

SAMPLING AND ANALYSIS PLAN
for
WESTERN ENVIRONMENTAL, INC.
SOIL RECLAMATION FACILITY

Prepared by:
ESRA CONSULTING LLC
183 MACK HILL ROAD
AMHERST, NEW HAMPSHIRE 03031

Prepared for:
WESTERN ENVIRONMENTAL, INC./WRT INDIO, LLC
62-150 GENE WELMAS DRIVE
MECCA, CALIFORNIA 92254

U.S. EPA REGION 9
975 HAWTHORNE STREET
SAN FRANCISCO, CALIFORNIA 94105

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCE CONTROL
1001 I STREET
SACRAMENTO, CA 95814-2828

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SAMPLING AND ANALYSIS PLAN APPROVALS

This Sampling and Analysis Plan, prepared by ESRA Consulting, LLC on behalf of Western Environmental, Inc. and WRT, LLC shall govern all aspects of the soil sampling, analysis and reporting for the survey of treated and untreated soils at the WEI/WRT facility to be performed by WEI/WRT and the CA Department of Toxic Substance Control to meet the following purpose and objectives:

- (1) To assist in the further characterization of odors associated with soy products, biosolids and petroleum hydrocarbon containing soils on the Site;
- (2) To characterize on-site soils to determine whether the WEI material recovery and recycling operations pose a threat to human health in the neighboring community;
- (3) To characterize treated soil to determine whether it meets the DTSC requirements for human health risk based on commercial/industrial standards of end use;
- (4) To enable DTSC to characterize the treated soils to determine whether it meets the DTSC requirements for human health risk based on residential standards of end use;
- (5) To verify the nature of untreated soil stockpiles and their classification according to DTSC hazardous waste criteria; and,
- (6) To evaluate the effectiveness of the WEI's treatment processes in reducing hazardous waste constituents to levels below DTSC hazardous waste criteria. .

Approvals Signature (required prior to project start):

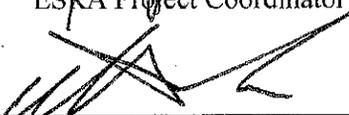
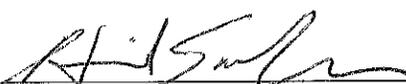
 _____ ESRA Project Coordinator	Date: <u>14 December 2011</u>
 _____ WEI/WRT Project Manager	Date: <u>12-14-11</u>
 _____ WEI/WRT QA Officer	Date: <u>12-14-2011</u>
 _____ DTSC Project Manager	Date: <u>12/14/11</u>

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1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared to address sampling activities being requested by the California Environmental Protection Agency, Department of Toxic Substance Control (DTSC) to characterize soils stored and reprocessed on Site. The Cabazon Band of Mission Indians (CBMI), Western Environmental, Inc. and the DTSC are in the process of entering into a cooperative agreement pertaining to WEI/WRT's recycling operations.

1.1 Sampling Purpose and Objective

The SAP is being prepared for the following purpose and objectives:

- (1) To assist in the further characterization of odors associated with soy products, biosolids and petroleum hydrocarbon containing soils on the Site;
- (2) To characterize on-site soils to determine whether the WEI material recovery and recycling operations pose a threat to human health in the neighboring community;
- (3) To characterize treated soil to determine whether it meets the DTSC requirements for human health risk based on commercial/industrial standards of end use;
- (4) To enable DTSC to characterize the treated soils to determine whether it meets the DTSC requirements for human health risk based on residential standards of end use;
- (5) To verify the nature of untreated soil stockpiles and their classification according to DTSC hazardous waste criteria; and,
- (6) To evaluate the effectiveness of the WEI's treatment processes in reducing hazardous waste constituents to levels below DTSC hazardous waste criteria.

1.2 Sampling Activities and Inspections Completed to Date at the WEI Site

U.S. EPA Region IX has inspected the site in November of 2010 and again in February of 2011 to conduct compliance inspections. The results of EPA investigations are summarized below.

On November 9, 2010 and February 9, 2011, U.S. EPA conducted an investigation at WEI to determine whether the facility was in compliance with federal hazardous waste requirements. The purpose of EPA's investigation was to determine whether the facility needed a Resource Conservation and Recovery Act (RCRA) hazardous waste permit.

On February 9, 2011 U.S. EPA Inspectors revisited the Site and collected samples from six (6) areas on the WEI facility. The six areas included the outgoing soil post treatment area, the incoming soil pre-treatment area, soil destined for the chemical fixation unit, soil treated by the chemical fixation unit, used oil, and three out of five baker tanks holding wastewater. Samples were analyzed for various chemical constituents depending on the sample source. Analysis

included metals, mercury, volatile organic carbon compounds, semi-volatile organic carbon compounds, pesticides and polychlorinated biphenyls (PCBs).

On February 9, 2011 EPA inspectors collected physical samples totaling to **eighty (80) samples from six (6) areas on the WEI facility**, which were then analyzed by EPA's laboratory.

The sample locations were described as follows:

ISPPA is the incoming soil processing area;
OSPTA is the outgoing soil post treatment area;
CFUA is the chemical fixation unit area before treatment;
CFU is the treated chemical fixation area;
WTA is the water treatment/storage area; and
UOTA is the used oil transfer area.

Samples were analyzed for various constituents based on the sample source. The analysis was comprehensive and included total metals, mercury, volatile organic compounds, semi-volatile organic compounds, pesticides and polychlorinated biphenyls (PCBs).

The analytical results found all samples were below federal hazardous waste levels.

Some samples of incoming contaminated soil were found to have polychlorinated biphenyls also known as PCBs at up to 4.2 ppm, which are potentially regulated under the Toxic Substances Control Act, a federal law. The PCBs are listed in the analysis results by their brand name "Aroclor" and formulation. For example, Aroclor 1016 and 1221 are different formulations of PCBs. These contaminated soils were determined by EPA to be below regulatory limits and were not subject to TSCA regulation.

Please note that some solvents such as acetone and methylene chloride are used in the lab, and often show up in lab analysis results. Samples labeled as Quality Control are generated or treated inside the lab, and do not indicate the levels present when the sampling took place.

Many of the results are reported in parts per billion, or ppb. To convert those results to parts per million, or ppm, move the decimal point three spaces to the left. For example, 1,000 ppb is 1 ppm.

The analytical results found all samples to be below RCRA hazardous waste levels.

1.3 Air Quality Investigations Undertaken in the Mecca, California Area

Two recent air quality investigations have been undertaken in the Mecca, CA area to investigate air quality. The results of the two studies are discussed below and do not indicate that there are health risks to the Mecca community or to the occupants of the areas schools.

1.3.1 South Coast Air Quality Management District Investigation and Air Sampling

The South Coast Air Quality Management District (SCAQMD) in March of 2011 conducted an air quality study of several schools in the Mecca, CA area. The SCAQMD Investigations and Air Sampling, Status Report dated March 31, 2011 presents the results of the air quality investigation relative to potential health related impacts from compounds detected during their air sampling investigation conducted in the Mecca, California area from February 18th through March 4th, 2011. The results of the air quality sampling are summarized in the following:

The SCAQMD sampled five (5) area locations as noted below:

Mecca Elementary School;
Saul Martinez Elementary School;
Head Start Preschool;
College of the Desert; and
Indio.

The SCAQMD performed chemical analysis for eleven (11) volatile organic compounds (VOC) as noted below:

1,3-butadiene;
acrolein;
MTBE;
benzene;
toluene;
ethylbenzene;
m, p-xylenes;
o-xylenes;
styrene;
hexane; and
hexene.

The results of the chemical analysis for the above eleven compounds analyzed indicate that the reported concentrations reflect normal or typical urban air concentrations as noted in SCAQMDs' March 31, 2011 report. The concentrations of compounds reported at all locations sampled do not pose a health concern and reflect near laboratory detection limits for the 11 VOC analyzed. SCAQMD notes in their March 31, 2011 Status Report the following "Therefore, over the period of sampling, there was no increased long-term risk due to toxic air pollutants at these sampling locations above what one would typically expect in southern California". WEI and its consultants agree with their determination that there is no health risk and that the concentrations reported reflect normal background concentrations for VOCs in urban air. While Mecca is classified as a rural area, the proximity of the community to the LA basin places it in the transport region for pollutants generated in the larger urban environment.

1.3.2 Monitoring of Contaminants at the Mecca Elementary School and Saul Martinez Elementary by the Riverside County Office of Industrial Hygiene, May 31, 2011

The Riverside County Office of Industrial Hygiene conducted an air quality investigation at the Mecca Elementary and Saul Martinez Elementary schools in April of 2011. As noted in the subject report the reasons for performing the airborne evaluations were due to the complaints and illnesses from students and teachers. The primary purpose of the assessment was to determine if there were any unhealthy airborne levels to the occupants who were attending both schools. Testing was performed outside and inside the classroom at each school site. The sampling was based on the findings of oil, gasoline, pesticides, agricultural waste and the description of odors, hydrocarbons, VOCs, sulfur, metals, and mold samples. Dust was collected to see if there were any hydrocarbons present. Additionally, a full State of California Title 22 analysis for water from each school single water fountain was performed. The results of the air quality investigation are summarized below:

Summary

Air sampling results for Mecca and Saul Martinez Elementary schools, which measured exposures of the many volatile organic compounds, polycyclic aromatic hydrocarbons, sulfur compounds, and metals were below the California Occupational Safety and Health Administration permissible exposure levels (Cal/OSHA PEL), National Institute Safety and Health (NIOSH) Time Weighed Average Recommended Exposure Limits (TWA REL) exposure limits and, American Conference of Governmental Industrial Hygienist Time Weighed Average (ACGIH TWA) exposure limits.

Water samples were taken from water fountains from Mecca and Saul Martinez Elementary schools and were below the State of California Title 22 water standards except for sodium.

The summary of the results are listed below:

1. California Title 22 water samples were taken at both school site water fountains. All samples came back acceptable at nearly all level of detection. Only sodium was above the maximum level of concentration. The other chemical of concern was arsenic which was below the standard.
2. Volatile Organic Compound (VOC) - 56+ different compounds. Many of them were found to be "none detect". All were well below the 8 hour TWA Permissible Exposure Limit (PEL) Cal/OSHA Title 8 Section 5155 standard.
3. Sulfur gases screened 14 different types of gases, and found all them to be below the level of detection.
4. Metals screen of 27 different types, found nearly all them below the level of detection. Two samples had trace levels of magnesium and titanium.
5. Polycyclic Aromatic Hydrocarbons (PAHs) - 16 different compounds, all eight dust wipe samples and all six air samples taken were found to be "none detect".
6. Air samples for mold and debris found typical levels for mold inside and outside of their location. However, Room 39 from Mecca Elementary showed high level of opaque particles and high levels of carbon dioxide (more fresh air needed) inside.

Please see the tables and discussion for more detailed information.

1.4 Project Organization

The project team organization for the SAP is described below and is shown on Figure 1.

WEI/WRT Project Coordinator will be responsible for coordinating communications with all parties participating in the planned sampling activities.

EPA Project Manager/Officer will have the responsibility to communicate and coordinate EPA requirements with the WEI/WRT Project Coordinator. It is anticipated that EPA will function in an advisory/consultative role for the planned sampling.

CBMI SAP Coordinator will have the responsibility to coordinate communications of SAP activities with the CBMI.

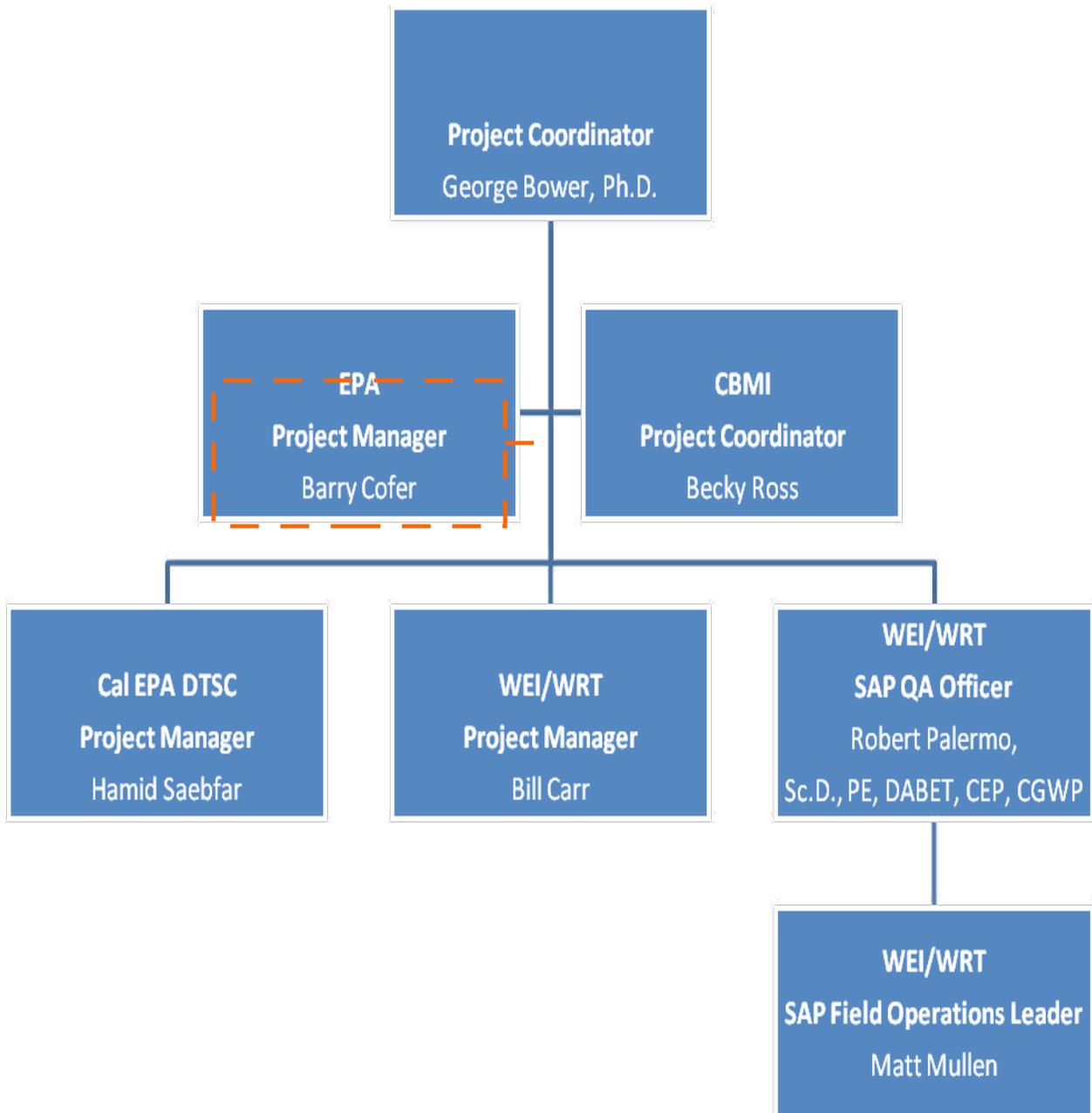
Cal EPA DTSC Project Manager will have the responsibility to communicate and coordinate DTSC requirements with the WEI/WRT Project Coordinator, WEI/WRT QA Officer and DTSC QA Officer such that all EPA SAP requirements are adequately addressed.

WEI/WRT Project Manager will have the responsibility to communicate and coordinate planned activities on Site and to ensure that adequate resources are allocated to the project to complete the sampling activities as planned.

WEI/WRT SAP QA Officer will be responsible for oversight of all sampling activities to ensure that samples are collected according to established protocols including, sample collection, sample chain of custody, sample preservation and sample shipment.

WEI/WRT SAP Field Operations Leader (FOL) will be responsible for ensuring that field operations are implemented consistent with the written SAP and that samples are collected according to the requirements specified in the SAP. The FOL will also ensure that equipment, supplies, and personnel including subcontract resources are available on site to fully implement the SAP.

Figure 1 – SAP Team Organization



Note: Indicates EPA advisory/consultative oversight 

1.5 Statement of Specific Problem

The SAP is being prepared to address community concerns with odors which have been observed in the Mecca area: specifically, if the odors pose a health risk to the community. Additionally, the SAP is being conducted to provide additional data as defined in Section 1; (3) thru (5). Previous sampling performed by U.S. EPA Region IX on the WEI/WRT site, in conjunction with generator sampling and analysis of the incoming wastes performed in accordance with CA and DTSC requirements and confirmatory analysis conducted by WEI, indicate that there are no exceedances of regulated hazardous waste in soil and liquid waste (see Section 1.2). Air quality sampling performed by SCAQMD and the RC Office of Industrial Hygiene did not identify any airborne contaminants in air which pose a health concerns to either the Mecca community of surrounding schools occupants (See Section 1.3).

It is also recognized that there are many potential air emission sources in the area that may also be impacting odors, including:

- Agricultural chemical use (herbicides and pesticides);
- Agricultural fertilizer use;
- Stack discharges from local emission sources;
- Food processing plants in the immediate area;
- Windblown dust from agricultural farming;
- Wastewater treatment plants;
- Sanitary landfills/dumps;
- Green waste from farming or power plant processing;
- Desert and farming dust from wind or agricultural activity;
- Septic gases from unmonitored septic systems;
- Pooling of septic waste in surface water impoundments during heavy rain/precipitation;
- Open burning of wastes and agricultural residues; and
- Salton Sea fish die-offs and algae decomposition.

1.6 Split Sampling by DTSC

This SAP defines procedures for the collection of representative samples of materials at the WEI/WRT facility and has been prepared for the exclusive use of WEI/WRT. While WEI/WRT may agree to allow DTSC to obtain split samples of certain samples prepared by WEI/WRT, nothing in this SAP shall be relied upon by DTSC to assure representativeness or quality objectives of the program. 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.

Nothing in this SAP, including the collection of any samples or other data by DTSC, shall grant, or be construed to grant, DTSC, or any other department, board, office or agency of the State of California, any jurisdiction over the CBMI, the Cabazon Indian Reservation, any other Indian tribe or Indian reservation in the State of California, or over any tribal or non-tribal operation located on any tribal land.

2.0 BACKGROUND

This section provides information on the WEI/WRT site description, hours of operations, potential environmental and odor impacts and material being stored and processed on site. Additionally, the WEI/WRT SAP also contain a number of figures, tables and appendix references which can be utilized to develop a better understanding of site operations. This information is included in the following references:

Figures:

Figure 1 – CRP Team Organization

Figure 2 – Site Location Map

Figure 3 – Site Layout Map

Figure 4 – Site Directions

Figure 5 – Arial Photograph

Tables:

Table 1 – Proposed Soil Sampling

Appendices:

Appendix A – EPA Data Quality Indicators (DQI) Tables for VOCs, SVOCs, Metals, PCBs, PAHs, hexavalent chromium and mercury

Appendix B – Sample Chain-of-Custody Form

2.1 Site and Area Description

The WEI/WRT Facility is approximately 40-acres in size and is located in Mecca, California. The land is leased to WEI/WRT by the Cabazon Band of Mission Indians (CBMI) and is an important business within the Tribe’s industrial development which is referred to as a “Resource Recovery Park”.

The WEI/WRT Facility is one of the few facilities that provides full service recycling and remediation of contaminated soils, construction debris, biodegradable materials, liquids, plastics and other similar materials to the State of California. The Site has been in operation since 2004. Materials are being recycled, bioremediated and being prepared for processing and reuse off Site. While the material is being processed it is temporarily stored on Site as shown on Figure 2.

Mecca is a desert farming community of 8,577 (2010 U.S. Census) people in California’s Riverside County near the northwest shore of the Salton Sea. Two federally recognized Indian Tribes hold reservation land in the area, including the Torres-Martinez Desert Cahuilla Indians (TMDCI), and the CBMI. The Cabazon Band operates the Resource Recovery Park on their land where WEI/WRT is situated.

The majority of the population in Mecca is Spanish-speaking, and employment is primarily tied to agricultural work. The Resource Recovery Park is the exception to this, with businesses that

include WEI/WRT, a tire recycling facility, a cereal manufacturer, and a co-generation power plant that processes large amounts of green (landscaping) waste.

2.2 WEI/WRT Operations

WEI/WRT is a material processing and recycling facility which returns to productive use materials which would otherwise have been discarded and/or disposed of in a landfill as solid waste. WEI/WRT treats petroleum hydrocarbon (PH) soils and reduces the petroleum hydrocarbon concentrations in received soils by bioremediation of the soils with microorganism which digest the PH resulting in lowered PH concentration allowing beneficial reuse of the soils for building and construction projects. WEI/WRT also treats fly ash from local power plants by amending (a soil blending technique) it with soil which results in reduced metal and Lead (Pb) concentrations below the Cal EPA regulated levels. WEI/WRT also recycles green products, biosolids, plastics and building debris including concrete, metal products, bricks and other recoverable building products.

2.3 Hours of Operation

WEI/WRT generally operates from 8:00 AM to 5:00 PM Monday through Friday.

2.4 Materials Received and Stored On Site

Provided below is a description of the waste recycling categories that WEI/WRT processes on site. The recycling process includes three categories of materials that are received at the WEI/WRT facility which includes Category 1- Non Odorous, Category 2 – Potentially Odorous and Category 3 – Odorous, as described below:

Category 1 - Non Odorous:

Waste Liquid: Hydrant water, brine water, non-contaminated liquid.

Solids Waste: Grout, fly ash, heavy metal soil without organics, scrap metal, clean plastic, clean wood, concrete, dried drilling muds, mature compost, Class A biosolids, non-contaminated soil, pesticide soil, soil with horse hair and oats, sand from casting molds, soil with high salinity, and sand blast media.

Category 2 - Potentially Odorous

Waste Liquid: Storm water, oily water, clarifier water, mop water, hydro blast water, parts wash water, drilling muds, tank bottoms, uniform waste water, cosmetic waste, sugar based syrups, used cooking oil, well monitoring water, and vehicle wash water.

Solid Waste: Diesel and oil spill, filter cake from water filtration, filter cake from anodizing, UST soil, clarifier removal, soil cuttings, heavy metal soil with organics, green waste, construction demolition debris, absorbent, oily rags, cosmetic waste, spent carbon, and dredging material.

Category 3 - Odorous

Waste Liquid: Soy whey, waste waters with sulfates.

Solid Waste: Class B biosolids, immature compost, heavily contaminated hydrocarbon soil, rubbing alcohol, and fish gel.

2.5 Addressing Potential Environmental and Odor Impacts

WEI/WRT has taken a number of mitigative measures on site to reduce potential environmental and odor impacts. WEI/WRT has implemented a program of odor mitigation that are being applied to each category of odor producing material (as noted above) received and managed at the facility. The program consists of the control of odorous emissions through profiling and testing during material acceptance; reduction in odor concentrations prior to acceptance and on-site; and, treatment of odor producing chemicals or conditions that are likely to produce off-site impacts during material handling or processing.

Mitigative Measures:

The WEI/WRT odor control program implements applicable mitigation measures for each odor producing category of material, test the effectiveness of controls and applies effective mitigation measures to facility operations.

Mitigative Measures to Control Odorous Emissions:

Control of odorous emissions is accomplished by the profiling process, which properly categorizes the material for mitigation purposes or rejects the material for acceptance at the facilities. The characterization process and the screening procedures are further defined in the project EPA Work Plan (see Table 1). Based on the profile, each material will be classified as Category 1, Category 2 or Category 3. Category 1 materials are those materials determined to have no or very low odor producing potential through quantitative analytical data and thus, will not be subject to odor control mitigation measures.

Mitigative Measures to Reduce Odorous Emissions:

After profiling, materials that are classified as Category 2 or Category 3 (based on chemical composition and physical characteristics) the following odor reduction methods are being applied to control potential off-site impacts:

- Blending of Category 2 and 3 materials with Category 1 materials to reduce chemical concentrations and odor potential;

- Covering of stockpiles of material with tarps, covers, spray coating or other barriers to reduce odor migration during storage or handling;

- Neutralizing the pH of materials in which the odor producing chemical or physical condition can be altered through pH adjustment; and

Establishment of screening or vegetative barrier at the property line to affect odor dispersion and/or dilution.

Mitigative Measures for Treatment of Odorous Emissions:

After profiling and acceptance of materials at the facility, and in the case of materials currently stored on-site, materials that are classified as Category 2 or Category 3 WEI/WRT will be further evaluated for potential odor treatment techniques to include but not limited to the following treatment measures:

- Application of odor neutralizing chemicals to degrade chemical compounds known to exhibit odors at sufficient levels to create off-site impacts;
- Application of water mist or water/chemical mist to degrade odor compounds and to prevent offsite migration of odors;
- Thermal treatment of materials with high concentrations of odor producing compounds which can be effectively treated in a thermal oxidizer at temperatures below 1800 °F; and
- Storage, handling and/or processing of odor producing materials in an enclosure designed to capture odorous emission with treatment of ventilation flows prior to release to the atmosphere.

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 quality 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).

The sampling is being conducted to address community concerns and to develop additional analytical data as requested by DTSC and as described in Section 1. The specific analytical parameters for which data quality must be collected include:

Analytical Parameter	EPA Method Reference
Volatile Organic Compounds	EPA Method 8260B and 5035
Semivolatile Organic Compounds	EPA Method 8270C
Polychlorinated Biphenyls	EPA Method 8028A
Cyanide	EPA Method 9014/9010B
Mercury	EPA Method 7471A
pH	EPA Method 9045C
Total Metals	EPA Method 6010B, 2020, and 7000A
Hexavalent Chromium	EPA Method 7196A

Polycyclic Aromatic Hydrocarbons	EPA Method 8310
Organochlorine Pesticides	EPA Method 8081B
Dioxins and Furans	EPA Method 8290

The Waste Extraction Test (WET) will be performed if the total metal analysis exceeds 10 times the numerical value of the Soluble Threshold Limit Concentration (STLC). Additionally, a Toxicity Characteristic Leaching Procedure (TCLP) shall be performed if the total metal concentration for a constituent exceeds 20 times the TCLP standard.) The sampling will take place on the WEI/WRT site from the treated soil stockpile areas. The analytical results will be compared to applicable standards using the California DTSC Clean Imported Fill Material Policy. The detection limits provided by the above analytical methods will be adequate for comparison of results to the applicable CA hazardous waste criteria. Although no residential exposure scenario exists for materials treated by WEI/WRT, the detection limits provided by the above analytical methods will be adequate to meet DTSC's comparison of results to applicable CA human health residential exposure criteria.

3.1 Project Task and Problem Definition

The soil samples being collected will be used to compare their analytical results for the parameters listed (see Section 3) to applicable CA standards as described in Section 1. The only media that will be sampled is soil. Comparing the soil sampling results to the applicable CA standards will provide needed information to answer the question if the soils pose a health risk to the Mecca community.

The sampling effort will serve to verify that the prior sampling effort completed by EPA on site in February of 2011 to characterize the soils on the site are representative for the site and that conclusions reached by EPA during their site inspection remain valid.

3.2 Data Quality Objectives (DQO)

The level of uncertainty associated with the sample collection and laboratory sample analysis is of acceptable data quality for comparative purposes to the applicable CA clean soil standards. Appropriate protocols will be followed in the field during sample collection and laboratory quality control procedures and reporting of instrument performance when reported within acceptable QA/QC ranges will satisfy the DQO requirements for the sampling. Exceedances of CA hazardous waste criteria for the analytical parameters shown in Section 3 will warrant further assessment and evaluation which is beyond the scope of this SAP.

3.3 Data Quality Indicators (DQI)

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 and are all capable of providing the required level of analytical sensitivity, accuracy, precision,

comparability and representativeness. The DQI established by U.S. EPA Region IX for the parameters noted in Section 3 can be found in Appendix A.

Definition 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 in comparable 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(s) 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.

3.4 Data Review and Validation

This section discusses data review including how data quality will be evaluated/validated. EPA 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, semivolatile 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.

3.5 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.

3.6 Assessment and Oversight

Field data sheets and log books will be reviewed by the WEI/WRT QA Officer on a daily basis to ensure that instrument calibrations, equipment operation, and sampling conditions have been accurately documented. The WEI/ERT 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 RATIONAL

This section provides a discussion and description of the soil sampling activities and the rational for the proposed soil verification sampling.

4.1 Soil Sampling

The analytical detection limits utilized for the soil sample analysis will be the lowest detection limits achievable by the laboratory for the analytical parameters and SW-846 methods identified in Section 5 to facilitate a direct comparison to USEPA and/or CA industrial/commercial and/or residential human health standards.

The treated soil stockpiles are the locations on site where the majority of the soil sampling is planned. The untreated soil stockpiles will also be sampled but to a lesser degree than the treated soil stockpiles. The untreated materials received at the site have already been characterized by the generators with sampling results provided to WEI preceding the shipment. WEI also performs confirmatory sampling on site to verify that the generator sample characterization is complete and accurate. Customer shipment profiles are also reviewed in advance for untreated materials before the shipment is received at the WEI facility.

Since the soil stockpiles (both treated and untreated) have already been characterized by the generator in accordance with CA requirements and have been sampled by EPA in February of 2011 for the same analytical parameters (e.g., VOCs, SVOCs, PCBs, metals, mercury and pesticides), and have further been analyzed by WEI/WRT during the treatment and post-treatment phase of processing, with results of all samples falling below federal hazardous waste levels, the additional number of sample locations required to further verify/characterize the nature and chemical composition of the stockpiles is approximately 30 sample locations which will be composited to provide for greater spatial coverage over the expanse of the treated soil stockpile. The estimated depth of the treated soil stockpile is approximately 20-25 feet so it is anticipated that soil samples will be composited at 5 foot depth intervals thus providing equivalent sample coverage of 120-150 sample locations. The total number of samples per location when including field sample duplicates, field sample blanks and DTSC field splits/duplicates is approximately 38 samples per sample location as shown on Table 1. Twenty-two (22) sampling locations will be established within the treated soil stockpile and eight (8) within the untreated soil stockpiles, with four (4) samples from the CA hazardous soil, and four (4) samples from the non-CA hazardous soil. Focusing the sampling effort on the treated soil stockpiles is justified since this is the material that is leaving the site for reuse in California. All of the treated soils leaving the site will be used in commercial/industrial applications and not for residential use.

Soil samples will be composited vertically using a Geoprobe sampling system as the Geoprobe advances vertically through the soil stockpile and/or an excavator will be used to assess the soil

samples at depth. A soil sampling grid will be established within the treated and untreated soil stockpile prior to sampling and composite soil samples will be randomly collected from the grid locations. Each randomly selected grid location will be staked prior to implementation of the field sampling. VOC analysis from each of the 30 grid sampling locations will be randomly selected at depth from each sampling grid location. PID screening result will be noted in the field log book at each location at depth to provide information on the presence of VOCs in both the treated and untreated stockpiles.

One field duplicate and field blank will be collected for each analytical parameter to evaluate data quality. Twenty percent (20%) of the thirty (30) proposed randomly selected sampling locations will be split/duplicate soil samples collected for each analytical parameter for DTSC analysis at the state laboratory. DTSC shall specify the specific location where it wants to have a split/duplicate sample in an approved addendum to this SAP, which defines all DTSC sampling activities, prepared by DTSC. Table 1 depicts the proposed soil sampling for the treated stockpile and sample breakdown by laboratory analysis.

4.2 Background Soil Sampling

Analysis for organochlorine pesticides (OGP) and dioxins will initially be performed by the Cal DTSC for both OCPs and dioxins. A limited background study will be undertaken by DTSC to establish soil background concentrations for both OCPs and dioxins in the Mecca area by collecting soil samples from areas where soil impact has been historically documented. The OCP and dioxin background sampling will be conducted from locations where these contaminants may be distributed in the immediate Mecca environment which includes agricultural areas, in and around areas where burning of garbage and materials containing plastics is/has taken place, in and around areas of diesel and vehicle exhaust emissions (from local commercial train service/railways), where incinerators are operating and where land application of sewerage sludges has taken place as documented in the California Department of Health Services Environmental Health Investigations Branch, Dioxins Technical Information for California Health Officials, May 2003.

Historically, studies in California have shown that background levels of dioxins in soils are prevalent throughout the state at concentrations in soil ranging from 1-2 parts per trillion (PPT). Millions of pounds of the herbicide 2,4-dichlorophenoxyacetic (2,4-D) are used in California agriculture annually which can also contribute to dioxin levels in soil.

WEI will participate in the sampling and will collect split/duplicate samples for analysis and a state approved laboratory. The background soil sampling results will be utilized as a comparative study to compare soil sampling for OCPs and dioxins conducted on the WEI site from both the treated and untreated soils.

5.0 REQUEST FOR ANALYSES

The analytical parameters for laboratory analysis are depicted in Table 1 and include the following analyses.

Analytical Parameter	EPA Method Reference
Volatile Organic Compounds	EPA Method 8260B and 5035
Semivolatile Organic Compounds	EPA Method 8270C
Polychlorinated Biphenyls	EPA Method 8028A
Cyanide	EPA Method 9014/9010B
Mercury	EPA Method 7471A
pH	EPA Method 9045C
Total Metals	EPA Method 6010B, 6020, and 7000A
Hexavalent Chromium	EPA Method 7196A
Polycyclic Aromatic Hydrocarbons	EPA Method 8310
Organochlorine Pesticides	EPA Method 8081B
Dioxins and Furans	EPA Method 8290

5.1 Analyses Narrative

Normal sample turn around time is anticipate 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 Analytical Laboratory

The analytical laboratories being evaluated for organic and inorganic sample analysis include Associated Laboratories in Orange, CA and Test America in Irvine, CA. A QA Plan will be obtained from the laboratory or SOPs for the methods to be performed. The WEI QA Officer will review the laboratory's QA Plan and provide comments concerning whether the laboratory's QA/QC program appears to be adequate to meet project objectives.

6.0 FIELD METHODS AND PROCEDURES

The field methods to be employed involve the collection of soil samples. Soil samples are to be composited for each sample grid location as described in Section 4.1. Samples are to be composited at 5 foot vertical depths at predetermined sample grid locations marked on the soil stockpiles and the soil samples will be homogenized in an stainless steel bowl prior to sample collection (except for VOC analysis). Field sampling personnel involved in sampling must wear clean, disposable gloves of the appropriate type.

6.1 Field Equipment

The field sampling equipment that will be required to support the SAP effort is listed below in Section 6.1.1.

6.1.1 List of Equipment Needed

Below is a list of the materials and equipment needed for surface soil sampling events. 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 6.3);
- 8-oz glass sample containers w/lids;
- Sample log sheets;
- Sample labels/tags;
- Coolers;
- Ice;
- Stainless Steel Bowls (3);
- 1-gallon zip-lock bags;
- Paper towels;
- Ballpoint pen and Permanent marker;
- Plastic (disposable) trowels;
- Steel trowels;
- Plastic trash bags.

6.1.2 Calibration of Field Equipment

Field equipment will be calibrated prior to use according to manufacturer's instruction and recommendations.

6.2 Field Screening

Field screening of soil sample will be performed for the presence of volatile organic compound with a 10.4eV PID as described in Section 3.0.

Screening for sample collection for volatile organic compounds analysis in soil will be performed using a 10.4 eV Photoionization Detector (PID) calibrated to an isobutylene standard.

The field soil sampling and screening procedures will involve the following:

1. When using PID/FID instrument the following procedure must be used:
 - A. Half- fill **either** a glass jar, or a plastic whirl pack bag or Ziploc® baggie.
- 1) When using glass jars:
 - a. Fill jars with a total capacity of 8 oz. or 16 oz. Preferably 16 oz.

- b. Seal each jar with one (1) or two (2) sheets of aluminum foil with the screw cap applied to secure the aluminum foil.
- 2) When using whirl pack bags or Ziploc® baggies:
 - a. Half fill whirl pack bags from the split spoon or the excavation.
 - b. Whirl and tie or zip to close.
- B. Vigorously shake the sample jars or bags for at least thirty (30) seconds once or twice in a 10-15 minute period to allow for headspace development.
- C. If ambient temperatures are below 32° Fahrenheit (0 ° Celsius) headspace development is to be within a heated vehicle or building.
- D. Quickly insert the PID/FID 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.
- E. Record headspace screening data from both jars or bags for comparison.
- F. PID/FID instruments shall be operated and calibrated to yield "total organic vapors" in parts per million as benzene. PID instruments should be operated with a 10.2 eV lamp source. Calibration must be checked/adjusted daily. In addition, all manufacturers' requirements for instrument calibration must be followed.
- G. 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.
- H. Any deviation(s) from these procedures must be noted and a basis stated for the deviation(s).

6.3 Soil

Soil samples from each grid location at depth (4 to 5 sample depths depending on stockpile location) will be collected and composited into a stainless steel bowl and homogenized to ensure that the soil has been adequately combined prior to transfer into the sample container glassware.

6.4 Decontamination Procedures

The decontamination procedures that will be followed are in accordance with approved 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 an EPA Region IX recommended procedure for the decontamination of sampling equipment for both organic and inorganic analyses:

- Non-phosphate detergent and tap water wash, using a brush if necessary;
- Tap-water rinse;
- 0.1 N nitric acid rinse;
- Deionized/distilled water rinse;
- Pesticide-grade solvent (reagent grade hexane) rinse in a decontamination bucket; and
- Deionized/distilled water rinse (twice).

Equipment will be decontaminated in a predesignated 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.

7.0 SAMPLE CONTAINERS, PRESERVATION AND STORAGE

Sample container, preservation and storage requirements for the identified analytical parameters are provided in Appendix A.

7.1 Soil Samples

Soil samples for PCBs, PAHs, and Semivolatile Organic Compounds will be homogenized and transferred from the sample-dedicated homogenization pail (or stainless steel bowl) into 8-ounce (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 4 C° immediately upon collection.

Soil samples to be analyzed for volatile organic compounds 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 C° immediately upon collection.

Soil samples to be analyzed for metals will be homogenized and transferred from the sample-dedicated homogenization pail into 8-oz, wide-mouth glass jars. For each sample, one 8-oz glass jar will be collected for each laboratory. Samples will not be chilled.

8.0 DISPOSAL OF RESIDUAL MATERIALS

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 contain EPA hazardous waste. Investigation-derived waste (IDW) will not be generated during the conduct of the sampling. Disposal of sampling derived soils will be placed back into the locations where the samples were collected. Disposal of residual materials and/or sampling supplies that can not be returned to the point of collection 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.

9.0 SAMPLE DOCUMENTATION AND SHIPMENT

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

9.1 Field Notes

Field notes will be captured in the field logbooks.

9.1.1 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 on Site: _____
Weather Conditions (Clear, Overcast, Windy, Sunny, etc.): _____
Wind Direction and Velocity (e.g., SE @ 10 mph): _____
Temperature (F°): _____
Description of Observed Site Condition (s): _____
Name of WEI Field Personnel (Print): _____
Signature: _____

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.

9.1.2 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 on site 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

9.2 Labeling

Samples will be labeled according to the following labeling sequence (Grid Location-Sample Number-Analytical Parameter):

For example, for Grid Location Number 001 and Soil Sample Number S001 to be analyzed for volatile organic compounds the sample would be labeled as follows.

GL#001-S001-VOC or GL#001-S002-SVOC or GL#001-S001-Metals, etc.

9.3 Sample Chain of Custody (COC)

All sample shipments for analyses will be accompanied by a Chain-of-Custody record. A copy of the form is found in Appendix B. Form(s) will be completed and sent with the samples for each laboratory and each shipment. If multiple coolers are sent to a single laboratory on a single day, form(s) will be completed and sent with the samples for each cooler. The Chain-of-Custody form 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 that is restricted to authorized personnel. Until the samples are shipped, the custody of the samples will be the responsibility of the WEI FOL conducting sampling. The WEI FOL 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 COC Form. 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.

9.4 Packaging and Shipment

All sample containers will be placed in a strong-outside shipping container (a steel-belted 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 WEI FOL 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; and
Whether additional samples will be shipped or if this is the last shipment.

10.0 QUALITY CONTROL

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

10.1 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.

10.1.1 Equipment Blanks

Equipment blanks will not be collected since dedicated sample glassware and disposable equipment will be used during the conduct of the sampling.

If reusable sampling equipment is utilized equipment decontamination 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.

10.1.2 Field Blanks

Field blanks will be collected as part of the sampling program as shown on Table 1 to evaluate the bias of results associated with possible cross-contamination during field handling, storage, during transport and analysis of the samples.

10.1.3 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.

10.1.4 Field Duplicates

Field duplicates will be collected as part of the sampling program as shown on Table 1 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:

$$\text{RPD} = \text{Range}/\text{Mean} \times 100$$

Where:

Range = Absolute Value of (Sample Concentration – Duplicate Concentration)

Mean = (Sample Concentration + Duplicate Concentration)/2

10.1.5 Temperature Blanks

Temperature blanks will not be included in sample shipments but sample temperatures will be verified prior to sample shipment and upon receipt at the analyzing laboratory.

10.1.6 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.

11.0 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 WEI QA Officer and DTSC QA Officer will be notified of the proposed changes and approve such changes prior to implementation in the field.

12.0 FIELD HEALTH AND SAFETY PROCEDURES

A Health and Safety Plan (HASP) has been prepared for the site as part of the U.S. EPA Administrative Consent Order (ACO) and will be followed during the conduct of the planned sampling activities.

**Table 1 – Proposed Soil Sampling
Sample Breakdown by Stockpile Location**

Analytical Parameter	Stockpile Location	Number of Field Samples	Number of Field Sample Duplicates	Number of Field Blanks	Cal EPA DTSC Field Splits (20%)	Required Number of Sample Containers
Volatile Organic Compounds (8260B and 5035)	Treated	22	1	1	6	38
	Untreated	8				
Semivolatile Organic Compounds (8270C)	Treated	22	1	1	6	38
	Untreated	8				
Polychlorinated Biphenyls (8028A)	Treated	22	1	1	6	38
	Untreated	8				
Cyanide (9014/9010B)	Treated	22	1	1	6	38
	Untreated	8				
Mercury (7471A)	Treated	22	1	1	6	38
	Untreated	8				
pH (9045C)	Treated	22	1	1	6	38
	Untreated	8				
Total Metals (6010B, 2020, and 7000A)	Treated	22	1	1	6	38
	Untreated	8				
Hexavalent Chromium (7196A)	Treated	22	1	1	6	38
	Untreated	8				
Polycyclic Aromatic Hydrocarbons (8310)	Treated	22	1	1	6	38
	Untreated	8				
Organochlorine Pesticides (8081B)	Treated	22	1	1	6	38
	Untreated	8				
Dioxins and Furans (8290)	Treated	6	1	1	6	14
	Untreated	0				
Sample Totals =		306	11	11	66	394

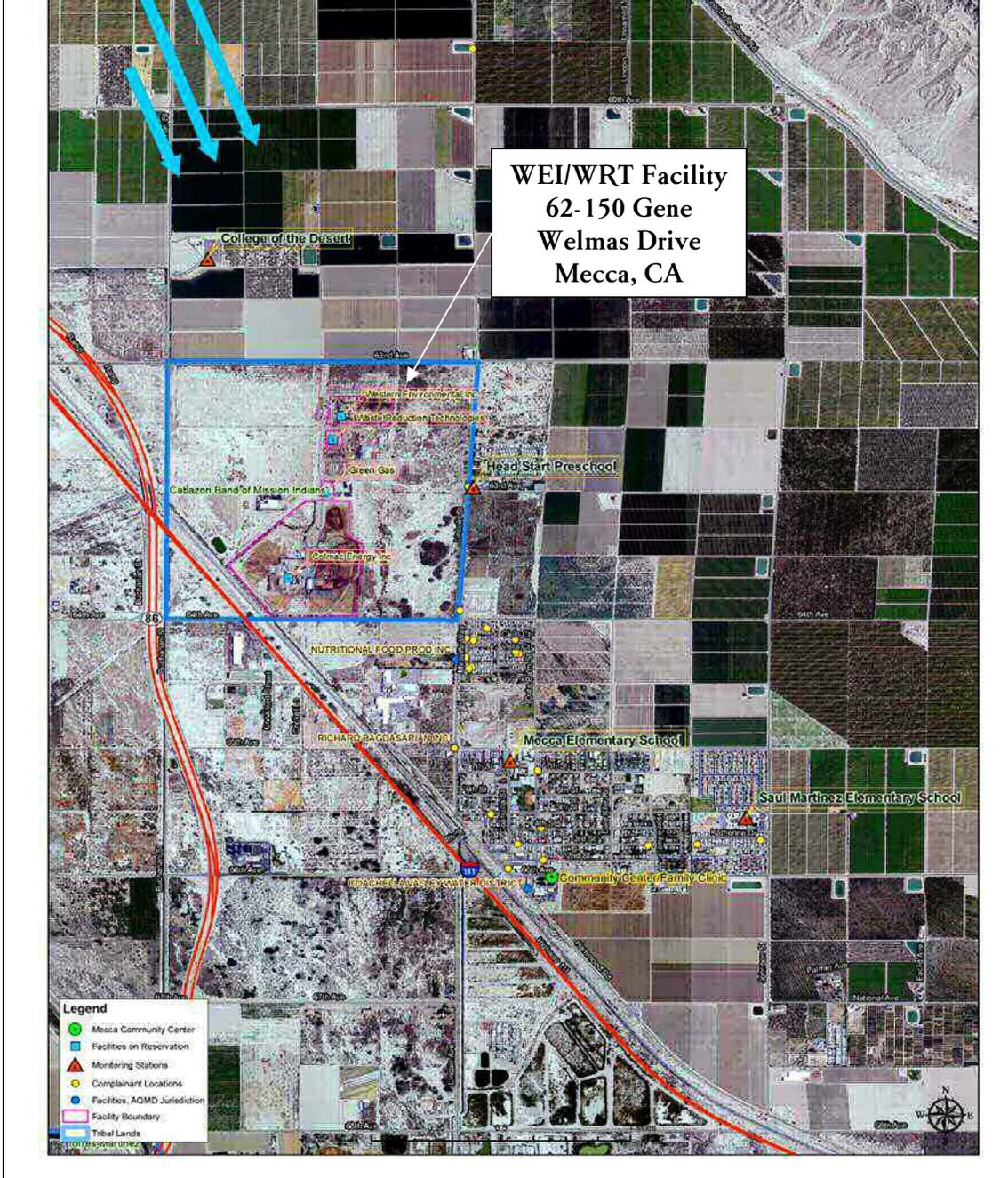


Figure 2 - Site Location Map

Western Environmental, Inc.

1160'

1312.5'

Supper sack holding area



Green Waste

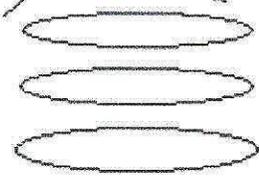


Clean wood

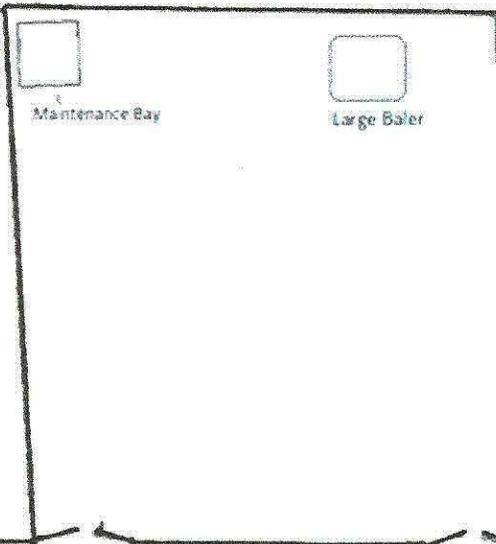
Water Tower



Wood chips



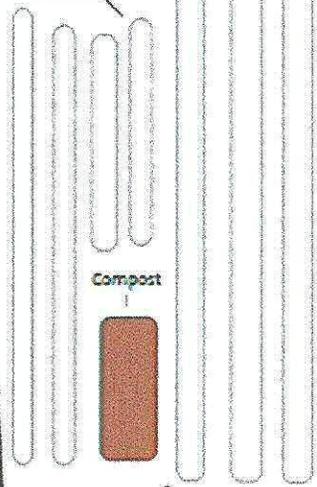
River rock



Maintenance Bay

Large Baler

Bio Solids



Compost



Gene Welmas Drive

1166'

1313.4'

Hydro Seed - 6-1-11
stockpile
height 20'

Figure 3 - Site Layout Map



Figure 4 – Site Directions

Western Environmental, Inc., 62-150 Gene Welmas Drive, Mecca, CA 94105

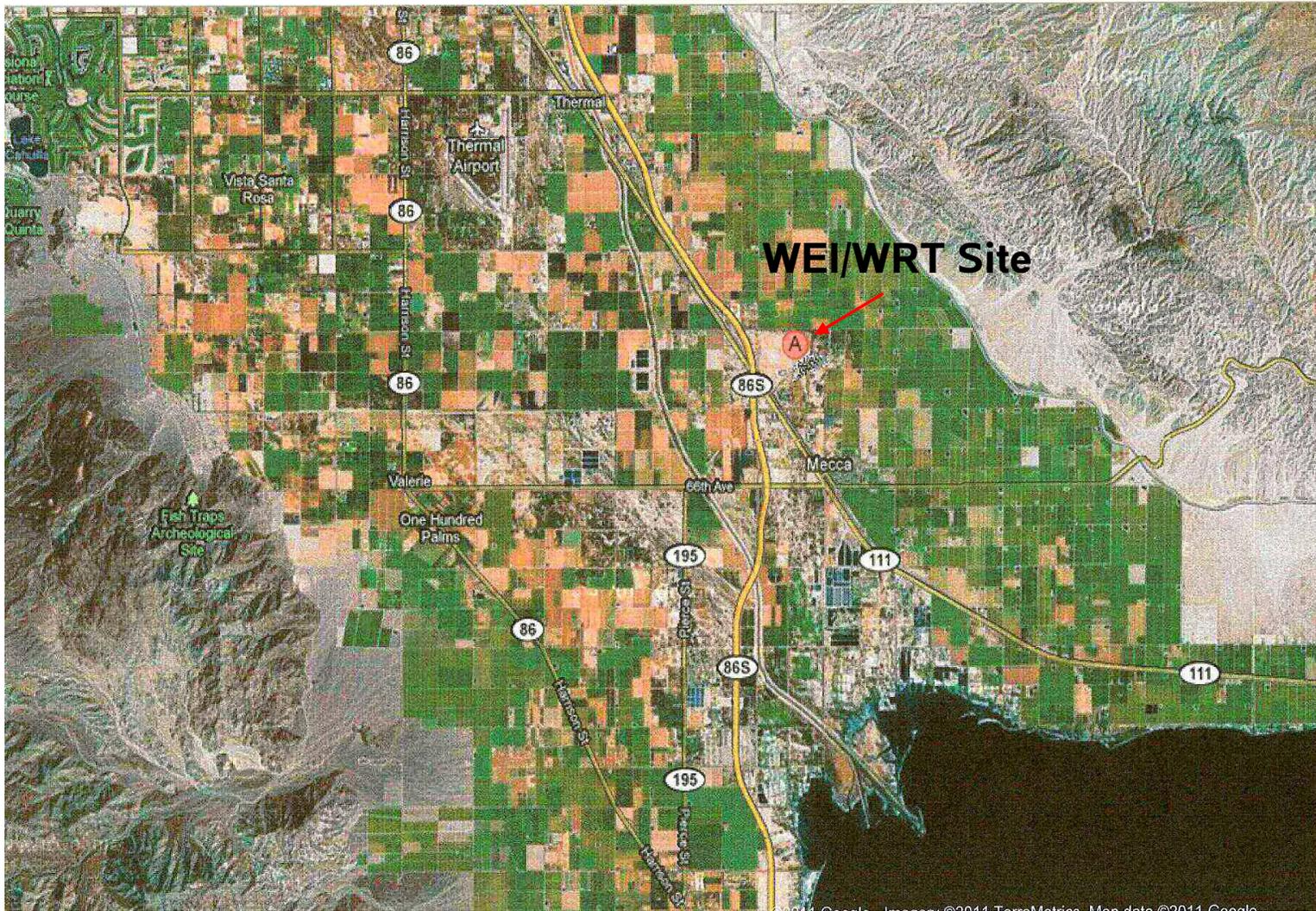


Figure 5 – Aerial Photograph

Western Environmental, Inc., 62-150 Gene Welmas Drive, Mecca, CA 94105

**Appendix A -
EPA Data Quality Indicators (DQI) Tables for VOCs, SVOCs, Metals, PCBs, PAHs,
Hexavalent Chromium and Mercury**

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 reprepped 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.

ORGANOCHLORINE PESTICIDES AND POLYCHLORINATED BIPHENYLS (PCBs)

SW-846 Method 8081 or 8080

Table 1A. Summary of Holding Times and Preservation for Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs)

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation
Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) in Water Samples	<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
Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) in Soil Samples	<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

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

Data Calculations and Reporting Units:

Calculate the calibration factors (CF) of single component pesticides according to Section 7.4.2 of SW-846 Method 8000A. Calculate sample results using the analyte CFs from the midpoint standard of the associated initial calibration curve. Perform sample quantitation for multiple components pesticides according to Section 7.6 of SW-846 Method 8080A or 8081.

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 Quantitation Limits (CRQL) for SW-846 Method 8081 or Method 8080

COMPOUND	CAS No.	CRQL Water µg/L	CRQL Soil µg/kg
alpha-BHC	319-84-6	0.05	2
beta-BHC	319-85-7	0.05	2
delta-BHC	319-86-8	0.05	2
gamma-BHC (Lindane)	58-89-9	0.05	2
Heptachlor	76-44-8	0.05	2
Aldrin	309-00-2	0.05	2
Heptachlor epoxide	1024-57-3	0.05	2
Endosulfan I	959-98-8	0.05	2
Dieldrin	60-57-1	0.1	3
4,4'-DDE	72-55-9	0.1	3
Endrin	72-20-8	0.1	3
Endosulfan II	33213-65-9	0.1	3
4,4'-DDD	72-54-8	0.1	3
Endosulfan sulfate	1031-07-8	0.1	3
4,4'-DDT	50-29-3	0.1	3
Methoxychlor	72-43-5	0.5	17
Endrin ketone	53494-70-5	0.1	3
Endrin aldehyde	7421-93-4	0.1	3
alpha-Chlordane	5103-71-9	0.05	2
gamma-Chlordane	5103-74-2	0.05	2
Toxaphene	8001-35-2	5	170
Aroclor-1016	12674-11-2	1	33
Aroclor-1221	11104-28-2	2	67
Aroclor-1232	11141-16-5	1	33
Aroclor-1242	53469-21-9	1	33
Aroclor-1248	12672-29-6	1	33
Aroclor-1254	11097-69-1	1	33
Aroclor-1260	11096-82-5	1	3

Table 2. Summary of Calibration Procedures for Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) by SW-846 Method 8081 or 8080

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration (minimum blank + 3 points for each analyte) (ICAL) ^{a, b, c}	Initially; whenever required, due to failure of CCV	RSD for CFs #20% (#30% for Surrogate compounds)	1. Terminate analysis 2. Re-calibrate and verify 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 #25%	1. Re-calibrate and verify 2. Re-analyze samples by CCV
Endrin and 4,4'-DDT Breakdown	Beginning and end of analytical sequence	#20% each or #30% combined	1. Investigate source of error and document 2. If either Endrin, 4,4'-DDT breakdown products were detected, re-analyze the samples

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

^b ICAL Prepare initial calibration individual standard mixtures A and B (IND A and IND B) of single component pesticides specified in Table 9 of SW-846 Method 8081 at three concentrations and multiple response pesticides, including toxaphene and Aroclors (except 1016 and 1260), prepared as initial calibration standards at the following concentration levels: Aroclors (except 1221 and 1222) at 200 ng/mL; and toxaphene at 500 ng/mL. Aroclor-1016 and Aroclor-1260 may be prepared as a single standard solution. Spike all calibration standards with the surrogate compounds diazinon and dieldrin at a concentration of 20 ng/mL.

^c Report the retention time window for each analyte. For multiple component pesticides, calculate the retention time window for 5 major peaks from the initial calibration standard analysis.

Determine retention time windows for both single and multiple component pesticides using the following guidelines:

<u>Column Type</u>	<u>Retention Time Window in Minutes</u>
Packed Column	#± 2%
Mega bore or wide bore capillary column	0 ±0.05 for tetrachloro-m-xylene through Aldrin 0 ±0.07 for compounds which elute after Aldrin 0 ±0.1 for decachlorobiphenyl

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 4°C ±2°C; 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 4°C ±2°C; 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 Quantitation 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

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 re-analyze 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 re-analyze samples 2. Re-analyze samples 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 re-analyze samples 2. Re-analyze samples compliant CCV

^a The ICAL low standard must be above but near the CRQL. The low ICAL standard must have a ratio 5:1. If this requirement cannot be met, the laboratory must submit a MDL study as part of the 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 deviation of the average initial calibration retention time for each analyte.

Table 3. Summary of Internal Quality Control Procedures for Polynuclear Aromatic Hydrocarbons 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 compound and document 2. All samples processed with method blank that is out of control are 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 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 check solution.
Cleanup Standard (midpoint concentration)	When column cleanup is used	>85% Recovery	1. Investigate problem, document, and re-analyze samples 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 received; 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.

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.

For soil samples:

In addition to the procedure outlined in Section 7.2 of SW-846 method 9045C,

For noncalcareous soils:

1. Weigh 20 grams of soil in a 50 mL beaker. Add 20 mL of Type II water. Stir the resulting suspension several times during the next 30 minutes.
2. Let the suspension to stand undisturbed for about 1 hour to allow most of the suspended clay to settle out

For calcareous soils:

1. Weigh 10 grams of soil in a 50 mL beaker. Add 20 mL of 0.01M CaCl_2 . Stir the resulting suspension several times during the next 30 minutes.
2. Let the suspension to stand undisturbed for about 1 hour to allow most of the suspended clay to settle out.

Data Calculations and Reporting Units:

Read pH meter results directly in pH units and solution temperature in EC.

Report pH results to the nearest 0.1 pH unit and temperature to the nearest EC. Report the results for noncalcareous soils as "soil pH measured in water" and for calcareous soils, report the results as "soil pH measured in 0.01M CaCl_2 ".

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 must be legible and sufficient to validate all sample and QC analyses.

Table 2. Summary of Calibration Procedures for pH by SW-846 Method 9040 (Liquids) and SW-846 Method 9045 (Soil)

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Meter Standardization	Initially	Refer to manufacture's instructions	Refer to manufacture's instructions concerning standardization and electrode(s) care
Calibration	Daily, prior to sample analysis	A minimum of 2 primary or secondary standard buffers must be used; Buffers must bracket expected pH of sample; Buffers must be 3 or more pH units apart; Buffer readings must be within 0.05 pH units of buffer's true value	1. Allow buffer temperatures to reach equilibrium 2. Repeat measurement with successive volumes of fresh buffer until acceptance criteria are met 3. Replace electrode(s) (follow manufacture's instructions)
Buffer pH Check	Check a calibration buffer solution after every 10 samples (minimum)	<±0.1 pH unit difference	1. Repeat measurement with successive volumes of fresh buffer until acceptance criteria is met before continuing analysis 2. Recalibrate meter and reanalyze samples

NOTE: Electrode(s) must be cleaned after each sample analysis by thoroughly rinsing and gently wiping.

Table 3. Summary of Internal Quality Control Procedures for pH by SW-846 Method 9040 (Liquids) and SW-846 Method 9045 (Soil)

QC Element	Frequency	Acceptance Criteria	Corrective Action
Sample Temperatures	Every sample	<2 EC difference from buffer	Refer to manufacture's instructions concerning the pH meter temperature compensating function
Duplicate Sample (DUP)	One per batch or SDG (1 per 20 samples minimum) ^a	<±0.1 pH unit difference	<ol style="list-style-type: none"> 1. Allow sample temperatures to reach equilibrium 2. Perform buffer pH check (See Calibration Procedure) 3. Clean electrode (See Calibration Procedure Note)

^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.

Semivolatile Organic Compounds (SVOCs) in Water	<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;
SVOCs in Soil ^b	<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

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

^b Perform initial sample analysis using a 2-gram sample for mid-level analysis and a 30-gram sample for low-level analysis

Data Calculations and Reporting Units:

Use the mean RRF from the initial calibration to calculate the concentration of individual analytes according to Section 7.7.2 of EPA Method 8270C, Revision 3.0.

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.

1,2-Dichlorobenzene	10	0.33	370	370
1,2,4-Trichlorobenzene	10	0.33	1,700	190
1,3-Dichlorobenzene	10	0.33	140	180
1,4-Dichlorobenzene	10	0.33	7.3	0.47
2-Chloronaphthalene	10	0.33	NA	NA
2-Chlorophenol	10	0.33	240	38
2-Methylnaphthalene	10	0.33	NA	NA
2-Methylphenol	10	0.33	53,000	1,800
2-Nitroaniline	25	0.8	64	2.2
2-Nitrophenol	10	0.33	NA	NA
2,2'-oxybis (1-Chloropropane)	10	0.33	NA	NA
2,4-Dichlorophenol	10	0.33	3,200	110
2,4-Dimethylphenol	10	0.33	21,000	730
2,4-Dinitrophenol	25	0.8	2,100	73
2,4-Dinitrotoluene	10	0.33	2,100	73
2,4,5-Trichlorophenol	25	0.8	110,000	3,700
2,4,6-Trichlorophenol	10	0.33	270	6.1
2,6-Dinitrotoluene	10	0.33	1,100	37
3-Nitroaniline	25	0.8	NA	NA
3,3'-Dichlorobenzidine	10	0.33	6.7	0.15
4-Bromophenyl-phenylether	10	0.33	NA	NA
4-Chloro-3-methylphenol	10	0.33	NA	NA
4-Chloroaniline	10	0.33	4,300	150
4-Chlorophenyl-phenyl ether	10	0.33	NA	NA
4-Methylphenol	10	0.33	5,300	180
4-Nitroaniline	25	0.8	NA	NA
4-Nitrophenol	25	0.8	66,000	2,300
4,6-Dinitro-2-methylphenol	25	0.8	NA	NA
Acenaphthene	10	0.33	28,000	370
Acenaphthylene	10	0.33	NA	NA
Anthracene	10	0.33	220,000	1,800
Benzo(a)anthracene	10	0.33	3.6	0.092
Benzo(a)pyrene	10	0.33	0.36	0.0092
Benzo(b)fluoranthene	10	0.33	3.6	0.092
Benzo(g,h,i)perylene	10	0.33	NA	NA
Benzo(k)fluoranthene	10	0.33	36	0.92
bis(2-Chloroethoxy)-methane	10	0.33	NA	NA

Table 1B: Target Compound List and Contract Required Quantitation Limits (CROQLs) for Semivolatile Organic Compounds (SVOCs) by SW-846 Method 8270

Analyte	Contract Required Quantitation Limits			PRGs	
	Water (Fg/L)	Soil (mg/kg)	Industrial Soil (mg/kg)	Tap Water (Fg/L)	
bis(2-Chloroethyl) ether	10	0.33	0.56	0.0098	
bis(2-Ethylhexyl)phthalate	10	0.33	21	4.8	
Butylbenzylphthalate	10	0.33	930	7,300	
Carbazole	10	0.33	150	3.4	
Chrysene	10	0.33	360	9.2	
Di-n-butylphthalate	10	0.33	NA	NA	
Di-n-octylphthalate	10	0.33	10,000	730	
Dibenz(a,h)anthracene	10	0.33	0.36	0.0092	
Dibenzofuran	10	0.33	3,200	24	
Diethylphthalate	10	0.33	100,000	29,000	
Dimethylphthalate	10	0.33	100,000	370,000	
Fluoranthene	10	0.33	37,000	1,500	
Fluorene	10	0.33	22,000	240	
Hexachlorobenzene	10	0.33	1.9	0.042	
Hexachlorobutadiene	10	0.33	38	0.86	
Hexachlorocyclopentadiene	10	0.33	7,100	260	
Hexachloroethane	10	0.33	210	4.8	
Indeno(1,2,3-cd)pyrene	10	0.33	3.6	0.092	
Isophorone	10	0.33	3,200	71	
N-Nitroso-di-n-propylamine	10	0.33	0.43	0.0096	
N-nitrosodiphenylamine	10	0.33	610	14	
Naphthalene	10	0.33	190	6.2	
Nitrobenzene	10	0.33	100	3.4	
Pentachlorophenol	25	0.8	15	0.56	
Phenanthrene	10	0.33	NA	NA	
Phenol	10	0.33	100,000	22,000	
Pyrene	10	0.33	26,000	180	

Notes:

Fg/L = micrograms per liter.
mg/kg = milligrams per kilogram.

NA = Not available.

PRG = U.S. EPA Preliminary Remediation Goals, Region 9 May 1, 1998...

Table 2. Summary of Calibration Procedures for SVOCs by SW-846 Method 8270C

Calibration Element	Frequency	Acceptance Criteria	Corrective Act
GC/MS Tuning with decafluorotriphenylphosphine (DFTPP)	Beginning of each 12-hour period during which standards samples are analyzed	Ion abundance criteria in Table 3 of Method 8270C, Revision 3.0	1. Identify the MS tune criteria before any standards, sample QC samples are analyzed 2. MS tune criteria before any standards, sample 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 RRFs #30%; or correlation coefficient (r) generated by the linear regression must be 0.99 for all analytes	1. Terminate analysis 2. Recalibrate before sample
Continuing Calibration Verification (CCV) ^d	Beginning of every 12-hour period, and end of run	%D between RRF of CCV and avg RRFs from ICAL #30%; or ±30% of true value for linear regression	1. Re-calibrate 2. Re-analyze last good CCV
Integrated areas of Internal Standards	Each analysis	Area must be within -50 to 100 percent.	1. Re-analyze internal standards and greater than 50 percent
Retention time evaluation of all standard, surrogate, and sample analytes	Each analysis	±3 x the SD of the avg ICAL RT for each analyte	1. Re-calibrate 2. Re-analyze control limits

^a The ICAL low standard must be above but near the CRQL. The low ICAL standard must have a ratio $\leq 5:1$. If this requirement cannot be met, the laboratory must submit a MDL study as per 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 a deviation of the average initial calibration retention time for each analyte.

^d If some compounds are beyond the control limits of the CCV and these target compounds are samples and 10 percent or less of these analytes are beyond control limits, a single point be used to quantify the out-of-control analytes.

Table 3. Summary of Internal Quality Control Procedures for SVOCs by SW-846 Method 8270C

QC Element	Frequency	Acceptance Criteria ^b	Corrective Action
Method Blank (MB)	Each 12-hour time period, minimum of one per SDG ^a	< CRQL for each compound	<ol style="list-style-type: none"> Investigate the contamination and Re-analyze all processed with a 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)	<p><u>Water Sample</u>: MS and MSD recoveries and RPD between within laboratory limits</p> <p><u>Soil Sample</u>: MS and MSD recoveries and RPD between within laboratory limits</p>	<ol style="list-style-type: none"> Report in case
Surrogate Spikes	Every sample, standard and method blank	<p><u>Water Sample</u>: Surrogate recoveries within laboratory limits</p> <p><u>Soil Sample</u>: Surrogate recoveries within laboratory limits</p>	<ol style="list-style-type: none"> Re-analyze all non-compliant sur recoveries
Laboratory Control Sample (LCS)	One per SDG	<p><u>Water Sample</u>: LCS recoveries within laboratory limits</p> <p><u>Soil Sample</u>: LCS recoveries within laboratory limits</p>	<ol style="list-style-type: none"> Investigate the problem and document Re-analyze all processed with a out of control.

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

^b within 3 sigma of laboratory control charts. The laboratory should submit the control charts Dilute and reanalyze samples which contain one or more target analytes at concentrations a calibration range. Results for such reanalyses should fall within the mid-range of the calibration range. Report results and submit documentation for both analyses.

Toxicity Characteristic Leaching Procedure (TCLP) for VOCs, SVOCs, Chlorinated Pesticides and Herbicides, and Metals by SW-846 Method 1311 and Analysis

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Table 1A. Summary of Holding Times and Preservation for TCLP Volatile Organic Compounds (VOCs) by SW-846 Method 1311

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation ^b
Volatile Organic Compounds (VOCs) in Water	<u>Technical for TCLP Extraction</u> : 14 days from collection; <u>Contract for TCLP Extraction</u> : 10 days from receipt at laboratory; <u>Technical and Contract Analysis</u> : 14 days from date of TCLP extraction to analysis.	Cool to 4°C ±2°C
VOCs in Soil ^{c,d}	<u>Technical and Contract for TCLP Extraction</u> : 48 hours cumulative from collection; (7 days if frozen) ^c <u>Technical and Contract of TCLP Extract</u> : 7 days from date of TCLP extraction to analysis.	Cool to 4°C ±2°C; sealed zero headspace containers. ^c

- ^a Individual target compounds are listed in Table 1B.
- ^b Preservatives should not be added to samples before extraction.
- ^c Freezing of soil samples requires contract approval.
- ^d Freezing of En Core TM samplers requires contract approval.

Data Calculations and Reporting Units:

Determine the percent solid as specified in Section 7.1 of SW-846 Method 1311 and report the result as percent solid. Extract the second sample/aliquot according to Section 7.3 of SW-846 Method 1311.

Calculate the response factor (RF) and the concentration of individual analytes according to the equations specified in Sections 7.3 and 7.5 of SW-846 Method 8260B, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), (Revision 2). Report final analyte concentration in units of micrograms per liter (µg/L). Report results that are less than 10 µg/L to 1 significant figure, and results that are greater than or equal to 10 µg/L 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 1B. Target Compound List, Contract Required Quantitation Limits

(CROs), and Regulatory and Spiking Levels for TCLP VOCs by GC/MS Method 8260B

<u>Analyte</u>	<u>CROL µg/L</u>	<u>Regulatory Level mg/L</u>	<u>Spiking Level µg/L</u>
Benzene	10	0.5	50
Carbon tetrachloride	10	0.5	50
Chlorobenzene	10	100	50
Chloroform	10	6.0	50
1,4-Dichlorobenzene	10	7.5	50
1,2-Dichloroethane	10	0.5	50
1,1-Dichloroethene	10	0.7	50
Methyl ethyl ketone	10	200	50
Tetrachloroethene	10	0.7	50
Trichloroethene	10	0.5	50
Vinyl chloride	10	0.2	50

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

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 4 of SW-846 Method 8260B	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	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	Every standard, sample, blank, and QC sample	IS area within a factor of two of the IS area in the associated CCV (-50% to +100%)	1. Investigate the system; 2. Re-analyze all samples analyzed during a system malfunction
Retention time evaluation of CCV standards	Each analysis of CCV standard	±3 x 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 method detection limit (MDL) study as part of the data package.

^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.

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

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	Each 12-hour time period, minimum of one per SDG ^a or one per batch of extraction fluid	< CRQL for each compound	1. Investigate the source of contamination and document. 2. Reextract and/or reanalyze all samples processed with a blank that is out of control.
Matrix Spike and Matrix Spike Duplicate (MS/MSD) ^b	One MS/MSD set per batch or SDG (1 MS/MSD set per 20 samples minimum)	<u>Sample extract</u> : 75-125% of expected value; #25% RPD between MS and MSD	1. Report in case narrative
Surrogate Spikes ^{b, c}	Every sample, QC sample, standard and method blank	<u>Sample extract</u> : 85-115% of expected value, except for 1,2-dichloroethane (75-115%)	1. Reanalyze all samples with non-compliant surrogate recoveries
Laboratory Control Sample (LCS)	One per SDG	<u>Sample extract</u> : 70-130% 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 Spiking solution to be added after the TCLP extraction, immediately preceding analysis.

^c 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.

Table AA. Summary of Holding Times and Preservation for TCLP SVOCs by SW-846 Method 1311

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation ^b
Semivolatile Organic Compounds (SVOCs)	<u>Technical for TCLP Extraction:</u> 14 days from collection; <u>Contract for TCLP Extraction:</u> 10 days from receipt at laboratory; <u>Technical and Contract of TCLP Extract:</u> 7 days from date of TCLP extraction to preparative extraction; <u>Technical for Analysis:</u> 40 days from preparative extraction; <u>Contract for Analysis:</u> 35 days from preparative extraction.	Cool to 4°C ±2°C

^a Individual target compounds are listed in Table 4B.

^b Preservatives should not be added to samples before extraction.

Data Calculations and Reporting Units:

Determine the percent solid as specified in Section 7.1 of SW-846 Method 1311 and report the result as percent solid. Extract the second sample/aliquot according to Section 7.3 of SW-846 Method 1311.

Analyze the extract for SVOCs by SW-846 Method 8270C, Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), (Revision 3.0). Calculate the concentration of individual analytes according to Section 7.7.2 of EPA Method 8270C. Report final analyte concentration in units of micrograms per liter (µg/L). Report results that are less than 10 µg/L to 1 significant figure, and results that are greater than or equal to 10 µg/L 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 4B. *Target Compound List, Contract Required Quantitation Limits (CRQLs), and Regulatory and Spiking Levels for TCLP SVOCs by SW-846 Method 8270*

<u>Analyte</u>	<u>CRQL $\mu\text{g/L}$</u>	<u>Regulatory Level mg/L</u>	<u>Spiking Level $\mu\text{g/L}$</u>
o-Cresol (2-Methylphenol)	10	200	50
m-Cresol (3-Methylphenol)	10	200	50
p-Cresol (4-Methylphenol)	10	200	50
2,4-Dinitrotoluene	10	0.13	50
Hexachlorobenzene	10	0.13	50
Hexachloro-1,3-butadiene	10	0.5	50
Hexachloroethane	10	3.0	50
Nitrobenzene	10	2.0	50
Pentachlorophenol	25	100	75
Pyridine	25	5.0	75
2,4,5-Trichlorophenol	25	400	75
2,4,6-Trichlorophenol	10	2.0	50

Table 5. Summary of Calibration Procedures for TCLP SVOCs by SW-846 Method

8270C

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
GC/MS Tuning with decafluorotriphenylphosphine (DFTPP)	Beginning of each 12-hour period during which standards and samples are analyzed	Ion abundance criteria in Table 3 of Method 8270C, Revision 3.0	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) <small>a, b, c</small>	Initially; whenever required, due to failure of CCV	%RSD for RRFs #30%; or correlation coefficient (r) generated by the linear regression must be ≥ 0.99 for all analytes	1. Terminate analysis 2. Recalibrate and verify before sample analysis
Continuing Calibration Verification (CCV) ^d	Beginning of every 12-hour period, and end of run	%D between RRF of CCV and avg RRFs from ICAL #30%; or $\pm 30\%$ of true value for linear regression	1. Re-calibrate and verify 2. Re-analyze samples back to last good CCV
Integrated areas of Internal Standards (IS)	Each analysis	Area must be within -50 to 100 percent. Retention time ± 0.33 minutes of CCV IS retention times.	1. Re-analyze samples with internal standard -50 percent and greater than 100 percent
Retention time evaluation of all standard, surrogate, and sample analytes	Each analysis	± 3 x the SD of the avg ICAL RT for each analyte	1. Re-calibrate and verify 2. Re-analyze samples out of control limits

^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 4B.

^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.

^d If some compounds are beyond the control limits of the CCV and these target compounds are detected in samples and 10 percent or less of these analytes are beyond control limits, a single point calibration may be used to quantify the out-of-control analytes.

Table 6. Summary of Internal Quality Control Procedures for TCLP SVOCs by SW-846 Method 8270C

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	Each 12-hour time period, minimum of one per SDG ^a or one per batch of extraction fluid	< CRQL for each compound	1. Investigate the source of contamination and document. 2. Re-analyze 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)	MS and MSD recoveries (65-135%) and RPD 30%	1. Report in case narrative
Surrogate Spikes ^b	Every sample, standard and method blank	Surrogate recoveries within laboratory limits	1. Re-analyze all samples with non-compliant surrogate recoveries
Laboratory Control Sample (LCS) ^b	One per SDG	LCS recoveries within laboratory limits	1. Investigate the source of problem and document. 2. Re-analyze 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 Within 3 sigma of laboratory control charts. The laboratory should submit the control charts.

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

Table 7A. Summary of Holding Times and Preservation for TCLP Chlorinated Pesticides by SW-846 Method 1311

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation ^b
Chlorinated Pesticides	<p><u>Technical for TCLP Extraction:</u> 14 days from collection;</p> <p><u>Contract for TCLP Extraction:</u> 10 days from receipt at laboratory;</p> <p><u>Technical and Contract of TCLP Extract:</u> 7 days from date of TCLP extraction to preparative extraction;</p> <p><u>Technical for Analysis:</u> 40 days from preparative extraction;</p> <p><u>Contract for Analysis:</u> 35 days from preparative extraction.</p>	Cool to 4°C ±2°C

^a Individual target compounds are listed in Table 7B.

^b Preservatives should not be added to samples before extraction.

Data Calculations and Reporting Units:

Determine the percent solid as specified in Section 7.1 of SW-846 Method 1311 and report the result as percent solid. Extract the second sample/aliquot according to Section 7.3 of SW-846 Method 1311.

Calculate the calibration factors (CF) of single component pesticides according to Section 7.4 of SW-846 Method 8081, Organochlorine Pesticides and PCBs as Aroclors by Gas Chromatography: Capillary Column Technique, (Revision 0). Calculate sample results using the analyte CFs from the midpoint standard of the associated initial calibration curve. Perform sample quantitation for multiple components pesticides according to Section 7.6 of SW-846 Method 8081. Report final analyte concentration in units of micrograms per liter (µg/L). Report results that are less than 10 µg/L to 1 significant figure, and results that are greater than or equal to 10 µg/L 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 7B: Target Compound List, Contract Required Quantitation Limits (CRLs), and Regulatory and Spiking Levels for TCLP Chlorinated Pesticides by

SW-846 Method 8081

<u>Analyte</u>	<u>CRQL µg/L</u>	<u>Regulatory Level</u> <u>mg/L</u>	<u>Spiking Level</u> <u>µg/L</u>
Chlordane (Technical)	0.5	0.03	5
Endrin	0.1	0.02	1
Heptachlor	0.05	0.008	0.5
Heptachlor epoxide	0.05	0.008	0.5
Lindane (gamma-BHC)	0.05	0.4	0.5
Methoxychlor	0.5	10	5
Toxaphene	5	0.5	50

Table 8. Summary of Calibration Procedures for TCUP Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) by SW-846 Method 8081

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration (minimum blank + 3 points for each analyte) (ICAL) ^{a, b, c}	Initially; whenever required, due to failure of CCV	RSD for CFs #20% (#30% for Surrogate compounds)	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 #25%	1. Re-calibrate and verify 2. Re-analyze samples back to last good CCV
Endrin and 4,4'-DDT Breakdown	Beginning and end of analytical sequence	#20% each analyte or #30% combined analytes	1. Investigate source of the problem and document 2. If either Endrin, 4,4'-DDT, or their breakdown products were detected, re-analyze the samples

^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 method detection limit (MDL) study as part of the data package.

^b For ICAL, prepare individual standard mixtures A and B (IND A and IND B) containing the single component pesticides specified in Table 9 of SW-846 Method 8081 at three concentration levels. For multiple response pesticides, including toxaphene and Aroclors (except 1016 and 1260), prepare separate ICAL standards at the following concentration levels: Aroclors (except 1221) at 100 ng/mL; Aroclor-1221 at 200 ng/mL; and toxaphene at 500 ng/mL. Aroclor-1016 and Aroclor-1260 may be combined into a single standard solution. Spike all calibration standards with the surrogate compounds discussed in the following Table 9 at a concentration of 20 ng/mL.

^c Report the retention time (RT) window for each analyte. For multiple component pesticides, calculate the RT window for 5 major peaks from the initial calibration standard analysis. Determine RT windows for both single and multiple component pesticides using the following guidelines:

<u>Column Type</u>	<u>RT Window in Minutes</u>
Packed Column	#± 2%
Mega bore or wide bore capillary column	±0.05 for tetrachloro-m-xylene through Aldrin ±0.07 for compounds which elute after Aldrin ±0.1 for decachlorobiphenyl

Table 9. Summary of Internal Quality Control Procedures for TCUP Organochlorine Pesticides and Polychlorinated

Biphenyls (PCBs) by SW-846 Method 8081

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	One per Batch or SDG ^a (1 per 20 samples minimum) or one per batch of extraction fluids.	< CRQL for each compound	1. Investigate source of contamination and document 2. Re-extract and re-analyze all samples processed with a non-compliant method blank
Surrogate ^b	Every standard, sample, method blank and QC sample at 10 times CRQL	60-150% 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)	65-135% of expected value; #30 RPD between MS and MSD	1. Address in narrative

^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 Spike each standard, sample, and blank with 1mL of a solution containing 0.2 µg/mL each of tetrachloro-m-xylene and decachlorobiphenyl

^c Spike MS/MSD samples with 1mL of a solution containing the following compounds and levels:

<u>Target compound</u>	<u>Concentration (µg/mL)</u>	<u>Target Compound</u>	<u>Concentration (µg/mL)</u>
(-BHC	0.5	Heptachlor	0.5
4,4'-DDT	1.0	Aldrin	0.5
Endrin	1.0	Dieldrin	1.0

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.

Second column confirmation is required for all positive results. Perform confirmation analyses on a column of a phase different from that used for quantitation. Confirmation analyses must meet all instrument calibration criteria and blank acceptance criteria specified in Table 8, above.

Table 10A. Summary of Holding Times and Preservation for TCLP Chlorinated Herbicides by SW-846 Method 1311

Analytical Parameter ^a	Technical and Contract Holding Times	Preservation ^b
Chlorinated Herbicides	<u>Technical for TCLP Extraction:</u> 14 days from collection; <u>Contract for TCLP Extraction:</u> 10 days from receipt at laboratory; <u>Technical and Contract of TCLP Extract:</u> 7 days from date of TCLP extraction to preparative extraction; <u>Technical for Analysis:</u> 40 days from preparative extraction; <u>Contract for Analysis:</u> 35 days from preparative extraction.	Cool to 4°C ±2°C

^a Individual target compounds are listed in Table 10B.

^b Preservatives should not be added to samples before extraction.

Data Calculations and Reporting Units:

Determine the percent solid as specified in Section 7.1 of SW-846 Method 1311 and report the result as percent solid. Extract the second sample/aliquot according to Section 7.3 of SW-846 Method 1311.

Calculate calibration factors and sample results according to Sections 7.7 and 7.8 of SW-846 Method 8151B, Chlorinated Herbicides by Gas Chromatography, (Revision 1). Report final analyte concentration in units of micrograms per liter (µg/L). Report results that are less than 10 µg/L to 1 significant figure, and results that are greater than or equal to 10 µg/L 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 10B. Target Compound List, Contract Required Quantitation Limits (CRQLs), and Regulatory and Spiking Levels for TCLP Chlorinated Herbicides by SW-846 Method 8151B

Analyte	CRQL µg/L	Regulatory Level mg/L	Spiking Level µg/L
2,4-D	12	10	60-100
2,4,5-TP (Silvex)	7	10	35-100

Table 11. Summary of Calibration Procedures for TCLP Chlorinated Herbicides by

SW-846 Method 8151

Calibration Element	Frequency	Acceptance Criteria	Corrective Action
Initial Calibration (minimum blank + 5 points for each analyte) (ICAL) <small>a, b, c</small>	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 (Separate source from ICAL standards)	Beginning of each 12-hour time period, after every 10 samples and end of run	%D between calculated and nominal amount for each compound must be #±25.0%	1. Re-calibrate and verify 2. Re-analyze samples back to last good 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 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 Report the retention time window for each analyte. Determine retention time windows as ±3 x the standard deviation (SD) of the average initial calibration retention time for each analyte.

^c ICAL and continuing CAL standards must contain all surrogate compounds and target analytes listed in Table 10B.

Table 12. Summary of Internal Quality Control Procedures for TCLP Chlorinated Herbicides by SW-846 Method 8151

QC Element	Frequency	Acceptance Criteria	Corrective Action
Method Blank (MB)	One per Batch or SDG ^a (1 per 20 samples minimum) per analytical instrument	< 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 Spike	Every standard, sample and method blank at 10 times CRQL	75-125% of expected value	1. Re-analyze all samples with non-compliant surrogate recoveries 2. If re-analysis does not solve the problem, re-extract and re-analyze
Matrix Spike and Matrix Spike Duplicate (MS/MSD)	One MS/MSD set per batch or SDG (1 MS/MSD set per 20 samples minimum) containing all analytes chosen from Table 10B	40-160% of expected value for dinoseb and 65-135% of expected value for other target analytes; #30 RPD between MS and MSD	1. Report in Case Narrative
Laboratory Control Sample (LCS)	One LCS per batch or SDG	40-160% for dinoseb; 80-120% for other target analytes	1. Re-extract and re-analyze all samples processed with an 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.

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.

Second column confirmation is required for all positive results. Confirmation must be performed on a column of a phase different from that used for quantitation. Confirmation analyses must meet all calibration criteria specified in Table 2 and blank acceptance criteria specified in Table 3 of the SW-846 Method 8151.

Table 13A. Summary of Holding Times and Preservation for TCLP Metals by SW-846 Method 1311

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 1AA. 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
1410/1411*

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	$r \geq 0.995$	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	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	< CRDL	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	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	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 <± 20% for samples >5X CRDL; ± CRDL for samples <5X CRDL	1. Flag associated data with an "*"
Matrix Spike Sample (MS)	One per batch or SDG ^{a, b, c}	± 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	± 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}	± 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	±3 x 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 ±3 x 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.

**Appendix B -
Sample Chain-of-Custody Form**

