Environmental Resources Management

1277 Treat Boulevard
Suite 500
Walnut Creek, CA 94597
(925) 946-0455
(925) 946-9968 (fax)
www.erm.com

16 January 2014

Mr. Anne Conner
Sr. Remediation Project Manager
Pacific Gas and Electric Company
3401 Crow Canyon Road
San Ramon, CA 94583

Subject: Port of Oakland Phase II Environmental Site Investigation
Work Plan205-209 Brush Street
Oakland, California

Dear Ms. Conner:

ERM-West, Inc. (ERM) has been retained by Pacific Gas and Electric Company (PG&E) to perform a Phase II Environmental Site Investigation at the Port of Oakland property located at 205-209 Brush Street in Oakland, Alameda County, California (the "site" or "subject property"). This document serves as the Work Plan for the Phase II Environmental Site Investigation, which includes soil, groundwater, and soil vapor sampling. The following sections present the detailed scope of work to be performed at the subject property and the schedule of the field work.

SCOPE OF WORK

Soil and Groundwater Sampling

Soil and groundwater samples will be collected from eight (8) locations across the site (Figure 1). ERM will install 8 soil borings using hand augering and a direct push drill rig to first encounter with groundwater or a maximum of 10 feet below ground surface (bgs), with temporary groundwater monitoring wells installed in each boring at the subject property. Based on site documents reviewed as part of the Phase I Environmental Site Assessment (ESA), depth to groundwater at the subject property is expected to be encountered at approximately 7 feet bgs.

Sampling locations are selected based on proximity to areas of interest identified during the Phase I ESA site visit conducted on 14 May 2013. Proposed soil boring locations are shown on Figure 1 with the rationale for selection summarized below:

Sampling Location	Rationale for Selection
SB-1	Former location of gasoline/diesel underground storage tanks (USTs). Soil excavation samples and groundwater samples collected during tank removal in June 2003 reported elevated concentrations of Total Petroleum Hydrocarbons as gasoline (TPHg), TPH as diesel (TPHd), Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX), Methyl Tertiary Butyl Ether (MTBE), and lead.
SB-2	Southeast and down gradient of former location of gasoline/diesel USTs. Extent of soil contamination has not been defined from former USTs.
SB-3	Southern property boundary adjacent to CNG station. Soil contamination was identified during CNG station installation; however, extent has not been delineated.
SB-4	Subject property building located in southeastern portion of the site. Historical operations included blacksmith, machine shop, truck repair, paint and varnish facility, adjacent varnish aboveground storage tank (AST), paint shop, and paint booth. A soil vapor sample will also be conducted at SB-4.
SB-5	Former solvent storage area where ground surface appeared compromised.
SB-6	Former vehicle wash area where a sump and former chemical storage was observed.
SB-7	Former vehicle maintenance building where hydraulic lift and used oil drums were observed. Historical operations included vehicle maintenance and repair. A soil vapor sample will also be conducted at SB-7.
SB-8	Adjacent to the south (downgradient) of former vehicle maintenance building. Historical operations in the vicinity of this location included vehicle maintenance and repair.

Soil and groundwater will be collected from each boring to determine whether historical site operations and off-site activities have impacted the subject property.

Procedure for Soil Boring Installation

At each proposed soil boring location, a direct-push technology rig will be used to advance the boring to a depth of 10 feet bgs. The soil boring holes will be 4 inches in diameter. During drilling activities, field personnel will:

- Log soils using the Unified Soil Classification System (USCS) and record the soil logging for each boring on separate boring logs;
- Make visual observations regarding the nature of the soil and evidence of contamination, if any, based on continuous sampling;
- Collect measurements for the potential presence of volatile vapors using an organic vapor analyzer with a photo-ionization detector [PID];
- Collect two soil samples from each boring for laboratory analysis; and
- Collect groundwater samples from each boring for laboratory analysis.

Procedure for Soil and Grab Groundwater Sample Collection

Two soil samples from each boring will be collected at depths based on visual observations and/or PID readings. If no contamination is apparent based on field observations, one surface (0.5 to 1 foot bgs) and one deeper sample (above the saturated zone) will be collected.

Soil samples will be collected in 6-inch (length) stainless steel sleeves or 6-inch acetate sleeves, capped on both ends, and sealed with Teflon tape. Collected sample containers will be labeled, placed in sealed plastic bags, stored in an iced cooler, and transported to the laboratory for analysis as soon as possible after sample collection. All samples will be recorded on a chain-of-custody (COC) form that will accompany the samples to the laboratory.

Each soil sample will be analyzed by a Calscience Environmental Laboratories, Inc. (Calscience), a California state-certified laboratory, for the following parameters:

- Total petroleum hydrocarbons (TPH) as gasoline (TPHg) and volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260B;

- TPH-Diesel and motor oil (TPHd/mo) by USEPA Method 8015M with silica gel cleanup;

- Semi-volatile organic compounds (SVOCs) by USEPA Method 8270C;

- Organochlorine pesticides and polychlorinated biphenyls (PCBs) by USEPA Methods 8081A/8082; and

- California Title 22 Metals by USEPA Methods 6010/7000 series.

Once groundwater is encountered, a temporary groundwater monitoring point will be installed in each boring. A grab groundwater sample will be collected from each temporary groundwater monitoring point. One field duplicate groundwater sample and one trip blank will be collected for quality assurance/quality control (QA/QC) purposes.

The grab groundwater samples will be collected by placing dedicated PVC casing with a slotted-screen into the borehole. Dedicated polyethylene tubing will be inserted into the casing and groundwater will be drawn through the tubing using a low-flow peristaltic pump. New tubing will be used at each location. Grab groundwater samples will be collected in laboratory-provided sample containers as specified below. Collected sample containers will be labeled, placed in sealed plastic bags, stored in an iced cooler, and transported to the laboratory for analysis as soon as possible after sample collection. All samples will be recorded on a COC form that will accompany the samples to the laboratory.

Each groundwater sample will be analyzed by Calscience for the following parameters:

- TPHg and VOCs by Agency USEPA Method 8260B;

- TPHd/mo by USEPA Method 8015M with silica gel cleanup;
- SVOCs by USEPA Method 8270C;
- Organochlorine pesticides and PCBs by USEPA Methods 8081A/8082; and
- California Title 22 Metals by USEPA Methods 6010/7000 series.

Grab groundwater samples for metals collected from the temporary monitoring points will be field filtered to remove soil particles.

The soil and groundwater samples will be analyzed on a standard 1-week turn-around time.

Upon completion of soil and groundwater sampling, each of the borings will be backfilled with hydrated bentonite chips. For boring locations on concrete or asphalt, boreholes will be patched using like material at the surface.. ERM will use a global positioning system (GPS) unit to locate the borings for figures and to document their location, if additional characterization is warranted based on those analytical results.

Soil Vapor Sampling

In addition to the collection of soil and groundwater samples, soil vapor samples will be collected from temporary soil vapor probes (SVPs) at two locations to establish initial soil vapor concentrations. Soil vapor samples will be collected above the first encountered groundwater. Based on historical groundwater observations, it is anticipated that the average depth of groundwater is approximately 7 feet bgs. The Department of Toxic Substances Control (DTSC) *Advisory – Active Soil Gas Investigations* (DTSC, 2012; DTSC Advisory) document for active soil gas investigation states that a minimum sampling depth of 5 feet bgs is recommended to minimize potential sample dilution with atmospheric air.

Soil vapor samples will be collected from two (2) temporary soil vapor probes (SVP-4 and SVP-7; Figure 1). One duplicate will be collected for

Quality Control/Quality Assurance (QA/QC) purposes and all samples will be analyzed for VOCs by USEPA Method TO-15. .

Procedure for Soil Vapor Probe Installation

Soil vapor probes will be installed by a C-57 (California Code of Regulations Title 16, Division 8, Article 3) licensed drilling contractor. At each proposed soil vapor probe location, a hand auger will be used to advance the boring to a depth of 5.5 feet bgs. Descriptions of the subsurface materials will be described by an ERM geologist from the soil cuttings and recorded on a boring log. Once the total depth of the boring is reached, the soil vapor probe construction materials will be immediately installed as follows:

- Each probe will consist of 0.25-inch outer-diameter Teflon tubing equipped with a stainless-steel coupler and vapor point. The vapor point will be lowered to a depth of 5 feet bgs.

- A 1-foot-thick annular filter pack will be installed around the vapor point. The filter pack will consist of clean, washed, well-graded, silica sand, and will extend approximately 0.5 foot below and 0.5 foot above the vapor point.

- Dry granular bentonite will then be added to the annular space to 1-foot above the sand pack.

- The remainder of annular space will consist of hydrated bentonite to ground surface.

Consistent with the DTSC Advisory, samples will not be collected for at least 48 hours, to allow subsurface conditions to equilibrate. The temporary soil vapor sample borings will be drilled out and grouted on the same day that they are sampled.

Procedure for Soil Vapor Sample Collection

This section provides the procedure for the collection of soil vapor samples using 1-L Summa canisters. The sampling procedures described herein are consistent with the DTSC Advisory.

Pre-sampling Activities

Prior to arriving at the site for the soil vapor sampling event, the following activities will be completed:

- Each canister will be inspected for defects and/or physical damage. Any observed defects or damage will be documented in the project logbook. If necessary, the canister will not be used and will be replaced with a new canister.

- The volume of each canister will be measured and documented in the project logbook. Canisters containing less than 25 in. Hg vacuum will be returned to the laboratory for a replacement canister.

- The receipt of all laboratory-supplied equipment (i.e., Summa canisters, flow controllers, particulate filters, chain-of-custody forms) will be verified.

The following information will be recorded on the sample form and/or field logbook prior to collecting soil vapor samples at each location:

- Serial numbers, or other unique identifier, of the Summa canister and flow controller;

- Initial vacuum on the Summa canister, as measured by the gauge on the flow controller, noting any discrepancies between the vacuum readings from the flow controller gauge and separate vacuum gauge;

- Sample date, outdoor temperature, and humidity; and

- Sample location and any comments, notes, or observations related to collecting the sample.

Sample Train Assembly and Purge Volume Calculations

The soil gas sampling equipment will generally be placed in this order, although the actual sampling equipment chain will be determined based on the soil gas sampling container:

1. Below ground soil gas inlet;
2. Tubing from below ground to above ground surface;

3. Manifold with flow controller set to approximately 170 milliliters (mL) per minute;
4. Sample container; and
5. Purge canister/vacuum pump.

Any changes to the sample chain will be noted on the sampling forms.

Once all tubing and sample containers are in place, a purge volume will be calculated. This includes the pore space of the annulus and the internal volume of the below-ground and above-ground tubing. The purge volume will be documented on the *Soil Vapor Probe Purge Calculations* form. For this sampling event, a default of three purge volumes will be used prior to sample collection. The following steps outline the procedure used to calculate the purge time for three purge volumes:

1. The appropriate purge volume is calculated in mL.

   <u>For 0.25-inch outer-diameter tubing:</u>
   1 Purge Volume (mL) = length of tubing (in feet, include tubing above and below ground surface) x 4.46 mL

   <u>For other size tubing:</u>
   1 Purge Volume (mL) = (length of tubing) x (Πr^2) x (16.38 mL/in^3)

   - Length of tubing = length of tubing above and below ground surface, in inches. The length of the tubing that is below ground can be found on each soil vapor probe completion form.

   - Πr^2 = r is the inner radius of the tubing, in inches, squared and multiplied by Π.

2. The purge time for the appropriate purge volume is calculated as follows:

   $$\text{Purge time (min)} = \frac{\text{3 purge volumes (mL)}}{\text{Flow controller purge rate (mL/min)}}$$

   Flow controller purge rate = 170 mL/minute

Sample Apparatus Pressure Test

Prior to purging and sampling, a sample apparatus pressure test is conducted. The pressure test confirms that there is no leak in the sample apparatus, from the well head to the sample container, and for the apparatus can be used to collect a representative soil vapor sample. The pressure test procedure is as follows:

- To perform the pressure test, all equipment is connected as described in the sample train. The sample train may be connected to the probe, but the valve to the probe must remain closed.

- The valves to the Summa canister and the probe/sampling point are closed, and the valve to the purge/vacuum pump is opened.

- The vacuum pump is started to evacuate air from the sample train and then the valve to the purge/vacuum pump is closed so that the vacuum is held and the vacuum pump is shut off.

- The initial vacuum readings on the flow controller on recorded and the sample train is allowed to sit for at least 10 minutes.

- After at least 10 minutes, the final vacuum readings on the flow controller are recorded. The vacuum should hold (within 1 inch-Hg) in the line during the 10 minutes. If the vacuum reading decreases more than 1 inch-Hg during the 10 minutes, the fittings are tightened and the pressure test is repeated.

Purging

The following procedure is used for purging the soil vapor probe:

- The sample train is connected to the soil vapor probe, if it has not already been connected, and the valve to the probe is confirmed to be closed;

- The valve on the sample collection Summa canister is confirmed to be closed, and then the valve to the purge canister/vacuum pump is opened; and

- The purge canister/vacuum pump is started, the purge start time and initial vacuum readings on the flow controller is recorded, and on the pump is operated for the length of time necessary to purge three volumes. A PID reading is collected from effluent stream during purging and recorded on the field form. After purging three volumes, vacuum readings on the flow controller are recorded, the valve to the purge canister/vacuum pump is closed, and the purge stop time is recorded.

Leak Detection Test

Isopropyl alcohol will be used as the leak check compound. It is extremely important to prevent cross-contamination while handling the isopropyl alcohol and sampling equipment. One person will be designated as the person to handle the leak detection compound at all locations ("dirty hands") and the other person be designated as the person to handle the sampling equipment for all locations ("clean hands"). While the soil vapor sample is being collected, the leak detection test is conducted by fanning the leak detection compound near each tubing fitting/connection. The used leak detection materials will be discarded in a sealed plastic baggie away from the sampling equipment/supplies.

Sample Collection

Soil vapor samples will be collected after the soil vapor probe is purged. Soil vapor sample collection procedures are as follows:

- The two-way shut-off valve on the manifold is confirmed to be open;

- The valve on the sample collection Summa canister is opened, recording the sample start time and the vacuum reading on the flow controller, which should be between 25- and 30-inch of mercury.

- The vacuum being pulled on the probe, which is measured by the vacuum gauge on the probe-side of the flow controller, will be recorded on the field form.

- While the soil vapor sample is being collected, the leak detection test will be conducted.

- The sample collection Summa canister will be left open until the vacuum reading is approximately 4-inch of mercury. Because we are using 1-L Summa canisters, this should take less than 10 minutes. If the vacuum does not decrease to 4-inch of mercury within 20 minutes, the Project Manager will be notified.

- Once the vacuum reading on the sample canister reaches approximately 4-inch Hg, the final vacuum readings on the manifold will be documented, the valve on the sample canister will be closed, and sample end time will be recorded. The canister and manifold will be disconnected, labeled, and documented on the COC.

During this sampling event, a duplicate sample will be collected at either SVP-4 or SVP-7.

Each soil vapor sample will be analyzed by a California state-certified laboratory for VOCs by USEPA Method TO-15. The soil vapor samples will be analyzed on a standard turn-around time of 1 week.

Equipment Decontamination

All non-disposable equipment will be decontaminated prior to use. Equipment decontamination will be limited to drilling equipment (hand augers, drill rods, and other downhole equipment) that will be decontaminated after each soil boring and each soil vapor probe is installed. Vapor probe construction material will be single use and will be provided as factory clean and hermetically sealed. Other sampling equipment will either be single use or cleaned by the analytical laboratory and will not require decontamination.

Decontamination procedures will generally consist of:

- Washing the equipment with a cleaning agent suitable for environmental equipment, such as Alconox or Liquinox;

- Rinsing the equipment with water;

- A final rinse with deionized water; and

- Drying the equipment with paper towels.

Typical equipment for decontamination:

- High pressure steam cleaner (provided by drilling contractor);
- Brushes;
- Wash/rinse tubs;
- Alconox detergent (or equivalent); and
- Deionized water.

Waste Disposal

All waste soil generated during the sampling work will remain on site in one 55-gallon drum pending analysis prior to disposal. ERM will collect one composite sample of the drummed soil to be analyzed for TPHg/VOCs, TPHd/mo, SVOCs, pesticides, PCBs, and metals. In addition, we assume that this work will generate one drum of decontamination water that will be characterized for the same constituents listed above prior to disposal.

ERM will manage the disposal of the soil and water waste generated during the sampling work, but will require Port of Oakland to sign manifests as the generator, if waste is profiled as hazardous. Further, if PG&E has preferred disposal facilities, ERM will work with those facilities for acceptance.

Health and Safety

The potential compounds of concern during this investigation are TPHs, pesticides, PCBs, metals, SVOCs, and VOCs. Field personnel must have read the January 2014 site specific Health and Safety Plan (HASP) and a copy must be maintained while on site. Field sampling activities should be performed in accordance with the requirements of the site specific HASP

Schedule and Reporting

ERM has obtained the necessary drilling permit (Water Resources Well Permit Number W2014-0024) from the Alameda County Public Works Agency (ACPWA) to begin implementation of the activities discussed herein. No subsurface disturbances will occur until the location is cleared by Underground Services Alert (USA) and the independent subsurface utility locator.

The field work is currently scheduled to be completed between 21 and 27 January 2014. An independent subsurface utility locator will mark out underground utilities and clear proposed boring locations on 21 January 2014. On 23 and 24 January 2014, soil and groundwater samples will be collected and the two temporary soil vapor probes will be installed. Soil vapor samples will be collected from the temporary soil vapor probes on 27 January 2014 and the probes will be destroyed.

A summary report will be prepared following the completion of the soil, groundwater, and soil vapor survey. The report will provide a summary of the analytical results from the samples collected during this investigation. In addition, the report will include the laboratory analytical reports, the completed boring logs from each soil boring and soil vapor probe location, and the field sampling forms.

Once the complete analytical results are received from the laboratory, a summary report will be prepared within three weeks.

CLOSING

Should you have any questions or require additional information, please do not hesitate to contact John Lucio at (925) 482-3222.

Sincerely,

John Lucio, P.G.
Project Manager

Jim Warner, P.G.
Principal-in-Charge

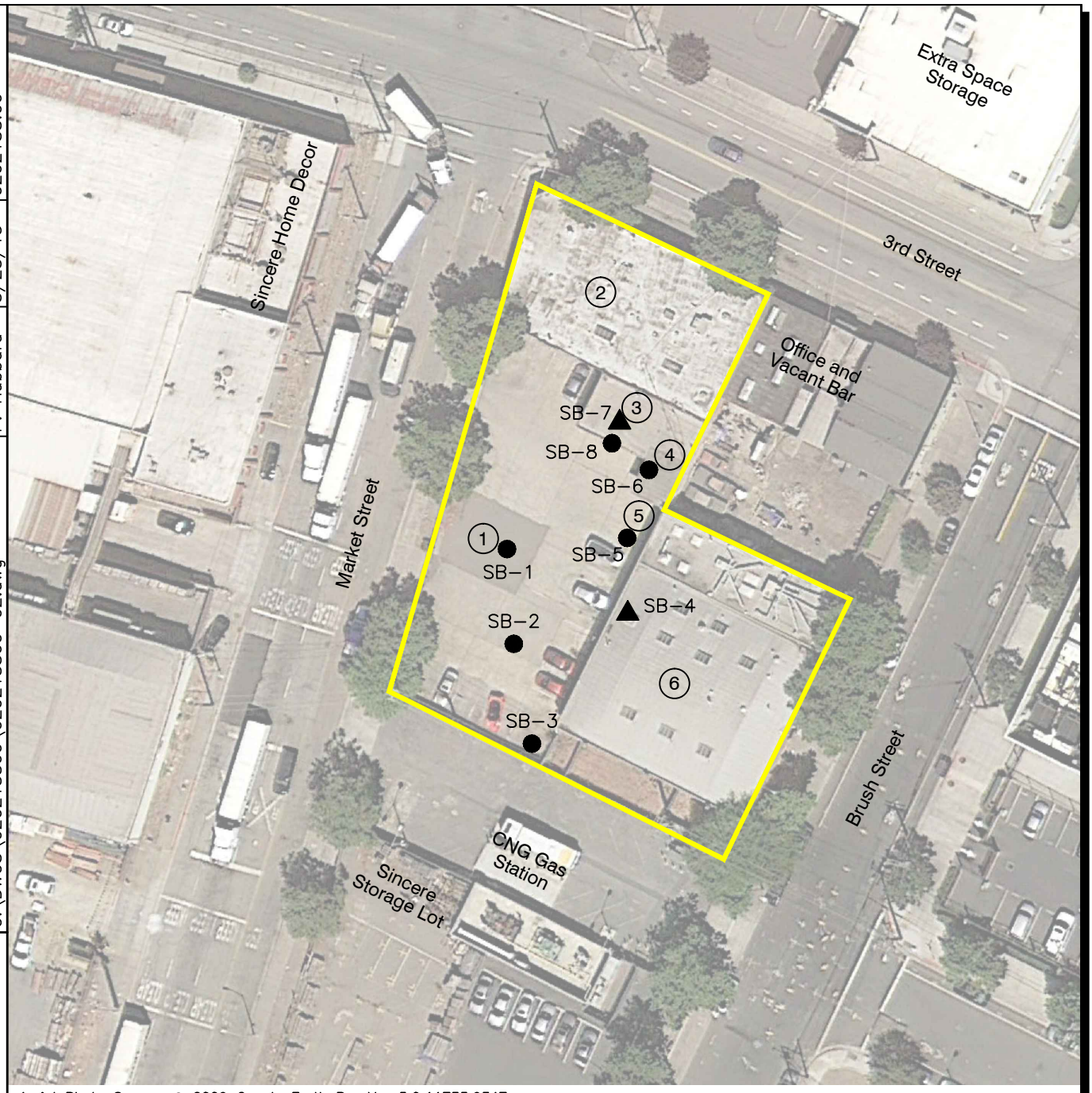

Figure 1

Proposed Soil Boring Locations
205/209 Brush Street
Oakland, California

ERM M/YY