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HEALTH CARE SERVICES
AGENCY
ALEX BRISCOE, Agency Director

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June 28, 2013

Mr. Anthony Kershaw
Solano Group
P.O. Box 9206
Berkeley, CA 94709
(sent via electronic mail to tkershaw@kershawinvestments.com)

Subject: Modified Approval of Work Plan; SCP Case RO0002857 and Geotracker Global ID T06019756124, Albany 1-Hour Cleaners, 1187 Solano Avenue, Albany, CA 94706

Dear Mr. Kershaw:

Alameda County Environmental Health (ACEH) staff has reviewed the case file including the *Assessment Workplan*, dated June 17, 2013. The document was prepared on your behalf by Pangea Environmental Services, Inc (Pangea). Thank you for submitting the work plan.

Based on ACEH staff review of the work plan, the proposed scope of work is conditionally approved for implementation provided that the technical comments below are incorporated during the proposed work. Submittal of a revised work plan or addendum is not required unless an alternate scope of work outside that described in the work plan or these technical comments is proposed. We request that you address the following technical comments, perform the proposed work, and send us the report described below. Please provide 72-hour advance written notification to this office (e-mail preferred to: mark.detterman@acgov.org) prior to the start of field activities.

TECHNICAL COMMENTS

1. **Draft Public Fact Sheet Notice –** ACEH has received and reviewed a draft Public Fact Sheet Notice and a list of addresses disclosing the presence of contamination associated with the former use of the site by a dry cleaning operation that used chlorinated organic solvents as a cleaning agent. We request that you distribute the attached revised Fact Sheet to the mailing list forwarded with the draft Fact Sheet (Attachment A). Following distribution of the Fact Sheet, please provide your personal certification by e-mail or letter, that the Fact Sheet was distributed by U.S. Mail to the attached mailing list no later than July 10, 2013. ACEH also requests that you record, document address, and forward comments received by the date identified below.
2. **Work Plan and Modifications –** The referenced work plan proposes a series of actions with which ACEH is in general agreement of undertaking; however, ACEH has several potential concerns in regards to the proposed sampling protocols for the sub-slab vapor samples and the affect of the sampling protocols on the Data Quality Objectives (DQOs) for the site. These modifications are requested in order to obtain representative data at the site without DQO problems, consistent with standard DQOs procedures. These are discussed in more detail immediately below.
    a. **Vapor Sample Purge Volume –** The referenced work plan proposes to purge the probe / sampling assembly five or more times the ambient volume of air in the assembly and void space. The April 2012 Department of Toxic Substances Control (DTSC) *Advisory Active Soil Gas Investigations* describes purge testing procedures that have not been described the

Standard Operating Procedures (SOPs) attached to the work plan. The DTSC document also states that to avoid extensive purging soil gas samples collected less than five feet below grade surface (bgs) a default three purge volume should be used. ACEH notes the proposed samples are sub-slab samples and that they would appear this shallow sample collection description. To maintain consistency with the DTSC advisory, ACEH requests documentation of purge volume testing that establishes the appropriate purge volume or observance of the default purge volume in the report requested below.

b. **Vapor Sample Handling Procedures –** In order to control expenses, the referenced work plan proposes to collect vapor samples that are likely to be elevated with Tedlar bags, while collecting vapor samples likely to be used to define the lateral extent of vapor impact in the sub-slab environment with Summa canisters. Please be aware that while the April 2012 Department of Toxic Substances Control (DTSC) *Advisory Active Soil Gas Investigations* approves use of "polymer gas sampling bags", there are specific sample handing protocols that are defined in the DTSC document that are not incorporated into the SOPs. Specifically these include elimination of exposure to both light and heat that can and will degrade the volatile organic compounds (VOCs) within the sample bag. This will lead to significant DQO issues for a site that is seeking to maintain expedited response times. To maintain DQO objectives for this site (which remain unstated), ACEH prefers the use of Summa canisters for all samples, unless the stated concerns are specifically incorporated SOPs and into the onsite workflow. Incorporation of these procedures into the SOPs can be demonstrated in the report requested below.

c. **Vapor Sample Analytical –** The referenced work plan proposed the analysis of all vapor samples by TO-15, and selected samples for the tracer gas helium and the vapor sampling SOPs indicate that oxygen will also be collected. To manage data quality concerns, ACEH requests that all vapor samples include analysis for helium, oxygen, and carbon dioxide.

d. **Contingent Sub-Slab Vapor Samples –** Should elevated VOC contamination be discovered in the field, contingent horizontal vapor extraction wells, similar in construction to existing vapor wells installed without ACEH approval, have been proposed in an e-mail since the submittal of the referenced work plan. ACEH believes the installation of these wells as a temporary mitigation measure is appropriate; however, also notes that the approval of construction design of the wells is not a part of this directive letter.

3. **Site Conceptual Model and Comprehensive Site Investigation Report –** Please submit a Site Conceptual Model (SCM) and a comprehensive site investigation report that incorporates all data generated at the site to date by the date identified below. Please detail how DQOs for the site investigation were achieved during the investigation. In order to expedite review, ACEH requests the SCM be presented in a tabular format that highlights the major SCM elements and potential associated data gaps, which need to be addressed to progress the site to case closure. Please see Attachment B "Site Conceptual Model Requisite Elements".

TECHNICAL REPORT REQUEST

Please upload technical reports to the ACEH ftp site (Attention: Mark Detterman), and to the State Water Resources Control Board's Geotracker website, in accordance with the specified file naming convention below, according to the following schedule:

- **June 28, 2013** – Documentation Fact Sheet Has Been Issued
  File to be named: RO2857_CORRES_L_yyyy-mm-dd

- **August 30, 2013** – Itemized List of Public Comments and Responses Received
  File to be named: RO2857_CORRES_L_yyyy-mm-dd

- **August 30, 2013** – Site Investigation Report
  File to be named: RO2857_SWI_R_L_yyyy-mm-dd

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.

Should you have any questions, please contact me at (510) 567--6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark Detterman
DN: cn=Mark Detterman, o, ou, email=mark.detterman@acgov.org, c=US
Date: 2013.06.28 13:55:07 -07'00'

Mark E. Detterman, PG, CEG
Senior Hazardous Materials Specialist

Enclosures: Attachment 1 – Responsible Party (ies) Legal Requirements / Obligations
Electronic Report Upload (ftp) Instructions

Attachment A – Public Fact Sheet
Attachment B – Site Conceptual Model Requisite Elements

cc: Bob Clark-Riddell, Pangea Environmental Services, Inc, 1710 Franklin Street, Suite 200, Oakland, CA 94612 (sent via electronic mail to bridell@pangeaenv.com)

Donna Drogos, (sent via electronic mail to donna.drogos@acgov.org)
Dilan Roe (sent via electronic mail to dilan.roe@acgov.org)
Mark Detterman (sent via electronic mail to mark.detterman@acgov.org)
Electronic File, GeoTracker

ATTACHMENT A

Public Fact Sheet

Fact Sheet on Environmental Assessment

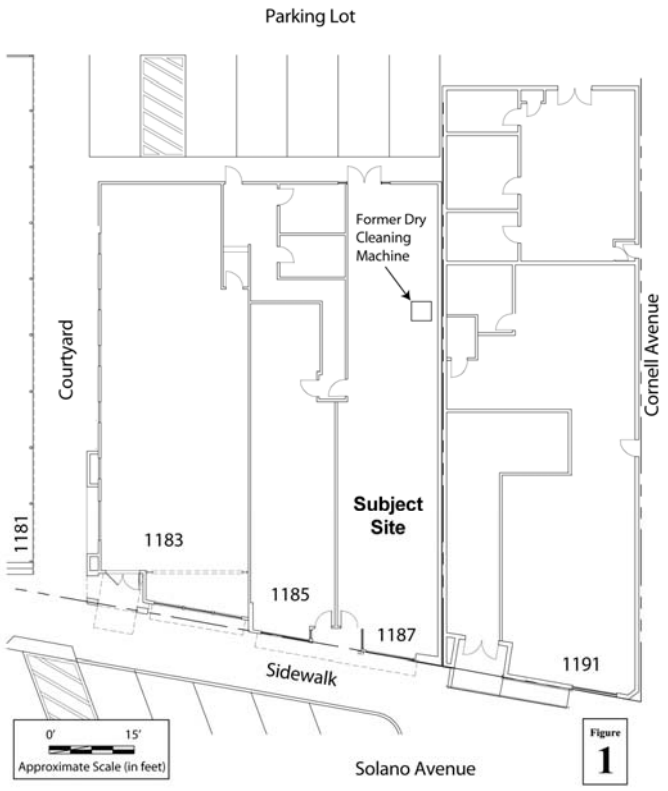
Albany 1-Hour Cleaners Site
1187 Solano Avenue
Albany, California
Alameda County
ACEH File No. RO002857
June 2013

This fact sheet is being provided to describe site background, past work to investigate site contamination, next steps, the oversight process for the site, and how you can obtain more information.

Summer, 2013

Summary

The Alameda County Environmental Health Department (ACEH) is issuing this fact sheet to inform you of ongoing investigation work at the former Albany 1-Hour Cleaner property (site), located at 1187 Solano Avenue, Albany, California (Figure 1). The purpose of the investigation work is to gather more information on the nature and extent of contamination on site as well as off site. This fact sheet contains information concerning site background, results of recent investigation and cleanup activities, planned investigation activities, and information contacts. A glossary of terms has been provided.



Background

The subject site consists of a vacant, one-story commercial unit at 1187 Solano Avenue (Figure 1). Dry cleaner operations occurred at Albany 1-Hour Cleaners at 1187 Solano Avenue (subject site) from approximately 1986 to 2011. From 1986 to 2004, the dry cleaning equipment used the chlorinated dry cleaning chemical tetrachloroethene, which is also known as perchloroethene (PCE) or 'perc'. In 2004, the dry cleaning equipment was replaced with hydrocarbon-based cleaning equipment to discontinue use of PCE. The subject site is vacant, with resumed site use currently planned for early 2014.

Previous Investigation Activities

Environmental investigation commenced at the site in 2004 and 2005 to evaluate potential cleaning solvent (PCE) contamination to the site subsurface. These investigations identified that PCE (and its breakdown products that are collectively known as volatile organic compounds (VOCs)) leaked into the subsurface, at concentrations greater than applicable regulatory agency screening levels. The VOCs found at the site are primarily tetrachloroethene (PCE) and trichloroethene (TCE). The VOCs were found in soil and soil gas about 5 ft deep, but were not detected in groundwater encountered at about 30 ft deep. The presence of these chemicals at concentrations exceeding regulatory screening levels does not indicate that adverse impacts to human health or the environment are necessarily occurring, but rather indicates that a potential for adverse risk may exist and that additional evaluation could be warranted.

No sensitive receptors such as schools, day care centers or hospitals were identified within 100 ft of the subject property structure. The consultant investigation report concluded that the risk posed by the identified compounds was within acceptable

Fact Sheet on Environmental Assessment

Albany 1-Hour Cleaner Site

Summer, 2013

levels for commercial site use and recommended no further action was required at the time.

Glossary of Terms

Soil Gas – Soil gas refers to the air that is present in the open spaces between soil particles between the ground surface and the water table. It includes air (primarily oxygen and nitrogen, like above ground), water vapor, and occasionally pollutants.

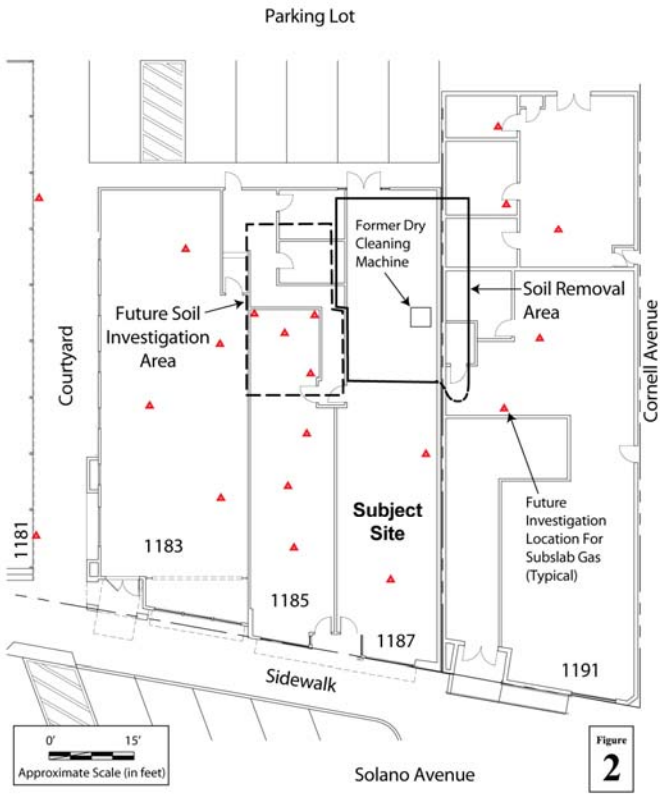
Subslab Gas – Subslab gas refers to the air that is present in the open spaces between soil particles and backfill material immediately beneath a building slab. It includes air (primarily oxygen and nitrogen, like above ground), water vapor, and occasionally pollutants.

Volatile organic compounds (VOCs) – VOCs are organic liquids, including many common solvents that readily evaporate at temperatures normally found at ground surface and at shallow depths. Many VOCs are known human carcinogens. Examples of VOC usage include dry cleaning solvent, carburetor cleaner, brake cleaner, and paint solvents.

Recent Investigation Activities

To further evaluate site conditions prior to planned site improvements, additional environmental investigation was performed in 2013. The additional assessment included soil sampling from over 45 borings; groundwater sampling within three monitoring wells and several borings; and subslab soil gas sampling from over 10 vapor probes. The additional assessment confirmed the presence of VOC impact to soil and soil gas that exceeded applicable environmental screening levels. The assessment also indicated that the VOC impact was present shallower in the subsurface (in subslab soil gas and in shallower soil) than understood from the prior investigation in 2004 and 2005.

VOCs detected in shallow soil, subslab gas, and groundwater are primarily beneath the northern portion of the subject site, and beneath the northern portion of the adjacent commercial unit at 1185 Solano Avenue. The data indicate that the highest concentrations of PCE were found immediately surrounding the old dry cleaning equipment. Lower concentrations of VOCs have been detected in subslab gas within a small northern portion of the adjacent unit at 1191 Solano Avenue. Data indicates that VOCs in shallow groundwater extends west from the subject site to 1181 Solano Avenue.



VOCs are able to move in the environment, from soil to groundwater, from groundwater to soil, and from groundwater or soil to air. The shallow groundwater in this area is not used for drinking water or other household/industrial purposes. Of particular interest is the potential for movement of VOCs into the interior of buildings where people could be exposed to contaminated indoor air. This process is called vapor intrusion into indoor air. The clayey, fine-grained soil present at the site tends to limit the ability of VOCs to move within the shallow subsurface, thereby helping minimize the potential for VOCs to intrude into indoor air.

Completed Cleanup Activities

Due to elevated VOC contamination and the potential for vapor intrusion, source removal was performed at considerable cost under most of the

former dry cleaning unit at 1187 Solano and also underneath the adjacent unit at 1191 Solano. All identified soil contamination that exceeded residential screening levels was removed and disposed offsite at an appropriate regulated facility. As shown on Figure 2, approximately 361.8 tons of soil was removed and disposed offsite. The excavation cavity was primarily backfilled with cement slurry to support the building wall during excavation under the wall, and to further limit vapor intrusion from any remaining VOC contamination. Some limited amount of VOC contamination remains in site soil, subslab gas, and groundwater.

During soil removal activity, subslab slotted piping was installed at the site to facilitate additional cleanup or mitigation of vapor intrusion into indoor air from potential remaining VOC contamination. In conjunction with a vacuum pump/blower, the piping allows extraction of subslab gas beneath the former dry cleaner unit at 1187 Solano Avenue, and from beneath the adjacent commercial units at 1183 Solano, 1185 Solano (vacant) and 1191 Solano. Short-term testing of the subslab piping has improved site conditions and demonstrated that extraction from the piping can mitigate potential vapor intrusion.

Next Steps

Because more information is needed about the extent of any remaining VOC contamination at the site, an investigation is currently being planned to further delineate the extent of VOCs in soil and subslab gas. This investigation will include advancing soil borings and collecting samples in the vicinity of the dashed area on Figure 2. The investigation will also include subslab gas sampling in nearby units at locations shown on Figure 2. Additional sampling of the three groundwater monitoring wells is planned to evaluate groundwater concentration trends over time.

The additional investigation data will be used to help determine if additional cleanup is needed, and to facilitate selection of an appropriate cleanup technique or a vapor intrusion mitigation approach.

Timeline

As noted above, additional investigation is currently being planned. Fieldwork is planned for July 2013, and a report documenting the results will be completed in August 2013. Following the additional investigation, some cleanup or mitigation may be needed.

If cleanup appears to be necessary, interim cleanup and mitigation of potential vapor intrusion may be performed using the existing subslab ventilation/extraction piping. Upon the completion of additional assessment and/or interim cleanup, a Corrective Action Plan (CAP) will be prepared to evaluate remedial alternatives and to select a final cleanup remedy. Before implementation of a CAP, another fact sheet will be mailed.

How to Get More Information

We invite you to comment on this project. All written and verbal comments received by Alameda County Environmental Health will be considered prior to approving the final remedial action plan for the site.

There are several ways that interested parties will be informed of future work. First, information repositories are being established where reports, data, work plans, and other materials can be viewed as they become available. One is the Alameda County Environmental Health Department's website at http://www.acgov.org/aceh/index.htm, where the electronic files for the case are available on-line.

A second way interested parties can obtain information is to contact the site representatives / spokespersons listed below.

For More Information

Please contact any of the following individuals with any questions or concerns you may have:

Mark Detterman, ACEH Case Manager 510-567-6876, mark.detterman@acgov.org

Bob Clark-Riddell, Pangea Environmental Services Inc; Environmental Consultant, 510-836-3700, briddell@pangeaenv.com

ATTACHMENT B

Site Conceptual Model Requisite Elements

ATTACHMENT B

Site Conceptual Model

The site conceptual model (SCM) is an essential decision-making and communication tool for all interested parties during the site characterization, remediation planning and implementation, and closure process. A SCM is a set of working hypotheses pertaining to all aspects of the contaminant release, including site geology, hydrogeology, release history, residual and dissolved contamination, attenuation mechanisms, pathways to nearby receptors, and likely magnitude of potential impacts to receptors.

The SCM is initially used to characterize the site and identify data gaps. As the investigation proceeds and the data gaps are filled, the working hypotheses are modified, and the overall SCM is refined and strengthened until it is said to be "validated". At this point, the focus of the SCM shifts from site characterization towards remedial technology evaluation and selection, and later remedy optimization, and forms the foundation for developing the most cost-effective corrective action plan to protect existing and potential receptors.

For ease of review, Alameda County Environmental Health (ACEH) requests utilization of tabular formats to (1) highlight the major SCM elements and their associated data gaps which need to be addressed to progress the site to case closure (see Table 1 of attached example), and (2) highlight the identified data gaps and proposed investigation activities (see Table 2 of the attached example). ACEH requests that the tables presenting the SCM elements, data gaps, and proposed investigation activities be updated as appropriate at each stage of the project and submitted with work plans, feasibility studies, corrective action plans, and requests for closures to support proposed work, conclusions, and/or recommendations.

The SCM should incorporate, but is not limited to, the topics listed below. Please support the SCM with the use of large-scaled maps and graphics, tables, and conceptual diagrams to illustrate key points. Please include an extended site map(s) utilizing an aerial photographic base map with sufficient resolution to show the facility, delineation of streets and property boundaries within the adjacent neighborhood, downgradient irrigation wells, and proposed locations of transects, monitoring wells, and soil vapor probes.

a. Regional and local (on-site and off-site) geology and hydrogeology. Include a discussion of the surface geology (e.g., soil types, soil parameters, outcrops, faulting), subsurface geology (e.g., stratigraphy, continuity, and connectivity), and hydrogeology (e.g., water-bearing zones, hydrologic parameters, impermeable strata). Please include a structural contour map (top of unit) and isopach map for the aquitard that is presumed to separate your release from the deeper aquifer(s), cross sections, soil boring and monitoring well logs and locations, and copies of regional geologic maps.

b. Analysis of the hydraulic flow system in the vicinity of the site. Include rose diagrams for depicting groundwater gradients. The rose diagram shall be plotted on groundwater elevation contour maps and updated in all future reports submitted for your site. Please address changes due to seasonal precipitation and groundwater pumping, and evaluate the potential interconnection between shallow and deep aquifers. Please include an analysis of vertical hydraulic gradients, and effects of pumping rates on hydraulic head from nearby water supply wells, if appropriate. Include hydraulic head in the different water bearing zones and hydrographs of all monitoring wells.

c. Release history, including potential source(s) of releases, potential contaminants of concern (COC) associated with each potential release, confirmed source locations, confirmed release locations, and existing delineation of release areas. Address primary leak source(s) (e.g., a tank, sump, pipeline, etc.) and secondary sources (e.g., high-

concentration contaminants in low-permeability lithologic soil units that sustain groundwater or vapor plumes). Include local and regional plan view maps that illustrate the location of sources (former facilities, piping, tanks, etc.).

d. Plume (soil gas and groundwater) development and dynamics including aging of source(s), phase distribution (NAPL, dissolved, vapor, residual), diving plumes, attenuation mechanisms, migration routes, preferential pathways (geologic and anthropogenic), magnitude of chemicals of concern and spatial and temporal changes in concentrations, and contaminant fate and transport. Please include three-dimensional plume maps for groundwater and two-dimensional soil vapor plume plan view maps to provide an accurate depiction of the contaminant distribution of each COC.

e. Summary tables of chemical concentrations in different media (i.e., soil, groundwater, and soil vapor). Please include applicable environmental screening levels on all tables. Include graphs of contaminant concentrations versus time.

f. Current and historic facility structures (e.g., buildings, drain systems, sewer systems, underground utilities, etc.) and physical features including topographical features (e.g., hills, gradients, surface vegetation, or pavement) and surface water features (e.g. routes of drainage ditches, links to water bodies). Please include current and historic site maps.

g. Current and historic site operations/processes (e.g., parts cleaning, chemical storage areas, manufacturing, etc.).

h. Other contaminant release sites in the vicinity of the site. Hydrogeologic and contaminant data from those sites may prove helpful in testing certain hypotheses for the SCM. Include a summary of work and technical findings from nearby release sites, including the two adjacent closed LUFT sites, (i.e., Montgomery Ward site and the Quest Laboratory site).

i. Land uses and exposure scenarios on the facility and adjacent properties. Include beneficial resources (e.g., groundwater classification, wetlands, natural resources, etc.), resource use locations (e.g., water supply wells, surface water intakes), subpopulation types and locations (e.g., schools, hospitals, day care centers, etc.), exposure scenarios (e.g. residential, industrial, recreational, farming), and exposure pathways, and potential threat to sensitive receptors. Include an analysis of the contaminant volatilization from the subsurface to indoor/outdoor air exposure route (i.e., vapor pathway). Please include copies of Sanborn maps and aerial photographs, as appropriate.

j. Identification and listing of specific data gaps that require further investigation during subsequent phases of work. Proposed activities to investigate and fill data gaps identified.

TABLE 1

INITIAL SITE CONCEPTUAL MODEL

CSM Element	CSM Sub-Element	Description	Data Gap	How to Address
Geology and Hydrogeology	Regional	The site is in the northwest portion of the Livermore Valley, which consists of a structural trough within the Diablo Range and contains the Livermore Valley Groundwater Basin (referred to as "the Basin") (DWR, 2006). Several faults traverse the Basin, which act as barriers to groundwater flow, as evidenced by large differences in water levels between the upgradient and downgradient sides of these faults (DWR, 2006). The Basin is divided into 12 groundwater basins, which are defined by faults and non-water-bearing geologic units (DWR, 1974). The hydrogeology of the Basin consists of a thick sequence of fresh-water-bearing continental deposits from alluvial fans, outwash plains, and lacustrine environments to up to approximately 5,000 feet bgs (DWR, 2006). Three defined fresh-water bearing geologic units exist within the Basin: Holocene Valley Fill (up to approximately 400 feet bgs in the central portion of the Basin), the Plio-Pleistocene Livermore Formation (generally between approximately 400 and 4,000 feet bgs in the central portion of the Basin), and the Pliocene Tassajara Formation (generally between approximately 250 and 5,000 or more feet bgs) (DWR, 1974). The Valley Fill units in the western portion of the Basin are capped by up to 40 feet of clay (DWR, 2006).	None	NA
	Site	***Geology:*** Borings advanced at the site indicate that subsurface materials consist primarily of finer-grained deposits (clay, sandy clay, silt and sandy silt) with interbedded sand lenses to 20 feet below ground surface (bgs), the approximate depth to which these borings were advanced. The documented lithology for one on-site boring that was logged to approximately 45 feet bgs indicates that beyond approximately 20 feet bgs, fine-grained soils are present to approximately 45 feet bgs. A cone penetrometer technology test indicated the presence of sandier lenses from approximately 45 to 58 feet bgs and even coarser materials (interbedded with finer-grained materials) from approximately 58 feet to 75 feet bgs, the total depth drilled. The lithology documented at the site is similar to that reported at other nearby sites, specifically the Montgomery Ward site (7575 Dublin Boulevard), the Quest laboratory site (6511 Golden Gate Drive), the Shell-branded Service Station site (11989 Dublin Boulevard), and the Chevron site (7007 San Ramon Road). ***Hydrogeology:*** Shallow groundwater has been encountered at depths of approximately 9 to 15 feet bgs. The hydraulic gradient and groundwater flow direction have not been specifically evaluated at the site.	As noted, most borings at the site have been advanced to approximately 20 feet bgs, and one boring has been advanced and logged to 45 feet bgs; CPT data was collected to 75 feet bgs at one location. Lithologic data will be obtained from additional borings that will be advanced on site to further the understanding of the subsurface, especially with respect to deeper lithology. The on-site shallow groundwater horizontal gradient has not been confirmed. Additionally, it is not known if there may be a vertical component to the hydraulic gradient.	Two direct push borings and four multi-port wells will be advanced to depth (up to approximately 75 feet bgs) and soil lithology will be logged. See items 4 and 5 on Table 2. Shallow and deeper groundwater monitoring wells will be installed to provide information on lateral and vertical gradients. See Items 2 and 5 on Table 2.
Surface Water Bodies		The closest surface water bodies are culverted creeks. Martin Canyon Creek flows from a gully west of the site, enters a culvert north of the site, and then bends to the south, passing approximately 1,000 feet east of the site before flowing into the Alamo Canal. Dublin Creek flows from a gully west of the site, enters a culvert approximately 750 feet south of the site, and then joins Martin Canyon Creek approximately 750 feet southeast of the site.	None	NA
Nearby Wells		The State Water Resources Control Board's GeoTracker GAMA website includes information regarding the approximate locations of water supply wells in California. In the vicinity of the site, the closest water supply wells presented on this website are depicted approximately 2 miles southeast of the site; the locations shown are approximate (within 1 mile of actual location for California Department of Public Health supply wells and 0.5 mile for other supply wells). No water-producing wells were identified within 1/4 mile of the site in the well survey conducted for the Quest Laboratory site (6511 Golden Gate Drive; documented in 2009); information documented in a 2005 report for the Chevron site at 7007 San Ramon Road indicates that a water-producing well may exist within 1/2 mile of the site.	A formal well survey is needed to identify water-producing, monitoring, cathodic protection, and dewatering wells.	Obtain data regarding nearby, permitted wells from the California Department of Water Resources and Zone 7 Water Agency (Item 11 on Table 2).

TABLE 2

DATA GAPS AND PROPOSED INVESTIGATION

Item	Data Gap	Proposed Investigation	Rationale	Analysis
5	Evaluate the possible presence of impacts to deeper groundwater. Evaluate deeper groundwater concentration trends over time. Obtain data regarding the vertical groundwater gradient. Obtain more lithological data below 20 feet bgs.	Install four continuous multichannel tubing (CMT) groundwater monitoring wells (aka multi-port wells) to approximately 65 feet bgs in the northern parking lot with ports at three depths (monitoring well locations may be adjusted pending results of shallow grab groundwater samples; we will discuss any potential changes with ACEH before proceeding). Groundwater monitoring frequency to be determined. Soil samples will be collected only if there are field indications of impacts. Soil lithology will be logged. However, information regarding the moisture content of soil may not be reliable using sonic drilling technology (two borings will be logged using direct push technology; see Item 4, above).	One well is proposed at the western (upgradient) property boundary to confirm that there are no deeper groundwater impacts from upgradient. Two wells are proposed near the center of the northern parking lot to evaluate potential impacts in an area where deeper impacts, if any, would most likely to be found. One well is proposed at the eastern (downgradient) property boundary to confirm that there are no impacts extending off-site. Port depths will be chosen based on the locations of saturated soils (as logged in direct push borings; see Item 4, above), but are expected at approximately 15, 45, and 60 feet bgs.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
6	Evaluate possible off-site migration of impacted soil vapor in the downgradient direction (east). Evaluate concentration trends over time.	Install 4 temporary nested soil vapor probes at approximately 4 and 8 feet bgs along the eastern property boundary. Based on the results of the sampling, two sets of nested probes will be converted to vapor monitoring wells to allow for evaluation of VOC concentration trends over time.	Available data indicate that PCE and TCE are present in soil vapor in the eastern portion of the northern parking lot. Samples are proposed on approximately 50-foot intervals along the eastern property boundary to provide a transect of concentrations through the vapor plume. The depths of 4 and 8 feet bgs are chosen to provide data closest to the source (i.e., groundwater) while avoiding saturated soil, and also provide shallower data to help evaluate potential attenuation within the soil column. Two sets of nested vapor probes will be converted into vapor monitoring wells (by installing well boxes at ground surface); the locations of the permanent wells will be chosen based on the results of samples from the temporary probes.	*Soil vapor* : VOCs by EPA Method TO-15.
7	Evaluate potential for off-site migration of impacted groundwater in the downgradient direction (east).	Advance two borings to approximately 20 feet bgs in the parking lot of the property east of the Crown site for collection of grab groundwater samples.	Two borings are proposed off-site, on the property east of the Crown site, just east of the building in the expected area of highest potential VOC concentrations.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance.
8	Evaluate VOC concentrations just north of the highest concentration area.	Advance two borings to approximately 20 feet bgs north of Building A for collection of soil and grab groundwater samples. Soil samples will be collected at two depths in the vadose zone. Soil samples will be collected based on field indications of impacts (PID readings, odor, staining) or, in the absence of field indications of impacts, at 5 and 10 feet bgs.	The highest concentrations of PCE in groundwater were detected at boring NM-B-32, just north of Building A. The nearest available data to the north are approximately 75 feet away. One of the borings will be advanced approximately 20 feet north of NM-B-32 to provide data close to the highest concentration area. A second boring will be advanced approximately halfway between the first boring and former boring NM-B-33 to provide additional spatial data for contouring purposes. These borings will be part of a transect in the highest concentration area.	*Groundwater:* VOCs by EPA Method 8260, dissolved oxygen, oxidation/reduction potential, temperature, pH, and specific conductance. *Soil:* VOCs by EPA Method 8260 (soil samples to be collected using field preservation in accordance with EPA Method 5035).
9	Evaluate VOC concentrations in soil vapor in the south parcel of the site.	Install four temporary soil vapor probes at approximately 5 feet bgs around boring SV-25, where PCE was detected in soil vapor at a low concentration.	PCE was detected in soil vapor sample SV-25 in the southern parcel, although was not detected in groundwater in that area. Three probes will be installed approximately 30 feet from of boring SV-25 to attempt to delineate the extent of impacts. A fourth probe is proposed west of the original sample, close to the property boundary and the location of mapped utility lines, which may be a potential conduit, to evaluate potential impacts from the west.	*Soil vapor* : VOCs by EPA Method TO-15.
10	Obtain additional information regarding subsurface structures and utilities to further evaluate migration pathways and sources.	Ground penetrating radar (GPR) and other utility locating methodologies will be used, as appropriate, to further evaluate the presence of unknown utilities and structures at the site.	Utilities have been identified at the site that include an on-site sewer lateral and drain line, and shallow water, electric, and gas lines. Given the current understanding of the distribution of PCE in groundwater at the site, it is possible that other subsurface utilities, and specifically sewer laterals, exist that may act as a source or migration pathway for distribution of VOCs in the subsurface.	NA