

RESPONSE PLAN
FORMER SOUTHLAND STEEL PROPERTY

APPENDIX C
SAMPLING AND ANALYSIS PLAN

SAMPLING AND ANALYSIS PLAN

**Former Southland Steel Facility
5959, 5969, 6011, 6161, & 6169 Alameda Street
Huntington Park, CA 90255**

Prepared for:

**Successor Agency to the
Community Development Commission
of the City of Huntington Park
Huntington Park, California**

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July 2014

Project No.: Eco-13-595

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1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) was prepared in order to detail the sampling activities associated with the ResPlan prepared for the Former Southland Steel facility in Huntington Park, California.

1.1 SAMPLING PURPOSE AND OBJECTIVE

The objectives of this SAP are provided below:

1. Characterization of soil vapor samples for purposes of impacted soil delineation. Procedures for soil vapor sampling are described in Section 4.2 of this plan.
2. Characterization of soils following removal actions in order to verify that remediation has been completed in accordance with the requirements set forth in the ResPlan. Procedures for confirmation soil sampling are described in Section 4.3 of this plan.
3. Characterization of excavated and stockpiled soil for purposes of off-site soil disposal. Procedures for confirmation soil vapor sampling are described in Section 4.4 of this plan. The procedures described will be used for soil classification according to DTSC hazardous waste criteria as described in California Code of Regulation Title 22, § 66262.11.
4. Characterization of soil that is planned for on-site import and backfill. Procedures for the testing and approval of import soil are described in Section 4.5 of this plan.
5. Characterization of groundwater collected from existing and planned groundwater wells within and immediately adjacent to the site. Procedures for the sampling and analysis of groundwater are described in Section 4.7 of this plan.
6. To enable the DTSC to assess and evaluate the procedures implemented during the removal action planned at the site, as well as to ensure that it meets agency requirements.

1.2 PAST SAMPLING ACTIVITIES

Subsurface environmental investigations have been performed at the site since 2004. These activities are summarized in Sections 4.5 and 4.6 of the ResPlan associated with this SAP. Based on site-specific sampling and analytical results, a Site Characterization Report was prepared and approved. The remedial actions described in the ResPlan were based on the data presented in the Site Characterization Report.

1.3 PROJECT ORGANIZATION

The project team organization for this SAP is described below. Eco's Project Coordinator will be responsible for coordinating communications with all parties participating in the planned sampling activities. This submittal assumes that Eco will be retained as the oversight consultant for the City during the conduct of the removal actions. The Contractor that will

conduct the excavation, removal, and off-site disposal of the soil will be selected and contracted to the City for such work.

The DTSC Project Manager/Officer will be responsible for communicating DTSC requirements with the Eco's Project Coordinator. It is anticipated that the DTSC will function in an advisory/consultative role for the planned sampling and will provide input when changes to the procedures outline in this plan are indicated during the field work. Such changes will be documented as field-approved changes to the plan, if necessary. The DTSC Project Manager will also have the responsibility to communicate DTSC requirements with the City Project Coordinator and to assure that the City is aware in a timely manner of changes that DTSC may require from procedures described herein.

Eco's Project Manager will be responsible for communicating and coordinating planned activities at the site, and to ensure that adequate resources are allocated to the project to complete the sampling activities as planned.

Eco's SAP Quality Assurance (QA) Officer will be responsible for overseeing all sampling activities and will ensure that samples are collected according to established protocols described herein.

1.4 STATEMENT OF SPECIFIC PROBLEM

The SAP is being prepared in order to address the field and laboratory procedures used during the collection and analyses of soil, soil vapor, and groundwater samples during implementation of the ResPlan associated with this SAP.

Previous site sampling and analysis is the basis for selecting the areas where excavation is planned. The purpose of the confirmation sampling described herein is to confirm that regulatory threshold limits for site contaminants are not exceeded at the perimeters of the removal areas. If confirmation sampling shows that no threshold criteria are exceeded, then the removal action will be deemed suitably completed. Otherwise additional soil removal may be required and confirmation sampling repeated.

It is recognized that there is potential for air emission during the field activities. Vapor measurements are planned for the construction areas and also at the site perimeter. These activities and threshold criteria for soil vapor emissions are described in the Health and Safety Plan, Appendix D of the ResPlan.

1.5 SPLIT SAMPLING BY DTSC OR USEPA

This SAP defines procedures for the collection of representative samples of materials at the former Southland Steel facility and has been prepared for the exclusive use of Eco and City Contractor. While Eco and/or City may agree to allow the DTSC and/or the USEPA to obtain split samples of certain samples prepared by Eco, nothing in this SAP shall be relied upon by the DTSC to assure representativeness or quality objectives of the program. The DTSC shall provide appropriately trained personnel to obtain any split samples and shall supply all required apparatus, containers, labels, forms, chain of custody and handling and transport of samples.

2.0 BACKGROUND

This section of the SAP is generally used to provide additional site information such as description, history, hours of planned operations and general sampling activities. This information is provided in the associated ResPlan, and will not be repeated in this SAP.

3.0 PROJECT DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are qualitative and quantitative statements for establishing criteria for data quality and for developing data collection designs. This section defines what the data will be used for and what qualities of data are needed to make decisions and is based on EPA's Guidance for the Data Quality Objectives Process (EPA QA/G-4, Final, September, 1994). See Table 1 for the DQOs.

The following sampling will be done for soil, soil vapor, and groundwater in support of the ResPlan requirements:

- ◆ **Confirmation Sampling for Excavated Areas:** Confirmation soil samples will be collected from the base and perimeter walls of the excavated areas. Eight areas of excavation (Area 1 through Area 8; Figure 2) are designated in the ResPlan. Soil samples will be collected in these areas in order to confirm that the soil contaminant concentrations are less than project cleanup requirements. If confirmation sampling cannot confirm this condition, additional excavating and confirmation sampling may be necessary.
- ◆ **Stockpile Sampling for Soil Disposal:** Excavated soil containing the contaminants of concern will be stockpiled at the site during soil removal operations. The stockpiled soil will be sampled and analyzed for hazardous waste classification. Once classified, it will be transported off-site for proper disposal.
- ◆ **Sampling of Backfill Soil:** Imported soil will be used to infill the remedial excavations following the completion of the removal actions. The imported soil will either have certification that is satisfactory to the City and DTSC that it is free of contamination, or it will be characterized (sampled and analyzed) and found free of elevated contaminant concentrations prior to onsite use.
- ◆ **Soil Sampling at the Former Transformer House:** A transformer house was depicted in the 1923 Sanborn map immediately south of the site. Since the transformer house is outside the site boundary, no soil sampling is planned as part of this remedial action.
- ◆ **Soil Vapor Sampling to Define Excavated Areas:** In three site areas, soil vapors in the upper 5 feet have been reported to be in excess of the calculated risk-based concentrations for indoor air. In these areas, soil vapor samples will be collected to confirm the high concentrations. The area of the high concentrations, if present, will be added to areas to be excavated. No soil vapor confirmation will be required other than the pre-excavation sampling and analysis described herein.
- ◆ **Groundwater Sampling for Existing and New Wells:** Four additional wells are planned for installation. The new wells will be developed prior to sampling. Four sampling events are planned for all wells (the existing four wells and the

four new wells): one event shortly after the installation of the four new wells and a second event about 3 months later. Groundwater sampling will be conducted on a semi-annual basis for 2 years, and then on an annual basis for 10 years.

Sampling and analysis for each of the above described activities is further described in sections below.

3.1 DATA QUALITY OBJECTIVES

An integral part of the SAP is the QA/QC program which is designed to ensure the reliability of all data generated during an investigation or remedial cleanup. During the onsite work, a variety of data will be collected. Each sample collected will be analyzed for a number of different chemicals. Data collected will be evaluated to determine whether the reported concentrations for these chemicals are of acceptable quality for use in the evaluation of whether remedial or investigative activities are meeting the Data Quality Objectives (DQOs) for this project. The QC checks discussed below will be used to verify that the collected data are not invalid or estimates as a result of inadequate or errant field or analytical procedures.

3.2 DATA QUALITY INDICATORS

Data quality indicators include accuracy, precision, completeness, representativeness, comparability, and the method detection limits established for various aspects of data gathering, sampling, or analysis activity. The analytical methods being employed are described in Section 5.1.2 and are all capable of providing the required level of analytical sensitivity, accuracy, precision, comparability and representativeness. The Data Quality indicators (DQIs) established by U.S. EPA Region IX for the parameters noted in Section 3 can be found in Attachment 1.

Definitions of the DQI terms are provided below:

- ◆ Accuracy is the degree of agreement of a measurement with a known or true value. To determine accuracy, a laboratory or field value is compared to a known or true concentration. Accuracy is determined by such QC indicators as: matrix spikes, surrogate spikes, laboratory control samples (blinds pikes) and performance samples.
- ◆ Precision is the degree of mutual agreement between or among independent measurements of a similar property (usually reported as a standard deviation [SD] or relative percent difference [RPD]). This indicator relates to the analysis of duplicate laboratory or field samples. An RPD of <20% for water and <35% for soil, depending upon the chemical being analyzed, is generally acceptable. Typically field precision is assessed by co-located samples, field duplicates, or field splits and laboratory precision is assessed using laboratory duplicates, matrix spike duplicates, or laboratory control sample duplicates).
- ◆ Completeness is expressed as percent of valid usable data actually obtained compared to the amount that was expected. Due to a variety of circumstances, sometimes either not all samples scheduled to be collected can be collected or else the data from samples cannot be used (for example, samples lost, bottles broken, instrument failures, laboratory mistakes, etc.). The minimum percent of completed analyses defined in this section depends on how much information is needed for decision making. Generally, completeness goals rise

the fewer the number of samples taken per event or the more critical the data are for decision making. Goals in the 75-95% range are typical.

- ◆ Representativeness is the expression of the degree to which data accurately and precisely represent a characteristic of an environmental condition or a population. It relates both to the area of interest and to the method of taking the individual sample. The idea of representativeness should be incorporated into discussions of sampling design. Representativeness is best assured by a comprehensive statistical sampling design, but it is recognized that this is usually outside the scope of most one-time events. Most one-time SAPs should focus on issues related to judgmental sampling and why certain areas are included or not included and the steps being taken to avoid either false positives or false negatives.
- ◆ Comparability expresses the confidence with which one dataset can be compared to another. The use of methods from EPA or "Standard Methods" or from some other recognized sources allows the data to be compared facilitating evaluation of trends or changes in a site, a river, groundwater, etc. Comparability also refers to the reporting of data incomparable units so direct comparisons are simplified (e.g., this avoids comparison of mg/L for nitrate reported as nitrogen to mg/L of nitrate reported as nitrate, or ppm vs. mg/L discussions).
- ◆ Detection Limit(s) (usually expressed as method detection limits (MDLs) or Quantitation Limit) for all analytes or compounds of interest for all analyses requested must be included in this section. These limits should be related to any decisions that will be made as a result of the data collection effort. A critical element to be addressed is how these limits relate to any regulatory or action levels that may apply.

3.3 DATA REVIEW AND VALIDATION

This section discusses data review procedures, including how the data quality will be evaluated and validated. USEPA has defined three levels/tiers for data validation as described below:

- ◆ Tier 1A involves a review of the QC data for the project, with up to 10% of the data being validated. Validation candidates are chosen based on the initial screening or higher level hits.
- ◆ Tier 1B involves a review using the EPA's automated data validation system, CADRE. This review is limited to data in the correct electronic format and only covers analyses for volatile organic compounds, semi-volatile organic compounds, organochlorine pesticides, metals, and cyanide.
- ◆ Tier 2 involves a selected validation based on several factors which should be defined in the DQOs for the project. Candidates might be a specific area within the sampling area, specific analytes or analyses of concern critical to decision making, potential costs of certain types of resampling, or some other factor.
- ◆ Tier 3 involves a traditional full validation.

There is no requirement that all data adhere to the same Tier; the project can mix and match depending on DQOs. Recognizing that this SAP has been prepared at the request of DTSC and

is a non-regulatory assessment, it is not anticipated that a formal data validation effort will be required under this SAP. A data review will be conducted to flag suspect samples or laboratory reported results which fall outside of acceptable reporting limits for both organic and inorganic analysis. Data which is flagged or rejected will be determined and will be appropriately noted in the final reported analytical summary tables.

3.4 DATA MANAGEMENT

Field notes will be maintained to document and describe any changed conditions in the field during sample collection, sample preparation and sample shipment. Field sketches in the project notebook will be prepared when required to describe actual conditions and locations of samples.

Digital photographs may also be utilized to document field conditions observed during the time of sampling.

3.5 ASSESSMENT AND OVERSIGHT

Field data sheets and log books will be reviewed by the Eco QA Officer on a daily basis to ensure that instrument calibrations, equipment operation, and sampling conditions have been accurately documented. The Eco QA Officer will also review laboratory reports to determine that the required level of QA/QC reporting has been achieved and that the quality control limits for laboratory blanks, surrogate recoveries and duplicates fall within acceptable limits.

4.0 SAMPLING AND SAMPLING RATIONALE

This section provides a discussion and description of the soil sampling activities and the rationale for all of the sampling at the site.

4.1 SOIL VAPOR SAMPLING

Indoor-air risk was assessed at the site at three locations where the soil-vapor concentrations of tetrachloroethene (PCE) and trichloroethylene (TCE) at a depth of 5 feet were found to be higher than Risk-Based Screening Levels (RBSLs): PCE – 35.6 micrograms per liter ($\mu\text{g/L}$) at 5-foot depths and 60.0 $\mu\text{g/L}$ at 10-foot depths; and, TCE – 13.6 $\mu\text{g/L}$ at 5-foot depths and 23.6 $\mu\text{g/L}$ at 10-foot depths.

The three sampled areas where the RBSLs were exceeded are: WB2-18, WB2-29, and WB3-26. Prior to excavation activities, an additional investigation will be performed in these three areas in order to delineate the extent of the impacted soil and define the boundary of remedial excavations. Figure 1 depicts the proposed locations to collect the gas samples. The gas samples will be collected at depths of 5 and 10 feet.

The following approach will be followed during the vapor probe installation, sampling, and analyses:

- ◆ Three vapor probes will initially be installed at WB2-18, WB2-29, and WB3-26 (Figure 1). The soil vapor concentrations at these locations will be measured. If the soil vapor concentrations are determined to be less than the RBSLs at these locations, the indoor air risk will be considered managed, and additional

remedial actions will not be conducted at these locations. In this case, no further soil vapor investigation will be required.

- ◆ If the soil vapor concentrations at one or more of the three locations is determined to be in excess of the RBSL concentrations, then additional soil vapor measurements will be made at those locations by installing step-out probes to define the impact area. Use of this approach will define the soil vapor impact for indoor air risk and this area will be identified for remedial action. Figure 1 depicts the proposed soil vapor probe step-out locations needed for possible definition of the impact area.

The following sections describe the vapor probe installation procedures and the sampling and analysis for soil vapor.

4.1.1 VAPOR PROBE INSTALLATION

Soil vapor probes will be installed with a push probe. Following the advancement of each boring, the following procedure will be used to install the vapor probe at each sampling interval:

1. A porous ceramic vapor probe attached to the end of new Teflon tubing (0.25-inch OD, 0.17-inch ID) will be placed down through the center of the boring to depths of 5 and 10 feet. The depth of the boring and vapor probe will be verified with a steel measuring tape. No. 2/12 sand will then be dropped through the annulus of the boring to infill the area around the vapor probe.
2. After the filter pack has been created, a 6- to 12-inch bentonite seal will be placed above the filter pack. Once the bentonite has been hydrated, additional granular bentonite will then be used to fill the upper portion of the boring. This bentonite will then be hydrated at the surface. A tightly valve will be placed at the top of the Teflon tubing, which will extend approximately 1.5 feet above ground surface.
3. At the conclusion of each installation, approximately one purge volume will be withdrawn from each probe. This is to allow proper functioning of the probes as it will remove atmospheric air entrained during installation and will facilitate probe equilibration.

4.1.2 SOIL VAPOR SAMPLING

The general sampling approach for soil vapor is described in this section. It is planned to follow the DTSC *Advisory-Active Soil Gas Investigations*, April 2012 and the guidance of that document shall apply where there is ambiguity in the sampling description below.

Soil vapor sampling will be conducted at least 2 hours after the installation of the vapor probe. Prior to the collection of a soil gas sample, the Teflon tubing will be purged for three to five internal volumes of the sampling system. This approach should ensure that vapor concentration entering a sampling container is 95% or greater representation of vapor concentration in surrounding soil. The purged vapor may be tested with a field vapor analyzer, such as a PID or FID instrument, until the concentrations of total hydrocarbons stabilize, or use field instruments to measure respiration gases (e.g., O₂, CO₂) and assess consistency across sequential purged volume samples. This may validate the purge method that can then be used across probes.

At the completion of purging, a valve in series with the tubing will be closed, limiting ambient air inflow into the tubing. Following purging, soil vapor samples will be collected using a 1-liter Summa canister. The vacuum of the canister will be used to pull soil vapors the subsurface and tubing into the Summa canisters. A regulator on the Summa canister will regulate the air flow to approximately 200 milliliters per minute. After approximately 5 minutes when the Summa canister is sufficiently full, its valve will be closed.

Each Summa canister will be labeled with the sample location identification number, sample depth, date, and time. Following the completion of sampling, all of the samples will immediately be transported to a laboratory along with a standard chain-of-custody record. The collected soil gas samples will be analyzed for VOCs EPA method number of TO-15 (Table 3).

4.2 CONFIRMATION SOIL SAMPLING

One of the fundamental remedial action goals for the Site, after remediation is complete, is to assure that receptors at the site have acceptable levels of risk. To achieve this goal, confirmation samples will be collected, following excavation activities, and prior to backfilling.

The objective of the confirmation sampling is to provide assurance that the excavation has adequately remediated the site (i.e., the areas designated for removal action) and that the remedial action goals have been achieved. The following section provides a brief overview of the process that will be used to demonstrate attainment of the remedial action goals for the COCs at the site. This section also presents a summary of the minimum number of confirmation samples that will be needed to support the conclusion that the residual levels of the COCs remaining on the site meet risk-based goals, as well as a discussion of the overall confirmation sampling program.

The selected remedial alternative for the site is to remove the contaminated soils, to the extent possible. After soil removal, confirmation samples will be collected from the sidewalls and base of the excavation at the recommended intervals as discussed later in this section.

4.2.1 SAMPLING PROCEDURES

Samples will be collected at approximately 20-foot intervals along the sidewalls of the excavation with a minimum of one sample per side wall. Sidewall soil samples will be collected approximately halfway down the wall. For example, if the excavation is 3.0 feet deep at the sidewall sample location, then the sample will be collected at a depth of approximately 1.5 feet. Sidewall soil samples will be collected by scraping the excavation face into sampling jars or by driving a sleeve into the face at each prescribed depth.

At the base of the excavation, samples will be collected on a grid pattern with a grid of 20 feet by 20 feet. One soil sample will be collected at each grid. Figure 2 shows the location of confirmation samples that will be collected from the base and sidewalls of excavation.

All equipment (e.g., trowel, hand augur, gloves, etc.) will be decontaminated prior to sampling. Loose material or soil will be gently brushed off the surface of the excavation and care will be taken to collect the sample from an area unaffected by the excavation. Excavation sidewall samples may be collected as a composite of material along the vertical depth of the excavation, or as discrete samples based on visual cues (e.g., black or staining soil, etc.). Post confirmation sampling will be conducted with consultation of the DTSC Project Manager.

Using a stainless steel or Teflon-coated trowel or hand auger, a sufficient quantity of surface soil will be collected (e.g., for PAH or metal analyses) to completely fill the laboratory sample container(s) specified for the sample location. Only sample containers supplied by the laboratory will be used. After filling the appropriate sample container(s), the container lid(s) will be sealed. The samples will then be appropriately labeled, placed in re-sealable plastic bags, and stored on ice in a cooler until delivered under a chain of custody to the analytical laboratory. The samples will be shipped to the laboratory using appropriate chain-of-custody and shipping procedures.

Field duplicates of all confirmation samples will be collected at a rate of 10 percent of the primary samples collected. Duplicate samples will be collected randomly. The location of the duplicate samples will be determined at the time of removal activities.

4.2.2 ADDITIONAL EXCAVATING AND SAMPLING

Excavation will continue until the confirmation sampling results are determined to be equal to, or below the specified remedial action goal (as shown in Section 5.2 of the ResPlan). Additional confirmation samples will be collected if the Site Manager finds it necessary, or at the request of DTSC.

4.3 SOIL STOCKPILE SAMPLING

Excavated soil will be stockpiled temporarily onsite prior to disposal. Sampling and analysis of the excavated soil shall be in accordance with the LAUSD guidance provided in guidance Section 01 4524, Environmental Import/Export Materials Testing. A copy of the guidance is provided in Attachment III. The guidance is to be used for selection of samples, number of samples, the sample analyses, and interpretations of results. Guidance relating to background concentrations of metals is not applicable for this plan.

4.4 IMPORT SOIL SAMPLING

Import soil will be identified by the contractor for the City. As necessary, this soil will be sampled and chemically analyzed to verify and document that it is free of contamination. Sampling and analysis of the import soil shall be in accordance with the LAUSD guidance provided in guidance Section 014524, Environmental Import/Export Materials Testing. A copy of this guidance is provided in Attachment III. The guidance is to be used for selection of samples, number of samples, the sample analyses, and interpretations of results. Guidance relating to background concentrations of metals is not applicable for this plan.

4.5 SOIL SAMPLING FOR PCBs

The transformer house identified in the Sanborn Map of 1923 is outside of the site boundary. Soil sampling within this adjoining property for the purpose of assessing PCBs in soil is not being conducted during this investigation. See Appendix H of the ResPlan for the location of the transformer house and rationale for not investigating PCBs.

4.6 GROUNDWATER MONITORING WELL INSTALLATION AND SAMPLING

4.6.1 *PRE-WELL INSTALLATION ACTIVITIES*

4.6.1.1 Well Installation Permits

Prior to drilling and well installation activities, well installation permits will be obtained from the Los Angeles County Department of Public Health.

4.6.1.2 Drilling Notification

Underground Service Alert (USA) will be notified at least 72 hours prior to initiation of drilling and sampling. All planned monitoring well locations will be clearly marked with white paint, wooden lath, and/or flagging, as required by USA. USA will contact public utility owners of record within the boring vicinities and notify them of our planned underground activities. The utility companies will contact Eco if any of the proposed borings are located near buried utility lines. Utility owners of record in the area, or their designated agents, will clearly mark the position of their utilities on the ground surface throughout the designated area.

The DTSC, City, and onsite property representatives will be notified at least 5 days prior to drilling and sampling.

4.6.1.3 Well Locations

The proposed well locations (EMW-1 through EMW-4) are shown on Figure 3. All wells are planned to be installed in one phase. As an option, and based on discussion with DTSC, two wells might be installed, developed, and gauged prior to installing the other two wells. The groundwater flow data collected from two wells, and the existing onsite wells will be used to refine the locations of the last two wells.

4.6.2 *WELL INSTALLATION ACTIVITIES*

4.6.2.1 Drilling, Soil Sampling, and Logging

Each well boring will be drilled using a hollow stem auger drill rig equipped with a 10-inch diameter drill bit. Each well boring will be drilled to a depth of about 10 feet below the depth where groundwater is encountered or an estimated depth of about 150 feet. Soil sampling will be conducted at 5-foot intervals between 5 and 150 feet. After each five-foot run, the sampler will be brought to the surface via the wire line. The soil will be removed from the sampler and placed on a work table for logging and sample preparation. After removing the soil, the sampler will be decontaminated and reassembled for further use.

Soil samples will be collected for possible testing at 5-foot intervals. The lowest 6-inches of soil will be placed into a stainless steel tube and then capped, labeled, and stored for possible testing. The remaining soil will be used for lithologic description in the field.

A State of California-registered geologist will review and describe the soil samples collected from each sampling interval. The soil description will include a lithologic description (using the Unified Soil Classification System), color (using the Munsell color system), general moisture content, and mineral content (if visible), including evaporites. All soil descriptions will be recorded onto Eco's standard boring log form.

The percent sample recovery will be recorded on the boring log for sample runs that do not have 100 percent recovery. Sample recovery is defined as the length of sample recovered relative to the distance to which it was driven into the soil.

A portion of each soil sample collected at 5-foot sample intervals will be placed in a plastic re-sealable bag and allowed to volatilize. The headspace of each bag will be measured in the field for volatile organic compounds (VOCs) using a photoionization detector. Headspace measurements will be recorded on the boring logs.

4.6.2.2 Well Construction Details

The wells will be constructed of 4-inch diameter Schedule 80 flush-joint threaded American Society for Testing and Materials (ASTM) D1785 polyvinyl chloride (PVC) pipe. The well screen will be of commercial design and consist of two 10-foot sections of slotted PVC Schedule 80. The slot size will be 0.01 inch. Number 2/12 Monterey sand will be used as the filter pack and will be placed in the annulus of the screened interval, extending approximately 2 feet above and 1 foot below the screen. A minimum 5-foot-thick seal of medium bentonite chips will be placed above the filter pack. A grout consisting of Portland cement with approximately 5 percent bentonite will be used above the bentonite seal to approximately 2 feet bgs. Medium bentonite chips will be placed on top of the grout up to 1½ feet from the surface. Concrete (with a well box) will be placed above the bentonite chips. Figure 4 shows the well construction detail of the wells.

The current design is for a 20-foot screened interval – about 10 feet above the current water level and about 10 feet below. Also, the slot size and the filter pack material are based on our experience with local well installation. It is expected that this will not change and will be the basis for our field mobilization and equipment procurement. No site-specific grain-size analysis of the formational material is expected necessary. However, the actual installation of the screened interval will be after consultation with DTSC, if necessary to make sure there is agreement with the DTSC geologist on the well screened interval. This will be a function of the interpreted geology during drilling and will be tentatively decided by the Registered Geologist in the field. Additional screened casing lengths (5-foot and 10-foot) will be available in the field in case it is decided that a longer screened interval is necessary.

4.6.2.3 Surface Completion

Each well will be completed with a 12-inch-diameter, flush-mounted, traffic-rated well box set in concrete that is mounded approximately 0.5 to 1 inch aboveground to prevent ponding inside the well. The concrete pad will be approximately 2 feet in diameter. The name of the well will be etched into the concrete.

4.6.2.4 Well Development

After installation, the drilling crew will develop the groundwater monitoring wells with a combination of surging and bailing. A stainless steel bailer will be used to initially purge the well water to remove sediment that collected during well installation. Surging will then be done to clean the PVC slots and the sand pack. After surging, a bailer will again be used to remove any newly generated sediment. Following the last bailing, a clean pump will be placed approximately 2 feet above the bottom of the well. The well will then be pumped at a flow rate between 0.5 and 5 gallons per minute. Pumping will continue until the well water runs clear and the groundwater parameters (i.e., pH, turbidity, conductivity) stabilize.

During well development, the goal will be to obtain water until a turbidity of 5 NTU as determined by a field instrument is achieved. To allow success towards achieving this goal, the driller will be consulted for his experience and also the casing completion will be carefully done to make sure there is minimal contact with the surrounding soil. Casing centralizers will be used as practical.

4.6.2.5 Well Survey

The four newly completed wells will be surveyed by a Licensed Surveyor. A “V” notch or other permanent mark will be placed at the north edge of the top of the well casing that can be used as the reference point for well elevations surveying and water level monitoring. The vertical survey will be accurate to 0.01 foot. Horizontal control will be within 0.1 foot.

To the extent practical, the same surveyor will be utilized that has recently surveyed site wells in February 2014. He will be instructed to use the same benchmark as the survey completed for the four existing wells at the site.

4.6.3 GROUNDWATER SAMPLING

Groundwater sampling will be conducted after a period of 72 hours after the completion of well development. Two groundwater sampling events will be conducted as part of this ResPlan – one soon after the well installation and a second three months later. Sampling during these events will be for all eight site monitoring wells; the four new wells and the four existing wells. Evaluation of the groundwater conditions will be done only after the completion of the second sampling event.

Thereafter, all site groundwater monitoring wells will be sampled during events to be scheduled on a semi-annual basis. The programmatic scheduling of the groundwater monitoring events is tentatively described in the ResPlan but is expected to be reviewed following the availability of the monitoring results. Actual sampling frequency may require to be decreased, may be increased, or may be stopped altogether basis on the findings.

4.6.3.1 Water Level Measurements

Prior to sampling, the wells will be sounded for depth to water from the top of the casing. An electronic sounder accurate to the nearest ± 0.01 foot will be used to measure the depth to water. Total well depth will also be sounded from the surveyed top of casing by lowering the weighted probe to the bottom of the well. Total well depths will be measured to the nearest 0.1 foot.

4.6.3.2 Purging

The newly-established groundwater wells will be purged and sampled with a portable bladder pump. During purging, field parameters (pH, temperature, electrical conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity) will be collected and recorded on sampling logs. Samples will be collected after the parameters have stabilized, indicating that representative formation water is entering the well.

Upon completion of purging, the well water will be transferred directly from the pump’s discharge line to laboratory supplied sampling containers.

Water removed from the wells during purging will be temporarily containerized in either a 5-gallon bucket or a 55-gallon drum. Upon completion of sampling, this water will be transferred to a 55-gallon drum. This drum will be properly labeled and then stored in a secured location. Groundwater data reported for the collected groundwater samples will be used to profile the waste water for disposal purposes.

5.0 GENERALLY APPLICABLE PROCEDURES AND PROTOCOLS

5.1 LABORATORY ANALYSES

5.1.1 ANALYTICAL LABORATORY

The analytical laboratory used for the project will be California accredited. Tentatively, for laboratory sample analysis the following laboratory will be utilized: American Environmental Testing Laboratory, Inc. (AETL) 2834 North Naomi Street, Burbank, California 91504. The laboratory QA Plan is available, if needed. Based on Eco's prior work with this laboratory it is assessed suitable to meet project objectives. Should the laboratory change, either because of Contract requirements or City preference, Eco will obtain the QA/QC program and SOPs from the laboratory for the methods to be performed. Eco's QA Officer will review the laboratory's QA Plan and assess its suitability to meet project objectives.

5.1.2 CHEMICAL ANALYSES

The analytical parameters for laboratory analysis are listed in Table 2 and include the following analyses:

Soil

- ◆ VOCs EPA Method 8260B/5035
- ◆ Title 22 metals using EPA Method 6010B & 7471B
- ◆ PAHs using EPA Method 8310
- ◆ Petroleum hydrocarbons using EPA Method 8015 (carbon chain)
- ◆ Moisture content using ASTM D2216

Soil Vapor

- ◆ VOCs EPA Method 8260B

Groundwater

- ◆ VOCs EPA Method 8260B
- ◆ Title 22 metals using EPA Method 6010B & 7471B
- ◆ Hexavalent Chromium using EPA Method 7196A
- ◆ Perchlorate using EPA Method 314

Normal sample turnaround time is anticipated for the sample analysis. There are no specific QC requirements or modified sample preparation techniques required by this SAP. The analysis requested will follow the EPA analytical methods for the parameters requested.

5.2 FIELD METHODS AND PROCEDURES

The field methods to be employed involve the collection of soil and soil vapor samples. This sampling is described in Section 4.

Field sampling personnel involved in sampling must wear clean, disposable gloves of the appropriate type.

5.2.1 FIELD EQUIPMENT

Below is a list of the materials and equipment needed for sampling activities. Both disposable and reusable sampling equipment may be required:

- ◆ Personal protective equipment [as specified in the Health and Safety Plan
- ◆ Sampling Plan (SP)
- ◆ Decontamination supplies (see Section 5.4)
- ◆ 4-oz or 8-oz glass sample containers with lids
- ◆ Sample log sheets
- ◆ Sample labels/tags
- ◆ Coolers
- ◆ Ice
- ◆ Stainless Steel Bowls (3)
- ◆ 1-gallon and 1-quart Ziploc bags and other sizes as necessary
- ◆ Paper towels
- ◆ Ballpoint pen and permanent marker
- ◆ Plastic (disposable) trowels
- ◆ Steel trowels
- ◆ Plastic trash bags

5.2.2 CALIBRATION OF FIELD EQUIPMENT

Field equipment, such as photoionization detector (PID) and water parameter meters, shall be calibrated prior to use according to manufacturer's instruction and recommendations.

5.3 FIELD SCREENING

During well installation, screening of soil samples for VOCs will be performed using a 10.6 eV PID calibrated to a 100-ppm isobutylene standard. The general field soil sampling and screening procedures when using PID instrument in the field will be as follows:

Use either half-filled glass jar or Ziploc[®] baggie.

1. When using glass jars:
 - (a) fill jars with a total capacity of 8 oz. or 16 oz. to about one half of its volume; and
 - (b) seal each jar with one (1) or two (2) sheets of aluminum foil with the screw cap applied to secure the foil.
2. When using Ziploc[®] baggies:
 - (a) half fill the bag with soil, and
 - (b) zip to close.
3. Vigorously shake the sample jars or bags for at least thirty (30) seconds once or twice in a 10 to 15 minute period to allow for headspace development.

4. If ambient temperatures are below 32° Fahrenheit headspace development is to be within a heated vehicle or building.
5. Quickly insert the PID sampling probe through the aluminum foil. If plastic bags are used, unzip the corner of the bag approximately one to two inches and insert the probe or insert the probe through the plastic. Record the maximum meter response (should be within the first 2-5 seconds). Erratic responses should be discounted as a result of high organic vapor concentrations or conditions of elevated headspace moisture.
6. Record headspace screening data from both jars and/or bags for comparison.
7. Calibration must be checked/adjusted daily. In addition, all manufacturers' requirements for instrument calibration must be followed.
8. If sample jars are to be re-used in the field, jars must be cleaned according to field decontamination procedures for cleaning of bailers. In addition, headspace readings must be taken to ensure no residual organic vapors exist in the cleaned sample jars. Plastic bags may not be re-used.
9. Any deviation(s) from these procedures must be noted and a basis stated for the deviation(s).

5.4 DECONTAMINATION PROCEDURES

Decontamination of sampling equipment must be conducted consistently as to assure the quality of samples collected. All equipment that comes into contact with potentially contaminated soil or water will be decontaminated. Disposable equipment intended for one-time use will not be decontaminated, but will be packaged for appropriate disposal.

Decontamination will occur prior to and after each use of a piece of equipment. All sampling devices used, including trowels and augers, will be steam-cleaned or decontaminated according to EPA Region 9 recommended procedures. The following, to be carried out in sequence, is in general accordance with the EPA Region IX recommended procedure for the decontamination of sampling equipment:

- ◆ Non-phosphate detergent and tap water wash, using a brush if necessary
- ◆ Tap-water rinse
- ◆ De-ionized/distilled water rinse

Equipment will be decontaminated in a pre-designated area on pallets or plastic sheeting, and clean bulky equipment will be stored on plastic sheeting in uncontaminated areas. Cleaned small equipment will be stored in plastic bags. Materials to be stored more than a few hours will also be covered.

5.5 SAMPLE CONTAINERS, PRESERVATION AND STORAGE

Sample container, preservation and storage requirements for the identified analytical parameters are provided in Table 3 of this plan.

5.5.1 SOIL SAMPLES

Soil samples for PAHs and metal analyses will be homogenized and transferred from the sample-dedicated homogenization pail (or stainless steel bowl) into 8-oz, wide-mouth glass jars using a trowel. For each sample, one 8-oz wide-mouth glass jar will be collected for each

laboratory. The samples will be chilled to about 4 degrees Celsius immediately upon collection.

All soil samples that are to be analyzed for VOCs will be collected using USEPA Method 5035. The sampling kit will be utilized to sample the ground directly, if possible, or will be used to sub-sample from soil samples otherwise collected. Soil samples to be analyzed for VOCs will be stored in their sealed Encore samplers for no more than two days prior to analysis. Frozen Encore sampler samples will be stored for no more than 4 days prior to analysis. If samples are preserved by ejecting into either methanol or sodium bisulfate solution the holding time is two weeks. Preserved samples will be chilled to 4 degrees Celsius immediately upon collection.

5.5.2 SOIL VAPOR SAMPLES

Soil vapor samples for VOCs will be collected in 1-liter Summa canisters and sent to the laboratory immediately after collection (Table 3). These samples will be analyzed using EPA method TO-15. The holding time for these samples is 14 days. Section 4.2 provides soil vapor sampling procedures to be followed in the field.

5.5.3 GROUNDWATER SAMPLES

Groundwater samples for VOC (EPA Method 8260B) analyses will be collected in three 40-milliliter vials. This sample has a 14 day holding time. Groundwater samples for hexavalent chromium analyses (EPA Method 7196A) will be collected in one 500 milliliter amber glass jar. This sample has a 1 day holding time. Groundwater samples for metal analyses (EPA Methods 6010B/7471B) will be collected in 500-milliliter polypropylene containers. This sample has a 6-month holding time. Groundwater samples for perchlorate analyses (Method 314) will be collected in one 125 milliliter wide-mouth polyethylene bottle. These samples have a 14 day holding time. Section 4 provides details on the sampling procedure from groundwater monitoring wells.

5.6 DISPOSAL OF EXCAVATED SOIL, INVESTIGATION-DERIVED WASTE, AND OTHER MATERIALS

The following wastes will be generated as part of the planned remedial activities:

- Excavated soil contaminated with metals and PAHs
- Investigation-derived waste (IDW) including waste water from well development and groundwater sampling and soil cuttings from the drilling of additional monitoring wells
- Materials and disposable equipment used during the operations

Based on prior analysis by the generators and U.S. EPA sampling on the site in February of 2011 none of the soil sampling locations contained EPA hazardous waste. Disposal of the IDW will be disposed of according to state and federal requirements.

Used PPE and disposable equipment will be double bagged and placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any PPE and disposable equipment that is to be disposed of which can still be reused will be rendered inoperable before disposal in the refuse dumpster.

5.7 SAMPLE DOCUMENTATION AND SHIPMENT

This section discusses the sample documentation and shipment requirements for the sampling program.

5.7.1 FIELD NOTES

Field notes will be recorded in the field logbooks. Field logbooks will be maintained throughout the entire sampling program. General entries made in the field logbook will include the following information: Date; Time of Day; Location onsite; Weather Conditions (Clear, Overcast, Windy, Sunny, etc.); Wind Direction and Estimated Velocity (e.g., SE@ 10 mph); Temperature (°F); Description of Observed Site Condition (s); Name of Eco Field Personnel and their Signatures.

Specific entries will be made for each day of sampling and will record the following information in the field logbook: team members participating in the sampling; time of arrival/entry on site and time of site departure; other personnel on site; summary of any meetings or discussions with tribal, contractor, or states/federal agency personnel; deviations from sampling plans, site safety plans, and SAP procedures; changes in personnel and responsibilities with reasons for the changes; levels of safety protection; and calibration readings for equipment.

5.7.2 PHOTOGRAPHS

Photographs will be taken of the grid system established for the sampling, during sample collection using the Geoprobe/excavator, and to document field conditions which change.

Photographs will also be taken at the sampling locations and at other areas of interest onsite or sampling area. They will serve to verify information entered in the field logbook. For each photograph taken, the following information will be written in the logbook or recorded in a separate field photography log: Time, date, location, and weather conditions; Description of the subject photographed, and Name of person taking the photograph.

5.7.3 SAMPLE LABELING

Samples will be labeled according to the following labeling sequence:

1. Date
2. Media
3. Location
4. Grid Location (if needed)
5. Sample Number

Date: The date shall be the date of the sample as a six digit number YYMMDD or 140415 for April 15, 2014.

Media:

- ◆ CSSB Confirmation soil sample at the base
- ◆ CSSW Confirmation soil sample at the wall
- ◆ SVB Soil vapor sample at boring
- ◆ SS Stockpile sample

- ◆ IS Import Sample

Location and Grid: Describe the location, see examples below:

- ◆ 9G3 midpoint in grid G3 of Area 9 excavation. Grids A, B, C, ... North/South and 1, 2, 3, ... East/West.
- ◆ 4N1 First sample on the north side of soil stockpile 4.
- ◆ 5N3 Third sample on north wall of excavation in Area 5.

Sample number: This number may or may not be necessary. If needed use sequential numbers starting with 1.

The existing groundwater monitoring wells will be identified as previously with their current designations. New planned monitoring wells will be EMW-series of wells and will be identified with sequential numbering as described in Figure 3. Groundwater samples will be number in the format YYMMDD:Well Number.

5.7.4 CHAIN OF CUSTODY RECORD

All sample shipments for analyses will be accompanied by a chain-of-custody record. A copy of the form is found in Attachment II. The chain of custodies will be completed and sent with the samples for each laboratory and each shipment. The chain-of-custody forms will identify the contents of each shipment and maintain the custodial integrity of the samples.

Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area. Until the samples are shipped, the custody of the samples will be the responsibility of the Eco field team conducting the sampling. The sampler or his designee will sign the chain-of-custody form in the "relinquished by" box and note date, time, and air bill number. The sample numbers for all field samples, field QC samples, and duplicates will be documented on the chain of custody. A self-adhesive custody seal will be placed across the lid of each sample. The shipping containers in which samples are stored (usually a sturdy picnic cooler or ice chest) will be sealed with self-adhesive custody seals any time they are not in someone's possession or view before shipping.

5.7.5 PACKAGING AND SHIPMENT

All sample containers will be placed in a strong-outside shipping container (such as a picnic cooler). The sample packaging procedures that will be followed for the soil samples are described below.

1. When ice is used, pack it in zip-locked, double plastic bags. Seal the drain plug of the cooler with fiberglass tape to prevent melting ice from leaking out of the cooler.
2. The bottom of the cooler should be lined with bubble wrap to prevent breakage during shipment.
3. Check screw caps for tightness and, if not full, mark the sample volume level of liquid samples on the outside of the sample bottles with indelible ink.
4. Secure bottle/container tops with clear tape and custody seal all container tops.
5. Affix sample labels onto the containers with clear tape.

6. Wrap all glass sample containers in bubble wrap to prevent breakage.
7. Seal all sample containers in heavy duty plastic zip-lock bags. Write the sample numbers on the outside of the plastic bags with indelible ink.
8. Place samples in a sturdy cooler(s) lined with a large plastic trash bag. Enclose the appropriate COC(s) in a zip- lock plastic bag affixed to the underside of the cooler lid.
9. Fill empty space in the cooler with bubble wrap or Styrofoam peanuts to prevent movement and breakage during shipment.
10. Ice used to cool samples will be double sealed in two zip lock plastic bags and placed on top and around the samples to chill them to the correct temperature.
11. Each ice chest will be securely taped shut with fiberglass strapping tape, and custody seals will be affixed to the front, right and back of each cooler.

Records will be maintained by the sample custodian of the following information:

- ◆ Sampling contractor's name (if not the organization itself)
- ◆ Name and location of the site or sampling area
- ◆ Total number(s) by estimated concentration and matrix of samples shipped to each laboratory
- ◆ Carrier, air bill number(s), method of shipment (priority next day)
- ◆ Shipment date and when it should be received by lab
- ◆ Irregularities or anticipated problems associated with the samples
- ◆ Whether additional samples will be shipped or if this is the last shipment

6.0 QUALITY CONTROL

This section discussed the quality control samples incorporated into the soil sampling program.

6.1 FIELD QUALITY CONTROL SAMPLES

Field duplicates and field blanks have been incorporated into the field sampling program for each individual analytical parameter as shown on Table 1.

6.1.1 EQUIPMENT BLANKS

Equipment blank will be collected since a reusable bladder pump will be used to collect groundwater samples. The blanks will be collected for chemical analysis on a one-per-day basis. The equipment blanks will be collected by pouring deionized or distilled water over the equipment after it has been adequately cleaned and collecting the water in an appropriate sampling container for subsequent laboratory analysis.

6.1.2 TRIP BLANKS

Trip blanks will be included for all VOC sample shipments to evaluate the bias of results associated with possible cross-contamination during sample shipment.

6.1.3 FIELD DUPLICATES

Field duplicates (confirmation soil samples, soil vapor samples, and groundwater samples) will be collected as part of the sampling program at a rate of 10 percent to measure precision which is a measure of the mutual agreement among individual measurements of the same property. Quantitatively, precision is expressed as Relative Percent Difference (RPD) between duplicate samples. U.S. EPA data validation guidelines typically use criteria for RPDs of field duplicates as <50 for soil samples. RPD is calculated as follows:

$$RPD = \frac{(C_s - C_d)}{\frac{(C_s + C_d)}{2}} \times 100$$

Where:

C_s = Sample Concentration

C_d = Duplicate Concentration

RPD = Relative Percent Difference

6.1.4 TEMPERATURE BLANKS

One temperature blank will be included in each sample cooler. Temperatures will be verified prior to sample shipment and upon receipt at the analyzing laboratory.

6.1.5 FIELD VARIABILITY AND CO-LOCATED SAMPLES

It is anticipated that the treated soil stockpiles will have far less variability than the untreated soil stockpiles since the treated soils have all been homogenized by soil blending and mixing operations.

7.0 FIELD VARIANCE

Changes in field conditions on the actual day of sampling or conditions different from that expected will be documented in the filed log book along with digital photographs to document the noted field variances when appropriate. If conditions make it necessary to modify the SAP the Eco QA Officer and DTSC QA Officer will be notified of the proposed changes and approve such changes prior to implementation in the field.

8.0 FIELD HEALTH AND SAFETY PROCEDURES

A Health and Safety Plan (HASP) has been prepared for the site as part of this ResPlan. It is presented as Appendix D of the ResPlan.

FIGURES

Randolph Street

SUBJECT SITE

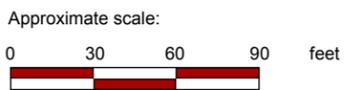
Wilmington Avenue

Alameda Street

Soil vapor boring

Proposed Soil Vapor Sampling Locations

Proposed Soil Vapor Sampling Locations



LEGEND:

- 2005 Soil/soil vapor boring.
- 2005 Soil vapor boring.
- 2004/2005 Soil boring.
- 2007/2008 Soil boring.
- Proposed soil vapor location - 1st round.
- Proposed soil vapor location - 2nd round.
- Proposed soil vapor location - 3rd round.

Randolph Street

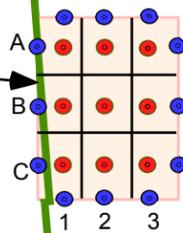
Area 1

SUBJECT SITE

Alameda Street

Wilmington Avenue

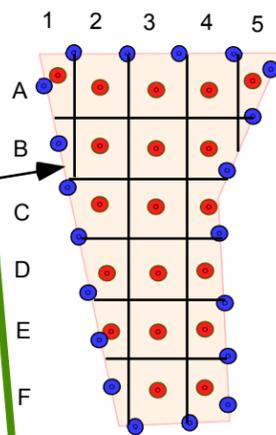
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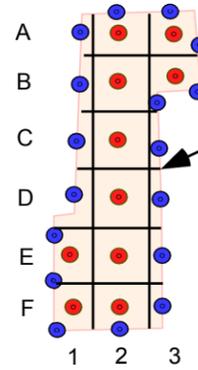
Area 5



Area 4



Area 3



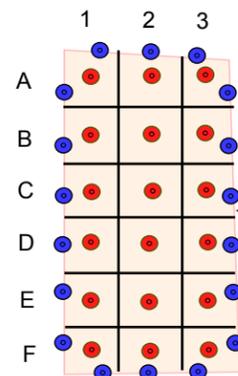
Area 6



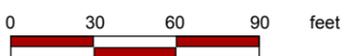
Area 7



Area 8



Approximate scale:



LEGEND:

- Confirmation Soil Samples from Sidewalls
- Confirmation Soil Samples from Base
- Recommended Excavation Limits



Randolph Street

SUBJECT SITE

Wilmington Avenue

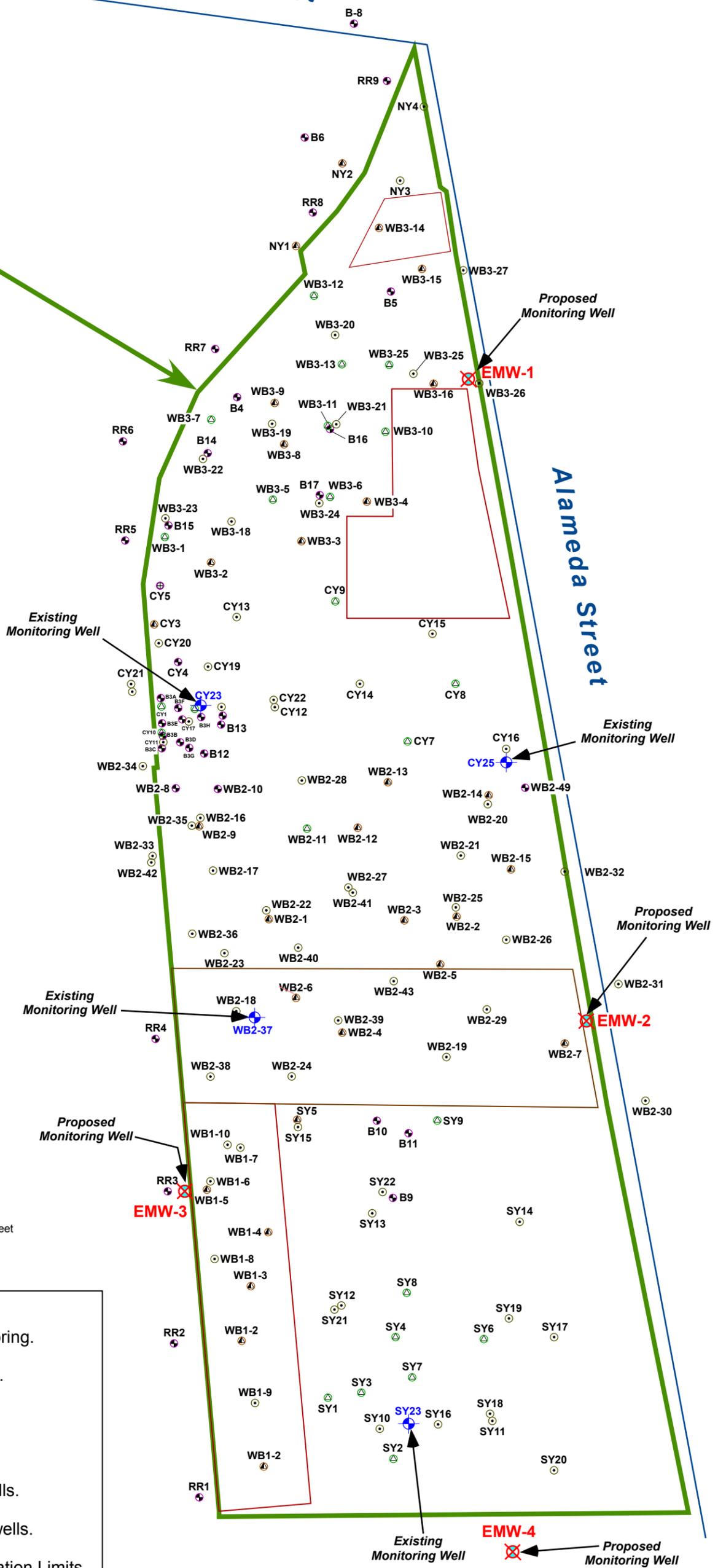
Alameda Street

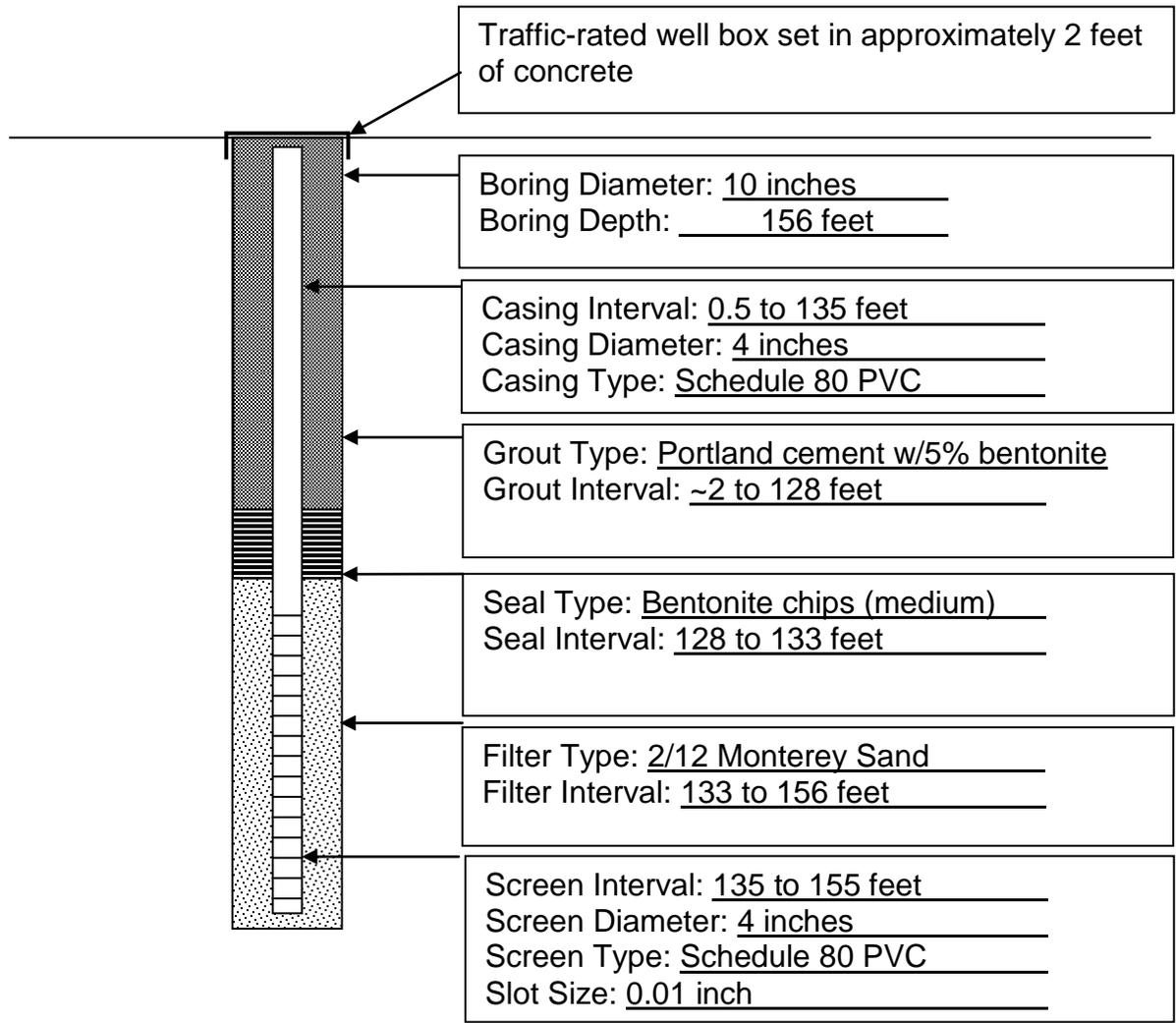


Approximate scale:
0 30 60 90 feet

LEGEND:

- 2005 Soil/soil vapor boring.
- 2005 Soil vapor boring.
- 2004/2005 Soil boring.
- 2007/2008 Soil boring.
- Existing monitoring wells.
- Proposed monitoring wells.
- Recommended Excavation Limits





TABLES

Table 1
Data Quality Objectives
Soil Vapor Sampling and Excavation Confirmation Sampling
Former Southland Steel Facility

<p>1. Problem Statement</p>	<ul style="list-style-type: none"> • Chemical concentration data are needed to delineate areas requiring excavation, then to confirm appropriate extents of excavation have been reached, in order to document that the site remediation goals for contamination in the soil have been achieved. The remedial goals are risk-based and are derived from site-specific risk assessment or from OEHHA published CHHSLs. • Groundwater chemical concentration data are needed from existing and new wells to be installed to further characterize groundwater beneath the site.
<p>2. Decision Statement</p>	<ul style="list-style-type: none"> • Determine approximate extent of excavation, then evaluate excavated areas to confirm that remedial goals for soil excavation have been met. Identify locations at the excavations for sampling, determine an appropriate sampling and analysis design to collect representative data, and describe procedures to implement the sampling program.
<p>3. Inputs to the decision</p>	<ul style="list-style-type: none"> • <i>Use of the chemical soil background data:</i> Sample size will be a function of each excavated area. Sampling will be done at the rate of one sample for every 20 feet of side wall and one sample for every 400 square feet of the base. This judgmental sampling has been found through experience to be generally satisfactory to confirm achievement of the remedial goals.
<p>4. Study Boundaries</p>	<ul style="list-style-type: none"> • Soil vapor sampling is planned in areas of formerly reported elevated soil vapor concentrations. Confirmation sampling is planned in all on-site excavation areas and the extent of the excavation shall represent the boundaries for that particular confirmation event. • One groundwater sampling event (on existing wells and newly installed wells) is planned shortly after installation of the new wells and a second sampling event will be conducted about three months later.
<p>5. Decision Rules</p>	<ul style="list-style-type: none"> • On the basis of sample results that area of the sample will be considered “passed” or “failed” for meeting remedial goals. Where passed, no further action (excavation) is necessary. Where failed, the area represented by that sample will be further excavated as indicated by field observations. This will be applicable to the base of the excavation and also the side walls.
<p>6. Limits on Decision Errors</p>	<ul style="list-style-type: none"> • Sampling design and laboratory measurement and analysis variability will be monitored by collecting a sufficient amount of quality control/quality assurance samples (i.e., splits, equipment rinsate blanks, duplicates, and matrix spike/matrix spike duplicates). • Level III data validation will be used for validation of the analytical results. • While the goal is to collect samples at the frequency described herein, unforeseen issues may occur that limit the number of samples that can be collected. If encountered, any limitations will be documented and described in the Remedial Action Report. The limitations will be shared with the City and DTSC during the conduct of the sampling for review and modifications, if necessary.
<p>7. Optimized Design</p>	<ul style="list-style-type: none"> • Sampling and Analysis Plan <ul style="list-style-type: none"> – The Field Sampling Plan describes the data quality objectives, sampling design of each excavated area (base and sidewalls), and field and laboratory methods for confirmation. – The Quality Assurance Parameters are described in the planning document for analytical reporting limits, quality assurance and quality control, and data validation requirements for the confirmation. – Field Sampling Standard Operating Procedures are documented in order to describe field sampling methods consistent with on-site soil sampling procedures. – The Health and Safety Plan (Appendix D) describes health and safety procedures to be used during fieldwork. • Use a systematic design to describe potential sampling locations at each excavation and then select the sampling locations within those boundaries judgmentally in the field. • Provide planning documents to oversight agency for review and comment, address comments, and modify plan, if warranted.

Table 2: Sampling and Analysis Requirements
Former Southland Steel Facility

Analytical Parameter	EPA Method Number	Location	Number of Field Samples	Number of QC Samples	Required Number of Samples
CONFIRMATION SOIL SAMPLES					
PAHs	8310	8 Proposed Areas	143	NA	143
Arsenic	6010	8 Proposed Areas	143	NA	143
Cadmium	6010	8 Proposed Areas	143	NA	143
STOCKPILES SOIL SAMPLES					
VOCs	8260	Mixed	50	NA	50
PAHs	8310	Mixed	50	NA	50
Metals	6010	Mixed	50	NA	50
TPHg+d	8015M	Mixed	50	NA	50
SOIL VAPOR SAMPLES¹					
VOCs	TO-14	Areas # 3, 4, and 8	42	4	46
GROUNDWATER SAMPLES² (per sampling event)					
VOCs	8260B	8 Wells	8	5	13
Metals	6010B	8 Wells	8	3	11
Cr(VI)	7196A	8 Wells	8	3	11
Perchlorate	314	8 Wells	8	3	11
SOIL SAMPLES (FROM WELL BORINGS)					
VOCs	8260B	4 Borings	124	NA	124
PAHs	8310	4 Borings	16	NA	16
Metals	6010B	4 Borings	72	NA	72
Moisture Content	ASTM D2216	4 Borings	124	NA	124
IMPORT SOIL SAMPLES					
The analysis will be performed based on the criteria for clean soil, as specified in Los Angeles Unified School District (LAUSD) Specification 01 4524. Attachment III- SAP					

Note:

- 1 Soil gas samples will be collected in three rounds, each round is contingent to the previous results
- 2 Groundwater samples for each event, 2 events will be anticipated for the after installation of new wells.
- NA= Not applicable, no duplicate samples will be collected for the soil samples

TABLE 3
SAMPLE CONTAINER AND PRESERVATION
Former Southland Steel Facility

Constituent	Analytical Method	Matrix	Container Type	Container Size	Preservative	Holding Time
VOCs	8260B	Water	Glass (VOA vial)	3X40 mL	HCl	14 days
Metals	6010B	Water	500 mL	P	HNO ₃ , pH < 2	180
Hexavalent chromium	7196A	Water	P,G	500ml	4°C	1 day
Perchlorate	314	Water	P	125-ml wide mouth	4°C	28 days
VOCs	8260B	Soil	Soils Kit	Soils Kit	Methanol	14 days
Metals	6010B	Soil	P,G	4 oz	4°C	6 months
PAHs	8310	Soil	G-TLC	8 oz.	4°C	14 days
TPHg,d	8015M	Soil	G-TLS or GTLC	4-oz wide mouth and/or Terracore Kit	4°C	14 days
Moisture Content	ASTM D2216	Soil	G	4oz	NA	7 days
VOCs	TO-15	Vapor	Summa	1 L	Ambient temperature	14 days

Notes:

VOCs = Volatile Organic Compounds
PCBs = Polychlorinated Biphenyls
PAHs = Polyaromatic Hydrocarbons
VOA = Volatile Organic Analysis
NA = not available
P = Plastic (HDPE)
G = Glass
G-TLC: Glass with Teflonâ-lined cap
G-TLS: Glass with Teflonâ-lined seprum
mL = Milliliters
L = Liter
Oz = Ounce
HCl = Hydrochloric Acid

ATTACHMENT 1

EPA DATA QUALITY INDICATOR TABLES FOR SAMPLED CONSTITUENTS

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation
Metals (except mercury)	<u>Technical</u> : 180 days from date of collection to TCLP extraction and another 180 days from date of TCLP extraction to analysis; <u>Contract</u> : TCLP extraction 26 days from sample receipt at laboratory and analysis within 26 days of extraction	Cool to 4°C ±2°C After extraction and filtration, pH <2 with nitric acid
Mercury	<u>Technical</u> : 28 days from date of collection to TCLP extraction and another 28 days from date of TCLP extraction to analysis; <u>Contract</u> : TCLP extraction 26 days from sample receipt at laboratory and analysis within 26 days of extraction	Cool to 4°C ±2°C After extraction and filtration, pH <2 with nitric acid

^a Individual target compounds are listed in Table 13B.

Data Calculations and Reporting Units:

Calculate the sample results according to the protocols of the appropriate analytical method: SW-846 Method 6010B (ICP) Section 7.6, SW-846 Methods 7470/7471 (CVAA) Sections 7.5 and 7.6, respectively, and SW-846 Method 1311 (TCLP Extraction) Section 7.2.14.

Report sample results in concentration units of milligrams per liter (mg/L).

For rounding results, adhere to the following rules:

- a) If the number following those to be retained is less than 5, round down;
- b) If the number following those to be retained is greater than 5, round up; or
- c) If the number following the last digit to be retained is equal to 5, round down if the digit is even, or round up if the digit is odd.

All records of analysis and calculations must be legible and sufficient to recalculate all sample concentrations and QC results. Include an example calculation in the data package.

TABLE 13B. Target Compound List, CAS Numbers, Contract Required Detection Limits, Regulatory and Spiking Levels for TCLP Metals by SW-846 Method 6010 and SW-846 Method 7470/7471

COMPOUND	CAS No.	CRDL (mg/L)	Regulatory Level (mg/L)	Spiking Level (mg/L)
Arsenic	7440-38-2	0.50	5.0	2.5 - 5.0
Barium	7440-39-3	1.0	100	50 - 100
Cadmium	7440-43-9	0.10	1.0	0.5 - 1.0
Chromium	7440-47-3	0.50	5.0	2.5 - 5.0
Lead	7439-92-1	0.50	5.0	2.5 - 5.0
Mercury	7439-97-6	0.02 ^a	0.2	0.1 - 0.2
Selenium	7782-49-2	0.10	1.0	0.5 - 1.0
Silver	7440-22-4	0.50	5.0	2.5 - 5.0

^a Mercury analysis is to be performed using 10 mL aliquots diluted to 100 mL.
The CRDL has been adjusted to account for this 10 X dilution.

Table 14A. Summary of Calibration Procedures for TCLP Metals by SW-846 Method 6010

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
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Initial Calibration (minimum blank + 1 calibration standard) (ICAL)	Initially, Daily; whenever required, due to failure of CCV	Acceptable ICV, CRDL, and ICB standards	1. Terminate analysis 2. Re-calibrate and verify before sample analysis
Initial Calibration Verification (ICV) at midpoint of ICAL (Different source from ICAL standards)	Daily, immediately following ICAL and prior to sample analysis	±10% from expected concentration	1. Terminate analysis and identify and document problem 2. Reprep and re-analyze ICV and all associated samples 3. Re-calibrate and re-analyze repped ICV and all associated samples
Calibration Blank Verification (ICB, CCB)	After ICV and every CCV	< CRDL	1. Terminate analysis 2. Determine Source of contamination 3. Reprep ICB and CCB 4. Re-analyze all samples associated with a contaminated blank
Continuing Calibration Verification (CCV)	Before samples, after every 10 samples, and end of run	± 10% from expected concentration	1. Re-calibrate and verify 2. Re-analyze samples back to last acceptable CCV
Contract Required Detection Limit Verification Standard (CRI)	After ICV and before sample analysis	±35% from expected concentration	1. Re-calibrate and verify 2. Re-analyze samples back to last compliant CCV
ICP Interference Check Sample (ICS)	Run at start and finish of daily run or twice per 8 hours	± 20% from true value concentration	1. Reprep and re-analyze standard 2. Re-calibrate, verify and re-analyze all associated samples

Table 14B. Summary of Calibration Procedures for TCLP Mercury by SW-846 Method 7470/7471

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration (minimum blank + 5 standards) (ICAL) ^a	Initially, each analytical batch; whenever required, due to failure of CCV	$r \leq 0.995$	<ol style="list-style-type: none"> 1. Terminate analysis 2. Re-calibrate and verify b analysis
Initial Calibration Verification (ICV) at midpoint of ICAL (Different source from ICAL standards)	Daily, immediately following ICAL and prior to sample analysis	$\pm 20\%$ from expected concentration	<ol style="list-style-type: none"> 1. Terminate analysis and id document problem 2. Reprep and re-analyze ICV associated samples 3. Re-calibrate and re-analy ICV and all associated sa
Calibration Blank Verification (ICB, CCB)	After ICV and every CCV	$< \text{CRDL}$	<ol style="list-style-type: none"> 1. Terminate analysis 2. Determine source of conta 3. Reprep ICB and CCB 4. Re-analyze all samples as with a contaminated blank
Continuing Calibration Verification (CCV)	Before Samples, after every 10 samples, and end of run	$\pm 20\%$ from expected concentration	<ol style="list-style-type: none"> 1. Re-calibrate and verify 2. Re-analyze samples back t acceptable CCV
Contract Required Detection Limit Verification Standard (CRA)	After ICV, and before sample analysis	$\pm 35\%$ from expected concentration	<ol style="list-style-type: none"> 1. Reprep and re-analyze sta 2. Re-calibrate and verify

^a The ICAL low standard must be at the CRDL.

Table 15. Summary of Internal Quality Control Procedures for TCLP Metals Analysis by SW-846 Method 6010 and SW-846 Method 7470/7471

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	One per SDG ^a or per batch of extraction fluid ^b	< CRDL	<ol style="list-style-type: none"> 1. If lowest sample concentration is more than 10X the blank conc., no action 2. If samples are non-detected, no action 3. If detected sample concentrations are less than 10X blank conc., all affected samples must be prepared again with another method blank and re-analyzed
Duplicate Sample (DUP)	One per batch or SDG ^{a, b}	RPD $\leq \pm 20\%$ for samples $> 5X$ CRDL; \pm CRDL for samples $< 5X$ CRDL	1. Flag associated data with an "*"
Matrix Spike Sample (MS)	One per batch or SDG ^{a, b, c}	$\pm 25\%$ from expected value ^d	1. A post-digestion spike must be performed for analytes that exceed limits.
Laboratory Control Sample (LCS) ^e	One per SDG ^a or per batch of extraction fluid ^b	$\pm 20\%$ from expected concentration	<ol style="list-style-type: none"> 1. Terminate analysis and identify and document the problem 2. Re-analyze all associated samples
Serial Dilution Sample (5 X Dilution) (ICP only)	One per batch or SDG ^{a, b}	$\pm 10\%$ difference from original results for analytes greater than 50 X IDL	1. Flag associated data with a "B"

^a SDG - Sample Delivery Group - each case of field samples received; or each 20 field samples within a case; or each 14 calendar day period during which field samples in a case are received.

^b Minimum requirement is the analysis of 1 QC sample per 20 samples.

^c Spiking solution must contain all analytes within the spiking ranges listed in Table 13B. Matrix spikes are to be added after filtration of the TCLP extract and before acidification.

^d An exception to this rule is granted in situations where the sample concentration exceeds the spike concentration by a factor of 4.

^e LCS spike solution must be from a different source than the calibration standards.

Dilute and re-analyze samples with concentrations exceeding the range of the calibration curve. Results for such re-analyses should fall within the mid-range of the calibration curve. Report results and submit documentation for both analyses.

VOLATILE ORGANIC COMPOUNDS (VOCs)

SW-846 Method 8260

Table 1A. Summary of Holding Times and Preservation for Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation
Volatile Organic Compounds (VOCs) in Water	<u>Technical</u> : 7 days from collection; <u>Contract</u> : 5 days from receipt at laboratory	Cool to 4EC ±2EC;
VOCs in Water	<u>Technical</u> : 14 days from collection; <u>Contract</u> : 10 days from receipt at laboratory	HCl to pH <2; Cool to 4EC ±2EC
VOCs in Soil	<u>Technical</u> : 48 hours <u>Contract</u> : 48 hours	Cool to 4EC ±2EC; sealed zero headspace containers; freezing can extend the holding time ^b
VOCs in Soil	<u>Technical</u> : 14 days from collection; <u>Contract</u> : 10 days from receipt at laboratory	Preserved samples: in methanol ^c or sodium bisulfate ^d

^a Individual target compounds are listed in Table 1B.

^b Freezing the sample can extend the holding time; however, 48 hours unfrozen holding time will be considered cumulative.

^c Use Method 5030 for purge and trap.

^d Use Method 5035 for purge and trap.

Data Calculations and Reporting Units:

Calculate the response factor (RF) and the concentration of individual analytes according to the equations specified in Sections 7.3.4 of Method 8260. Report water sample results in concentration units of micrograms per liter (Fg/L).

Report soil sample results on a dry-weight basis in micrograms per kilogram (Fg/kg). Report percent solid and percent moisture to the nearest whole percentage point.

For rounding results, adhere to the following rules:

- a) If the number following those to be retained is less than 5, round down;
- b) If the number following those to be retained is greater than 5, round up; or
- c) If the number following the last digit to be retained is equal to 5, round down if the digit is even, or round up if the digit is odd.

All records of analysis and calculations must be legible and sufficient to recalculate all sample concentrations and QC results. Include an example calculation in the data package.

Table 1B. Target Compound List, CAS Numbers, and Contract Required Quantitation Limits for Volatile Organic Compounds by Method 8260

<u>Analyte</u>	<u>CAS Number</u>	<u>CRQL Fg/L^a</u>	<u>CRQL Fg/Kg^b</u>
Benzene	71-43-2	1	5
Bromobenzene	108-86-1	1	5
Bromochloromethane	74-97-5	1	5
Bromodichloromethane	75-27-4	1	5
Bromoform	75-25-2	1	5
Bromomethane	74-83-9	1	5
n-Butylbenzene	104-51-8	1	5
sec-Butylbenzene	135-98-8	1	5
tert-Butylbenzene	98-06-6	1	5
Carbon tetrachloride	56-23-5	1	5
Chlorobenzene	108-90-7	1	5
Chlorodibromomethane	124-48-1	1	5
Chloroethane	75-00-3	1	5
Chloroform	67-66-3	1	5
Chloromethane	74-87-3	1	5
2-Chlorotoluene	95-49-8	1	5
4-Chlorotoluene	106-43-4	1	5
1,2-Dibromo-3-chloropropane	96-12-8	1	5
1,2-Dibromoethane	106-93-4	1	5
Dibromomethane	74-95-3	1	5
1,2-Dichlorobenzene	95-50-1	1	5
1,3-Dichlorobenzene	541-73-1	1	5
1,4-Dichlorobenzene	106-46-7	1	5
Dichlorodifluoromethane	75-71-8	1	5
1,1-Dichloroethane	75-34-3	1	5
1,2-Dichloroethane	107-06-2	1	5
1,1-Dichloroethene	75-35-4	1	5
cis-1,2-Dichloroethene	156-59-2	1	5
trans-1,2-Dichloroethene	156-60-5	1	5

1,2-Dichloropropane	78-87-5	1	5
2,2-Dichloropropane	594-20-7	1	5
1,3-Dichloropropane	142-28-9	1	5
1,1-Dichloropropene	563-58-6	1	5
Ethylbenzene	100-41-4	1	5
Hexachlorobutadiene	87-68-3	1	5
Isopropylbenzene	98-82-8	1	5
p-Isopropyltoluene	99-87-8	1	5
Methylene chloride	75-09-2	1	5
Naphthalene	91-20-3	1	5
n-Propylbenzene	103-65-1	1	5
Styrene	100-42-5	1	5
1,1,1,2-Tetrachloroethane	630-20-6	1	5
1,1,2,2-Tetrachloroethane	79-34-5	1	5
Tetrachloroethene	127-18-4	1	5
Toluene	108-88-3	1	5
1,2,4-Trichlorobenzene	120-82-1	1	5
1,2,3-Trichlorobenzene	87-61-6	1	5
1,1,1-Trichloroethane	71-55-6	1	5
1,1,2-Trichloroethane	79-00-5	1	5
Trichloroethene	79-01-6	1	5
Trichlorofluoromethane	75-69-4	1	5
1,2,3-Trichloropropane	96-18-4	1	5
1,2,4-Trimethylbenzene	95-63-6	1	5
1,3,5-Trimethylbenzene	108-67-8	1	5
Vinyl chloride	75-01-4	1	5
o-Xylene	95-47-6	1	5
m-Xylene	108-38-3	1	5
p-Xylene	106-42-3	1	5
Methyl-t-butyl ether	163-40-44	1	5
Dichlorofluoromethane	75-43-4	1	5

^a Based on 25 mL water purge. ^b Based on wet weight

Table 2. Summary of Calibration Procedures for VOCs by SW-846 Method 8260

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
GC/MS Tuning with BFB	Beginning of each 12 hour period during which standards samples are analyzed	Ion abundance criteria in Table 4 of Method 8260	1. Identify the problem. 2. MS tune criteria must be met before any calibration standards, samples, blanks, or QC samples are analyzed
Initial Calibration (minimum blank + 5 points for each analyte) (ICAL) ^{a, b, c}	Initially; whenever required, due to failure of CCV	RSD for RFs #20%	1. Terminate analysis 2. Recalibrate and verify before sample analysis
Continuing Calibration Verification (CCV)	Following ICV, every 12-hour, and end of run	%D between RF of CCV and avg RFs from ICAL #15%	1. Recalibrate and verify 2. Reanalyze samples back to last good CCV
System Performance Check Compound (SPCC)	With ICAL or CCV	RF for chloromethane, 1,1-dichloroethane, bromoform, \$0.10; chlorobenzene, 1,1,2,2-tetrachloroethane, \$0.30	1. Terminate analysis 2. Recalibrate and verify before sample analysis
Calibration Check Compounds (CCC)	With ICAL or CCV	RSD for RFs #30%	1. Terminate analysis 2. Recalibrate and verify before sample analysis
Internal Standards	Each analysis of CCV	-50 to +100%	1. Re-analyze all samples analyzed while system was out-of-control
Retention time evaluation of CCV standards	Each analysis of CCV standard	$\pm 3 \times$ the SD of the avg ICAL RT for each analyte	1. Re-calibrate and verify 2. Re-analyze samples back to last good CCV

^a The ICAL low standard must be above but near the CRQL. The low ICAL standard must have a signal to noise ratio \$5:1. If this requirement cannot be met, the laboratory must submit a MDL study as part of the data package.

^b ICAL and continuing CAL standards must contain all target analytes listed in Table 1B.

^c Report the retention time window for each analyte. Determine retention time windows as $\pm 3 \times$ the standard deviation of the average initial calibration retention time for each analyte.

Table 3. Summary of Internal Quality Control Procedures for VOCs by SW-846 Method 8260

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	Each 12-hour time period, minimum of one per SDG ^a	< CRQL for each compound	1. Investigate the source of contamination and document. 2. Reanalyze all samples processed with a blank that is out of control.
Matrix Spike and Matrix Spike Duplicate (MS/MSD)	One MS/MSD set per batch or SDG (1 MS/MSD set per 20 samples minimum)	<u>Water Sample</u> : 65-135% of expected value; #30% RPD between MS and MSD <u>Soil Sample</u> : 50-150% of expected value; #50% RPD between MS and MSD	1. Report in case narrative
Surrogate Spikes: ^b	Every sample, standard and method blank	<u>Water Sample</u> : 85-115% except for 1,2-dichloroethane (75-115%) of expected value <u>Soil Sample</u> : 70-125% of expected value	1. Reanalyze all samples with non-compliant surrogate recoveries
Laboratory Control Sample (LCS)	One per SDG	<u>Water Sample</u> : 70-130% of expected value <u>Soil Sample</u> : 65-135% of expected value	1. Investigate the source of problem and document. 2. Reanalyze all samples processed with a LCS that is out of control.

^a SDG - Sample Delivery Group - each case of field samples received; or each 20 field samples within a case; or each 14 calendar day period during which field samples in a case are received.

^b Toluene-d₈, BFB, 1,2-dichloroethane-d₄, and Dibromofluoromethane

Dilute and reanalyze samples which contain one or more target analytes at concentrations above the initial calibration range. Results for such reanalyses should fall within the mid-range of the calibration curve.

Report results and submit documentation for both analyses.

**VOLATILE ORGANIC COMPOUNDS (VOCs) in Air (Ambient Air/Soil Vapor/Stack Gas)
Samples Collected in Specially-Prepared Canisters and Analyzed by Gas
Chromatography/Mass Spectrometry (GC/MS)**

EPA Method TO-15 (January 1999)

Table 1A. Summary of Holding Times and Preservation for Volatile Organic Compounds (VOCs) in Air

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation
Volatile Organic Compounds (VOCs) in SUMMA® canisters ^b	<u>Technical</u> : 14 days from collection; <u>Contract</u> : 10 days from receipt at laboratory	Ambient temperature
VOCs in tedlar bags	<u>Technical</u> : 48 hours from collection; <u>Contract</u> : 36 hours from receipt at laboratory	Ambient temperature

^a Individual target compounds are listed in Table 1B.

^b The laboratory must provide the following equipment certified as clean: Cleaned and evacuated 6-liter SUMMA® canisters with the manufacturer's serial number, or a unique permanent identification number attached. For cleaning and certification of SUMMA® canisters, follow the requirements specified in Section 8.4 of EPA Method TO-15 (January 1999). Cleaned and preset ultra-low flow orifices for each ambient air sample preset by the laboratory at a flow rate of 3.2 mL/min ±10% and digital flow meters capable of accurate measurements in the 3.2 mL/min range.

Leak test all canisters prior to sample collection according to Section 8.4 of Method TO-15 (January 1999).

Data Calculations and Reporting Units:

Calculate and report the sample results as specified in Section 10.8.4 of EPA Method TO-15 (January 1999). All records of analyses, dilutions and calculations must be legible and sufficient to recalculate all sample concentrations and QC results.

Perform sample quantitation using the relative response factor (RRF) from the daily continuing calibration standard. Report results for all target analytes in concentration units of parts per billion by volume (ppbv). Report tentatively identified compounds (TICs) with a response of <10% of the nearest internal standard. TIC values should be estimated in ppbv based on the response of the corresponding internal standard.

For rounding results, adhere to the following rules:

- a) If the number following those to be retained is less than 5, round down;
- b) If the number following those to be retained is greater than 5, round up; or
- c) If the number following the last digit to be retained is equal to 5, round down if the digit is even, or round up if the digit is odd.

All records of analysis and calculations must be legible and sufficient to recalculate all sample concentrations and QC results. Include an example calculation in the data package.

Table 1B. Target Compound List, CAS Numbers, and Contract Required Quantitation Limits for VOCs by EPA Method TO-15

Analyte	CAS Number	MW	CRQL	CRQL	CRQL	MDL	MDL
			ppbv	ug/M3	ug/L	ppbv	ug/M3
Benzene	71-43-2	78.1	1.0	3.5	0.0035	0.2	0.7
Bromomethane	74-83-9	94.9	1.0	4.2	0.0042	0.2	0.8
Carbon Tetrachloride	56-23-5	153.8	1.0	6.9	0.0069	0.2	1.4
Chlorobenzene	108-90-7	112.6	1.0	5.0	0.0050	0.2	1.0
Chloroethane	75-00-3	64.5	1.0	2.9	0.0029	0.2	0.6
Chloroform	67-66-3	119.4	1.0	5.3	0.0053	0.2	1.1
Chloromethane	74-87-3	50.5	1.0	2.3	0.0023	0.2	0.5
1,1-Dichloroethane	75-34-3	99	1.0	4.4	0.0044	0.2	0.9
1,2-Dichloroethane	107-06-2	99	1.0	4.4	0.0044	0.2	0.9
1,1-Dichloroethene	75-35-4	96.9	1.0	4.3	0.0043	0.2	0.9
cis-1,2-Dichloroethene	156-59-2	96.9	1.0	4.3	0.0043	0.2	0.9
trans-1,2-Dichloroethene	156-60-5	96.9	1.0	4.3	0.0043	0.2	0.9
1,2-Dichloropropane	78-87-5	113	1.0	5.0	0.0050	0.2	1.0
cis-1,3-Dichloropropene	10061-01-5	111	1.0	5.0	0.0050	0.2	1.0
trans-1,3-Dichloropropene	10061-02-6	111	1.0	5.0	0.0050	0.2	1.0
Ethylbenzene	100-41-4	106.2	1.0	4.7	0.0047	0.2	0.9
Methylene Chloride	75-09-2	84.9	1.0	3.8	0.0038	0.2	0.8
Styrene	100-42-5	104.2	1.0	4.6	0.0046	0.2	0.9
1,1,2,2-Tetrachloroethane	79-34-5	167.9	1.0	7.5	0.0075	0.2	1.5
Tetrachloroethene	127-18-4	165.8	1.0	7.4	0.0074	0.2	1.5
Toluene	108-88-3	92.1	1.0	4.1	0.0041	0.2	0.8
1,1,1-Trichloroethane (TCA)	71-55-6	133.4	1.0	6.0	0.0060	0.2	1.2
1,1,2-Trichloroethane	79-00-5	133.4	1.0	6.0	0.0060	0.2	1.2
Trichloroethene (TCE)	79-01-6	131.4	1.0	5.9	0.0059	0.2	1.2
Vinyl Chloride	75-01-4	62.5	1.0	2.8	0.0028	0.2	0.6
p-Xylene & m-Xylene	106-42-3 & 108-38-3	106.2	2.0	9.5	0.0095	0.4	1.9
o-Xylene	95-47-6	106.2	1.0	4.7	0.0047	0.2	0.9

Table 2. Summary of Calibration Procedures for VOCs by EPA Method TO-15

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
GC/MS Tuning with 4-bromofluorobenzene (BFB)	Beginning of each 12 hour period during which standards and samples are analyzed	Ion abundance criteria in Table 3 of Method TO-15	1. Identify the problem. 2. MS tune criteria must be met before calibration
Initial Calibration (minimum blank + 5 points for each analyte) (ICAL) ^{a, b, c}	Initially; whenever required, due to failure of CCV	RRFs ≥ 0.05 for each analyte; RSD for RRFs $\leq 30\%$	1. Terminate analysis 2. Recalibrate and verify before sample analysis
Continuing Calibration Verification (CCV) (middle of the calibration range)	Following ICV, every 12-hour, and end of run	RRFs ≥ 0.05 for each analyte; %D between RRF of CCV and avg. RRFs from ICAL $\leq 30\%$	1. Recalibrate and verify 2. Reanalyze samples back to last good CCV
CRQL standard	Every 12 hour	65-135% of the expected value	1. Recalibrate and verify 2. Reanalyze samples back to last good CRQL standard
Internal Standards ^d	Every standard, sample, blank, and QC sample	IS area within $\pm 40\%$ of the IS area in the associated CCV	1. Investigate the system; 2. Re-analyze all samples analyzed during a system malfunction
Retention time evaluation	Each analysis	± 0.50 minute of the IS retention time in the associated CCV	1. Re-calibrate and verify 2. Re-analyze samples back to last good CCV

^a The ICAL low standard must be at concentrations equivalent to the CRQL.

^b ICAL and CCV standards must contain all target analytes listed in Table 1B.

^c Report the retention time (RT) window for each analyte. Determine RT windows as ± 3 x the standard deviation (SD) of the average initial calibration RT for each analyte.

^d Internal standards: Bromochloromethane, 1,4-Difluorobenzene, and Chlorobenzene-d5.

The standards must be traceable to known certified source. Humidify calibration standards when used.

Table 3. Summary of Internal Quality Control Procedures for VOCs by EPA Method TO-15

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	Each 12-hour time period, minimum of one per SDG ^a	< CRQL for each compound	1. Investigate the source of contamination and document. 2. Reanalyze all samples processed with a blank that is out of control.
Blank Spike Blank Spike Duplicate (BS/BSD)	One BS/BSD set per batch or SDG (1 MS/MSD set per 20 samples minimum)	65-135% of expected value; ≤35% RPD between BS and BSD	1. Report in case narrative
Surrogate Spikes ^b	Every sample, standard and method blank	80-120% of expected value	1. Reanalyze all samples with non-compliant surrogate recoveries
Laboratory Duplicates	One per SDG	RPD ≤20 between duplicate results ≥5 times CRQL; ±CRQL for duplicate results ≤5 times CRQL	1. Reanalyze all samples with non-compliant results

^a SDG - Sample Delivery Group - each case of field samples received; or each 20 field samples within a case; or each 14 calendar day period during which field samples in a case are received.

^b 1,2-dichloroethane-d₄, Toluene-d₈, and 4-Bromofluorobenzene. If other surrogates are used the laboratory must demonstrate that the surrogates do not interfere with any target analytes. The laboratory must also notify the Region in advance.

Reanalyze samples containing target analytes at concentrations greater than the initial calibration range. Analyze a smaller aliquot of sample from the SUMMA® canister. If after analyzing a smaller aliquot, the concentration is still greater than the initial calibration range, then dilute the sample and reanalyze according to procedures outlined in EPA Method TO-15. If sample dilution is necessary, the dilution must be adjusted so that the target analyte is quantitated at a level in the upper half of the calibration range. Report the results and submit documentation for the analysis of both the diluted and undiluted sample.

Both the primary ions and the secondary ions must be present in the spectra. The acceptance level for relative abundance of the appropriate ions in all standards, method blanks, QC samples, laboratory duplicates and field samples is determined to be ±20% of the expected abundance observed in the most recent continuing calibration standard. All ions greater than 15% in the standard spectrum must be present in the sample spectrum.

POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)

SW-846 Method 8310

Table 1A. Summary of Holding Times and Preservation for Carbamate and Urea Pesticides by High Performance Liquid Chromatography

Analytical Parameter ¹	Technical and Contract Holding Times	Preservation
Polynuclear Aromatic Hydrocarbons (PAHs)	<u>Technical for Extraction:</u> 7 days from collection; <u>Contract for Extraction:</u> 5 days from receipt at laboratory <u>Technical and Contract for Analysis:</u> 40 days from extraction	Cool to 4EC ±2EC; Store in TFE-fluorocarbon-sealed bottles away from the light
Polynuclear Aromatic Hydrocarbons (PAHs)	<u>Technical for Extraction:</u> 14 days from collection; <u>Contract for Extraction:</u> 10 days from receipt at laboratory <u>Technical and Contract for Analysis:</u> 40 days from extraction	Cool to 4EC ±2EC; Store away from the light

¹ Individual target compounds are listed in Table 1B.

Data Calculations and Reporting Units:

Calculate the sample results using calibration factors determined according to Sections 7.4.2 and 7.8.1 of SW-846 Method 8000A.

Report water sample results in concentration units of micrograms per liter (Fg/L). Report soil sample results on a dry-weight basis in micrograms per kilogram (Fg/kg).

For rounding results, adhere to the following rules:

- a) If the number following those to be retained is less than 5, round down;
- b) If the number following those to be retained is greater than 5, round up; or
- c) If the number following the last digit to be retained is equal to 5, round down if the digit is even, or round up if the digit is odd.

All records of analysis and calculations must be legible and sufficient to recalculate all sample concentrations and QC results. Include an example calculation in the data package.

TABLE 1B. Target Compound List, CAS Numbers, and Contract Required Quantiation Limits for SW-846 Method 8310

COMPOUND	CAS No.	CRQL Water µg/L	CRQL Soil µg/kg
Acenaphthene	83-32-9	2	1340
Acenaphthylene	208-96-8	2	1340
Anthracene	120-12-7	0.1	67
Benzo (a) anthracene	56-55-3	0.1	67
Benzo (a) pyrene	50-32-8	0.1	67
Benzo (b) fluoranthene	205-99-2	0.1	67
Benzo (g, h, i) perylene	191-24-2	0.1	67
Benzo (k) fluoranthene	207-08-9	0.1	67
Chrysene	218-01-9	0.1	67
Dibenzo (a, h) anthracene	53-70-3	0.1	67
Fluoranthene	206-44-0	0.1	67
Fluorene	86-73-7	2	1340
Indeno (1, 2, 3-cd) pyrene	193-39-5	0.1	67
Naphthalene	91-20-3	2	1340
Phenanthrene	85-01-8	0.1	67
Pyrene	129-00-0	0.1	67

Table 2. Summary of Calibration Procedures for Polynuclear Aromatic Hydrocarbons by SW-846 Method 8310

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration (minimum blank + 5 points for each analyte) (ICAL) ^{a, b, c}	Initially; whenever required, due to failure of CCV	RSD for CFs #20%	1. Terminate analysis 2. Re-calibrate and verify before sample analysis
Continuing Calibration Verification (CCV) at midpoint of ICAL	Beginning of each day, after every 10 samples, and end of run	%D between CF of CCV and avg CFs from ICAL #15%	1. Re-calibrate and verify 2. Re-analyze samples back to last compliant CCV
Retention time evaluation for CCV standards	Each analysis of CCV standards	± 3 x the SD of the avg ICAL RT for each analyte	1. Re-calibrate and verify 2. Re-analyze samples back to last compliant CCV

^a The ICAL low standard must be above but near the CRQL. The low ICAL standard must have a signal to noise ratio $\geq 5:1$. If this requirement cannot be met, the laboratory must submit a MDL study as part of the data package.

^b ICAL and continuing CAL standards must contain all target analytes listed in Table 1B.

^c Report the retention time window for each analyte. Determine retention time windows as ± 3 x the standard deviation of the average initial calibration retention time for each analyte.

Table 3. Summary of Internal Quality Control Procedures for Polynuclear Aromatic Hydrocarbons by SW-846 Method 8310

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	One per Batch or SDG ^a (1 per 20 samples minimum)	< CRQL for each compound	1. Investigate source of contamination and document 2. All samples processed with a method blank that is out of control must be re-extracted and re-analyzed
Surrogate ^b	Every standard, sample, and method blank at 10 times CRQL	65-125% of expected value	1. Re-analyze all samples with non-compliant surrogate recoveries
Matrix Spike and Matrix Spike Duplicate (MS/MSD) ^c	One MS/MSD set per batch or SDG (1 MS/MSD set per 20 samples minimum)	75-125% of expected value; #30 RPD between MS and MSD	1. Report in case narrative
QC Check Solution	One per Batch or SDG	See Table 3 of SW-846 Method 8310	1. Repeat preparation and analysis of QC check solution.
Cleanup Standard (midpoint concentration)	When column cleanup is used	>85% Recovery	1. Investigate problem, determine cause, and document. 2. Do not analyze samples until cleanup standard is compliant.

^a SDG - Sample Delivery Group - each case of field samples received; or each 20 field samples within a case; or each 14 calendar day period during which field samples in a case are received.

^b The compound decafluorobiphenyl is recommended.

^c MS/MSD spike should contain a minimum of three PAH compounds chosen from the compound list in Table 1B.

Dilute and re-analyze samples with one or more analytes at concentrations exceeding the range of the calibration curve. Results for such re-analyses should fall within the mid-range of the calibration curve. Report results and submit documentation for both analyses.

HEXAVALENT CHROMIUM in Soil and Water
 Colorimetric
 SW-846 Method 7196A *

HEXAVALENT CHROMIUM in Water
 Atomic Absorption, Chelation-Extraction
 EPA Method 218.4

Table 1. Summary of Contract Required Detection Limits, Holding Times, and Preservation for Hexavalent Chromium (Cr⁺⁶)

Analytical Parameter	Contract Required Detection Limit (CRDL)	Technical and Contract Holding Times ^a	Preservation
Hexavalent Chromium (Cr ⁺⁶) in Water Samples	20 µg/L ^b 10 µg/L ^c	Technical: 24 hours from collection; Contract: 12 hours from receipt at laboratory	Cool to 4°C ±2°C ^e
Cr ⁺⁶ in Soil Samples ^d	2 mg/kg	Contract: 12 hours from receipt at laboratory	Cool to 4°C ±2°C

- * If the colorimetric method is not suitable, EPA Method 218.4 may be used. If EPA Method 218.4 is designated for analysis, the diphenylcarbazide colorimetric procedure discussed in Section 2.3 of EPA Method 218.4 **may NOT** be used.
- ^a Laboratories bidding on this analysis must be located within a 3 hour drive from the site of sample collection.
- ^b 20 µg/L CRDL for analysis by SW-846 Method 7196A
- ^c 10 µg/L CRDL for analysis by EPA Method 218.4
- ^d Soil Samples: Follow EPA SW-846 Method 3060A (January 1995) for sample digestion.
- ^e Determine initial pH of water samples.

Data Calculations and Reporting Units:

Calculate the sample results from the standard curve. Calculate soil sample results using the equation provided in Section 7.10.1 of Method 3060A. Report water sample results in concentration units of micrograms per liter (µg/L). Report soil sample results in concentration units of milligrams per kilogram (mg/kg). Cr⁺⁶ concentrations that are less than 10 µg/L or 10 mg/kg to 1 significant figure, and Cr⁺⁶ concentrations that are greater than or equal to 10 µg/L or 10 mg/kg to 2 significant figures.

For rounding results, adhere to the following rules:

- a) If the number following those to be retained is less than 5, round down;
- b) If the number following those to be retained is greater than 5, round up;
- or
- c) If the number following the last digit to be retained is equal to 5, round down if the digit is even, or round up if the digit is odd.

All records of analysis and calculations must be legible and sufficient to recalculate all sample concentrations and QC results. Include an example calculation in the data package.

Table 2. Summary of Calibration Procedures for Hexavalent Chromium

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration (minimum blank + 5 points for each analyte) (ICAL) ^{a, b}	Initially; whenever required, due to failure of ICV or CCV	r \geq 0.995	1. Terminate analysis 2. Recalibrate and verify before sample analysis
Initial Calibration Verification (ICV) at midpoint of ICAL (Separate source from ICAL standards)	Daily, prior to sample analysis; immediately following ICAL	$\pm 10\%$ from expected concentration	1. Identify and document problem 2. Reprep ICV and reanalyze all associated samples 3. Recalibrate and reanalyze reprepared ICV and all associated samples
Continuing Calibration Verification (CCV)	Following ICV and before sample analysis; after every 10 samples and end of run	$\pm 10\%$ from expected concentration	1. Recalibrate and verify 2. Reanalyze samples back to last good CCV
Calibration Blank Verification (ICB, CCB)	After ICV and every CCV	< CRDL	1. Terminate analysis 2. Identify and document the problem 3. Recalibrate, verify and reanalyze all associated samples with results less than 10 times the level of contamination in the blank.
CRDL Verification Standard	After initial CCV/CCB	$\pm 20\%$ from expected concentration	1. Reprep and reanalyze standard 2. Recalibrate and verify

^a The ICAL standards for SW-846 Method 7196A must include standard concentrations at the CRDL (20 $\mu\text{g/L}$) through 500 $\mu\text{g/L}$.

The ICAL standards for EPA Method 218.4 must include standard concentrations at the CRDL (10 $\mu\text{g/L}$) through 250 $\mu\text{g/L}$.

^b A calibration curve must be prepared with each set of samples.

Table 3. Summary of Internal Quality Control Procedures for Hexavalent Chromium

QC Element	Frequency	Acceptance Criteria	Corrective Action
Laboratory Method Blank (MB)	One per Batch or SDG ^a (1 per 20 samples minimum)	< CRDL	1. If lowest sample concentration is more than 10X the blank conc., no action 2. If samples are non-detected, no action 3. If detected sample concentrations are less than 10X blank conc., all associated samples must be prepared again with another method blank and reanalyzed
Duplicate Sample (DUP)	One per batch or SDG (1 per 20 samples minimum)	RPD <20% for samples >5X CRDL; ± CRDL for samples <5X CRDL	1. Flag associated data with an "*"
Matrix Spike (MS)	One per batch or SDG (1 per 20 samples minimum)	± 25% from expected value	1. Flag associated data with an "N"
Laboratory Control Sample (LCS)	One per batch or SDG (1 per 20 samples minimum)	± 20% from expected concentration	1. Terminate analysis 2. Identify and document the problem 3. Reanalyze all associated samples

^a SDG - Sample Delivery Group - each case of field samples received; or each 20 field samples within a case; or each 14 calendar day period during which field samples in a case are received.

Dilute and reanalyze samples with concentrations exceeding the range of the calibration curve. Results for such reanalyses should fall within the mid-range of the calibration curve. Report results and submit documentation for both analyses.

PERCHLORATE in WATER by ION CHROMATOGRAPHY
 Modified ^a EPA Method 300.0 (Revision 2.1, August 1993)

Table 1. Summary of Contract Required Detection Limits, Holding Times, and Preservation for Perchlorate

Analytical Parameter	Contract Required Detection Limit (CRDL)	Technical and Contract Holding Times	Preservation
Perchlorate	5.0 µg/L	Technical: 28 days from collection; Contract: 21 days from receipt at laboratory	Cool to 4°C ±2°C

^a EPA Method 300.0 modified for the analysis of perchlorate in water as described in the California Department of Health Services (DHS) method (Sanitation & Radiation Laboratories Branch; Determination of Perchlorate by Ion Chromatography, Rev. No. 0, June 3, 1997).

Data Calculations and Reporting Units:

Calculate the sample results according to Section 12 of EPA Method 300.0 (Revision 2.1, August 1993) or Section 12 of the California DHS method. Report sample results in the concentration unit of micrograms per liter (µg/L). Report perchlorate concentrations which are ≥ 10 µg/L to three significant figures and perchlorate concentrations which are < 10 µg/L to two significant figures.

For rounding results, adhere to the following rules:

- a) If the number following those to be retained is less than 5, round down;
- b) If the number following those to be retained is greater than 5, round up; or
- c) If the number following the last digit to be retained is equal to 5, round down if the digit is even, or round up if the digit is odd.

All records of analysis and calculations must be legible and sufficient to recalculate all sample concentrations and QC results. Include an example calculations in the data package.

Table 2. Summary of Calibration Procedures for Perchlorate by Modified EPA Method 300.0

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration (minimum blank + 5 points for perchlorate)(ICAL) ^{a, b}	Initially; monthly; or whenever required due to failure of IPC	r \geq 0.995	1. Terminate anal 2. Recalibrate an sample analysis
Instrument Performance Check (IPC) ^c (Separate source from ICAL standards)	Following the calibration and prior to sample analysis; after every 10 samples; and end of run	\pm 10% from expected concentration	1. Recalibrate an 2. Reanalyze sampl good IPC
Retention time evaluation for IPC standard	Each analysis of IPC standard	\pm 10% from expected retention time	1. Recalibrate an 2. Reanalyze sampl good IPC
Calibration Blank Verification (ICB, CCB)	After ICAL; every IPC; and end of the analytical sequence	< CRDL	1. Terminate anal 2. Identify and c 3. Recalibrate, v all associated sa
CRDL Verification Standard	After initial IPC/CCB	\pm 20% from expected concentration	1. Reprep and rea 2. Recalibrate an

^a The low level standard should be at a concentration equal to the contract required detection limit (CRDL).

^b Report the retention time window for each analyte. Determine retention time windows as \pm 10% of the mean retention time for each analyte in the calibration standards.

^c The IPC standard solution should contain perchlorate at a concentration different from the concentration of perchlorate in the calibration standards.

Table 3. Summary of Internal Quality Control Procedures for Perchlorate by Modified EPA Method 300.0

QC Element	Frequency	Acceptance Criteria	Corrective Action
Laboratory Reagent Blank (LRB)	One per Batch or SDG ^a (1 per 20 samples minimum)	< CRDL	1. If lowest sample c than 10X the blank co 2. If samples are non 3. If detected sample less than 10X blank c samples must be prepa another method blank
Duplicate Sample (DUP)	One per batch or SDG (1 per 20 samples minimum)	RPD <20% for samples >5X CRDL; ± CRDL for samples <5X CRDL	1. Flag associated da
Laboratory Fortified Matrix (LFM) ^b	One per batch or SDG (1 per 20 samples minimum)	± 25% from expected value	1. Flag associated da
Laboratory Fortified Blank (LFB)	One per batch or SDG (1 per 20 samples minimum)	± 10% from expected concentration	1. Terminate analysis 2. Identify and docum 3. Reanalyze all asso

^a SDG - Sample Delivery Group - each case of field samples received; or each 20 field samples within a case; or each 14 calendar day period during which field samples in a case are received.

^b If the LFM sample exceeds the calibration range, the sample must be diluted appropriately, re-spiked, and reanalyzed.

Dilute and reanalyze samples with concentrations exceeding the range of the calibration curve. Results for such reanalyses should fall within the mid-range of the calibration curve. Report results and submit documentation for both analyses.

Perform confirmatory techniques, such as sample dilution and spiking, when the identification of a peak in the chromatogram is questionable. Spike the sample with an appropriate amount of the relevant standard and reanalyze.

Analyze a laboratory blank after the analysis of an unusually concentrated sample to check for contamination by carry-over. Any sample with perchlorate present at a concentration 2× the calibration range is considered an unusually concentrated sample.

TOTAL PETROLEUM HYDROCARBONS (TPH) as Gasoline and Diesel

SW-846 Method 8015B (Revision 2, December 1996)

Table 1A. Summary of Contract Required Quantitation Limits, Holding Times, and Preservation for Total Petroleum Hydrocarbons (TPH) as Gasoline and Diesel

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation
Total Petroleum Hydrocarbons (TPH) as Gasoline in Water Samples	<u>Technical</u> : 7 days from collection; <u>Contract</u> : 5 days from receipt at laboratory	Cool to 4EC ±2EC
TPH as Gasoline in Water Samples	<u>Technical</u> : 14 days from collection; <u>Contract</u> : 10 days from receipt at laboratory	HCl or H ₂ SO ₄ to pH<2; Cool to 4EC ±2EC
TPH as Gasoline in Soil Samples	<u>Technical</u> : 48 hours <u>Contract</u> : 48 hours	Cool to 4EC ±2EC; sealed zero headspace containers; freezing can extend the holding time ^{b,c}
TPH as Gasoline in Soil Samples	<u>Technical</u> : 14 days from collection; <u>Contract</u> : 10 days from receipt at laboratory	Preserved samples: in methanol ^d or sodium bisulfate ^e
TPH as Diesel in Water Samples	<u>Technical to Extraction</u> : 14 days from collection; <u>Contract to Extraction</u> : 10 days from receipt at laboratory <u>Technical and Contract to Analysis</u> : 40 days from extraction	Cool to 4EC ±2EC; HCl or H ₂ SO ₄ to pH<2 ^f
TPH as Diesel in Soil Samples	<u>Technical to Extraction</u> : 14 days from collection; <u>Contract to Extraction</u> : 10 days from receipt at laboratory <u>Technical and Contract to Analysis</u> : 40 days from extraction	Cool to 4EC ±2EC

^a Individual target compounds are listed in Table 1B.

^b Freezing the sample can extend the holding time; however, 48 hours unfrozen holding time will be considered cumulative.

^c Use Method 5021 for headspace analysis.

^d Use Method 5030 for purge and trap.

^e Use Method 5035 for purge and trap.

^f Diesel analysis does not require acidification; however, acidified samples can be analyzed for diesel.

Data Calculations and Reporting Units:

Calculate the sample results using calibration factors determined according to Sections 7.7.2 of Method 8015B and 7.4.2 and 7.8.1 of SW-846 Method 8000A.

Report water sample results in concentration units of milligrams per liter (mg/L). Report soil sample results on a dry-weight basis in milligrams per kilogram (mg/kg).

For rounding results, adhere to the following rules:

- a) If the number following those to be retained is less than 5, round down;
- b) If the number following those to be retained is greater than 5, round up; or
- c) If the number following the last digit to be retained is equal to 5, round down if the digit is even, or round up if the digit is odd.

All records of analysis and calculations must be legible and sufficient to recalculate all sample concentrations and QC results. Include an example calculation in the data package.

TABLE 1B. Target Compound List and Contract Required Detection Limits (CRQL) for SW-846 Method 8015B

COMPOUND	CRQL Water mg/L	CRQL Soil mg/kg
Gasoline - Purge and Trap	0.5	10
Gasoline - Headspace	5.0	5
Diesel	0.5	10

Table 2. Summary of Calibration Procedures for Total Petroleum Hydrocarbons (TPH) as Gasoline and Diesel by SW-846 Method 8015B

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration (minimum blank + 5 points for each analyte) (ICAL) ^{a, b, c}	Initially; whenever required, due to failure of CCV	RSD for CFs #20%; or, if using a linear calibration curve, a correlation coefficient (r) of ≥ 0.99 for each compound	1. Terminate analysis 2. Re-calibrate and verify before sample analysis
Continuing Calibration Verification (CCV) at midpoint of ICAL	Beginning of each 12 hour time period, after every 10 samples and end of run	%D between calculated amount and nominal amount within $\pm 25\%$	1. Re-calibrate and verify 2. Re-analyze samples back to last good CCV
Retention time evaluation CCV standards	Each analysis of CCV standards	$\pm 3 \times$ the SD of the avg ICAL RT for surrogate, See footnote ^c for GRO and DRO	1. Re-calibrate and verify 2. Re-analyze samples back to last good IPC

^a The ICAL low standard must be above but near the CRQL. The low ICAL standard must have a signal to noise ratio $\geq 5:1$. If this requirement cannot be met, the laboratory must submit a MDL study as part of the data package.

^b Gasoline Range Organics (GRO): C₆-C₁₀; Diesel Range Organics (DRO): C₁₀-C₂₈

^c Establish and report retention time (RT) windows for GRO and DRO as described in Section 7.4 of Method 8015B and 7.6 of Method 8000B. Calculate RT windows for GRO and DRO based on the lower limit of the RT window for the first eluting component and the upper limit of the RT window for the last eluting component. Determine RT windows for surrogate compounds as $\pm 3 \times$ the standard deviation (SD) of the average ICAL RT for each analyte.

Table 3. Summary of Internal Quality Control Procedures for Total Petroleum Hydrocarbons (TPH) as Gasoline and Diesel by SW-846 Method 8015B

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	<u>Gasoline</u> : One per each 12 hour time period and after unusually concentrated samples <u>Diesel</u> : One per Batch or SDG ^a (1 per 20 samples minimum) and for each instrument used	< CRQL for each compound	1. Investigate source of contamination and document corrective action measures 2. Re-extract and re-analyze all samples processed with a method blank that is out-of-control
Surrogate Spike ^b	Every sample and MB at midpoint of calibration range	<u>Water Samples</u> : 75-125% of expected value <u>Soil Samples</u> : 60-125% of expected value	1. Re-analyze all samples with non-compliant surrogate recoveries
Matrix Spike and Matrix Spike Duplicate (MS/MSD)	One MS/MSD set per batch or SDG (1 MS/MSD set per 20 samples minimum)	65-135% of expected value; #30 RPD between MS and MSD	1. Report in case narrative
Laboratory Control Sample (LCS)	<u>Gasoline</u> : one each 12-hour period; <u>Diesel</u> : one per Batch or SDG	80-120% of expected value	1. Re-extract and re-analyze all samples processed with out-of-control LCS

^a SDG - Sample Delivery Group - each case of field samples received; or each 20 field samples within a case; or each 14 calendar day period during which field samples in a case are received.

^b Surrogates for GRO: 4-bromofluorobenzene and 1,1,1-trifluorotoluene;
Surrogate for DRO: hexacosane or ortho-terphenyl

Dilute and reanalyze samples with one or more analytes at concentrations exceeding the range of the calibration curve. Results for such reanalyses should fall within the mid-range of the calibration curve. Report results and submit documentation for both analyses.

ATTACHMENT 2

SAMPLE FIELD FORMS



Date(s) Drilled	Logged By	Reviewed By
Drilling Method	Drill Bit Size/Type	Total Depth of Borehole
Drill Rig Type	Drilling Contractor	Approximate Surface Elevation
Sampling Method	Depth to Groundwater	
Borehole Backfill	Comments	

Elevation, feet Depth, feet	SAMPLES			Graphic Log	Unified Soil Classification	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
	Type	Number	Blows per 6 inches							
0										
2										
4										
6										
8										
10										
12										
14										
16										
18										
20										
22										
24										



Elevation, feet	Depth, feet	SAMPLES			Unified Soil Classification	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows per 6 inches						
24										
26										
28										
30										
32										
34										
36										
38										
40										
42										
44										
46										
48										
50										
52										

Report: ECO_2S; File: CFORANGE.GPJ; 9/27/2005



Elevation, feet	Depth, feet	SAMPLES			Unified Soil Classification	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows per 6 inches						
52										
54										
56										
58										
60										
62										
64										
66										
68										
70										
72										
74										
76										
78										
80										



Elevation, feet	Depth, feet	SAMPLES			Unified Soil Classification	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows per 6 inches						
80										
82										
84										
86										
88										
90										
92										
94										
96										
98										
100										
102										
104										
106										
108										

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Elevation, feet	Depth, feet	SAMPLES			MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows per 6 inches					
110									
112									
114									
116									
118									
120									
122									
124									
126									
128									
130									
132									
134									
136									

Report: ECO_2S; File: CFORANGE.GPJ; 9/27/2005



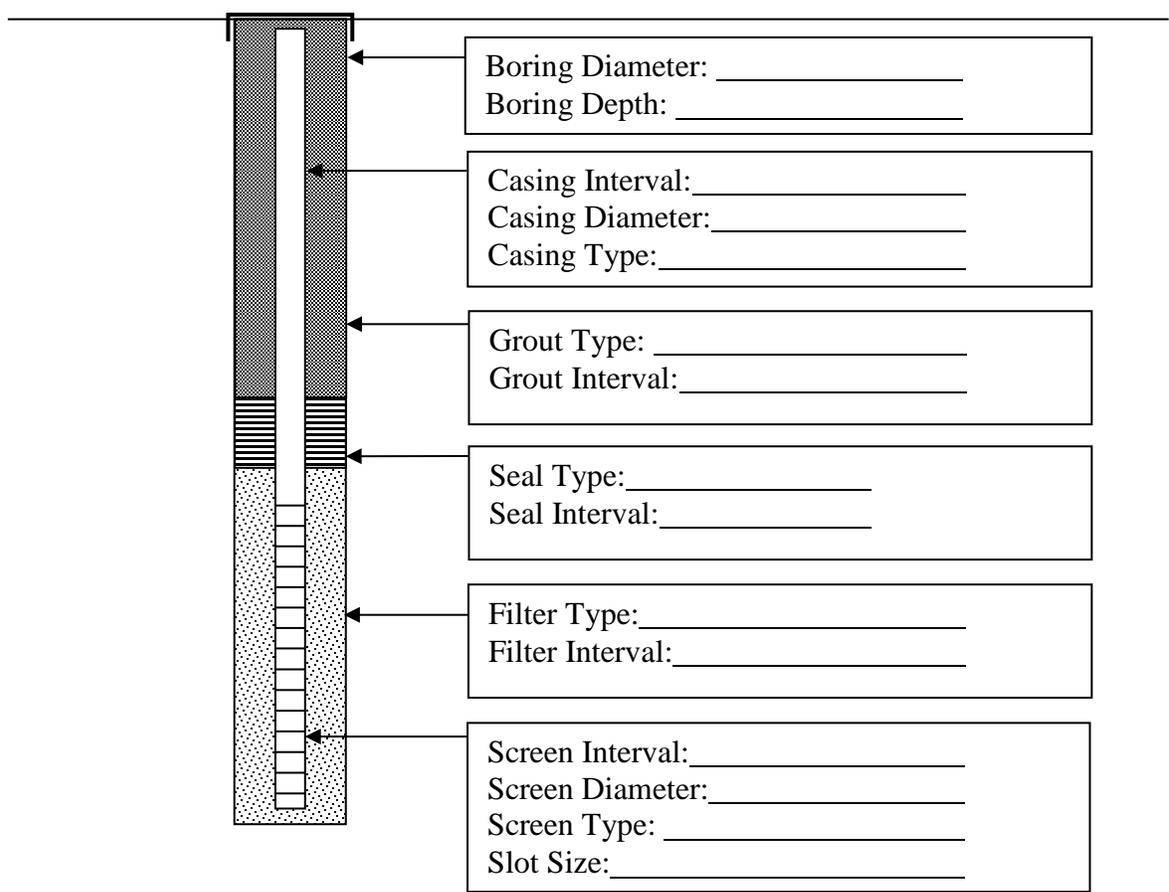
Elevation, feet	Depth, feet	SAMPLES			Unified Soil Classification	MATERIAL DESCRIPTION	Headspace PID, ppm	Background PID, ppm	Drilling Progress, 24-hour clock	REMARKS
		Type	Number	Blows per 6 inches						
136										
138										
140										
142										
144										
146										
148										
150										
152										
154										
156										
158										
160										
162										
164										

Report: ECO_2S; File: CFORANGE.GPJ; 9/27/2005

Project: _____	MONITORING WELL CONSTRUCTION DETAILS FOR _____
Project Location: _____	
Project Number: _____	
Well Location: _____	

Method of Installation: _____

Notes:



ATTACHMENT 3

SECTION 01 4524 – ENVIRONMENTAL
IMPORT/EXPORT MATERIALS TESTING

NOTES TO OAR: This Section must be included in Division 01 whenever any earthwork, including related sections 31 2200, 31 2313, 31 2316, 31 2319, 31 2323 and 32 1100, is included in the scope of work of the project. All imported and exported fill materials are required to be tested; such testing shall be conducted at site of origin. In the event that site is balanced and does not require either export or import, then requirements of this section shall not apply; however, this section is still required to be included in bidding documents. Clean gravel from a pre-evaluated commercial source may also be eligible for a variance to this section (01 4524) with prior written approval from LAUSD-OEHS. While OWNER Consultant (soils engineer) provides testing for compaction, grading, etc., CONTRACTOR retains the services of a licensed environmental professional and an independent State of California certified laboratory to sample and test for the requirements of this section. A request for variance to the Specification must be submitted in writing to OEHS two weeks in advance of need and be accompanied by a memo explaining the rationale for the variance and a project funding code to cover OEHS review. **DELETE THIS TEXT BOX PRIOR TO ISSUING THIS SPECIFICATION.**

SECTION 01 4524

ENVIRONMENTAL IMPORT/EXPORT MATERIALS TESTING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section specifies the requirements for the sampling, testing, transportation and certification of imported fill materials or exported fill materials from school sites.
- B. This Section defines:
 - 1. CONTRACTOR requirements for use of existing, imported or generated materials on school sites.
 - 2. CONTRACTOR requirements for stockpiling materials for use on schools sites.
 - 3. CONTRACTOR requirements for exporting materials from a school site including transportation.
 - 4. Testing requirements for all materials imported, exported, stockpiled or generated for use on a school site.
 - 5. CONTRACTOR testing and reporting requirements.
 - 6. CONTRACTOR submittal requirements.
- C. Related Requirements:
 - 1. Division 1: General Requirements.
 - 2. Section 01 1100: Summary of Work.
 - 3. Section 01 3113: Project Coordination.
 - 4. Section 01 3213: Construction Schedule.
 - 5. Section 01 3300: Submittal Procedures.
 - 6. Section 01 7700: Contract Closeout.
 - 7. Section 31 2200: Grading.
 - 8. Section 31 2313: Excavation and Fill.

9. Section 31 2316: Excavation and Fill. (Pavement)
10. Section 31 2319: Excavation and Fill (Structures).
11. Section 31 2323: Excavation and Fill (Utilities).
12. Section 32 1100: Base Course.

1.02 OBJECTIVES

- A. Ensure that fill materials imported to school sites are safe for students, staff and visitors.
- B. Ensure that materials exported from school sites for use at school and non-school sites or offsite disposal/recycling are adequately characterized for lawful disposition.
- C. Ensure that representative data be collected so that analytical determinations can be made in regard to the first two objectives.
- D. Require CONTRACTOR to contract with and pay for the services of a licensed environmental professional (licensed State of California Professional Engineer [PE Civil], Professional Geologist [PG] or Registered Environmental Assessor II [REA II]) familiar with environmental site assessment and waste classification and disposal requirements to perform such services.
- E. Require CONTRACTOR to contract with and pay for an independent, approved California Department of Health Services certified testing laboratory to perform testing of imported, exported and site generated fill materials.
- F. Require CONTRACTOR to pay all fees required by authorities having jurisdiction over area.
- G. Require CONTRACTOR to post bonds required by authorities having jurisdiction over area.

1.03 DEFINITIONS

- A. Definitions not furnished in text of this section:
 1. CEQA: California Environmental Quality Act.
 2. EIR: Environmental Impact Report.
 3. Environmental Compliance Manager: Individual at LAUSD-OEHS, who ensures LAUSD compliance with all pertinent regulations, ordinances, codes, and/or policies.
 4. LAUSD-OEHS: Los Angeles Unified School District – Office of Environmental Health and Safety.
 5. Licensed Environmental Professional: Person licensed in the State of California and with sufficient knowledge and experience to competently perform environmentally-related work, including (but necessarily limited to) environmental site investigations, remedial projects, and other tasks involving the collection of soil, soil vapor, and groundwater samples; the selection of analytical methods for said samples; the interpretation of analytical data; the preparation of work plans, reports, and other relevant documents; and the supervision and/or oversight of remedial contractors. For the purposes of this Section, a licensed environmental professional shall include a Professional

Geologist or “P.G.,” a Professional Engineer or “P.E.,” or a Registered Environmental Assessor II or “REA II.”

6. ug/kg: micrograms/kilogram.
7. mg/kg: milligrams/kilogram.
8. NA: Not Applicable.
9. RCRA: federal Resource Conservation and Recovery Act.
10. Soil Certification/Sample Data Report: Report documenting location, volume, sampling procedures, analytical methods, chemical test results, and recommendations for either disposing or re-using stockpiled soil excavated from LAUSD sites or proposed for import to same. Preparation of report is to follow the procedures given in Part 1.04 of this section.
11. Soil Sampling Plan (SSP): As described in 1.04 of this section, a document providing sufficient guidance with which to adequately characterize soil proposed for import to, or export from, a LAUSD school Site. Guidance in this document is to be in accordance with the procedures described in Part 1.04 of this section.
12. STLC: Soluble Threshold Limit Concentrations as defined in Tables II and III, Chapter 11, Article 3, § 66261.24-1 of Title 22 of the California Code of Regulations (CCR).
13. TCLP: Toxicity Characteristic Leaching Procedure, test method 1311, documented in Title 40, Part 261, Subpart C, § 261.24 of the Code of Federal Regulations (CFR).
14. TTLC: Total Threshold Limit Concentrations, as defined in Tables II and III, Chapter 11, Article 3, § 66261.24-1 of Title 22 of the CCR.
15. USEPA or EPA: United States Environmental Protection Agency.
16. WET: Waste Extraction Test, as defined in Appendix II-1, Chapter 11 of Title 22 of the CCR.

1.04 SUBMITTALS

- A. CONTRACTOR shall submit to OWNER’S Authorized Representative (OAR) for transmittal to the LAUSD-OEHS:
 1. A qualifications statement for CONTRACTOR’s independent California certified testing laboratory and required licensed environmental professional (California Professional Engineer [PE civil], Professional Geologist [PG] or Registered Environmental Assessor II [REA II]) prior to the start of Work. CONTRACTOR’s licensed environmental professional must possess recent demonstrated environmental experience in soil sampling and waste classification.
 2. A draft import/export Soil Sampling Plan (SSP) prepared by CONTRACTOR’s licensed environmental professional for review and concurrence by LAUSD-OEHS. The objective of the SSP is to obtain representative sample data. The Draft SSP or equivalent document acceptable to LAUSD-OEHS must be

submitted at least 72 hours prior to all proposed import/export sampling activities. The consultant's proposal (with or without fees) is acceptable in lieu of a SSP.

- a. At a minimum, the Draft SSP shall include a site map which shows the location of the proposed import/export and the location and number of the proposed stockpile samples. The draft SSP shall also contain information pertaining to the total volume of the stockpile proposed for sampling and the rationale in support of the proposed sampling approach. Existing environmental documentation specific to the import/export site shall be utilized by the CONTRACTOR's environmental professional to support the proposed sampling approach and analytical method suite. For new school sites, this information would include a Department of Toxic Substances Control (DTSC) approved site investigation report, e.g., Preliminary Environmental Assessment (PEA). It is the responsibility of the CONTRACTOR to request this information in advance from the OAR if they do not already have access to a copy at the jobsite.
- b. Lacking this information or rationale, samples shall be analyzed for all analytical methods described in Article 3.02. Guidance for the minimum number of samples per stockpile volume is provided in Table 1 (supplemental samples may be required by LAUSD-OEHS if pothole sampling is utilized.). In addition, the draft SSP shall contain all necessary contact information for the import/export site and a proposed schedule for the sampling activities.
- c. To expedite the review process, the Draft SSP shall be submitted electronically to LAUSD-OEHS in MS Word format. LAUSD-OEHS will either approve the document or request revisions be made. This process shall continue until LAUSD-OEHS approves the draft SSP.
- d. Upon revision of the draft SSP by the CONTRACTOR's licensed environmental professional and acceptance by the LAUSD-OEHS, four copies of the final SSP will be provided to the OAR for distribution to LAUSD-OEHS and the project file.

3. Draft Soil Certification/Sample Data Report:

- a. A draft Soil Certification/Sample Data Report prepared by CONTRACTOR's licensed environmental professional for review and concurrence. At a minimum the draft Soil Certification/Sample Data Report shall contain:
 - 1) A site map showing the location of the stockpile(s) and stockpile sample locations.
 - 2) A detailed discussion and evaluation of the laboratory results.
 - 3) A summary of findings and recommendations that provide a determination on the waste classification of the subject materials, based on the representative sample results.
 - 4) Recommendations for additional steps, if any.
 - 5) Chain-of-custody forms and all laboratory data with respective QA/QC sheets.

- b. Contractor must allow LAUSD-OEHS a minimum of 72 hours to review the draft Soil Certification/Sample Data Report. To expedite the review process, the draft Soil Certification/Sample Data Report shall be submitted electronically to LAUSD in MS Word format. LAUSD-OEHS will either approve the document or request that revisions be made. This shall continue until LAUSD-OEHS approves the draft Soil Certification/Sampling Data Report.
- c. Upon revision of the draft Soil Certification/Sample Data Report by the CONTRACTOR'S licensed environmental professional and acceptance by LAUSD-OEHS, three copies of the final report, signed and stamped by the licensed professional, shall be submitted to the OAR for distribution to LAUSD-OEHS, the project file, and to the LAUSD-OEHS Environmental Compliance Manager. If the soil is to be exported to or imported from, a LAUSD school site (if it satisfied the requirements of Part 3, article 3.02 paragraphs F and G of this Section) then a PG or PE civil must sign and stamp the final report, if the school site (whether exporting or importing the soil) is still under oversight from the DTSC or if that agency has yet to issue a No Further Action (NFA) determination for the site.
 - 1) The Environmental Compliance Manager shall confirm that the proposed waste classification for the proposed import/export material is appropriate. For materials designated unacceptable for export except to a licensed facility, or for those materials sent electively by CONTRACTOR to a licensed facility, the Environmental Compliance Manager shall provide information on the necessary waste manifest documentation.
- 4. Written documentation (e-mail is acceptable) verifying that all export soil data for any soils exported for use at a non-school site, including the final Certification Report prepared by CONTRACTOR's licensed environmental professional, were provided to the proposed recipient prior to export and delivery.
- 5. Prior to import/export, written documentation in the form of a letter sent by the transporter to the CONTRACTOR (who must in turn submit it to LAUSD-OEHS) to verify the following:
 - a. The hauling contract for each load imported to, or exported from, the school site specifies "clean" truck and/or trailer beds, in which the material will be carried;
 - b. The actual truck and/or trailer beds utilized for import/export activities will be clear of visible contamination or deleterious materials;
 - c. The trucks will go directly from the source location to the recipient location with no detours or stops at other locations; and
 - d. Short loads will not be augmented by other materials that were not tested as part of the final SSP.
 - e. All import/export transportation activities shall be conducted in accordance with all applicable Local, State and Federal rules and regulations.
- 6. Certification, in the form of haul tickets or completed waste manifests, documenting the volume and recipient of all import/export materials and

activities. This documentation shall be coordinated through the LAUSD-OEHS Environmental Compliance Manager.

- a. For approved import/export to new school sites, unregulated facilities (landfill) or non-school sites, haul tickets may be utilized, but shall contain the following minimum information:
 - 1) Date(s) of haul activity.
 - 2) Address of source site.
 - 3) Address of recipient.
 - 4) Load volume.
 - 5) Time of departure from source.
 - 6) Time of arrival at recipient site.
 - 7) Signature of recipient or recipient's agent.
 - 8) It is the CONTRACTOR's responsibility to confirm that no other trips or short-load augmentation occurred and submit documentation to the OAR and LAUSD-OEHS.
- b. For export to regulated facilities (landfills, recyclers, etc.), the appropriate waste manifest(s) as determined by the LAUSD Environmental Compliance Manager in 1.04.A.3 must be completed and a copy of the executed manifest, signed by the receiving site, must be provided to the OAR. The waste manifest copy, signed by the receiving facility and based on the manifest address, will be sent directly to LAUSD-OEHS and the LAUSD Environmental Compliance Manager.

1.05 APPROVALS

- A. NO import or export of earth or geotechnical grading or filling materials can occur at LAUSD sites without PRIOR approval by LAUSD-OEHS.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Imported:
 1. Soils: Soils proposed for import shall be tested pursuant to the requirements of this Section (01 4524), unless a variance has been requested by CONTRACTOR and approved by LAUSD-OEHS prior to the import of the subject materials.
 2. Gravels: Clean gravel, consisting of native rock from a commercial source, may be granted a variance from the testing requirements of this Section provided a request for variance is submitted by CONTRACTOR for review and approval at least 72 hours prior to import. CONTRACTOR shall provide written documentation, which identifies the source, volume and proposed transport date(s) of the material for review.

- a. Furthermore, a letter signed and stamped by either a PE (civil) or PG and originating from the commercial source must state the following:
 - 1) The quarry does not mine ultramafic (i.e. natural asbestos containing) materials.
 - 2) The gravel is produced from virgin aggregate materials and does not contain any contaminated or reclaimed or recycled materials.
 - b. Additionally, a letter from the material transporter and signed by the same must state the following:
 - 1) Haul truck and/or trailer beds transferring the material are clear of visible contamination and deleterious materials.
 - 2) Haul trucks will go directly from the quarry source to the site with no trips or augmentation of short loads with other materials.
 - c. The request for variance requires approval by LAUSD-OEHS prior to CONTRACTOR importing the materials.
3. Sands: Clean sand from a commercial source may be granted a variance from the testing requirements of this Section provided a request for variance is submitted by CONTRACTOR for review and approval at least 72 hours prior to import. CONTRACTOR shall provide written documentation, which identifies the source, volume and proposed transport date(s) of the material for review.
- a. Furthermore, a letter signed and stamped by either a PE (civil) or PG and originating from the commercial source must state the following:
 - 1) The source does not mine ultramafic (i.e. natural asbestos containing) materials.
 - 2) The sand is produced from virgin materials and does not contain any contaminated or reclaimed or recycled materials.
 - b. Additionally, a letter from the material transporter and signed by the same must state the following:
 - 1) Haul truck and/or trailer beds transferring the material are clear of visible contamination or deleterious materials.
 - 2) Haul trucks will go directly from the commercial source to the site with no trips or augmentation of short loads with other materials.
 - c. The request for variance requires approval by LAUSD-OEHS prior to CONTRACTOR importing the materials.
4. Miscellaneous Material: No miscellaneous material containing crushed concrete, asphalt, construction debris, or other potential deleterious materials may be utilized or imported to a LAUSD project site for use as fill or grading material.

B. Exported/Site Generated:

1. Soils: Soils proposed for export shall be tested pursuant to the requirements of the subject section, unless a variance has been requested by CONTRACTOR and approved by LAUSD-OEHS prior to the import of the subject materials. (Note: Once soils or other materials for export have been tested, they can not be disturbed or reused for any purpose without prior approval by LAUSD-OEHS.)
2. Gravels/Sands: Gravels, sands, or other natural rock materials shall not be exported from a LAUSD project site without prior testing by CONTRACTOR pursuant to this Section (01 4524) and/or approval by LAUSD-OEHS. An exception to this provision is gravel adhering to concrete or asphalt pavement. In this instance and in consultation with OEHS, which shall make the final decision, CONTRACTOR may dispose of said materials and construction debris without sampling and analytical testing required under this Section.
3. Miscellaneous Material. No miscellaneous material or other similar materials shall be exported from a LAUSD project site without prior testing by CONTRACTOR pursuant to this Section (01 4524) and/or approval by LAUSD-OEHS. No crushed miscellaneous material containing concrete, asphalt, construction debris, or other potential deleterious materials that is generated onsite may be used as fill or grading material of any sort at a LAUSD project site. Crushed asphalt shall be segregated and stockpiled separately. The onsite use of crushing equipment is not permitted.

PART 3 - EXECUTION

3.01 GRADING/EXCAVATION

- A. If the CONTRACTOR encounters an area(s) with discolored, stained, and/or odorous soils or any other evidence of contamination during excavation/grading work, CONTRACTOR must immediately notify the OAR, cease work in the aforementioned area(s), and secure the area(s) with fencing, tape, stakes or other suitable means to prevent entry by personnel or equipment. In turn, the OAR must immediately notify LAUSD-OEHS, which will initiate a construction response to address the contamination, in accordance with pertinent regulatory requirements.

3.02 SAMPLING AND TESTING

- A. CONTRACTOR shall contract with, and pay for, the services of a licensed environmental professional (licensed State of California Professional Engineer [PE Civil], Professional Geologist [PG] or Registered Environmental Assessor II [REA II]) to perform sampling of Materials that are subject to Part 2 Products of this Section.
- B. CONTRACTOR shall contract with, and pay for, an independent, approved California Department of Health Services certified testing laboratory to perform testing of imported, exported and site generated fill materials.
- C. All fill/grading material, unless otherwise specified in writing by LAUSD-OEHS, whether imported or exported, must be tested at the site of origin. Import/export testing and certification process shall include the steps listed below. OWNER retains the right to refuse any fill material proposed for use at a school site.

1. Stockpile all materials for sampling (standard stockpile or backhoe pothole stockpile). Crushed fill materials generated by CONTRACTOR at a school site must be segregated by material (e.g., separate stockpiles for concrete, asphalt, etc.).
2. Submit draft SSP for review and concurrence by LAUSD-OEHS. SSP must include figures identifying the site location, the stockpile location, the sampling locations, and a brief site history including the type of remedial activity that occurred at the source site, if any.
3. Collect and analyze samples (see Table 1 for number of samples per volume) per SSP. The samples must include discrete samples and composite samples.
 - a. Discrete samples correspond to a single sample depth. These samples are to be used for producing composite samples, as described below, and for analysis, in accordance with Part 3.02 E.1, which correspond to Volatile Organic Compounds or VOCs. For analysis of these compounds, the licensed professional shall collect one from each sampling location and at different depths between these locations, so that all stockpile depths are equally represented.
 - b. Composite samples correspond to three sample depths for one horizontal sampling location. Each composite sample will consist of three discrete samples collected near the top, middle, and bottom of the stockpile at each sampling location. The licensed environmental professional shall then have the analytical laboratory combine the discrete samples into one composite sample for each sampling location and retain some of each discrete sample for further analysis, as necessary. The composite sample shall be analyzed, in accordance with Part 3.02 E.2, which describes required testing other than for VOCs. Once materials for export have been stockpiled and tested, they may not be used onsite for any purpose without prior approval by OEHS.
 - 1) Composite samples with concentrations approximating or exceeding those permitted herein may be attributed to constituents within one or more discrete samples. Analyzing the discrettes comprising the composite may reveal the one(s) with elevated concentrations and, thus, better isolate (and minimize) the volume of soils within the stockpile requiring removal and licensed disposal.
4. Submit draft Soil Certification/Sample Data Report for review and concurrence by LAUSD-OEHS.
5. Submit final Soil Certification/Sample Data Report to the LAUSD-OEHS Environmental Compliance Manager for concurrence of proposed waste classification. All certified material not utilized or exported within a period of 90 days will be subject to retesting unless a variance is requested by CONTRACTOR and is approved by LAUSD-OEHS prior to use or import/export of the subject materials.

6. Submit required pre import/export documentation/record to the OAR and to LAUSD-OEHS Environmental Compliance Manager (e-mail is acceptable).
 7. Submit post import/export certifications to the OAR and LAUSD OEHS Environmental Compliance Manager (e-mail is acceptable).
 8. In addition to the preceding, requirements, and as necessary or as specified by LAUSD-OEHS, certifications and submittals as indicated in previous articles of PART 3.02 or in the remainder of 01 4524 may be required.
- D. Import/export fill materials shall be stockpiled by CONTRACTOR (or at export site) and are deemed acceptable for import/export or reuse only when it is demonstrated to the satisfaction of LAUSD OEHS that the subject materials meet the requirements of this Section.
- E. As described in paragraph 1.04.A.2.b, lacking site-specific data or sample rationale to support a more focused analytical approach; the CONTRACTOR shall analyze all samples for the following substances according to the methods indicated below. Table 3 is a waste classification flowchart for use by CONTRACTOR's licensed environmental professional. In all cases, detection levels and quality assurance/quality control methods shall be in accordance with standard method reporting limits, best laboratory practices and the following USEPA (EPA) methods for discrete and composite samples:
1. Discrete samples shall be analyzed for Volatile Organic Compounds (VOCs), utilizing EPA Method 8260B/5035 and for Total Petroleum Hydrocarbons (TPH) gasoline, utilizing EPA Method 8015M [collection by EPA Method 5035 using either volatile organic analysis (VOA) kits, Encores, or an equivalent]
 2. Composite samples shall be analyzed for the following:
 - a. TPH, utilizing EPA Method 8015M, for full carbon-chain speciation (including diesel, oil, and other long-chain hydrocarbons).
 - b. Polychlorinated biphenyls, utilizing EPA Method 8082.
 - c. Semi-Volatile Compounds (SVOCs), utilizing EPA Method 8270C.
 - d. Organochlorine Pesticides (OCPs), utilizing EPA Method 8081A.
 - e. Organophosphorous Pesticides (OPPs), utilizing EPA Method 8141A.
 - f. Chlorinated Herbicides, utilizing EPA Method 8151A.
 - g. California Code of Regulations Title 22 (CAM 17) Metals, utilizing EPA Method 6010B/7470A.
 - h. Hexavalent Chromium, utilizing EPA Method 7199.
 - i. Arsenic/Thallium, utilizing EPA Method 6020.
 3. For EPA Method 8270C, a Method Detection Limit (MDL) of 250 ug/Kg in addition to the Practical Quantitation Limit (PQL) or equivalent. This requirement is due to a recent DTSC directive requiring MDLs or PQLs to be sufficiently low to detect Carcinogenic Polycyclic Aromatic Hydrocarbons (CPAHs) in the composite sample, even if these compounds exceed actionable concentrations (900 ug/Kg) in only one of the three discrete samples comprising the composite.

4. The certified laboratory may also need to analyze the composite samples for polycyclic aromatic hydrocarbons (PAHs), a component of semi-volatile compounds, if the data evaluation performed in accordance with Part 3.02 G of this Section (01 4524) does not meet DTSC requirements. The analytical methods to be used for this purpose are EPA Method 8270 SIM, if the samples contain relatively high concentrations of hydrocarbons, or EPA Method 8310, if the samples contain low concentrations of hydrocarbons.
- F. Import/export fill material may be deemed defective for use by LAUSD-OEHS at a school site if any of the following results are obtained:
1. TPH are present at concentrations exceeding 100 milligrams per kilogram (mg/kg) for gasoline and/or 1,000 mg/kg for oil/diesel and long-chain hydrocarbons.
 2. Solvents and other VOCs are present at concentrations exceeding the laboratory reporting limit.
 3. PCBs are present at concentrations exceeding the laboratory reporting limit.
 4. SOVCs are present at concentrations exceeding the laboratory reporting limit.
 5. OCPs are present at concentrations exceeding the laboratory reporting limit.
 6. OPPs are present at concentrations exceeding the laboratory reporting limit.
 7. Chlorinated herbicides are present at concentrations exceeding the laboratory reporting limit.
 8. California Code of Regulations Title 22 (CAM 17) Metals at concentrations exceeding site-specific background.
 9. Hexavalent chromium is present at concentrations exceeding 15 mg/kg.
- G. As mentioned in paragraph 3.02 E, evaluate concentrations of CPAHs, a subset of SVOCs, in the import/export material by conducting the analyses set forth below.
1. Comparing CPAH concentrations with the Benzo(a)pyrene [B(a)p] equivalent concentration of 900 micrograms/kilogram (ug/kg), the background concentration for CPAHs defined in "A Methodology For Using Background PAHs To Support Remediation Decisions," prepared by the Environ Corporation for the Southern California Gas Company and Southern California Edison, January 24, 2002 (referred to as "document"). In this document, CPAHs are defined in Table 2, and Potency Equivalency Factors (PEFs) for each CPAH are listed in Table 3. Using the correct PEF for each CPAH, the licensed environmental professional shall convert the concentration of each CPAH into its B(a)p equivalent concentration. The summation of these B(a)p equivalents for each CPAH must not exceed 900 ug/kg. If CPAHs do not exceed the laboratory reporting limit, then the licensed environmental professional must perform the procedure described above, using the PEF and the laboratory reporting or practical quantitation limits (LRL or PQL) for each CPAH. The result will be the LRL or PQL for each CPAH converted to B(a)p equivalent concentrations. The summation of these B(a)p equivalent concentrations (representing the LRL or PQL for each CPAH) must not exceed 900 ug/kg.

2. Comparing CPAH concentrations with those documented in the PEA, including the remedial action level specified for the school Site. CPAH concentrations in the import/export material must not exceed these concentrations or this level.
- H. Evaluate concentrations of metals in import fill by conducting the analysis set forth below.
1. Compare the maximum detected metal concentrations in import/export material samples to the site-specific background levels provided in the site PEA Report. The PEA Report shall be available from the OAR. If any metal concentration exceeds its listed background value, the fill material fails and shall be deemed defective and unacceptable for use unless supported by a site specific health risk assessment.
 2. In addition to section 3.02.G.1, import/export fill shall be deemed defective and unacceptable for use if any of the following results are obtained:
 - a. Arsenic concentrations exceed 12.0 mg/kg.
 - b. Lead concentration exceeds 80 mg/kg or fails TTLC/STLC.
 - c. Import/Export materials at new school sites with total lead concentrations greater than 50 mg/kg shall be analyzed for leachability (STLC/TTLC) prior to export. Materials exceeding STLC limits identified in Table 2 are deemed defective and unacceptable for use at school sites.
 - d. Import/Export materials at new school sites with total chromium concentrations greater than or equal to 100 mg/kg shall be tested for hexavalent chromium.
- I. All export/import material shall be characterized, handled, and documented in accordance with applicable US EPA and State of California hazardous waste and hazardous materials regulations (See Table 2). For the purpose of this specification, “contaminated” shall mean any soil or geotechnical material with constituent concentrations, which would require disposal at a regulated facility (i.e., California hazardous or RCRA hazardous). OAR must be notified at least 72 hours prior to the disposal of any hazardous waste or hazardous material. No material disposal or reuse can take place without prior written approval of LAUSD-OEHS.
- J. Specification test results and LAUSD-OEHS approvals shall be valid for a period of 90 days from the date of the subject testing unless a variance is requested by CONTRACTOR and approved by LAUSD-OEHS. Previously approved materials shall not be utilized or disposed offsite after the 90 day limit without prior review and approval by LAUSD-OEHS.
- K. Requests for variances to this Specification shall be submitted in writing to LAUSD-OEHS a minimum of two weeks in advance of need for review and approval. The request for variance must provide all available testing data, a rationale to support the request and have an active funding line (provided by OAR) to facilitate review by LAUSD-OEHS. LAUSD-OEHS will review the request for variance and will provide its preliminary determination within two weeks. Certain requests may require final approval by the DTSC.

- L. Soils with concentrations above Section 01 4524 screening levels may, upon prior approval by LAUSD-OEHS, be reused at other school sites if supported by a site-specific human health risk assessment at the receiving school.

3.02 TRANSPORTATION

- A. Details of the samples and testing must be submitted to and approved by LAUSD-OEHS Environmental Compliance Manager before the materials from which the samples were collected undergo transportation.
- B. Haul Routes and Regulations/Restrictions: CONTRACTOR must comply with requirements of project environmental disclosure documents (i.e., CEQA EIR) and authorities having jurisdiction over the project area and the proposed activities (e.g. Regional Water Quality Control Board, DTSC, etc.).

3.03 COSTS

- A. CONTRACTOR shall pay all fees required by authorities having jurisdiction over area.
- B. Contractor shall pay all fees for disposal and/or processing of contaminated and/or hazardous fill materials at a regulated facility.
- C. CONTRACTOR shall post and pay for all bonds required by authorities having jurisdiction over area.

TABLE 1: MINIMUM SAMPLING FREQUENCY

Volume (Cubic Yards)*	Sampling Frequency*
0 - 500	1 per 100 CY
501 - 1,000	1 per 250 CY
1,001 - 5,000	1 per 250 CY for first 1000 CY 1 per 500 CY thereafter
> 5,000	12 samples for first 5000 CY 1 per 1000 CY thereafter

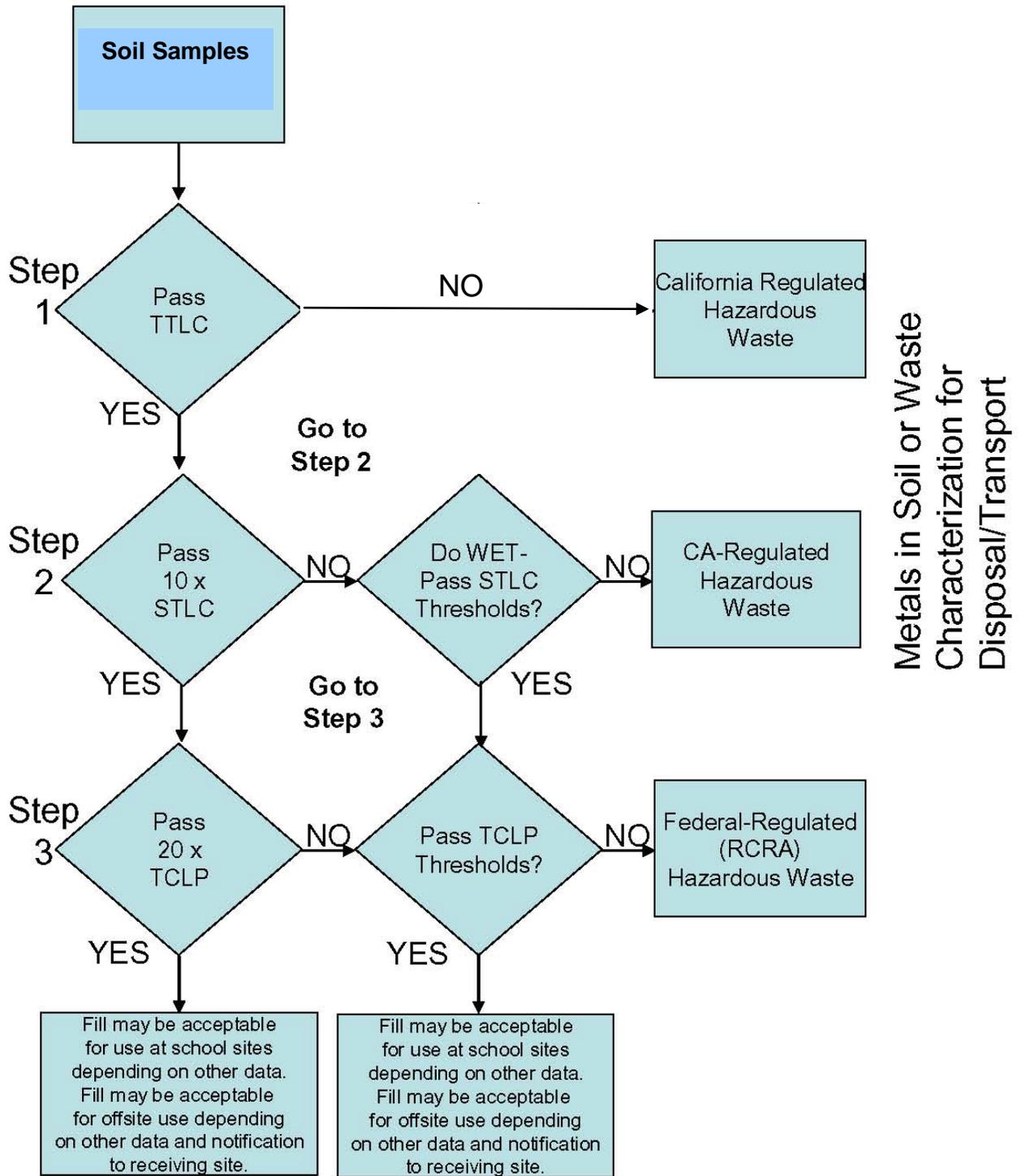
All samples are to be collected, analyzed and accepted before import/export: materials going to licensed facilities must meet sampling criteria from that facility. The rationale for sample approach should be discussed in the draft SSP. In-situ (in place) sampling by boring or hand auger method is not acceptable.

Pothole stockpile sampling may require discrete depth supplemental sampling in order to achieve representative results. The rationale for sample approach should be discussed in the draft SSP. In situ (in place) sampling by boring or hand auger is not acceptable.

*Discuss alternative screening & sampling approaches with LAUSD-OEHS representative for project.

Chemicals of Potential Concern	TABLE 2 WASTE CHARACTERIZATION				
	Hazardous Waste if Exceed Criteria - TTLC Level* (mg/kg)	Additional WET Leaching Tests if Exceed Hazardous Waste Criteria - 10 times STLC Level** (mg/kg)	California-Regulated Hazardous Waste - Soluble Threshold Limit Concentration - STLC Level (mg/l)	Additional TCLP Leaching Tests if Exceed Hazardous Waste Criteria - 20 times TCLP Level** (mg/kg)	Federally-Regulated (RCRA) Hazardous Waste - Toxicity Characteristic Leaching Procedure - TCLP Level (mg/l)
CAM 17 Metals					
Antimony	500	150	15	NA	NA
Arsenic	500	50	5	100	5
Barium	10,000	1,000	100	2,000	100
Beryllium	75	7.5	0.75	NA	NA
Cadmium	100	10	1	20	1
Chromium	2,500	50	5	100	5
Cobalt	8,000	800	80	NA	NA
Copper	2,500	250	25	NA	NA
Lead	1,000	50	5	100	5
Mercury	20	2	0.2	4	0.2
Molybdenum	3,500	3,500	350	NA	NA
Nickel	2,000	200	20	NA	NA
Selenium	100	10	1	20	1
Silver	500	50	5	100	5
Thallium	700	70	7	NA	NA
Vanadium	2,400	240	24	NA	NA
Zinc	5,000	2,500	250	NA	NA
<i>Chromium (VI)</i>	500	50	5	NA	NA

TABLE 3 – WASTE CLASSIFICATION FLOWCHART



Metals in Soil or Waste
Characterization for
Disposal/Transport

END OF SECTION