

July 26, 2006

Mr. Jerry Wickham  
Department of Environmental Health  
Alameda County Health Agency  
1131 Harbor Bay Parkway  
Alameda, California 94502

Subject: SLIC Case No. RO0002892, Chevron Sunol Pipeline, 2793 Calaveras Road, Sunol, CA - **Work Plan for Groundwater Monitoring Well Installation and SVE System Expansion and Operation**

Dear Mr. Wickham:

On behalf of Chevron Pipe Line Company (Chevron), URS Corporation (URS) has prepared the attached work plan to install two additional groundwater monitoring wells and expand and operate the soil vapor extraction system (SVE) at the Chevron Sunol Pipeline Site (Site) in Sunol, California. The attached work plan incorporates comments received from the Alameda County Environmental Health (ACEH) staff in the May 26, 2006 meeting among representatives of ACEH, Chevron, and URS and is intended to fulfill the requests stated in the June 5, 2006 and July 14, 2006 ACEH comment letters to Chevron. Specifically, this work plan is intended to fulfill the ACEH's technical report request to submit proposals for SVE system expansion and additional subsurface investigation by July 26, 2006 and August 11, 2006, respectively.

If you have any questions on our Work Plan, please call Mr. Joe Morgan at 510-874-3201.

Sincerely yours,

URS CORPORATION



Joe Morgan III  
Senior Project Manager

Attachments:

Perjury Statement

Disclosure Statements (2)

Work Plan for Groundwater Monitoring Well Installation and SVE System Expansion and Operation -- Chevron Sunol Pipeline Site

This work plan (“Groundwater Monitoring Well Installation and SVE System Expansion and Operation Chevron Sunol Pipeline, Sunol, California”) was prepared under my direct supervision. The information and proposed SVE expansion and operation activities presented in this work plan are based on our review of available data obtained during our previous field efforts, studies performed by others, laboratory data produced by independent laboratories, and our discussions with the Alameda County Environmental Health staff. To the best of our knowledge, we have incorporated into our recommendations all relevant data pertaining to the Chevron Pipeline Release site in Sunol, California.

The portion of the work plan for SVE expansion and operation activities discussed herein was developed in accordance with the standard of care used to develop this type of work plan. The assumptions that were made and the recommendations for additional field activities were based on our professional experience and protocols reported in the literature for similar investigations.

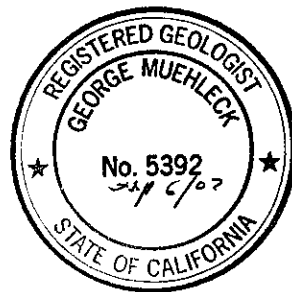


**URS Corporation**  
Approved by:


  
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Hanchih Angela Liang, Ph.D., P.E.

This work plan (“Groundwater Monitoring Well Installation and SVE System Expansion and Operation Chevron Sunol Pipeline, Sunol, California”) was prepared under my direct supervision. The information and suggested additional subsurface investigation activities presented in this work plan are based on our review of available data obtained during our previous subsurface investigation efforts and our discussions with the Alameda County Environmental Health staff. To the best of our knowledge, we have incorporated into our recommendations all relevant data pertaining to the Chevron Pipeline Release site in Sunol, California.

The work plan for additional subsurface investigation and SVE expansion and operation activities discussed herein was developed in accordance with the standard of care used to develop this type of work plan. The assumptions that were made and the recommendations for additional field activities were based on our professional experience and protocols reported in the literature for similar investigations.



**URS Corporation**  
Approved by:

  
George Muehleck, P.G.



Global Gas

**Jeff Cosgray**  
Sr. Site Remediation  
Specialist

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July 24, 2006

Mr. Jerry Wickham  
Department of Environmental Health  
Alameda County Health Agency  
1131 Harbor Bay Parkway  
Alameda, California 94502

Dear Mr. Wickham:

I declare, under penalty of perjury, that the information contained in URS' work plan titled "Groundwater Monitoring Well Installation and SVE System Expansion and Operation Chevron Sunol Pipeline, Sunol, California" is true and correct to the best of my knowledge at the present time.

Submitted by

Jeffrey Cosgray

A handwritten signature in black ink that reads "Jeffrey Cosgray". The signature is written in a cursive style with a large, looping initial "J".

**FINAL WORK PLAN**

**GROUNDWATER MONITORING  
WELL INSTALLATION AND  
SVE SYSTEM EXPANSION AND  
OPERATION  
CHEVRON SUNOL PIPELINE  
SUNOL, CALIFORNIA**

**SLIC CASE NO. RO0002892**

*Prepared for:*

Chevron Pipe Line Company  
4800 Fournace Place, E320C  
Bellaire, Texas 77401

July 2006

**URS**

URS Corporation  
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# TABLE OF CONTENTS

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1.	Section 1 ONE Introduction .....	1-1
2.	Section 2 TWO Background .....	2-1
	2.1 Release Location .....	2-1
	2.2 Release History .....	2-1
	2.3 Subsurface Investigation .....	2-2
3.	Section 3 THREE Installation of Groundwater Monitoring Wells .....	3-1
	3.1 Rationale For Additional Boring/Monitoring Well Locations.....	3-1
	3.2 Drilling and Soil Sampling Procedures.....	3-1
	3.3 Well Installation and Development Procedures.....	3-2
	3.4 Pre-Drilling Activities.....	3-3
	3.5 Decontamination and Investigative Derived Waste.....	3-3
	3.6 Surveying .....	3-3
	3.7 Reporting.....	3-4
4.	Section 4 FOUR SVE System Expansion and Operation .....	4-1
	4.1 Installation of Additional SVE Wells .....	4-1
	4.1.1 Rationale For Additional SVE Well Locations .....	4-1
	4.1.2 Drilling and Soil Sampling Procedures.....	4-2
	4.1.3 SVE Well Installation .....	4-3
	4.1.4 Pre-Drilling Activities.....	4-4
	4.1.5 Decontamination and Investigative Derived Waste.....	4-4
	4.1.6 Surveying .....	4-4
	4.2 Connecting the SVE Wells to the System.....	4-5
	4.3 SVE Operation .....	4-5
	4.4 Collecting Vapor Samples for Laboratory Analysis.....	4-5
	4.5 Reporting.....	4-6
5.	Section 5 FIVE References .....	5-1

# TABLE OF CONTENTS

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## Tables

- 1 August 2005 Temperatures, Sunol, California

## Figures

- 1 Proposed Additional SVE and Groundwater Monitoring Well Locations

## Appendices

- A Alameda County Environmental Health Comment Letters dated June 5, 2006 and July 14, 2006

## Acronyms and Abbreviations

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bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
cfm	cubic feet per minute
CPL	Chevron Pipe Line Company
F	Fahrenheit
g/m <sup>3</sup>	grams per cubic meter
hp	horsepower
PID	photoionization detector
ppm	parts per million
psia	pounds per square inch atmosphere
PVC	polyvinyl chloride
SFPUC	San Francisco Public Utilities Commission
SVE	soil vapor extraction
URS	URS Corporation
EPA	United States Environmental Protection Agency



On behalf of Chevron Pipe Line Company (Chevron), URS Corporation (URS) has prepared this work plan to install two additional groundwater monitoring wells and expand and operate the soil vapor extraction system (SVE) at the Chevron Sunol Pipeline Site (Site) in Sunol, California.

This work plan incorporates comments received from the Alameda County Environmental Health (ACEH) staff in the May 26, 2006 meeting among representatives of ACEH, Chevron, and URS. In addition, this work plan is intended to fulfill the requests stated in the June 5, 2006 and July 14, 2006 ACEH comment letters to Chevron (Appendix A). Specifically, this work plan is intended to fulfill the ACEH's technical report request to submit proposals for SVE system expansion and additional subsurface investigation by July 26, 2006 and August 11, 2006, respectively.

The scope of work includes the following:

- Installing one (1) additional groundwater monitoring well within the gravel zone downgradient from the release location along Calaveras Road.
- Installing one (1) additional groundwater monitoring well within the gravel zone to the northeast of MW-1 and to the west of Calaveras Road.
- Installing five (5) additional SVE wells on the hillside in the vicinity of the release location.
- Continuing operation of the SVE system for an estimated 6 months or until the concentrations at each well reach asymptotic values.
- Developing SVE shutdown criteria.
- Assessing SVE system effectiveness in achieving overall project goals and evaluating other remedial alternatives, if necessary.

This section describes the release location and release history as well as the subsurface investigation that URS conducted at the release location.

## 2.1 RELEASE LOCATION

The location of the pipeline release is approximately 2.7 miles south of the intersection of Interstate 680 and Calaveras Road, between mileposts 2.7 and 2.8 of Calaveras Road, in Sunol Valley, Valle de San Jose Mexican land grant (La Costa Valley Quadrangle) in Alameda County, California. The release location is approximately 4 miles southeast from the city of Sunol, California. The pipeline extends along Calaveras Road and traverses a steep hillside above the east side of the road. The San Francisco Public Utilities Commission (SFPUC) owns the property where the release occurred and leases it to a cattle rancher. Immediately to the west of Calaveras Road at the location of the release is a tree nursery (the Valley Crest Tree Company), which also leases the property from the SFPUC.

## 2.2 RELEASE HISTORY

The release of unleaded gasoline occurred on August 14, 2005, on a pipeline owned by Chevron, when a motor grader that was grading the dirt road parallel to Calaveras Road struck the pipeline. Chevron estimated that approximately 700 barrels (29,400 gallons) of unleaded gasoline were released.

While the estimated release volume was 29,400 gallons, the data collected to date indicates that a vast majority of the product was removed from the site during emergency response activities and evaporated immediately after and in the days following the release. The following facts support this assumption:

- The product was released as a spray at approximately 750 pounds per square inch (psi) pressure from a hole in the top of the pipeline, allowing for rapid volatilization. The condition of site vegetation indicated that the gasoline spray reached as high as 50 feet in the air.
- The down slope portion of Calaveras Road was saturated with product, most of which evaporated or was removed when the roadway was replaced.

- The dense vegetation on the hillside provided a large amount of surface area for evaporation.
- The high volatility of gasoline and the ambient temperature at the site at the time of the release contributed to a significant amount of gasoline vaporization from the soil immediately after and in the days following the release. Table 1 shows the highest, lowest, and average temperatures, and the wind speed from August 14 (release date) through August 31, 2005.
- A total of 152 tons of gasoline impacted soil and debris were disposed of as part of the emergency remedial activities. A significant amount of gasoline was removed from the site through the excavated soils.
- According to one standard industry modeling tool, a pool containing approximately 30,000 gallons of product with only the surface area exposed would evaporate entirely in about six hours. The actual conditions during the spill would have been exponentially more favorable for evaporation given the factors listed above.

### 2.3 SUBSURFACE INVESTIGATION

In response to Alameda County's request to evaluate the soil and groundwater impacts of the release, Chevron retained URS to conduct multiple phases of subsurface investigation. The purpose of the subsurface investigation was to evaluate the lateral and vertical extent of gasoline-impacted soil and groundwater at the release location. URS advanced a total of 19 Geoprobe<sup>®</sup> borings, nine hand-augered borings, two hollow-stem auger borings, and four air-rotary auger borings to collect soil and groundwater samples. The sampling locations are shown on Figure 1. These field activities were conducted from August 25 to November 10, 2005. The investigation results were presented in *Subsurface Investigation Report, Chevron Pipeline Release, Sunol, California* (URS 2005).

URS conducted the first phase of work (SB-1 through SB-10) from August 25 to 29, 2005 along side Calaveras Road in the Alameda County Public Works Agency Right of Way (ROW). Typically, the direct-push sampling equipment encountered refusal at approximately 20 feet below ground surface (bgs). No groundwater was encountered during this sampling effort. Our drilling subcontractor told our staff that the area between the roadway pavement and the fence to

the west is too narrow to allow use of different drilling equipment capable of reaching the groundwater table. Another complicating factor in this area is a buried cable that runs along the pavement edge.

The second phase of the investigation was conducted from October 11 to 25, 2005 on PUC property on the east side of Calaveras Road on the hillside where the release occurred. This phase of the investigation included advancing 18 direct push borings and nine (9) hand-augered borings (SB-11 through SB-27). During this investigation high PID readings and strong gasoline odors were detected in soils collected from borings located closest to the spill location. Reduced PID readings and gasoline odors were detected in soils collected farther away from the spill.

The third phase of the investigation was conducted on October 10, 2005 in the nursery on the west side of Calaveras Road. During this phase, URS advanced two borings with an auger rig in an attempt to locate groundwater (HSA-1 and HSA-2). Groundwater was apparently encountered in HSA-1 at 37 feet bgs, but not enough water was present to collect a sample. Although groundwater was not sampled, this drilling effort was successful in evaluating site geology to the depths of 37 and 50.5 feet bgs, where refusal was encountered for the two borings.

In both borings a gravel layer was encountered where gasoline odors were present. The top of the gravel layer varied in depth from 17 to 23 feet bgs and the bottom of the layer varied from 37 to 43 feet bgs. Highly weathered clayey bedrock was encountered at 43 feet bgs at HSA-2; this bedrock was underlain by increasingly less weathered sandy siltstone bedrock from 45 feet bgs to the total explored depth of 50.5 feet bgs.

The fourth phase of the investigation was conducted in the nursery from October 18 to 21, 2005. Due to the difficult drilling conditions encountered with the HSA rig (i.e., cobbles and refusal with the auger rig), an air-rotary casing hammer (ARCH) drill rig was used to drill four exploratory borings (AR-1 through AR-4) to a maximum depth of 108 feet bgs (AR-2). Three of the borings were completed as monitoring wells (MW-1 through MW-3) to approximately 40 feet bgs.

Groundwater was initially encountered in only two of the wells (MW-1 and MW-2), but was present in all three wells after winter rainfall. Although groundwater was not encountered at AR-2, a 75-foot-thick siltstone/claystone confining layer beneath the unconsolidated gravel layer was identified.

One monitoring well, MW-1, occasionally had a thin sheen of gasoline free-product on the groundwater surface prior to January 17, 2006. MW-1 displayed the greatest product thickness of 0.17 feet on November 10, 2005. Between November 10, 2005 and January 11, 2006, approximately 1.5 gallons of gasoline and gasoline-impacted water were removed from MW-1 using a bailer. No sheen or free-product has been observed in MW-1 since January 11, 2006. No sheen or measurable free-product has been encountered in any of the other monitoring wells during our quarterly groundwater monitoring events.

URS conducted an additional subsurface investigation from January 17 to 31, 2006 to address the ACEH's request to fully define the extent of contamination in soil and groundwater at the site. As part of the additional subsurface investigation activities URS installed four additional groundwater monitoring wells (MW-4 through MW-7, Figure 1). Three of the wells were installed along Calaveras Road into the confined sandstone water-bearing zone. One well was installed to the west of Calaveras Road to the north of MW-1 and MW-3 into the unconfined gravel water-bearing zone (URS 2006b).

As part of the interim remedial action, URS installed four SVE wells (SVE-1D through SVE-4D) on the dirt road where the release occurred (Figure 1). URS installed and operated a SVE system for the week of November 7, 2005. Based on the success of the system, URS continued to operate the system for three additional months until February 12, 2006. In total, approximately 1,000 gallons of gasoline were removed from the soil. The design strategy, operation, monitoring, and sampling activities were presented in the Interim Remediation Report (URS 2006a).

To fulfill the ACEH staff's request to further investigate groundwater and contaminant migration at the Site, URS proposes installing two (2) additional groundwater monitoring wells. One of the wells will be installed along Calaveras Road directly downslope from the release location within the gravel layer. The second well will be installed northeast of MW-1 and east of MW-4 on the nursery property within the gravel layer directly overlying the siltstone bedrock (Figure 1).

### **3.1 RATIONALE FOR ADDITIONAL BORING/MONITORING WELL LOCATIONS**

The monitoring well proposed for installation along Calaveras Road is intended to screen the thin (4-5 feet thick) gravel zone that appears to be a preferential pathway for downgradient contaminant migration. Although groundwater was not encountered within the gravel zone during previous investigations, this additional well will be used to monitor possible future contaminant migration during periods of heavy precipitation. As shown on Figure 1, the proposed well is located directly between the release point and MW-1, where the highest contaminant concentrations have been observed.

The location of the proposed additional well within the nursery property was chosen to further evaluate the northeastern extent of the contaminant plume observed at MW-1. This well will also serve as an additional data point in evaluating the depth to the bedrock surface and its influence on local groundwater flow.

### **3.2 DRILLING AND SOIL SAMPLING PROCEDURES**

URS will advance the proposed boring along Calaveras Road to just below the gravel/bedrock contact to install a well equipped with a sump below the screened interval. The purpose of the sump would be to capture any groundwater passing through the screened interval of the well for sampling purposes since adequate volumes of water may not be present to conduct conventional purging and sampling techniques. The proposed boring to the west of Calaveras Road will be advanced to the gravel/bedrock contact. Based on the geologic data collected from the previous subsurface investigations, bedrock depths are estimated to be approximately 20 to 25 feet below ground surface (bgs) along Calaveras Road and 40 to 45 feet bgs in the nursery. URS will attempt to advance the borings using hollow stem auger (HSA) drilling methods. However, if refusal is encountered above the bedrock, mud-rotary drilling methods will be used.

Continuous soil sampling will be possible using either drilling method. Soils will be logged using the Unified Classification System (ASTM D2487) and a portion of each sample interval will be collected for headspace analysis for the presence of volatile organic compounds (VOCs) using a photoionization detector (PID). Any indications of visual or olfactory impacts will also be noted on the boring log.

Soil samples will only be collected for laboratory analysis at intervals exhibiting visual impacts and high PID readings. URS will collect soil samples for laboratory analysis using EnCore™ soil sampling kits in accordance with USEPA Method 5035. The Encore™ method of sample collection requires less soil recovery from the sampler than a brass sleeve and will reduce headspace issues for analytical samples. Samples submitted for laboratory analysis will be analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B and total petroleum hydrocarbons quantified as gasoline range organics (TPH-GRO) by USEPA Method 8015M. Samples will be kept on ice in a cooler and will be submitted under URS chain-of-custody procedures to Lancaster Analytical Laboratory, a State of California certified laboratory. The samples will be analyzed on a standard turn around time.

### **3.3 WELL INSTALLATION AND DEVELOPMENT PROCEDURES**

Both wells will be completed with 2-inch-diameter, flush-threaded, Schedule 40 polyvinyl chloride (PVC) blank casings and 5 or 10 foot 0.020-inch-slot PVC well screens. The wells will be screened within the gravel zone and across the water table or potential water-bearing zone, if present. The well installed along Calaveras Road will be equipped with a 1-foot sump extending below the screened interval and the bedrock contact in an effort to collect groundwater that may flow through the gravel layer. A hydrated bentonite bottom seal will be installed adjacent to the sump. Both wells will be completed with #3 sand filter packs placed within the annulus of each well from the bottom of the casing to approximately 1.5 to 2 feet above the top of the well screen. The annulus of each well will then be sealed with approximately 2 feet of hydrated bentonite chips or pellets on top of the filter pack, and a Portland cement and 5 percent bentonite grout slurry tremied to the surface. Both wells will be completed with vehicle-rated well vaults and locking caps.

After the wells have been installed and sufficient water columns exist, they will be developed. If water does not exist in sufficient quantities the well will not be developed. Well development will include surging and purging the wells until a minimum of three well volumes (casing and filter pack volume) are removed. During purging the temperature, pH, conductivity, and turbidity of the water will be monitored. The well will be considered developed when either the well has been purged dry or three consecutive readings meet the following stabilization parameters: pH +/- 0.2 pH units, conductivity +/- 3% of reading, turbidity +/- 1.0 NTU (if measured).

### **3.4 PRE-DRILLING ACTIVITIES**

Prior to drilling, URS will have Underground Service Alert perform a utility clearance. In addition, URS will retain Cruz Brothers Locators Inc., of Scotts Valley, California, to clear each boring location for the presence of underground utilities. URS has obtained an encroachment permit from the County of Alameda Public Works Agency to work in the right-of-way for the well location proposed along Calaveras Road. For safety reasons, URS will also have traffic-control measures in place for one lane of traffic. The boring locations will be advanced with a hand auger to five feet bgs as a safety measure before the drilling rig is used.

### **3.5 DECONTAMINATION AND INVESTIGATIVE DERIVED WASTE**

Sampling equipment to be reused will be washed using an Alconox/water solution and rinsed between each sampling event. All investigative derived waste generated during the investigation activities will be drummed and stored onsite pending waste characterization analyses and disposal at either a Chevron approved facility or for on-site re-use, if appropriate.

### **3.6 SURVEYING**

The well locations and elevations will be located in accordance with SWRCB Geotracker requirements by professional land surveyors using a combination of conventional and Global Positioning System (GPS) survey techniques for future mapping and groundwater flow analysis. The survey results will be included in a table in the investigation report.



**3.7 REPORTING**

The activities conducted as part of this additional well installation effort will be discussed in a supplemental subsurface investigation report. The report will include boring logs, well construction details, well development forms, and analytical results.

Based on the findings of this supplemental investigation, the additional groundwater monitoring wells will be evaluated for additional remediation efforts and be integrated into the Quarterly Groundwater Monitoring Program.

SVE is an in-situ vadoze zone soil remediation technology in which a vacuum is applied to the soil to induce a controlled flow of air and remove VOCs from the soil. The primary objective of SVE as an interim remedial measure at the Sunol site is removal of gasoline contaminant mass in the soils for the purpose of protecting groundwater.

The SVE gas flow enhances evaporation of non-aqueous phase liquids (NAPL), desorption of contaminants from the surfaces of soil particles, and volatilization of contaminants dissolved in pore water. Therefore, contaminant recovery rates for SVE systems are controlled by two mass transfer mechanisms: vaporization and soil adsorption (Johnson, Palmer, and Keely 1987; USEPA 1991).

Due to the mass transfer limitations, the SVE system cannot be operated indefinitely without diminishing efficiency. The system will be removed when, as a whole, it reaches a consistent asymptote on the concentration versus time graph. If project overall objectives have not been met at this point, other remedial measures, such as biodegradation and monitored natural attenuation may be evaluated (USEPA 1994, USACE 1995).

#### **4.1 INSTALLATION OF ADDITIONAL SVE WELLS**

To address ACEH concerns regarding impacts to the area downslope of the release location, URS proposes to install four additional SVE wells on the hillside downslope of the release location and one additional SVE well along the dirt road in the vicinity of SB-20 (Figure1).

##### **4.1.1 Rationale For Additional SVE Well Locations**

The current SVE wells (SVE-1D through SVE-4D) were successful in removing approximately 1,000 gallons of gasoline from the soil near the release location during the three months of operation. In an attempt to increase the removal rate of the SVE operation, URS proposes adding an additional five SVE wells, to increase the area influenced by the SVE system.

Specifically, four additional SVE wells will be installed on the hillside below the release location. These additional SVE wells are intended to remove gasoline from soils in the area between SB-19, SB-20, and MW-5, where the highest PID readings were observed during subsurface investigation activities.

Although the area below the release location was not previously accessible with a rig, recent cattle traffic has flattened out some areas on the slope along the fence (Figure 1). Stationing a limited access rig in this area may now be feasible. The footpath, recently created by the cows, traverses the hill below the release location and extends for an adequate distance to advance three (3) borings within the target area discussed above. A small shelf, located about 40 feet upslope from Calaveras Road (between MW-5 and MW-6), was also discovered beneath dead branches and thick ground cover during recent biological impact assessment activities and will also provide sufficient space to advance one (1) boring.

On June 29, 2006 a site safety visit was conducted between URS and the prospective drilling contractor, Clearheart Drilling of Santa Rosa, CA to assess the hazards associated with advancing the four borings on the steep hillside. After discussing the drilling challenges and potential hazards, the URS Oakland Health and Safety Officer, Shannon Couch, agreed that drilling in the proposed locations appeared possible, provided that Clearheart Drilling meets both URS and Chevron subcontractor safety requirements and that the appropriate safety measures are employed. However, the ability to conduct the proposed activities safely can only be fully assessed during fieldwork. Any action that could result in an unsafe condition or compromise worker safety will be grounds for terminating any or all of the proposed borings.

The fifth boring location is proposed near the former SB-20 location, along the dirt road in the vicinity of existing wells SVE-3S and SVE-4D. Ideally, the additional boring will be advanced into the gravelly zone where PID readings over 1000 ppm were recorded at SB-20. The installed SVE well will screen the gravel unit, which appears to be a preferential pathway for downgradient contaminant transport.

#### **4.1.2 Drilling and Soil Sampling Procedures**

URS plans to advance the four (4) borings on the hillside to depths of 20-30 feet below ground surface (bgs) to maximize the radius of influence for each SVE well and reduce short-circuiting through the surface of the hillside. As discussed above, URS recommends advancing the fifth proposed boring into the gravel unit to a depth of approximately 35-40 feet bgs. The total depth at each boring location will ultimately be determined in the field based on observations and drilling capabilities.

Based on the extremely steep slope below the release location, URS will use a hand-portable limited access solid flight auger drill rig to advance the four hillside borings. The limited access rig will be powered by a track-mounted rig, staged on the dirt roadway. URS proposes continuous soil sampling ahead of the 6-inch outer diameter solid augers through the open borehole. Sampling capabilities will be dependent on the drilling conditions, rig capability, and borehole collapse.

Because larger rig access is possible on the dirt road, the fifth boring will ideally be drilled with a track-mounted rig using the 6-inch outer diameter solid flight augers. Because this boring is intended for installation in the immediate vicinity of SB-20 where soil sampling was previously conducted, additional soil sampling is not planned.

Soil samples collected from the four hillside borings will be classified using the Unified Classification System (ASTM D2487) and a portion of each sample interval will be collected for headspace analysis for the presence of volatile organic compounds (VOCs) using a PID. Any indications of visual or olfactory impacts will also be noted on the boring log.

A minimum of 1 soil sample will be collected for laboratory analysis for every 5 feet each hillside boring is advanced. Soil samples will be collected at intervals exhibiting visual or olfactory impacts and high PID readings. Additional soil samples may be collected within a given 5-foot interval if impacts to multiple soil horizons are noted. URS will collect soil samples for laboratory analysis using EnCore™ soil sampling kits in accordance with USEPA Method 5035. Samples submitted for laboratory analysis will be analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method 8260B and total petroleum hydrocarbons quantified as gasoline range organics (TPH-GRO) by USEPA Method 8015M. Samples will be kept on ice in a cooler and will be submitted using proper chain-of-custody procedures to Lancaster Analytical Laboratory, a State of California certified laboratory. The samples will be analyzed on a standard turn around time.

#### 4.1.3 SVE Well Installation

All five SVE wells will be installed with 2-inch diameter, flush-threaded, schedule 40 PVC blank casings and 5-10 foot 0.020-inch-slot PVC well screens. The wells will be completed with #3 sand filter packs placed within the annulus of each well from the bottom of the casing to

approximately 1.5 to 2 feet above the top of the well screen. The annulus of each well will then be sealed with approximately 2 feet of hydrated bentonite chips or pellets on top of the filter pack, and a Portland cement and 5 percent bentonite grout slurry tremied to the surface. No surface completions are planned for any of the wells to allow for easy connection to the SVE system.

#### **4.1.4 Pre-Drilling Activities**

Prior to drilling, URS will have Underground Service Alert perform a utility clearance. In addition, URS will retain Cruz Brothers Locators Inc., of Scotts Valley, California, to clear each boring location for the presence of underground utilities. URS has obtained an encroachment permit from the Alameda County Department of Public Works Agency to work in the right-of-way for the well located on the shelf upslope from Calaveras Road. For safety reasons, URS will also have traffic-control measures in place while working on the shelf.

Prior to setting up the drill rig, the drilling contractor, Clearheart Drilling of Santa Rosa, CA will hand dig a path and a platform to safely access and operate at each of the proposed boring locations. All five boring locations will be advanced with a hand auger to five feet bgs as a safety measure before the drill rig is used. Due to the specialized nature of the limited access rig, the pre-drilling preparation activities, and the additional safety measures required to work safely on the hillside, URS does not anticipate commencing this work until September 2006.

#### **4.1.5 Decontamination and Investigative Derived Waste**

Sampling equipment to be reused will be washed using an Alconox/water solution and rinsed between each sampling event. All investigative derived waste generated during the investigation activities will be drummed and stored onsite pending waste characterization analyses and disposal at either a Chevron approved facility or for on-site re-use, if appropriate.

#### **4.1.6 Surveying**

The well locations and elevations will be located in accordance with SWRCB Geotracker requirements by professional land surveyors using a combination of conventional and Global Positioning System (GPS) survey techniques. The survey results will be included in a table in the remediation report.

## 4.2 CONNECTING THE SVE WELLS TO THE SYSTEM

Once the five additional SVE wells are installed and the grout is set, they will be connected to a portable SVE system along with the existing SVE wells (SVE-1D through SVE-4D). The typical system will consist of a trailer-mounted 200 cubic-feet-per-minute (cfm) thermal oxidizer that includes a 10-horsepower (hp) liquid ring pump and a 100-gallon knockout pot; a 49-hp propane powered electrical generator; conveyance pipes and manifold; and a 1000-gallon propane tank. Exact SVE system details will depend on equipment availability.

The system is capable of inducing a vacuum with up to 20 inches of mercury (Hg). A custom manifold will be constructed to enable the vacuum applied to each well to be varied. This will allow the field technician to regulate the vacuum pressure, and flow for all nine wells, to ensure maximum system productivity.

The SVE system will be provided by Stratus Environmental of Cameron Park, CA. All supplies, gauges, permits, and fuel will be provided by Stratus. Stratus will also visit the site bi-monthly to monitor system performance.

## 4.3 SVE OPERATION

The expanded SVE system is proposed to operate for an estimated 6 months or until the concentrations at each well reach asymptotic values. Stratus will conduct weekly site visits to ensure the system is operating smoothly. A field log will be used to record system readings, flow rates, induced vacuum pressures, PID readings at each well head and the influent port on the SVE system, and system temperatures during each site visit.

## 4.4 COLLECTING VAPOR SAMPLES FOR LABORATORY ANALYSIS

URS will collect vapor samples from each SVE wellhead and from the influent port on the SVE system. The new SVE wells will be sampled bi-monthly for the first month of operation, and monthly thereafter. The existing SVE wells and the influent port will be sampled on a monthly basis. Compliance samples will also be collected from the effluent port on the SVE system on a monthly basis. A field log will be used to record system readings, flow rates, induced vacuum pressures, PID readings, and temperatures during each site visit.

The grab vapor samples will be collected in Tedlar bags and transported under URS chain-of-custody to Lancaster Laboratories, a State of California certified laboratory, via FedEx. The vapor samples will be analyzed for hydrocarbon concentrations as hexane by U.S Environmental Protection Agency (USEPA) Method 25 Modified and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by USEPA Method TO-14A. Samples will be analyzed on a standard turn around time.

#### **4.5 REPORTING**

The field data, boring logs, air analytical results, and mass removal calculations will be in the SVE system evaluation report at the end of the project.

- Johnson, Palmer, and Keely 1987. Mass transfer of organics between soil, water and vapor phases: implications for monitoring, biodegradation and remediation. *Proceedings: Petroleum Hydrocarbons and Organic Chemicals in Ground Water*. Johnson, R. L., Palmer, C. D., and Keely, J. F. November 1987. NWWA/API, Dublin, OH. pp. 473-507.
- URS 2005. *Subsurface Investigation Report, Chevron Pipeline Release, Sunol, California*. URS Corporation, December 15, 2005.
- URS 2006a. *Interim Remediation Report, Soil Vapor Extraction System for the Chevron Pipeline Release Location, Sunol, California, SLIC Case No. RO0002892*. URS Corporation, February 28, 2006.
- URS 2006b. *Additional Subsurface Investigation Report, Chevron Sunol Pipeline, Sunol, California*. URS Corporation, May 22, 2005.
- USACE 1995. Engineering Manual: Soil Vapor Extraction and Bioventing EM 1110-1-4001. United States Army Corps of Engineers. November 30, 1995.
- USEPA 1991. *Guide for Conducting Treatability Studies Under CERCLA, Soil Vapor Extraction*. EPA/540/2-91/019A.
- USEPA 1994. Remediation Technologies Screening Matrix and Reference Guide. EPA/542/B-94/013. October 1994.



## Tables

Table 1 August 2005 Temperatures, Sunol, California











Date	Temperature (°F)			Wind (mph)		Precipitation (in)
	high	avg	low	high	avg	sum
8/14/05	79	68	57	18	6	0
8/15/05	80	67	55	13	11	0
8/16/05	91	74	57	14	3	0
8/17/05	87	72	57	18	8	0
8/18/05	75	66	57	21	8	0
8/19/05	78	66	55	16	9	0
8/20/05	84	68	55	15	8	0
8/21/05	82	68	55	15	9	0
8/22/05	93	72	52	15	6	0
8/23/05	96	76	55	17	0	0
8/24/05	86	70	55	18	3	0
8/25/05	89	72	54	10	5	0
8/26/05	95	74	55	14	0	0
8/27/05	97	78	60	14	2	0
8/28/05	96	78	57	14	0	0
8/29/05	84	70	55	15	5	0
8/30/05	93	73	55	12	1	0
8/31/05	98	78	57	14	0	0
Maximum	98	78	60	21	11	0
Minimum	75	66	52	10	0	0

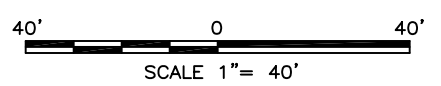
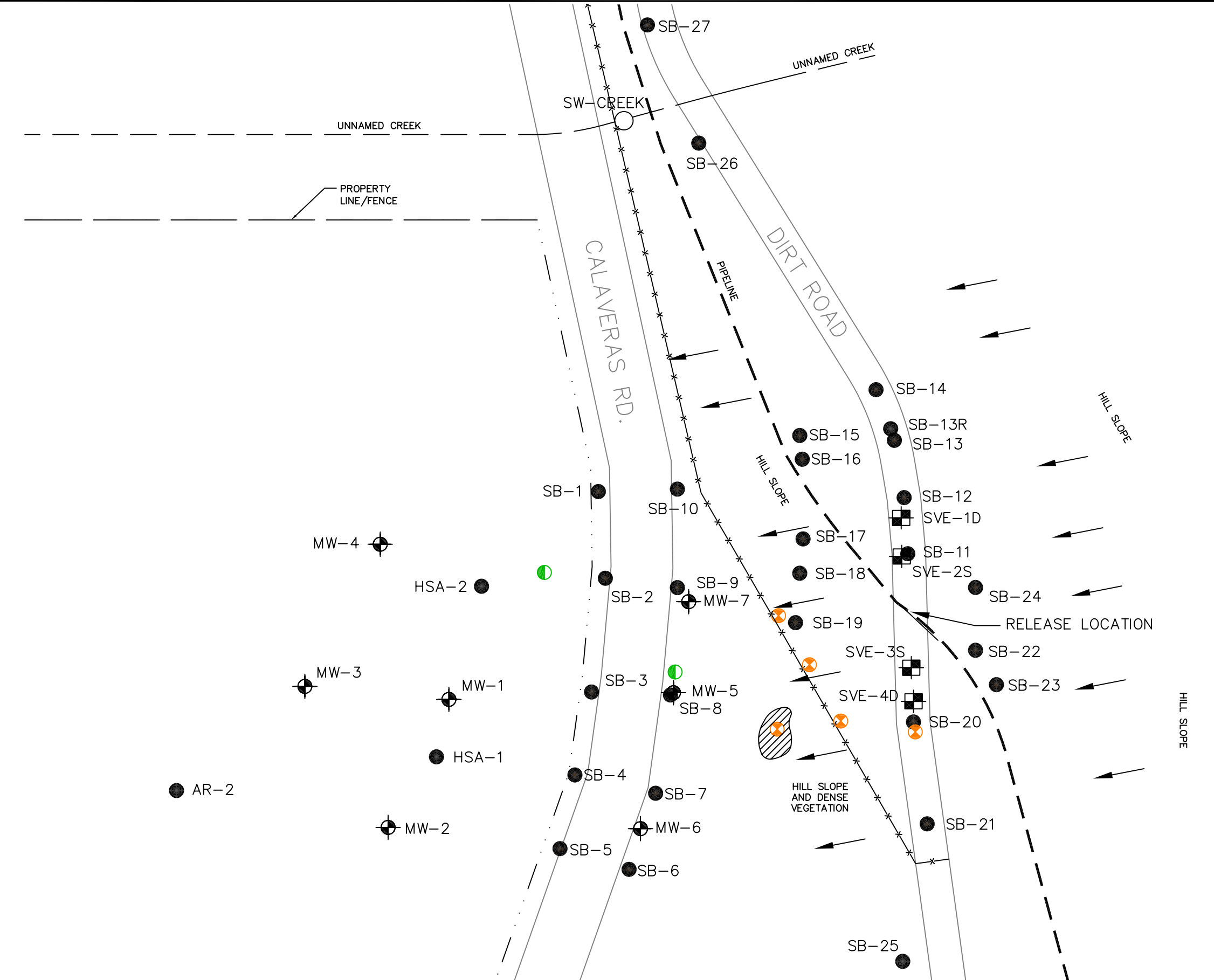
Source: [www.wunderground.com](http://www.wunderground.com)

## Figures

Jul 19, 2006 - 4:37pm  
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**LEGEND:**

-  SURFACE WATER SAMPLE
-  SOIL BORING
-  MONITORING WELL
-  SVE WELL
-  PROPOSED SVE WELL LOCATIONS
-  PROPOSED GROUNDWATER MONITORING WELLS
-  SHELF
-  FENCE
-  PIPELINE
-  HILL SLOPE 80-90% GRADE



<b>URS</b>	CHEVRON PIPELINE COMPANY	<b>PROPOSED ADDITIONAL SVE AND GROUNDWATER MONITORING WELL LOCATIONS</b>	Figure 1
	Project No. 26815217		

**Appendix A**  
**Alameda County Environmental Health Comment Letters**  
**dated June 5, 2006 and July 14, 2006**

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) 337-9335

June 5, 2006

Mr. Jeff Cosgray  
Chevron Pipe Line Company  
4800 Fournace Place  
Bellaire, TX 77401-2324

Subject: SLIC Case No. RO0002892, Chevron Sunol Pipeline, 2793 Calaveras Road, Sunol, CA

Dear Mr. Cosgray:

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above-referenced site and the document entitled, "Additional Subsurface Investigation Report, Chevron Sunol Pipeline Release, Sunol, California," dated May 22, 2006. The report was prepared on your behalf by URS Corporation and discusses site investigation activities conducted from January 17 through January 31, 2006. The report presents recommendations regarding the operation of the soil vapor extraction (SVE) system, quarterly monitoring, and free product recovery. In correspondence dated March 14, 2006, ACEH requested that the SVE system be expanded into the area downslope from the release. Logistical issues related to the steepness of the hillside have prevented the installation of SVE wells on the hillside. The issues related to possible expansion of the SVE system were discussed during a meeting conducted on May 26, 2006 between Jeff Cosgray (Chevron Pipe Line Company), Joe Morgan (URS), Greg White (URS), Angela Liang (URS), Ariu Levi (ACEH), Donna Drogos (ACEH), and myself. ACEH believes that continued operation of the SVE system without the addition of SVE wells on the hillside would not address a significant long-term source of contamination at the site. Based on discussions during the May 26, 2006 meeting, Chevron and URS will conduct further evaluation of the feasibility of potential technologies that will allow the installation of SVE wells on the slope.

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

**TECHNICAL COMMENTS**

1. **Gravel Layer as Preferential Pathway.** ACEH concurs with the finding in Section 4 of the "Additional Subsurface Investigation Report," that the gravel zone near the top of the bedrock on the hillside and apparently continuing to the west across Calaveras Road, is a preferential pathway. The gravel zone appears to be a preferential pathway for contaminant movement from perched zones beneath the hillside to the shallow gravel zone west of Calaveras Road where free product has been observed intermittently in well MW-1. Monitoring wells MW-5 through MW-7, which were planned to monitor the water table at the top of the bedrock, were screened entirely within sandstone bedrock 10 to 15 feet below the gravel zone and therefore do not monitor this preferential pathway. Although groundwater was not encountered in the gravel layer during installation of wells MW-5 through MW-7, the gravel layer appears to act as a preferential pathway for groundwater and contaminant migration, at least seasonally. In

order to monitor potential contaminant migration within the gravel layer, we request that monitoring wells be installed within the gravel layer at the base of the hillside east of Calaveras Road. Please present plans for well installation in the Work Plan requested below. Please also consider the potential for the fault/unconformity identified along Calaveras Road to affect groundwater and contaminant movement.

2. **Groundwater and Contaminant Migration West of Calaveras Road.** The "Additional Subsurface Investigation Report," concludes that groundwater contamination does not extend as far west as MW-3 and MW-4. We concur that wells MW-3 and MW-4 appear to be properly installed to monitor groundwater contamination at the top of the bedrock and that groundwater contamination does not appear to extend west to these wells. A bedrock surface that slopes to the east and northeast in this area is presumed to be influencing groundwater movement within the unconfined water-bearing zone west of Calaveras Road (Figure 10). Therefore, we request that you install a minimum of one additional monitoring well in a location northeast of MW-1 on the west side of Calaveras Road to monitor contaminant movement along the sloping bedrock surface.
3. **Cross Section D-D' on Figure 7.** On cross section D-D', please correct the length of the screen interval for MW-5 to 10 feet rather than 25 feet in future reports. In addition, please correct the label in the upper left corner to D rather than D'.
4. **Quarterly Groundwater Monitoring.** Please collect groundwater samples from all monitoring wells and the unnamed creek on a quarterly basis. We concur with the proposed analyses for total petroleum hydrocarbons as gasoline and benzene, toluene, ethylbenzene, and xylenes.
5. **Expansion of the SVE System.** We have no objection to continued operation of the existing SVE system. However, as we stated in our March 14, 2006 correspondence, the area downslope of the release has been significantly affected by the release and the SVE system must be expanded to remove the mass of hydrocarbons downslope from the release. We previously requested a Work Plan by May 2, 2006 to install additional SVE wells downslope from the release and continue operations of the SVE system. In follow-up to the discussions during our May 26, 2006 meeting, we now request that you submit a proposal to expand the SVE system by July 26, 2006.

#### **TECHNICAL REPORT REQUEST**

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

- **July 14, 2006** – Proposal for SVE System Expansion and Operation
- **August 11, 2006** – Work Plan for Additional Subsurface Investigation
- **August 15, 2006** – Quarterly Monitoring Report for the Second Quarter 2006

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

Effective **January 31, 2006**, 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](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.



Jeff Cosgray  
June 5, 2006  
Page 4

**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.

Sincerely,



Jerry Wickham  
Hazardous Materials Specialist

Enclosure: ACEH Electronic Report Upload (ftp) Instructions

cc: ✓ Joe Morgan III, URS Corporation, 1333 Broadway, Suite 800, Oakland, CA 94612

Joe Naras, San Francisco Public Utilities Commission, Natural Resources Division,  
1657 Rollins Road, Burlingame, CA 94010

Matt Katen, QIC 80201, Zone 7 Water Agency, 100 North Canyons Parkway,  
Livermore, CA 94551

Donna Drogos, ACEH  
Jerry Wickham, ACEH  
File

**ALAMEDA COUNTY  
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) 337-9335

July 14, 2006

Mr. Jeff Cosgray  
Chevron Pipe Line Company  
4800 Fournace Place  
Bellaire, TX 77401-2324

Subject: SLIC Case No. RO0002892, Chevron Sunol Pipeline, 2793 Calaveras Road, Sunol, CA

Dear Mr. Cosgray:

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above-referenced site and the document entitled, "Response to ACEH June 5, 2006 Letter – Technical comment 1. Gravel layer as Preferential Pathway," dated July 10, 2006. The correspondence was prepared on your behalf by URS Corporation and recommends that monitoring wells not be installed within the shallow gravel zone along Calaveras Road. The technical comments below provide our responses to the correspondence.

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

**TECHNICAL COMMENTS**

- 1. Hypothesis Regarding Groundwater in the Gravel Layer.** The URS correspondence concludes that since groundwater was not observed at the time of drilling in January that groundwater would not be present in the future to collect a representative sample and goes on to conclude that "groundwater appears to be present for very limited periods of time, if at all." The two hypotheses that groundwater is: 1) present at very limited times or 2) not at all, could be tested by the installation of a well in the gravel layer. If groundwater is observed in the gravel layer for short periods during the year, the hypothesis that groundwater is present at very limited times would be confirmed and the mass of contaminants being transported through the migration pathway could be roughly estimated based on the duration of flow and concentration of hydrocarbons in the groundwater. If groundwater is not observed at any time in a well in the gravel layer, the hypothesis that groundwater is not present "at all" would be confirmed. If groundwater never moved through the gravel layer, the observed impact to the gravel layer is likely the result of free phase product flow that affected approximately three feet of the gravel layer above the bedrock (as observed in boring MW-5). This information would also be useful in understanding past and future contaminant migration.
- 2. Benefit from Monitoring Groundwater East of Well MW-1.** The URS correspondence states, "Because the locations of the requested borings/wells are between the source area and MW-1 (located approximately 80 feet to the west), it is unclear if any benefit would be gained in monitoring a zone that lies in the middle of the impacted area." This statement appears to be contradictory to widely accepted guidance documents on placement of

monitoring wells at hazardous waste sites, which recommend the placement of wells within a plume or directly downgradient from a source to identify the distribution of contaminant concentrations and monitor contaminant flux from the source area. Well MW-1 is approximately 185 feet west of the source and on the opposite side of a postulated fault from the source. The proposal to monitor the source using only data from well MW-1 is unacceptable.

- 3. Requested Groundwater Monitoring Well Installation for Gravel Layer.** We request that you install a minimum of one well (adjacent to MW-5) to monitor the gravel layer above bedrock to address technical comments 1 and 2 or propose an alternative approach to monitor and estimate contaminant flux from the source area to groundwater using sampling locations in addition to well MW-1. Please note the additional request in our June 8, 2006 correspondence to monitor contaminant migration in groundwater along the sloping bedrock surface west of Calaveras Road. Please present your proposals in the Work Plan requested below.

### **TECHNICAL REPORT REQUEST**

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

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Jeff Cosgray  
July 14, 2006  
Page 3

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Sincerely,



Jerry Wickham  
Hazardous Materials Specialist

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Jeff Cosgray  
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