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TRANSMITTAL

DATE: June 5, 2013

REFERENCE NO.: 060058

PROJECT NAME: Former Chevron 211253, Livermore

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

ACEH RO #0189

RECEIVED
By Alameda County Environmental Health at 1:32 pm, Jun 12, 2013

Please find enclosed:
- ☐ Draft
- ☐ Originals
- ☐ Prints
- ☒ Final
- ☐ Other

Sent via:
- ☐ Mail
- ☐ Overnight Courier
- ☐ Same Day Courier
- ☒ Other ftp upload

QUANTITY	DESCRIPTION
1	Soil Vapor Investigation Report

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

COMMENTS:
Should you have any questions or concerns, please contact Brian Silva of CRA at (916) 889-8908 or Carryl MacLeod of Chevron at (925) 790-6506.

Copy to: Mr. Jose Rios, 7-Eleven, Inc
Mr. Kirk Sniff, Strasburger & Price, LLP

Completed by: Brian Silva [Please Print] Signed:

Filing: **Correspondence File**

Carryl MacLeod
Project Manager
Marketing Business Unit

Chevron Environmental Management Company
6101 Bollinger Canyon Road
San Ramon, CA 94583
Tel (925) 790-6506
cmacleod@chevron.com

June 5, 2013

Alameda County Health Care Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: Former Texaco Service Station 211253
930 Springtown Boulevard
Livermore, California
ACEHS Case No. RO0189

I accept the Soil Vapor Investigation Report.

I agree with the conclusions and recommendations presented in this document. The information included is accurate to the best of my knowledge, and appears to meet local agency and Regional Board guidelines. This Soil Vapor Investigation Report was prepared by Conestoga Rovers & Associates, upon whose assistance and advice I have relied.

This letter is submitted pursuant to the requirements of California Water Code Section 13267(b)(1) and the regulating implementation entitled Appendix A pertaining thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Sincerely,

Carryl MacLeod
Project Manager

Attachment: Soil Vapor Investigation Report

SOIL VAPOR INVESTIGATION

Former Texaco Service Station 211253
930 Springtown Boulevard
Livermore, California
ACEH Case RO0189

Prepared For:

Mr. Jerry Wickham
Alameda County Environmental Health Services (ACEH)
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Prepared by:
Conestoga-Rovers & Associates

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JUNE 5, 2013
REF. NO. 060058 (22)

SOIL VAPOR INVESTIGATION

Former Texaco Service Station 211253
930 Springtown Boulevard
Livermore, California
ACEH Case RO0189

Brian Silva

Greg Barclay, PG 6260

Prepared by:
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JUNE 5, 2013
REF. NO. 060058 (22)

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) is submitting this Soil Vapor Investigation for former Texaco Service Station 211253 located at 930 Springtown Boulevard in Livermore, California (site) on behalf of Chevron Environmental Management Company (Chevron). The purpose of this investigation and human health risk assessment (HHRA) is to evaluate potential risk to site workers and to provide data for comparison of subsurface site conditions to low-threat closure policy criteria, which will be provided under separate cover. This work was approved by ACEH in correspondence dated December 17, 2012 (Appendix A). The following sections provide site background information, a summary of the soil vapor investigation activities and results, a site-specific HHRA, and conclusions and recommendations.

2.0 SITE DESCRIPTION AND BACKGROUND

The site is a former Texaco service station located on the south corner of Springtown Boulevard and Lassen Road in Livermore, California (Figure 1). In mid-1985, Texaco sold the site to Southland Corporation who removed the underground storage tanks (USTs), dispenser islands, and product piping and constructed a 7-Eleven convenience store. The site is still occupied by the 7-Eleven convenience store and a paved parking area (Figure 2). No fuel is currently stored or dispensed at the site. The site is bordered by commercial property to the north, residential properties to the west, a hotel to the south, and a former Arco Service Station (now an active Chevron-branded service station) to the east (environmental case RO0001050, closed July 18, 2012). A summary of previous environmental work at the site is included in Appendix B.

3.0 SITE CONCEPTUAL MODEL

All elements of a SCM are contained in the following documents and information included herein:

- *Site Conceptual Model and Work Plan*, March 30, 2011
- *Draft Feasibility Study and Corrective Action Plan*, July 3, 2012
- *Draft Feasibility Study and Corrective Action Plan Addendum,* November 5, 2012

With the completion of the soil vapor investigation, previously identified data gaps have been addressed.

4.0 SOIL VAPOR INVESTIGATION

To assess soil vapor conditions below the site, CRA installed and sampled five dual-nested (5 and 10 fbg) vapor probes and collected two undisturbed soil samples for physical parameter analysis. The locations of the vapor probes are shown on Figure 2 and were selected based on the locations of the former USTs, dispenser islands, site soil analytical data, and current building location.

4.1 SITE HEALTH AND SAFETY PLAN

CRA created a comprehensive site health and safety plan to protect site workers. The plan was reviewed and signed by all site workers and visitors and kept onsite at all times.

4.2 PERMITS AND UNDERGROUND UTILITY LOCATION

CRA conducted work under the Alameda County Flood Control and Water Conservation District also known as Zone 7 Water Agency (Zone 7), drilling permit 2013016 for soil vapor probes VP-1 through VP-5. Copies of the permits are included in Appendix C.

Prior to drilling, CRA contacted Underground Service Alert to notify utility providers of the proposed work and to identify the locations of subsurface utilities. On February 2, 2013, a private utility locator, ULS Services Corporation of Pocatello, Idaho, surveyed the site to confirm that the proposed boring locations were free of underground utilities.

4.3 VAPOR PROBE INSTALLATION

On February 26 and February 27, 2013, five dual-nested vapor probe borings were advanced using a 3 ¼ -inch diameter hand-auger to a depth of approximately 10 fbg. Soil cuttings were logged and select samples were collected for chemical and physical parameter analysis. The soil vapor probes were constructed with 0.25-inch diameter Teflon® tubing and fitted with a 6-inch long 0.010-inch slotted stainless steel filter screen. The tubing and screen were set into each open boring with the middle of the

screen interval at approximately 5 fbg and 10 fbg, with the exception of VP-5. Cobbles were encountered at 7.5 fbg and hand-auger refusal was met at 9.6 fbg. The middle of the screened intervals for VP-5 were set at 4.5 and 9 fbg. Each screen interval was placed within a 12-inch sand pack consisting of #2/12 Monterey sand. Above the sand pack, 12-inches of dry granulated bentonite were topped with 12-inches of hydrated granular bentonite. Each probe was separated by approximately 6 inches of grout mixture. Each boring was finished to grade with a grout mixture. The probe tubing was labeled and capped, and a traffic-rated well box was installed flush to grade. Well construction diagrams and boring logs for the dual nested vapor probes are included in Appendix D

4.4 SOILS ENCOUNTERED

Soils encountered beneath the site during this assessment are generally consistent with previous investigations. Silty sands and sandy gravel fill was encountered at ground surface to a depth of approximately 1.5 fbg to 3 fbg. Beneath the fill, 2 to 7 feet of silts, sands, and silt/sand mixtures with fine to coarse gravel were encountered to depths ranging between approximately 3 and 10.5 fbg. Silty clay was encountered at 8 fbg in VP-2 and cobbles ranging in size from 3-inches to 6-inches were encountered in VP-5 at 7.5 fbg.

4.5 SOIL SAMPLING

Soil cuttings from vapor probe borings VP-1 through VP-5 were collected from 5 and 10 fbg at each location for chemical analysis (due to the occurrence of cobbles in VP-5 the 10 fbg sample had to be taken from approximately 9 fbg). Soil samples were selected for chemical analysis based on location to provide representative site characteristics. All soil samples were collected in new stainless steel sleeves, capped with Teflon squares and plastic end caps, labeled, placed on ice, and shipped under chain-of-custody (COC) protocol to Eurofins Lancaster Laboratories, Inc. for chemical analysis.

Two soil samples for physical parameter analysis (VP-5-PHYS-5 and VP-3-PHYS-10) were collected at 5 and 10 fbg. The soil samples were collected in a new stainless steel sleeve via a slide hammer, capped with Teflon squares and plastic end caps, labeled, placed on ice, and shipped under COC protocol to Gulf Shore Construction Services, Inc. for analysis.

4.6 SOIL VAPOR SAMPLING AND LEAK DETECTON

On March 12 and 13, 2013, soil vapor samples were collected from the vapor probes. Samples were collected using 6-liter SUMMA™ canisters with a manifold and flow controller, set at approximately 150 milliliters per minute (ml/min), and connected to the sampling tubing. The initial vacuum pressure in the canisters ranged from approximately 27 to 30 inches of mercury (except for the SUMMA™ for VP-3-10, which reported an initial vacuum of 19 inches of mercury) and the vacuum of each SUMMA™ canister was used to draw the soil vapor through the flow controller until a negative pressure of approximately 5 inches of mercury was obtained. Initial and residual vacuum pressure were measured and recorded on the COC.

Prior to sampling each vapor point, approximately 3 probe volumes were purged using a separate 6 L SUMMA™ canister. One field duplicate was collected from a depth of 5 fbg for quality control/quality assurance purposes by using a splitter connected to the soil vapor probe.

Prior to collecting a sample, a closed circuit sampling train was created by attaching the sample SUMMA™ canister in series with the purge SUMMA™ canister via a steam-cleaned, stainless-steel manifold. A "shut-in" test was performed prior to connecting the sampling equipment to the vapor probe tubing. This test was performed by sealing all openings to ambient air, opening the purge SUMMA™ canister to establish a vacuum inside the sampling train and waiting to ensure the vacuum remained stable over time. The shut-in test reduces the potential for ambient air to dilute the soil vapor samples.

In accordance with the Department of Toxic Substances Control (DTSC) Advisory – Active Soil Gas Investigation guidance document, dated March 2010, leak testing was performed during sampling using laboratory grade helium. The vapor probe vault, probe tubing, and entire sampling train were enclosed in a rigid shroud. The helium concentration inside the shroud was maintained above 10 percent helium and quantified using a helium meter. After sampling, the SUMMA™ canisters were packaged and sent to the Air Toxics laboratory in Folsom, California under COC for analysis. Soil vapor sampling data sheets with purge volume calculations, pressure tests, starting and ending vacuum pressures, measurement times, and notes are provided in Appendix E.

4.7 INVESTIGATION DERIVED WASTE

Soil cuttings and decontamination rinsate generated during the field activities were temporarily stored onsite in 55-gallon steel drums pending waste profiling and disposal. The drums were removed by Veolia Environmental Services of Sacramento, California, and transported to a Chevron-approved disposal facility on April 1, 2013.

4.8 LABORATORY ANALYSIS AND ANALYTICAL RESULTS

Laboratory analytical reports for soil and soil vapor analyses are included in Appendix F. The analysis performed for each sample set and the analytical results are summarized in Tables 1 through 3.

4.9 SOIL VAPOR CHEMICAL ANALYSIS AND RESULTS

Soil vapor samples were kept at ambient temperature and submitted to Eurofins Air Toxics Ltd. of Folsom, California, on March 14, 2013, and analyzed for the following:

- TPHg, BTEX, MTBE and naphthalene by EPA Method TO-15 SIM (GC/MS)
- Air Phase Hydrocarbon (APH) Fractions (Sp) Aromatics C8-C12 Modified TO-15 GC/MS Full Scan
- APH Fractions (Sp) Aliphatics C5-C12 Modified TO-15 GC/MS Full Scan
- Oxygen, carbon dioxide, nitrogen, methane, and helium by American Society for Testing and Materials (ASTM) D-1946

Only soil vapor from the 10-foot probe at VP-3 contained chemicals of potential concern (COPCs) that exceeded the commercial risk-based screening levels. Soil vapor collected from the 5-foot probe at VP-3 did not exceed commercial risk-based screening levels nor the most conservative residential risk-based screening levels. It should be noted that VP-3 is located in the former source area (UST pit), away from the site building and other buildings on adjacent properties.

COPCs in the remaining probes did not exceed the commercial risk-based screening levels nor the most conservative residential screening levels. The site is expected to remain a convenience store for the foreseeable future. Based on this information, potential vapor intrusion is not a significant concern under the current land use scenario. Soil vapor analytical results are summarized in Table 1.

4.10 SOIL CHEMICAL ANALYSIS AND RESULTS

Soil samples were submitted to Eurofins Lancaster Laboratories, Inc. on March 1, 2013 and analyzed for the following:

- TPHg by EPA Method 8015
- BTEX and MTBE by EPA Method 8260
- Naphthalene by EPA Method 8260B

Soil samples at approximately 5 and 10 fbg collected during the soil vapor investigation were below the reporting limit for TPHg, BTEX, MTBE, and naphthalene. Soil analytical results are summarized in Table 2.

4.11 SOIL PHYSICAL PARAMETERS

Soil samples collected for physical parameter testing were submitted to Gulf Shore Construction Services, Inc. of Rancho Cordova, California on February 28, 2013 and analyzed for the following:

- Total porosity by Phase Relation ASTM Method D2216
- Dry bulk density by ASTM Method D2937
- Moisture content by ASTM Method D2216
- Particle size distribution by ASTM Method D422
- Specific Gravity by ASTM Method D854

Results of soil physical parameter testing are summarized in Table 3 and were utilized in the preparation of the HHRA (Appendix G).

5.0 SITE-SPECIFIC HHRA

Ms. April Gowing, Ph.D., of CRA's Risk Assessment Group, completed a site-specific HHRA for residual petroleum hydrocarbons in soil and soil vapor at the site to determine the potential risk to site workers. A summary of the results of the HHRA are included below and the HHRA document is included in Appendix G.

5.1 FINDINGS OF HHRA

Soil analytical data collected between 1985 and 2013 and soil vapor analytical data collected in 2013 were considered for the determination of site COPCs, and subsequent determination of the potential human health risks and hazards from exposure to COPCs in site media.

The following summarizes the findings of the HHRA:

- Benzene and ethylbenzene were identified as COPCs in site soil.
- C5-C6 Aliphatic, C6-C8 Aliphatic, and C8-C10 Aliphatic petroleum hydrocarbon fractions were identified as COPCs in site soil vapor.
- Risks and hazards for a current/future commercial/industrial worker were evaluated for direct contact exposure (ingestion, dermal contact, and inhalation of ambient air) to soil COPCs and inhalation exposure to soil vapor COPCs volatilizing to indoor air within an onsite building.
- For the current/future commercial/industrial receptor, the carcinogenic risk associated with exposure to COPCs in site soil and soil vapor did not exceed the target risk of 1.0×10^{-4}. In addition, the cumulative non-carcinogenic hazards associated with the current/future industrial/commercial worker exposure to COPCs through direct contact to site soil and inhalation exposure to COPCs in site soil vapor did not exceed their respective target hazard index (HI) of 1.0.
- In summary, direct contact exposure to soil and indoor air inhalation exposure to soil vapor are not expected to result in unacceptable risks or hazards to the current/future commercial/industrial receptor at the site.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on results of the soil vapor investigation and findings of the HHRA, direct contact exposure to soil and indoor air inhalation exposure to soil vapor are not expected to result in unacceptable risks or hazards to the current/future commercial/industrial receptor at the site. CRA will prepare a low-threat closure request, which will compare current site conditions to general and media-specific closure criteria, for submittal to ACEH.

FIGURES

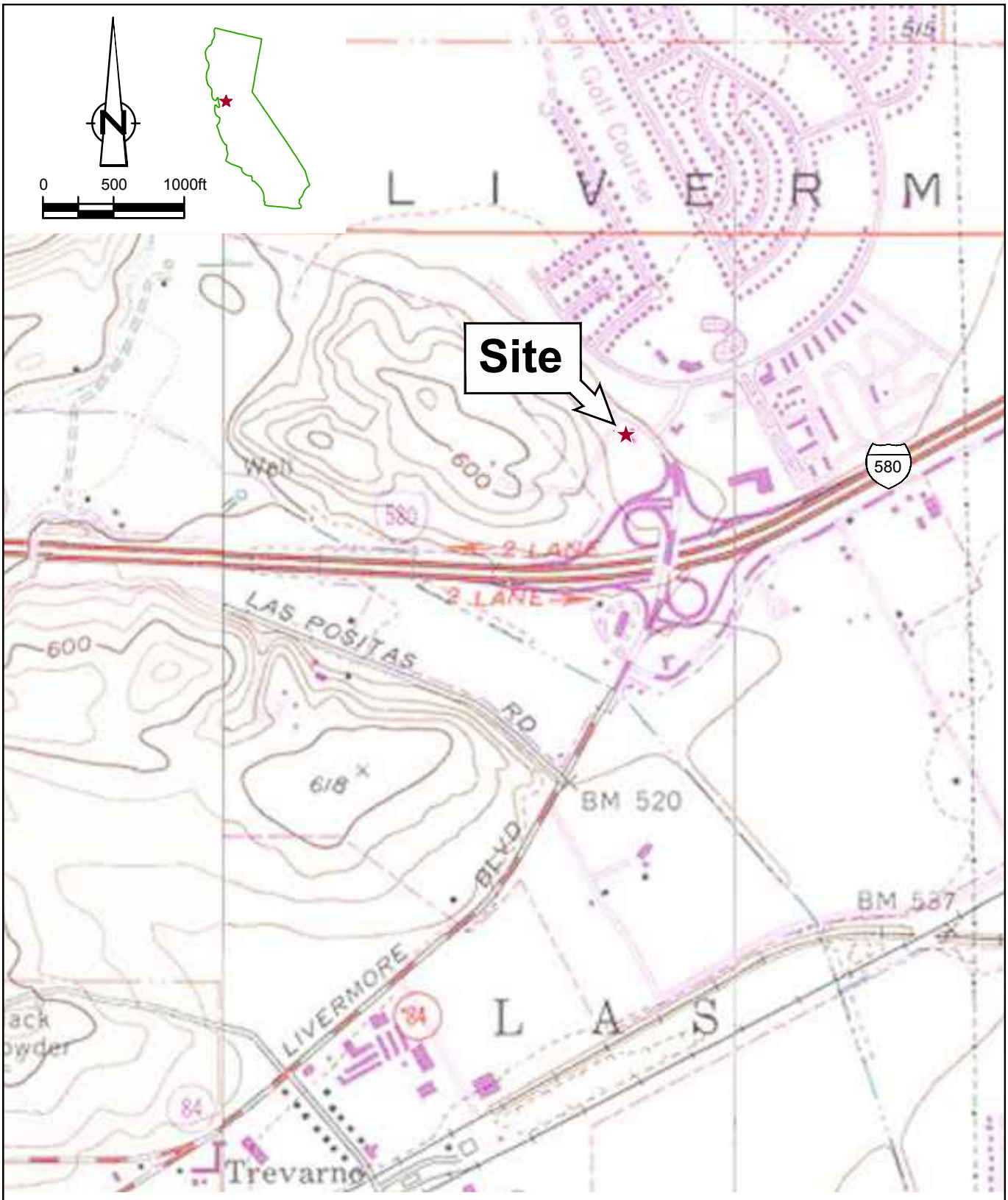

Figure 1

VICINITY MAP
FORMER TEXACO STATION 211253
930 SPRINGTOWN BOULEVARD
Livermore, California

60058-2013.3(022)GN-WA001 MAY 15/2013

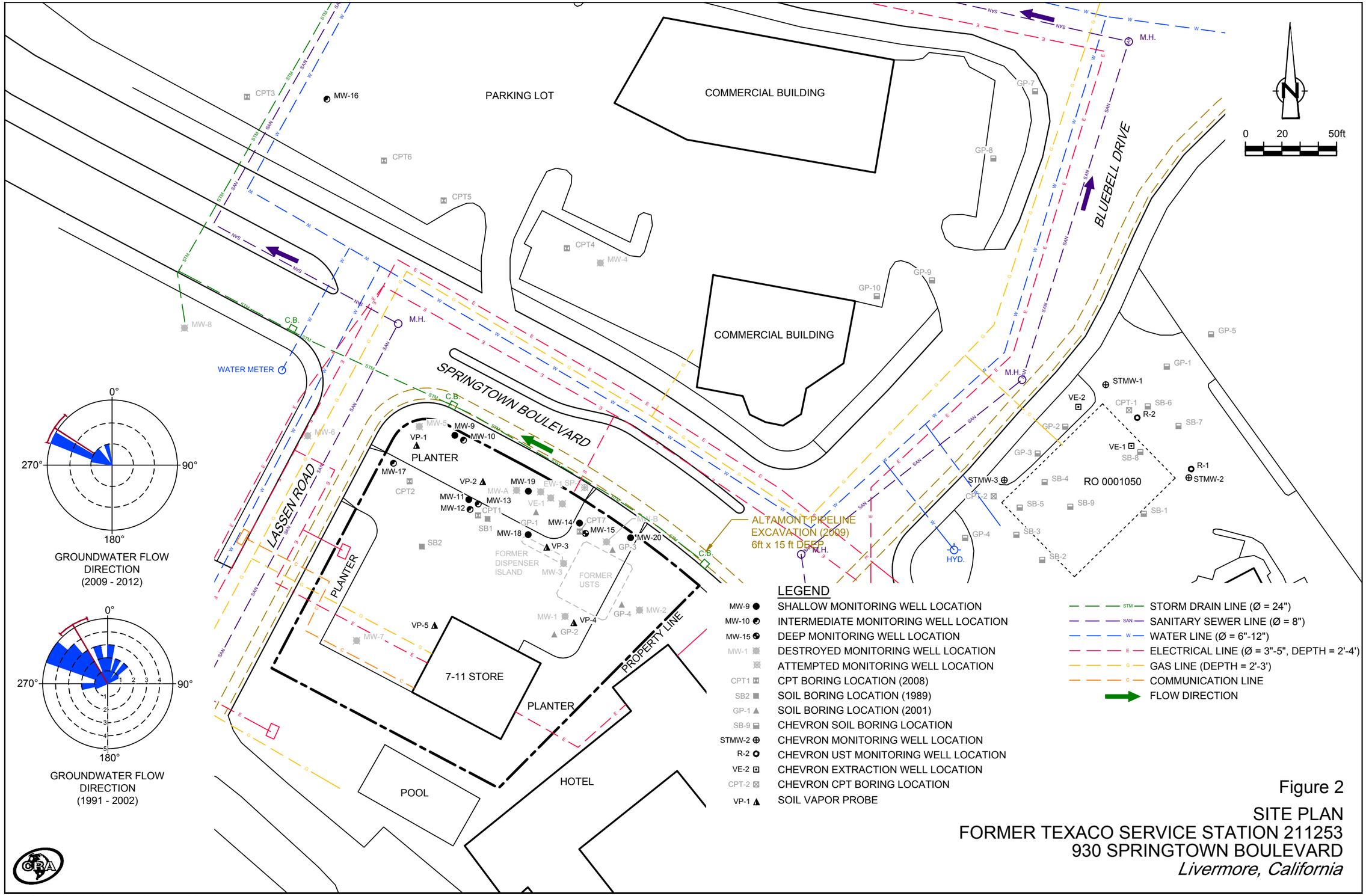

Figure 2

SITE PLAN
FORMER TEXACO SERVICE STATION 211253
930 SPRINGTOWN BOULEVARD
Livermore, California

60058-2013.3(022)GN-WA002 MAY 15/2013

TABLES

TABLE 1
SOIL VAPOR SAMPLING DATA
FORMER TEXACO SERVICE STATION 211253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

			HYDROCARBONS							*PRIMARY VOCS*							*GENERAL CHEMISTRY*				
Location	Depth	Date	*Total Petroleum Hydrocarbons - Gasoline*	*Total Petroleum Hydrocarbons (C5-C6) Aliphatics*	*Total Petroleum Hydrocarbons (>C6-C8) Aliphatic*	*Total Petroleum Hydrocarbons (>C8-C10) Aliphatic*	*Total Petroleum Hydrocarbons (>C8-C10) Aromatic*	*Total Petroleum Hydrocarbons (>C10-C12) Aliphatic*	*Total Petroleum Hydrocarbons (>C10-C12) Aromatic*	*Benzene*	*Toluene*	*Ethylbenzene*	*m&p-Xylenes*	*o-Xylene*	*Methyl tert butyl ether (MTBE)*	*Naphthalene*	*Methane*	*Nitrogen*	*Carbon dioxide*	*Oxygen*	*Helium*
	ft	Units	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*%*	*%*	*%*	*%*	*%*
ESLs (Residential)			150,000	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	42	160,000	490	52,000	52,000	4,700	36	*NE*	*NE*	*NE*	*NE*	*NE*
ESLs (com/Ind)			1,200,000	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	420	1,300,000	4,900	440,000	440,000	47,000	360	*NE*	*NE*	*NE*	*NE*	*NE*
VP-1	**5**	**03/13/2013**	440	<53	<67	<95	<80	<110	<89	3	<3.1	<3.5	<3.5	<3.5	<2.9	<17	<0.00016	81	3.3	15	<0.082
VP-1	**10**	**03/13/2013**	460	<55	<70	<99	<84	<120	<93	4.5	5	<3.7	8.1	4.7	<3.1	<18	<0.00017	78	1.7	20	<0.085
VP-2	**5**	**03/13/2013**	2,300	<56	500	<100	<85	<120	<95	6.3	<3.2	<3.8	6.6	4.4	<3.1	<18	<0.00017	82	1.7	16	<0.086
VP-2-5 (DUP)	**5**	**03/13/2013**	1,700	<55	350	<100	<84	<120	<94	6.3	<3.2	<3.7	6.5	4.2	<3.1	<18	<0.00017	82	1.7	16	<0.086
VP-2	**10**	**03/13/2013**	17,000	600	4,700	340	<170	<240	<190	13	<6.4	<7.4	9.9	<7.4	<6.2	<36	0.0012	90	5.7	4.6	<0.086
VP-3	**5**	**03/13/2013**	12,000	390	2,400	180	<150	<210	<170	<4.9	<5.8	<6.6	<6.6	<6.6	<5.5	<32	0.0025	93	1.9	4.7	<0.076
VP-3	**10**	**03/13/2013**	**2,600,000**	140,000	840,000	36,000	<16,000	<23,000	<18,000	**<530**	<620	<720	<720	<720	<590	**<3,400**	0.57	98	0.39	1.5	<0.082
VP-4	**5**	**03/12/2013**	560	<46	<58	<82	<69	<98	<77	<2.2	7	<3.1	6.8	<3.1	<2.5	<15	<0.00014	80	6.5	13	0.19
VP-4	**10**	**03/12/2013**	<160	<50	<64	<90	<76	<110	<85	<2.5	6.9	<3.4	3.9	<3.4	<2.8	<16	<0.00016	80	8.9	11	<0.078
VP-5	**4.5**	**03/12/2013**	540	<54	<69	<98	<82	<120	<92	3.4	14	<3.6	11	<3.6	<3.0	<18	<0.00017	84	3.1	13	<0.084
VP-5	**9**	**03/12/2013**	<160	<51	<65	<92	<78	<110	<87	<2.5	4.5	<3.4	<3.4	<3.4	<2.8	<16	<0.00016	83	3.8	13	<0.079

TABLE 1
SOIL VAPOR SAMPLING DATA
FORMER TEXACO SERVICE STATION 211253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

			HYDROCARBONS							*PRIMARY VOCS*							*GENERAL CHEMISTRY*				
Location	Depth	Date	*Total Petroleum Hydrocarbons - Gasoline*	*Total Petroleum Hydrocarbons (C5-C6) Aliphatics*	*Total Petroleum Hydrocarbons (>C6-C8) Aliphatic*	*Total Petroleum Hydrocarbons (>C8-C10) Aliphatic*	*Total Petroleum Hydrocarbons (>C8-C10) Aromatic*	*Total Petroleum Hydrocarbons (>C10-C12) Aliphatic*	*Total Petroleum Hydrocarbons (>C10-C12) Aromatic*	*Benzene*	*Toluene*	*Ethylbenzene*	*m&p-Xylenes*	*o-Xylene*	*Methyl tert butyl ether (MTBE)*	*Naphthalene*	*Methane*	*Nitrogen*	*Carbon dioxide*	*Oxygen*	*Helium*
	ft	Units	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*ug/m3*	*%*	*%*	*%*	*%*	*%*
ESLs (Residential)			150,000	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	42	160,000	490	52,000	52,000	4,700	36	*NE*	*NE*	*NE*	*NE*	*NE*
ESLs (com/Ind)			1,200,000	*NE*	*NE*	*NE*	*NE*	*NE*	*NE*	420	1,300,000	4,900	440,000	440,000	47,000	360	*NE*	*NE*	*NE*	*NE*	*NE*

Abbreviations and Notes:

ft = Feet

ug/m3 = Micrograms per cubic meter

% = Percentage

-- = Not available / not applicable

<x = Not detected above laboratory method detection limit

DUP = Indicates duplicate sample

ESLs are taken from Table E - Environmental screening levels for residential and comercial/industrial land use in shallow soil gas, referenced in Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater, California Regional Water Quality Control Board, San Francisco Bay Region, Interim Final-November 2007 (Revised May 2013).
Data in bold represent concentrations that exceed applicable ESLs (residential)

TABLE 2

SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPH*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*Naphthalene*	*TBA*	*DIPE*	*ETBE*	*TAME*	*1,2-DCA*	*EDB*
	ESL		← *Reported in milligrams per kilogram (mg/kg)* →													
Soil Leaching Screening Level (Drinking Water Sourse) Table G			*NE*	***83***	***0.044***	***2.9***	***3.3***	***2.3***	***0.023***	***3.4***	***0.075***	*NE*	*NE*	*NE*	***0.0045***	***0.0003***
Soil Direct Exposure Construction/Trench Worker Table K-3			*NE*	4200	12	650	210	420	2,800	130	320,000	*NE*	*NE*	*NE*	21	1.7
2013 Vapor Probe Installation																
VP-1-S-5	02/26/13	5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-1-S-10	02/26/13	10	--	<1.0	<0.0005	<0.0009	<0.0009	<0.0009	<0.0005	<0.0009	--	--	--	--	--	--
VP-2-S-5	02/26/13	5	--	<10	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-2-S-10	02/26/13	10	--	<4.1	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-3-S-5	02/26/13	5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-3-S-10	02/26/13	10	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-4-S-5	02/27/13	5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-4-S-10	02/27/13	10	--	<1.0	<0.0005	<0.0009	<0.0009	<0.0009	<0.0005	<0.0009	--	--	--	--	--	--
VP-5-S-5	02/27/13	5	--	<9.9	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-5-S-9	02/27/13	9	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
2012 Well Installation																
MW-17	01/16/12	5	--	<1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-17	01/19/12	10.5	--	<11	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-17	01/19/12	15.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-17	01/19/12	20.5	--	<1.1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-17	01/19/12	25.5	--	<1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-17	01/19/12	30.5	--	<0.9	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-17	01/19/12	36.5	--	<9.9	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--

TABLE 2

SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPH*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*Naphthalene*	*TBA*	*DIPE*	*ETBE*	*TAME*	*1,2-DCA*	*EDB*
	ESL		← *Reported in milligrams per kilogram (mg/kg)* →													
Soil Leaching Screening Level (Drinking Water Sourse) Table G			*NE*	***83***	***0.044***	***2.9***	***3.3***	***2.3***	***0.023***	***3.4***	***0.075***	*NE*	*NE*	*NE*	***0.0045***	***0.0003***
Soil Direct Exposure Construction/Trench Worker Table K-3			*NE*	4200	12	650	210	420	2,800	130	320,000	*NE*	*NE*	*NE*	21	1.7
MW-18	01/16/12	5	--	**310**	<0.025	<0.051	**4.6**	**6.6**	--	--	--	--	--	--	--	--
MW-18	01/18/12	11	--	**170**	**0.44**	**7.1**	1.9	**8.3**	--	--	--	--	--	--	--	--
MW-18	01/18/12	15	--	**540**	**0.38**	**19**	**12**	**51**	--	--	--	--	--	--	--	--
MW-18	01/18/12	20	--	13	0.005	0.15	0.091	0.33	--	--	--	--	--	--	--	--
MW-18	01/18/12	25	--	**1,200**	**0.36**	**9.9**	**13**	**52**	--	--	--	--	--	--	--	--
MW-18	01/18/12	31	--	<0.9	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-19	01/17/12	5	--	<1.1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-19	01/18/12	10	--	<1.0	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-19	01/18/12	15	--	1.4	<0.0005	<0.001	0.002	<0.001	--	--	--	--	--	--	--	--
MW-19	01/18/12	20	--	2.5	<0.0005	<0.0009	0.015	0.001	--	--	--	--	--	--	--	--
MW-19	01/18/12	25	--	30	<0.023	<0.046	0.067	<0.046	--	--	--	--	--	--	--	--
MW-19	01/18/12	30	--	3.7	0.012	<0.001	0.009	0.002	--	--	--	--	--	--	--	--
MW-20	01/16/12	5	--	<0.9	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-20	01/17/12	10	--	<1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-20	01/17/12	15	--	50	<0.026	<0.052	<0.052	<0.052	--	--	--	--	--	--	--	--
MW-20	01/17/12	19.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-20	01/17/12	25	--	1.2	<0.0005	0.007	0.041	0.13	--	--	--	--	--	--	--	--
MW-20	01/17/12	30	--	<1	<0.0005	<0.001	0.007	0.020	--	--	--	--	--	--	--	--
MW-20	01/17/12	35	--	<0.9	<0.0005	<0.001	0.004	0.014	--	--	--	--	--	--	--	--
MW-20	01/17/12	40	--	<0.9	<0.0005	0.003	0.012	0.038	--	--	--	--	--	--	--	--
MW-20	01/17/12	45	--	<1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--

TABLE 2

SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPH*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*Naphthalene*	*TBA*	*DIPE*	*ETBE*	*TAME*	*1,2-DCA*	*EDB*
	ESL		← *Reported in milligrams per kilogram (mg/kg)* →													
Soil Leaching Screening Level (Drinking Water Sourse) Table G			*NE*	*83*	***0.044***	***2.9***	***3.3***	***2.3***	***0.023***	***3.4***	***0.075***	*NE*	*NE*	*NE*	***0.0045***	***0.0003***
Soil Direct Exposure Construction/Trench Worker Table K-3			*NE*	4200	12	650	210	420	2,800	130	320,000	*NE*	*NE*	*NE*	21	1.7
2009 CRA Well Installation																
MW-10	06/24/09	10.5	--	48	<0.025	<0.051	0.094	<0.051	--	--	--	--	--	--	--	--
MW-10	06/24/09	15.5	--	1.7	0.001	0.006	0.16	0.12	--	--	--	--	--	--	--	--
MW-10	06/24/09	20.5	--	1.8	<0.0005	<0.001	0.005	0.001	--	--	--	--	--	--	--	--
MW-10	06/24/09	26	--	<1.0	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-13	06/24/09	10.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-13	06/25/09	15.5	--	8.7	<0.0005	<0.0009	<0.0009	<0.0009	--	--	--	--	--	--	--	--
MW-13	06/25/09	20.5	--	11	**0.18**	0.005	0.017	0.008	--	--	--	--	--	--	--	--
MW-13	06/25/09	25.5	--	**1100**	**1.2**	**50**	**13**	**90**	--	--	--	--	--	--	--	--
MW-13	06/25/09	31	--	**150**	**0.22**	**8.1**	**3.5**	**22**	--	--	--	--	--	--	--	--
MW-13	06/25/09	36.5	--	52	**0.046**	0.85	0.30	1.8	--	--	--	--	--	--	--	--
MW-15	06/30/09	9.5	--	**5200**	**4.5**	**44**	**55**	**260**	--	--	--	--	--	--	--	--
MW-15	06/30/09	14.5	--	**150**	0.003	0.014	0.065	0.24	--	--	--	--	--	--	--	--
MW-15	06/30/09	19.5	--	**6400**	**<0.50**	**31**	**170**	**530**	--	--	--	--	--	--	--	--
MW-15	06/30/09	24.5	--	34	<0.025	0.12	0.23	0.94	--	--	--	--	--	--	--	--
MW-15	06/30/09	29.5	--	4.9	<0.0005	0.028	0.037	0.20	--	--	--	--	--	--	--	--
MW-15	06/30/09	34.5	--	**86**	<0.023	0.34	0.65	**3.0**	--	--	--	--	--	--	--	--
2007 - 2008 CRA Subsurface Investigation																
CPT1	11/21/07	5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.021	<0.001	<0.001	<0.001	<0.001	<0.001
CPT1	11/21/07	16	--	1.3	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT1	11/21/07	20	--	<1.0	**0.073**	0.002	0.001	<0.001	<0.0005	--	<0.019	<0.001	<0.001	<0.001	<0.001	<0.001

TABLE 2

SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPH*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*Naphthalene*	*TBA*	*DIPE*	*ETBE*	*TAME*	*1,2-DCA*	*EDB*
	ESL		*Reported in milligrams per kilogram (mg/kg)*													
Soil Leaching Screening Level (Drinking Water Sourse) Table G			*NE*	***83***	***0.044***	***2.9***	***3.3***	***2.3***	***0.023***	***3.4***	***0.075***	*NE*	*NE*	*NE*	***0.0045***	***0.0003***
Soil Direct Exposure Construction/Trench Worker Table K-3			*NE*	4200	12	650	210	420	2,800	130	320,000	*NE*	*NE*	*NE*	21	1.7
CPT1	11/21/07	30	--	59	**0.61**	2.8	0.42	**5.8**	**<0.024**	--	<0.97	<0.048	<0.048	<0.048	<0.048	<0.048
CPT1	11/21/07	37	--	16	0.004	0.056	0.039	0.30	<0.005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT1	11/21/07	41	--	**130**	0.043	1.1	0.52	**3.4**	**<0.024**	--	<0.97	<0.049	<0.049	<0.049	<0.049	<0.049
CPT1	11/21/07	45	--	1.8	0.004	0.059	0.018	0.13	<0.0005	--	<0.019	<0.001	<0.001	<0.001	<0.001	<0.001
CPT1	11/21/07	50	--	<1.0	0.0008	0.022	0.009	0.060	<0.0005	--	<0.021	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	10.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.021	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	15.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.021	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	20.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	30.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	35.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	40.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	45.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.021	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	50.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT3	04/07/08	19.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT4	07/18/08	23.5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.019	<0.001	<0.001	<0.001	<0.001	<0.001
CPT5	04/09/08	21.5	--	<1.0	<0.0005	<0.0009	<0.0009	<0.0009	<0.0005	--	<0.019	<0.0009	<0.0009	<0.0009	<0.0009	<0.0009
CPT6	11/19/07	5	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.021	<0.001	<0.001	<0.001	<0.001	<0.001
CPT6	11/20/07	25	--	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005		<0.019	<0.001	<0.001	<0.001	<0.001	<0.001

TABLE 2

SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPH*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*Naphthalene*	*TBA*	*DIPE*	*ETBE*	*TAME*	*1,2-DCA*	*EDB*
	ESL		←					*Reported in milligrams per kilogram (mg/kg)*								→
Soil Leaching Screening Level (Drinking Water Sourse) Table G			*NE*	*83*	*0.044*	*2.9*	*3.3*	*2.3*	*0.023*	*3.4*	*0.075*	*NE*	*NE*	*NE*	*0.0045*	*0.0003*
Soil Direct Exposure Construction/Trench Worker Table K-3			*NE*	4200	12	650	210	420	2,800	130	320,000	*NE*	*NE*	*NE*	21	1.7
CPT7	04/08/08	5	--	**510**	<0.026	<0.053	**3.6**	**16**	**<0.026**	--	<1.1	<0.053	<0.053	<0.053	<0.053	<0.053
CPT7	04/09/08	10.5	--	**1700**	**2.5**	**20**	**14**	**70**	**<0.025**	--	<0.99	<0.050	<0.050	<0.050	<0.050	<0.050
CPT7	04/09/08	12	--	**510**	**0.28**	<0.050	2.8	1.4	**<0.025**	--	<1.0	<0.050	<0.050	<0.050	<0.050	<0.050
CPT7	04/09/08	17	--	**700**	**0.45**	**5.7**	**6.0**	**27**	<0.023	--	<0.92	<0.046	<0.046	<0.046	<0.046	<0.046
CPT7	04/09/08	20	--	**430**	**0.15**	**6.6**	**4.2**	**19**	**<0.024**	--	<0.97	<0.049	<0.049	<0.049	<0.049	<0.049
CPT7	04/09/08	25	--	53	0.039	1.6	2.4	**11**	**<0.026**	--	<1.0	<0.052	<0.052	<0.052	<0.052	<0.052
CPT7	04/09/08	30	--	82	**0.048**	0.60	0.50	2.2	**<0.025**	--	<0.98	<0.049	<0.049	<0.049	<0.049	<0.049
CPT7	04/09/08	35	--	16	<0.026	0.16	0.13	0.61	**<0.026**	--	<1.1	<0.053	<0.053	<0.053	<0.053	<0.053
CPT7	04/09/08	40	--	2.1	0.0007	0.031	0.049	0.24	<0.0005	--	<0.019	<0.0009	<0.0009	<0.0009	<0.0009	<0.0009
CPT7	04/09/08	42	--	3.7	0.005	0.037	0.046	0.20	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT7	04/09/08	50.5	--	38	0.026	0.46	0.72	**3.3**	**<0.026**	--	<1.0	<0.051	<0.051	<0.051	<0.051	<0.051
CPT7	04/09/08	55	--	32	<0.026	0.52	0.83	**3.9**	**<0.026**	--	<1.0	<0.052	<0.052	<0.052	<0.052	<0.052
2001 KHM Vadose Zone Investigation																
GP-1	06/21/01	3.5	--	<1.0**	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-1	06/21/01	6.0	--	<1.0**	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-1	06/21/01	11.0	--	<1.0**	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-1	06/21/01	14.5	--	11**	<0.005	<0.005	<0.005	<0.010	<0.005	--	--	--	--	--	--	--
GP-3	06/21/01	3.5	--	<1.0**	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-3	06/21/01	7.0	--	<1.0**	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-3	06/21/01	10.5	--	<1.0**	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--

TABLE 2

SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPH*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*Naphthalene*	*TBA*	*DIPE*	*ETBE*	*TAME*	*1,2-DCA*	*EDB*
	ESL		← *Reported in milligrams per kilogram (mg/kg)* →													
Soil Leaching Screening Level (Drinking Water Sourse) Table G			***NE***	***83***	***0.044***	***2.9***	***3.3***	***2.3***	***0.023***	***3.4***	***0.075***	***NE***	***NE***	***NE***	***0.0045***	***0.0003***
Soil Direct Exposure Construction/Trench Worker Table K-3			***NE***	4200	12	650	210	420	2,800	130	320,000	***NE***	***NE***	***NE***	21	1.7
GP-4	06/21/01	3.5	--	<1.0**	<0.005	<0.005	<0.005	0.0097	<0.005	--	--	--	--	--	--	--
GP-4	06/21/01	6.0	--	<1.0**	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-4	06/21/01	14.0	--	27**	<0.005	<0.005	<0.005	<0.010	<0.005	--	--	--	--	--	--	--
1992 Weiss Extraction Well Installation																
B-1 (EW-1)	10/19/92	9.7	--	<1.0	<0.005*	<0.005*	<0.005*	<0.005*	--	--	--	--	--	--	--	--
B-1 (EW-1)	10/19/92	14.5	--	**1200**	**6.6***	**21***	**15***	**50***	--	--	--	--	--	--	--	--
B-1 (EW-1)	10/19/92	24.7	--	3	0.017*	0.051*	0.050*	0.21*	--	--	--	--	--	--	--	--
B-1 (EW-1)	10/19/92	29.5	--	<1.0	<0.005*	<0.005*	<0.005*	<0.005*	--	--	--	--	--	--	--	--
B-2 (VE-1/SP-1	10/20/92	14.5	--	**1000**	**7.1***	**22***	**13***	**56***	--	--	--	--	--	--	--	--
B-2 (VE-1/SP-1	10/20/92	16.7	--	**990**	**2.9***	**15***	**14***	**53***	--	--	--	--	--	--	--	--
B-2 (VE-1/SP-1	10/20/92	18.5	--	<1.0	0.007*	0.029*	<0.005*	<0.005*	--	--	--	--	--	--	--	--
1984-1989																
B3-15 (MW-A)	09/27/84	15	--	--	**27**	**86**	**190**	**310**	--	--	--	--	--	--	--	--
B4-15 (MW-B)	09/27/84	15	--	--	**0.15**	0.83	0.97	3.1	--	--	--	--	--	--	--	--
Bottom	06/26/85	--	3.2*	--	**0.58***	0.24*	0.40*	0.009*	--	--	--	--	--	--	--	--
North	06/26/85	--	1.4*	--	<0.001*	<0.001*	<0.001*	<0.001*	--	--	--	--	--	--	--	--
South	06/26/85	--	<0.01*	--	<0.001*	<0.001*	<0.001*	<0.001*	--	--	--	--	--	--	--	--
East	06/26/85	--	1.3*	--	0.02*	0.02*	0.01*	0.01*	--	--	--	--	--	--	--	--
West	06/26/85	--	<0.01*	--	<0.001	<0.001*	<0.001*	<0.001*	--	--	--	--	--	--	--	--

TABLE 2

SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPH*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*Naphthalene*	*TBA*	*DIPE*	*ETBE*	*TAME*	*1,2-DCA*	*EDB*
ESL			← *Reported in milligrams per kilogram (mg/kg)* →													
Soil Leaching Screening Level (Drinking Water Sourse) Table G			***NE***	***83***	***0.044***	***2.9***	***3.3***	***2.3***	***0.023***	***3.4***	***0.075***	***NE***	***NE***	***NE***	***0.0045***	***0.0003***
Soil Direct Exposure Construction/Trench Worker Table K-3			***NE***	4200	12	650	210	420	2,800	130	320,000	***NE***	***NE***	***NE***	21	1.7
MW-5C	11/11/86	14	--	2.1	0.030	0.025	--	0.070	--	--	--	--	--	--	--	--
MW-6B	11/11/86	10.5	--	<0.050	0.002	0.005	--	0.003	--	--	--	--	--	--	--	--
SB-1D	12/04/89	12.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
SB-1E	12/04/89	16	--	**1500**	**4**	**<3**	**19**	**24**	--	--	--	--	--	--	--	--
SB-1F	12/04/89	21	--	5	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
SB-1G	12/04/89	27	--	31	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
SB-1H	12/04/89	32	--	**310**	**1**	**5**	**<4**	**15**	--	--	--	--	--	--	--	--
SB-2A	12/05/89	9.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
SB-2C	12/05/89	14.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
SB-2D	12/05/89	19.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
MW7C	12/05/89	10.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
MW7D	12/05/89	14.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
MW7F	12/05/89	19.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
MW8C	12/05/89	10	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
MW8D	12/05/89	17.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--
MW8E	12/05/89	20.5	--	<1	**<1**	**<3**	**<4**	**<15**	--	--	--	--	--	--	--	--

TABLE 2

SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPH*	*TPHg*	*Benzene*	*Toluene*	*Ethyl-benzene*	*Total Xylenes*	*MTBE*	*Naphthalene*	*TBA*	*DIPE*	*ETBE*	*TAME*	*1,2-DCA*	*EDB*
	ESL		←						*Reported in milligrams per kilogram (mg/kg)*							→
Soil Leaching Screening Level (Drinking Water Sourse) Table G			***NE***	***83***	***0.044***	***2.9***	***3.3***	***2.3***	***0.023***	***3.4***	***0.075***	***NE***	***NE***	***NE***	***0.0045***	***0.0003***
Soil Direct Exposure Construction/Trench Worker Table K-3			***NE***	4200	12	650	210	420	2,800	130	320,000	***NE***	***NE***	***NE***	21	1.7

Notes:

Total petroleum hydrocarbons as fuel (TPH) analyzed by EPA method 8020 unless otherwise noted

Total petroleum hydrocarbons as gasoline (TPHg) analyzed by EPA method 8015B modified unless otherwise noted

Benzene, toluene, ethylbenzene, and xylenes (BTEX); methyl tertiary-butyl ether (MTBE); t-butyl alcohol (TBA); di-isopropyl ether (DIPE); ethyl tertiary-butyl ether (ETBE); t-amyl methyl ether (TAME); 1,2-dichloroethane (1,2-DCA); 1,2-dibromoethane (EDB) by EPA method 8260B unless otherwise noted

Environmental Screening Levels (ESLs) for commerical land use where groundwater is a current or potential drinking water source from*Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* presented by the California Regional Water Quality Control Board - San Francisco Bay Region Interim Final November 2007, revised May 2008.

NE = Not established

fbg = feet below grade

ND = Not detected above various laboratory method detection limits

* = Analyzed by EPA method 8020

**=TPHg analyzed by EPA method 8260B

<x = Not detected at reporting limit x

-- = Not analyzed/not applicable

TABLE 3

SUMMARY OF SOIL PHYSICAL PARAMETER RESULTS
930 SPRINGTOWN BLVD
LIVERMORE, CALIFORNIA

Sample Location:	***VP-5***	***VP-3***
Sample ID:	***VP-5-PHYS-5***	***VP-3-PHYS-10***
Sample Date:	***02/27/12***	***02/26/13***
Sample Depth (ft bgs):	***5***	***10***

Parameter	*Units*		
Wet Unit Weight	lb/ft^3	147.5	157
Dry Unit Weight	lb/ft^3	129.2	129.2
Mostiure Content	%	11.5	21.5
Specific Gravity	--	2.81	2.86
Porosity	--	0.25	0.28
Grain Size (mm)			
>3-inches	%	0.0	0.0
Coarse Gravel	%	12.1	0.0
Fine Gravel	%	16.2	0.3
Course Sand	%	6.7	0.3
Medium Sand	%	6.6	2.3
Fine Sand	%	27	44.4
Fines (Silts and Clays)	%	31.4	52.7

Notes:
ft bgs = feet below ground surface
lb/ft^3 = pounds per cubic foot
% = percent
mm = millimeters
- = unitless

APPENDIX A

REGULATORY CORRESPONDENCE

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Director

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

December 17, 2012

Ms. Roya Kambin
Chevron Environmental Management Company
6101 Bollinger Canyon Road, 5th Floor
San Ramon, CA 94583-5186
(Sent via E-mail to: RKLG@chevron.com)

Mr. Jose Rios
Environmental Services
7-Eleven, Inc.
One Arts Plaza, 1722 Routh St., Suite 1000
Dallas, TX 75201
(Sent via E-mail to: jose.rios@7-11.com)

Subject: Review of Addendum to Draft Feasibility Study and Corrective Action Plan for Fuel Leak Case No. RO0000189 and GeoTracker Global ID T0600101353, Chevron #21-1253/Texaco, 930 Springtown Boulevard, Livermore, CA 94550

Dear Ms. Kambin and Mr. Hilliard:

Alameda County Environmental Health (ACEH) staff has reviewed the fuel leak case file for the above-referenced site, including the documents entitled, "*Addendum to Draft Feasibility Study and Corrective Action Plan*," dated November 5, 2012 (FS/CAP) and "*Third Quarter 2012 Groundwater Monitoring and Sampling Report*," dated October 30, 2012. The FS/CAP, which was prepared on Chevron's behalf by Conestoga-Rovers & Associates, presents a brief synopsis of how the site conditions compare to criteria for the State Water Resources Control Board Low-Threat Closure Policy.

The FS/CAP proposes monitoring of well MW-14 on a quarterly basis, conducting a soil vapor investigation, the use of surfactant-enhanced LNAPL recovery if NAPL returns to well MW-14, and air sparging/soil vapor extraction if a vapor intrusion risk is evident. A Work Plan to conduct the soil vapor investigation is included in the FS/CAP. The proposed scope of work may be implemented as proposed. We request that you perform the proposed scope of work and send us the reports requested below.

TECHNICAL REPORT REQUEST

Please upload technical reports to the ACEH ftp site (Attention: Jerry Wickham), and to the State Water Resources Control Board's GeoTracker website according to the following schedule and file-naming convention:

- **April 17, 2013** – Soil Vapor Investigation Report
  File to be named: SWI_R_yyyy-mm-dd RO189

- **30 days following end of each quarter** – Groundwater Monitoring Reports
  File to be named: GWM_R_yyyy-mm-dd RO189

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

If you have any questions, please call me at 510-567-6791 or send me an electronic mail message at jerry.wickham@acgov.org. Online case files are available for review at the following website: http://www.acgov.org/aceh/index.htm.

Sincerely,

Jerry Wickham, California PG 3766, CEG 1177, and CHG 297
Senior Hazardous Materials Specialist

Attachment: Responsible Party(ies) Legal Requirements/Obligations

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Danielle Stefani, Livermore Pleasanton Fire Department, 3560 Nevada St, Pleasanton, CA 94566 (*Sent via E-mail to: dstefani@lpfire.org*)

Colleen Winey (QIC 8021), Zone 7 Water Agency, 100 North Canyons Pkwy, Livermore, CA 94551 (*Sent via E-mail to: cwiney@zone7water.com*)

Tina Hariu, Conestoga-Rovers & Associates, 5900 Hollis Street, Suite A, Emeryville, CA 94608 (*Sent via E-mail to: thariu@craworld.com*)

Donna Drogos, ACEH (*Sent via E-mail to: donna.drogos@acgov.org*)
Jerry Wickham, ACEH (*Sent via E-mail to: jerry.wickham@acgov.org*)

GeoTracker, eFile

Attachment 1

Responsible Party(ies) Legal Requirements/Obligations

REPORT/DATA REQUESTS

These reports/data are being requested pursuant to Division 7 of the California Water Code (Water Quality), Chapter 6.7 of Division 20 of the California Health and Safety Code (Underground Storage of Hazardous Substances), and Chapter 16 of Division 3 of Title 23 of the California Code of Regulations (Underground Storage Tank Regulations).

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (Local Oversight Program [LOP] for unauthorized releases from petroleum Underground Storage Tanks [USTs], and Site Cleanup Program [SCP] for unauthorized releases of non-petroleum hazardous substances) require submission of reports in electronic format pursuant to Chapter 3 of Division 7, Sections 13195 and 13197.5 of the California Water Code, and Chapter 30, Articles 1 and 2, Sections 3890 to 3895 of Division 3 of Title 23 of the California Code of Regulations (23 CCR). Instructions for submission of electronic documents to the ACEH FTP site are provided on the attached "Electronic Report Upload Instructions."

Submission of reports to the ACEH FTP site is in addition to requirements for electronic submittal of information (ESI) to the State Water Resources Control Board's (SWRCB) Geotracker website. In April 2001, the SWRCB adopted 23 CCR, Division 3, Chapter 16, Article 12, Sections 2729 and 2729.1 (Electronic Submission of Laboratory Data for UST Reports). Article 12 required electronic submittal of analytical laboratory data submitted in a report to a regulatory agency (effective September 1, 2001), and surveyed locations (latitude, longitude and elevation) of groundwater monitoring wells (effective January 1, 2002) in Electronic Deliverable Format (EDF) to Geotracker. Article 12 was subsequently repealed in 2004 and replaced with Article 30 (Electronic Submittal of Information) which expanded the ESI requirements to include electronic submittal of any report or data required by a regulatory agency from a cleanup site. The expanded ESI submittal requirements for petroleum UST sites subject to the requirements of 23 CCR, Division, 3, Chapter 16, Article 11, became effective December 16, 2004. All other electronic submittals required pursuant to Chapter 30 became effective January 1, 2005. Please visit the SWRCB website for more information on these requirements. (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/)

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "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." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 7835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, late reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

Alameda County Environmental Cleanup Oversight Programs (LOP and SCP)	**REVISION DATE:** July 25, 2012
	ISSUE DATE: July 5, 2005
	PREVIOUS REVISIONS: October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010
SECTION: Miscellaneous Administrative Topics & Procedures	**SUBJECT:** Electronic Report Upload (ftp) Instructions

The Alameda County Environmental Cleanup Oversight Programs (petroleum UST and SCP) require submission of all reports in electronic form to the county's FTP site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

REQUIREMENTS

- **Please do not submit reports as attachments to electronic mail.**
- Entire report including cover letter must be submitted to the ftp site as **a single Portable Document Format (PDF) with no password protection**.
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- **Signature pages and perjury statements must be included and have either original or electronic signature.**
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:

  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

Submission Instructions

1) Obtain User Name and Password
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to .loptoxic@acgov.org
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for**.

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ://alcoftp1.acgov.org
      (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site as they are NOT being supported at this time.
   b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to .loptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
   d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

APPENDIX B

PREVIOUS ENVIRONMENTAL INVESTIGATIONS

PREVIOUS ENVIRONMENTAL INVESTIGATION AND REMEDIATION
FORMER TEXACO 211253
930 SPRINGTOWN BOULEVARD, LIVERMORE, CALIFORNIA

1984 Initial Investigation

In September 1984, J.H. Kleinfelder and Associates (Kleinfelder) discovered approximately 1-inch of light non-aqueous phase liquid (LNAPL) adjacent to the underground storage tanks (USTs) during an initial investigation. It appears that Kleinfelder installed monitoring wells MW-A and MW-B in September 1984. No additional information was located by CRA.

1985 Hydrocarbon Investigation and UST/Product Line Removal

In May through July 1985, Groundwater Technology Incorporated (GTI) installed monitoring wells MW-1 through MW-3 around the UST pit to assess the extent of hydrocarbons detected by Kleinfelder. On June 26, 1985, GTI collected soil samples beneath the USTs and product lines during the decommissioning of the Texaco station including UST and product line removal. GTI conducted a ½-mile well survey through the Alameda Flood Control and Water Conservation District. Eight wells were identified north, east, and south of the site. Additional information is available in GTI's August 1985 *Hydrocarbon Investigation Report*.

1985 Monitoring Well Installation

In September 1985, GTI installed well MW-4. Additional information is available in GTI's September 17, 1985 Untitled Report.

1986 Monitoring Well Installation

In November 1986, GTI installed wells MW-5 and MW-6. Additional information is available in GTI's March 23, 1987 *Status Report*.

1989 Additional Site Assessment

In December 1989, GTI advanced soil borings SB-1 and SB-2 and installed monitoring wells MW-7 and MW-8. More information available in GTI's April 10, 1990 *Report of Additional Environmental Site Assessment.*

1991 Soil Vapor Extraction (SVE) Pilot Test

In July 1991, GTI conducted a SVE pilot test. The radius of vacuum influence was calculated as less than 30 feet. At a flow rate of 100 cubic feet per minute, the hydrocarbon removal rate from MW-5 was calculated to be 135 pounds/day. More information is available in GTI's September 12, 1991 *Work Plan for Soil and Groundwater Remediation*.

1993 Extraction Well Installation and Feasibility Testing

In October 1992, Weiss Associates (WA) installed groundwater extraction well EW-1, vapor extraction well VE-1, and air sparge well SP-1. In November 1992, WA conducted a 24 hour aquifer test using EW-1. Groundwater was extracted at an average flow rate of 7.85 gallons per minute (gpm). The average aquifer transmissivity was estimated to be 3,400 gallons per day per foot. Although most of the monitoring wells are screened over a length of 20 feet, boring logs indicate that the more permeable, sandy gravel zone is 15 feet thick. Using this thickness, an average hydraulic conductivity value of 225 gpd/ft^2 (0.021 ft/min), and a specific storage of 0.001 ft^{-1} are estimated for this aquifer. WA also conducted a vapor extraction test on vapor extraction well VE-1, groundwater extraction well EW-1, and existing monitoring wells MW-A, MW-B and MW-5. The hydrocarbon mass removal rate ranged between 0.3 and 127 pounds/day total petroleum hydrocarbons as gasoline. WA conducted an air sparging test from the air sparge well SP-1 and vapor extraction wells VE-1, and concluded that air sparging with vapor extraction would effectively remove hydrocarbons from saturated sediments. Additional information is available in WA's January 5, 1993 *Extraction Well Installation and Feasibility Testing.*

1994 Remediation System Start-Up

In November 1994, GTI started operation of a 100 cfm King Buck/Hasstech MMC-5a catalytic oxidizer SVE\Air Sparge system. The system was connected to wells MW-A, MW-B, MW-3, MW-5, VE-1, and SP-1. The system operated intermittently through August 1995, when it was shutdown due low hydrocarbon removal rates. Additional information including system diagrams, startup testing, sampling activities and laboratory analytical data are available in GTI's March 10, 1995 *Remediation System Start-up/Air Monitoring and Sampling Report.*

1996 Well Destruction Report

In February 1996, Kaprealian Engineering Incorporated (KEI) destroyed wells MW-6 and MW-7. Additional information is available in KEI's January 22, 1996 *Report of Destruction of Monitoring Wells.*

1997 Tier 2 Risk Based Corrective Action Analysis

In December 1997, KEI submitted a summary of the input parameters to be used for a subsequent Tier 2 Risk-Based Corrective Action (RBCA) analysis, including subsurface soil and groundwater sample analytic results. KEI modeled BTEX concentrations and concluded no onsite Site-Specific Target Levels were exceeded for any of the pathways modeled. Additional information available in KEI's October 31, 1997 *Risk-Based Corrective Action Analysis*.

2001 RBCA Vadose Zone Investigation and RBCA Analysis

In August 2001, KHM Environmental Management (KHM) submitted an addendum to the previous RBCA in response to an ACEH email requesting an evaluation of risk to a "Residential Setting" and risk associated with potential vapor intrusion to the onsite building. In June 2001, KHM advanced geoprobe borings GP-1 through GP-4. Borings GP-1 and GP-3 were advanced adjacent to groundwater monitoring wells with the highest hydrocarbon concentrations (MW-A and MW-B), GP-2 was advanced outside of the UST complex area, and GP-4 was advanced on the east side of the former UST complex. Borings GP-1, GP-3, and GP-4 were first advanced to 3 fbg for collection of a vadose zone soil gas samples, then advanced to first encountered groundwater at approximately 15 fbg. KHM concluded the only potential pathway of exposure for a residential setting was vapor intrusion; however because no benzene was detected in vadose zone soil gas, there was no risk to human health or the environment. Additional information is available in KHM's August 13, 2001 *Vadose Zone Investigation and Risk-Based Correction Action (RBCA) Analysis.*

2001 Closure Request

In December 2001, KHM submitted a case closure request under the direction of ACEH. KHM concluded all hydrocarbon sources had been removed, the SVE system adequately removed hydrocarbons from the vadose zone, the dissolved hydrocarbons were defined and limited in extent, and no sensitive receptors were at risk. Additional information is available in KHM's December 10, 2001 letter requesting closure.

2002 Case Closure

ACEH's March 2002 letter stated the Regional Water Quality Control Board (RWQCB) concurred with ACEH's recommendation for case closure, and all wells must be destroyed prior to issuing a "Remedial Action Completion" letter.

2002 Well Destruction

In December 2002, KHM destroyed onsite and offsite wells MW-1 through MW-5, MW-A, MW-B, EW-1, VE-1, and SP-1 by pressure grouting. Additional information is available in KHM's January 7, 2003 *Well Destructions – MW-1 through MW-5, MW-8, MW-A, MW-B, EW-1, VE-1 and SP-1.*

2007/2008 Subsurface Investigation

By January 2007, no "Remedial Action Completion" letter had been issued by ACEH or the RWQCB. In a letter dated January 31, 2007, ACEH requested horizontal and vertical delineation of the hydrocarbon plume, preferential pathway evaluation, and well decommissioning documentation. In 2007 and 2008, to address the ACEH's technical comments and re-evaluate the site for closure, Conestoga-Rovers & Associates (CRA) advanced cone penetration testing

(CPT) borings CPT1 through CPT7 both on and offsite. Additional information is available in CRA's August 13, 2008 *Subsurface Investigation Report.*

2009 Altamont Pipeline Excavation

In 2009, the Zone 7 water agency installed the Altamont pipeline along the northern boundary of the site property. According to conversations with the water agency, an excavation approximately 6 feet wide by 15 feet deep was advanced removing approximately 240 cubic yards of soil. According to the water agency, no further details regarding this excavation are available.

2009 Monitoring Well Installation

In July 2009, CRA installed monitoring wells MW-9 through MW-16 to delineate dissolved hydrocarbon concentrations. The monitoring wells were installed at three different levels: shallow wells MW-9, MW-11, and MW-14, intermediate wells MW-10, MW-12, MW-13, and MW-16, and deep well MW-15. Additional information is available in CRA's August 19, 2009 *Monitoring Well Installation Report.*

2012 Monitoring Well Installation

In January 2012, CRA installed onsite monitoring wells MW-17, MW-18, MW-19, and MW-20. The offsite monitoring well, proposed in the sidewalk on the south side of Springtown Boulevard, could not be installed. During borehole clearance, pea gravel was encountered at 4.5 fbg which likely indicated the presence of an underground utility, and the well could not be safely installed. There was no alternative location due to the adjacent Altamont Pipeline and electrical utilities in the surrounding area. CRA also conducted a preferential pathway study and an onsite geophysical survey to search for a potential secondary onsite source. No UST that could be a secondary source was identified beneath the site during the geophysical survey. It does not appear any underground utilities are acting as preferential pathways for offsite hydrocarbon migration. Details are available in CRA's March 22, 2012 *Subsurface Investigation Report.*

APPENDIX C

ZONE 7 WATER AGENCY DRILLING PERMIT

ZONE 7 WATER AGENCY

100 NORTH CANYONS PARKWAY, LIVERMORE, CALIFORNIA 94551 VOICE (925) 454-5000 FAX (925) 245-9306
E-MAIL whong@zone7water.com

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 930 Springtown Blvd. Livermore, CA 94551

Coordinates Source _____ ft. Accuracy _____ ft.
LAT: _____ ft. LONG: _____ ft.
APN 099-0023-004

CLIENT
Name Chevron Environmental Management Company
Address _____ Phone _____
City _____ Zip _____

APPLICANT
Name Conestoga-Rovers & Associates
Email bsandoval@craworldwide.com Fax 916-899-9999
Address 10969 Trade Center Dr. Suite 107 Phone 916-899-9700
City Rancho Cordova Zip 95670

TYPE OF PROJECT:

Well Construction	__	Geotechnical Investigation	__
Well Destruction	__	Contamination Investigation	__
Cathodic Protection	__	Other Soil Vapor Monitoring Well	

PROPOSED WELL USE:

Domestic	__	Irrigation	__
Municipal	__	Remediation	__
Industrial	__	Groundwater Monitoring	__
Dewatering	__	Other Hand auger	__

DRILLING METHOD:

Mud Rotary	__	Air Rotary	__	Hollow Stem Auger	__
Cable Tool	__	Direct Push	__	Other _____	__

DRILLING COMPANY Vapor Tech Services

DRILLER'S LICENSE NO. C-57 916085

WELL SPECIFICATIONS:
Drill Hole Diameter 3 in. Maximum
Casing Diameter 1 in. Depth 10 ft.
Surface Seal Depth _____ ft. Number 5

SOIL BORINGS:
Number of Borings 5 Maximum
Hole Diameter 3 in. Depth 10 ft.

ESTIMATED STARTING DATE 01-26-13 02
ESTIMATED COMPLETION DATE 01-27-13 02

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

APPLICANT'S SIGNATURE _____ Date 1-15-13

ATTACH SITE PLAN OR SKETCH

FOR OFFICE USE

PERMIT NUMBER 2013016
WELL NUMBER 3S/2E-3G27 to 3S/2E-3G31
APN 99-0023-004-00

PERMIT CONDITIONS
(Circled Permit Requirements Apply)

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to your proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report (DWR Form 188), signed by the driller.
3. Permit is void if project not begun within 90 days of approval date.
4. Notify Zone 7 at least 24 hours before the start of work.

B. WATER SUPPLY WELLS
1. Minimum surface seal diameter is four inches greater than the well casing diameter.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
3. Grout placed by tremie.
4. An access port at least 0.5 inches in diameter is required on the wellhead for water level measurements.
5. A sample port is required on the discharge pipe near the wellhead.

(C.) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal diameter is four inches greater than the well or piezometer casing diameter.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.
3. Grout placed by tremie.

D. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

F. WELL DESTRUCTION. See attached.

(G.) SPECIAL CONDITIONS. Submit to Zone 7 within 60 days after completion of permitted work the well installation report including all soil and water laboratory analysis results.

Approved Wyman Hong Date 2/11/13
Wyman Hong

Revised: January 4, 2010

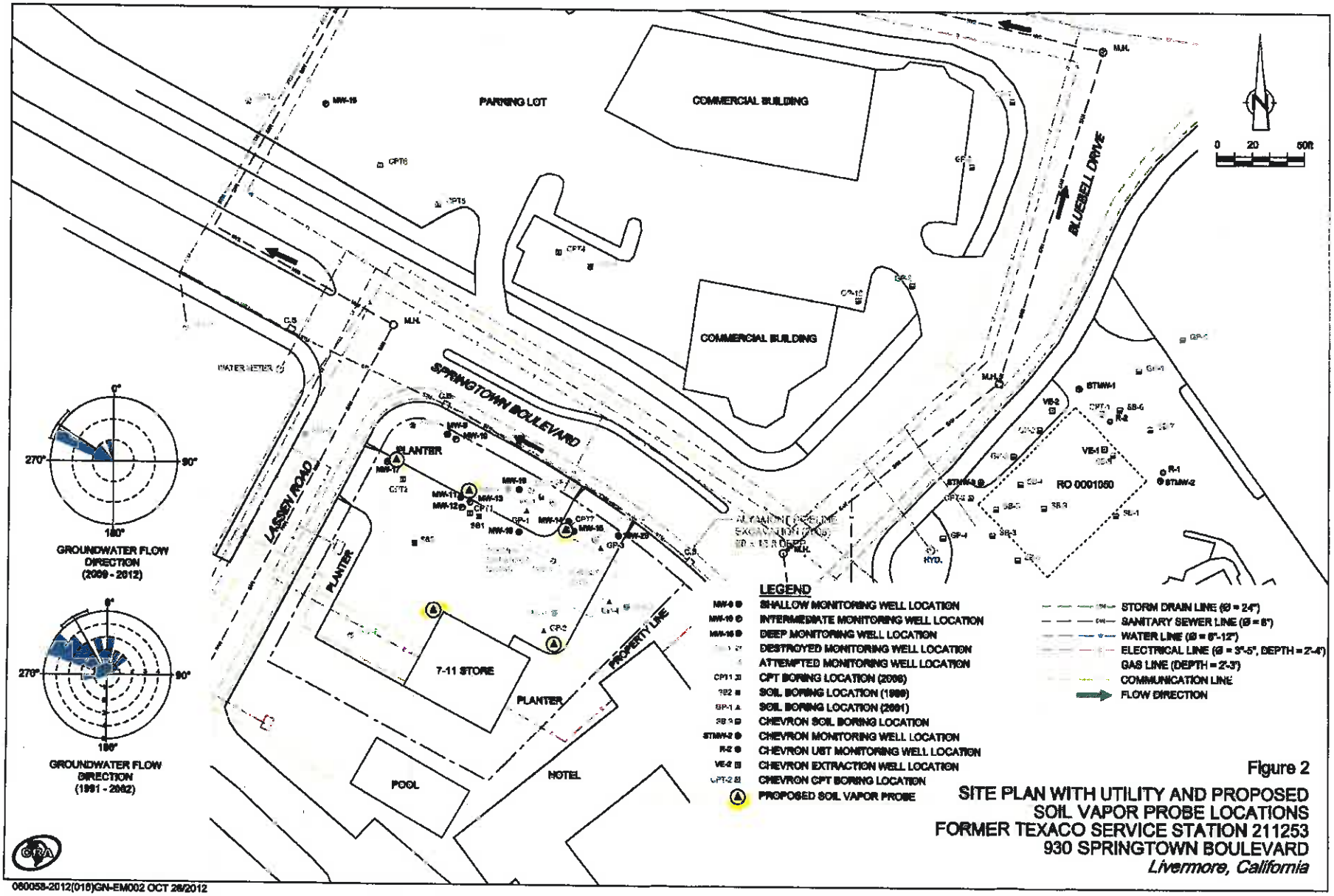

Figure 2

SITE PLAN WITH UTILITY AND PROPOSED SOIL VAPOR PROBE LOCATIONS
FORMER TEXACO SERVICE STATION 211253
930 SPRINGTOWN BOULEVARD
Livermore, California

080058-2012(018)GN-EM002 OCT 26/2012

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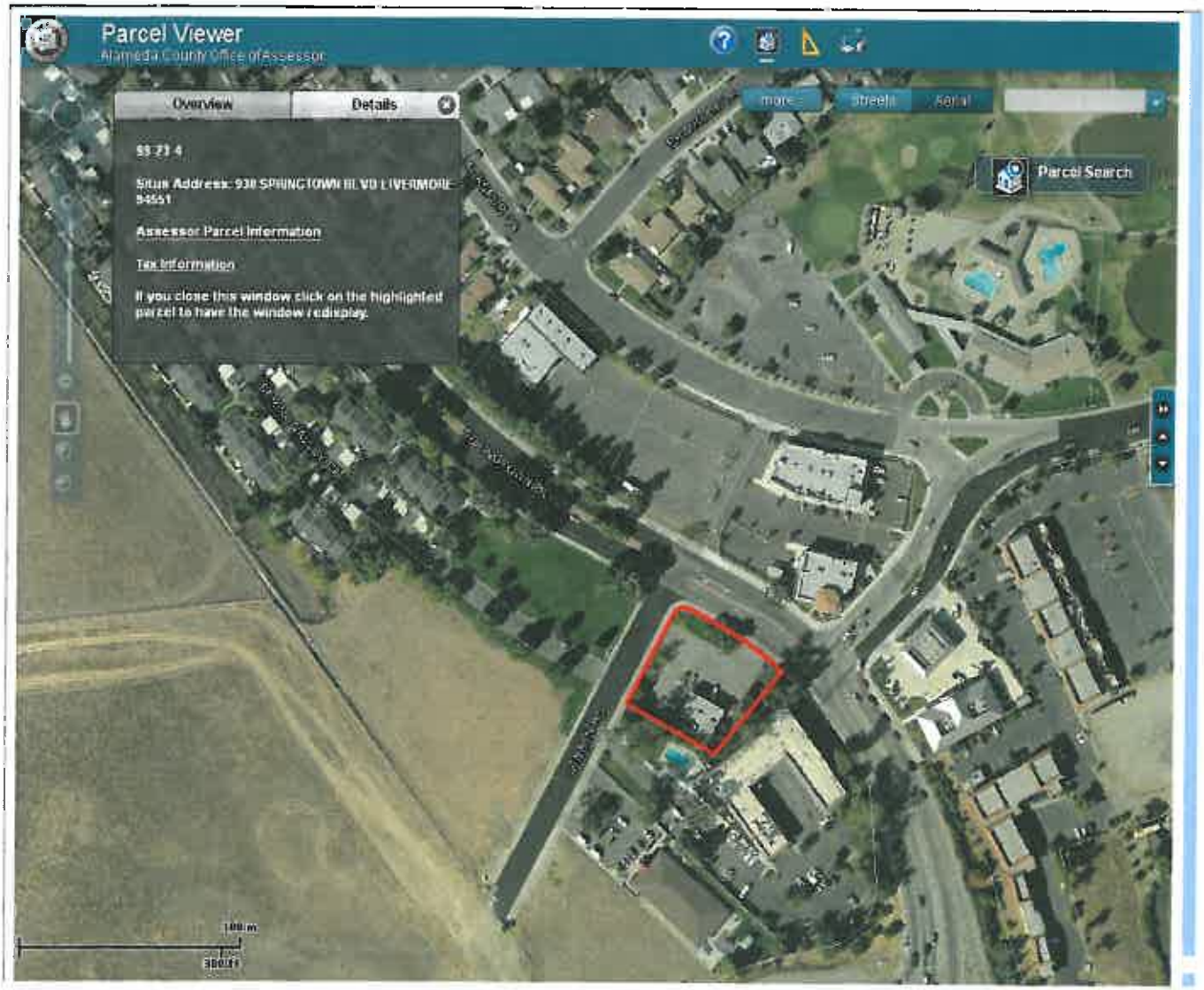

APPENDIX D

VAPOR WELL BORING LOGS AND WELL CONSTRUCTION DIAGRAMS

Conestoga-Rovers & Associates
10969 Trade Center Drive, Suite 107
Rancho Cordova, CA
Telephone: 916-889-8900
Fax: 916-889-8999

BORING/WELL LOG

CLIENT NAME	Chevron Environmental Management Co.	**BORING/WELL NAME**	VP-1
JOB/SITE NAME	Former Texaco Service Station 211253	**DRILLING STARTED**	26-Feb-13
LOCATION	930 Springtown Blvd, Livermore, CA	**DRILLING COMPLETED**	26-Feb-13
PROJECT NUMBER	060058	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vapor Tech Services	**GROUND SURFACE ELEVATION**	Not Surveyed
DRILLING METHOD	Hand-Auger	**TOP OF CASING ELEVATION**	Not Surveyed
BORING DIAMETER	3.25"	**SCREENED INTERVAL**	NA
LOGGED BY	W. Martinez	**DEPTH TO WATER (First Encountered)**	NA
REVIEWED BY		**DEPTH TO WATER (Static)**	NA
REMARKS			

PID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (fbg)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (fbg)	WELL DIAGRAM
				0			Top Soil		Traffic rated well vault set in concrete
							Fill: Clay with silt; reddish brown; moist; high plasticity; trace gravel	0.5	Portland Type I/II
				1					
				2					
				3				3.0	
0.0							**Clayey silt:** Medium stiff; fine sands; light reddish brown; moist; medium plasticity		Bentonite Seal
				4			@ 4 fbg color change to pale red		
0.0		VP-1- 5		5				5.0	Monterey Sand #2/12
									6" Stainless Steel Vapor Probe
				6			@ 6 fbg decreasing sand; low plasticity		Bentonite Seal
								6.5	
				7	ML				Portland Type I/II
0.0									
				8			@ 8 fbg soft; decreasing clays; trace gravel; color change to light reddish brown	8.1	Bentonite Seal
				9			@ 9 fbg color change to very pale brown; organic black veins	9.1	
0.0		VP-1- 10		10					6" Stainless Steel Vapor Probe
								10.5	Bottom of Boring @ 10.5 fbg

WELL LOG (PID) I:\PROJECT FILES\6-CHAR\06---\0600--\060058\060058-GINT\060058-BORING LOGS-VP1-VP5.GPJ DEFAULT.GDT 5/14/13

Conestoga-Rovers & Associates
10969 Trade Center Drive, Suite 107
Rancho Cordova, CA
Telephone: 916-889-8900
Fax: 916-889-8999

BORING/WELL LOG

CLIENT NAME	Chevron Environmental Management Co.	**BORING/WELL NAME**	VP-2
JOB/SITE NAME	Former Texaco Service Station 211253	**DRILLING STARTED**	26-Feb-13
LOCATION	930 Springtown Blvd, Livermore, CA	**DRILLING COMPLETED**	26-Feb-13
PROJECT NUMBER	060058	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vapor Tech Services	**GROUND SURFACE ELEVATION**	Not Surveyed
DRILLING METHOD	Hand-Auger	**TOP OF CASING ELEVATION**	Not Surveyed
BORING DIAMETER	3.25"	**SCREENED INTERVAL**	NA
LOGGED BY	B. Sandor	**DEPTH TO WATER (First Encountered)**	NA
REVIEWED BY		**DEPTH TO WATER (Static)**	NA
REMARKS			

PID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (fbg)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (fbg)	WELL DIAGRAM
				0			Grass and top soil		Traffic rated well vault set in concrete
							Fill: silty clay with gravel; reddish brown; moist; medium plasticity	0.5	Portland Type I/II
				1					
				2					
							Silt with Fine gravel: soft; light reddish brown; dry; low plasticity	2.5	Bentonite Seal
				3					
				4					
0.0		VP-2- 5		5	ML				Monterey Sand #2/12
									6" Stainless Steel Vapor Probe
				6			@ 6 fbg increasing fine sand; decreasing fine gravel; color change to light brown; moist; medium plasticity	6.1	Bentonite Seal
				7					Portland Type I/II
							Silty Clay: medium Stiff; brown; moist; medium plasticity	8.0	Bentonite Seal
				8					
				9	CL				
0.0		VP-2- 10		10			@ 10 fbg increasing silts with depth	10.0	6" Stainless Steel Vapor Probe
								10.5	Bottom of Boring @ 10.5 fbg

WELL LOG (PID) I:\PROJECT FILES\6-CHAR\06---\0600--\060058\060058-GINT\060058-BORING LOGS-VP1-VP5.GPJ DEFAULT.GDT 5/14/13

Conestoga-Rovers & Associates
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Rancho Cordova, CA
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Fax: 916-889-8999

BORING/WELL LOG

CLIENT NAME	Chevron Environmental Management Co.	**BORING/WELL NAME**	VP-3
JOB/SITE NAME	Former Texaco Service Station 211253	**DRILLING STARTED**	26-Feb-13
LOCATION	930 Springtown Blvd, Livermore, CA	**DRILLING COMPLETED**	26-Feb-13
PROJECT NUMBER	060058	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vapor Tech Services	**GROUND SURFACE ELEVATION**	Not Surveyed
DRILLING METHOD	Hand-Auger	**TOP OF CASING ELEVATION**	Not Surveyed
BORING DIAMETER	3.25"	**SCREENED INTERVAL**	NA
LOGGED BY	W. Martinez	**DEPTH TO WATER (First Encountered)**	NA
REVIEWED BY		**DEPTH TO WATER (Static)**	NA
REMARKS			

PID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (fbg)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (fbg)	WELL DIAGRAM
							Asphalt	0.3	Traffic rated well vault set in concrete
50.1				1			**Fill:** sandy gravel; brown; moist; loose; dark discoloration	1.5	Portland Type I/II
				2			**Silty sand:** soft; fine sand; trace fine gravel; light reddish brown; dry		
				3	SM				Bentonite Seal
1.1				4			**Clayey sand:** medium stiff; pale red; damp; low plasticity	4.0	
0.0		VP-3- 5		5			@ 5 fbg Increase clay; moist	5.1	Monterey Sand #2/12 6" Stainless Steel Vapor Probe
				6					Bentonite Seal
					ML				
0.0				7			@ 7 fbg decrease clay; very soft; color change to light reddish brown	7.1	Portland Type I/II
				8			@ 8 fbg black veins	8.1	Bentonite Seal
				9			**Sand with silt:** dense; fine sand; pinkish gray; moist	9.0	
		VP-3-PHYS-10			SM				
1.4		VP-3- 10		10				10.0	6" Stainless Steel Vapor Probe
					ML		**Silt with sand:** soft; fine sand; pinkish gray; moist; low plasticity; organic black veins	10.5	Bottom of Boring @ 10.5 fbg

WELL LOG (PID) I:\PROJECT FILES\6-CHAR\06---\0600--\060058\060058-GINT\060058-BORING LOGS-VP1-VP5.GPJ DEFAULT.GDT 5/14/13

Conestoga-Rovers & Associates
10969 Trade Center Drive, Suite 107
Rancho Cordova, CA
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Fax: 916-889-8999

BORING/WELL LOG

CLIENT NAME	Chevron Environmental Management Co.	**BORING/WELL NAME**	VP-4
JOB/SITE NAME	Former Texaco Service Station 211253	**DRILLING STARTED**	27-Feb-13
LOCATION	930 Springtown Blvd, Livermore, CA	**DRILLING COMPLETED**	27-Feb-13
PROJECT NUMBER	060058	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vapor Tech Services	**GROUND SURFACE ELEVATION**	Not Surveyed
DRILLING METHOD	Hand-Auger	**TOP OF CASING ELEVATION**	Not Surveyed
BORING DIAMETER	3.25"	**SCREENED INTERVAL**	NA
LOGGED BY	B. Sandor	**DEPTH TO WATER (First Encountered)**	NA
REVIEWED BY		**DEPTH TO WATER (Static)**	NA
REMARKS			

PID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (fbg)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (fbg)	WELL DIAGRAM
				0			Asphalt	0.3	Traffic rated well vault set in concrete
							Fill: gravel with little sand; reddish brown; moist		Portland Type I/II
				1					
				2			@ 2 fbg decreasing gravel, increasing silt with depth	2.1	
								2.5	
				3			**Clayey silt:** soft; little fine sand; reddish brown; moist; medium plasticity		Bentonite Seal
				4					
0.0		VP-4- 5		5					Monterey Sand #2/12
									6" Stainless Steel Vapor Probe
				6			@ 6 fbg predominatly silt; very pale brown	6.1	Bentonite Seal
					ML				Portland Type I/II
				7					
				8					Bentonite Seal
							@ 8.5 fbg trace coarse gravel	8.6	
				9					
0.0		VP-4- 10		10					6" Stainless Steel Vapor Probe
								10.5	Bottom of Boring @ 10.5 fbg

WELL LOG (PID) I:\PROJECT FILES\6-CHAR\06---\0600--\060058\060058-GINT\060058-BORING LOGS-VP1-VP5.GPJ DEFAULT.GDT 5/14/13

Conestoga-Rovers & Associates
10969 Trade Center Drive, Suite 107
Rancho Cordova, CA
Telephone: 916-889-8900
Fax: 916-889-8999

BORING/WELL LOG

CLIENT NAME	Chevron Environmental Management Co.	**BORING/WELL NAME**	VP-5
JOB/SITE NAME	Former Texaco Service Station 211253	**DRILLING STARTED**	27-Feb-13
LOCATION	930 Springtown Blvd, Livermore, CA	**DRILLING COMPLETED**	27-Feb-13
PROJECT NUMBER	060058	**WELL DEVELOPMENT DATE (YIELD)**	NA
DRILLER	Vapor Tech Services	**GROUND SURFACE ELEVATION**	Not Surveyed
DRILLING METHOD	Hand-Auger	**TOP OF CASING ELEVATION**	Not Surveyed
BORING DIAMETER	3.25"	**SCREENED INTERVAL**	NA
LOGGED BY	W. Martinez	**DEPTH TO WATER (First Encountered)**	NA
REVIEWED BY		**DEPTH TO WATER (Static)**	NA
REMARKS			

PID (ppm)	BLOW COUNTS	SAMPLE ID	EXTENT	DEPTH (fbg)	U.S.C.S.	GRAPHIC LOG	LITHOLOGIC DESCRIPTION	CONTACT DEPTH (fbg)	WELL DIAGRAM
							Asphalt	0.3	Traffic rated well vault set in concrete
							Fill: clayey silt; reddish brown; moist; low plasticity @ 4 inches below grade coarse gravel with sand; no plasticity	0.5	Portland Type I/II
				1					
				2					
				3				3.0	Bentonite Seal
					ML		**Silt:** soft; trace fine sand; very pale brown; moist; low plasticity		
				4					
0.0		VP-5-PHYS-5							Monterey Sand #2/12
0.0		VP-5- 5		5			**Sandwith gravel:** loose sand (80% fine, 20% medium); gravel (60% fine, 40% coarse) trace silt; very pale brown; moist	4.7	6" Stainless Steel Vapor Probe
				6					Bentonite Seal
				7	SP				Portland Type I/II
							@ 7.5 fbg decrease in fine gravel, increase in cobbles with depth		Bentonite Seal
				8			@ 8.5 fbg increase cobbles		
0.0		VP-5- 9		9					6" Stainless Steel Vapor Probe
								9.6	Bottom of Boring @ 9.6 fbg

WELL LOG (PID) I:\PROJECT FILES\6-CHAR\06---\0600--\060058\060058-GINT\060058-BORING LOGS-VP1-VP5.GPJ DEFAULT.GDT 5/14/13

APPENDIX E

SOIL VAPOR SMPLING DATA SHEETS

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-1-5 Date: 3-13-13

Job/Site Name: 211253 Technician: W. Martinez / B Sandor

Project No. 060058 PM: Brian Silva

Site Address: 930 Springtown Blvd. Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
1346	25.2	outer	- Passed 10 min leak test
	23.9	inner	- Passed 10 min leak test

Purge Volume

Calculated Purge Volume: 111.4 ml

Time	Flow	Volume	PID Reading
1350	150 ml/min	111.4 ml	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: 34325

Summa Canister Size: 6L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
1354	-28	1507	-3 in/Hg

Notes: Helium meter malfunctioned, in order to maintain at least 10% Helium concentration we adjusted the out put on the helium tank to such a level that we were sure to have more then 10%.

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-1-10 Date: 3-13-13

Job/Site Name: 21253 Technician: W. Martinez / B. Sandor

Project No. 060058 PM: Brian Silva

Site Address: 930 Springtown Blvd. Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
1346	~~outer~~ 25.5	outer	-Passed 10 min leak test
	26.0	inner	-Passed 10 min leak test

Purge Volume

Calculated Purge Volume: 178 mL

Time	Flow	Volume	PID Reading
1356	150 ml/min	178 mL	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: ~~34323~~ 34323

Summa Canister Size: 6 L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
1358	-29.5	1445	-4.5 in/Hg

Notes: Helium meter malfunctioned, in order to maintain at least 10% Helium concentration we adjusted the output on the helium tank to such a level that we were sure to have more than 10%

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-2-5 Date: 3/13/13

Job/Site Name: 211253 Technician: William Martinez / B. Sandor

Project No. 060058 PM: Brian Silva

Site Address: 930 Springtown blvd, Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
1109	-26.2 in/Hg	outer	-Passed 10min leak test
	-26.5 in/Hg	inner	-Passed 10min leak test

Purge Volume

Calculated Purge Volume: 111.4 mL (45 sec)

Time	Flow	Volume	PID Reading
1121	150 ml/min	111.4mL	N/A

Sample Collection

Flow Control Orifice Setting: 5 Summa Canister ID: 5676

Summa Canister Size: 5 6L Analysis:

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
1132	-30 in/Hg	102	-5 in Hg

Notes: Dup1 Sample taken Same time (location) as VP-2-5

Initial pressure is -30 in/Hg.

100,000 ppm of Helium was maintained during sampling

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-2-10 Date: 3/13/13

Job/Site Name: 21253 Technician: B. Sandor / M. Martinez

Project No. 060058 PM: Brian Silva

Site Address: 930 Springtown Blvd Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
1109	-25 in/Hg	outer	- Passed leak test
	-26.9 in/Hg	inner	- Passed leak test

Purge Volume

Calculated Purge Volume: 178 mL (7 / sec)

Time	Flow	Volume	PID Reading
1121	150 mL/min	178 mL	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: 34034

Summa Canister Size: 6L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
1132	-30 in/Hg	1212	-5 in/Hg

Notes:

100,000 ppm of Helium was maintained during sampling

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-3-5 Date: 3/13/13

Job/Site Name: 21125 Technician: B. Sandor / W. Martinez

Project No. 060058 PM: Brian Silva

Site Address: 930 Spring town blvd, Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
0910	-26.5 in/Hg	Outer	- Passed 10 min leak test
	-27.4 in/Hg	Inner	- Passed 10 min leak test.

Purge Volume

Calculated Purge Volume: 111.4 mL

Time	Flow	Volume	PID Reading
0920	150 mL/L	111.4 L	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: 33984

Summa Canister Size: 6 L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
0929	-29	1019	-4 in Hg

Notes:

100,000 PPM of Helium was maintained during Sampling

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-3-10 Date: 3/13/13

Job/Site Name: 211253 Technician: B. Sandor / W. Martinez

Project No. ~~211253-06058~~ PM: Brian Silva

Site Address: 930 Springtown Blvd, Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
0910	-27.0 in/Hg	Outer	-Passed 10 min leak test
	-27.0 in/Hg	inner	-Passed 10 min leak test

Purge Volume

Calculated Purge Volume: 178mL

Time	Flow	Volume	PID Reading
0920	150 mL/L	178mL	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: 34246

Summa Canister Size: 6L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
0929	~ -19 in Hg	1019	-5 in Hg

Notes:

100000 PPM of Helium was maintained during sampling

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-4-10 Date: 3/12/13

Job/Site Name: 211253 Technician: William Martinez / Boyan Sandov

Project No. 060058 PM: Brian Silva

Site Address: 930 Springtown blvd, Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
1417	-29.5 in/Hg	Outer	-Fail - try again
	-30.0 in/Hg	inner	-Fail - try again
1440	-30.0 in/Hg	outer	-Pass 10min leak test
	-27 in/Hg	inner	-Pass 10min leak test

Purge Volume

Calculated Purge Volume: 178mL 1min 11sec.

Time	Flow	Volume	PID Reading
1500	150 mL/min	178mL	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: 24486

Summa Canister Size: 6L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
1529	28.5	1614	-3.5 in/Hg

Notes:

10000 ppm of Helium was maintained during Sampling

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-4-5~~3~~ Date: 3/12/13

Job/Site Name: 211253 Technician: William Martinez / Bryan Sander

Project No. 060058 PM: Brian Silva

Site Address: 930 Springtown blvd Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
1417	-29.6 in/Hg	Outer	-Fail - try again
	-28.0 in/Hg	inner	-Fail - Try again
1440	-30.0 in/Hg	Outer	-Fail - replace train / Summa
	-28.9 in/Hg	inner	-Fail - replace train/Summa
1514 (13855)	~~-~~ 25.9 in/Hg	Outer	- Passed 10min leak test
	-26.5 in/Hg	inner	-Passed 10 min leak test.

Purge Volume

Calculated Purge Volume: 111.4mL 45. sec

Time	Flow	Volume	PID Reading
1520	150 mL/L	111.4mL	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: ~~34495~~ 13855

Summa Canister Size: 6L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
1529	-27.5 in/Hg	1644	-2.5 in/Hg

Notes:

100,000 PPM was maintained of Helium during sampling

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-5-4.5 Date: 3/12/13

Job/Site Name: 211253 Technician: W. Martinez / B. Sandor

Project No. 060058 PM:

Site Address: 930 Springtown blvd, Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
~~1126~~	~~-26~~ 28.6	Outer	-No good - ~~not all~~ extra valve closed
	~~-28~~ 28.3	inner	No good - extra valve closed
1138	28.3	outer	~~-Passed~~
	29.2	inner	~~-Passed~~
1148	28.3	Outer	-Passed 10 min leak test
	29.2	inner	-Passed 10 min leak test

Purge Volume

Calculated Purge Volume: ~~= 26mL~~ 96.85m (~40sec)

Time	Flow	Volume	PID Reading
1157	150mL/min	96.85mL	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: 34501

Summa Canister Size: 6L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
1207	~~27~~ 29.2	1311	4.0 in/Hg

Notes:

100,000 PPM of Helium was maintained during sampling

Conestoga-Rovers & Associates

SOIL VAPOR SAMPLING DATA SHEET

Soil Vapor Sampling Point ID: VP-5-~~8~~9 **Date:** 3/12/13

Job/Site Name: ~~G~~ 211253 **Technician:** B. Sandor / W. Martinez

Project No. 060058 **PM:** Brian Silva

Site Address: 930 Springtown blvd, Livermore, CA

Vapor Sampling Apparatus Pressure Testing

Time	Vacuum Reading	Unit	Comments
~~1126~~	~~28.2~~	outer gauge	extra valve closed - No good
	~~29.2~~	inner gauge	extra valve closed - No good
1138	28.9	outer gauge	~~passed~~ (dry)
	28.4	inner gauge	~~passed~~ (dry)
1148	28.9	outer	- passed 10 min leak test
	28.4	inner	- passed 10 min leak test

Purge Volume

Calculated Purge Volume: ~~Flow rate~~ 154.86 (~1.~~2~~ in 2 sec

Time	Flow	Volume	~~PID Reading~~
1157	150 mL/min	154.86	N/A

Sample Collection

Flow Control Orifice Setting: _____ Summa Canister ID: 33972

Summa Canister Size: 6L Analysis: _____

Time - Begin Sampling	Canister Vacuum	Time - End Sampling	Canister Vacuum
1207	-27.0 in/Hg	1258	-2 in/Hg

Notes:

100,000 ppm of Helium was maintained during sampling

I.D = 1/8" or 0.125" diameter.

A of ⊙ = πr^2 so, volume of well = πr^2 · depth or $3.14 \cdot (0.0625)^2 \cdot 66"$ (for 5.5') or 126' (for 10.5)

Conversions: 1 mL = 0.061 inches^3 so, 200/16.387 Basically just under 5 inches Hg = 0.8

1 inch^3 = 16.387 mL

APPENDIX F

LABORATORY ANALYTICAL DATA

MOISTURE CONTENT & UNIT WEIGHT TEST RESULTS

Sample Identification	Depth, ft.	Wet Unit Weight, lb/ft.^{3}	Dry Unit Weight, lb/ft.^{3}	Moisture Content, %	Specific Gravity	Porosity
VP-3-PHYS-10	10	157.0	129.2	21.5	2.86	0.28
VP-5-PHYS-5	5	147.5	132.3	11.5	2.81	0.25

Test Method: ASTM D2216, ASTM D2937 and ASTM D854

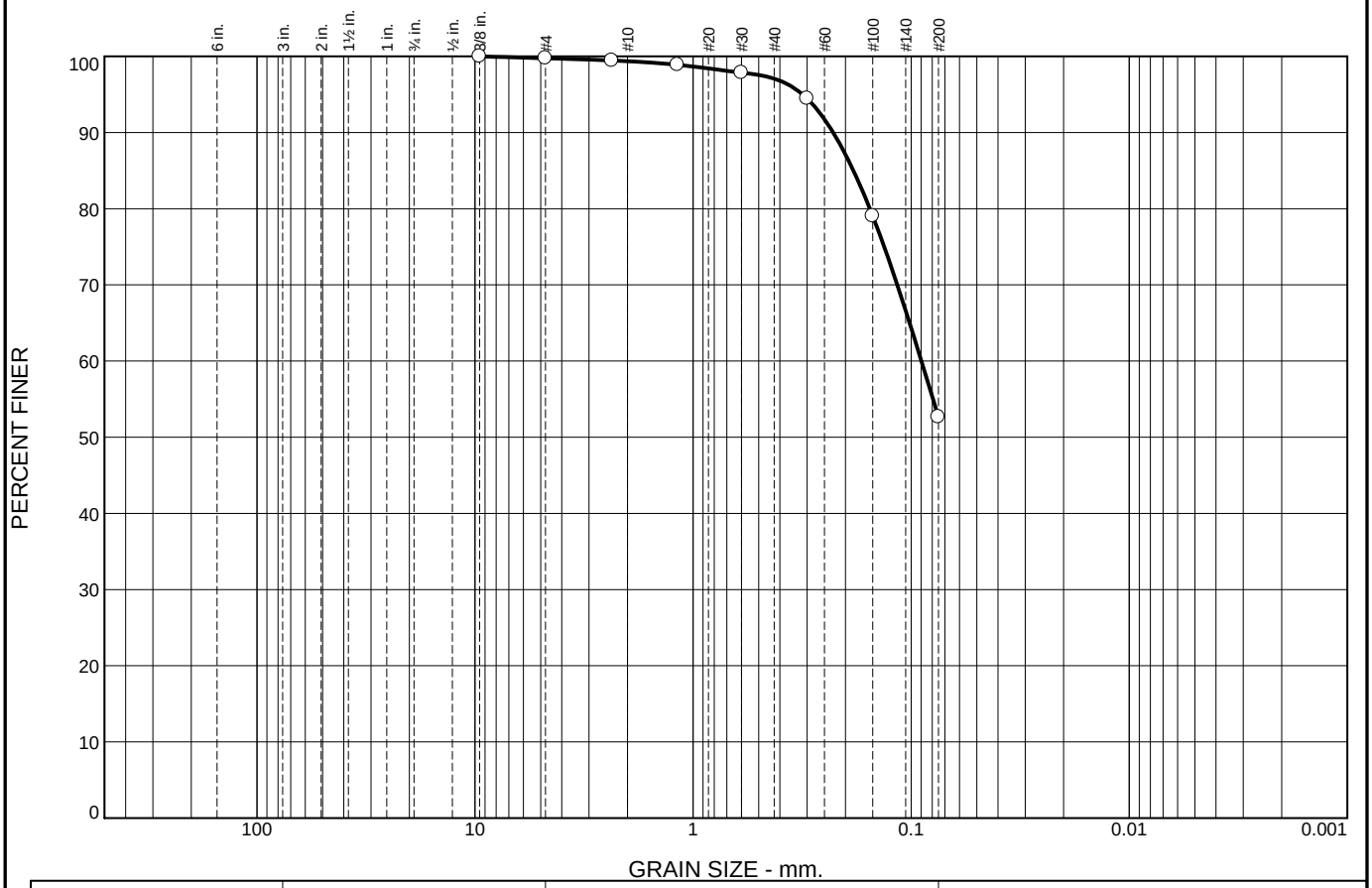
PROJECT NUMBER: **13-105** March 8, 2013

Former Texaco Service Station 211253

GULF SHORE

3383 Fitzgerald Road, Suite A, Rancho Cordova, CA 95742
Phone: (916) 939-4117

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.3	0.3	2.3	44.4	52.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.1840	0.0897						

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○	02/28/2013		21.5

Project No. 13-105 **Client:** Conestoga-Rovers & Associates

Project: Former Texaco Service Station #211253

○ **Location:** VP-3-PHYS-10 **Depth:** 10.0 **Sample Number:** 414

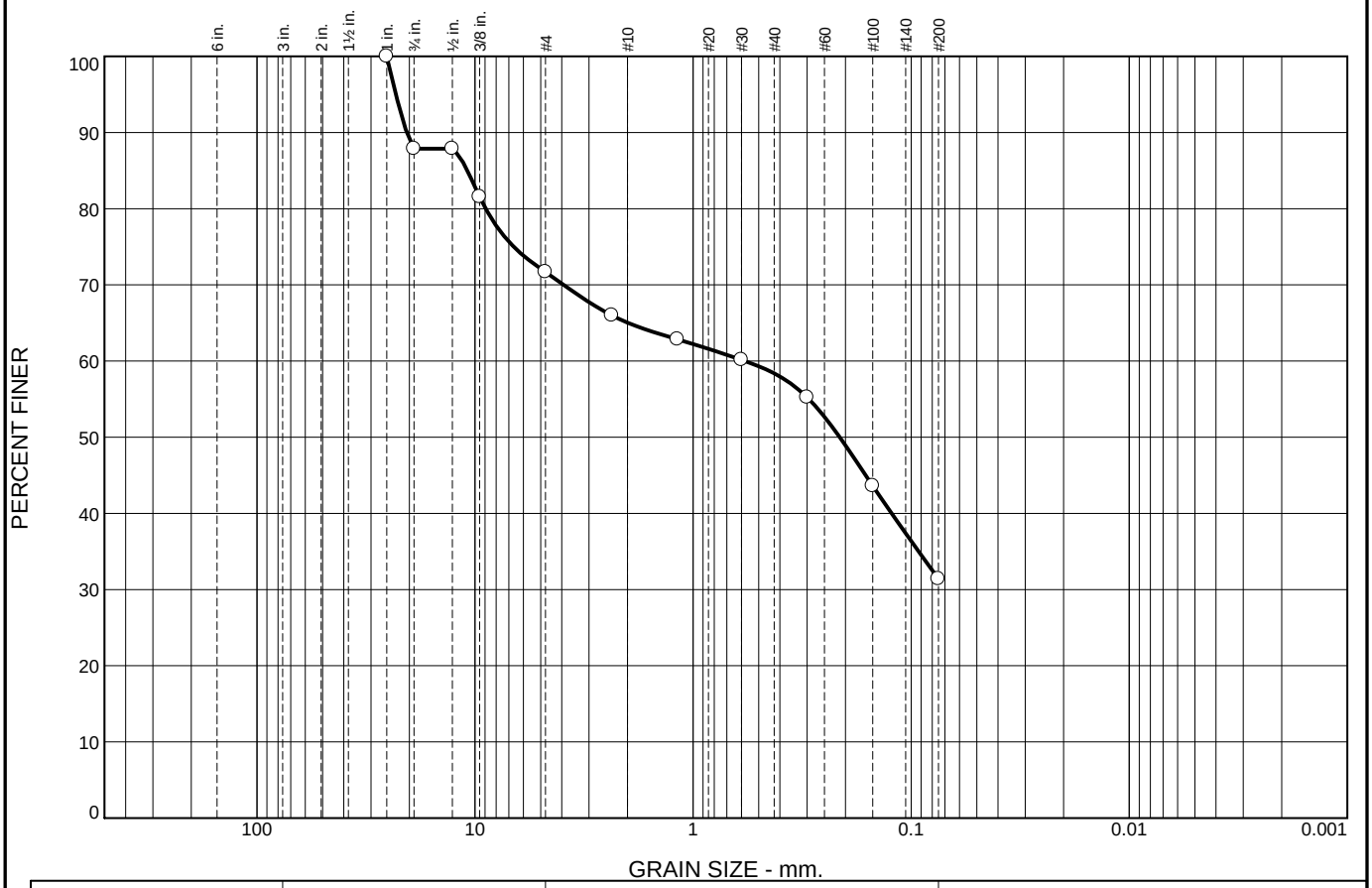
GS GULF SHORE

Remarks:

Figure

Tested By: AC **Checked By:** CMW

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	12.1	16.2	6.7	6.6	27.0	31.4	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			10.8446	0.5798	0.2126					

MATERIAL DESCRIPTION	TEST DATE	USCS	NM
○	02/28/2013		11.5

Project No. 13-105 **Client:** Conestoga-Rovers & Associates

Project: Former Texaco Service Station #211253

○ **Location:** VP-5-PHYS-5 **Depth:** 5.0 **Sample Number:** 415

GS GULF SHORE

Remarks:

Figure

Tested By: AC **Checked By:** CMW

ANALYTICAL RESULTS

Prepared by:

Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17605-2425

Prepared for:

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

March 13, 2013

Project: 211253

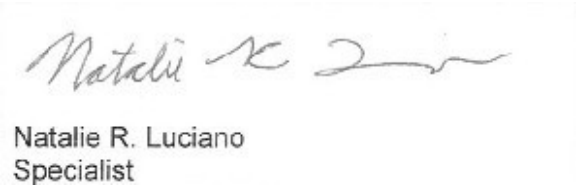
Submittal Date: 03/01/2013
Group Number: 1372489
PO Number: 0015118372
Release Number: MACLEOD
State of Sample Origin: CA

Client Sample Description	Lancaster Labs (LLI) #
VP-1-S-5-130226 NA Soil	6969792
VP-1-S-10-130226 NA Soil	6969793
VP-2-S-5-130226 NA Soil	6969794
VP-2-S-10-130226 NA Soil	6969795
VP-3-S-5-130226 NA Soil	6969796
VP-3-S-10-130226 NA Soil	6969797
VP-4-S-5-130227 NA Soil	6969798
VP-4-S-10-130227 NA Soil	6969799
VP-5-S-5-130227 NA Soil	6969800
VP-5-S-9-130227 NA Soil	6969801

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

ELECTRONIC COPY TO	Chevron	Attn: CRA EDD
ELECTRONIC COPY TO	CRA	Attn: Brian Silva

Respectfully Submitted,



Natalie R. Luciano
Specialist

(717) 556-7258

Sample Description: VP-1-S-5-130226 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-1

LLI Sample # SW 6969792
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/26/2013 11:41 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL105

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	1.01
10237	Ethylbenzene	100-41-4	N.D.	0.001	0.005	1.01
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	1.01
10237	Naphthalene	91-20-3	N.D.	0.001	0.005	1.01
10237	Toluene	108-88-3	N.D.	0.001	0.005	1.01
10237	Xylene (Total)	1330-20-7	N.D.	0.001	0.005	1.01
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	1	1	24.3

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130633AA	03/05/2013 04:54	Andrea E Lando	1.01
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:58	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:18	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/06/2013 15:19	Laura M Krieger	24.3
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:19	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-1-S-10-130226 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-1

LLI Sample # SW 6969793
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/26/2013 13:04 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL110

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	0.95
10237	Ethylbenzene	100-41-4	N.D.	0.0009	0.005	0.95
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	0.95
10237	Naphthalene	91-20-3	N.D.	0.0009	0.005	0.95
10237	Toluene	108-88-3	N.D.	0.0009	0.005	0.95
10237	Xylene (Total)	1330-20-7	N.D.	0.0009	0.005	0.95
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	1	1	24.53

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130633AA	03/05/2013 05:16	Andrea E Lando	0.95
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:22	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/06/2013 01:26	Laura M Krieger	24.53
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:23	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-2-S-5-130226 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-2

LLI Sample # SW 6969794
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/26/2013 11:25 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL205

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	1.04
10237	Ethylbenzene	100-41-4	N.D.	0.001	0.005	1.04
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	1.04
10237	Naphthalene	91-20-3	N.D.	0.001	0.005	1.04
10237	Toluene	108-88-3	N.D.	0.001	0.005	1.04
10237	Xylene (Total)	1330-20-7	N.D.	0.001	0.005	1.04
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	10	10	256.67
	Reporting limits were raised due to sample foaming.					

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130633AA	03/05/2013 05:39	Andrea E Lando	1.04
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:26	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/05/2013 19:09	Laura M Krieger	256.67
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:26	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-2-S-10-130226 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-2

LLI Sample # SW 6969795
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/26/2013 12:55 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL210

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	0.98
10237	Ethylbenzene	100-41-4	N.D.	0.001	0.005	0.98
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	0.98
10237	Naphthalene	91-20-3	N.D.	0.001	0.005	0.98
10237	Toluene	108-88-3	N.D.	0.001	0.005	0.98
10237	Xylene (Total)	1330-20-7	N.D.	0.001	0.005	0.98
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	4.1	4.1	101.42
	Reporting limits were raised due to sample foaming.					

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130633AA	03/05/2013 06:01	Andrea E Lando	0.98
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:29	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/06/2013 15:58	Laura M Krieger	101.42
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:30	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-3-S-5-130226 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-3

LLI Sample # SW 6969796
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/26/2013 15:37 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL305

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	1.05
10237	Ethylbenzene	100-41-4	N.D.	0.001	0.005	1.05
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	1.05
10237	Naphthalene	91-20-3	N.D.	0.001	0.005	1.05
10237	Toluene	108-88-3	N.D.	0.001	0.005	1.05
10237	Xylene (Total)	1330-20-7	N.D.	0.001	0.005	1.05
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	1.0	1.0	25.3

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130662AA	03/07/2013 20:56	Andrea E Lando	1.05
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:33	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/06/2013 02:01	Laura M Krieger	25.3
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:35	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-3-S-10-130226 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-3

LLI Sample # SW 6969797
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/26/2013 16:31 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL310

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	0.99
10237	Ethylbenzene	100-41-4	N.D.	0.001	0.005	0.99
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	0.99
10237	Naphthalene	91-20-3	N.D.	0.001	0.005	0.99
10237	Toluene	108-88-3	N.D.	0.001	0.005	0.99
10237	Xylene (Total)	1330-20-7	N.D.	0.001	0.005	0.99
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	1.0	1.0	25.35

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130711AA	03/12/2013 15:53	Chelsea B Stong	0.99
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:40	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/06/2013 02:36	Laura M Krieger	25.35
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:41	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-4-S-5-130227 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-4

LLI Sample # SW 6969798
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/27/2013 09:45 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL405

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	1.02
10237	Ethylbenzene	100-41-4	N.D.	0.001	0.005	1.02
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	1.02
10237	Naphthalene	91-20-3	N.D.	0.001	0.005	1.02
10237	Toluene	108-88-3	N.D.	0.001	0.005	1.02
10237	Xylene (Total)	1330-20-7	N.D.	0.001	0.005	1.02
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	1	1	24.78

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130662AA	03/07/2013 21:19	Andrea E Lando	1.02
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:44	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/06/2013 03:11	Laura M Krieger	24.78
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:45	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-4-S-10-130227 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-4

LLI Sample # SW 6969799
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/27/2013 10:10 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL410

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	0.94
10237	Ethylbenzene	100-41-4	N.D.	0.0009	0.005	0.94
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	0.94
10237	Naphthalene	91-20-3	N.D.	0.0009	0.005	0.94
10237	Toluene	108-88-3	N.D.	0.0009	0.005	0.94
10237	Xylene (Total)	1330-20-7	N.D.	0.0009	0.005	0.94
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	1.0	1.0	25.64

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130662AA	03/07/2013 21:41	Andrea E Lando	0.94
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:49	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/06/2013 03:46	Laura M Krieger	25.64
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:50	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-5-S-5-130227 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-5

LLI Sample # SW 6969800
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/27/2013 13:43 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL505

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	1.06
10237	Ethylbenzene	100-41-4	N.D.	0.001	0.005	1.06
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	1.06
10237	Naphthalene	91-20-3	N.D.	0.001	0.005	1.06
10237	Toluene	108-88-3	N.D.	0.001	0.005	1.06
10237	Xylene (Total)	1330-20-7	N.D.	0.001	0.005	1.06
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	9.9	9.9	248.26
	Reporting limits were raised due to sample foaming.					

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130662AA	03/07/2013 22:04	Andrea E Lando	1.06
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:53	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/05/2013 19:44	Laura M Krieger	248.26
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:54	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Sample Description: VP-5-S-9-130227 NA Soil
Facility# 211253 CRAW
930 Springtown-Livermore T0600101353 VP-5

LLI Sample # SW 6969801
LLI Group # 1372489
Account # 10880

Project Name: 211253

Collected: 02/27/2013 16:40 by WM

Submitted: 03/01/2013 09:15
Reported: 03/13/2013 15:38

ChevronTexaco
6001 Bollinger Canyon Rd L4310
San Ramon CA 94583

SL509

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Method Detection Limit*	As Received Limit of Quantitation	Dilution Factor
GC/MS Volatiles	**SW-846 8260B**		**mg/kg**	**mg/kg**	**mg/kg**	
10237	Benzene	71-43-2	N.D.	0.0005	0.005	1.03
10237	Ethylbenzene	100-41-4	N.D.	0.001	0.005	1.03
10237	Methyl Tertiary Butyl Ether	1634-04-4	N.D.	0.0005	0.005	1.03
10237	Naphthalene	91-20-3	N.D.	0.001	0.005	1.03
10237	Toluene	108-88-3	N.D.	0.001	0.005	1.03
10237	Xylene (Total)	1330-20-7	N.D.	0.001	0.005	1.03
GC Volatiles	**SW-846 8015B modified**		**mg/kg**	**mg/kg**	**mg/kg**	
01725	TPH-GRO N. CA soil C6-C12	n.a.	N.D.	1	1	24.61

General Sample Comments

State of California Lab Certification No. 2501

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
10237	VOCs 8260 BTEX/MTBE/Naph Soil	SW-846 8260B	1	B130662AA	03/07/2013 22:26	Andrea E Lando	1.03
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
00374	GC/MS - Bulk Soil Prep	SW-846 5035A Modified	2	201306130292	03/02/2013 13:59	Mitchell R Washel	n.a.
06646	GC/MS HL Bulk Sample Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:57	Mitchell R Washel	n.a.
01725	TPH-GRO N. CA soil C6-C12	SW-846 8015B modified	1	13063A34B	03/06/2013 04:21	Laura M Krieger	24.61
01150	GC - Bulk Soil Prep	SW-846 5035A Modified	1	201306130292	03/02/2013 13:57	Mitchell R Washel	n.a.

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: ChevronTexaco Group Number: 1372489
Reported: 03/13/13 at 03:38 PM

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Laboratory Compliance Quality Control

Analysis Name	Blank Result	Blank MDL**	Blank LOQ	Report Units	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: B130633AA	Sample number(s): 6969792-6969795								
Benzene	N.D.	0.0005	0.005	mg/kg	109	106	80-120	2	30
Ethylbenzene	N.D.	0.001	0.005	mg/kg	105	101	80-120	4	30
Methyl Tertiary Butyl Ether	N.D.	0.0005	0.005	mg/kg	108	107	74-121	1	30
Naphthalene	N.D.	0.001	0.005	mg/kg	74	78	59-123	5	30
Toluene	N.D.	0.001	0.005	mg/kg	102	98	80-120	4	30
Xylene (Total)	N.D.	0.001	0.005	mg/kg	105	100	80-120	5	30
Batch number: B130662AA	Sample number(s): 6969796,6969798-6969801								
Benzene	N.D.	0.0005	0.005	mg/kg	105	105	80-120	1	30
Ethylbenzene	N.D.	0.001	0.005	mg/kg	96	95	80-120	1	30
Methyl Tertiary Butyl Ether	N.D.	0.0005	0.005	mg/kg	111	112	74-121	1	30
Naphthalene	N.D.	0.001	0.005	mg/kg	77	77	59-123	0	30
Toluene	N.D.	0.001	0.005	mg/kg	96	96	80-120	0	30
Xylene (Total)	N.D.	0.001	0.005	mg/kg	98	97	80-120	1	30
Batch number: B130711AA	Sample number(s): 6969797								
Benzene	N.D.	0.0005	0.005	mg/kg	94	100	80-120	6	30
Ethylbenzene	N.D.	0.001	0.005	mg/kg	94	101	80-120	7	30
Methyl Tertiary Butyl Ether	N.D.	0.0005	0.005	mg/kg	105	105	74-121	0	30
Naphthalene	N.D.	0.001	0.005	mg/kg	79	79	59-123	1	30
Toluene	N.D.	0.001	0.005	mg/kg	94	100	80-120	6	30
Xylene (Total)	N.D.	0.001	0.005	mg/kg	95	101	80-120	6	30
Batch number: 13063A34B	Sample number(s): 6969792-6969801								
TPH-GRO N. CA soil C6-C12	N.D.	1.0	1.0	mg/kg	92	90	67-119	3	30

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: B130633AA	Sample number(s): 6969792-6969795 UNSPK: P964059								
Benzene	92	96	55-143	4	30				
Ethylbenzene	78	86	44-141	9	30				
Methyl Tertiary Butyl Ether	90	96	55-129	6	30				
Naphthalene	56	66	10-138	16	30				
Toluene	83	87	50-146	4	30				
Xylene (Total)	77	85	44-136	9	30				

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: ChevronTexaco Group Number: 1372489
Reported: 03/13/13 at 03:38 PM

Sample Matrix Quality Control

Unspiked (UNSPK) = the sample used in conjunction with the matrix spike
Background (BKG) = the sample used in conjunction with the duplicate

Analysis Name	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD MAX	BKG Conc	DUP Conc	DUP RPD	Dup RPD Max
Batch number: B130711AA	Sample number(s): 6969797 UNSPK: P977977								
Benzene	111		55-143						
Ethylbenzene	115		44-141						
Methyl Tertiary Butyl Ether	110		55-129						
Naphthalene	67		10-138						
Toluene	112		50-146						
Xylene (Total)	113		44-136						

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 8260 Ext. Soil Master w/GRO
Batch number: B130633AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
6969792	114	106	94	85
6969793	117	107	92	86
6969794	119	114	91	84
6969795	118	108	93	86
Blank	108	105	94	89
LCS	105	102	99	102
LCSD	105	104	98	101
MS	108	106	99	101
MSD	107	109	98	102
Limits:	50-141	54-135	52-141	50-131

Analysis Name: 8260 Ext. Soil Master w/GRO
Batch number: B130662AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene
6969796	110	104	92	84
6969798	111	106	94	82
6969799	113	108	92	85
6969800	114	108	92	81
6969801	114	108	89	86
Blank	108	104	92	88
LCS	106	101	97	100
LCSD	104	102	96	99
Limits:	50-141	54-135	52-141	50-131

Analysis Name: 8260 Ext. Soil Master w/GRO
Batch number: B130711AA

	Dibromofluoromethane	1,2-Dichloroethane-d4	Toluene-d8	4-Bromofluorobenzene

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: ChevronTexaco Group Number: 1372489
Reported: 03/13/13 at 03:38 PM

Surrogate Quality Control

6969797	111	112	95	88
Blank	111	109	97	89
LCS	106	108	102	102
LCSD	104	101	101	102
MS	105	101	103	102
Limits:	50-141	54-135	52-141	50-131

Analysis Name: TPH-GRO N. CA soil C6-C12
Batch number: 13063A34B

	Trifluorotoluene-F
6969792	76
6969793	79
6969794	98
6969795	84
6969796	73
6969797	77
6969798	81
6969799	81
6969800	101
6969801	80
Blank	89
LCS	87
LCSD	83
Limits:	61-122

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Chevron California Region Analysis Request/Chain of Custody

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Acct. # 10880 Group # 1372469 Sample # 6969792-801

For Lancaster Laboratories use only

Instructions on reverse side correspond with circled numbers.

SCR #:

1 Client Information

Facility # 211253 WBS

Site Address 930 per W. Martinez mes 3/4/13 ~~390~~ Springtown Blvd, Livermore, CA

Chevron PM Carryl MacLeod Lead Consultant CRA

Consultant/Office Rancho Cordova

Consultant Project Mgr. Brian Silva

Consultant Phone # (916) 889-8908

Sampler William Martinez

2 Sample Identification

3 Grab / Composite

4 Matrix

Soil / Sediment / Water / Potable / Ground / NPDES / Surface / Oil / Air

Total Number of Containers

5 Analyses Requested

BTEX + MTBE 8021 / 8260 ☒

TPH GRO 8015 / 8260 ☒

TPH 8015 MOD DRO

Silica Gel Cleanup

8260 Full Scan

Oxygenates ____

Total Lead Method ____

Dissolved Lead Method ____

Naphthalene by EPA 8260B

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Water	Oil	Total Containers
VP-1-5	2/26/13	1141						
VP-1-10	2/26/13	1304						
VP-2-5	2/26/13	1125						
VP-2-10	2/26/13	1255						
VP-3-5	2/26/13	1537						
VP-3-10	2/26/13	1631						
VP-4-5	2/27/13	0945						
VP-4-10	2/27/13	1010						
VP-5-5	2/27/13	1343						
VP-5-9	2/27/13	1640						

☐ Results in Dry Weight
☐ J value reporting needed
☐ Must meet lowest detection limits possible for 8260 compounds
☐ 8021 MTBE Confirmation
☐ Confirm highest hit by 8260
☐ Confirm all hits by 8260
☐ Run _____ oxy's on highest hit
☐ Run _____ oxy's on all hits

6 Remarks

Please send EDFs to Brian Silva at bsilva@craworld.com

Please call (916)889-8906 if you have any questions.

7 Turnaround Time Requested (TAT) (please circle)

(Standard) 5 day 4 day

72 hour 48 hour 24 hour

8 Data Package Options (please circle if required)

~~Type I - Full~~ Type VI (Raw Data) not needed per WMartinez mes 3/1/13

Relinquished by	Date	Time	Received by	Date	Time
William Martinez	2/28/13	1200			

9

Relinquished by Commerical Carrier: UPS ____ FedEx X Other ____

Received by: Pat Ga — Date 3/1/13 — Time 0915

Temperature Upon Receipt 1.2 °C

Custody Seals Intact? (Yes) No

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

RL	Reporting Limit	**BMQL**	Below Minimum Quantitation Level
N.D.	none detected	**MPN**	Most Probable Number
TNTC	Too Numerous To Count	**CP Units**	cobalt-chloroplatinate units
IU	International Units	**NTU**	nephelometric turbidity units
umhos/cm	micromhos/cm	**ng**	nanogram(s)
C	degrees Celsius	**F**	degrees Fahrenheit
meq	milliequivalents	**lb.**	pound(s)
g	gram(s)	**kg**	kilogram(s)
µg	microgram(s)	**mg**	milligram(s)
mL	milliliter(s)	**L**	liter(s)
m3	cubic meter(s)	**µL**	microliter(s)
		pg/L	picogram/liter

< less than - The number following the sign is the limit of quantitation, the smallest amount of analyte which can be reliably determined using this specific test.

> greater than

J estimated value – The result is ≥ the Method Detection Limit (MDL) and < the Limit of Quantitation (LOQ).

ppm parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg), or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter of gas per liter of gas.

ppb parts per billion

Dry weight basis Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

U.S. EPA CLP Data Qualifiers:

Organic Qualifiers

A	TIC is a possible aldol-condensation product
B	Analyte was also detected in the blank
C	Pesticide result confirmed by GC/MS
D	Compound quantitated on a diluted sample
E	Concentration exceeds the calibration range of the instrument
N	Presumptive evidence of a compound (TICs only)
P	Concentration difference between primary and confirmation columns >25%
U	Compound was not detected
X,Y,Z	Defined in case narrative

Inorganic Qualifiers

B	Value is <CRDL, but ≥IDL
E	Estimated due to interference
M	Duplicate injection precision not met
N	Spike sample not within control limits
S	Method of standard additions (MSA) used for calculation
U	Compound was not detected
W	Post digestion spike out of control limits
*****	Duplicate analysis not within control limits
+	Correlation coefficient for MSA <0.995

Analytical test results meet all requirements of NELAC unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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3/29/2013
Mr. Jeffrey Cloud
Conestoga-Rovers Associates (CRA)
1420 80th Street SW
Suite A
Everett WA 98203

Project Name: 211253
Project #: 060058
Workorder #: 1303265A

Dear Mr. Jeffrey Cloud

The following report includes the data for the above referenced project for sample(s) received on 3/14/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1303265A

Work Order Summary

CLIENT:	Mr. Jeffrey Cloud Conestoga-Rovers Associates (CRA) 1420 80th Street SW Suite A Everett, WA 98203	**BILL TO:**	Accounts Payable Conestoga-Rovers Associates (CRA) 2055 Niagara Falls Blvd. Suite Three Niagara Falls, NY 14304
PHONE:	425-212-5100	**P.O. #**	060058
FAX:	425-212-5199	**PROJECT #**	060058 211253
DATE RECEIVED:	03/14/2013	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	03/29/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VP-1-5	Modified TO-15	5.7 "Hg	4.7 psi
02A	VP-1-10	Modified TO-15	5.9 "Hg	5.4 psi
03A	VP-2-5	Modified TO-15	6.5 "Hg	5.2 psi
04A	VP-2-10	Modified TO-15	6.7 "Hg	4.8 psi
05A	VP-3-5	Modified TO-15	3.5 "Hg	5.2 psi
06A	VP-3-10	Modified TO-15	5.5 "Hg	5.1 psi
07A	VP-4-5	Modified TO-15	1.5 "Hg	5 psi
08A	VP-4-10	Modified TO-15	4.1 "Hg	5 psi
09A	VP-5-4.5	Modified TO-15	6.1 "Hg	5 psi
10A	VP-5-9	Modified TO-15	4.5 "Hg	5.1 psi
11A	DUP	Modified TO-15	6.5 "Hg	5 psi
12A	Lab Blank	Modified TO-15	NA	NA
13A	CCV	Modified TO-15	NA	NA
14A	LCS	Modified TO-15	NA	NA
14AA	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 03/29/13

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
Conestoga-Rovers Associates (CRA)
Workorder# 1303265A

Eleven 6 Liter Summa Canister (100% Certified) samples were received on March 14, 2013. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

A single point calibration for TPH referenced to Gasoline was performed for each daily analytical batch. Recovery is reported as 100% in the associated results for each CCV.

Dilution was performed on samples VP-2-10, VP-3-5, and VP-3-10 due to the presence of high level non-target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV and/or LCS.

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-1-5

Lab ID#: 1303265A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.82	0.94	2.6	3.0
TPH ref. to Gasoline (MW=100)	41	110	170	440

Client Sample ID: VP-1-10

Lab ID#: 1303265A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.85	1.4	2.7	4.5
Toluene	0.85	1.3	3.2	5.0
m,p-Xylene	0.85	1.9	3.7	8.1
o-Xylene	0.85	1.1	3.7	4.7
TPH ref. to Gasoline (MW=100)	42	110	170	460

Client Sample ID: VP-2-5

Lab ID#: 1303265A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.86	2.0	2.8	6.3
m,p-Xylene	0.86	1.5	3.8	6.6
o-Xylene	0.86	1.0	3.8	4.4
TPH ref. to Gasoline (MW=100)	43	560	180	2300

Client Sample ID: VP-2-10

Lab ID#: 1303265A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	1.7	4.1	5.5	13
m,p-Xylene	1.7	2.3	7.4	9.9
TPH ref. to Gasoline (MW=100)	86	4100	350	17000

Client Sample ID: VP-3-5

Lab ID#: 1303265A-05A

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-3-5

Lab ID#: 1303265A-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH ref. to Gasoline (MW=100)	76	2900	310	12000

Client Sample ID: VP-3-10

Lab ID#: 1303265A-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TPH ref. to Gasoline (MW=100)	8200	650000	34000	2600000

Client Sample ID: VP-4-5

Lab ID#: 1303265A-07A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	0.70	1.8	2.6	7.0
m,p-Xylene	0.70	1.6	3.1	6.8
TPH ref. to Gasoline (MW=100)	35	140	140	560

Client Sample ID: VP-4-10

Lab ID#: 1303265A-08A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	0.78	1.8	2.9	6.9
m,p-Xylene	0.78	0.91	3.4	3.9

Client Sample ID: VP-5-4.5

Lab ID#: 1303265A-09A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.84	1.0	2.7	3.4
Toluene	0.84	3.8	3.2	14
m,p-Xylene	0.84	2.6	3.6	11
TPH ref. to Gasoline (MW=100)	42	130	170	540

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-5-9

Lab ID#: 1303265A-10A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Toluene	0.79	1.2	3.0	4.5

Client Sample ID: DUP

Lab ID#: 1303265A-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Benzene	0.86	2.0	2.7	6.3
m,p-Xylene	0.86	1.5	3.7	6.5
o-Xylene	0.86	0.97	3.7	4.2
TPH ref. to Gasoline (MW=100)	43	420	170	1700

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Client Sample ID: VP-1-5

Lab ID#: 1303265A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032215**	**Date of Collection: 3/13/13 3:07:00 PM**	
Dil. Factor:	**1.63**	**Date of Analysis: 3/22/13 06:15 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.82	Not Detected	2.9	Not Detected
Benzene	0.82	0.94	2.6	3.0
Toluene	0.82	Not Detected	3.1	Not Detected
Ethyl Benzene	0.82	Not Detected	3.5	Not Detected
m,p-Xylene	0.82	Not Detected	3.5	Not Detected
o-Xylene	0.82	Not Detected	3.5	Not Detected
Naphthalene	3.3	Not Detected	17	Not Detected
TPH ref. to Gasoline (MW=100)	41	110	170	440

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	80	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VP-1-10

Lab ID#: 1303265A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032216**	**Date of Collection: 3/13/13 2:45:00 PM**	
Dil. Factor:	**1.70**	**Date of Analysis: 3/22/13 06:51 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.85	Not Detected	3.1	Not Detected
Benzene	0.85	1.4	2.7	4.5
Toluene	0.85	1.3	3.2	5.0
Ethyl Benzene	0.85	Not Detected	3.7	Not Detected
m,p-Xylene	0.85	1.9	3.7	8.1
o-Xylene	0.85	1.1	3.7	4.7
Naphthalene	3.4	Not Detected	18	Not Detected
TPH ref. to Gasoline (MW=100)	42	110	170	460

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	81	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: VP-2-5

Lab ID#: 1303265A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032217**	**Date of Collection: 3/13/13 1:02:00 PM**	
Dil. Factor:	**1.73**	**Date of Analysis: 3/22/13 07:25 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.86	Not Detected	3.1	Not Detected
Benzene	0.86	2.0	2.8	6.3
Toluene	0.86	Not Detected	3.2	Not Detected
Ethyl Benzene	0.86	Not Detected	3.8	Not Detected
m,p-Xylene	0.86	1.5	3.8	6.6
o-Xylene	0.86	1.0	3.8	4.4
Naphthalene	3.5	Not Detected	18	Not Detected
TPH ref. to Gasoline (MW=100)	43	560	180	2300

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	83	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: VP-2-10

Lab ID#: 1303265A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032223**	**Date of Collection: 3/13/13 12:12:00 PM**	
Dil. Factor:	**3.42**	**Date of Analysis: 3/22/13 09:45 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1.7	Not Detected	6.2	Not Detected
Benzene	1.7	4.1	5.5	13
Toluene	1.7	Not Detected	6.4	Not Detected
Ethyl Benzene	1.7	Not Detected	7.4	Not Detected
m,p-Xylene	1.7	2.3	7.4	9.9
o-Xylene	1.7	Not Detected	7.4	Not Detected
Naphthalene	6.8	Not Detected	36	Not Detected
TPH ref. to Gasoline (MW=100)	86	4100	350	17000

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	94	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: VP-3-5

Lab ID#: 1303265A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032224**	**Date of Collection: 3/13/13 10:19:00 AM**	
Dil. Factor:	**3.06**	**Date of Analysis: 3/22/13 10:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	1.5	Not Detected	5.5	Not Detected
Benzene	1.5	Not Detected	4.9	Not Detected
Toluene	1.5	Not Detected	5.8	Not Detected
Ethyl Benzene	1.5	Not Detected	6.6	Not Detected
m,p-Xylene	1.5	Not Detected	6.6	Not Detected
o-Xylene	1.5	Not Detected	6.6	Not Detected
Naphthalene	6.1	Not Detected	32	Not Detected
TPH ref. to Gasoline (MW=100)	76	2900	310	12000

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	92	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VP-3-10

Lab ID#: 1303265A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032225**	**Date of Collection:**	**3/13/13 10:19:00 AM**
Dil. Factor:	**330**	**Date of Analysis:**	**3/23/13 07:45 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	160	Not Detected	590	Not Detected
Benzene	160	Not Detected	530	Not Detected
Toluene	160	Not Detected	620	Not Detected
Ethyl Benzene	160	Not Detected	720	Not Detected
m,p-Xylene	160	Not Detected	720	Not Detected
o-Xylene	160	Not Detected	720	Not Detected
Naphthalene	660	Not Detected	3400	Not Detected
TPH ref. to Gasoline (MW=100)	8200	650000	34000	2600000

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: VP-4-5

Lab ID#: 1303265A-07A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032218**	**Date of Collection: 3/12/13 4:44:00 PM**	
Dil. Factor:	**1.41**	**Date of Analysis: 3/22/13 07:55 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.70	Not Detected	2.5	Not Detected
Benzene	0.70	Not Detected	2.2	Not Detected
Toluene	0.70	1.8	2.6	7.0
Ethyl Benzene	0.70	Not Detected	3.1	Not Detected
m,p-Xylene	0.70	1.6	3.1	6.8
o-Xylene	0.70	Not Detected	3.1	Not Detected
Naphthalene	2.8	Not Detected	15	Not Detected
TPH ref. to Gasoline (MW=100)	35	140	140	560

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	79	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: VP-4-10

Lab ID#: 1303265A-08A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032219**	**Date of Collection: 3/12/13 1:14:00 PM**	
Dil. Factor:	**1.55**	**Date of Analysis: 3/22/13 08:13 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.78	Not Detected	2.8	Not Detected
Benzene	0.78	Not Detected	2.5	Not Detected
Toluene	0.78	1.8	2.9	6.9
Ethyl Benzene	0.78	Not Detected	3.4	Not Detected
m,p-Xylene	0.78	0.91	3.4	3.9
o-Xylene	0.78	Not Detected	3.4	Not Detected
Naphthalene	3.1	Not Detected	16	Not Detected
TPH ref. to Gasoline (MW=100)	39	Not Detected	160	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	94	70-130
1,2-Dichloroethane-d4	82	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: VP-5-4.5

Lab ID#: 1303265A-09A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032220**	**Date of Collection: 3/12/13 1:11:00 PM**	
Dil. Factor:	**1.68**	**Date of Analysis: 3/22/13 08:34 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.84	Not Detected	3.0	Not Detected
Benzene	0.84	1.0	2.7	3.4
Toluene	0.84	3.8	3.2	14
Ethyl Benzene	0.84	Not Detected	3.6	Not Detected
m,p-Xylene	0.84	2.6	3.6	11
o-Xylene	0.84	Not Detected	3.6	Not Detected
Naphthalene	3.4	Not Detected	18	Not Detected
TPH ref. to Gasoline (MW=100)	42	130	170	540

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	82	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: VP-5-9

Lab ID#: 1303265A-10A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032221**	**Date of Collection: 3/12/13 12:58:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 3/22/13 08:59 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.79	Not Detected	2.8	Not Detected
Benzene	0.79	Not Detected	2.5	Not Detected
Toluene	0.79	1.2	3.0	4.5
Ethyl Benzene	0.79	Not Detected	3.4	Not Detected
m,p-Xylene	0.79	Not Detected	3.4	Not Detected
o-Xylene	0.79	Not Detected	3.4	Not Detected
Naphthalene	3.2	Not Detected	16	Not Detected
TPH ref. to Gasoline (MW=100)	40	Not Detected	160	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	81	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: DUP

Lab ID#: 1303265A-11A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032222**	**Date of Collection: NA**	
Dil. Factor:	**1.71**	**Date of Analysis: 3/22/13 09:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.86	Not Detected	3.1	Not Detected
Benzene	0.86	2.0	2.7	6.3
Toluene	0.86	Not Detected	3.2	Not Detected
Ethyl Benzene	0.86	Not Detected	3.7	Not Detected
m,p-Xylene	0.86	1.5	3.7	6.5
o-Xylene	0.86	0.97	3.7	4.2
Naphthalene	3.4	Not Detected	18	Not Detected
TPH ref. to Gasoline (MW=100)	43	420	170	1700

Container Type: 6 Liter Summa Canister (100% Certified)

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	81	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1303265A-12A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032211**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/22/13 03:37 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Methyl tert-butyl ether	0.50	Not Detected	1.8	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Naphthalene	2.0	Not Detected	10	Not Detected
TPH ref. to Gasoline (MW=100)	25	Not Detected	100	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	82	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: CCV

Lab ID#: 1303265A-13A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/22/13 10:29 AM**	

Compound	%Recovery
Methyl tert-butyl ether	108
Benzene	98
Toluene	100
Ethyl Benzene	112
m,p-Xylene	116
o-Xylene	118
Naphthalene	117
TPH ref. to Gasoline (MW=100)	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	84	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCS

Lab ID#: 1303265A-14A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/22/13 11:00 AM**	

Compound	**%Recovery**
Methyl tert-butyl ether	100
Benzene	91
Toluene	92
Ethyl Benzene	104
m,p-Xylene	108
o-Xylene	110
Naphthalene	72
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	83	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCSD

Lab ID#: 1303265A-14AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/22/13 11:22 AM**	

Compound	**%Recovery**
Methyl tert-butyl ether	98
Benzene	90
Toluene	90
Ethyl Benzene	102
m,p-Xylene	107
o-Xylene	108
Naphthalene	70
TPH ref. to Gasoline (MW=100)	Not Spiked

Container Type: NA - Not Applicable

Surrogates	**%Recovery**	**Method Limits**
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	80	70-130
4-Bromofluorobenzene	99	70-130

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3/28/2013
Mr. Jeffrey Cloud
Conestoga-Rovers Associates (CRA)
1420 80th Street SW
Suite A
Everett WA 98203

Project Name: 211253
Project #: 060058
Workorder #: 1303265B

Dear Mr. Jeffrey Cloud

The following report includes the data for the above referenced project for sample(s) received on 3/14/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 APH are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1303265B

Work Order Summary

CLIENT:	Mr. Jeffrey Cloud Conestoga-Rovers Associates (CRA) 1420 80th Street SW Suite A Everett, WA 98203	**BILL TO:**	Accounts Payable Conestoga-Rovers Associates (CRA) 2055 Niagara Falls Blvd. Suite Three Niagara Falls, NY 14304
PHONE:	425-212-5100	**P.O. #**	060058
FAX:	425-212-5199	**PROJECT #**	060058 211253
DATE RECEIVED:	03/14/2013	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	03/28/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VP-1-5	Modified TO-15 APH	5.7 "Hg	4.7 psi
01B	VP-1-5	Modified TO-15 APH	5.7 "Hg	4.7 psi
02A	VP-1-10	Modified TO-15 APH	5.9 "Hg	5.4 psi
02B	VP-1-10	Modified TO-15 APH	5.9 "Hg	5.4 psi
03A	VP-2-5	Modified TO-15 APH	6.5 "Hg	5.2 psi
03B	VP-2-5	Modified TO-15 APH	6.5 "Hg	5.2 psi
04A	VP-2-10	Modified TO-15 APH	6.7 "Hg	4.8 psi
04B	VP-2-10	Modified TO-15 APH	6.7 "Hg	4.8 psi
05A	VP-3-5	Modified TO-15 APH	3.5 "Hg	5.2 psi
05B	VP-3-5	Modified TO-15 APH	3.5 "Hg	5.2 psi
06A	VP-3-10	Modified TO-15 APH	5.5 "Hg	5.1 psi
06B	VP-3-10	Modified TO-15 APH	5.5 "Hg	5.1 psi
07A	VP-4-5	Modified TO-15 APH	1.5 "Hg	5 psi
07B	VP-4-5	Modified TO-15 APH	1.5 "Hg	5 psi
08A	VP-4-10	Modified TO-15 APH	4.1 "Hg	5 psi
08B	VP-4-10	Modified TO-15 APH	4.1 "Hg	5 psi
09A	VP-5-4.5	Modified TO-15 APH	6.1 "Hg	5 psi
09B	VP-5-4.5	Modified TO-15 APH	6.1 "Hg	5 psi
10A	VP-5-9	Modified TO-15 APH	4.5 "Hg	5.1 psi
10B	VP-5-9	Modified TO-15 APH	4.5 "Hg	5.1 psi
11A	DUP	Modified TO-15 APH	6.5 "Hg	5 psi
11B	DUP	Modified TO-15 APH	6.5 "Hg	5 psi
12A	Lab Blank	Modified TO-15 APH	NA	NA

Continued on next page

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WORK ORDER #: 1303265B

Work Order Summary

CLIENT:	Mr. Jeffrey Cloud Conestoga-Rovers Associates (CRA) 1420 80th Street SW Suite A Everett, WA 98203	**BILL TO:**	Accounts Payable Conestoga-Rovers Associates (CRA) 2055 Niagara Falls Blvd. Suite Three Niagara Falls, NY 14304
PHONE:	425-212-5100	**P.O. #**	060058
FAX:	425-212-5199	**PROJECT #**	060058 211253
DATE RECEIVED:	03/14/2013	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	03/28/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
12B	Lab Blank	Modified TO-15 APH	NA	NA
13A	CCV	Modified TO-15 APH	NA	NA
13B	CCV	Modified TO-15 APH	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 03/28/13

Technical Director

Certification numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-4, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2012, Expiration date: 10/17/2013.
Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
Modified TO-15 & VPH Fractions
Conestoga-Rovers Associates (CRA)
Workorder# 1303265B

Eleven 6 Liter Summa Canister (100% Certified) samples were received on March 14, 2013. The laboratory performed analysis via EPA Method TO-15 and Air Toxics VPH (Volatile Petroleum Hydrocarbon) methods for the Determination of VPH Fractions using GC/MS in the full scan mode. The method involves concentrating up to 0.5 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis. This method is designed to measure gaseous phase aliphatic and aromatic compounds in ambient air and soil gas collected in stainless steel Summa canisters. Air Toxics VPH method is a hybrid of EPA TO-15, MADEP APH and WSDE VPH methods. Chromatographic peaks were identified via mass spectrum as either aliphatic or aromatic petroleum hydrocarbons and included in the appropriate range as defined by the method. The volatile Aliphatic hydrocarbons are collectively quantified within the C5 to C6 range, C6 to C8 range, C8 to C10 range and the C10 to C12 range. Additionally, the volatile Aromatic hydrocarbons are collectively quantified within the C8 to C10 range and the C10 to C12 range. The Aromatic ranges refer to the equivalent carbon (EC) ranges.

Aliphatic data is calculated from the Total Ion chromatogram which has been reprocessed in a duplicate file differentiated from the original by the addition of an alphanumeric extension. The Aromatic calculation also uses the information contained in the associated Extracted Ion file.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

Dilution was performed on samples VP-2-10, VP-3-5 and VP-3-10 due to matrix interference.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-1-5

Lab ID#: 1303265B-01A

No Detections Were Found.

Client Sample ID: VP-1-5

Lab ID#: 1303265B-01B

No Detections Were Found.

Client Sample ID: VP-1-10

Lab ID#: 1303265B-02A

No Detections Were Found.

Client Sample ID: VP-1-10

Lab ID#: 1303265B-02B

No Detections Were Found.

Client Sample ID: VP-2-5

Lab ID#: 1303265B-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	17	120	71	500

Client Sample ID: VP-2-5

Lab ID#: 1303265B-03B

No Detections Were Found.

Client Sample ID: VP-2-10

Lab ID#: 1303265B-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	34	190	110	600
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	34	1100	140	4700
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	34	59	200	340

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Summary of Detected Compounds
MODIFIED METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-2-10

Lab ID#: 1303265B-04B

No Detections Were Found.

Client Sample ID: VP-3-5

Lab ID#: 1303265B-05A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	31	120	99	390
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	31	590	120	2400
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	31	32	180	180

Client Sample ID: VP-3-5

Lab ID#: 1303265B-05B

No Detections Were Found.

Client Sample ID: VP-3-10

Lab ID#: 1303265B-06A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	3300	42000	11000	140000
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	3300	210000	14000	840000
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	3300	6200	19000	36000

Client Sample ID: VP-3-10

Lab ID#: 1303265B-06B

No Detections Were Found.

Client Sample ID: VP-4-5

Lab ID#: 1303265B-07A

No Detections Were Found.

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Summary of Detected Compounds
MODIFIED METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: VP-4-5

Lab ID#: 1303265B-07B

No Detections Were Found.

Client Sample ID: VP-4-10

Lab ID#: 1303265B-08A

No Detections Were Found.

Client Sample ID: VP-4-10

Lab ID#: 1303265B-08B

No Detections Were Found.

Client Sample ID: VP-5-4.5

Lab ID#: 1303265B-09A

No Detections Were Found.

Client Sample ID: VP-5-4.5

Lab ID#: 1303265B-09B

No Detections Were Found.

Client Sample ID: VP-5-9

Lab ID#: 1303265B-10A

No Detections Were Found.

Client Sample ID: VP-5-9

Lab ID#: 1303265B-10B

No Detections Were Found.

Client Sample ID: DUP

Lab ID#: 1303265B-11A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	17	86	70	350

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Summary of Detected Compounds
MODIFIED METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: DUP

Lab ID#: 1303265B-11B

No Detections Were Found.

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Client Sample ID: VP-1-5

Lab ID#: 1303265B-01A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032215a**	**Date of Collection: 3/13/13 3:07:00 PM**	
Dil. Factor:	**1.63**	**Date of Analysis: 3/22/13 06:15 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	16	Not Detected	53	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	16	Not Detected	67	Not Detected
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	16	Not Detected	95	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	16	Not Detected	110	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-1-5

Lab ID#: 1303265B-01B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032215c**	**Date of Collection:**	**3/13/13 3:07:00 PM**
Dil. Factor:	**1.63**	**Date of Analysis:**	**3/22/13 06:15 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	16	Not Detected	80	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	16	Not Detected	89	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-1-10

Lab ID#: 1303265B-02A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032216a**	**Date of Collection: 3/13/13 2:45:00 PM**	
Dil. Factor:	**1.70**	**Date of Analysis: 3/22/13 06:51 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	17	Not Detected	55	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	17	Not Detected	70	Not Detected
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	17	Not Detected	99	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	17	Not Detected	120	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-1-10

Lab ID#: 1303265B-02B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032216c**	**Date of Collection: 3/13/13 2:45:00 PM**	
Dil. Factor:	**1.70**	**Date of Analysis: 3/22/13 06:51 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	17	Not Detected	84	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	17	Not Detected	93	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-2-5

Lab ID#: 1303265B-03A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032217a**	**Date of Collection: 3/13/13 1:02:00 PM**	
Dil. Factor:	**1.73**	**Date of Analysis: 3/22/13 07:25 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	17	Not Detected	56	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	17	120	71	500
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	17	Not Detected	100	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	17	Not Detected	120	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-2-5

Lab ID#: 1303265B-03B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032217c**	**Date of Collection:**	**3/13/13 1:02:00 PM**
Dil. Factor:	**1.73**	**Date of Analysis:**	**3/22/13 07:25 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	17	Not Detected	85	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	17	Not Detected	95	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-2-10

Lab ID#: 1303265B-04A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032223a**	**Date of Collection: 3/13/13 12:12:00 PM**	
Dil. Factor:	**3.42**	**Date of Analysis: 3/22/13 09:45 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	34	190	110	600
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	34	1100	140	4700
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	34	59	200	340
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	34	Not Detected	240	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-2-10

Lab ID#: 1303265B-04B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032223c**	**Date of Collection: 3/13/13 12:12:00 PM**	
Dil. Factor:	**3.42**	**Date of Analysis: 3/22/13 09:45 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	34	Not Detected	170	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	34	Not Detected	190	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-3-5

Lab ID#: 1303265B-05A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032224a**	**Date of Collection: 3/13/13 10:19:00 AM**	
Dil. Factor:	**3.06**	**Date of Analysis: 3/22/13 10:22 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	31	120	99	390
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	31	590	120	2400
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	31	32	180	180
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	31	Not Detected	210	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-3-5

Lab ID#: 1303265B-05B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032224c**	**Date of Collection:**	**3/13/13 10:19:00 AM**
Dil. Factor:	**3.06**	**Date of Analysis:**	**3/22/13 10:22 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	31	Not Detected	150	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	31	Not Detected	170	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-3-10

Lab ID#: 1303265B-06A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032225a**	**Date of Collection: 3/13/13 10:19:00 AM**	
Dil. Factor:	**330**	**Date of Analysis: 3/23/13 07:45 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	3300	42000	11000	140000
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	3300	210000	14000	840000
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	3300	6200	19000	36000
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	3300	Not Detected	23000	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-3-10

Lab ID#: 1303265B-06B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032225c**	**Date of Collection:**	**3/13/13 10:19:00 AM**
Dil. Factor:	**330**	**Date of Analysis:**	**3/23/13 07:45 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	3300	Not Detected	16000	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	3300	Not Detected	18000	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-4-5

Lab ID#: 1303265B-07A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032218a**	**Date of Collection:**	**3/12/13 4:44:00 PM**
Dil. Factor:	**1.41**	**Date of Analysis:**	**3/22/13 07:55 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	14	Not Detected	46	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	14	Not Detected	58	Not Detected
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	14	Not Detected	82	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	14	Not Detected	98	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-4-5

Lab ID#: 1303265B-07B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032218c**	**Date of Collection: 3/12/13 4:44:00 PM**	
Dil. Factor:	**1.41**	**Date of Analysis: 3/22/13 07:55 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	14	Not Detected	69	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	14	Not Detected	77	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-4-10

Lab ID#: 1303265B-08A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032219a**	**Date of Collection: 3/12/13 1:14:00 PM**	
Dil. Factor:	**1.55**	**Date of Analysis: 3/22/13 08:13 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	16	Not Detected	50	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	16	Not Detected	64	Not Detected
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	16	Not Detected	90	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	16	Not Detected	110	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-4-10

Lab ID#: 1303265B-08B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032219c**	**Date of Collection:**	**3/12/13 1:14:00 PM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**3/22/13 08:13 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	16	Not Detected	76	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	16	Not Detected	85	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-5-4.5

Lab ID#: 1303265B-09A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032220a**	**Date of Collection: 3/12/13 1:11:00 PM**	
Dil. Factor:	**1.68**	**Date of Analysis: 3/22/13 08:34 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	17	Not Detected	54	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	17	Not Detected	69	Not Detected
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	17	Not Detected	98	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	17	Not Detected	120	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-5-4.5

Lab ID#: 1303265B-09B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032220c**	**Date of Collection: 3/12/13 1:11:00 PM**	
Dil. Factor:	**1.68**	**Date of Analysis: 3/22/13 08:34 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	17	Not Detected	82	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	17	Not Detected	92	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-5-9

Lab ID#: 1303265B-10A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032221a**	**Date of Collection: 3/12/13 12:58:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 3/22/13 08:59 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	16	Not Detected	51	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	16	Not Detected	65	Not Detected
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	16	Not Detected	92	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	16	Not Detected	110	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-5-9

Lab ID#: 1303265B-10B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032221c**	**Date of Collection:**	**3/12/13 12:58:00 PM**
Dil. Factor:	**1.58**	**Date of Analysis:**	**3/22/13 08:59 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	16	Not Detected	78	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	16	Not Detected	87	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: DUP

Lab ID#: 1303265B-11A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032222a**	**Date of Collection: NA**	
Dil. Factor:	**1.71**	**Date of Analysis: 3/22/13 09:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	17	Not Detected	55	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	17	86	70	350
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	17	Not Detected	100	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	17	Not Detected	120	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: DUP

Lab ID#: 1303265B-11B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032222c**	**Date of Collection: NA**	
Dil. Factor:	**1.71**	**Date of Analysis: 3/22/13 09:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	17	Not Detected	84	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	17	Not Detected	94	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: Lab Blank

Lab ID#: 1303265B-12A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032206a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/22/13 12:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	10	Not Detected	32	Not Detected
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	10	Not Detected	41	Not Detected
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	10	Not Detected	58	Not Detected
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	10	Not Detected	70	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: Lab Blank

Lab ID#: 1303265B-12B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032206c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/22/13 12:19 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	10	Not Detected	49	Not Detected
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	10	Not Detected	55	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: CCV

Lab ID#: 1303265B-13A

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032205a**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/22/13 11:54 AM**	

Compound	%Recovery
C5-C6 Aliphatic Hydrocarbons (ref. to Pentane + Hexane)	70
>C6-C8 Aliphatic Hydrocarbons (ref. to Heptane)	76
>C8-C10 Aliphatic Hydrocarbons (ref. to Decane)	75
>C10-C12 Aliphatic Hydrocarbons (ref. to Dodecane)	84

Container Type: NA - Not Applicable

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Client Sample ID: CCV

Lab ID#: 1303265B-13B

MODIFIED METHOD TO-15 GC/MS FULL SCAN

File Name:	**3032205c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/22/13 11:54 AM**	

Compound	%Recovery
>C8-C10 Aromatic Hydrocarbons (ref. to 1,2,3-TMB)	115
>C10-C12 Aromatic Hydrocarbons (ref. to 1,2,4,5-TMB)	126

Container Type: NA - Not Applicable

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4/2/2013
Mr. Jeffrey Cloud
Conestoga-Rovers Associates (CRA)
1420 80th Street SW
Suite A
Everett WA 98203

Project Name: 211253
Project #: 060058
Workorder #: 1303265C

Dear Mr. Jeffrey Cloud

The following report includes the data for the above referenced project for sample(s) received on 3/14/2013 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1303265C

Work Order Summary

CLIENT:	Mr. Jeffrey Cloud Conestoga-Rovers Associates (CRA) 1420 80th Street SW Suite A Everett, WA 98203	**BILL TO:**	Accounts Payable Conestoga-Rovers Associates (CRA) 2055 Niagara Falls Blvd. Suite Three Niagara Falls, NY 14304
PHONE:	425-212-5100	**P.O. #**	060058
FAX:	425-212-5199	**PROJECT #**	060058 211253
DATE RECEIVED:	03/14/2013	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	04/02/2013		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	VP-1-5	Modified ASTM D-1946	5.7 "Hg	4.7 psi
02A	VP-1-10	Modified ASTM D-1946	5.9 "Hg	5.4 psi
03A	VP-2-5	Modified ASTM D-1946	6.5 "Hg	5.2 psi
04A	VP-2-10	Modified ASTM D-1946	6.7 "Hg	4.8 psi
05A	VP-3-5	Modified ASTM D-1946	3.5 "Hg	5.2 psi
06A	VP-3-10	Modified ASTM D-1946	5.5 "Hg	5.1 psi
07A	VP-4-5	Modified ASTM D-1946	1.5 "Hg	5 psi
08A	VP-4-10	Modified ASTM D-1946	4.1 "Hg	5.1 psi
09A	VP-5-4.5	Modified ASTM D-1946	6.1 "Hg	5 psi
10A	VP-5-9	Modified ASTM D-1946	4.5 "Hg	5.1 psi
11A	DUP	Modified ASTM D-1946	6.5 "Hg	5 psi
12A	Lab Blank	Modified ASTM D-1946	NA	NA
12B	Lab Blank	Modified ASTM D-1946	NA	NA
13A	LCS	Modified ASTM D-1946	NA	NA
13AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 04/02/13

Technical Director

Certfication numbers: AZ Licensure AZ0775, CA NELAP - 12282CA, NY NELAP - 11291,
TX NELAP - T104704434-12-5, UT NELAP CA009332012-3, WA NELAP - C935
Name of Accrediting Agency: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2011, Expiration date: 10/17/2012.
Eurofins Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
Conestoga-Rovers Associates (CRA)
Workorder# 1303265C

Eleven 6 Liter Summa Canister (100% Certified) samples were received on March 14, 2013. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A 3-point calibration curve is performed. Quantitation is based on a daily calibration standard which may or may not resemble the composition of the associated samples.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The reporting limit for Nitrogen was raised from 0.10% to 0.50%.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-1-5

Lab ID#: 1303265C-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.16	15
Nitrogen	0.82	81
Carbon Dioxide	0.016	3.3

Client Sample ID: VP-1-10

Lab ID#: 1303265C-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	20
Nitrogen	0.85	78
Carbon Dioxide	0.017	1.7

Client Sample ID: VP-2-5

Lab ID#: 1303265C-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	16
Nitrogen	0.86	82
Carbon Dioxide	0.017	1.7

Client Sample ID: VP-2-10

Lab ID#: 1303265C-04A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	4.6
Nitrogen	0.86	90
Carbon Dioxide	0.017	5.7
Methane	0.00017	0.0012

Client Sample ID: VP-3-5

Lab ID#: 1303265C-05A

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-3-5

Lab ID#: 1303265C-05A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.15	4.7
Nitrogen	0.76	93
Carbon Dioxide	0.015	1.9
Methane	0.00015	0.0025

Client Sample ID: VP-3-10

Lab ID#: 1303265C-06A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.16	1.5
Nitrogen	0.82	98
Carbon Dioxide	0.016	0.39
Methane	0.00016	0.57

Client Sample ID: VP-4-5

Lab ID#: 1303265C-07A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.14	13
Nitrogen	0.70	80
Carbon Dioxide	0.014	6.5
Helium	0.070	0.19

Client Sample ID: VP-4-10

Lab ID#: 1303265C-08A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.16	11
Nitrogen	0.78	80
Carbon Dioxide	0.016	8.9

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: VP-5-4.5

Lab ID#: 1303265C-09A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	13
Nitrogen	0.84	84
Carbon Dioxide	0.017	3.1

Client Sample ID: VP-5-9

Lab ID#: 1303265C-10A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.16	13
Nitrogen	0.79	83
Carbon Dioxide	0.016	3.8

Client Sample ID: DUP

Lab ID#: 1303265C-11A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	16
Nitrogen	0.86	82
Carbon Dioxide	0.017	1.7

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Client Sample ID: VP-1-5

Lab ID#: 1303265C-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040110b**	**Date of Collection: 3/13/13 3:07:00 PM**	
Dil. Factor:	**1.63**	**Date of Analysis: 4/1/13 08:30 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.16	15
Nitrogen	0.82	81
Carbon Dioxide	0.016	3.3
Methane	0.00016	Not Detected
Helium	0.082	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-1-10

Lab ID#: 1303265C-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040111b**	**Date of Collection: 3/13/13 2:45:00 PM**	
Dil. Factor:	**1.70**	**Date of Analysis: 4/1/13 09:12 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	20
Nitrogen	0.85	78
Carbon Dioxide	0.017	1.7
Methane	0.00017	Not Detected
Helium	0.085	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-2-5

Lab ID#: 1303265C-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040112b**	**Date of Collection: 3/13/13 1:02:00 PM**	
Dil. Factor:	**1.73**	**Date of Analysis: 4/1/13 10:03 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	16
Nitrogen	0.86	82
Carbon Dioxide	0.017	1.7
Methane	0.00017	Not Detected
Helium	0.086	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-2-10

Lab ID#: 1303265C-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040113b**	**Date of Collection: 3/13/13 12:12:00 PM**	
Dil. Factor:	**1.71**	**Date of Analysis: 4/1/13 10:40 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.17	4.6
Nitrogen	0.86	90
Carbon Dioxide	0.017	5.7
Methane	0.00017	0.0012
Helium	0.086	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-3-5

Lab ID#: 1303265C-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040114b**	**Date of Collection: 3/13/13 10:19:00 AM**	
Dil. Factor:	**1.53**	**Date of Analysis: 4/1/13 11:06 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.15	4.7
Nitrogen	0.76	93
Carbon Dioxide	0.015	1.9
Methane	0.00015	0.0025
Helium	0.076	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-3-10

Lab ID#: 1303265C-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040120b**	**Date of Collection: 3/13/13 10:19:00 AM**	
Dil. Factor:	**1.65**	**Date of Analysis: 4/2/13 01:54 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.16	1.5
Nitrogen	0.82	98
Carbon Dioxide	0.016	0.39
Methane	0.00016	0.57
Helium	0.082	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-4-5

Lab ID#: 1303265C-07A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040115b**	**Date of Collection: 3/12/13 4:44:00 PM**	
Dil. Factor:	**1.41**	**Date of Analysis: 4/1/13 11:46 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.14	13
Nitrogen	0.70	80
Carbon Dioxide	0.014	6.5
Methane	0.00014	Not Detected
Helium	0.070	0.19

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-4-10

Lab ID#: 1303265C-08A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040116b**	**Date of Collection: 3/12/13 1:14:00 PM**	
Dil. Factor:	**1.56**	**Date of Analysis: 4/2/13 12:18 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.16	11
Nitrogen	0.78	80
Carbon Dioxide	0.016	8.9
Methane	0.00016	Not Detected
Helium	0.078	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-5-4.5

Lab ID#: 1303265C-09A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040117b**	**Date of Collection: 3/12/13 1:11:00 PM**	
Dil. Factor:	**1.68**	**Date of Analysis: 4/2/13 12:42 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.17	13
Nitrogen	0.84	84
Carbon Dioxide	0.017	3.1
Methane	0.00017	Not Detected
Helium	0.084	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: VP-5-9

Lab ID#: 1303265C-10A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040118b**	**Date of Collection: 3/12/13 12:58:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 4/2/13 01:05 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.16	13
Nitrogen	0.79	83
Carbon Dioxide	0.016	3.8
Methane	0.00016	Not Detected
Helium	0.079	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: DUP

Lab ID#: 1303265C-11A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040119b**	**Date of Collection: NA**	
Dil. Factor:	**1.71**	**Date of Analysis: 4/2/13 01:28 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.17	16
Nitrogen	0.86	82
Carbon Dioxide	0.017	1.7
Methane	0.00017	Not Detected
Helium	0.086	Not Detected

Container Type: 6 Liter Summa Canister (100% Certified)

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Client Sample ID: Lab Blank

Lab ID#: 1303265C-12A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040104b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/1/13 05:09 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	Not Detected
Nitrogen	0.50	Not Detected
Carbon Dioxide	0.010	Not Detected
Methane	0.00010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: Lab Blank

Lab ID#: 1303265C-12B

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040103c**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/1/13 04:41 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1303265C-13A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040102b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/1/13 03:45 PM**	

Compound	%Recovery
Oxygen	102
Nitrogen	101
Carbon Dioxide	101
Methane	98
Helium	99

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1303265C-13AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10040123b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/2/13 03:03 AM**	

Compound	%Recovery
Oxygen	104
Nitrogen	101
Carbon Dioxide	101
Methane	99
Helium	99

Container Type: NA - Not Applicable

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CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager ~~Brian Silva~~ BS 3-13-13 Kelly Beuttner

Collected by: (Print and Sign) W. Martinez / B. Sandor

Company CRA Email bsilva@craworld.com

Address 10969 Trade Center Dr City Suite 107 Rancho Cordova State CA Zip 95670

Phone 916-884-8908 Fax 916 884 8999

Project Info:
P.O. #
Project # 060058
Project Name 211253

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	VP-1-5	34325	3-13-13	1507	VOCs / TPHg TO-15	-28	-3		
02A	VP-1-10	34323	3-13-13	1445	VOCs/TPHg TO-15 APH	-29.5	-4.5		
03A	VP-2-5	5676	3-13-13	1302	VOCs/TPHg TO-15 SIM	-30	-5		
04A	VP-2-10	34031	3-13-13	1212	O_2 CO_2 N methane He ASTM 1946	-30	-5		
05A	VP-3-5	33984	3-13-13	1019		-29	-4		
06A	VP-3-10	34246	3-13-13	1019		-19	-5		
07A	VP-4-5	13855	3-12-13	1644		-27.5	-2.5		
08A	VP-4-10	24480	3-12-13	1614		-28.5	-3.5		
09A	~~VP-5-5~~ BS 3-13-13	VP-5-4.5	34501	3-12-13	1311		-29.2	-4.0	
10A	~~VP-5-10~~ BS 3-13-13	VP-5-9	33072	3-12-13	1258		-27.0	-2	

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	3-14-13	[signature] ATL	03/14/13 0955
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:
Please run all samples for
- VOCs/TPHg TO-15
- VOCs/TPHg TO-15 APH
- VOCs/TPHg TO-15 SIM
- O_2, CO_2, N, methane, He ASTM-1946

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Client drop off		NA	good	Yes No (None)	1303265

Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Kelly Buettner

Collected by: (Print and Sign) W. Martinez / B. Sandar

Company CRA Email bsilva@craworld.com

Address 10969 Trade Center Dr. st 107 City Rancho Cordova State CA Zip 95670

Phone 916-999-3909 Fax 916-854-3599

Project Info:
P.O. #
Project # 060058
Project Name 21253

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
11A	DUP	9421			VOCs/TPHg TO-15	-30	-5		
					VOCs/TPHg TO-15 APH				
					VOCs/TPHg TO-15 SIM				
					O_2 CO_2 N methane He ASTM 1946				

Relinquished by: (signature) Date/Time: 3-14-13
Received by: (signature) Date/Time: Karl Beeler AIC 03/14/13 1955

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Notes:
Please run all samples for
- VOCs/TPHg TO-15.
- VOCs/TPHg TO-15 APH.
- VOCs/TPHg TO-15 SIM
- O_2, CO_2, N, methane, He ASTM 1946

Lab Use Only

Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
Client drop		NA	good	Yes No (None)	1303265

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Project Manager ~~Brian Silva~~ BS 3-13-13 Kelly Beuttner

Collected by: (Print and Sign) W. Martinez / B. Sandor

Company CRA Email bsilva@craworld.com

Address 10969 Trade Center Dr City Suite 107 Rancho Cordova State CA Zip 95670

Phone 916-884-8908 Fax 916 884 8999

Project Info:
P.O. #
Project # 060058
Project Name 211253

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	VP-1-5	34325	3-13-13	1507	VOCs / TPHg TO-15	-28	-3		
02A	VP-1-10	34323	3-13-13	1445	VOCs/TPHg TO-15 APH	-29.5	-4.5		
03A	VP-2-5	5676	3-13-13	1302	VOCs/TPHg TO-15 SIM	-30	-5		
04A	VP-2-10	34031	3-13-13	1212	O_2 CO_2 N methane He ASTM 1946	-30	-5		
05A	VP-3-5	33984	3-13-13	1019		-29	-4		
06A	VP-3-10	34246	3-13-13	1019		-19	-5		
07A	VP-4-5	13855	3-12-13	1644		-27.5	-2.5		
08A	VP-4-10	24480	3-12-13	1614		-28.5	-3.5		
09A	~~VP-5-5~~ BS 3-13-13	VP-5-4.5	34501	3-12-13	1311		-29.2	-4.0	
10A	~~VP-5-10~~ BS 3-13-13	VP-5-9	33072	3-12-13	1258		-27.0	-2	

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
[signature]	3-14-13	[signature] ATL	03/14/13 0955
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes:
Please run all samples for
- VOCs/TPHg TO-15
- VOCs/TPHg TO-15 APH
- VOCs/TPHg TO-15 SIM
- O_2, CO_2, N, methane, He ASTM-1946

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	Client drop off		NA	good	Yes No (None)	1303265

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Project Info:
P.O. #
Project # 060058
Project Name 21253

Turn Around Time:
☒ Normal
☐ Rush
specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
11A	DUP	9421			VOCs/TPHg TO-15	-30	-5		
					VOCs/TPHg TO-15 APH				
					VOCs/TPHg TO-15 SIM				
					O_2 CO_2 N methane He ASTM 1946				

Relinquished by: (signature) Date/Time: 3-14-13
Received by: (signature) Date/Time: Karl Beeler AIC 03/14/13 1955

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Relinquished by: (signature) Date/Time
Received by: (signature) Date/Time

Notes:
Please run all samples for
- VOCs/TPHg TO-15.
- VOCs/TPHg TO-15 APH.
- VOCs/TPHg TO-15 SIM
- O_2, CO_2, N, methane, He ASTM 1946

Lab Use Only

Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
Client drop		NA	good	Yes No (None)	1303265

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APPENDIX G

SOIL AND SOIL VAPOR HHRA MEMO

CONESTOGA-ROVERS & ASSOCIATES

651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2
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www.CRAworld.com

MEMORANDUM

TO:	Brian Silva	REF. NO.:	60058
FROM:	Sarah Gewurtz/Tina LePage/April Gowing/kf/1	DATE:	May 10, 2013
RE:	**Site-Specific Human Health Risk Assessment, Former Texaco Station 21-1253 930 Springtown Boulevard, Livermore, California**		

1.0 INTRODUCTION

On behalf of Chevron Environmental Management Company (Chevron), Conestoga-Rovers & Associates (CRA) has conducted a Site-specific Human Health Risk Assessment (HHRA) for residual petroleum hydrocarbons in soil and soil vapor at the former Texaco Station 21-1253 located at 930 Springtown Boulevard, Livermore, California (Site). Soil monitoring has been conducted at the Site since 1984, and soil vapor monitoring was conducted in March 2013. The purpose of the HHRA was to evaluate whether the presence of residual petroleum hydrocarbons in Site soil and soil vapor could pose risks/hazards that are above acceptable levels to human health.

2.0 ANALYTICAL DATA

The soil and soil vapor data evaluated in the HHRA are summarized in the following subsections.

2.1 SOIL DATA

The soil analytical data set applied in the HHRA includes soil data collected between 1985 and 2013 from the following sampling locations: Bottom, North, South, East, West, B-1, CPT1, CPT2, CPT6, CPT7, GP-1, GP-3, GP-4, MW8C, MW-15, MW-17, MW-18, MW-19, MW-20, SB-2A, VP-1, VP-2, VP-3, VP-4, and VP-5. Samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX), total petroleum hydrocarbons (TPH) gasoline (g), and selected volatile organic compounds (VOCs). The data set evaluated for the purposes of the HHRA includes only those samples taken from depths of less than 10 feet below ground surface (ft bgs), as the commercial/industrial receptors are not expected to be exposed to soil from depths greater than 10 ft bgs. Table A.1 of Attachment A presents the soil analytical data applied in the HHRA.

2.2 SOIL VAPOR DATA

The soil vapor data set includes data collected in 2013 from the following sampling locations: VP-1, VP-2, VP-3, VP-4, and VP-5. Soil vapor samples were analyzed for BTEX, the VOC chemicals methyl tert-butyl ether (MTBE) and naphthalene, and aromatic and aliphatic petroleum hydrocarbon (PHC) fractions. Table A.2 of Attachment A presents the soil vapor analytical data applied in the HHRA.

3.0 SITE-SPECIFIC HUMAN HEALTH RISK ASSESSMENT

The basis of this HHRA was to evaluate the potential for risks to human health due to residual petroleum hydrocarbons in Site soil and soil vapor. The HHRA consisted of the following four components: 1) Problem Formulation; 2) Exposure Assessment; 3) Toxicity Assessment; and 4) Risk Characterization. These four components are presented below.

3.1 PROBLEM FORMULATION

The chemicals of potential concern (COPCs) in Site soil and soil vapor were selected based on a comparison of the greater of the maximum detected concentration or maximum detection limit of all chemicals analyzed to the appropriate Office of Environmental Health and Hazard Assessment (OEHHA) California Human Health Screening Levels (CHHSLs) or the San Francisco Regional Water Quality Control Board (SFRWQCB) Environmental Screening Levels (ESLs) when CHHSLs were not available. There were no CHHSLs available for the chemicals analyzed in soil. As such, the COPCs for soil were identified by comparing the maximum detected concentration or maximum detection limit to the SFRWQCB Table K-2 (SFRWQCB, 2013). COPCs for Site soil vapor were identified by comparing the analytical results to the CHHSL commercial/industrial soil-gas-screening numbers for volatile chemicals below buildings constructed without engineered fill below sub-slab gravel (OEHHA, 2010). If there were no CHHLS soil vapor criteria, soil vapor concentrations were compared to the Table E-2 Shallow Soil Gas Screening Levels for Evaluation of Potential Vapor Intrusion, Commercial/Industrial Land Use (SFRWQCB, 2013). All compounds that were detected that lacked corresponding ESLs were identified as COPCs and carried forward in the HHRA. All compounds that were not detected were not identified as COPCs.

3.1.1 SOIL CHEMICALS OF POTENTIAL CONCERN

As indicated in Table 1, the maximum concentrations of benzene and ethylbenzene in Site soil exceeded the SFRWQCB Table K-2 ESLs (SFWQCB, 2013), and were therefore identified as COPCs and carried forward in the HHRA.

3.1.2 SOIL VAPOR CHEMICALS OF POTENTIAL CONCERN

As indicated in Tables 2, C5-C6 Aliphatic, C6-C8 Aliphatic, and C8-C10 Aliphatic PHC fractions were detected in Site soil vapor but lacked corresponding CHHSLs and ESLs. As such, C5-C6 Aliphatic, C6-C8 Aliphatic, and C8-C10 Aliphatic PHC fractions were identified as COPCs and carried forward in the HHRA.

3.1.3 HUMAN HEALTH CONCEPTUAL SITE MODEL

The human health conceptual site model (CSM) is developed based on the potential routes of exposure posed by the presence of COPCs in Site soil and soil vapor. The Site currently operates as a 7-Eleven convenience store and the projected land use of the Site is continuing commercial/industrial. The Site was formerly a Texaco service station until it was sold in 1985 to Southland Corporation. The Site is located in

an area of primarily commercial land use and a commercial/industrial worker is considered a potential receptor in the HHRA. The commercial/industrial worker would be considered an adult working primarily indoors at a commercial building located at the Site. The commercial/industrial worker exposure pathways are described further in Section 3.1.4.

3.1.4 RISK ASSESSMENT OBJECTIVES

The objective of the HHRA is to quantify the health risks/hazards to the human receptors associated with the presence of COPCs in Site soil and soil vapor. Human health risks/hazards are calculated for the receptors following an approach published by the California Regional Water Quality Control Board (CRWQCB), as referenced herein, and by the United States Environmental Protection Agency (USEPA). The Property is located in an area of primarily commercial land use. The Site currently operates as a 7-Eleven convenience store, and this land use is expected to continue. The potential receptor for the Site includes a current and future commercial/industrial worker (adult). The potential commercial/industrial worker exposure pathways are described below.

Commercial/Industrial Worker

The commercial/industrial worker would be an adult working primarily indoors within a current/future on-site commercial building, and a limited amount outdoors. The commercial/industrial worker could therefore be exposed to soil that may be impacted by COPCs through direct contact, or to indoor air that may be impacted by volatile COPCs present in soil vapor through inhalation. Direct contact exposure of the commercial/industrial worker to COPCs in soil, and volatile COPCs in soil vapor migrating to indoor air is quantitatively evaluated in the risk characterization presented in Section 3.4.

3.1.5 QUANTIFICATION OF HEALTH RISKS

A quantitative risk characterization was conducted to determine the non-cancer hazards and cancer risks for commercial/industrial worker inhalation exposures to soil and soil vapor COPCs. For the non-cancer hazard, the hazard index for all COPCs was compared to a target hazard index of 1.0. The estimated cancer risk level for all COPCs was compared to the target risk levels of 1×10^{-6} and 1×10^{-4}.

3.2 EXPOSURE ASSESSMENT

Exposure is defined as the contact of a receptor with a chemical or physical agent. The exposure assessment is the estimation of the magnitude, frequency, duration, and routes of potential exposure. An exposure assessment provides a systematic analysis of the potential exposure mechanisms by which a receptor may be exposed to chemical or physical agents at or originating from a source. The objectives of an exposure assessment are as follows:

- Receptor Characteristics
- Exposure Pathway Analysis
- Estimation of Exposure

3.2.1 RECEPTOR CHARACTERISTICS

The current/future commercial/industrial worker is assumed to be an adult working primarily indoors within the existing 7-Eleven convenience store. The commercial/industrial worker receptor could be exposed to COPCs through direct contact with impacted soil and/or by the inhalation of indoor air impacted by volatile COPCs in soil vapor.

3.2.2 EXPOSURE PATHWAY ANALYSIS

As described in Section 3.1.4, the exposure pathways quantitatively evaluated in this HHRA are the potential commercial/industrial worker direct contact exposure to soil COPCs and inhalation exposure to COPCs in soil vapor migrating to indoor air. The quantification of the potential exposure of the receptor to the COPCs in soil and soil vapor is presented in Section 3.2.3.

3.2.3 EXPOSURE ESTIMATES

In the HHRA, the magnitude of exposure reflects a number of parameters, among them the chemical concentration, fraction of time exposed, exposure frequency, and exposure duration. This section outlines the approach for determining the amount of the identified COPCs to which the selected receptors may be exposed due to the on-site media.

Inhalation of Indoor Air Exposure Pathway

The chronic daily intake equation for calculating chemical intake from the inhalation of indoor air (USEPA, 1989) is:

$$CDI_{inh} = \frac{CIA \times FT \times EF \times ED}{AT} \qquad \text{Equation 1}$$

Where:

CDI_{inh} = Chronic daily chemical intake via inhalation (mg/m^3)

CIA = Chemical concentration in indoor air (e.g., mg/m^3)

FT = Fraction of time exposed (unitless)

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time (averaging period, days)

Incidental Ingestion of Soil Exposure Pathway

The chronic daily intake equation for calculating chemical intake from the incidental ingestion of soil (USEPA 1989) is:

$$CDI_{ing} = \frac{CS \times IR \times EF \times ED \times CF}{BW \times AT} \qquad \text{Equation 2}$$

Where:

CDI_{ing} = Chronic daily chemical intake via soil ingestion (mg/kg body weight/day)
CS = Chemical concentration in soil (mg/kg)
IR = Ingestion rate (mg soil/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
CF = Conversion factor (10^{-6} kg/mg)
BW = Body weight (kg)
AT = Averaging time (averaging period, days)

Soil Dermal Contact Exposure Pathway

The chronic daily intake equation for calculating chemical intake from dermal exposure to soil (USEPA, 1989) is:

$$CDI_{derm} = \frac{CS \times SA \times AF \times ABS \times EF \times ED \times CF}{BW \times AT} \qquad \text{Equation 3}$$

Where:

CDI_{derm} = Chronic daily chemical intake via dermal contact (mg/kg body weight/day)
CS = Chemical concentration in soil (mg/kg)
SA = Skin surface area available for contact (cm^2/day)
AF = Soil to skin adherence factor (mg/cm^2)
ABS = Absorption factor - dermal (unitless)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
CF = Conversion factor (10^{-6} kg/mg)
BW = Body weight (kg)
AT = Averaging time (averaging period, days)

Soil Particulate or Vapor Inhalation from Soil Exposure Pathway

The intake equation for calculating chemical intake from the inhalation of particulate or vapors originating from soil (USEPA, 2002) is:

$$CDI_{part/vap} = \frac{CS \times FT \times EF \times ED \times (1/PEF \text{ or } VF)}{AT} \qquad \text{Equation 4}$$

Where:

$CDI_{part/vap}$	=	Chronic daily chemical intake via particulate and soil vapor inhalation (mg/kg body weight/day)
CS	=	Chemical concentration in soil (mg/kg)
FT	=	Fraction time exposed (unitless)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
PEF	=	Soil particulate emission factor (m^3/kg)
VF	=	Volatilization factor (m^3/kg)
AT	=	Averaging time (averaging period, days)

As all Site COPCs are considered volatile, the particulate emission factor (PEF) was not applied.

Exposure Point Concentrations

Soil and soil vapor analytical data were used to estimate the chemical intake of the COPCs in the various media by the exposure pathways presented above. The chemical concentration or exposure point concentration (EPC) of each COPC in Site soil and soil vapor corresponds to the 95 percent Upper Confidence Limit (UCL) of the mean of the data set which is known as the reasonable maximum exposure (RME). The RME values for soil and soil vapour were determined based on the observed data distribution and the percentage of censored data points (non-detect results) consistent with the USEPA's ProUCL Version 4.1.00 software. The methods incorporated in this software are described in USEPA (2010a, 2010b), which have been used as the primary reference documents for the UCL methodologies.

The arithmetic mean, maximum, and RME (95 percent UCL) concentrations for the COPCs in Site soil and soil vapor are presented in Tables 3 and 4, respectively.

3.2.3.1 COMMERCIAL/INDUSTRIAL WORKER EXPOSURE ASSUMPTIONS

The commercial/industrial worker receptor evaluated in this HHRA was considered to be an adult worker for a typical working duration of 25 years (DTSC, 2011). The commercial/industrial worker exposure assumptions utilized in the estimation of the magnitude of their exposure to COPCs in soil and indoor air are summarized in the following table:

Receptor Characteristics for a Commercial/Industrial Worker		
Parameter	***Commercial/Industrial Worker***	***Reference***
Ingestion Rate of Soil	100 mg/day	DTSC, 2011
Body Weight	70 kg	DTSC, 2011
Skin Surface Area Available for Contact	5,700 cm^2/day	DTSC, 2011
Soil to Skin Adherence Factor	0.2 mg/cm^2	DTSC, 2011
Absorption Factor – Dermal	Chemical-specific	DTSC, 2011; MADEP, 2002 (1)
Fraction Time Exposed – Indoor Air	8/24	DTSC, 2011
Fraction Time Exposed – Outdoor Air	1/24	Professional Judgement (2)
Exposure Frequency	250 days/year	DTSC, 2011
Exposure Duration	25 years	DTSC, 2011
Averaging Time (cancer)	25,550 days	DTSC, 2011
Averaging Time (non-cancer)	9,125 days	DTSC, 2011
Volatilization Factor	Chemical-specific, m^3/kg	USEPA, 2002 (3)

Notes:
(1) Dermal absorption fraction for volatile organic compounds (VOCs) listed at 0 (DTSC, 2011) and for petroleum hydrocarbon compounds (PHCs) listed at 0.1. (MADEP, 2002).
(2) Professional Judgement; assume that a worker will spend only one hour outside during their 8 hour work day.
(3) Volatilization factor calculated using equations presented USEPA (2002), as discussed in the following section below.

The exposure assumptions and equations utilized in the calculation of the magnitude of exposure to COPCs in soil and indoor air from soil vapor for the commercial/industrial worker are summarized in Tables 5 and 6.

The inhalation of vapors originating from soil is modeled through the use of a VF to estimate ambient air concentrations based on soil concentrations. The VF is chemical-specific and was calculated using the approach presented by USEPA (2002) and Site-specific soil properties. The equations and inputs for the calculated VF values are presented in Table 7. The derivation of the dispersion term, Q/C_{vol}, used in the calculation of the VF is presented in Table 7, and was based on an area of 0.5 acres and values for Zone 2 (Fresno, California) for the constants A, B, and C, as presented in USEPA (2002).

The concentration of chemicals in indoor air is modeled based on the concentration of volatile chemicals in Site soil vapor using the Johnson and Ettinger (1991) model (J&E Model), as described in Attachment B. The indoor air concentrations from soil vapor were conservatively modeled assuming the maximum soil vapor concentrations.

The building at 930 Springtown Boulevard is approximately 14.6 m by 16.5 m. Therefore, the default commercial building dimensions of 10 m by 10 m applied by CalEPA (2005) to estimate the potential indoor air concentrations for the current/future commercial/industrial receptor is conservative.

3.3 HUMAN HEALTH TOXICITY VALUES

The toxicity values used in the calculation of the human health risks and hazards include cancer slope factors (CSF) and inhalation unit risk factors (URF) for carcinogenic effects and chronic reference doses (RfD) and chronic inhalation reference concentrations (RfC) for non-carcinogenic effects. In most cases,

non-carcinogenic toxicity factors were obtained from USEPA (2012) or CalEPA (2012) for the oral or inhalation route of exposure, respectively. Carcinogenic toxicity factors were obtained from the CalEPA OEHHA Toxicity Criteria Database (2009). Non-carcinogenic endpoints for C5-C6 Aliphatic, C6-C8 Aliphatic, and C8-C10 Aliphatic were obtained from the Total Petroleum Hydrocarbon Working group (Volume 4, 1997).

Tables 8 and 9 present the COPC non-cancer toxicity data (RfDs and RfCs) used to estimate human health effects for the oral/dermal and inhalation exposure routes, respectively. Tables 10 and 11 present the COPC cancer toxicity data (CSFs and URFs) used to estimate human health effects for the oral/dermal and inhalation exposure routes, respectively.

3.4 RISK CHARACTERIZATION

Quantitative analyses were conducted to characterize health risks/hazards for the commercial/industrial worker receptor. The methodology applied to quantify health risks/hazards is presented below, and the quantified health risks/hazards are presented in Section 3.4.1. The interpretation of the quantified health risks/hazards is presented in Section 3.4.2.

The objective of the quantitative risk characterization is to integrate information developed in the exposure assessment (Section 3.2) and the toxicity assessment (Section 3.3) into a complete evaluation of the potential human health risks associated with exposure to COPCs for the commercial/industrial worker.

Non-Cancer Hazard Estimates

The potential for non-cancer health effects from exposure to a COPC is evaluated by comparing an exposure level over a specified time period to a RfD or RfC for a similar time period. This ratio, termed the hazard quotient, is calculated according to the following general equation:

$$HQ = \frac{I}{RfD \text{ or } RfC}$$

Where:

HQ = The Hazard Quotient (unitless) is the ratio of the exposure dose of a chemical to a reference concentration not expected to cause adverse effects from a lifetime exposure. A hazard quotient equal to or below 1.0 is considered protective of human health.

I = The Chemical Intake, or exposure, is the chemical dose calculated by applying the exposure scenario assumptions and is expressed as mg/(kg-day) for ingestion and dermal exposure, and as mg/m^3 for inhalation exposures. The intake represents the average daily chemical dose or concentration over the expected period of exposure.

RfD = The Reference Dose is a daily dose believed not to cause an adverse effect from even a lifetime studies.

RfC = The Reference Concentration is a daily concentration believed not to cause an adverse effect from even a lifetime exposure (mg/m^3). Both the RfD and the RfC are based on experimental data.

COPCs may exert toxic effects on different target organs. However, for the purposes of this HHRA, non-carcinogenic effects were not differentiated for each target organ. This assumption implies that all chemicals act on the same target organ, which may not be the case, and is a default assumption. Summation of HQs for individual COPCs for a specific exposure scenario is called the Hazard Index (HI). The potential non-carcinogenic effects resulting from exposure to all COPCs are compared to the target HI of 1, which is considered protective of human health.

Cancer Risk Estimates

Exposure scenarios may involve potential exposure to a carcinogen through more than one pathway (e.g., oral, dermal, and inhalation). To represent the potential carcinogenic effects posed by multiple pathways, it is assumed that these risks are additive. Cancer risks are calculated utilizing the following general equation:

$$Cancer\ Risk = I \times (CSF\ or\ URF)$$

Where:

Cancer Risk	=	Estimated upper bound on additional risk of cancer over a lifetime in an individual exposed to the carcinogen for a specified exposure period (unitless).
I	=	The Chemical Intake due to exposure to the chemical is calculated using exposure scenario assumptions and is expressed in mg/(kg-day) for oral and dermal exposure, and in mg/m^3 for inhalation exposure. The chronic daily intake represents the total lifetime chemical dose averaged over an individual expected lifetime of 70 years.
CSF	=	The Cancer Slope Factor models the potential carcinogenic response and is expressed as $[mg/(kg\text{-}day)]^{-1}$.
URF	=	The inhalation Unit Risk Factor models the potential carcinogenic response and is expressed as $[mg/m^3]^{-1}$.

For estimating cancer risks from exposure to multiple carcinogens from a single exposure route, the following equation is used:

$$Risk_T = \sum_{i=1}^{N} Risk_i$$

Where:

$Risk_T$	=	Total cancer risk from route of exposure
$Risk_i$	=	Cancer risk for the chemical
N	=	Number of chemicals

USEPA policy, as specified in the NCP (1990), has established that an upper limit cancer risk falling below or within the range of 1.0×10^{-6} to 1.0×10^{-4} is acceptable. USEPA does, however, determine the acceptable risk level on a site-by-site basis, taking into account a full engineering and cost analysis for the site. The potential risks resulting from exposure to all COPCs are compared to target risks of 1.0×10^{-6} and 1.0×10^{-4},

or 1 in 1,000,000 and 1 in 10,000, respectively. A total risk equal to or below 1.0×10^{-4} is considered protective of human health by CalEPA (2005), CRWQCB (2008), and the USEPA (1989).

3.4.1 QUANTIFICATION OF HEALTH RISKS

The risk characterization conducted for the HHRA consists of quantifying the magnitude of exposure followed by the hazard quotient and cancer risk posed by all COPCs to the commercial/industrial worker receptor. The calculations of the hazard quotient and cancer risk posed by each COPC to the current/future industrial/commercial worker within the Site is presented in Table 12 and summarized in Table 13 and in Section 3.4.2.

3.4.2 QUANTITATIVE INTERPRETATION OF HEALTH RISKS

The risk characterization conducted for the HHRA consists of quantifying the magnitude of exposure followed by the hazard quotient and cancer risk posed by all COPCs to the commercial/industrial worker receptor. The calculation of the hazard quotients and cancer risks posed by each COPC within the Site to the current/future commercial/industrial worker is presented in Table 12. The hazard index and cumulative cancer risk for the current/future commercial/industrial worker is summarized in Table 13 and in Section 3.4.2.

3.4.2.1 COMMERCIAL/INDUSTRIAL WORKER (CURRENT/FUTURE)

The calculations of current/future commercial/industrial worker receptor exposures to soil and soil vapor were conducted following the equations presented in Tables 5 and 6. The calculation of the hazard quotient and risk levels was conducted following the equations presented earlier in Section 3.4. The risk/hazard calculations for each COPC identified for the current/future commercial/industrial worker exposure to COPCs in soil and soil vapor are presented in Table 12. The cumulative cancer risk and hazard index results are summarized in Table 13 and in the table below.

Receptor	*Medium*	*Route*	*Carcinogenic Risk*	*Risk > 10^{-6}*	*Risk > 10^{-4}*	*Non-Carcinogenic Hazard Index*	*HI > 1.0*	*Table Reference*
Commercial/Industrial Worker	Soil	Direct Contact (incidental ingestion, dermal contact, and ambient air inhalation)	7.8E-07	No	No	2.1E-03	No	13
	Soil Vapor-to-Indoor Air	Indoor air Inhalation	NC	-	-	3.5E-03	No	13
Cumulative Across All Media and Exposure Pathways:			**7.8E-07**	**No**	**No**	**5.6E-03**	**No**	**13**

Note:
NC – Not calculated.

As presented above, the cumulative carcinogenic risks associated with the current/future commercial/industrial worker exposure to COPCs in Site soil and soil vapor did not exceed their respective

target risk of 1.0×10^{-4}. In addition, the cumulative non-carcinogenic hazards associated with the current/future industrial/commercial worker exposure to COPCs in Site soil and soil vapour did not exceed their respective target HI of 1.0.

4.0 SUMMARY AND CONCLUSIONS

The soil analytical data collected between 1985 and 2013, and the soil vapor analytical data collected in 2013 were considered for the determination of Site COPCs, and subsequent determination of the potential human health risks and hazards from exposure to COPCs in Site media.

The following summarizes the major findings for the HHRA:

- Benzene and ethylbenzene were identified as COPCs in Site soil.
- C5-C6 Aliphatic, C6-C8 Aliphatic, and C8-C10 Aliphatic PHC fractions were identified as COPCs in Site soil vapor.
- Risks and hazards for a current/future commercial/industrial worker were evaluated for direct contact exposure (ingestion, dermal contact, and inhalation of ambient air) to soil COPCs and inhalation exposure to soil vapor COPCs volatilizing to indoor air within an on-Site building.
- For the current/future commercial/industrial receptor, the carcinogenic risk associated with exposure to COPCs in Site soil and soil vapor did not exceed the target risk of 1.0×10^{-4}. In addition, the cumulative non-carcinogenic hazards associated with the current/future industrial/commercial worker exposure to COPCs through direct contact to Site soil and inhalation exposure to COPCs in Site soil vapor did not exceed their respective target HI of 1.0.
- In summary, direct contact exposure to soil and indoor air inhalation exposure to soil vapor are not expected to result in unacceptable risks or hazards to the current/future commercial/industrial receptor at the Property.

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TABLES

TABLE 1

OCCURRENCE, DISTRIBUTION, AND IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN (COPCs) IN SOIL
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Medium: Soil
Exposure Medium: Soil

CAS Number	*Chemical*	*Minimum (1,2) Concentration*	*Minimum Qualifier*	*Maximum (1,2) Concentration*	*Maximum Qualifier*	*Units*	*Location of Maximum Concentration*	*Detection Frequency (2)*	*Range of Detection Limits (2)*	*Concentration Used for Screening (3)*	*Screening Criteria (4)*		*COPC Flag Y - yes N - no*	*Rationale for Contaminant Deletion or Selection (5)*
	TPH													
--	TPH (gasoline)	1.3		5200		mg/kg	MW-15; 9.5 ftbgs (06/30/09)	6/35	0.01 - 10	5200	15000	NC	N	BSC
	BTEX													
71-43-2	Benzene	0.02		4.5		mg/kg	MW-15; 9.5 ftbgs (06/30/09)	3/35	0.0005 - 1	4.5	3	C	Y	ASC
108-88-3	Toluene	0.02		44		mg/kg	MW-15; 9.5 ftbgs (06/30/09)	3/35	0.0009 - 3	44	1100	NC	N	BSC
100-41-4	Ethylbenzene	0.01		55		mg/kg	MW-15; 9.5 ftbgs (06/30/09)	5/35	0.0009 - 4	55	15	C	Y	ASC
1330-20-7	Xylenes (total)	0.009		260		mg/kg	MW-15; 9.5 ftbgs (06/30/09)	6/35	0.0009 - 15	260	510	NC	N	BSC
	VOCs													
106-93-4	1,2-Dibromoethane	ND		ND		mg/kg	--	0/4	0.001 - 0.053	0.053	1.1	C	N	ND
107-06-2	1,2-Dichloroethane	ND		ND		mg/kg	--	0/4	0.001 - 0.053	0.053	1.8	C	N	ND
108-20-3	di-Isopropyl ether	ND		ND		mg/kg	--	0/4	0.001 - 0.053	0.053	--	--	N	ND
637-92-3	Ethyl t-butyl ether	ND		ND		mg/kg	--	0/4	0.001 - 0.053	0.053	--	--	N	ND
1634-04-4	Methyl Tert Butyl Ether	ND		ND		mg/kg	--	0/20	0.0005 - 0.026	0.026	200	C	N	ND
91-20-3	Naphthalene	ND		ND		mg/kg	--	0/10	0.0009 - 0.001	0.001	8.4	C	N	ND
994-05-8	t-Amyl methyl ether	ND		ND		mg/kg	--	0/4	0.001 - 0.053	0.053	--	--	N	ND
75-65-0	t-Butyl Alcohol	ND		ND		mg/kg	--	0/4	0.02 - 1.1	1.1	--	NC	N	ND

Notes:

ND = Not Detected

C = = Carcinogenic; based on USEPA classification system

NC = Non-Carcinogenic; based on USEPA classification system

-- = Not Available

(1) Minimum/maximum detected concentration.

(2) Based on data collected from sampling locations: Bottom, North, South, East, West, B-1, CPT1, CPT2, CPT6, CPT7, GP-1, GP-3, GP-4, MW8C, MW-15, MW-17, MW-18, MW-19, MW-20, SB-2A, VP-1, VP-2, VP-3, VP-4, VP-5.

(3) Maximum concentration or maximum detection limit is used for chemicals of potential concern (COPC) selection.

(4) Due to CHHSLs not being available for these parameters, SFBRWQCB ESLs (2013) substituted.
SFBRWQCB, 2013, Cover Memo: February 2013 Update to Environmental Screening Levels, California Regional Water Quality Control Board, Interim Final, February 8, 2013.
Lookup Tables, Table K-2: Direct Exposure Soil Screening Levels, Commercial/ Industrial Worker Exposure Scenario.

(5) Rationale Codes
Selection Reason : Maximum detected above Screening Criterion (ASC)
Analyte Detected (AD)
Deletion Reason : Maximum detected below Screening Criterion (BSC)
Analyte Not Detected (ND)

TABLE 2

OCCURRENCE, DISTRIBUTION, AND IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN (COPCs) IN SOIL VAPOR
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Scenario Timeframe: Current/ Future
Medium: Soil Vapor
Exposure Medium: Indoor Air

CAS Number	*Chemical*	*Minimum (1,2) Concentration*	*Minimum Qualifier*	*Maximum (1,2) Concentration*	*Maximum Qualifier*	*Units*	*Location of Maximum Concentration*	*Detection Frequency (2)*	*Range of Detection Limits (2)*	*Concentration Used for Screening (3)*	*Screening Criteria (4)*		*COPC Flag Y - yes N - no*	*Rationale for Contaminant Deletion or Selection (5)*
	PHCs													
--	TPHg	440		2600000		µg/m^3	VP-3; 10 ftbgs (03/13/13)	8/10	160	2600000	3100000 (6)	--	N	BSC
--	C5-C6 Aliphatic	390		140000		µg/m^3	VP-3; 10 ftbgs (03/13/13)	3/10	46 - 56	140000	--	--	Y	AD
--	C6-C8 Aliphatic	350		840000		µg/m^3	VP-3; 10 ftbgs (03/13/13)	4/10	58 - 70	840000	--	--	Y	AD
--	C8-C10 Aliphatic	180		36000		µg/m^3	VP-3; 10 ftbgs (03/13/13)	3/10	82 - 100	36000	--	--	Y	AD
--	C10-C12 Aliphatic	ND		ND		µg/m^3	--	0/10	98 - 23000	23000	--	--	N	ND
--	C8-C10 Aromatic	ND		ND		µg/m^3	--	0/10	69 - 16000	16000	--	--	N	ND
--	C10-C12 Aromatic	ND		ND		µg/m^3	--	0/10	77 - 18000	18000	--	--	N	ND
	BTEX													
71-43-2	Benzene	3		13		µg/m^3	VP-2; 10 ftbgs (03/13/13)	5/10	2.2 - 530	530	120	C	N	BSC
108-88-3	Toluene	4.5		14		µg/m^3	VP-5; 4.5 ftbgs (03/12/13)	5/10	3.1 - 620	620	380000	NC	N	BSC
100-41-4	Ethylbenzene	ND		ND		µg/m^3	--	0/10	3.1 - 720	720	1400	NC	N	ND
1330-20-7	Xylenes (total)	3.9		12.8		µg/m^3	VP-1; 10 ftbgs (03/13/13)	6/10	3.4 - 720	720	880000	NC	N	BSC
	VOCs													
1634-04-4	Methyl tert-butyl Ether (MTBE)	ND		ND		µg/m^3	--	0/10	2.5 - 590	590	13000	C	N	ND
91-20-3	Naphthalene	ND		ND		µg/m^3	--	0/10	15 - 3400	3400	110	C	N	ND

Notes:
ND = Not Detected
C = = Carcinogenic; based on USEPA classification system
NC = Non-Carcinogenic; based on USEPA classification system
-- = Not Available
(1) Minimum/maximum detected concentration.
(2) Based on data collected from sampling locations: VP-1, VP-2, VP-3, VP-4, VP-5.
(3) Maximum concentration or maximum detection limit is used for chemicals of potential concern (COPC) selection.
(4) OEHHA Soil Screening Numbers (http://oehha.ca.gov/risk/chhsltable.html), Table 3: California Human Health Screening Levels (CHHSLs),
Soil-Gas-Screening Numbers for Volatile Chemicals below Buildings Constructed Without Engineered Fill below Sub-slab Gravel, Commercial/Industrial Land Use, September 23, 2010
(5) Rationale Codes
Selection Reason : Maximum detected above Screening Criterion (ASC)
Analyte Detected (AD)
Deletion Reason : Maximum detected below Screening Criterion (BSC)
Analyte Not Detected (ND)
(6) Due to CHHSL not available for this parameter, SFBRWQCB ESL (2013) substituted.
SFBRWQCB, 2013, Cover Memo: February 2013 Update to Environmental Screening Levels, California Regional Water Quality Control Board, Interim Final, February 8, 2013.
Table E-2: Shallow Soil Gas Screening Levels for Evaluation of Potential Vapor Intrusion, Commercial/Industrial Land Use.

TABLE 3

EXPOSURE POINT CONCENTRATION (EPC) SUMMARY FOR CHEMICALS OF POTENTIAL CONCERN IN SOIL

FORMER TEXACO STATION 21-1253

930 SPRINGTOWN BOULEVARD

LIVERMORE, CALIFORNIA

Scenario Timeframe: Current/ Future

Medium: Soil

Exposure Medium: Soil

Chemical of Potential Concern	*Units*	*Arithmetic Mean*	*95% UCL of Normal Data*	*Maximum Detected Concentration*	*Maximum Qualifier*	*EPC Units*	*Reasonable Maximum Exposure*		
							Medium EPC Value	*Medium EPC Statistic*	*Medium EPC Rationale*
BTEX									
Benzene	mg/kg	1.76E-01	4.50E+00	4.50E+00		mg/kg	4.50E+00	95% UCL-N	W-Test (2)
Ethylbenzene	mg/kg	1.93E+00	(1)	5.50E+01		mg/kg	4.76E+00	95% UCL-N	W-Test (2)

Notes:

For data sets with non-detects, the Kaplan-Meier method was used (per USEPA 2006).

W-Test : Developed by Shapiro and Wilk for data sets with under 50 samples.

Refer to USEPA Supplemental Guidance to RAGS: Calculating the Concentration Term (RAGS, 1992), OSWER Directive 9285.7-081, May 1992.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-L);

95% UCL of Gamma distributed data (95% UCL-G); Non-parametric method used to Determine 95% UCL (95% UCL-NP).

(1) Data set is gamma distributed.

(2) Shapiro-Wilk W Test was used for data sets where n<=50.

TABLE 4

EXPOSURE POINT CONCENTRATION (EPC) SUMMARY FOR CHEMICALS OF POTENTIAL CONCERN IN SOIL VAPOR

FORMER TEXACO STATION 21-1253

930 SPRINGTOWN BOULEVARD

LIVERMORE, CALIFORNIA

Scenario Timeframe: Current/ Future
Medium: Soil Vapor
Exposure Medium: Indoor Air

Chemical of Potential Concern	*Units*	*Arithmetic Mean*	*95% UCL of Normal Data*	*Maximum Detected Concentration*	*Maximum Qualifier*	*EPC Units*	*Reasonable Maximum Exposure*		
							Medium EPC Value	*Medium EPC Statistic*	*Medium EPC Rationale*
PHCs									
C5-C6 Aliphatic	µg/m^3	1.41E+04	(1)	1.40E+05		µg/m^3	1.76E+05	95% UCL-NP	W-Test (3)
C6-C8 Aliphatic	µg/m^3	8.48E+04	(2)	8.40E+05		µg/m^3	2.53E+05	95% UCL-N	W-Test (3)
C8-C10 Aliphatic	µg/m^3	3.68E+03	(1)	3.60E+04		µg/m^3	2.98E+04	95% UCL-NP	W-Test (3)

Notes:

For data sets with non-detects, the Kaplan-Meier method was used (per USEPA 2006).

W-Test : Developed by Shapiro and Wilk for data sets with under 50 samples.

Refer to USEPA Supplemental Guidance to RAGS: Calculating the Concentration Term (RAGS, 1992), OSWER Directive 9285.7-081, May 1992.

Statistics: Maximum Detected Value (Max); 95% UCL of Normal Data (95% UCL-N); 95% UCL of Log-transformed Data (95% UCL-L);

95% UCL of Gamma distributed data (95% UCL-G); Non-parametric method used to Determine 95% UCL (95% UCL-NP).

(1) Data set is lognormally distributed.

(2) Data set is gamma distributed.

(3) Shapiro-Wilk W Test was used for data sets where n<=50.

TABLE 5

VALUES USED FOR DAILY INTAKE CALCULATIONS FOR SOIL - INDUSTRIAL/ COMMERCIAL WORKER
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Scenario Timeframe: Current/ Future
Medium: Soil
Exposure Medium: Soil
Receptor Population: Industrial/Commercial Worker
Receptor Age: Adult

Exposure Route	*Parameter Code*	*Parameter Definition*	*Units*	*Value*	*Rationale/ Reference*	*Intake Equation/ Model Name*
Ingestion	CS	Chemical Concentration in Soil	mg/kg	(1)	(1)	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate of Soil	mg/day	100	DTSC, 2011	CS x IR x CF x EF x ED x 1/BW x 1/AT
	CF	Conversion Factor	kg/mg	1.00E-06	--	
	EF	Exposure Frequency	days/year	250	DTSC, 2011	
	ED	Exposure Duration	years	25	DTSC, 2011	
	BW	Body Weight	kg	70	DTSC, 2011	
	AT-C	Averaging Time (cancer)	days	25,550	DTSC, 2011	
	AT-N	Averaging Time (non-cancer)	days	9,125	DTSC, 2011	
Dermal	CS	Chemical Concentration in Soil	mg/kg	(1)	(1)	CDI (mg/kg-day) =
	SA	Skin Surface Area Available for Contact	cm^2	5,700	DTSC, 2011	CS x CF x SA x AF x ABS x EF x ED x 1/BW x 1/AT
	CF	Conversion Factor	kg/mg	1.00E-06	--	
	EF	Exposure Frequency	days/year	250	DTSC, 2011	
	ED	Exposure Duration	years	25	DTSC, 2011	
	BW	Body Weight	kg	70	DTSC, 2011	
	AT-C	Averaging Time (cancer)	days	25,550	DTSC, 2011	
	AT-N	Averaging Time (non-cancer)	days	9,125	DTSC, 2011	
	AF	Soil to Skin Adherence Factor	mg/cm^2	0.2	DTSC, 2011	
	ABS	Absorption Fraction - dermal	%/100	chemical-specific	DTSC, 2011 (2)	
Inhalation	CS	Chemical Concentration in Soil	mg/kg	(1)	(1)	CDI (mg/m^3) =
	FT	Fraction Time Exposed	unitless	1/24	Professional Judgement (3)	CS x FT x EF x ED x (1/PEF or VF) x 1/AT
	EF	Exposure Frequency	days/year	250	DTSC, 2011	
	ED	Exposure Duration	years	25	DTSC, 2011	
	AT-C	Averaging Time (cancer)	days	25,550	DTSC, 2011	
	AT-N	Averaging Time (non-cancer)	days	9,125	DTSC, 2011	
	PEF	Particulate Emission Factor	m^3/kg	1.3E+09	DTSC, 2011	
	VF	Volatilization Factor	m^3/kg	chemical-specific	Refer to Table 7	

Notes:

(1) For soil concentrations, refer to Table 3.

(2) Dermal absorption fraction for volatile organic compounds (VOCs) listed at 0 (DTSC, 2011).

(3) Professional Judgement; assume worker spends only 1 hour outside during their 8 hour workday.

References:

DTSC, 2011: Human Health Risk Assessment Note 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities, California Department of Toxic Substances Control (DTSC), Office of Human and Ecological Risk (HERO), May 20, 2011 (http://www.dtsc.ca.gov/AssessingRisk/upload/HHRA_Note1.pdf).

TABLE 6

VALUES USED FOR DAILY INTAKE CALCULATIONS FOR INDOOR AIR - CURRENT/ FUTURE INDUSTRIAL/ COMMERCIAL WORKER

FORMER TEXACO STATION 21-1253

930 SPRINGTOWN BOULEVARD

LIVERMORE, CALIFORNIA

Scenario Timeframe: Current/ Future
Medium: Soil Vapor
Exposure Medium: Indoor Air
Receptor Population: Industrial/ Commercial Worker
Receptor Age: Adult

Exposure Route	*Parameter Code*	*Parameter Definition*	*Units*	*Value*	*Rationale/ Reference*	*Intake Equation/ Model Name*
Inhalation	CIA	Chemical Concentration in Indoor Air	mg/m^3	(1)	(1)	CDI (mg/m^3) =
	FT	Fraction Time Exposed	unitless	8/24	DTSC, 2011	CIA x FT x EF x ED x 1/AT
	EF	Exposure Frequency	days/year	250	DTSC, 2011	
	ED	Exposure Duration - child	years	25	DTSC, 2011	
	AT-C	Averaging Time (cancer)	days	25,550	DTSC, 2011	
	AT-N	Averaging Time (non-cancer)	days	9,125	DTSC, 2011	

Notes:

(1) For modeled indoor air concentrations, see Attachment B.

Reference:

DTSC, 2011: Human Health Risk Assessment Note 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities, California Department of Toxic Substances Control (DTSC), Office of Human and Ecological Risk (HERO), May 20, 2011 (http://www.dtsc.ca.gov/AssessingRisk/upload/HHRA_Note1.pdf).

TABLE 7

DERIVATION OF VOLATILIZATION FACTOR (VF) FOR SOIL INHALATION EXPOSURE TO VOLATILES -
INDUSTRIAL/ COMMERCIAL WORKER EXPOSURE
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

VF: Soil-to-Air Volatilization Factor

$$VF = Q/C \times \frac{(3.14 \times D_A \times T)^{1/2}}{(2 \times \rho_b \times D_A)} \times 10^{-4} (m^2/cm^2)$$

					Chemical of Potential Concern	
			Reference	*Units*	*Benzene*	*Ethylbenzene*
Where:	VF	= soil-to-air volatilization factor	Equation 4-8, USEPA, 2002	m^3/kg	2.32E+03	4.74E+03
	Q/C_{vol}	= inverse of mean conc - centre of square source	Equation D-3, USEPA, 2002	$(g/m^2\text{-sec})/(kg/m^3)$	70.95	70.95
	D_A	= apparent diffusivity	Equation 4-8, USEPA, 2002	cm^2/s	1.32E-03	3.16E-04
	T	= exposure interval	USEPA, 2002	s	7.88E+08	7.88E+08
	ρ_b	= soil dry bulk density	Attachment B	g/cm^3	2.09	2.09

Q/C_{vol}: Inverse of Mean Conc - Centre of Square Source

$$Q/C_{vol} = A \times \exp\frac{(\ln Area - B)^2}{C}$$

Where:	Q/C_{vol}	= inverse of mean conc - centre of square source	Equation D-3, USEPA, 2002	$(g/m^2\text{-sec})/(kg/m^3)$	70.95	70.95
	"A"	= constant	USEPA, 2002 (1)		10.22	10.22
	Area	= areal extent of the site or contamination	site-specific (only half of site)	acres	0.25	0.25
	"B"	= constant	USEPA, 2002 (1)		19.27	19.27
	"C"	= constant	USEPA, 2002 (1)		220.06	220.06

D_A: Apparent Diffusivity

$$D_A = \frac{\left[\left(\Theta_a^{10/3} D_i H' + \Theta_w^{10/3} D_w\right)/n^2\right]}{\rho_b K_d + \Theta_w + \Theta_a H'}$$

				Units		
Where:	D_A	= apparent diffusivity	Equation 4-8, USEPA, 2002	cm^2/s	1.32E-03	3.16E-04
	Θ_a	= air-filled porosity	Attachment B	unitless	0.251	0.251
	Θ_w	= water-filled porosity	Attachment B	unitless	0.148	0.148
	n	= total soil porosity	Attachment B	unitless	0.399	0.399
	ρ_b	= soil dry bulk density	Attachment B	g/cm^3	2.09	2.09
	H'	= dimensionless Henry's Law Constant	USEPA, 2004	unitless	2.27E-01	3.22E-01
	D_i	= diffusivity of chemical x in air	USEPA, 2004	cm^2/s	8.80E-02	7.50E-02
	D_w	= diffusivity of chemical x in water	USEPA, 2004	cm^2/s	9.80E-06	7.80E-06
	K_d	= soil-water partition coefficient	USEPA, 2002	cm^3/g	3.53E-01	2.18E+00

Kd: Soil-Water Partition Coefficient

$$K_d = K_{oc} \times f_{oc}$$

				Units		
Where:	K_d	= soil-water partition coefficient	USEPA, 2002	cm^3/g	3.53E-01	2.18E+00
	K_{oc}	= soil organic carbon-water partition coefficient	USEPA, 2004	cm^3/g	5.89E+01	3.63E+02
	f_{oc}	= organic content of soil	USEPA, 2002	g/g	0.0060	0.0060

Note:

(1) Applied the USEPA (2002) values for Zone 2, Fresno, California.

Reference:

USEPA, 2002: Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, Office of Emergency and Remedial Response, OSWER 9355.4-24, December 2002.

USEPA, 2004: User's Guide for Evaluating Subsurface Vapor Intrusion Into Buildings, February 22, 2004.

TABLE 8

NON-CANCER TOXICITY DATA - ORAL/DERMAL ROUTE OF EXPOSURE
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Chemical of Potential Concern (COPC)	*Chronic/ Subchronic*	*Oral RfD Value*	*Oral RfD Units*	*Oral to Dermal Adjustment Factor (ABS_{GI}) (1)*	*Absorbed Dermal RfD (2)*	*Units*	*Primary Target Organ*	*Combined Uncertainty/Modifying Factors*	*Sources of RfD: Target Organ (3)*	*Source Date (MM/DD/YY)*
BTEX										
Benzene	chronic	4.00E-03	mg/kg-d	100%	4.00E-03	mg/kg-d	blood system	300	IRIS	Apr-03
Ethylbenzene	chronic	1.00E-01	mg/kg-d	100%	1.00E-01	mg/kg-d	kidney	1000	IRIS	Jun-91
PHCs										
C5-C6 Aliphatic	chronic	5.00E+00	mg/kg-d	100%	5.00E+00	mg/kg-d	--	--	TPH Working Group	1997
C6-C8 Aliphatic	chronic	5.00E+00	mg/kg-d	100%	5.00E+00	mg/kg-d	--	--	TPH Working Group	1997
C8-C10 Aliphatic	chronic	1.00E-01	mg/kg-d	100%	1.00E-01	mg/kg-d	--	--	TPH Working Group	1997

Notes:

-- = Not Available

(1) A default value of 100 percent has been assumed for all parameters.

(2) Absorbed Dermal RfD = Oral RfD x (ABS_{GI}/100), consistent with Equation 4.3 of USEPA, 2004: Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005, July 2004.

(3) IRIS: Integrated Risk Information System (IRIS) Database (http://cfpub.epa.gov/ncea/iris/index.cfm).
Note: date provided is the last revision date of the IRIS toxicity data provided.
TPH Working Group: Total Petroleum Hydrocarbon Working Group, Development of Fraction Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH), Volume 4, 1997.

TABLE 9

NON-CANCER TOXICITY DATA -- INHALATION ROUTE OF EXPOSURE
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Contaminant of Potential Concern (COPC)	*Chronic/ Subchronic*	*Value Inhalation RfC*	*Units*	*Primary Target Organ*	*Combined Uncertainty/Modifying Factors*	*Sources of RfC: Target Organ (1)*	*Source Date (MM/DD/YY)*
BTEX							
Benzene	chronic	6.00E-02	mg/m^3	blood system	--	CalEPA	Feb-12
Ethylbenzene	chronic	2.00E+00	mg/m^3	developmental effects	--	CalEPA	Feb-12
PHCs							
C5-C6 Aliphatic	chronic	1.84E+01	mg/m^3	--	--	TPH Working Group	1997
C6-C8 Aliphatic	chronic	1.84E+01	mg/m^3	--	--	TPH Working Group	1997
C8-C10 Aliphatic	chronic	1.00E+00	mg/m^3	--	--	TPH Working Group	1997

Notes:

-- = Not Available

(1) CalEPA: Cal EPA Toxicity Criteria Database, Chronic Reference Exposure Level (REL) Summary Table, Office of Environmental Health Hazard Assessment (OEHHA), February 2012.

TPH Working Group: Total Petroleum Hydrocarbon Working Group, Development of Fraction Specific Reference Doses (RfDs) and Reference Concentrations (RfCs) for Total Petroleum Hydrocarbons (TPH), Volume 4, 1997.

TABLE 10

CANCER TOXICITY DATA - ORAL/DERMAL ROUTE OF EXPOSURE
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Contaminant of Potential Concern (COPC)	*Oral Cancer Slope Factor*	*Oral to Dermal Adjustment Factor (ABS_{GI}) (1)*	*Absorbed Dermal Cancer Slope Factor (2)*	*Units*	*Weight of Evidence/ Cancer Guideline Description*	*Source (3)*	*Source Date (MM/DD/YY)*
BTEX							
Benzene	1.00E-01	100%	1.00E-01	$(mg/kg\text{-}day)^{-1}$	A	CalEPA	May-09
Ethylbenzene	1.10E-02	100%	1.10E-02	$(mg/kg\text{-}day)^{-1}$	B2	CalEPA	May-09
PHCs							
C5-C6 Aliphatic	--	--	--	--	--	--	--
C6-C8 Aliphatic	--	--	--	--	--	--	--
C8-C10 Aliphatic	--	--	--	--	--	--	--

Notes:

-- = Not Available

(1) A default value of 100 percent has been assumed for all parameters.

(2) Absorbed Dermal CSF = Oral CSF x (ABS_{GI}/100), consistent with Equation 4.2 of USEPA, 2004: Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Final. EPA/540/R/99/005, July.

(1) CalEPA: Cal EPA Toxicity Criteria Database, Hot Spots Unit Risk and Cancer Potency Values, Office of Environmental Health Hazard Assessment (OEHHA), May 2009.

EPA Weight of Evidence Classification :

A - Known Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

TABLE 11

CANCER TOXICITY DATA -- INHALATION ROUTE OF EXPOSURE
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Contaminant of Potential Concern (COPC)	*Unit Risk*	*Units*	*Weight of Evidence/ Cancer Guideline Description*	*Source (1)*	*Source Date (MM/DD/YY)*
BTEX					
Benzene	2.90E-02	$(mg/m^3)^{-1}$	A	CalEPA	May-09
Ethylbenzene	2.50E-03	$(mg/m^3)^{-1}$	B2	CalEPA	May-09
PHCs					
C5-C6 Aliphatic	--	--	--	--	--
C6-C8 Aliphatic	--	--	--	--	--
C8-C10 Aliphatic	--	--	--	--	--

Notes:

-- = Not Available

(1) CalEPA: Cal EPA Toxicity Criteria Database,
Hot Spots Unit Risk and Cancer Potency Values,
Office of Environmental Health Hazard Assessment (OEHHA),
May 2009.

USEPA Weight of Evidence Classification:

A - Known human carcinogen

B1 - Probable human carcinogen -
indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence
in animals and inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as a human carcinogen

E - Evidence of noncarcinogenicity

TABLE 12

CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS FOR INDUSTRIAL/ COMMERCIAL WORKER
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Scenario Timeframe: Current/ Future
Receptor Population: Industrial/ Commercial Worker
Receptor Age: Adult

Medium	*Exposure Medium*	*Exposure Point*	*Exposure Route*	*Chemical of Potential Concern (COPC)*	*EPC*		*Cancer Risk Calculations*					*Non-Cancer Hazard Calculations*				
					Value	*Units*	*Intake/Exposure Concentration*		*CSF/Unit Risk*		*Cancer Risk*	*Intake/Exposure Concentration*		*RfD/RfC*		*Hazard Quotient*
							Value	*Units*	*Value*	*Units*		*Value*	*Units*	*Value*	*Units*	
Soil	Soil	On-Site	Ingestion	Benzene	4.50E+00	mg/kg	1.57E-06	mg/kg-d	1.00E-01	$(mg/kg-d)^{-1}$	1.57E-07	4.40E-06	mg/kg-d	4.00E-03	mg/kg-d	1.10E-03
				Ethylbenzene	4.76E+00	mg/kg	1.66E-06	mg/kg-d	1.10E-02	$(mg/kg-d)^{-1}$	1.83E-08	4.66E-06	mg/kg-d	1.00E-01	mg/kg-d	4.66E-05
			Exp. Route Total								1.76E-07					1.15E-03
			Dermal	Benzene	4.50E+00	mg/kg	0.00E+00	mg/kg-d	1.00E-01	$(mg/kg-d)^{-1}$	0.00E+00	0.00E+00	mg/kg-d	4.00E-03	mg/kg-d	0.00E+00
				Ethylbenzene	4.76E+00	mg/kg	0.00E+00	mg/kg-d	1.10E-02	$(mg/kg-d)^{-1}$	0.00E+00	0.00E+00	mg/kg-d	1.00E-01	mg/kg-d	0.00E+00
			Exp. Route Total								0.00E+00					0.00E+00
		Exposure Point Total									1.76E-07					1.15E-03
	Exposure Medium Total										1.76E-07					1.15E-03
	Ambient Air	On-Site	Inhalation	Benzene	4.50E+00	mg/kg	1.98E-05	mg/kg-d	2.90E-02	$(mg/m^3)^{-1}$	5.74E-07	5.55E-05	mg/kg-d	6.00E-02	mg/m^3	9.24E-04
				Ethylbenzene	4.76E+00	mg/kg	1.02E-05	mg/kg-d	2.50E-03	$(mg/m^3)^{-1}$	2.56E-08	2.87E-05	mg/kg-d	2.00E+00	mg/m^3	1.43E-05
			Exp. Route Total								6.00E-07					9.39E-04
		Exposure Point Total									6.00E-07					9.39E-04
	Exposure Medium Total										6.00E-07					9.39E-04
Medium Total											7.75E-07					2.09E-03
Soil Vapor	Indoor Air	On-Site	Inhalation	C5-C6 Aliphatic	5.10E+01	$\mu g/m^3$	4.15E-03	mg/kg-d	--	$(mg/m^3)^{-1}$	NC	1.16E-02	mg/kg-d	1.84E+01	mg/m^3	6.32E-04
				C6-C8 Aliphatic	7.35E+01	$\mu g/m^3$	5.99E-03	mg/kg-d	--	$(mg/m^3)^{-1}$	NC	1.68E-02	mg/kg-d	1.84E+01	mg/m^3	9.12E-04
				C8-C10 Aliphatic	8.63E+00	$\mu g/m^3$	7.04E-04	mg/kg-d	--	$(mg/m^3)^{-1}$	NC	1.97E-03	mg/kg-d	1.00E+00	mg/m^3	1.97E-03
			Exp. Route Total								NC					3.51E-03
		Exposure Point Total									NC					3.51E-03
	Exposure Medium Total										NC					3.51E-03
Medium Total											NC					3.51E-03
Total of Receptor Risks Across All Media											**7.8E-07**	**Total of Receptor Hazards Across All Media**				**5.6E-03**

Note:
NC = Not Calculated

TABLE 13

SUMMARY OF INDUSTRIAL/ COMMERCIAL WORKER RISKS AND HAZARDS FOR COPCs

FORMER TEXACO STATION 21-1253

930 SPRINGTOWN BOULEVARD

LIVERMORE, CALIFORNIA

Scenario Timeframe: Current
Receptor Population: Industrial/ Commercial Worker
Receptor Age: Adult

Medium	*Exposure Medium*	*Exposure Point*	*Chemical of Potential Concern (COPC)*	*Carcinogenic Risk*				*Non-Carcinogenic Hazard Quotient*				
				Ingestion	*Inhalation*	*Dermal*	*Exposure Routes Total*	*Primary Target Organ*	*Ingestion*	*Inhalation*	*Dermal*	*Exposure Routes Total*
Soil	Soil	On-Site	Benzene	1.57E-07	5.74E-07	0.00E+00	7.32E-07	blood system	1.10E-03	9.24E-04	0.00E+00	2.02E-03
			Ethylbenzene	1.83E-08	2.56E-08	0.00E+00	4.39E-08	kidney	4.66E-05	1.43E-05	0.00E+00	6.09E-05
			Chemical Total	1.76E-07	6.00E-07	0.00E+00	7.75E-07		1.15E-03	9.39E-04	0.00E+00	2.09E-03
		Exposure Point Total					7.75E-07					2.09E-03
	Exposure Medium Total						7.75E-07					2.09E-03
Medium Total							7.75E-07					2.1E-03
Soil Vapor	Indoor Air	On-Site	C5-C6 Aliphatic	--	NC	--	NC	--	--	6.32E-04	--	6.32E-04
			C6-C8 Aliphatic	--	NC	--	NC	--	--	9.12E-04	--	9.12E-04
			C8-C10 Aliphatic	--	NC	--	NC	--	--	1.97E-03	--	1.97E-03
			Chemical Total	--	NC	--	NC		--	3.51E-03	--	3.51E-03
		Exposure Point Total					NC					3.51E-03
	Exposure Medium Total						NC					3.51E-03
Medium Total							NC					3.5E-03
Total Risk Across All Media and All Exposure Routes							**7.8E-07**	**Total Hazard Index Across All Media and All Exposure Routes**				**5.6E-03**

Total [blood system] HI =	2.0E-03
Total [kidney] HI =	6.1E-05

Note:

NC = Not Calculated

ATTACHMENT A

TABLE A.1

SUMMARY OF SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHg (mg/kg)*	*Benzene (mg/kg)*	*Toluene (mg/kg)*	*Ethyl-benzene (mg/kg)*	*Total Xylenes (mg/kg)*	*MTBE (mg/kg)*	*Naphthalene (mg/kg)*	*TBA (mg/kg)*	*DIPE (mg/kg)*	*ETBE (mg/kg)*	*TAME (mg/kg)*	*1,2-DCA (mg/kg)*	*EDB (mg/kg)*
VP-1-S-5	02/26/13	5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-1-S-10	02/26/13	10	<1.0	<0.0005	<0.0009	<0.0009	<0.0009	<0.0005	<0.0009	--	--	--	--	--	--
VP-2-S-5	02/26/13	5	<10	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-2-S-10	02/26/13	10	<4.1	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-3-S-5	02/26/13	5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-3-S-10	02/26/13	10	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-4-S-5	02/27/13	5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-4-S-10	02/27/13	10	<1.0	<0.0005	<0.0009	<0.0009	<0.0009	<0.0005	<0.0009	--	--	--	--	--	--
VP-5-S-5	02/27/13	5	<9.9	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
VP-5-S-9	02/27/13	9	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	<0.001	--	--	--	--	--	--
MW-17	01/16/12	5	<1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-18	01/16/12	5	310	<0.025	<0.051	4.6	6.6	--	--	--	--	--	--	--	--
MW-19	01/17/12	5	<1.1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-19	01/18/12	10	<1.0	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-20	01/16/12	5	<0.9	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-20	01/17/12	10	<1	<0.0005	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
MW-15	06/30/09	9.5	5200	4.5	44	55	260	--	--	--	--	--	--	--	--
CPT1	11/21/07	5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.021	<0.001	<0.001	<0.001	<0.001	<0.001
CPT2	11/19/07	5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.020	<0.001	<0.001	<0.001	<0.001	<0.001
CPT6	11/19/07	5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	--	<0.021	<0.001	<0.001	<0.001	<0.001	<0.001
CPT7	04/08/08	5	510	<0.026	<0.053	3.6	16	<0.026	--	<1.1	<0.053	<0.053	<0.053	<0.053	<0.053

TABLE A.1

SUMMARY OF SOIL ANALYTICAL DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Sample ID	*Date*	*Depth (fbg)*	*TPHg (mg/kg)*	*Benzene (mg/kg)*	*Toluene (mg/kg)*	*Ethyl-benzene (mg/kg)*	*Total Xylenes (mg/kg)*	*MTBE (mg/kg)*	*Naphthalene (mg/kg)*	*TBA (mg/kg)*	*DIPE (mg/kg)*	*ETBE (mg/kg)*	*TAME (mg/kg)*	*1,2-DCA (mg/kg)*	*EDB (mg/kg)*
GP-1	06/21/01	3.5	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-1	06/21/01	6.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-3	06/21/01	3.5	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-3	06/21/01	7.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
GP-4	06/21/01	3.5	<1.0	<0.005	<0.005	<0.005	0.0097	<0.005	--	--	--	--	--	--	--
GP-4	06/21/01	6.0	<1.0	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	--	--	--	--	--
B-1 (EW-1)	10/19/92	9.7	<1.0	<0.005*	<0.005*	<0.005*	<0.005*	--	--	--	--	--	--	--	--
Bottom	06/26/85	--	3.2	0.58*	0.24*	0.40*	0.009*	--	--	--	--	--	--	--	--
North	06/26/85	--	1.4	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
South	06/26/85	--	<0.01	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
East	06/26/85	--	1.3	0.02	0.02	0.01	0.01	--	--	--	--	--	--	--	--
West	06/26/85	--	<0.01	<0.001	<0.001	<0.001	<0.001	--	--	--	--	--	--	--	--
SB-2A	12/05/89	9.5	<1	<1	<3	<4	<15	--	--	--	--	--	--	--	--
MW8C	12/05/89	10	<1	<1	<3	<4	<15	--	--	--	--	--	--	--	--

Notes:

fbg = feet below grade

<x = Not detected at reporting limit x

-- = Not analyzed/not applicable

TABLE A.2

SUMMARY OF SOIL VAPOR SAMPLING DATA
FORMER TEXACO STATION 21-1253
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

Location	Depth (fbg)	Date	*TPH - Gasoline* $\mu g/m^3$	*TPH (C5-C6) Aliphatics* $\mu g/m^3$	*TPH (>C6-C8) Aliphatic* $\mu g/m^3$	*TPH (>C8-C10) Aliphatic* $\mu g/m^3$	*TPH (>C8-C10) Aromatic* $\mu g/m^3$	*TPH (>C10-C12) Aliphatic* $\mu g/m^3$	*TPH (>C10-C12) Aromatic* $\mu g/m^3$	*Benzene* $\mu g/m^3$	*Toluene* $\mu g/m^3$	*Ethyl-benzene* $\mu g/m^3$	*Total Xylenes* $\mu g/m^3$	*MTBE* $\mu g/m^3$	*Naphthalene* $\mu g/m^3$
VP-1	5	03/13/2013	440	<53	<67	<95	<80	<110	<89	3	<3.1	<3.5	<3.5	<2.9	<17
VP-1	10	03/13/2013	460	<55	<70	<99	<84	<120	<93	4.5	5	<3.7	12.8	<3.1	<18
VP-2	5	03/13/2013	2300/1700	<56/<55	500/350	<100/<100	<85/<84	<120/<120	<95/<94	6.3/6.3	<3.2/<3.2	<3.8/<3.7	11/10.7	<3.1/<3.1	<18/<18
VP-2	10	03/13/2013	17,000	600	4,700	340	<170	<240	<190	13	<6.4	<7.4	9.9	<6.2	<36
VP-3	5	03/13/2013	12,000	390	2,400	180	<150	<210	<170	<4.9	<5.8	<6.6	<6.6	<5.5	<32
VP-3	10	03/13/2013	2,600,000	140,000	840,000	36,000	<16,000	<23,000	<18,000	<530	<620	<720	<720	<590	<3,400
VP-4	5	03/12/2013	560	<46	<58	<82	<69	<98	<77	<2.2	7	<3.1	6.8	<2.5	<15
VP-4	10	03/12/2013	<160	<50	<64	<90	<76	<110	<85	<2.5	6.9	<3.4	3.9	<2.8	<16
VP-5	4.5	03/12/2013	540	<54	<69	<98	<82	<120	<92	3.4	14	<3.6	11	<3.0	<18
VP-5	9	03/12/2013	<160	<51	<65	<92	<78	<110	<87	<2.5	4.5	<3.4	<3.4	<2.8	<16

Notes:

fbg = feet below grade

<x = Not detected at reporting limit x

ATTACHMENT B

TABLE OF CONTENTS

LIST OF TABLES
(Following Text)

1.0 INTRODUCTION

This Attachment presents the estimation of indoor air Exposure Point Concentrations (EPCs) for volatile Chemicals of Potential Concern (COPCs) in soil vapor from the former Texaco Station 21-1253 located at 930 Springtown Boulevard, Livermore, California (Site). The estimated indoor air EPCs are applied in the Tier II Human Health Risk Assessment (HHRA) to assess potential health risks/hazards posed by the indoor air inhalation exposure pathway. Vapor migration into indoor air is of concern due to the presence of volatile chemicals in Site soil vapor. The Site is located in an area of primarily commercial land use. Therefore, the indoor air inhalation exposure pathway is considered complete for a commercial/industrial worker receptor.

The Johnson and Ettinger (1991) model (J&E Model) developed by the United States Environmental Protection Agency (USEPA) (USEPA, 2004) was applied to estimate indoor air COPC concentrations from impacted soil vapor. Potential indoor air concentrations were estimated following the approach applied by the USEPA in their document entitled, "Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)" (USEPA, 2002).

The methodology for developing the estimated indoor air EPCs is presented in Section 2.0. The input parameters applied to develop the EPCs are presented in Section 3.0. All references cited in this Attachment are listed in Section 4.0.

2.0 METHODOLOGY

The predicted indoor air concentrations were developed using the J&E Model as implemented by USEPA (2004). Johnson and Ettinger (1991) present a model for estimating the degree of attenuation occurring as volatile contaminants in soil gas migrate upward through the vadose zone, enter an overlying building, and mix with building indoor air. The degree of attenuation is quantified through the calculation of an attenuation factor, α, after Johnson and Ettinger (1991; Equation 21). The methodologies applied to estimate indoor air EPCs from the results of soil vapor sampling using the J&E Model are described in Sections 2.1. A description of several conservative features inherent to the J&E Model is provided in Section 2.2.

2.1 DERIVATION OF ESTIMATED INDOOR AIR EPCs FROM SOIL VAPOR

The reasonable maximum detected concentrations of the volatile COPCs identified in soil vapor were applied to estimate indoor air EPCs as follows:

$$C_{building} = C_{sg} \times \alpha$$

where:

$C_{building}$ - Predicted indoor air concentration within a building based on the measured soil vapor concentration [micrograms per cubic meter ($\mu g/m^3$)]

C_{sg} - The reasonable maximum COPC concentration in soil gas [micrograms per cubic meter ($\mu g/m^3$)]

α - Site-specific calculated soil gas attenuation factor which relates the indoor air concentration to the concentration in soil vapor based on the heuristic model developed by Johnson and Ettinger (1991; Equation 21) and accounts for the advective-diffusive migration of volatile contaminants in soil vapor through the vadose zone soil and building foundation, followed by the mixing of the intruding vapors with building indoor air

The derivation of the Site-specific soil gas attenuation factor for the soil vapor to indoor air pathway was conducted through the application of the J&E Model for soil gas incorporated into the Microsoft Excel spreadsheet developed by the USEPA (USEPA, 2004; "SG-ADV-Feb04.xls, Version 3.1"). The USEPA implementation of the J&E Model has undergone extensive peer review and is widely accepted by regulatory agencies throughout the United States. The Site-specific compound, vadose zone soil,

and building properties applied in the derivation of the soil gas attenuation factor and the estimation of indoor air EPCs at the Site are presented in Section 3.0.

2.2 CONSERVATIVE FEATURES OF J&E MODEL

It is important to note that the J&E Model used to develop the indoor air EPCs incorporate several conservative assumptions. The key conservative aspects incorporated into the J&E Model are described below:

- The J&E Model assumes that all contaminant vapors below a building migrate vertically upward into the building and do not move laterally, or in three-dimensions, around the building to vent to the atmosphere.
- The J&E Model assumes that no contaminant vapors migrate around the sides of buildings through preferential pathways, such as granular foundation bedding material, to vent to the atmosphere.
- The J&E Model assumes there is a constant and continuous source of COPCs in the subsurface. Source depletion due to naturally occurring biological or chemical degradation of contaminants is not considered.

All of the conservative aspects described above combine to produce higher estimates of indoor air EPCs than are actually expected to occur.

3.0 ESTIMATED INDOOR AIR EPCS

The estimated indoor air EPCs were developed using the J&E Model with Site-specific compound, vadose zone soil, and building properties. The compound-specific inputs applied in the J&E Model are described in Section 3.1. The details of the vadose zone conditions at the Site are presented in Section 3.2. The details of the building properties applied in the estimation of the indoor air EPCs are described in Section 3.3. The estimation of the indoor air EPCs is presented in Section 3.4.

3.1 COMPOUND PROPERTIES

The compound properties applied in the estimation of the indoor air EPCs consist of a Henry's Law constant, a water diffusion coefficient, and an air diffusion coefficient. The identified COPCs were aliphatic petroleum hydrocarbons (PHCs) and their applied compound properties were obtained from the Total Petroleum Hydrocarbon Criteria Working Group (TPH Work Group), 1997. The Henry's Law constant and air diffusion coefficient were corrected to a vadose zone temperature of 22 degrees Celsius, which corresponds to the highest average soil temperature for California, as presented in CalEPA (2005).

3.2 VADOSE ZONE CONDITIONS

Previous site investigations indicate that the subsurface beneath the Site consists of fill material, overlying layers of silt, sand, clay, and gravel. The upper 10 feet contains varying degrees of fill, namely Silt, silty clay, and gravelly sand, as indicated on the stratigraphic logs for soil vapor probes VP-1 to VP-5. Based on these descriptions, and for conservatism, the vadose zone at the Site was conservatively assumed to consist primarily of loam. Ideally, the indoor air EPCs for the Site would be estimated using the J&E Model with Site-specific vadose zone soil properties. When site-specific soil physical properties were not available, default values for loam soil were conservatively applied.

The Site-specific vadose zone soil physical properties applied in the development of the indoor air concentrations consisted of the following:

- Moisture-filled porosity, ε_M:

  A moisture-filled porosity of 0.148 was applied, based on the default moisture-filled porosity for loam soil, as indicated in USEPA (2004).

Dry bulk soil density, ρ_{db} :

A dry bulk soil density value of 2.094 g/cm^3 was applied, and corresponds to the average dry bulk density measured in vapor probes V3 and V5 of 2.070 g/cm^3 and 2.119 g/cm^3, respectively.

- Total porosity, ε_T :

  A porosity value of 39.9 percent was applied, based on the default total porosity, as indicated in USEPA (2004).

- Distance below grade to soil gas sampling, L_S :

  A distance of 4.25 ft (129.54 cm) was applied, based on the depth to the top of the soil vapor screen for VP-5, which was the soil vapour probe that had the smallest depth to the top of the soil vapor screen.

Building Properties for the Commercial/Industrial Exposure Scenario

The commercial/industrial building properties applied in the development of the Site-specific indoor air concentrations consisted of the following:

- Enclosed space floor length, L_B :

  A below grade building length of 1,000 cm was applied, based on the default commercial building dimensions of 10 m × 10 m, and assuming slab-on-grade construction (CalEPA, 2005).

- Enclosed space floor width, W_B :

  A below grade building width of 1,000 cm was applied, based on the default commercial building dimensions of 10 m × 10 m, and assuming slab-on-grade construction (CalEPA, 2005).

- Enclosed space height, H_B :

  A building ceiling height of 244 cm was applied, based on the default building footprint, and an assumed ceiling height of 2.44 metres (CalEPA, 2005).

- Building indoor air exchange rate, T_{air} :

  A building indoor air exchange rate of 1.0 building volumes per hour was applied, consistent with the Industrial/Commercial building enclosed-space air exchange rate reported in Table B-7 of the Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil (CalEPA, 2005).

- Foundation thickness, L_{crack} :

  A default foundation thickness of 9 cm was applied (CalEPA, 2005).

- Depth below grade to bottom of enclosed space floor, L_F :

  A depth below grade to the bottom of the enclosed space floor of 9 cm was applied, as indicated in CalEPA (2005)

- Floor-wall seam crack width, w :

  A floor-wall seam crack width value of 0.1 cm was applied consistent with the default floor-wall seam crack width, as indicated in CalEPA (2005).

- Vadose zone/building pressure differential, ΔP :

  A pressure differential value of 4 Pascal (Pa) was applied consistent with the default pressure differential applied in USEPA (2002; Appendix G).

- Average vapor flow rate into building, Q_{soil} :

  A default vapor flow rate into the building of 5 liters per minute (L/m) was applied consistent with the CalEPA (2005)

3.4 ESTIMATED INDOOR AIR EPC RESULTS

The estimated indoor air EPCs for the commercial/industrial scenario based on the soil vapor to indoor air pathway is presented in Table B.1. The applied vadose zone soil, building, and chemical properties described in Sections 3.1 to 3.3 above are also summarized in Table B.1. The resulting indoor air EPCs are applied in the Tier II HHRA to assess potential health risks/hazards posed by the indoor air inhalation exposure pathway.

4.0 REFERENCES

CalEPA, 2005. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Integrated Risk Assessment Section, Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, January 2005 Revision.

Johnson, P.C. and R.A. Ettinger, 1991. Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapors into Buildings, Environmental Science and Technology, 25(8), pp. 1445-145.

TPH Work Group, 1997. Total Petroleum Hydrocarbon Criteria Working Group Series, Selection of Representative TPH Fractions Based on Fate and Transport Considerations, Volume 3, July 1997.

USEPA, 2002. Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), EPA Report No. EPA530-F-02-052, Office of Solid Waste and Emergency Response, November.

USEPA, 2004. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings, Office of Emergency and Remedial Response, Washington, DC, February 22.

TABLE B.1

DERIVATION OF INDOOR AIR EXPOSURE POINT CONCENTRATIONS FROM SOIL GAS - COMMERCIAL/INDUSTRIAL WORKER INDOOR AIR INHALATION EXPOSURE
FORMER TEXACO STATION 21-1168
930 SPRINGTOWN BOULEVARD
LIVERMORE, CALIFORNIA

	Chemical Properties (1)						*Soil Gas*	*Johnson & Ettinger*	*Indoor Air EPC*
	Henry's Law		*Water Diffusion*		*Air Diffusion*		*Concentration*	*Attenuation Factor*	*in Building*
Chemical of Potential Concern	*Constant, H_L*		*Coefficient, D_{H2O}*		*Coefficient, D_{air}*		*C_{sg} (2)*	*α*	*$C_{building}$ (4)*
(COPC)	*(atm m³/mol)*		*(cm²/s)*		*(cm²/s)*		*(µg/m³)*	*(unitless) (3)*	*(µg/m³)*
PHCs									
C5-C6 Aliphatic	1.01E+00	(22°C)	1.00E-05	(25°C)	4.92E-02	(22°C)	1.76E+05	2.90E-04	5.10E+01
C6-C8 Aliphatic	1.04E+00	(22°C)	1.00E-05	(25°C)	4.92E-02	(22°C)	2.53E+05	2.90E-04	7.35E+01
C8-C10 Aliphatic	1.61E+00	(22°C)	1.00E-05	(25°C)	4.92E-02	(22°C)	2.98E+04	2.90E-04	8.63E+00

Notes:

(1) The chemical properties for PHC fractions were obtained from the Total Petroleum Hydrocarbon Criteria Working Group (TPH Work Group), 1997. The Henry's Law constant and air diffusion coefficient were corrected for an average vadose zone temperature of 22°C. The reference temperature for the water diffusion coefficient is 25°C and considering its low value, a correction to 22°C was considered negligible.

(2) Reasonable maximum exposure soil gas concentrations, as presented in Table 4 of the main report.

(3) The soil gas attenuation factor α is based on the solution for soil gas migration to building indoor air presented in Johnson and Ettinger [1991; Equation (21)], the vadose zone and building properties listed below, and a 4 Pa pressure difference between the vadose zone and the building (ΔP) as applied by USEPA (2002: Appendix G, Table G-3). The calculation of the soil gas attenuation factor was conducted using the Excel spreadsheet "SG-ADV-Feb04.xls" developed by USEPA (2004) and the following Site-specific vadose zone and building properties.

Vadose Zone Soil Properties:

Total Porosity, ε_T (%)	39.9	Default total porosity for loam soil, as indicated in USEPA (2004).
Moisture-Filled Porosity, ε_m	0.148	Default moisture-filled porosity for loam soil, as indicated in USEPA (2004).
Vapor-Filled Porosity, ε_v	0.251	Vapor-filled porosity, $\varepsilon_v = \varepsilon_T / 100 - \varepsilon_m$
Dry Bulk Soil Density, ρ_{db} (g/cm³)	2.09	Average dry bulk density measured in vapor probes V3 and V5.
Vadose Zone Temperature (°C)	22	Conservatively applied highest average California soil temperature of 22°C, as presented in CalEPA (2005).
Soil Gas Sampling Depth Below Grade, L_S (cm)	129.5	Minimum depth to top of soil vapor screens of 1.295 m bgs (4.25 ft bgs at VP-5).

Building Properties:

Enclosed Floor Space Length, L_B (cm)	1,000	Based on default commercial building dimensions of 10 m x 10 m, and assuming slab-on-grade construction (CalEPA, 2005).
Enclosed Floor Space Width, W_B (cm)	1,000	Based on default commercial building dimensions of 10 m x 10 m, and assuming slab-on-grade construction (CalEPA, 2005).
Enclosed Space Height, H_B (cm)	244	Based on default commercial building ceiling height of 2.44 m (CalEPA, 2005).
Building Air Exchange Rate, T_{air} (1/hr)	1	Commercial indoor air exchange rate after CalEPA (2005).
Floor-Wall Seam Crack Width, w (cm)	0.1	Default floor-wall seam crack width indicated in CalEPA (2005).
Foundation Thickness, L_{crack} (cm)	9	Assumed based on minimum floor slab thickness of 9 cm (3.5 inch), as presented in CalEPA (2005).
Depth Below Grade to Bottom of Enclosed Space Floor, L_F (cm)	9	Based on a typical slab depth of 0.09 m below grade, as indicated in CalEPA (2005).
Average Flow Rate into Building, Q_{soil} (L/min)	5	Default flow rate into building, as indicated in CalEPA (2005).

(4) The exposure point concentration in the building is calculated from, $C_{building} = C_{sg} * \alpha$.

References:

CalEPA, 2005. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Integrated Risk Assessment Section, Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, January 2005 Revisions.

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