Ian Robb
Project Manager
Marketing Business Unit

Chevron Environmental Management Company
6001 Bollinger Canyon Road
San Ramon, CA 94583
Tel (925) 842-9496
Fax (925) 842-8370
ianrobb@chevron.com

02/26/09

RE: Chevron Service Station # - 21-1253

Address 930 Springtown Blvd, Livermore

I have reviewed the attached work plan dated 02/26/09.

I agree with the conclusions and recommendations presented in the referenced report. The information in this report is accurate to the best of my knowledge and all local Agency/Regional Board guidelines have been followed. This report was prepared by Conestoga-Rovers & Associates (CRA) 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.

Sincerely,

Ian Robb

Attachment: Report

CONESTOGA-ROVERS & ASSOCIATES

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

February 26, 2009 Reference No. 060058

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

Re: Work Plan for Monitoring Well Installation
Former Texaco Service Station 21-1253
930 Springtown Boulevard
Livermore, California
Fuel Leak Case RO0000189

Dear Mr. Wickham:

Conestoga-Rovers & Associates (CRA) is submitting this *Work Plan for Monitoring Well Installation* on behalf of Chevron Environmental Management Company (Chevron) for the site referenced above. Alameda County Environmental Health Services (ACEH) has requested a pilot test work plan or draft corrective action plan to remediate remaining residual petroleum hydrocarbon impact in soil and groundwater in a letter dated December 4, 2008 (Attachment A). CRA understands the request, but believes that it is necessary to determine current groundwater conditions prior to any proposed remedial work. Therefore, CRA proposes to install six groundwater monitoring wells and monitor for four quarters before presenting any work plan of remedial actions. Presented below are a summary of the site background and the proposed scope of work.

SITE BACKGROUND

The site is a former Texaco service station located on the corner of Springtown Boulevard and Lassen Road in Livermore, California (Figure 1). In the summer of 1985, Texaco sold the site. The underground storage tanks (USTs) and product lines were removed concurrent with the construction of a 7-Eleven convenience store on the site. The site is still occupied by a 7-Eleven convenience store, surrounded by a paved parking area (Figure 2).

A total of 11 soil borings, 10 groundwater monitoring wells, 1 soil vapor extraction and air sparge well and 1 groundwater extraction well have been installed at the site. All site wells were subsequently destroyed based on ACEH and the San Francisco Regional Water Quality Board concurrence in 2002 that no further action was needed. No remedial action completion certificate was ever issued. In 2007, ACEH

requested investigative work to fill data gaps prior to issuing case closure. A summary of environmental investigations conducted to date at the site is included as Attachment B.

SITE GEOLOGY AND HYDROGEOLOGY

Soil at the site consists of alluvial and colluvial silty clays, silty sands, gravelly sands, sandy silts and clayey silts of Holocene age. These soils have a maximum thickness in the region of approximately 150 feet. The Pliocene-aged Tassajara Formation, described by DWR as consisting of sandstone, shale and limestone, forms the bedrock beneath the site.

The site is located in the Mocho II sub-basin of the Main Basin in the Livermore Valley, as defined by the California Department of Water Resources (DWR) and the Zone 7 Water Agency. The Mocho II sub-basin is defined by the Livermore Fault on the west, thinning Quaternary alluvium on the east, the Livermore Uplands to the south and the Tassajara Formation to the north. General groundwater gradient in the basin is to the west; however, hills near the site appear to affect groundwater flow direction. Groundwater from the Main Basin is used as current drinking water source. The nearest surface waters to the site are Arroyo Seco and Arroyo Las Positas, which converge approximately one mile west of the site. Historically, site depth to groundwater in the first encountered shallow water-bearing zone has ranged from approximately 6.5 fbg to 19. 5 feet below grade (fbg).

PROPOSED SCOPE OF WORK

In a letter dated December 4, 2008, ACEH requested additional work to remediate remaining impact in soil and groundwater beneath the site based on elevated concentrations in soil and grab-groundwater compared to the previous concentrations included in the closure request from 2001. Prior to assessing remedial options, CRA recommends collecting current groundwater monitoring, concentration, and plume extent data.

The following monitoring wells are proposed for installation:

- Three wells will be installed onsite and screened between 5 and 15 fbg to verify groundwater concentrations from the previous subsurface investigation. The screened interval is based on historical groundwater fluctuations from the previously destroyed monitoring wells onsite.
- Two wells will be installed onsite and screened between 25 and 30 bg near CPT1 and CPT7 to verify deeper groundwater concentrations.
- One well will be installed offsite, near CPT3 to verify the presence of petroleum hydrocarbons in groundwater and to determine if the plume has moved offsite. The well will be screened form 5 to 20 fbg, based on historical well data from the two closest former wells. The well depth and well

screen interval may be modified in the field based on depth to water and soils encountered at each boring location.

Once the monitoring wells are installed, CRA proposes at least four quarters of monitoring and sampling to confirm and evaluate fluctuations of groundwater elevation and hydrocarbon concentration trends. Historical groundwater elevations fluctuated up to five feet and it is necessary to determine if groundwater concentrations are dependant upon groundwater depth. After four quarters of groundwater data is collected, CRA will propose further recommended actions as appropriate. The locations of proposed monitoring wells are presented on Figure 2. To accomplish this scope of work, Chevron and CRA propose to conduct the following:

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 remain onsite during all field activities.

Permits: CRA will obtain soil boring permits from the Zone 7 Water District prior to beginning field operations.

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. Per Chevron safety standards, each boring will be cleared to 8 fbg using an air-knife assisted vacuum rig or hand auger.

Well Installation: The monitoring wells will be advanced with 8-inch diameter hollow-stem augers then completed as monitoring wells MW-9 through MW-14. The wells will be completed using 4-inch diameter Schedule 40 PVC casing with a 0.010-inch slotted screen and screened at the appropriate depths. The filter pack will consist of #2/12 sand from the bottom of the boring to approximately 2 feet above the screened interval. Screen depths may be adjusted depending on the depth of groundwater encountered. Exact boring locations and final depths will be based on site and utility constraints and the vertical extent of soil impact. Well location and top-of-casing elevation will be surveyed by a licensed land surveyor. Well development will be completed at least two days after installation and groundwater sampling will be initiated on a quarterly basis for at least four quarters. CRA's Standard Field Procedures for Well Installation are presented as Attachment C.

Soil Sampling Protocol: Soil samples will be collected for laboratory analysis at approximately 5-foot intervals, at obvious changes in soils, and where hydrocarbon staining or odors are observed, to the bottom of the boring. CRA geologists will log collected soils using the modified Unified Soil Classification System. Soil will be field-screened using a photo-ionization detector (PID) and visual observations. 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.

Chemical Analysis: Soil samples will be analyzed for the following:

- Total Petroleum Hydrocarbons as gasoline by EPA Method 8015 modified; and
- Benzene, toluene, ethylbenzene and xylenes by EPA Method 8260B.

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 analytical profile results.

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

- Descriptions of the drilling and sampling methods;
- Boring logs;
- Tabulated soil and groundwater analytical results;
- Analytical reports and chain-of-custody forms;
- Soil disposal details;
- An evaluation of the extent of hydrocarbons in the subsurface; and
- Conclusions and recommendations.

SCHEDULE

CRA will proceed with the proposed scope of work upon receipt of written approval from ACEH. After approval, CRA will obtain the necessary drilling permits, access agreements, and schedule the subcontractors at their earliest availability. We will submit our investigation report approximately eight weeks after completion of field activities.

CONESTOGA-ROVERS
& ASSOCIATES

February 26, 2009 Reference No. 060058

We appreciate the opportunity to work with you on this project. If you determine that the proposed scope of work is not appropriate based on your request, please contact Ms. Charlotte Evans at (510) 420-3351 or Mr. Ian Robb at (925) 543-2375 so that we may discuss the proposed work.

Sincerely,

CONESTOGA-ROVERS & ASSOCIATES

Charlotte Evans

CE/ih/1

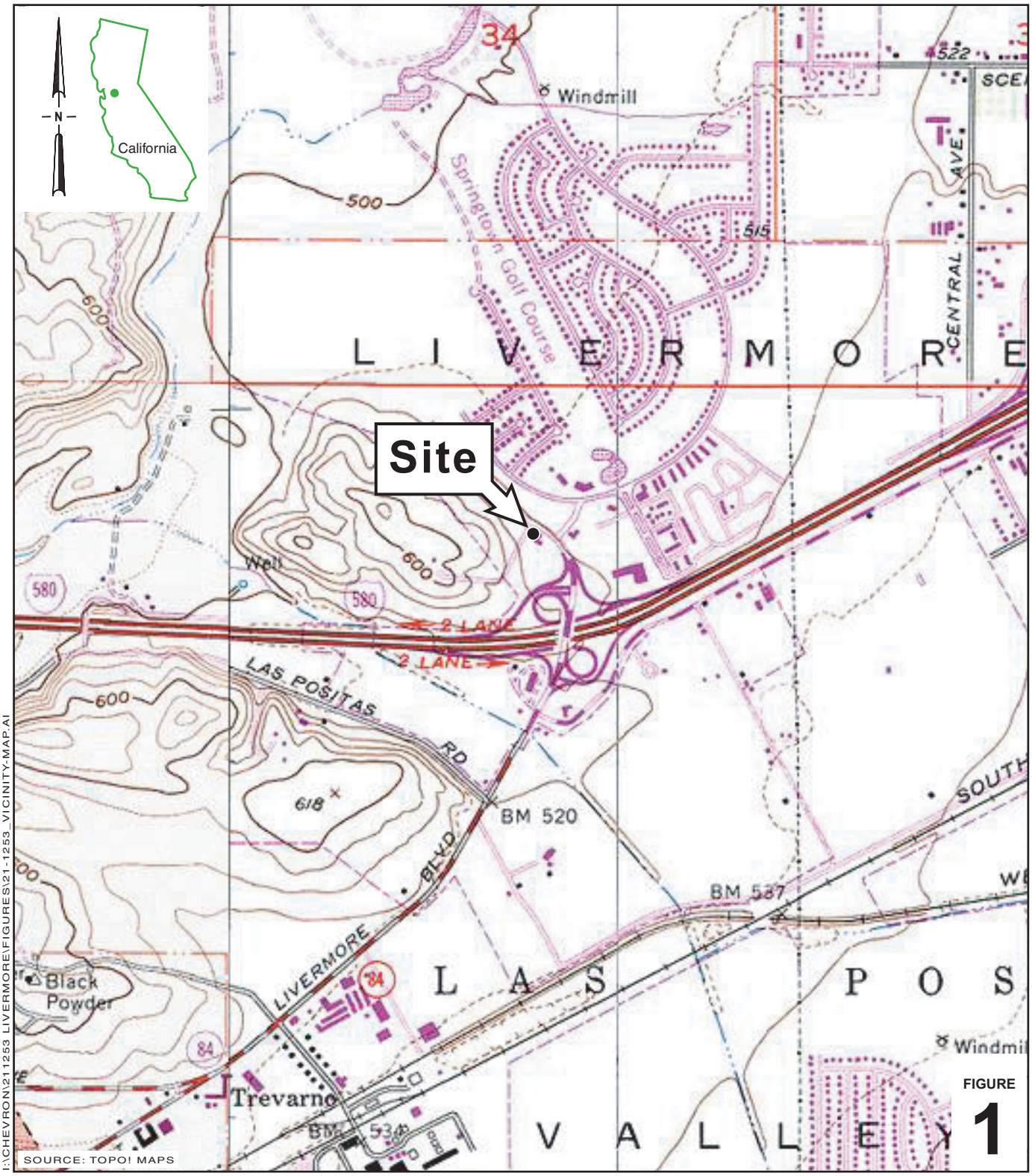
Brandon S. Wilken, P.G. # 7564

Encl.

Figure 1	Site Vicinity Map
Figure 2	Site Plan with Proposed Monitoring Well Locations
Attachment A	ACEH December 9, 2008 Letter
Attachment B	Summary of Previous Environmental Work
Attachment C	Standard Field Procedures for Well Installation

cc: Mr. Ian Robb, Chevron Environmental Management Company
Mr. Ken Hilliard, Environmental Services, 7-Eleven, Inc.
Mr. Kirk Sniff, Strasburger & Price, LLP

04/06/07



I:\CHEVRON\211253 LIVERMORE\FIGURES\21-1253_VICINITY-MAP.AI

FIGURE 1

0 1/8 1/4 1/2 1

SCALE : 1" = 1/4 MILE

Former Texaco Service Station

930 Springtown Boulevard

Livermore, California

CONESTOGA-ROVERS & ASSOCIATES

Vicinity Map

02/25/09

Site Plan

EXPLANATION

- Proposed deep monitoring well location
- Proposed monitoring well location
- MW-1 — Destroyed monitoring well location
- CPT1 — CPT boring location
- Storm Drain line
- Sanitary Sewer line
- Water line
- Gas line
- Communications line

CPT3
CPT6
CPT5
CPT4
MW-4
MW-8
SPRINGTOWN BOULEVARD
MW-6
MW-5
planter
CPT2
MW-A
EW-1
VE-1
SP-1
CPT1
CPT7
MW-B
former dispenser island
MW-3
former USTs
LASSEN ROAD
planter
MW-2
MW-1
MW-7
7-11 Store
planter
property line

N

0 20 40 80

Scale (ft)

FIGURE

2

Former Texaco Station #21-1253

930 Springtown Boulevard

Livermore, California

CONESTOGA-ROVERS & ASSOCIATES

I:\CHEVRON\0600--\060058 #211253 LIVERMORE\060058-FIGURES\060058 21-1253 SITE PLAN.DWG

APPENDIX A

ACEH DECEMBER 9, 2008 LETTER

Recd Dec. 8 2008

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-93

December 4, 2008

Mr. Ian Robb
Chevron Environmental Management Company
6001 Bollinger Canyon Rd., K2256
San Ramon, CA 94583-2324

Mr. Ken Hilliard
Environmental Services
7-Eleven, Inc.
One Arts Plaza, 1722 Routh St., Suite 1000
Dallas, TX 75201

Subject: Fuel Leak Case No. RO0000189 and Geotracker Global ID T0600101353, Chevron #21-1253/Texaco, 930 Springtown Boulevard, Livermore, CA 94550

Dear Mr. Robb and Mr. Hilliard:

Alameda County Environmental Health (ACEH) staff has reviewed the fuel leak case file for the above-referenced site, including the document entitled, "*Subsurface Investigation Report*," dated August 13, 2008. The "*Subsurface Investigation Report*," presents the results from several phases of cone penetration test (CPT) soil borings in 2007 and 2008. Soil and grab groundwater samples were collected from each of seven CPT borings. Total petroleum hydrocarbons as gasoline (TPHg) and benzene were detected in groundwater at maximum concentrations of 160,000 and 4,200 micrograms per liter (µg/L), respectively.

In correspondence dated March 8, 2002, Alameda County Environmental Health (ACEH) staff indicated that ACEH and the San Francisco Regional Water Quality Board had reviewed the case closure summary and concurred that no further action related to the underground storage tank release is required at this time. The March 8, 2002 correspondence went on to request that the nine monitoring wells at the site be decommissioned, if they will no longer be monitored. Subsequent review of the case file by ACEH staff in 2007, which is documented in correspondence dated January 31, 2007, identified data gaps that need to be addressed prior to considering the case for closure. The seven CPT borings advanced in 2007 and 2008 were implemented to address these data gaps.

The August 13, 2008 "*Subsurface Investigation Report,*" concludes that all data gaps identified in the ACEH letter dated January 31, 2007 have been addressed. The Report goes on to conclude that current site conditions are similar to conditions upon which ACEH and the Water Board concurred that no further action was necessary. No rationale for case closure is presented other than current conditions are believed to be similar to previously referenced conditions. A document entitled, "*Request for Closure,*" dated December 10, 2001 is referenced and included as Attachment G to the "*Subsurface Investigation Report.*" Based upon our review of the case file including the August 13, 2008 "*Subsurface Investigation Report,*" December 10, 2001 "*Request*

for Closure," and the August 13, 2001, "*Vadose Zone Investigation and Risk-Based Corrective Action (RBCA) Analysis*," we do not concur that current site conditions are similar to previously referenced conditions. Please see technical comments 1 through 4 for descriptions of specific differences.

Based upon our review of the case file, site conditions are significantly different than cited and represented in documents previously used to evaluate the site for case closure. The volume and concentration of residual soil and groundwater contamination at the site requires that the site be remediated. Therefore, we request that you submit a Work Plan for pilot testing or a Draft Corrective Action Plan **by February 26, 2009**.

TECHNICAL COMMENTS

1. **Plume Extent.** Our January 31, 2007 directive letter requested that you investigate the potential for the plume to have migrated off-site to the northwest, possibly along a preferential pathway. The four CPT borings were advanced off-site to the north and northwest to address this data gap. TPHg was detected at a concentration of 1,700 micrograms per liter (µg/L) in a grab groundwater sample collected from a sand layer at a depth of approximately 24 feet bags in boring CPT3. Boring CPT-3 is more than 300 feet from the former USTs and approximately 190 feet from the northern corner of the property. Therefore, we do not understand the conclusion in the August 13, 2008, "*Subsurface Investigation Report*," that the plume is limited to the northern property boundary. It appears that the plume extends off-site and is significantly larger than previously considered.

2. **Vertical Delineation.** In our January 31, 2007 directive letter, the vertical extent of contamination was identified as a data gap for the site based on the potential for downward migration of contamination at the site due to long-term water level fluctuations and the observation of fuel hydrocarbons at the lowest depths investigated. The CPT borings included depth-discrete soil and grab groundwater sampling that provided data on the vertical distribution of contamination to address this data gap. In the three CPT borings where the highest concentrations of petroleum hydrocarbons were detected, the grab groundwater samples collected below a depth of 20 feet bags contained the highest concentration of TPHg. In boring CPT-1, the concentration of TPHg in the grab groundwater sample collected at a depth of 24 feet bags (160,000 µg/L) was nearly two orders of magnitude higher than the concentration of TPHg in the shallower grab groundwater sample collected at 16 feet bags (1,700 µg/L). In the five (of total seven) CPT borings where petroleum hydrocarbons were detected in groundwater, the highest concentrations of TPHg were generally detected in grab groundwater samples collected between 24 and 43 feet bags. Groundwater monitoring wells MW-A and MW-B, which were directly downgradient from the former USTs, only extended to a depth of 16 feet bags. Wells MW-A and MW-B were the primary wells used to delineate the extent of contamination and trends in concentration over time. The 2007 and 2008 CPT investigation shows that the vertical extent and concentrations of petroleum hydrocarbons are significantly greater than previously assumed in 2002.

3. **Grab Groundwater Results.** The August 13, 2008, "*Subsurface Investigation Report*," appears to discount the grab groundwater sampling results by stating that, "grab groundwater

samples are often one to two orders of magnitude higher than stabilized groundwater monitoring well samples." The basis for this statement is not provided. However, data from both types of sampling are available for this site and can be readily compared. Boring CPT-7 is adjacent to former well MW-B and boring CPT-1 is adjacent to former well MW-A. During the last monitoring well sampling event on January 4, 2002, the groundwater sample from well MW-B contained 10,000 µg/L of TPHg and 11 µg/L of benzene. Former well MW-B was screened from approximately 4 to 16 feet bgs; therefore, the results can be compared to the grab groundwater sample collected at a depth of 13 feet bgs from adjacent boring CPT-7. The grab groundwater sample collected at a depth of 13 feet bgs from boring CPT-7 contained 3,600 µg/L of TPHg and 21 µg/L of benzene. The TPHg concentration in the sample from the monitoring well is higher than the grab groundwater sampling result. At the second location, the results from monitoring well MW-A can be compared to the grab groundwater sample collected at a depth of 16 feet bgs from boring CPT-1 (monitoring well was screened from approximately 4 to 16 feet bgs). During the last monitoring well sampling event on January 4, 2002, the groundwater sample from well MW-A contained 9,100 µg/L of TPHg and 4.1 µg/L of benzene. In comparison, the grab groundwater sample collected at a depth of 16 feet bgs from boring CPT-1 contained 1,700 µg/L of TPHg and 7 µg/L of benzene. Again, the concentration of TPHg was higher in the groundwater sample from the monitoring well than in the comparable grab groundwater sample. These results do not fit with the stated conclusion that grab groundwater sampling results are one to two orders of magnitude higher than results from monitoring wells. As discussed in technical comment 2, the depth at which the grab groundwater samples were collected is a much more significant factor for this site than the sampling method.

4. **Comparison of Current Conditions to Conditions Cited in Request for Closure.** The August 13, 2008, "*Subsurface Investigation Report*," concludes that, "current site conditions are similar to conditions upon which ACEHS and RWQCB-SFB originally based their no further action determination" and requests that a remedial action completion certificate be issued. In order to evaluate this conclusion, we have compared the current site conditions to those described in the December 10, 2001 "*Request for Closure*," and in the August 13, 2001 "*Vadose Zone Investigation and Risk-Based Corrective Action (RBCA) Analysis*." Case closure was requested in the December 10, 2001 "*Request for Closure*," based on the following facts:

Basis for Case Closure Request in December 10, 2001 "*Request for Closure*"	**Current Conditions**
The USTs were removed in June 1985 and the site is currently a 7-Eleven convenience store	No changes.
Graphs show the effectiveness of SVE system in removing petroleum hydrocarbons from vadose zone soil	The graphs show that the SVE system performance declined over time but does not provide an indication of the mass removed or the effectiveness of the SVE system to remediate the vadose zone. Moreover, much of the contamination at this site is below the water table and not affected by SVE. Therefore, even if it

	could be assumed that SVE was effective in removing petroleum hydrocarbons from the vadose zone, site cleanup is necessary to address deeper contamination.
The effectiveness of the SVE system was confirmed by analysis of soil samples in June 2001. TPHg was detected in two samples at concentrations of 11 and 14 milligrams per kilogram (mg/kg), respectively.	TPHg and benzene were detected in vadose zone soil samples collected in 2008 at concentrations up to 1,700 and 2.5 mg/kg, respectively. This is a significant difference from the 2001 assumed conditions.
The dissolved petroleum plume is small (0.1 acres) and was assumed to be largely on site.	TPHg was detected in a grab groundwater sample from CPT-3 at a concentration of 1,500 micrograms per liter (µg/L). CPT3 is off-site more than 300 feet from the former USTs. This is a significant difference from the 2001 assumed conditions.
MTBE was not detected in groundwater samples during recent sampling events.	No changes
No registered water supply wells were identified within 1/2.-mile of the site.	No changes
Current conditions do not pose a threat to human health based on a 2001 RBCA analysis	The RBCA analysis was based on data that has been superseded by data from the 2007 and 2008 CPT investigation. Maximum concentrations from the 2007 and 2008 CPT investigation exceed the site-specific target levels in the 2001 RBCA. This is a significant difference from the 2001 assumed conditions.

Based upon the differences noted in the table above and the greater horizontal and vertical extent of contamination discussed in technical comments 1 and 2 above, there are significant differences between the conditions encountered during the 2007 and 2008 CPT investigation and the conditions described in the December 10, 2001 "*Request for Closure.*"

TECHNICAL REPORT REQUEST

Please submit technical reports to Alameda County Environmental Health (Attention: Jerry Wickham), according to the following schedule:

- **February 26, 2009** – Pilot Test Work Plan or Draft Corrective Action 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

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to 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 Instructions." 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. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all 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 monitoring wells, and other data to the Geotracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is 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.

If you have any questions, please call me at (510) 567-6791 or send me an electronic mail message at jerry.wickham@acgov.org.

Sincerely,

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

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: Cheryl Dizon, QIC 80201, Zone 7 Water Agency, 100 North Canyons Parkway
Livermore, CA 94551

Danielle Stefani, Livermore-Pleasanton Fire Department, 3560 Nevada Street
Pleasanton, CA 94566

Charlotte Evans, Conestoga-Rovers & Associates, 5900 Hollis Street, Suite A,
Emeryville, CA 94608

Donna Drogos, ACEH
Jerry Wickham, ACEH
File

APPENDIX B

SUMMARY OF PREVIOUS ENVIRONMENTAL WORK

SITE HISTORY

1984 Initial Investigation: In September 1984, J.H. Kleinfelder and Associates (Kleinfelder) discovered approximately 1-inch of non-aqueous phase liquid hydrocarbons near the tank pit area. No additional information from this report is available.

1985 Hydrocarbon Investigation and UST/Product Line Removal: Groundwater Technology Incorporated (GTI) installed monitoring wells MW-1 through MW-4 around the tank pit area to assess the extent of hydrocarbons detected by Kleinfelder. Groundwater monitoring wells MW-A and MW-B were installed prior to this investigation, but no reports on well installation were found. GTI also observed underground storage tank (UST) and piping removal and collected soil samples beneath the USTs and product lines during the decommissioning of the Texaco station. Low hydrocarbon concentrations were detected in soil from the tank pit area (a maximum of 3.2 milligrams per kilogram (mg/kg) total petroleum hydrocarbons as gasoline (TPHg) and 0.58 mg/kg benzene). This indicates that the hydrocarbon release probably resulted from a product line leak or tank over filling rather than from a UST leak. GTI conducted a ½-mile well survey through the Alameda Flood Control and Water Conservation District; no registered water supply wells were identified. A sensitive receptor survey did not identify any other sensitive receptors near the site. More information available in GTI's August 1985 *Hydrocarbon Investigation Report*.

1987 Monitoring Well Installation: In March 1987, GTI installed wells MW-5 and MW-6. The highest hydrocarbon concentrations detected in soil were 2.1 mg/kg TPHg and 0.030 mg/kg benzene from MW-5 at 14 feet below grade (fbg). The new wells were surveyed and GTI began monthly monitoring of groundwater levels at the site. More information available in GTI's March 23, 1987 *Status Report*.

1990 Additional Site Assessment: In April 1990, GTI advanced four soil borings, two of which were converted to monitoring wells MW-7 and MW-8. No soil results from this report are available. The highest TPHg and benzene groundwater concentrations were detected in wells MW-A and MW-B nearest the former USTs (up to 39,000 micrograms per liter (µg/L) TPHg and 2,700 µg/L benzene). No hydrocarbons were detected in wells MW 1, MW 4, MW-7 and MW-8. More information available in GTI's April 10, 1990 *Report of Additional Environmental Site Assessment*.

1993 Extraction Well Installation and Feasibility Testing: In January 1993, Weiss Associates (WA) advanced soil borings B-1 and B-2, and installed groundwater extraction well EW-1, vapor extraction well VE-1, and air sparge well SP-1. The highest hydrocarbon concentration detected in soil was 1,200 mg/kg TPHg, just below the water table at 14.4 fbg in boring B-1. WA developed, sampled and conducted a 24 hour aquifer test on EW-1. WA expected the extraction well to capture most of the dissolved hydrocarbons in the groundwater beneath the site. Due to its placement in coarse-grained channel deposits, WA also expected EW-1 to mitigate off-site migration of hydrocarbons. 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. WA concluded that soil vapor extraction (SVE) could effectively remove vapors from a majority of the impacted areas. 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. More information available in WA's January 5, 1993 *Extraction Well Installation and Feasibility Testing*.

1994 Remediation System Start-Up: GTI started operation of an SVE system in November 1994. GTI's March 1995 report diagrams the remediation system and presents startup testing and sampling activities. More information 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) decommissioned monitoring wells MW-6 and MW-7 by overdrilling to the maximum depth of 25 fbg, then backfilling the borings with grout. More information available in KEI's January 22, 1996 *Report of Destruction of Monitoring Wells*.

1997 Tier 2 RBCA Input Summary: 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. More 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 a RBCA analysis indicating that current conditions did not pose a threat to human health or the environment and no further active remediation was required. Their analysis was based on soil and soil vapor sample results collected in June 2001. In September 2001, KHM prepared an addendum in response to comments received by email from ACEHS. More information 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 summarizing the site background and conditions. More information available in KHM's December 10, 2001 letter requesting closure.

2003 Well Destruction Report: In December 2002, KHM decommissioned all onsite and offsite wells (MW-1 through MW-5, MW-A, MW-B, EW-1, VE-1, and SP-1) by pressure grouting with approval from the ACEHS. More information 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: In 2007 and 2008, seven cone penetration testing (CPT) borings were advanced on and offsite to evaluate potential preferential pathways and the dissolved plume extent for re-evaluation for case closure. Maximum concentrations of TPHg and benzene were detected at 1,700 mg/kg and 2.5 mg/kg, respectively, in CPT7 at 10.5 fbg. No TPHg or BTEX were detected in soil from CPT2 through CPT6. No fuel oxygenates, including MTBE, were detected in any soil sample. Multiple grab-groundwater samples were collected from each boring to investigate current hydrocarbon concentrations in groundwater. Maximum hydrocarbon concentrations of 160,000 µg/L TPHg, 4,200 µg/L benzene, 20,000 µg/L toluene, 1,700 µg/L ethylbenzene and 15,000 µg/L xylenes were detected in CPT1 at 24 fbg. Groundwater from CPT7 at 42 fbg also contained 11,000 µg/L TPHg at and 2,100 µg/L xylenes.

Except for minor EDB concentrations (a maximum of 4.0 µg/L), no MTBE or other fuel oxygenates were detected in any of the borings. More information available in CRA's August 13, 2008 *Subsurface Investigation Report*.

APPENDIX C

STANDARD FIELD PROCEDURES FOR WELL INSTALLATION

Conestoga-Rovers & Associates

STANDARD FIELD PROCEDURES FOR MONITORING WELL INSTALLATION

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

DRILLING AND SAMPLING

Objectives

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

Soil Boring and Sampling

Soil borings are typically drilled using hollow-stem augers or direct-push technologies such as the Geoprobe®. Prior to drilling, the first 8 ft of the boring are cleared using an air or water knife and vacuum extraction. This minimizes the potential for impacting utilities.

Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Additional soil samples are collected near the water table and at lithologic changes. Samples are collected using lined split-barrel or equivalent samplers driven into undisturbed sediments at the bottom of the borehole.

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

Sample Analysis

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

Field Screening

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

Water Sampling

Water samples, if they are collected from the boring, are either collected using a driven Hydropunch® type sampler or are collected from the open borehole using bailers. The groundwater samples are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4^{o}C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. Equipment blanks may be analyzed if non-dedicated sampling equipment is used.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Groundwater monitoring wells are installed to monitor groundwater quality and determine the groundwater elevation, flow direction and gradient. Well depths and screen lengths are based on groundwater depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and State and local regulatory guidelines. Well screens typically extend 10 to 15 feet below and 5 feet above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three feet thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. Rinsed and graded sand corresponding to the slot size occupies the annular space between the boring and the well screen to about one to two feet above the well screen. A two feet thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of Portland type I, II cement.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

Wells are generally developed using a combination of groundwater surging and extraction. Surging agitates the groundwater and dislodges fine sediments from the sand pack. After about ten minutes of surging, groundwater is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of groundwater are extracted and the sediment volume in the groundwater is negligible. This process usually occurs prior to installing the sanitary surface seal to ensure sand pack stabilization. If development occurs after surface seal installation, then development occurs 24 to 72 hours after seal installation to ensure that the Portland cement has set up correctly.

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

Groundwater Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of groundwater are purged prior to sampling. Purging continues until groundwater pH, conductivity, and temperature have stabilized. Groundwater samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labeled, placed in protective foam sleeves, stored on crushed ice at or below 4^{o}C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

Waste Handling and Disposal

Soil cuttings from drilling activities are usually stockpiled onsite and covered by plastic sheeting. At least three individual soil samples are collected from the stockpiles and composited at the analytic laboratory. The composite sample is analyzed for the same constituents analyzed in the borehole samples in addition to any analytes required by the receiving disposal facility. Soil cuttings are transported by licensed waste haulers and disposed in secure, licensed facilities based on the composite analytic results.

Groundwater removed during development and sampling is typically stored onsite in sealed 55-gallon drums. Each drum is labeled with the drum number, date of generation, suspected contents, generator identification and consultant contact. Upon receipt of analytic results, the water is either pumped out using a vacuum truck for transport to a licensed waste treatment/disposal facility or the individual drums are picked up and transported to the waste facility where the drum contents are removed and appropriately disposed.