ExxonMobil
Environmental Services Company
4096 Piedmont Avenue #194
Oakland, California 94611
510 547 8196 Telephone
510 547 8706 Facsimile

Jennifer C. Sedlachek
Project Manager

ExxonMobil

September 16, 2011

Ms. Barbara Jakub
Alameda County Health Care Services Agency
Department of Environmental Health
1131 Harbor Bay Parkway, Room 250
Alameda, California 94502-6577

RE: Former Mobil RAS #99105/6301 San Pablo Avenue, Oakland, California.

Dear Ms. Jakub:

Attached for your review and comment is a copy of the letter report entitled ***Work Plan for Soil Boring and Soil Vapor Sampling,*** dated September 16, 2011, for the above-referenced site. The report was prepared by Cardno ERI of Petaluma, California, and details activities at the subject site.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

If you have any questions or comments, please contact me at 510.547.8196.

Sincerely,

Jennifer C. Sedlachek
Project Manager

Attachment: Cardno ERI's ***Work Plan for Soil Boring and Soil Vapor Sampling,*** dated September 16, 2011

cc: w/ attachment
Leroy Griffin, Oakland Fire Department
On Dan and Nathan Lam

w/o attachment
Paula Sime, Cardno ERI

Cardno ERI
Shaping the Future

Cardno ERI
License A/C10-611383

601 North McDowell Blvd.
Petaluma, CA 94954-2312
USA

Phone **707 766 2000**
Toll-free 800 382 9105
Fax 707 789 0414
www.cardno.com

www.cardnoeri.com

September 16, 2011
Cardno ERI 278301.W01

Ms. Jennifer C. Sedlachek
ExxonMobil Environmental Services
4096 Piedmont Avenue #194,
Oakland, California 94611

SUBJECT **Work Plan for Soil Borings and Soil Vapor Sampling**
Former Mobil Service Station 99105
6301 San Pablo Avenue, Oakland, California

Ms. Sedlachek:

At the request of ExxonMobil Environmental Services (EMES), on behalf of ExxonMobil Oil Corporation, Cardno ERI prepared this work plan for soil borings and soil vapor sampling for the subject site (Plate 1). The purpose of this work is to further investigate the condition of soil, groundwater, and soil vapor west of the subject site. This report was requested by the Alameda County Health Care Services (ACEH) in a letter dated July 21, 2011 (Appendix A).

SITE DESCRIPTION

The site is located at 6301 San Pablo Avenue, Oakland, California, on the northwestern corner of San Pablo Avenue and 63rd Street (Plate 1). The site was operated as a Mobil service station from 1951 to 1980, then used as a rental car lot, and is currently an automobile oil change facility. Four 2,000-gallon gasoline USTs and one 350-gallon used-oil UST were not in use after 1980, and were removed in 1994. Properties in the vicinity of the site are occupied by commercial developments, located to the north on San Pablo Avenue. An elementary school is located across San Pablo Avenue to the east and residential properties are located to the west and south of the site (Plate 2). The Saint Paul Primitive Baptist Church is located adjacent to the site to the west.

GEOLOGY AND HYDROGEOLOGY

The subject site is located in the East Bay Subbasin of the Santa Clara Valley Groundwater Basin. A northwest trending alluvial plain, the Easy Bay Subbasin is bounded on the north by San Pablo Bay, on the east by the Franciscan Basement rock contact, and by the Niles Cone Groundwater Basin to the south. The East Bay Plain Subbasin aquifer system consists of unconsolidated deposits, Quaternary in age and with a cumulative thickness of approximately 1,000 feet. These deposits included early Pleistocene Santa Clara Formation, the late Pleistocene Alameda Formation, the early Holocene Temescal Formation, and artificial fill (ETIC, 2011a).

DTW at the subject site has ranged from approximately 3 to 12.5 feet bgs during the monitoring program. The direction of groundwater flow, according to the most recent groundwater monitoring report, is southwest. Historically, the direction of groundwater flow has varied from the northwest to the southwest (ETIC, 2011a).

PREVIOUS WORK

Cumulative groundwater monitoring and sampling data is included in Tables 1A and 1B. Well construction details are included in Table 2. Cumulative soil and soil vapor analytical results are included in Tables 3 and 4, respectively.

Site Assessment Activities

Site assessment activities have included the installation of groundwater monitoring wells MW1 through MW5 and soil vapor sampling wells VW1 through VW5 and the drilling of soil borings AB-1 through AB-13, B1 through B5, MP-1 through MP-6, and HA-1 (ETIC, 2011a). Wells MW1 and MW4 have been destroyed (ETIC, 2011a).

Remediation Activities

In 1994, one 350-gallon used oil UST and four 2,000-gallon gasoline USTs were removed from the site. Holes were observed in two of the 2,000-gallon gasoline tanks. Analytical results from soil samples collected from the bottom of the gasoline tank excavation area (11 feet bgs), indicated maximum concentrations of 520 mg/kg of TPHg and 0.18 mg/kg of benzene. During UST excavation, liquid-phase hydrocarbons were observed in groundwater.

In February 1996, standing water in the UST excavation was pumped out of the excavation area. Soil samples were collected from the bottom of the gasoline tank excavation area (Table 3). Additionally, two 2-inch diameter steel and three 2-inch diameter fiberglass fuel pipelines were removed from the site. Signs of rust were

observed in the steel piping at the stub-ups near the northwest end of the former dispenser island. Holes were not observed in the pipes. The excavation was approximately 3 feet deep by 3 feet wide and 50 feet long, extending from the southeastern corner of the gasoline tank excavation to the dispenser islands. Hydrocarbons were observed in soil near the northwestern end of the former dispenser island. An area approximately 16 feet long by 11 feet wide and 5 feet deep was overexcavated to remove the soil. Compliance soil samples were collected every 20 feet from beneath the former product line.

An estimated total of 367 cubic yards of soil was excavated from the site during the UST and product line removals (ETIC, 2011a).

During redevelopment activities conducted by the property owner in early 1999, more than 200 cubic yards of soil was removed from the northeastern side of the site (ETIC, 2011a).

A DPE event was conducted in November 1998. Monitoring wells MW3 and MW4 were used as groundwater and soil vapor extraction wells. Six temporary monitoring points (MP-1 through MP-6) were installed to monitor vacuum readings and groundwater depths during the DPE event. Approximately 75 gallons of groundwater were generated and 21 pounds of vapor-phase hydrocarbons were removed. Monitoring points MP-1 through MP-6 were destroyed following the DPE event (TRC, 2000).

PROPOSED WORK

Cardno ERI will evaluate current conditions of groundwater and soil vapor in sediment underlying the properties located immediately west of the subject site by advancing three soil borings and installing three soil vapor sampling wells. Upon approval of this work plan, Cardno ERI will begin negotiating access with the adjacent property owner. Permitting and field work will commence once access is obtained. Personnel will conduct the assessment in accordance with the field protocol presented in Appendix B.

Pre-Field Activities

Prior to the onset of drilling, a soil boring permit will be obtained from the Alameda County Public Works Agency – Water Resources (ACPWA). Cardno ERI personnel will visit the site to check for obstructions and to mark the proposed locations. Underground Service Alert and the ACPWA will be notified at least 48 hours prior to the onset of field activities. Prior to drilling, the locations will be manually excavated with hand tools in accordance with EMES' subsurface clearance protocol.

Hand-Auger Soil Borings

The proposed soil borings (B6 through B8) will be advanced using hand augers due to the limited access to the off-site parcel. The borings will be approximately 4 inches in diameter and will be advanced to the depth at which groundwater is first encountered. Based on the results of previous investigations, groundwater is expected between 5 and 11 feet bgs.

Soil samples will be collected for stratigraphic evaluation and field screening with a PID, and select soil samples will be submitted for laboratory analysis. Grab groundwater samples will be collected from first-encountered groundwater and submitted for laboratory analysis.

Upon completion of sampling activities, borings B6 through B8 will be backfilled with neat cement grout. The boring locations will be surveyed in accordance with Assembly Bill (AB) 2886 and incorporated into the Generalized Site Plan (Plate 2).

Soil Vapor Sampling Well Installation

Cardno ERI proposes to install the soil vapor sampling wells in the locations shown on Plate 2. The borings for the wells will be advanced to approximately 5 feet bgs using hand and/or vacuum excavation tools. Soil samples will be collected from each boring at 1-foot intervals and select samples will be preserved for laboratory analysis. A soil vapor sampling well will be constructed in each boring. Proposed well details are presented on Plate 3.

At least 48 hours after well installation, a purge volume test will be conducted on well SVS3. Following the purge volume test, each well will be sampled.

Cardno ERI will conduct the soil vapor survey in accordance with the protocol presented in Appendix B and the protocol presented in the following guidance documentation:

- *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (Interim Final), published by the Department of Toxic Substances Control of the California Environmental Protection Agency (December 15, 2004, revised February 7, 2005) (DTSC, 2005).

- *Advisory – Active Soil Gas Investigations*, jointly issued by the Department of Toxic Substances Control of the California Environmental Protection Agency and the California Regional Water Quality Control Board, Los Angeles Region (CRWQCB-LA, 2003).

- *Collecting and Interpreting Soil Gas-Samples from the Vadose Zone, A Practical Strategy for Assessing the Subsurface Vapor-to-Indoor Air Migration Pathway of Petroleum Hydrocarbon Sites*, American Petroleum Institute Publication Number 4741 (November 2005) (API, 2005).

- *Advisory – Active Soil Gas Investigation* (Draft), published by the Department of Toxic Substances Control of the California Environmental Protection Agency (March 3, 2010) (DTSC, 2010).

- *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater*, published by the California Regional Water Quality Control Board, San Francisco Bay Region (revised May 2008) (CRWQCB-SFB, 2008).

Laboratory Analyses

Select soil and groundwater samples will be submitted for analysis to an EMES-approved, state-certified analytical laboratory. The soil and groundwater samples will be analyzed for TPHd and TPHg using EPA Method 8015B and BTEX, MTBE, DIPE, ETBE, TAME, TBA, 1,2-DCA, and EDB using EPA Method 8260B.

Soil vapor samples will be analyzed for full-scan VOCs, including BTEX, fuel oxygenates, lead scavengers, and naphthalene using EPA Method TO-15; TPHg using EPA Method TO-3 or TO-15; and helium, oxygen, carbon dioxide, and methane using American Society of Testing and Materials (ASTM) Method 1946.

Waste Management Plan

The soil and decontamination water generated during drilling activities will be temporarily stored on site in DOT-approved, 55-gallon drums. Soil cuttings will be transported to an EMES-approved facility for disposal. Decontamination water will be transported to InStrat, Inc., of Rio Vista, California, for recycling. Waste disposal documentation for soil and water will be included in the report.

Site Safety Plan

Field work will be performed in accordance with a site-specific safety plan.

Report

After completion of the proposed field activities, a report summarizing field and laboratory procedures, boring logs, and laboratory results will be submitted EMES and the ACEH. The report will be signed by a State of California professional geologist.

CONTACT INFORMATION

The responsible party contact is Ms. Jennifer C. Sedlachek, ExxonMobil Environmental Services, 4096 Piedmont Avenue #194, Oakland, California, 94611. The consultant contact is Ms. Paula Sime, Cardno ERI, 601 North McDowell Boulevard, Petaluma, California, 94954. The agency contact is Barbara J. Jakub, P.G., Alameda County Health Care Services, Environmental Health Services - Environmental Protection, 1131 Harbor Bay Parkway, Suite 250, Alameda, California, 94502.

LIMITATIONS

For any documents cited that were not generated by Cardno ERI, the data taken from those documents is used "as is" and is assumed to be accurate. Cardno ERI does not guarantee the accuracy of this data and makes no warranties for the referenced work performed nor the inferences or conclusions stated in these documents.

This document was prepared in accordance with generally accepted standards of environmental, geological, and engineering practices in California at the time of investigation. No soil engineering or geotechnical references are implied or should be inferred. The evaluation of the geologic conditions at the site for this investigation is made from a limited number of data points. Subsurface conditions may vary away from these data points.

Please contact Ms. Paula Sime, Cardno ERI's project manager for this site, at (707) 766-2000 with any questions regarding this site.

Sincerely,

Alex G. Snyder
Staff Geologist
for Cardno ERI
707 766 2000
Email: alex.snyder@cardno.com

David R. Daniels
P.G. 8737
for Cardno ERI
707 766 2000
Email: david.daniels@cardno.com

cc: Barbara J. Jakub, Health Care Services Agency, Environmental Health Services, 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502

Leroy Griffin, Oakland Fire Department, 250 Frank H. Ogawa, Ste. 3341, Oakland, California 94612

On Dan and Nathan Lam, 200 El Dorado Terrace, San Francisco, California 94112

Enclosures:

References

Acronym List

Plate 1	Site Vicinity Map
Plate 2	Generalized Site Plan
Plate 3	Schematic Nested Soil Vapor Sampling Well Diagram
Table 1A	Cumulative Groundwater Monitoring and Sampling Data
Table 1B	Additional Cumulative Groundwater Monitoring and Sampling Data
Table 2	Well Construction Details
Table 3	Cumulative Soil Analytical Results
Table 4	Soil Vapor Analytical Results
Appendix A	Correspondence
Appendix B	Field Protocol

REFERENCES

American Petroleum Institute (API). November 2005. Collecting and Interpreting Soil Gas Samples from the Vadose Zone. Publication Number 4741.

California Regional Water Quality Control Board, Los Angeles Region (CRWQCB-LA). January 2003. Advisory – Active Soil Gas Investigations.

California Regional Water Quality Control Board, San Francisco Bay Region (CRWQCB-SFB). May 2008. Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater (Interim Final – May 2008).

Department of Toxic Substances Control of the California Environmental Protection Agency (DTSC). December 15, 2004. Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Interim Final). Revised February 7, 2005.

Department of Toxic Substances Control of the California Environmental Protection Agency (DTSC). March 3, 2010. Advisory – Active Soil Gas Investigation (Draft).

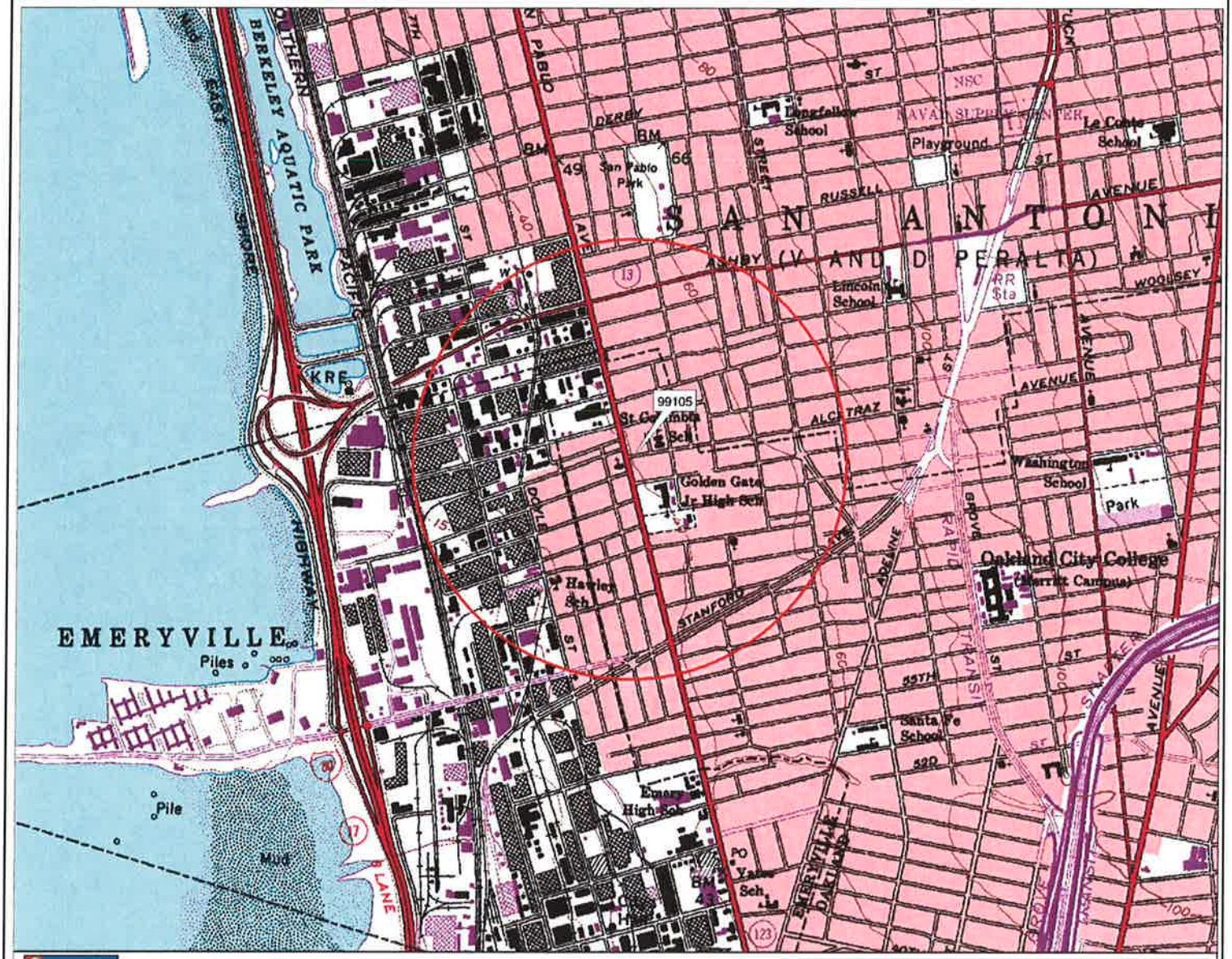
ETIC Engineering, Inc. (ETIC). March 28, 2011a. *Subsurface Investigation Report, Former Mobil Station 99105, 6301 San Pablo Avenue, Oakland, California.*

ETIC Engineering, Inc. (ETIC). March 28, 2011b. *Soil Vapor Survey Report, Former Mobil Station 99105, 6301 San Pablo Avenue, Oakland, California.*

TRC. April 11, 2000. *Supplemental Site Assessment Report.*

ACRONYM LIST

µg/L	Micrograms per liter
µs	Microsiemens
1,2-DCA	1,2-dichloroethane
acfm	Actual cubic feet per minute
AS	Air sparge
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
CEQA	California Environmental Quality Act
cfm	Cubic feet per minute
COC	Chain of Custody
CPT	Cone Penetration (Penetrometer) Test
DIPE	Di-isopropyl ether
DO	Dissolved oxygen
DOT	Department of Transportation
DPE	Dual-phase extraction
DTW	Depth to water
EDB	1,2-dibromoethane
EPA	Environmental Protection Agency
ESL	Environmental screening level
ETBE	Ethyl tertiary butyl ether
FID	Flame-ionization detector
fpm	Feet per minute
GAC	Granular activated carbon
gpd	Gallons per day
gpm	Gallons per minute
GWPTS	Groundwater pump and treat system
HVOC	Halogenated volatile organic compound
J	Estimated value between MDL and PQL (RL)
LEL	Lower explosive limit
LPC	Liquid-phase carbon
LRP	Liquid-ring pump
LUFT	Leaking underground fuel tank
LUST	Leaking underground storage tank
MCL	Maximum contaminant level
MDL	Method detection limit
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/m^3	Milligrams per cubic meter
MPE	Multi-phase extraction
MRL	Method reporting limit
msl	Mean sea level
MTBE	Methyl tertiary butyl ether
MTCA	Model Toxics Control Act
NAI	Natural attenuation indicators
NAPL	Non-aqueous phase liquid
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
ORP	Oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OVA	Organic vapor analyzer
P&ID	Process & Instrumentation Diagram
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene or perchloroethylene
PID	Photo-ionization detector
PLC	Programmable logic control
POTW	Publicly owned treatment works
ppmv	Parts per million by volume
PQL	Practical quantitation limit
psi	Pounds per square inch
PVC	Polyvinyl chloride
QA/QC	Quality assurance/quality control
RBSL	Risk-based screening levels
RCRA	Resource Conservation and Recovery Act
RL	Reporting limit
scfm	Standard cubic feet per minute
SSTL	Site-specific target level
STLC	Soluble threshold limit concentration
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound
TAME	Tertiary amyl methyl ether
TBA	Tertiary butyl alcohol
TCE	Trichloroethene
TOC	Top of well casing elevation; datum is msl
TOG	Total oil and grease
TPHd	Total petroleum hydrocarbons as diesel
TPHg	Total petroleum hydrocarbons as gasoline
TPHmo	Total petroleum hydrocarbons as motor oil
TPHs	Total petroleum hydrocarbons as stoddard solvent
TRPH	Total recoverable petroleum hydrocarbons
UCL	Upper confidence level
USCS	Unified Soil Classification System
USGS	United States Geologic Survey
UST	Underground storage tank
VCP	Voluntary Cleanup Program
VOC	Volatile organic compound
VPC	Vapor-phase carbon



FN 2783TOPO

EXPLANATION

1/2-mile radius circle

N

APPROXIMATE SCALE

0 0.5 1 mile

SOURCE:
Modified from a map
provided by
DeLorme 3-D TopoQuads

Cardno ERI
Shaping the Future

SITE VICINITY MAP

FORMER MOBIL SERVICE STATION 99105
6301 San Pablo Avenue
Oakland, California

PROJECT NO.
2783

PLATE
1

APPROXIMATE SCALE

0 30 60 Feet

FN 2783 11 W01 GSP_WP

Cardno ERI
Shaping the Future

GENERALIZED SITE PLAN

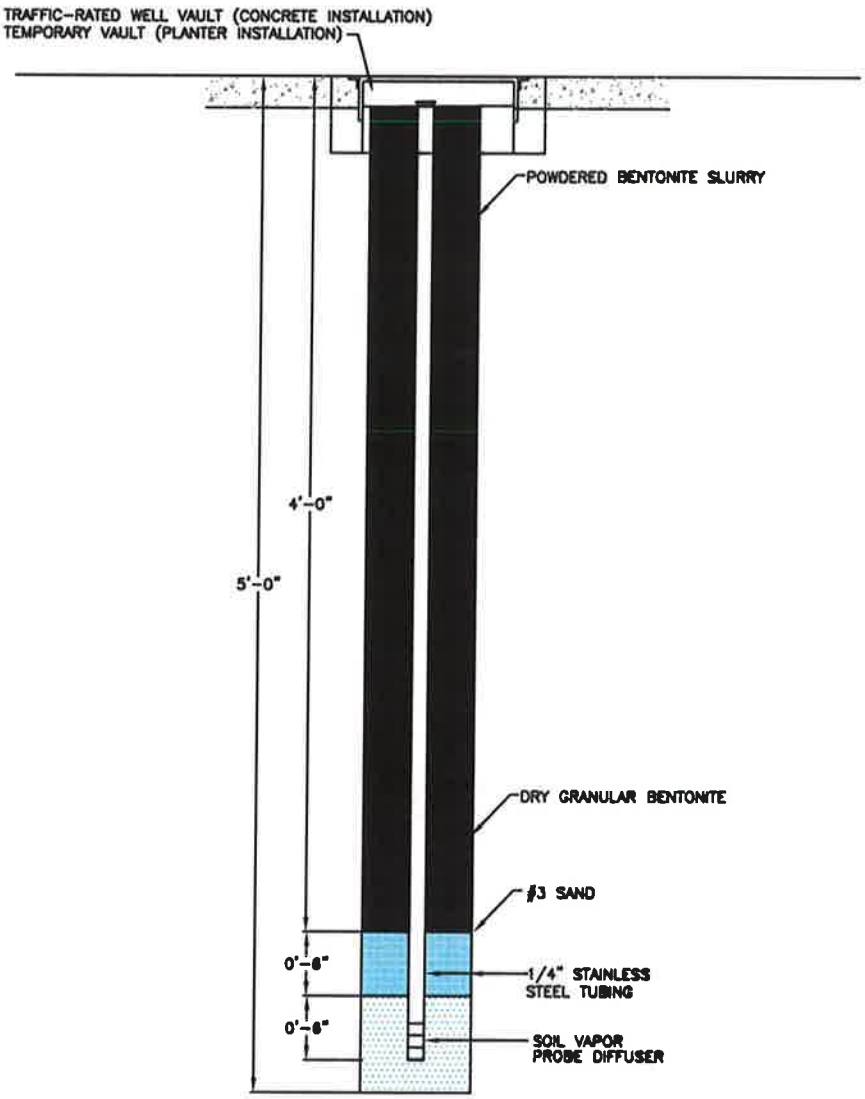
FORMER MOBIL SERVICE STATION 99105
6301 San Pablo Avenue
Oakland, California

EXPLANATION

- MW5 Groundwater Monitoring Well
- AB13 Soil Boring
- VW5 Soil Vapor Sampling Well
- B8 Proposed Soil Boring
- SVS3 Proposed Soil Vapor Sampling Well

PROJECT NO. 2783

PLATE 2



SOIL VAPOR WELL DETAIL

NOT TO SCALE

FN 2783 11 W01 SOIL VAPOR WELL_SP

Cardno ERI
Shaping the Future

SCHEMATIC NESTED SOIL VAPOR SAMPLING WELL DIAGRAM
FORMER MOBIL SERVICE STATION 99105
6301 San Pablo Avenue
Oakland, California

PROJECT NO.
2783

PLATE
3

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Well ID	Sampling Date		TOC Elev. (feet)	DTW (feet)	GW Elev. (feet)	NAPL (feet)	TPHd (µg/L)	TPHg (µg/L)	MTBE 8020/8021 (µg/L)	MTBE 8240/8260 (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
TW1	01/04/96		---	6.00	---	No	700	ND	---	---	ND	ND	ND	ND
WW1	01/04/96		---	3.00	---	No	---	ND	---	---	ND	ND	ND	ND
MW1	03/14/96		32.79	4.50	28.29	No	450	610	---	---	0.75	0.54	1.5	59
MW1	05/21/96		32.79	5.64	27.15	No	ND	ND	---	---	ND	ND	ND	ND
MW1	08/13/96		32.79	9.76	23.03	No	ND	ND	---	---	ND	ND	ND	ND
MW1	11/08/96		32.79	10.24	22.55	No	ND	ND	ND	---	ND	0.92	ND	2.1
MW1	01/31/97		32.79	3.83	28.96	No	ND	ND	2.6	ND	ND	0.85	ND	ND
MW1	04/22/97		32.79	9.14	23.65	No	ND	ND	ND	---	ND	ND	ND	ND
MW1	07/29/97	a	32.79	10.18	22.61	No	60e	ND	36	---	0.84	0.95	ND	1.6
MW1	10/09/97	a	32.79	10.46	22.33	No	56e	ND	ND	---	ND	ND	ND	ND
MW1	01/23/98	a	32.79	3.95	28.84	No	33	ND	ND	---	ND	ND	ND	ND
MW1	04/22/98		32.79	5.33	27.46	No	ND	ND	ND	---	ND	ND	ND	ND
MW1	07/21/98		32.79	9.17	23.62	No	---	ND	ND	---	ND	ND	ND	ND
MW1	10/20/98		32.79	10.41	22.38	No	---	ND	ND	---	ND	ND	ND	ND
MW1	01/27/99		32.79	5.51	27.28	No	---	ND	ND	---	ND	ND	ND	ND
MW1	Apr-99		Destroyed during construction activities.											
MW2	03/14/96		32.80	4.51	28.29	No	250	560	---	---	2.0	0.96	4.3	11
MW2	05/21/96		32.80	5.65	27.15	No	560	730	---	---	5.1	1.4	6.7	5.9
MW2	08/13/96		32.80	10.14	22.66	No	380b	490	---	---	25	3.5	7.2	13
MW2	11/08/96		32.80	10.70	22.10	No	160d	520	6.1	---	80	2.7	14	66
MW2	01/31/97		32.80	3.84	28.96	No	130b	74	ND	---	ND	ND	ND	ND
MW2	04/22/97		32.80	9.61	23.19	No	430	260	ND	---	2.7	ND	2.5	ND
MW2	07/29/97	a	32.80	10.53	22.27	No	150d	320	ND	---	28	1.2	10	ND
MW2	10/09/97	a	32.80	10.87	21.93	No	160b	460	2.6	---	43	2.8	2.0	2.6
MW2	01/23/98	a	32.80	3.75	29.05	No	54	ND	ND	---	ND	ND	ND	ND
MW2	04/22/98		32.80	5.36	27.44	No	540	180	ND	---	1.2	0.3	0.4	ND
MW2	07/21/98		32.80	9.55	23.25	No	---	80	ND	---	8.9	2.1	0.6	2.5
MW2	10/20/98		32.80	10.75	22.05	No	---	50	ND	---	0.8	0.7	ND	0.8
MW2	01/27/99		32.80	5.53	27.27	No	---	ND	ND	---	0.6	ND	ND	ND
MW2	07/27/99		32.80	6.20	26.60	No	---	ND	ND	---	ND	0.6	ND	ND
MW2	12/08/99		32.80	9.98	22.82	No	---	ND	ND	---	1.2	0.43	ND	ND
MW2	10/25/00		39.34	11.30	28.04	No	---	<20	<0.30	---	2.0	0.59	0.46	1.3
MW2	01/15/01		39.34	9.41	29.93	No	---	<20	<0.30	---	<0.20	0.46	<0.20	<0.60
MW2	04/10/01		39.34	6.16	33.18	No	---	23	<1.0	---	0.28	<0.20	<0.20	<0.60

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Well ID	Sampling Date		TOC Elev. (feet)	DTW (feet)	GW Elev. (feet)	NAPL (feet)	TPHd (µg/L)	TPHg (µg/L)	MTBE 8020/8021 (µg/L)	MTBE 8240/8260 (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
MW2	07/24/01		39.34	10.70	28.64	No	---	<50	<0.30	---	<0.20	0.93	<0.20	0.82
MW2	11/27/01		39.34	10.15	29.19	No	---	<50	<0.30	---	1.2	0.22	<0.20	<0.60
MW2	01/18/02		41.99	5.46	36.53	No	---	<50.0	1.40	---	<0.50	<0.50	<0.50	<0.50
MW2	04/10/02		41.99	6.48	35.51	No	---	<50.0	1.80	---	<0.50	<0.50	<0.50	<0.50
MW2	07/12/02		41.99	10.45	31.54	No	---	<50.0	<0.50	---	<0.50	<0.50	<0.50	<0.50
MW2	10/14/02		41.99	11.46	30.53	No	---	<50.0	<0.5	---	<0.5	4.1	0.6	4.0
MW2	01/20/03		41.99	5.39	36.60	No	---	<50.0	0.6	---	<0.50	<0.50	<0.50	<0.50
MW2	04/28/03		41.99	5.87	36.12	No	---	<50.0	<0.50	---	<0.50	<0.50	<0.50	<0.50
MW2	07/15/03		41.99	10.31	31.68	No	---	<50	<0.5	---	<0.5	<0.5	<0.5	<0.5
MW2	10/08/03		41.99	11.20	30.79	No	---	<50	<0.5	---	<0.5	<0.5	<0.5	<0.5
MW2	01/15/04		41.99	5.36	36.63	No	---	63.3	1.0	---	0.70	<0.5	<0.5	<0.5
MW2	09/17/10		41.99	10.72	31.27	No	<50	<50	---	<0.50	<0.50	<0.50	<0.50	<0.50
MW2	12/15/10		42.24	Well resurveyed.										
MW3	03/14/96		32.80	9.55	23.25	No	1,200	4,200	---	---	220	30	140	520
MW3	05/21/96		32.80	10.16	22.64	No	2,800	8,500	---	---	710	110	440	1,700
MW3	08/13/96		32.80	11.18	21.62	No	2,300c	5,000	---	---	430	ND	200	360
MW3	11/08/96		32.80	11.51	21.29	No	2,900b	8,400	73	ND	890	82	790	1,700
MW3	01/31/97		32.80	7.90	24.90	No	7,500b	16,000	ND	---	660	85	960	1,800
MW3	04/22/97		32.80	10.64	22.16	No	2,700	8,000	200	ND	340	33	400	490
MW3	07/29/97	a	32.80	11.36	21.44	No	2,300b	9,800	ND	---	330	ND	530	530
MW3	10/09/97	a	32.80	11.52	21.28	No	2,600b	7,300	270	ND	300	ND	430	460
MW3	01/23/98	a	32.80	7.50	25.30	No	2,300	6,100	ND	---	190	23	330	320
MW3	04/22/98		32.80	6.81	25.99	No	2,600	4,900	ND	ND	140	12	250	230
MW3	07/21/98		32.80	10.65	22.15	No	---	7,400	74	ND	250	16	400	370
MW3	10/20/98		32.80	11.57	21.23	No	---	6,700	ND	ND	200	18	350	350
MW3	01/27/99		32.80	9.11	23.69	No	---	3,100	13	---	74	4	94	39
MW3	07/27/99		32.80	7.27	25.53	No	---	8,900	ND	---	170	21	360	440
MW3	12/08/99		32.80	10.63	22.17	No	---	4,800	ND	---	94	13	170	210
MW3	10/25/00		39.27	12.08	27.19	No	---	3,800	<50	<5	63	2.9	100	65
MW3	01/15/01		39.27	10.29	28.98	No	---	4,300	<5.0	---	76	9.5	47	76
MW3	04/10/01		39.27	10.11	29.16	No	---	2,700	<20	---	55	4.4	100	37
MW3	07/24/01		39.27	11.57	27.70	No	---	3,100	<1.0	---	110	6.9	110	81
MW3	11/27/01		39.27	10.93	28.34	No	---	2,400	<0.30	---	47	8.9	25	35
MW3	01/18/02		41.71	9.47	32.24	No	---	1,130	13.6	---	15.3	2.30	42.0	24.6
MW3	04/10/02		41.71	10.14	31.57	No	---	916	11.2	---	35.1	3.00	22.5	13.8
MW3	07/12/02		41.71	11.34	30.37	No	---	2,330	15.4	---	60.5	2.90	39.8	50.9

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Well ID	Sampling Date	TOC Elev. (feet)	DTW (feet)	GW Elev. (feet)	NAPL (feet)	TPHd (µg/L)	TPHg (µg/L)	MTBE 8020/8021 (µg/L)	MTBE 8240/8260 (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
MW3	10/14/02	41.71	12.10	29.61	No	---	2,550	<0.5	---	36.9	3.8	20.3	48.0
MW3	01/20/03	41.71	9.20	32.51	No	---	1,750	10.7	---	20.4	304.0	60.7	22.0
MW3	04/28/03	41.71	9.37	32.34	No	---	2,730	11.2	---	10.0	2.7	42.7	20.1
MW3	07/15/03	41.71	11.15	30.56	No	---	1,790	5.6	---	68.8	3.6	39.0	44.7
MW3	10/08/03	41.71	11.89	29.82	No	---	1,320	7.1	---	35.1	4.0	23.6	31.8
MW3	01/15/04	41.71	9.16	32.55	No	---	791	3.4	---	24.4	1.3	40.1	14.7
MW3	09/17/10	41.71	11.46	30.25	No	99	2,500	---	<0.50	2.6	0.31f	1.8	1.8
MW3	12/15/10	42.18	Well resurveyed.										
MW4	03/14/96	31.50	4.92	26.58	No	3,500	12,000	---	---	2,200	140	880	2,000
MW4	05/21/96	31.50	8.60	22.90	No	4,200	11,000	---	---	1,700	ND	930	470
MW4	08/13/96	31.50	10.02	21.50	0.02	---	---	---	---	---	---	---	---
MW4	11/08/96	31.50	10.28	21.33	0.15	---	---	---	---	---	---	---	---
MW4	01/31/97	31.50	7.88	23.62	No	8,200b	23,000	ND	---	980	68	1,100	1,400
MW4	04/22/97	31.50	7.40	24.10	No	4,500	8,800	ND	---	950	ND	610	130
MW4	07/29/97	31.50	9.85	21.74	0.12	---	---	---	---	---	---	---	---
MW4	10/09/97	31.50	10.35	21.38	0.30	---	---	---	---	---	---	---	---
MW4	01/23/98	31.50	4.68	27.51	0.92	---	---	---	---	---	---	---	---
MW4	04/22/98	31.50	6.39	25.22	0.14	---	---	---	---	---	---	---	---
MW4	07/21/98	31.50	7.10	24.55	0.20	---	---	---	---	---	---	---	---
MW4	10/20/98	31.50	9.03	22.60	0.17	---	---	---	---	---	---	---	---
MW4	01/27/99	31.50	5.37	26.18	0.07	---	---	---	---	---	---	---	---
MW4	Apr-99	Destroyed during construction activities.											
MW5	10/25/00	39.18	10.92	28.26	No	---	2,500	<20	---	79	3.8	66	<20
MW5	01/15/01	39.18	8.32	30.86	No	---	3,900	<5.0	---	120	7.9	280	52
MW5	04/10/01	39.18	7.21	31.97	No	---	8,000	<50	<5	280	4.4	410	100
MW5	07/24/01	39.18	9.54	29.64	No	---	7,000	<1.0	---	360	7.4	380	67
MW5	11/27/01	39.18	8.84	30.34	No	---	5,000	8.9	<2	64	11	340	52
MW5	01/18/02	41.59	6.52	35.07	No	---	6,330	21.8	---	99.1	2.30	103	19.6
MW5	04/10/02	41.59	7.20	34.39	No	---	2,140	<2.50	---	275	8.00	183	24.5
MW5	07/12/02	41.59	8.83	32.76	No	---	3,940	20	<0.50	350	<0.50	268	14
MW5	10/14/02	41.59	10.74	30.85	No	---	4,040	<2.5	---	98.5	9.0	169	29.0
MW5	01/20/03	41.59	6.45	35.14	No	---	7,660	59	<0.50	421	10.0	743	96.0
MW5	04/28/03	41.59	6.68	34.91	No	---	7,510	47	<0.50	403	5.5	524	50.5
MW5	07/15/03	41.59	8.68	32.91	No	---	6,080	52.9	<2.5	406	19.8	412	34.7
MW5	10/08/03	41.59	10.56	31.03	No	---	2,460	54.3	<0.5	160	12.8	173	31.7

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Well ID	Sampling Date	TOC Elev. (feet)	DTW (feet)	GW Elev. (feet)	NAPL (feet)	TPHd (µg/L)	TPHg (µg/L)	MTBE 8020/8021 (µg/L)	MTBE 8240/8260 (µg/L)	B (µg/L)	T (µg/L)	E (µg/L)	X (µg/L)
MW5	01/15/04	41.59	6.56	35.03	No	---	4,630	37.4	<0.5	181	6.0	312	38.5
MW5	09/17/10	41.59	9.99	31.60	No	5,700	6,600	---	<5.0	19	<5.0	16	1.4f
MW5	12/15/10	41.86	Well resurveyed.										
Grab Groundwater Samples													
AB1	03/05/98	---	---	---	---	---	1,600	ND	---	31	5.3	79	130
AB2	03/05/98	---	---	---	---	---	ND	ND	---	ND	2.9	0.9	5.7
AB3	03/05/98	---	---	---	---	---	6,800	230	---	680	100	1,500	2,300
AB4	03/05/98	---	---	---	---	---	8,500	ND	---	240	ND	260	720
AB6	03/05/98	---	---	---	---	---	12,000	ND	---	350	ND	310	100
AB9	03/05/98	---	---	---	---	---	1,000	ND	---	57	12	44	93
AB10	03/05/98	---	---	---	---	---	200	ND	---	3.0	1.2	3.2	2.8
AB11	03/05/98	---	---	---	---	---	ND	ND	---	ND	ND	ND	ND
AB12	03/05/98	---	---	---	---	---	8,800	37	---	660	50	630	940
AB13	03/05/98	---	---	---	---	---	210	ND	---	11	0.8	10	15
HA1	01/25/00	---	---	---	---	---	<500	<5.0	---	<0.3	<0.3	<0.3	<0.6
Soil Borings													
B1	11/18/10	---	---	---	---	---	---	---	---	---	---	---	---
B2	11/19/10	---	---	---	---	---	---	---	---	---	---	---	---
B3	11/19/10	---	---	---	---	<50g	<50	—	<0.50	<0.50	<0.50	0.053f	0.21f
B4	11/19/10	---	---	---	---	---	---	---	---	---	---	---	---
B5	11/18/10	---	---	---	—	<50g	<50	---	<0.50	<0.50	<0.50	0.047f	0.21f

TABLE 1A
CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Notes:	Adapted from ETIC's *Report of Groundwater Monitoring, Third Quarter 2010*.	
TOC Elev.	=	Top of casing elevation.
DTW	=	Depth to water.
GW Elev.	=	Groundwater elevation.
NAPL	=	Non-aqueous phase liquid.
TPHd	=	Total petroleum hydrocarbons as diesel analyzed using EPA Method 8015B.
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using EPA Method 8015B.
MTBE 8020/8021	=	Methyl tertiary butyl ether analyzed using EPA Method 8020 or 8021B.
MTBE 8240/8260	=	Methyl tertiary butyl ether analyzed using EPA Method 8260B or 8240.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8260B.
DIPE	=	Di-isopropyl ether analyzed using EPA Method 8260B.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method 8260B.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method 8260B.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method 8260B.
1,2-DCA	=	1,2-dichloroethane analyzed using EPA Method 8260B.
EDB	=	1,2-dibromoethane analyzed using EPA Method 8260B.
ND	=	Not detected at or above the laboratory reporting limit.
µg/L	=	Micrograms per liter.
<	=	Less than the stated laboratory reporting limit.
---	=	Not analyzed/Not applicable.
a	=	Well sampled using no-purge method.
b	=	Diesel and unidentified hydrocarbons <C15.
c	=	Diesel and unidentified hydrocarbons <C15>C25.
d	=	Diesel and unidentified hydrocarbons >C20.
e	=	Unidentified hydrocarbons >C18.
f	=	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit.
g	=	The sample extract was subjected to Silica Gel treatment prior to analysis.

TABLE 1B
ADDITIONAL CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Well ID	Sampling Date	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	TBA (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)
TW1	01/04/96	---	---	---	---	---	---
WW1	01/04/96	---	---	---	---	---	---
MW1	03/14/96 - 01/27/99	Not analyzed for these analytes.					
MW1	Apr-99	Destroyed during construction activities.					
MW2	03/14/96 - 01/15/04	Not analyzed for these analytes.					
MW2	**09/17/10**	**<0.50**	**<0.50**	**<0.50**	**<10**	**<0.50**	**<0.50**
MW3	03/14/96 - 01/15/04	Not analyzed for these analyt	Not analyzed for these analytes.				
MW3	**09/17/10**	**0.17f**	**<0.50**	**<0.50**	**9.8f**	**1.9**	**<0.50**
MW4	03/14/96 - 01/27/99	Not analyzed for these analytes.					
MW4	Apr-99	Destroyed during construction activities.					
MW5	10/25/00 - 01/15/04	Not analyzed for these analytes.					
MW5	**09/17/10**	**<5.0**	**<5.0**	**<5.0**	**<100**	**<5.0**	**<5.0**
Grab Groundwater Samples							
Not analyzed for these analytes.							
Soil Borings							
B1	11/18/10	---	---	---	---	---	---
B2	11/19/10	---	---	---	---	---	---
B3	11/19/10	---	---	---	---	---	---
B4	11/19/10	---	---	---	---	8.7	---
B5	11/18/10	---	---	---	---	---	---
						0.099f	---

TABLE 1B
ADDITIONAL CUMULATIVE GROUNDWATER MONITORING AND SAMPLING DATA
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Notes:	Adapted from ETIC's *Report of Groundwater Monitoring, Third Quarter 2010*.	
TOC Elev.	=	Top of casing elevation.
DTW	=	Depth to water.
GW Elev.	=	Groundwater elevation.
NAPL	=	Non-aqueous phase liquid.
TPHd	=	Total petroleum hydrocarbons as diesel analyzed using EPA Method 8015B.
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using EPA Method 8015B.
MTBE 8020/8021	=	Methyl tertiary butyl ether analyzed using EPA Method 8020 or 8021B.
MTBE 8240/8260	=	Methyl tertiary butyl ether analyzed using EPA Method 8260B or 8240.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8260B.
DIPE	=	Di-isopropyl ether analyzed using EPA Method 8260B.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method 8260B.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method 8260B.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method 8260B.
1,2-DCA	=	1,2-dichloroethane analyzed using EPA Method 8260B.
EDB	=	1,2-dibromoethane analyzed using EPA Method 8260B.
ND	=	Not detected at or above the laboratory reporting limit.
µg/L	=	Micrograms per liter.
<	=	Less than the stated laboratory reporting limit.
---	=	Not analyzed/Not applicable.
a	=	Well sampled using no-purge method.
b	=	Diesel and unidentified hydrocarbons <C15.
c	=	Diesel and unidentified hydrocarbons <C15>C25.
d	=	Diesel and unidentified hydrocarbons >C20.
e	=	Unidentified hydrocarbons >C18.
f	=	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit.
g	=	The sample extract was subjected to Silica Gel treatment prior to analysis.

TABLE 2
WELL CONSTRUCTION DETAILS
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Well ID	Well Installation Date	Well Destruction Date	TOC Elevation (feet)	Well Casing Material	Total Depth (feet)	Well Depth (feet)	Borehole Diameter (inches)	Casing Diameter (inches)	Screened Interval (feet)	Slot Size (inches)	Filter Pack Interval (feet)	Filter Pack Material
MW1	03/02/00	Apr-99	32.79	PVC	21.5	20	10	4	5-20	0.010	4.5-21.5	#12 Sand
MW2	03/02/00	---	42.24	PVC	21.5	20	10	4	5-20	0.010	4.5-21.5	#12 Sand
MW3	03/02/00	---	42.18	PVC	21.5	20	10	4	5-20	0.010	4.5-21.5	#12 Sand
MW4	03/02/00	Apr-99	31.50	PVC	26.5	25	10	4	5-25	0.010	4.5-21.5	#12 Sand
MW5	09/07/04	---	41.86	PVC	21.5	20	10	4	5-20	0.010	4-21.5	#2/12 Sand
VW1	11/01/10	---	---	Stainless Steel	6	6	4	0.25	5.25-5.75	0.0057	5-6	#2/12 Sand
VW2	11/02/10	---	---	Stainless Steel	6	6	4	0.25	5.25-5.75	0.0057	5-6	#2/12 Sand
VW3	11/01/10	---	---	Stainless Steel	6	6	4	0.25	5.25-5.75	0.0057	5-6	#2/12 Sand
VW4	11/02/10	---	---	Stainless Steel	6	6	4	0.25	5.25-5.75	0.0057	5-6	#2/12 Sand
VW5	11/02/10	---	---	Stainless Steel	6	6	4	0.25	5.25-5.75	0.0057	5-6	#2/12 Sand

Notes:

TOC = Top of casing.

PVC = Polyvinyl chloride.

--- = Not applicable/Not available.

TABLE 3
CUMULATIVE SOIL ANALYTICAL RESULTS
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Sample ID	Sample Date	Depth (feet bgs)	TPHd (mg/kg)	TPHg (mg/kg)	MTBE 8020/8021) (mg/kg)	MTBE (8260B) (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	TBA (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	1,2-DCA (mg/kg)	EDB (mg/kg)	Lead (mg/kg)	TOG (mg/kg)
Monitoring and Remediation Wells																		
MW1	03/01/96	5 - 5.5	3.4	<1.0	---	---	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	<2.5	---
MW1	03/01/96	10 - 10.5	<1.0	<1.0	---	---	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	<2.5	---
MW1	03/01/96	15 - 15.5	4.2	<1.0	---	---	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	<2.5	---
MW2	03/01/96	5 - 5.5	2.4	<1.0	---	---	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	<2.5	---
MW2	03/01/96	10 - 10.5	57	220	---	---	1.2	1.4	2.7	14	---	---	---	---	---	---	<2.5	---
MW2	03/01/96	15 - 15.5	<1.0	<1.0	---	---	<0.0050	<0.0050	0.0063	0.035	---	---	---	---	---	---	<2.5	---
MW3	03/01/96	5.5 - 6	1.1	<1.0	---	---	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	<2.5	9
MW3	03/01/96	10.5 - 11	72	53	---	---	0.032	0.43	0.65	0.93	---	---	---	---	---	---	<2.5	290
MW3	03/01/96	15.5 - 16	<1.0	<1.0	---	---	<0.0050	<0.0050	<0.0050	<0.0050	---	---	---	---	---	---	<2.5	10
MW4	03/01/96	5.5 - 6	34	280	---	---	1.2	1	4.1	19	---	---	---	---	---	---	<2.5	---
MW4	03/01/96	10.5 - 11	7.7	6	---	---	0.11	<0.0050	0.11	0.093	---	---	---	---	---	---	<2.5	---
MW4	03/01/96	15.5 - 16	2.1	6	---	---	0.076	0.023	0.083	0.07	---	---	---	---	---	---	<2.5	---
VW1	11/01/10	5.5-6	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.050	<0.010	<0.010	<0.010	<0.0050	<0.0050	---	---
VW2	11/02/10	5.5-6	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.050	<0.010	<0.010	<0.010	<0.0050	<0.0050	---	---
VW3	11/01/10	5.5-6	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.050	<0.010	<0.010	<0.010	<0.0050	<0.0050	---	---
VW4	11/02/10	5.5-6	<5.0b	3.7c	---	<0.0050	<0.0050	<0.0050	0.0050	0.0050a	<0.050	<0.010	<0.010	<0.010	<0.0050	<0.0050	---	---
VW5	11/02/10	5.5-6	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.010	<0.050	<0.010	<0.010	<0.010	<0.0050	<0.0050	---	---
Borings																		
AB-1	03/05/98	5 - 6	---	ND	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
AB-2	03/05/98	4 - 5	---	ND	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
AB-3	03/05/98	5.5	---	ND	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
AB-4	03/05/98	5 - 6	---	18	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
AB-5	03/05/98	3 - 4	---	170	ND	---	ND	ND	0.65	ND	---	---	---	---	---	---	---	---
AB-6	03/05/98	5	---	230	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
AB-7	03/05/98	4-5	---	19	ND	---	ND	ND	0.032	ND	---	---	---	---	---	---	---	---
AB-8	03/05/98	5'	---	ND	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---

TABLE 3
CUMULATIVE SOIL ANALYTICAL RESULTS
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Sample ID	Sample Date	Depth (feet bgs)	TPHd (mg/kg)	TPHg (mg/kg)	MTBE 8020/8021) (mg/kg)	MTBE (8260B) (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	TBA (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	1,2-DCA (mg/kg)	EDB (mg/kg)	Lead (mg/kg)	TOG (mg/kg)
AB-9	03/05/98	4	---	16	ND	---	0.006	ND	0.028	ND	---	---	---	---	---	---	---	---
AB-10	03/05/98	4	---	ND	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
AB-11	03/05/98	5 - 6	---	3.9	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
AB-12	03/16/98	5 - 6	---	ND	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
AB-13	03/16/98	5 - 6	---	ND	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
MP-1	11/16/98	7.5	---	10	ND	---	ND	0.007	0.013	ND	---	---	---	---	---	---	---	---
MP-2	11/16/98	7	---	270	ND	---	ND	0.03	0.29	2.1	---	---	---	---	---	---	---	---
MP-2	11/16/98	10.5	---	140	0.15	---	0.08	ND	0.31	ND	---	---	---	---	---	---	---	---
MP-3	11/16/98	7.5	---	230	0.28	---	ND	0.1	1.6	ND	---	---	---	---	---	---	---	---
MP-4	11/16/98	5	---	120	0.19	---	ND	ND	0.35	ND	---	---	---	---	---	---	---	---
MP-4	11/16/98	10	---	18	ND	---	ND	0.013	0.07	0.086	---	---	---	---	---	---	---	---
MP-5	11/16/98	6.5	---	6.4	ND	---	ND	ND	0.015	0.022	---	---	---	---	---	---	---	---
MP-5	11/16/98	10.5	---	220	0.52	---	ND	ND	1.4	3	---	---	---	---	---	---	---	---
MP-6	11/16/98	7	---	ND	ND	---	ND	ND	ND	ND	---	---	---	---	---	---	---	---
MP-6	11/16/98	10	---	240	0.92	ND	ND	ND	1.6	4.2	---	---	---	---	---	---	---	---
HA-1	01/25/00	5	---	<0.50	<0.025	---	<0.0050	<0.0050	<0.0050	<0.010	---	---	---	---	---	---	---	---
B1	11/17/10	5-5.5	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B1	11/18/10	9.5-10	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B1	11/18/10	14.5-15	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B1	11/18/10	19.5-20	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B1	11/18/10	24.5-25	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B2	11/17/10	5-5.5	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B2	11/18/10	8.5-9	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B2	11/19/10	14.5-15	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B2	11/19/10	19.5-20	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B3	11/17/10	5-5.5	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B3	11/18/10	9.5-10	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B3	11/19/10	12-12.5	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B3	11/19/10	14.5-15	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B3	11/19/10	17-17.5	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---

TABLE 3
CUMULATIVE SOIL ANALYTICAL RESULTS
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Sample ID	Sample Date	Depth (feet bgs)	TPHd (mg/kg)	TPHg (mg/kg)	MTBE 8020/8021) (mg/kg)	MTBE (8260B) (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	TBA (mg/kg)	DIPE (mg/kg)	ETBE (mg/kg)	TAME (mg/kg)	1,2-DCA (mg/kg)	EDB (mg/kg)	Lead (mg/kg)	TOG (mg/kg)
B3	11/19/10	19.5-20	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B4	11/17/10	5-5.5	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B4	11/18/10	9.5-10	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B4	11/19/10	14.5-15	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B4	11/19/10	19.5-20	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B5	11/17/10	5-5.5	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B5	11/18/10	9.5-10	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B5	11/19/10	14.5-15	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
B5	11/19/10	19.5-20	<5.0b	<0.50	---	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	ND	ND	ND	ND	ND	ND	---	---
Soil Stockpile Samples																		
Comp-1	01/25/00	Composite	---	<0.50	<0.025	---	<0.0050	<0.0050	<0.0050	<0.010	---	---	---	---	---	---	8.04	---

Notes:

TPHd	=	Total petroleum hydrocarbons as diesel analyzed using EPA Method 8015B.
TPHg	=	Total petroleum hydrocarbons as gasoline analyzed using EPA Method 8015B.
MTBE (8020/8021)	=	Methyl tertiary butyl ether analyzed using EPA Method 8020 or 8021B).
MTBE (8260B)	=	Methyl tertiary butyl ether analyzed using EPA Method 8260B.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method 8260B.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method 8260B.
DIPE	=	Di-isopropyl ether analyzed using EPA Method 8260B.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method 8260B.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method 8260B.
1,2-DCA	=	1,2-dichloroethane analyzed using EPA Method 8260B.
EDB	=	1,2-dibromoethane analyzed using EPA Method 8260B.
TOG	=	Total oil and grease.
ND	=	Not detected at or above the laboratory reporting limit.
feet bgs	=	Feet below ground surface.
mg/kg	=	Milligrams per kilogram.
<	=	Less than the stated laboratory reporting limit.
---	=	Not analyzed/Not sampled/Not applicable.
a	=	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
b	=	The sample extract was subjected to Silica Gel treatment prior to analysis.
c	=	The chromatographic pattern does not match that of the specified standard.

TABLE 4
SOIL VAPOR ANALYTICAL DATA
Former Mobil Service Station 99105
6301 San Pablo Avenue
Oakland, California

Well ID	Depth (feet bgs)	Sample Date	TPHg ($\mu g/m^3$)	MTBE ($\mu g/m^3$)	B ($\mu g/m^3$)	T ($\mu g/m^3$)	E ($\mu g/m^3$)	X ($\mu g/m^3$)	1,2-DCA ($\mu g/m^3$)	EDB ($\mu g/m^3$)	TBA ($\mu g/m^3$)	DIPE ($\mu g/m^3$)	ETBE ($\mu g/m^3$)	TAME ($\mu g/m^3$)	O_2 + A (%V)	Methane (%V)	CO_2 (%V)	Helium (lab) ($\mu g/m^3$)	Helium (field) (ppm)
VW1	5-6	11/09/10	190,000	<13	10	17	80	100	<3.6	<6.9	<11	<15	<15	<15	3.75	<0.895	14.0	---	0.0
VW2	5-6	11/09/10	20,000	<9.8	<2.2	<2.6	<3.0	<12	4.8	<5.2	<8.2	<11	<11	<11	18.5	<0.680	3.02	---	0.0
VW3	5-6	11/09/10	120,000	<11	9.7	25	9.0	36	4.2	<5.9	<9.3	<13	<13	<13	1.55	<0.765	16.6	---	0.0
VW4	5-6	11/09/10	250,000,000	<10,000	16,000	9,200	71,000	60,000	<2,900	<5,400	<8,500	<12,000	<12,000	<12,000	1.59	14.2	14.1	<16,400	18,000
VW5	5-6	11/09/10	31,000,000	<2,300	1,000	<590	<680	<2,700	<640	<1,200	<1,900	<2,600	<2,600	<2,600	10.3	6.61	12.5	<16,400	10,000
VW5 (DUP)	5-6	11/09/10	30,000,000	<2,200	740	<570	<660	<2,600	<610	<1,200	<1,800	<2,500	<2,500	<2,500	9.10	6.44	13.1	<16,400	---

Notes:

TPHg	=	Total petroleum hydrocarbons analyzed using EPA Method TO-3M.
MTBE	=	Methyl tertiary butyl ether analyzed using EPA Method TO-15.
BTEX	=	Benzene, toluene, ethylbenzene, and total xylenes analyzed using EPA Method TO-15.
1,2-DCA	=	1,2-dichloroethane analyzed using EPA Method TO-15.
EDB	=	1,2-dibromoethane analyzed using EPA Method TO-15.
TBA	=	Tertiary butyl alcohol analyzed using EPA Method TO-15.
DIPE	=	Di-isopropyl ether analyzed using EPA Method TO-15.
ETBE	=	Ethyl tertiary butyl ether analyzed using EPA Method TO-15.
TAME	=	Tertiary amyl methyl ether analyzed using EPA Method TO-15.
O_2 + A	=	Oxygen plus argon analyzed using ASTM D-1946.
Methane	=	Methane analyzed using ASTM D-1946.
CO_2	=	Carbon dioxide analyzed using ASTM D-1946.
Helium (lab)	=	Helium analyzed using ASTM D-1946.
Helium (field)	=	Helium measured in the field.
$\mu g/m^3$	=	Micrograms per cubic meter.
ppm	=	Parts per milion.
feet bgs	=	Feet below ground surface.
---	=	Not analyzed.

APPENDIX A

CORRESPONDENCE

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

July 21, 2011

Jennifer Sedlachek
ExxonMobil
4096 Piedmont, Ave., #194
Oakland, CA 94611

On Dan and Nathan Lam
200 El Dorado Terrace
San Francisco, CA 94112

Subject: Work Plan Request for Fuel Leak Case No. RO0000445 and Geotracker Global ID T0600101855, Mobil#99-105 / Cars Rent A Car, 6301 San Pablo Avenue, Oakland, CA 94608

Dear Ms. Sedlachek and Messrs. Lam:

Thank you for the recently submitted reports entitled, *Soil Vapor Survey Report* and *Subsurface Investigation Report* both dated March 28, 2011 and prepared by ETIC Engineering, Inc. for the subject site. Alameda County Environmental Health (ACEH) staff has reviewed the case file including the above-mentioned report/work plan for the above-referenced site. The reports present the results of an investigation of off-site soil and groundwater and on-site soil vapor sampling. Although significant levels of contaminants were detected in soil vapor, no conclusions or recommendations were included with the report.

We request that you address the following technical comments, perform the proposed work, and send us the technical reports requested below.

TECHNICAL COMMENTS

1. **Conclusions and Recommendations** – The reports do not present conclusions or recommendations but state that "recommendations will be submitted under separate cover". All reports are to include conclusions and recommendations.

2. **Soil, Groundwater and Vapor Characterization** – The Subsurface Investigation Report presents the results of soil and groundwater sampling located 110 feet downgradient of the site. While these results are below the detection limit for all constituents besides 1,2-Dichloroethane, groundwater concentrations in the downgradient wells contain values of up to 6,600 micrograms per liter (µg/L) total petroleum hydrocarbons as gasoline and 19 µg/L benzene. The Soil Vapor Survey Report presents soil vapor concentrations for the subject site and indicates that concentrations immediately adjacent to the site border were up to 190,000 micrograms per cubic meter (µg/m^3) TPHg and 10 µg/m^3 benzene. The residential and church properties between the site and those locations remain unevaluated for possible vapor intrusion or groundwater contamination. Please present a proposal to collect soil vapor and groundwater samples at the residential and church properties adjacent to the site by the due date below.

3. **Corrective Action Plan** – The maximum on-site soil vapor concentrations were 250,000,000 $\mu g/m^3$ total petroleum hydrocarbons as gasoline (TPHg) and 16,000 $\mu g/m^3$ benzene. These values exceed the San Francisco Regional Water Quality Control Board (SFRWQCB) environmental screening levels (ESLs) by multiple orders of magnitude for both residential and commercial land use. In addition, a church and residential properties are located downgradient and possibly over the contamination. At this time, a Feasibility Study/Corrective Action Plan (FS/CAP) prepared in accordance with Title 23, California Code of Regulations, Section 2725 appears warranted. The FS/CAP must include a concise background of soil and groundwater investigations performed in connection with this case and an assessment of the residual impacts of the chemicals of concern (COCs) for the site and the surrounding area where the unauthorized release has migrated or may migrate. The FS/CAP should also include, but is not limited to, a detailed description of site lithology, including soil permeability, and most importantly, contamination cleanup levels and cleanup goals, in accordance with the SFRWQCB Basin Plan and for the appropriate groundwater designation. Please note that soil cleanup levels should ultimately (within a reasonable timeframe) achieve water quality objectives (cleanup goals) for groundwater in accordance with the SFRWQCB Basin Plan. Please specify appropriate cleanup levels and cleanup goals in accordance with 23 CCR Section 2725, 2726, and 2727 in the FS/CAP.

   The FS/CAP must evaluate at least three viable alternatives for remedying or mitigating the actual or potential adverse affects of the unauthorized release(s) besides the 'no action' and 'monitored natural attenuation' remedial alternatives. Each alternative shall be evaluated not only for cost-effectiveness but also its timeframe to reach cleanup levels and cleanup goals, and ultimately the Responsible Party must propose the most cost-effective corrective action.

TECHNICAL REPORT REQUEST

Please submit technical reports to ACEH (Attention: Barbara Jakub), according to the following schedule:

- **September 30, 2011** – Groundwater Monitoring Report (2nd Half- 2011)
- **September 30, 2011** – Work Plan
- **60 Days after Work Plan Approval** – Soil and Water Investigation Report
- **60 Days after SWI Submittal** – FS/CAP
- **March 30, 2012** – Groundwater Monitoring Report (1st Half- 2012)

Thank you for your cooperation. Should you have any questions or concerns regarding this correspondence or your case, please call me at (510) 639-1287 or send me an electronic mail message at barbara.jakub@acgov.org.

Sincerely,

Digitally signed by Barbara J. Jakub
DN: cn=Barbara J. Jakub, o, ou, email=barbara.jakub@acgov.org, c=US
Date: 2011.07.21 14:36:29 -07'00'

Barbara J. Jakub, P.G.
Hazardous Materials Specialist

Enclosure: Responsible Party(ies) Legal Requirements/Obligations
ACEH Electronic Report Upload (ftp) Instructions

cc: Hamidou Barry, ETIC Engineering Inc., 2285 Morello Avenue, Pleasant Hill, CA 94523 *(Sent via e-mail to: hbarry@eticeng.com)*
Leroy Griffin, Oakland Fire Department, 250 Frank H. Ogawa Plaza, Ste. 3341, Oakland, CA 94612-2032 (*Sent via E-mail to: lgriffin@oaklandnet.com*)
Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Barbara Jakub, ACEH (*Sent via E-mail to: barbara.jakub@acgov.org*)
GeoTracker
File

APPENDIX B

FIELD PROTOCOLS

Cardno ERI
Soil Boring and Well Installation
Field Protocol

Preliminary Activities

Prior to the onset of field activities at the site, Cardno ERI obtains the appropriate permit(s) from the governing agency(s). Advance notification is made as required by the agency(s) prior to the start of work. Cardno ERI marks the borehole locations and contacts the local one call utility locating service at least 48 hours prior to the start of work to mark buried utilities. Borehole locations may also be checked for buried utilities by a private geophysical surveyor. Prior to drilling, the borehole location is cleared in accordance with the client's procedures. Fieldwork is conducted under the advisement of a registered professional geologist and in accordance with an updated site-specific safety plan prepared for the project, which is available at the job site during field activities.

Drilling and Soil Sampling Procedures

Cardno ERI contracts a licensed driller to advance the boring and collect soil samples. The specific drilling method (e.g., hollow-stem auger, direct push method, or sonic drilling), sampling method [e.g., core barrel or California-modified split spoon sampler (CMSSS)] and sampling depths are documented on the boring log and may be specified in a work plan. Soil samples are typically collected at the capillary fringe and at 5-foot intervals to the total depth of the boring. To determine the depth of the capillary fringe prior to drilling, the static groundwater level is measured with a water level indicator in the closest monitoring well to the boring location, if available.

The borehole is advanced to just above the desired sampling depth. For CMSSSs, the sampler is placed inside the auger and driven to a depth of 18 inches past the bit of the auger. The sampler is driven into the soil with a standard 140-pound hammer repeatedly dropped from a height of 30 inches onto the sampler. The number of blows required to drive the sampler each 6-inch increment is recorded on the boring log. For core samplers (e.g., direct push), the core is driven 18 inches using the rig apparatus.

Soil samples are preserved in the metal or plastic sleeve used with the CMSSS or core sampler, in glass jars or other manner required by the local regulatory agency (e.g., Environmental Protection Agency Method 5035). Sleeves are removed from the sample barrel, and the lowermost sample sleeve is immediately sealed with Teflon™ tape, capped, labeled, placed in a cooler chilled to 4° Celsius and transported to a state-certified laboratory. The samples are transferred under chain-of-custody (COC) protocol.

Field Screening Procedures

Cardno ERI places the soil from the middle of the sampling interval into a plastic re-sealable bag. The bag is placed away from direct sunlight for a period of time which allows volatilization of chemical constituents, after which the tip of a photo-ionization detector (PID) or similar device is inserted through the plastic bag to measure organic vapor concentrations in the headspace. The PID measurement is recorded on the boring log. At a minimum, the PID or other device is calibrated on a daily basis in accordance with manufacturer's specifications using a hexane or isobutylene standard. The calibration gas and concentration are recorded on a calibration log. Instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but they do not measure the concentration of petroleum hydrocarbons in the soil matrix with the same precision as laboratory analysis. Cardno ERI trained personnel describe the soil in the bag according to the Unified Soil Classification System and record the description on the boring log, which is included in the final report.

Air Monitoring Procedures

Cardno ERI performs a field evaluation for volatile hydrocarbon concentrations in the breathing zone using a calibrated photo-ionization detector or lower explosive level meter.

Groundwater Sampling

A groundwater sample, if desired, is collected from the boring by using Hydropunch™ sampling technology or installing a well in the borehole. In the case of using Hydropunch™ technology, after collecting the capillary fringe soil sample, the boring is advanced to the top of the soil/groundwater interface and a sampling probe is pushed to approximately 2 feet below the top of the static water level. The probe is opened by partially withdrawing it and thereby exposing the screen. A new or decontaminated bailer is used to collect a water sample from the probe. The water sample is then emptied into laboratory-supplied containers constructed of the correct material and with the correct volume and preservative to comply with the proposed laboratory test. The container is slowly filled with the retrieved water sample until no headspace remains and then promptly sealed with a Teflon-lined cap, checked for the presence of bubbles, labeled, entered onto a COC record and placed in chilled storage at 4° Celsius. Laboratory-supplied trip blanks accompany the water samples as a quality assurance/quality control procedure. Equipment blanks may be collected as required. The samples are kept in chilled storage and transported under COC protocol to a client-approved, state-certified laboratory for analysis.

Backfilling of Soil Boring

If a well is not installed, the boring is backfilled from total depth to approximately 5 feet below ground surface (bgs) with either neat cement or bentonite grout using a tremie pipe and either the boring is backfilled from 5 feet bgs to approximately 1 foot bgs with hydrated bentonite chips or backfill is continued to just below grade with neat cement grout. The borehole is completed to surface grade with material that best matches existing surface conditions and meets local agency requirements. Site-specific backfilling details are shown on the respective boring log.

Well Construction

A well (if constructed) is completed using materials documented on the boring log or specified in a work plan. The well is constructed with slotted casing across the desired groundwater sampling depth(s) and completed with blank casing to within 6 inches of surface grade. No further construction is conducted on temporary wells. For permanent wells, the annular space of the well is backfilled with Monterey sand from the total depth to approximately 2 feet above the top of the screened casing. A hydrated granular bentonite seal is placed on top of the sand filter pack. Grout may be placed on top of the bentonite seal to the desired depth using a tremie pipe. The well may be completed to surface grade with a 1-foot thick concrete pad. A traffic-rated well vault and locking cap for the well casing may be installed to protect against surface-water infiltration and unauthorized entry. Site-specific well construction details including type of well, well depth, casing diameter, slot size, length of screen interval and sand size are documented on the boring log or specified in the work plan.

Well Development and Sampling

If a permanent groundwater monitoring well is installed, the grout is allowed to cure a minimum of 48 hours before development. Cardno ERI personnel or a contracted driller use a submersible pump or surge block to develop the newly installed well. Prior to development, the pump is decontaminated by allowing it to run and re-circulate while immersed in a non-phosphate solution followed by successive immersions in potable water and de-ionized water baths. The well is developed until sufficient well casing volumes are removed so that turbidity is within allowable limits and pH, conductivity and temperature levels stabilize in the purge water. The volume of groundwater extracted is recorded on a log.

Following development, groundwater within the well is allowed to recharge until at least 80% of the drawdown is recovered. A new or decontaminated bailer is slowly lowered past the air/water interface in the well, and a water sample is collected and checked for the presence of non-aqueous phase liquid, sheen or emulsions. The water sample is then emptied into laboratory-supplied containers as discussed above.

Surveying

If required, wells are surveyed by a licensed land surveyor relative to an established benchmark of known elevation above mean sea level to an accuracy of +/- 0.01 foot. The casing is notched or marked on one side to identify a consistent surveying and measuring point.

Decontamination Procedures

Cardno ERI or the contracted driller decontaminates soil and water sampling equipment between each sampling event with a non-phosphate solution, followed by a minimum of two tap water rinses. De-ionized water may be used for the final rinse. Downhole drilling equipment is steam-cleaned prior to drilling the borehole and at completion of the borehole.

Waste Treatment and Soil Disposal

Soil cuttings generated from the drilling or sampling are stored on site in labeled, Department of Transportation-approved, 55-gallon drums or other appropriate storage container. The soil is removed from the site and transported under manifest to a client- and regulatory-approved facility for recycling or disposal. Decontamination fluids and purge water from well development and sampling activities, if conducted, are stored on site in labeled, regulatory-approved storage containers. Fluids are subsequently transported under manifest to a client- and regulatory-approved facility for disposal or treated with a permitted mobile or fixed-base carbon treatment system.

Cardno ERI

Soil Vapor Sampling Well Installation and Sampling Field Protocol

Preliminary Activities

Prior to the onset of field activities at the site, Cardno ERI obtains the appropriate permit(s) from the governing agency(s). Advance notification is made as required by the agency(s) prior to the start of work. Cardno ERI marks the borehole locations and contacts the local one call utility locating service at least 48 hours prior to the start of work to mark buried utilities. Borehole locations may also be checked for buried utilities by a private geophysical surveyor. Prior to drilling, the borehole location is cleared in accordance with the client's procedures. Fieldwork is conducted under the advisement of a registered professional geologist and in accordance with an updated site-specific safety plan prepared for the project, which is available at the job site during field activities.

Well Construction

The borehole is advanced to the desired depth using either a direct-push rig, hand auger, or air vacuum rig. Lithologic conditions are recorded on a boring log during borehole advancement, and select soil matrix sampling may be conducted based on soil characteristics.

Each soil vapor sampling (SVS) well is constructed using inert screen material attached to $^1/_8$- to ¼-inch outer diameter inert tubing. A gas-tight vacuum fitting or valve is attached to the top of each length of tubing using a female compression fitting. Each screen is set within a minimum of a 12-inch thick appropriately sized sand pack, with a minimum of 3 inches of sand pack above the top of the screen. A minimum of 4 inches of dry granular bentonite is set above each screen and associated sand pack. In SVS wells with multiple and separate casings and screens, the annular space between the top of the dry granular bentonite above the deep screen and the bottom of the sand pack associated with the shallow screen is sealed with a minimum of 18 inches of hydrated bentonite. The remainder of the annular space of the well is sealed with hydrated bentonite to 1 foot below ground surface. Wellheads are finished with traffic-rated well boxes set in concrete flush with the surrounding grade. No glues, chemical cements, or solvents are used in well construction.

A boring log is completed with the construction details for each well, including the materials of construction, depth of the borehole, screen length, and annular seal thickness.

Soil Vapor Sampling

Samples are collected using a soil vapor purging and sampling manifold consisting of a flow regulator, vacuum gauges, vacuum pump, shroud, and laboratory-prepared, gas-tight, opaque containers such as Summa™ canisters. Samples may also be collected using a syringe and analyzed by a mobile laboratory. Prior to use, Summa™ canisters are checked to ensure they are under the laboratory induced vacuum between 31 and 25 inches of mercury

(in. Hg). New inert tubing is used to purge and sample each well. Prior to purging and sampling each SVS well, the sampling manifold is connected to the gas-tight vacuum fitting or valve at the wellhead, and the downstream tubing and fittings are vacuum tested at approximately 24 to 28 in. Hg. Purging and sampling are conducted only on SVS wells when the tubing and fittings hold the applied vacuum for 5 minutes per vacuum gauge reading.

When required, Cardno ERI conducts a purge volume versus constituent concentration test on at least one SVS well prior to purging and sampling activities. The purge volume test well is selected based on the location of the anticipated source of chemical constituents at the site and on the location of anticipated maximum soil vapor concentrations based on lithologic conditions. If the SVS well has been in place for more than 1 week, it is assumed that soil vapor in the sand pack has equilibrated with the surrounding soil, and only the screen and tubing volumes are included in the purge volume calculation. If the SVS well has been in place for less than 1 week, the volume of the sand pack around the screen is included in the purge volume calculation. A photo-ionization detector (PID) or on-site mobile laboratory is used to evaluate concentrations of chemical constituents in the vapor stream after 1, 3, and 10 volumes of vapor have been purged from the SVS well. Purging is conducted at a rate of 100 to 200 milliliters per minute (ml/min). The purge volume exhibiting the highest concentration is the volume of vapor purged from each SVS well prior to sampling. If the three separate purge volumes produce equal concentrations a default of 3 purge volumes is extracted prior to sampling.

Prior to sampling, a helium leak test is performed at each SVS well, including a summa canister and its fittings, to check for leaks in the SVS annulus. To assess the potential for leaks in the SVS well annulus, a shroud is placed over the SVS well and summa canister and the shroud is filled with a measured amount of helium. Helium screening is performed in the field by drawing soil gas into a Tedlar bag via a lung-box and screening the contents of the Tedlar bag with a helium meter. The concentration of helium in the sample divided by the concentration of helium in the shroud provides a measure of the proportion of the sample attributable to leakage. A leak that comprises less than 5% of the sample is insignificant. Helium screening is also performed using laboratory analysis of the contents of the summa canister collected under the shroud. Sampling is conducted at approximately the same rate of purging, at 100 to 200 ml/min. Soil vapor samples are submitted under chain-of-custody protocol for the specified laboratory analyses.

At a minimum, weather conditions (temperature, barometric pressure and precipitation), the sampling flow rate, the purge volume, the helium leak detection percentage results, the sample canister identification number, the method of sample collection, and the vacuum of the sampling canister at the start and end of sample collection (if applicable) are recorded on a log for each SVS well purged and sampled.

Decontamination Procedures

If soil samples are collected, Cardno ERI or the contracted driller decontaminates the soil sampling equipment between each sampling interval using a non-phosphate solution, followed by a minimum of two tap water rinses.

De-ionized water may be used for the final rinse. Downhole drilling equipment is steam-cleaned or triple-rinsed prior to advancing each borehole.

Waste Treatment and Disposal

Soil cuttings generated from the well installation are stored on site in labeled, Department of Transportation-approved, 55-gallon drums or other appropriate storage container. The soil is removed from the site and transported under manifest to a client- and regulatory-approved facility for recycling or disposal. Decontamination water is stored on site in labeled, regulatory-approved storage containers, and is subsequently transported under manifest to a client- and regulatory-approved facility for disposal or treated with a permitted mobile or fixed-base carbon treatment system.