg/L. TPHg was detected in soil vapor samples at concentrations ranging up to 71,000,000 micrograms per cubic meter (µg/m^3) and benzene was detected at concentrations up to 170,000 µg/m^3. Details of these activities are included in Cambria's November 15, 2005 *Site Investigation Report.*

2005 Door-to-Door Survey: Cambria conducted a door-to-door survey within 300 feet of the subject site for wells, basements, and foundation type to identify building construction and potential vapor receptors. Questionnaires were sent to 110 properties and responses for 25 properties were received as of January 13, 2006. Of the 25 responses received, none of the properties had basements. Three properties were denoted as vacant; nine properties contained buildings constructed with slab-on-grade foundations; three contained buildings constructed with perimeter foundations. Tabulated data and a list of properties included in the survey, and which completed surveys were received was included in Cambria's January 15, 2006 *Door to Door Survey Report, Access Agreement Update, and Status/Schedule Update.*

2006 Subsurface Investigation: Cambria advanced three monitoring wells (MW-6 through MW-8), one soil boring (B-23), and six soil vapor probes (VP-1 through VP-6). TPHg was detected in soil samples at concentrations up to 3,800 mg/kg and benzene was detected at concentrations up to 33 mg/kg. A complete discussion and presentation of these activities and findings is included in Cambria's April 14, 2006 *Site Investigation Report, and First Quarter 2006 – Groundwater Monitoring Report.*

2006 Dual-Phase Extraction (DPE) Pilot Test: Cambria conducted a five-day DPE pilot test on wells V-1, V-2, MW-6, MW-7, MW-4, MW-5, and MW-8 and a constant vacuum DPE test was conducted on well MW-6. The report concluded **1)** the absence of vapor phase concentrations (and groundwater concentrations) from well V-1 indicates that the former UST excavation does not contain residual source material; **2)** high sustained and increasing vapor concentrations suggest source material is present in the vicinity of wells V-2, MW-5, and MW-8; **3)** variability in extraction flow rates across the site may reflect heterogeneities in subsurface soils or may suggest preferential pathways; and **4)** the extremely high effective radius of influence calculated for wells MW-5 and MW-8 during DPE testing on well MW-7 supports the presence of a preferential pathway in the vicinity of these wells. The data from the DPE pilot test suggests that DPE is feasible at this site.

The groundwater table was effectively drawn down by DPE and moderate vapor extraction flow rates were yielded from some of the extraction points. Although DPE is deemed feasible, Cambria did not recommend implementing DPE at this site. The extraction points that yielded the highest vapor concentrations did not yield an effective vapor extraction flow rate. Conversely, low vapor concentrations were yielded from the extraction point that did yield an effective vapor extraction flow rate. Therefore, DPE is not considered feasible in the target areas at this site. The pilot test details and results are presented in Cambria's March 14, 2006 *Pilot Test Report.*

2006 Subsurface Investigation: Monitoring wells MW-12 and MW-14 were installed at two offsite properties. None of the soil samples from well MW-12 indicated the presence of any TPHg, benzene, toluene, ethylbenzene, or xylenes (BTEX). The 5 fbg sample from MW-14 also did not contain any reportable concentrations. TPHg was reported in the 10 and 14 fbg samples from MW-14 at concentrations of 32 and 970 mg/kg, respectively. Benzene was reported in the same two samples at concentrations of 0.0083 and 2.3 mg/kg, respectively. These activities are documented in Cambria's May 25, 2006 *Subsurface Investigation Report.*

2006 Survey and Site Visit: In addition to surveying the new wells, Cambria identified historical boring locations from patches on the ground surface, historical excavation edges, trenches, and other site features, and requested that they be included in the survey. Report figures since May 2006 have included the new survey data. Also, during the site visit, an inspection inside the building identified two bathrooms. A floor drain was observed in the northern-most bathroom. Standing liquid was present in the floor drain and automotive parts and cleaners were stored in this area. Thus, a sample from the floor drain was collected and submitted for analyses of volatile organic compounds (VOCs) by EPA Method 8260 and semi-volatile organic compounds (SVOCs) by EPA Method 8270. The floor drain sample was analyzed for VOCs and SVOCs. The results indicated the presence of carbon disulfide (3.69 µg/L), ethylbenzene (0.610 µg/L), and toluene (0.770 µg/L). This information was reported in Cambria's May 25, 2006 *Subsurface Investigation Report.*

2006 Geophysical Survey: As recommended in Cambria's May 25, 2006 *Subsurface Investigation Report*, a geophysical study was performed on May 22, 2006. The objectives of this effort were to determine whether or not a waste oil UST was in the ground in the northwest portion of the property, and to evaluate the presence of subsurface utilities in this area that may act as preferential pathways, including the mapping of the sewer line from the floor drain found inside the northwest corner of the building during the April 19, 2006 site inspection. The results did not identify the presence of a UST on the northwest corner of the site, but did find another vent line located behind the northeast

corner of the station building. A subsurface electric line was traced from the station building to the western property boundary, and an unidentified subsurface utility was traced from the northwest corner of the station building to the southwest, near MW-5 and toward MW-6. The presence of the unknown utility line in the northwest corner confirms the observations of a possible preferential pathway in this area based on the dual-phase extraction pilot test performed in January 2006. NORCAL was unable to run a line down the floor drain inside of the building due to the trap in the line, so the sewer cleanout was found on the exterior of the building. Accessing the cleanout would have resulted in damage to the cap, and the property owner would not grant permission for Cambria to open the cleanout and repair any damage. Thus, the location, direction, and depth of the sewer line in this area are still unknown. However, based on the GPR survey that was performed to try to locate a non-metallic sewer line, NORCAL concludes that the sewer line may be more than 4 feet below grade, since the GPR was unable to identify the line. This information was presented in Cambria's July 25, 2006 *Status Update, Report of Geophysical Survey, and Request for Agency Meeting*.

2006 Subsurface Investigation and Vapor Probe Installation: Cambria installed cone-penetrometer test borings CPT-1 through CPT-5 and soil vapor probes VP-1 through VP-6. There was a lack of adequate groundwater recharge for many of the groundwater samples attempted between 15 and 29 fbg. Groundwater sample results from between 31-37 fbg confirm significant attenuation of contaminants of at least one order of magnitude from the interval monitored by the site wells (5-20 fbg), thus nor further vertical delineation is warranted. Comparison of data from 1995, 2000, and 2006 in similar location (B-6 & B-9, B-19, and CPT-5, respectively) demonstrates attenuation of contaminant concentrations over time is occurring. A site inspection at the neighboring property was performed and revealed that due to significant ventilation and air exchange with outdoor ambient air, vapor sampling within the above-ground basement was no longer warranted. These activities are documented in Cambria's January 31, 2007 *CPT Investigation and Vapor Probe Installation Report*.

2007 Subsurface Investigation and Vapor Probe Installation: Conestoga-Rovers & Associates (CRA) installed CPT-6 and CPT-7 within 27th Street southwest of the site, CPT-10 on the Marcus-Foster school property northwest of the site, and VP-7 and VP-8 on private properties west-northwest of the site. The CPT logs identified thin lithologic units of higher permeability that appear to be allowing preferential migration of contaminants in groundwater toward MW-14 and CPT-10. Further delineation and monitoring of the first encountered water zone to the northwest and west of the site was recommended. Soil vapor samples collected from onsite probes indicated petroleum hydrocarbon concentrations exceeding screening levels for protection of onsite commercial workers. Soil vapor samples collected from offsite vapor probe pairs VP-7

and VP-8, located on residential property, indicated that the soil gas concentrations immediately adjacent to the subject site and three parcels down gradient do no exceed the residential ESLs. Results of the investigation are documented in CRA's August 27, 2007 *Plume Delineation and Soil Vapor Sampling Report.*

2008 Site Conceptual Model (SCM) and Feasibility Study/Corrective Action Plan (FS/CAP): CRA submitted a February 2, 2008 SCM and FS/CAP for the site. Excavation followed by a bio-sparge curtain to assist biodegradation was recommended as remedial action for the site. A *Remedial Action Plan* was submitted by CRA on May 28, 2008 detailing the excavation and bio-sparging.

2008 Subsurface Investigation and Vapor Probe Installation: CRA advanced hand auger borings HA-1 through HA-8 in the north corner of the site and installed soil vapor probe VP-9 on private property north of the site. Soil analytical data indicated that TPHd, TPHmo, and PAHs are present in all of the shallow fill material samples (0.7 fbg) collected from the borings. These detections dramatically decreased with depth. Only one of the 24 soil samples collected (HA-8-1.5', 1,060 mg/kg) exceeded the lead ESL, adequately defining the extent of lead in shallow soil. Petroleum hydrocarbon concentrations in the soil vapor sample collected from VP-9 were below applicable residential ESLs, defining the extent of these constituents in soil vapor north-northeast of onsite probe VP-6. Details of this investigation are presented in CRA's May 12, 2009 *Subsurface Investigation Report.*

Groundwater Monitoring: Quarterly groundwater monitoring has been ongoing at the site since August 1996 and currently includes on-site monitoring wells MW-1 through MW-8, VP-1, and VP-2, and off-site monitoring wells MW-12 and MW-14. Fuel oxygenates are not a significant component of the groundwater plumes, although some detections of di-isopropyl ether and TBA have been observed. Overall, the groundwater flow direction is primarily to the west, with some radial components on site to the northwest and southwest. Historically, monitoring wells MW-1, MW-2, MW-3, and MW-12 have shown little or no impact from petroleum hydrocarbons. Maximum historical concentrations of TPHg and benzene have been observed in on-site monitoring well MW-5. The second quarter 2009 sample event reported maximum concentrations of TPHg and benzene at 150,000 and 7,000 µg/L, respectively in well MW-5. Historical groundwater monitoring results and current conditions are detailed in CRA's August 3, 2009 *Groundwater Monitoring– Second Quarter 2009.*

Vapor Monitoring: Vapor monitoring of off-site soil vapor probes VP-7 and VP-8 has been ongoing at the site since October 2007 and is currently conducted semiannually. Vapor probe VP-9 was added to the monitoring program in the third quarter of 2008.

Historically, BTEX concentrations in soil vapor samples have consistently been below applicable screening levels in off-site vapor probes. During the first quarter 2009 sampling event, CRA was only able to collect one vapor sample from the shallow screen interval (3 fbg) of probe VP-8. Water was present in the shallow screen interval (3 fbg) for probes VP-6 and VP-7 and in the deeper screen interval (5 fbg) for probes VP-6 through VP-9, so no soil vapor samples could be collected from these probes. Toluene was the only chemical of concern detected, and the concentration was below the applicable residential ESL. Historical soil vapor and current data are summarized in CRA's May 4, 2009 *Groundwater Monitoring and Soil Vapor Report – First Quarter 2009.*