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9:58 am, Jun 30, 2009

Alameda County
Environmental Health

Ian Robb
Project Manager
Marketing Business Unit

**Chevron Environmental
Management Company**
6111 Bollinger Canyon Road
San Ramon, CA 94583
Tel (925) 543-2375
Fax (925) 543-2324
irobbs@chevron.com

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

Re: Former Texaco Service Station No. 21-1283
3810 Broadway
Oakland, CA

I have reviewed the attached work plan dated June 29, 2009.

I agree with the conclusions and recommendations presented in the referenced work plan. This information in this work plan is accurate to the best of my knowledge and all local Agency/Regional Board guidelines have been followed. This work plan 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,

A handwritten signature in blue ink, appearing to read "I. Robb".

Ian Robb
Project Manager

Attachment: Work Plan



**CONESTOGA-ROVERS
& ASSOCIATES**

5900 Hollis Street, Suite A
Emeryville, California 94608
Telephone: (510) 420-0700 Fax: (510) 420-9170
<http://www.craworld.com>

June 26 2009

Reference No. 311955

Mr. Steven Plunkett
Alameda County Environmental Health (ACEH)
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Re: Work Plan for Soil Vapor Survey
Former Texaco Service Station 21-1283
3810 Broadway
Oakland, California
ACEH RO #0056

Dear Mr. Plunkett:

Conestoga-Rovers & Associates (CRA) is submitting this Work Plan on behalf of Chevron Environmental Management Company (Chevron) to perform a soil vapor survey at the site referenced above. Alameda County Environmental Health (ACEH) has requested a soil vapor survey based on elevated concentrations of residual petroleum hydrocarbons present in soil and groundwater as outlined in their letter dated May 13, 2009 (Attachment A). Presented below are a summary of the site background and the proposed scope of work.

SITE DESCRIPTION

The site is an active independently branded service station and automobile repair facility located at the northeast corner of the intersection of Broadway and 38th Street in Oakland, California (Figure 1). The site operated as a Texaco Service Station from approximately 1963 to 1985. Site facilities include a station building with two service bays, two dispenser islands and two underground storage tanks (USTs) as shown on Figure 2. Land use surrounding the site is primarily commercial and residential.

A total of 12 soil borings and 13 groundwater monitoring wells have been installed at the site. Currently, nine groundwater monitoring wells are associated with the site. A total of five USTs were installed in 1963, including four 6,000-gallon USTs and one 550-gallon used oil UST. The four 6,000-gallon USTs were removed in February 1980, and the 550-gallon used oil UST was removed in May 1991. A summary of environmental investigations conducted at the site is included as Attachment B.

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SITE GEOLOGY AND HYDROGEOLOGY

The site is located in the East Bay Plain Groundwater Basin, which consists of unconsolidated sediments of Pleistocene and Holocene age overlying bedrock of Jurassic, Cretaceous, and Tertiary age. The East Bay Plain overlies a flank of a broad Franciscan bedrock depression. Unconsolidated sediments in the basin vary in thickness up to 1,000 feet. These unconsolidated sediments are commonly referred to, from oldest to youngest, Santa Clara Formation, the Alameda Formation, Temescal and artificial fill (RWQCB, 1999).

The site is underlain primarily by unconsolidated fill material overlying sandy silts and clays, interbedded with well sorted sands and silty sands. According to the 1996 McLaren/Hart report, clays are typically encountered above the water-bearing zones. Sand stringers are present especially between 16 to 20 feet below grade (fbg).

The site is located in the Oakland Sub Basin of the East Bay Plain Groundwater Basin. The site is roughly 85 feet above mean sea level. The closest stream is Glen Echo Creek, located approximately 1,500 feet south of the site. The nearest surface water body is Lake Merritt, located approximately 1.3 miles to the south of the site. Historical depth to groundwater onsite has ranged from approximately 14 to 26 fbg. Groundwater elevation beneath the site was significantly influenced in 2007-2008 due to local dewatering associated with Kaiser Permanente construction across Broadway. Groundwater flow direction varies considerably, including to the north, to the west, and to the south. Groundwater mounding and groundwater depressions have also been observed onsite.

PROPOSED SCOPE OF WORK

The objective of the proposed scope of work is to provide soil vapor data to evaluate whether the pathway from soil gas to indoor air exists for any onsite building. To meet this objective, two nested vapor wells, with vapor probes at 5 and 15 fbg, will be installed onsite: one in the vicinity of well MW-1 and the former used oil tank and one in the vicinity of well MW-6 (Figure 3). To accomplish this work, CRA will conduct the following activities:

Underground Utility Location: CRA will contact Underground Services Alert (USA) and use a private utility locator to reconfirm that no utilities exist at and near the probe locations.

Health and Safety Plan: CRA will prepare a health and safety plan to protect site workers. The plan will be reviewed and signed by all site workers and visitors. The plan will be kept onsite during all field activities.



June 26, 2009

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Permits: CRA will obtain soil boring permits from the Alameda County Public Works Agency prior to beginning field operations.

Vapor Well Installation and Soil Sampling: CRA will install nested vapor probes at 5 fbg and 15 fbg in vapor wells SV-1 and SV-2 onsite (Figure 3). It is estimated that the total depth of borings will not exceed 16 fbg. Disturbed soil samples will be collected between grade and 8 fbg using a hand-auger and steam cleaned brass or stainless steel tubes. Undisturbed soil samples will be collected with a slide-hammer and steam cleaned brass or stainless steel tubes below 8 fbg and analyzed for physical soil parameters and petroleum hydrocarbons. Soils will be field-screened using a photo-ionization detector (PID) and visual observations. Soil samples will be collected for laboratory analysis at approximately 5-foot intervals, at obvious changes in soils, and where hydrocarbon staining is observed. CRA geologists will log collected soils using the modified Unified Soil Classification System. All samples will be sealed, capped, labeled, logged on a chain-of-custody form, placed on ice and transported to a Chevron and State-approved laboratory for analysis.

Vapor Probe Construction: Vapor probes will be constructed with a permeable porcelain filter, a 1/4-inch push-to-connect fitting to 1/4-inch Teflon tubing. Each probe will be placed at approximately 5 fbg and 15 fbg and surrounded by a 12-inch sand pack. Above the sand pack, 12-inches of dry granulated bentonite will be topped with at least 12-inches of hydrated granular bentonite. Each probe will be separated from the others by a bentonite grout mixture. The soil vapor wells will be finished at the surface using a typical well vault.

Vapor Probe Sampling: Vapor samples will be collected at least 48-hours after the placement of the probes using 1-liter Summa™ canisters in a manifold system, connected to the sampling tubing at each vapor point. Approximately three purge volumes will be purged from the sampling tubing before sampling begins, at the same flow rate the sample will be collected at. While sampling, the vacuum of the Summa™ canister will be used to draw the soil vapor through the flow controller until a negative pressure of approximately 5-inches of is observed on the vacuum gauge. In accordance with the Department of Toxic Substances Control (DTSC) *Advisory-Active Soil Gas Investigations* guidance document, dated January 28, 2003, leak testing using laboratory grade helium will be performed during sampling. After sampling, the Summa™ canisters will be packaged and sent to the Air Toxics laboratory under chain-of-custody for analysis. Standard Field Procedures for Soil Vapor Probe Installation and Sampling are presented as Attachment C.



**CONESTOGA-ROVERS
& ASSOCIATES**

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Chemical Analysis: Select soil samples will be analyzed for the following:

- Total Petroleum Hydrocarbons as diesel and Total Petroleum Hydrocarbons as gasoline (TPHg) by EPA Method 8015 modified
- Benzene, toluene, ethylbenzene and xylenes (BTEX) and methyl tert-butyl ether (MTBE) by EPA Method 8260B
- Physical parameters, including moisture content, bulk density, total porosity, air- and water-filled porosity, organic carbon and effective permeability

Vapor samples will be analyzed for the following:

- TPHg, BTEX, MTBE, and naphthalene by EPA Method TO-15
- O₂, CO₂, N₂, CH₄ and helium by ASTM D-1946 (GC/TCD)

Waste Disposal: Soil cuttings generated will be placed in drums and labeled appropriately. These wastes will be transported to the appropriate Chevron-approved disposal facility following receipt of profiling analytical results.

Reporting: Upon completion of field activities and review of the analytical results, we will prepare an investigation/risk evaluation report that, at a minimum, will contain:

- Descriptions of the installation and sampling methods
- Boring logs
- Tabulated soil and vapor analytical results with comparison to environmental screening levels from the 2007 *Screening for Environmental Concerns at Sites with Contaminated Soil and Groundwater* by the California Regional Water Quality Control Board, San Francisco Bay Region Interim Final November 2007, revised May 2008
- Analytical reports and chain-of-custody forms
- Conclusions and recommendations



**CONESTOGA-ROVERS
& ASSOCIATES**

June 26, 2009

Reference No. 311955

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CLOSING

The site conceptual model also requested by ACEH will be submitted under separate cover by June 29, 2009. We appreciate the opportunity to work with you on this project. Please contact Charlotte Evans of CRA at (510) 420-3351 or Ian Robb of Chevron at (925) 543-2375 if you have any questions or comments regarding this work plan.

Sincerely,

CONESTOGA-ROVERS & ASSOCIATES

Charlotte Evans



Brandon S. Wilken, PG# 7564

CE/aa/2
Enc.

Figure 1 Site Vicinity Map
Figure 2 Site Plan with Proposed Soil Vapor Well Locations

Attachment A ACEH May 13, 2009 Letter
Attachment B Summary of Previous Environmental Work
Attachment C Standard Field Procedures for Soil Vapor Probe Installation and Sampling

cc: Mr. Ian Robb, Chevron Environmental Management Company
 Mr. Gerald Friedkin
 Mr. Joe Zadik

FIGURES

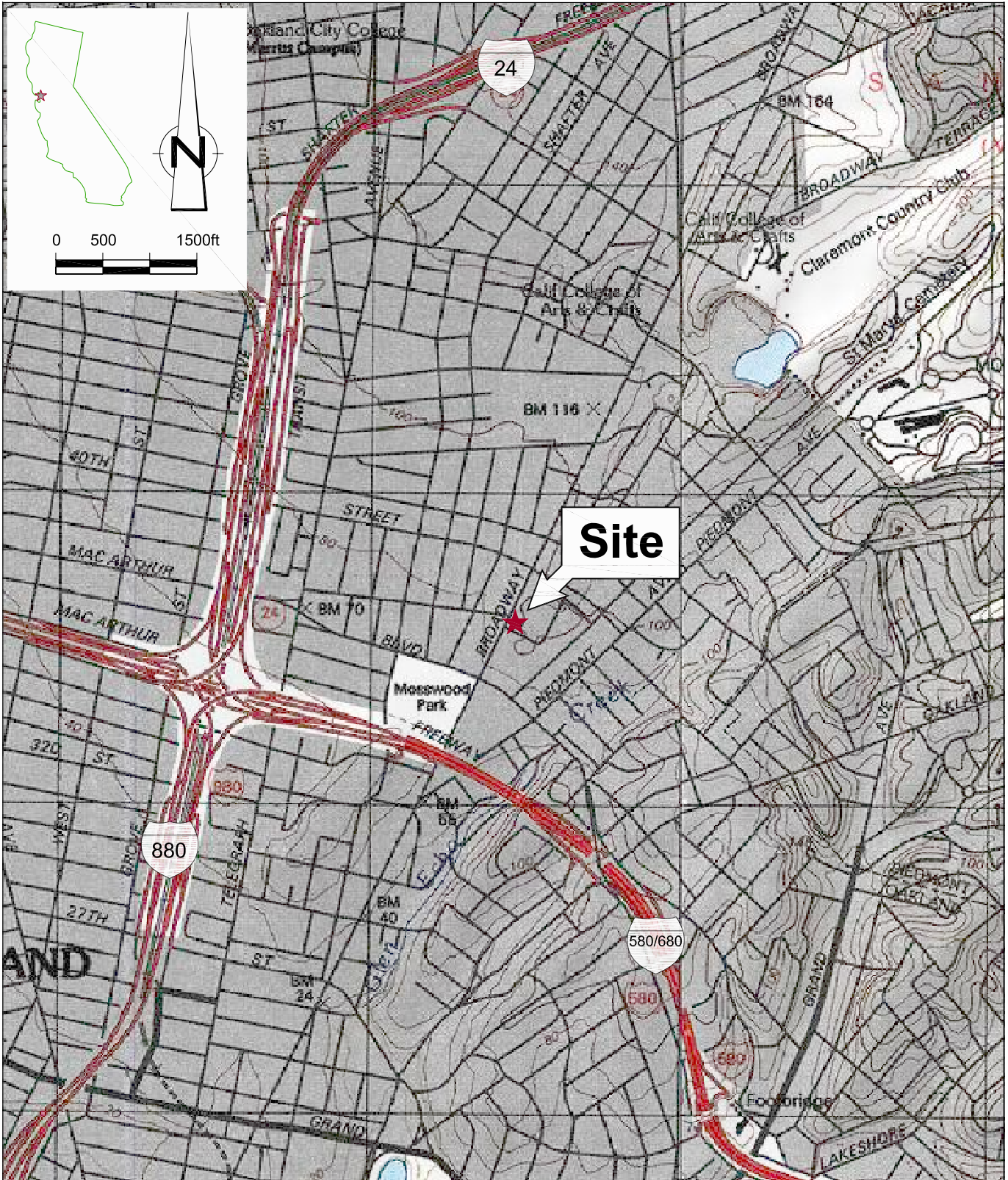
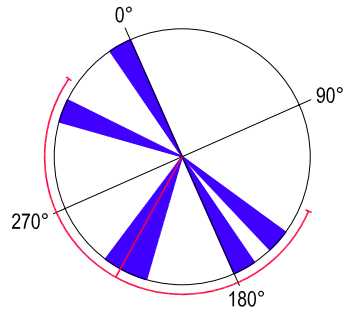


Figure 1
 SITE VICINITY MAP
 FORMER TEXACO SERVICE STATION 21-1283
 3810 BROADWAY
 Oakland, California



EXPLANATION

- ⊕ Proposed vapor well location
- MW-1 ● Monitoring well location
- MW-2 ☒ Destroyed well location
- B-3 ⊙ Soil boring location
- Electrical line
- Storm Drain line
- Sanitary Sewer line
- Water line
- Gas line
- Communications line



Historic Groundwater Flow Direction
2001 through 2008

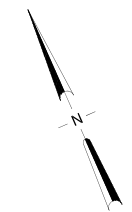
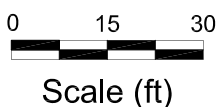
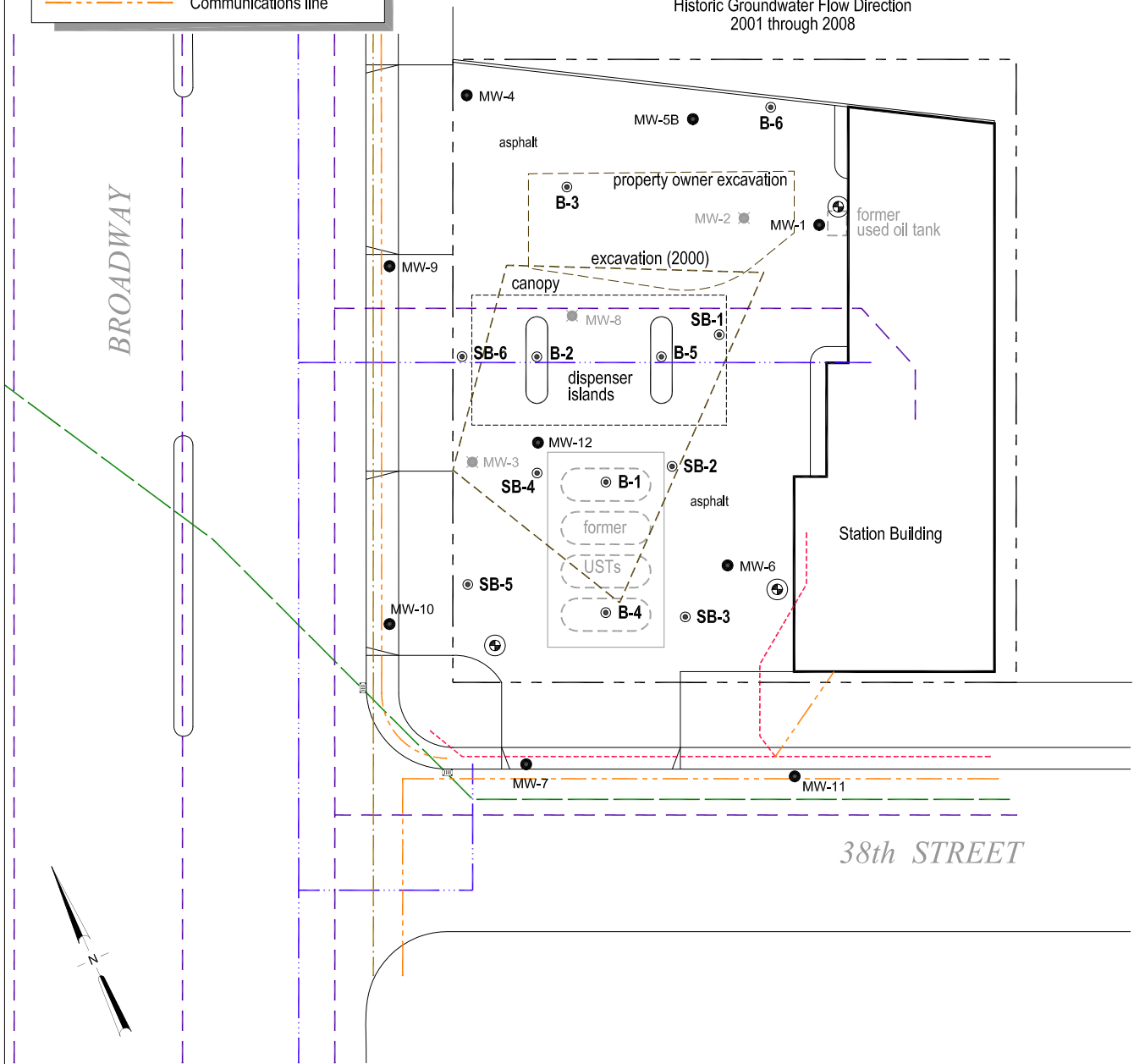


Figure 2

SITE PLAN WITH PROPOSED VAPOR WELL LOCATIONS
FORMER TEXACO SERVICE STATION 21-1283
3810 BROADWAY
Oakland, California



Siteplan modified from map provided by Gettler-Ryan Inc.

ATTACHMENT A

ACEH MAY 13, 2009 LETTER



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

May 13, 2009

Mr. Ian Robb
Chevron Corporation
6111 Bollinger Canyon Rd
San Ramon, CA 94583-2324

Mr. Gerald Friedkin
300 Grand Avenue
Oakland CA 94610

Mr. Joe Zadik
Express Auto Clinic
8255 San Leandro Street

Subject: Fuel Leak Case No. RO0000056 (Global ID# T0600101108), Chevron #21-1663 /Express Auto Clinic, 3810 Broadway, Oakland, CA 94611

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Dear Messrs: Robb, Friedkin and Zadik:

Alameda County Environmental Health Department (ACEH) staff has reviewed the case file for the above referenced site and the reports entitled, "Monitoring Well Installation Report" dated September 25, 2002 and "Soil Excavation Report" dated June 5, 2000 prepared by Delta Environmental Consultants and Toxicchem Management Systems Inc, respectively.

Based on ACEH staff review of the case file, we request that you address the following technical comments and send us the reports described below. Please provide 72-hour advance written notification to this office (e-mail preferred to steven.plunkett@acgov.org) prior to the start of field activities.

TECHNICAL COMMENTS

1. **Soil Removal.** Post excavation confirmation soil samples collected at approximately 20 feet below ground surface detected significantly elevated levels of petroleum hydrocarbon contamination in soil at concentrations of up to 3,100 milligrams per kilogram (mg/kg) TPH gasoline, 1,900 mg/kg TPH diesel and 14 mg/kg benzene. Groundwater samples collected from the excavation pit detected 33,000 µg/L TPHg and 5,700 µg/L benzene. In addition, during the installation of monitoring well MW-1 significantly elevated levels of petroleum hydrocarbon contamination were detected in soil and groundwater at concentrations of up to 65,000 mg/kg TPHg and 88 mg/kg benzene and 180,000 µg/L TPHg and 12,000 µg/L benzene, respectively.

The high concentrations of residual TPHg and benzene in soil and groundwater warrant the evaluation of the soil vapor to indoor air migration pathway. In order to evaluate this pathway it is necessary to collect soil vapor samples. We request that you submit work plan detailing you proposal fo this work and prepared according to the DTSC's January 2003 *Advisory- Active Soil Gas Investigations*. Please submit the work plan by the date specified below.

2. **Site Conceptual Model (SCM).** Several site investigations have been performed at this site to evaluate soil and groundwater contamination. At this juncture it appears, the preparation of a SCM that synthesizes all the analytical data and evaluates all potential exposure pathways and potential receptors that may exist at the site, including identifying or developing site cleanup objectives and goals is needed. At a minimum, the SCM should include:

- (1) Local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.) extent of contamination, direction and rate of groundwater flow, potential preferential pathways, and locations of receptors;
- (2) Geologic cross section maps that illustrate subsurface features, man-made conduits, and lateral and vertical extent of contamination;
- (3) Plots of chemical concentrations versus time;
- (4) Plots of chemical concentrations versus distance from the source;
- (5) Summary tables of chemical concentrations in different media (i.e. soil, groundwater, and soil vapor);
- (6) Well logs, boring logs, and well survey maps; and
- (7) Discussion of likely contaminant fate and transport.

If data gaps (i.e. potential contaminant volatilization to indoor air or source area(s) are undefined, etc.) are identified in the SCM, please include a proposed scope of work to address those data gaps in the work plan due by the date specified below. Please note that the work plan must address all technical comments presented in this correspondence and all data gaps identified by your consultant in their SCM.

TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention: Mr. Steven Plunkett), according to the following schedule:

- **June 29, 2009** – Site Conceptual Model with Work Plan

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.

ELECTRONIC SUBMITTAL OF REPORTS

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) 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. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program ftp site are provided on the attached "Electronic Report Upload (ftp) Instructions." Please do not submit reports as attachments to electronic mail.

Submission of reports to the Alameda County ftp site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) Geotracker website. Submission of reports to the Geotracker website does not fulfill the requirement to submit documents to the Alameda County ftp site. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitor wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, electronic submittal of a complete copy

of all necessary reports was required in Geotracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.swrcb.ca.gov/ust/cleanup/electronic_reporting).

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, 6835, 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, later 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. Should you have any questions, do not hesitate to call me at (510) 383-1767.

Sincerely,



Steven Plunkett
Hazardous Materials Specialist



Donna L. Drogos
Supervising Hazardous Materials Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Charlotte Evans, CRA, 5900 Hollis Street, Suite A, Emeryville, CA 94608
Leroy Griffin, City of Oakland, Assistant Fire Marshall, 250 Frank Ogawa Plaza, Suite 3341 Oakland, CA 94612

Donna Drogos, Steven Plunkett, File

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

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) 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

- Entire report including cover letter must be submitted to the ftp site as a **single portable document format (PDF) with no password protection**. (Please do not submit reports as attachments to electronic mail.)
- 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)

Additional Recommendations

- A separate copy of the tables in the document should be submitted by e-mail to your Caseworker in **Excel** format. These are for use by assigned Caseworker only.

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 dehloptoxic@acgov.org
 - Or
 - ii) Send a fax on company letterhead to (510) 337-9335, to the attention of My Le Huynh.
 - 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 <ftp://alcoftp1.acgov.org>
 - (i) Note: Netscape and Firefox browsers will not open the FTP site.
 - b) Click on File, then on Login As.
 - 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 dehloptoxic@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.

ATTACHMENT B

SUMMARY OF PREVIOUS ENVIRONMENTAL WORK

SUMMARY OF PREVIOUS ENVIRONMENTAL WORK

1980 and 1991 Tank Removal: A total of five underground storage tanks (USTs) were installed in 1963 including four 6,000 gallon fuel USTs and one 550-gallon used oil UST. The four 6,000-gallon USTs were removed from the site in February 1980. The 550-gallon used-oil UST was removed in May 1991 by SEMCO. No report by SEMCO is available, but the information was reported in Kaldveer Associates' (KA) November 15, 1991 *Limited Soil and Ground Water Quality Investigation Report*.

October 1991 Well Install: KA installed groundwater monitoring well MW-1 following the removal of the used-oil UST. No petroleum hydrocarbons were detected in soil samples analyzed from well MW-1. Maximum concentrations in groundwater were 1,700 micrograms per liter ($\mu\text{g/L}$) total petroleum hydrocarbons as diesel (TPHd), 300 $\mu\text{g/L}$ total petroleum hydrocarbons as gasoline (TPHg) and 4.1 $\mu\text{g/L}$ benzene. Additional information is available in KA's November 15, 1991 *Limited Soil and Ground Water Quality Investigation Report*.

January 1992 Well Installation: KA installed groundwater monitoring well MW-2 to further assess groundwater quality in the vicinity of the former used-oil UST. No petroleum hydrocarbons were detected in soil samples analyzed from well MW-2. Maximum concentrations in groundwater were 670 $\mu\text{g/L}$ TPHd in well MW-1, and 4,000 $\mu\text{g/L}$ TPHg and 470 $\mu\text{g/L}$ benzene in well MW-2. Additional information is available in KA's February 26, 1992 *Soil and Ground Water Quality Investigation Report*.

September 1995 Subsurface Investigation and Well Installation: McLaren Hart (MH) advanced soil borings B-1 through B-6. Encountered soil consisted of clay to silty sands. Soil samples from borings B-1, B-2, B-4 and B-5 contained up to 4,800 milligrams per kilogram (mg/kg) TPHg and 48 mg/kg benzene. In October 1995 MH installed wells MW-3 and MW-4 in response to hydrocarbons detected in borings B-1, B-2, B-4 and B-5. A soil sample at 8.5 feet below grade (fbg) from well MW-3 contained 65,000 mg/kg TPHg and 88 mg/kg benzene. Maximum concentrations in groundwater were 190,000 $\mu\text{g/L}$ TPHg and 24,000 $\mu\text{g/L}$ benzene in boring B-1. During this investigation wells MW-1 and MW-2 were redeveloped as part of an updated monitoring and sampling program and after redevelopment well MW-2 contained light non-aqueous phase liquids (LNAPL). Additional information is available in MH's January 11, 1996 *Supplemental Site Investigation*.

September 1996 Well Installation: Fluor Daniel GTI (FDGTI) installed monitoring wells MW-5 through MW-10 to evaluate the extent of the dissolved petroleum hydrocarbon plume. Elevated petroleum hydrocarbon concentrations were only detected in soil samples from well MW-8, up to 14,000 mg/kg TPHg and 55 mg/kg benzene at 15 fbg. No petroleum

hydrocarbons were detected in soil samples from wells MW-5, MW-7, and MW-10. Additional information is available in FDGTT's November 25, 1996 *Soil and Groundwater Investigation Report*.

July 1998 Subsurface Investigation: In July 1998, Toxichem advanced soil borings SB-1 through SB-6. Petroleum hydrocarbons were detected in soil from borings SB-1 and SB-2 at concentration up to 2,900 mg/kg TPHg and 16 mg/kg benzene at 14 fbg in boring SB-2. Additional information is available in Toxichem's November 15, 1998 *Corrective Action Plan*.

February and March 2000 Well Destructions and Remedial Excavation: Wells MW-3 and MW-8 were destroyed prior to Toxichem completing a remedial excavation onsite. The final excavation depth was approximately 22 fbg and approximately 1,400 cubic yards of petroleum hydrocarbon impacted soil were properly disposed of offsite. During the remedial excavation, well MW-2 was damaged and later destroyed. Additional information is available in Toxichem's June 5, 2000 *Soil Excavation Report*.

August 2000 Offsite Well Install: Toxichem installed offsite monitoring well MW-11. No petroleum hydrocarbons were detected in soil samples from well MW-11. No additional information is available, but the above information was reported in Delta Environmental Consultants' (Delta) September 25, 2002 *Monitoring Well Installation Report*.

May 2002 Well Replacement and Installation: Delta replaced damaged monitoring well MW-5 with well MW-5B and installed well MW-12 within the previously excavated area. No soil or grab-groundwater samples were collected. More information is available in Delta's September 25, 2002 *Monitoring Well Installation Report*.

ATTACHMENT C

STANDARD FIELD PROCEDURES FOR SOIL VAPOR PROBE INSTALLATION
AND SAMPLING

Conestoga-Rovers & Associates

STANDARD FIELD PROCEDURES FOR SOIL VAPOR PROBE INSTALLATION AND SAMPLING

VAPOR POINT METHODS

This document describes Conestoga-Rovers & Associates' standard field methods for soil vapor sampling. These procedures are designed to comply with Federal, State and local regulatory guidelines. Specific field procedures are summarized below.

Objectives

Soil vapor samples are collected and analyzed to assess whether vapor-phase subsurface contaminants pose a threat to human health or the environment.

Shallow Soil Vapor Point Installation

The shallow soil vapor point method for soil vapor sampling utilizes a hand auger or drill rig to advance a boring for the installation of a soil vapor sampling point. Once the boring is hand augered to the final depth, a probe, connected with Swagelok fittings to nylon or Teflon tubing of ¼-inch outer-diameter, is placed within 12-inches of number 2/16 filter sand (Figure A). A 12-inch layer of dry granular bentonite is placed on top of the filter pack. Pre-hydrated granular bentonite is then poured to fill the borehole. The tube is coiled and placed within a wellbox finished flush to the surface. Soil vapor samples will be collected no sooner than 48 hours after installation of the soil vapor points to allow adequate time for representative soil vapors to accumulate. Soil vapor sample collection will not be scheduled until after a minimum of three consecutive precipitation-free days and irrigation onsite has ceased. Figure B shows the soil vapor sampling apparatus. A measured volume of air will be purged from the tubing using a different Summa purge canister. Immediately after purging, soil vapor samples will be collected using the appropriate size Summa canister with attached flow regulator and sediment filter. The soil vapor points will be preserved until they are no longer needed for risk evaluation purposes. At that time, they will be destroyed by extracting the tubing, hand augering to remove the sand and bentonite, and backfilling the boring with neat cement. The boring will be patched with asphalt or concrete, as appropriate.

Sampling of Soil Vapor Points

Samples will be collected using a SUMMA™ canister connected to sampling tubing at each vapor point. Prior to collecting soil vapor samples, the initial vacuum of the canisters is measured and recorded on the chain-of-custody. The vacuum of the SUMMA™ canister is used to draw the soil vapor through the flow controller until a negative pressure of approximately 5-inches of Hg is observed on the vacuum gauge and recorded on

Conestoga-Rovers & Associates

the chain-of-custody. The flow controllers should be set to 100-200 ml/minute. Field duplicates should be collected for every day of sampling and/or for every 10 samples collected.

Prior to sample collection, stagnant air in the sampling apparatus should be removed by purging approximately 3 purge volumes. The purge volume is defined as the amount of air within the probe and tubing.

In accordance with the DTSC Advisory-Active Soil Gas Investigations guidance document, dated January 28, 2003, leak testing needs to be performed during sampling. Helium is recommended, although shaving cream is acceptable.

Vapor Sample Storage, Handling, and Transport

Samples are stored and transported under chain-of-custody to a state-certified analytic laboratory. Samples should never be cooled due to the possibility of condensation within the canister.