

STATE OF CALIFORNIA

California Regional Water Quality Control Board - Los Angeles Region

GENERAL WORKPLAN REQUIREMENTS

FOR A

HEAVY METALS¹ SOIL INVESTIGATION

APPENDIX A

INTRODUCTION

This guidance document and the related *Laboratory QC/QA Requirements for Title 22 Metals Analysis* are designed to assist dischargers required to perform a heavy metal soil assessment. This document outlines all activities to be conducted by the discharger in order to complete an assessment and determine whether the soil and/or groundwater have been contaminated due to industrial and/or commercial activities at the site. The requirements itemized below are to be used when conducting an initial heavy metal soil investigation to evaluate the following:

- A. Waste discharges to the soil at potential source areas,
- B. Assess and delineate the lateral and vertical extent of soil contamination, and
- C. Soil properties that affect contaminant mobility and transport in the unsaturated zone.

The work plan must include, but is not limited to, the following items:

1. A technical approach including the sampling rationale and justification for the location, depth, and type of boring including the sampling interval. The boring locations must be plotted on a facility map configured to scale.
2. The document must include the Los Angeles County Assessor's Parcel Number(s) for the property being investigated.
3. Soil samples must be collected from the middle of low permeability (silts and clays) or high moisture content units (saturated soils), if the individual lithologic unit is five feet thick or greater.
4. Describe the proposed drilling method, equipment, and procedures for borings.
5. Describe equipment and procedures used for the collection, handling, storage, and shipment of soil samples.
6. Describe decontamination and waste handling procedures.
7. Describe the laboratory quality assurance/quality control program.

¹California Code of Regulations; Title 22 metals, including total and hexavalent chromium

8. A site-specific Health and Safety Plan (HASP) should be prepared prior to fieldwork or field sampling startup. The HASP defines minimum health and safety requirements and designates protocols to be followed for the field operation to comply with state and federal health and safety requirements.
9. A time schedule for the completion of the scope of work.

WORKPLAN FOR SUBSURFACE SOIL INVESTIGATION

A subsurface soil technical report (hereinafter work plan) will be required to assess the shallow subsurface soil to determine the impact of prior releases of heavy metal contaminants. Implementation of the work plan will determine the lateral and vertical extent of heavy metal soil contamination in the impacted areas identified.

The task of implementing the work plan involves selecting optimum boring locations within and around the source areas, collecting soil samples at depths of 1, 5, 10, 15, 20 and 25-feet below ground surface (bgs) and at every lithologic change. If not previously performed, at least one continuously cored soil boring should be drilled and logged for a complete stratigraphic column of the soils beneath the site, preferably in proximity to source area.

Unless previous data exists, at least two soil borings must be installed and sampled at two different locations away from known source areas to ascertain background heavy metal concentrations. These soil samples should be collected from "native soils" (not from areas of imported fill and preferably from areas that are the least likely to contain heavy metal residues due to historical operations at the facility).

Background heavy metal concentrations will be compared to values obtained from impacted areas to determine impact and will be used, along with other indices, to determine site-specific cleanup levels.

IDENTIFICATION OF CONTAMINATED SOURCE AREAS AT HEAVY METAL USAGE, STORAGE AND DISPOSAL AREA

- Identify the areas, based on the historical or current land use for the facility which were used for plating, chemical storage, processing, treatment and disposal.
- Identify potential source locations of heavy metal soil contamination, such as areas of former spills and leaks.
- Provide a labeled, surveyed, and scaled plot plan or diagram showing current, and any previous locations of structures used for heavy metal plating, chemical and hazardous waste storage, treatment and disposal at the facility.
- Identify locations such as aboveground tanks, vats, underground tanks, clarifiers, sumps, channels, pipelines, trenches, drains, sewer connections, seepage pits, basins, ditches, and dry wells.
- Include tables listing the functions or purposes of each structure, duration of use, chemical contents, and quantity of chemicals stored.

- If information is available on prior chemical spills provide the date of the spill, the reporting agency (i.e. Fire Department or Regional Board), and the extent of any remedial action performed.

Also list names, addresses, duration and dates of previous site owners and operators, and types of chemical-processes used.

FIELD PROCEDURES

The following investigation procedures must also be addressed in the work plan at a minimum:

1. Contingency plan to extend boring depths if evidence exists of contamination at the bottom of the borehole.

During drilling and soil sampling, 'all the boring logs must be prepared by or under the direct supervision of a State of California Registered Geologist (PG), or Registered Civil Engineer (PE). In addition, visual indications of soil contamination must be noted such as staining, and discoloration, olfactory indicators, estimation, of percentages of the different soil types, range in grain sizes, degree of grading/sorting, moisture content and porosity. Unique sample identification and locations must be provided.

2. Provide complete and legible boring logs that will include:
 - a. A description of earth materials, conditions (moisture, color, etc.), and classifications per Unified Soil Classification System (USCS);
 - b. A lithographic column with USCS abbreviations and symbols;
 - c. Labeled sample depths (measured in feet);
 - d. A record of penetration in blows per foot (blow counts) and inches (or percent) of sample recovered;
 - e. A California registered professional must sign each boring log.
3. An appropriate number of quality control samples collected.
4. All the boreholes must be back-filled in accordance with requirements listed in *California Well Standards Bulletin 74-90, California Department of Water Resources, (June 1991)*.
5. Investigation-derived wastes must be disposed of in Department of Transportation approved containers, or transported to a United States Environmental Protection Agency (USEPA) approved waste management facility.
6. Following receipt of laboratory analytical results, submit a technical report (site investigation report) to the Regional Board for review and approval. The report must contain a description of

field activities, procedures used, a discussion of analytical results and delineation of contaminants in the shallow soil, data interpretation, conclusions and recommendations. Boring logs, laboratory analytical results, and chain of custody forms should be included in the appendices. Figures must include a surveyed map showing the locations of the contaminant source areas or structures, a map showing surveyed soil sample and boring locations, and isoconcentration maps for significant contaminants discovered.

If the results of the site investigation have not fully delineated the contamination, then a work plan to completely define the extent of soil and/or groundwater impacts is to be included with your site investigation report pursuant to Section 13267 of the California Water Code.

Comply with the Regional Board's chain of custody procedures regarding soil samples. Samples must be handled and analyzed per the *General Requirements Laboratory QC/QA for Title 22 Heavy Metals Analysis (APPENDIX B)*.

OPTIONAL SOIL PARAMETERS:

Additional soil data collection may be considered during site-assessment and/or remediation phases for site-specific risk assessment and/or fate and transport modeling.

Soil samples shall be collected from different lithological units at various locations and depths, and sent to a California certified laboratory for determining the following parameters:

- a) Water-Solid adsorption/distribution coefficient (Kd)
- b) Fraction of organic carbon content (foe)
- c) Grain-size distribution (ASTM D 422-630)
- d) Effective soil porosity
- e) pH (ASTM G51-77)
- f) Bulk density or Specific Gravity (ASTM D 854-83)
- g) Soil moisture content (ASTM D 2216-80)
- h) Plasticity index for clayey and silty materials (Atterberg Limits)
- i) Gas permeability (if possible).

LABORATORY METHOD FOR ANALYSES OF SOIL SAMPLES

For the purpose of screening soil samples for Title 22 heavy metal contaminants, the Regional Board will accept the use of EPA Method 6010B. However, for certain Title 22 metals of concern, EPA Method 6020 may be required to achieve meet the required detection limits for reporting. EPA Method 7199 and EPA Method 245.5 will be required to provide a quantitative value for hexavalent chromium, and mercury, respectively.

LABORATORY CERTIFICATION

The Regional Board requires that all laboratories performing analyses on any samples be certified by the California Department of Public Health's (CDPH) Environmental Laboratory Accreditation Program (FLAP). For a listing of accredited laboratories refer to the CDPH web site:

<http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx>

SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

All personnel working in the field or in the laboratory will hold current certification showing that they have received training in accordance with requirements specified in 29 CFR1910.120 (Occupational Safety and Health [OSHA]) regulations, or any other regulatory training/certification requirements.

SURVEY DATA FOR SOIL DATA

All soil data points (soil borings) shall be surveyed relative to longitude and latitude coordinates. Acceptable quality data may come from a commercially available, hand held global positioning system (GPS) device.

DOCUMENT SUBMITTAL REQUIREMENTS

Deliverables and technical reports include, but are not limited to, work plans, work plan addenda, investigation reports, design reports, quarterly groundwater monitoring reports, report addenda, and letter responses to Regional Board comments. Site plans with proposed soil boring locations must be submitted in an AutoCADD or GIS format that can be input into a spatial or GIS database.

The State Board adopted regulations (Chapter 30, Division 3 of Title 23 & Division 3 of Title 27, California Code of Regulation) requiring the electronic submittal of information (ESI) for all site cleanup programs, starting January 1, 2005. Currently, all of the information on electronic submittals and GeoTracker contacts can be found on the Internet at the following link:

http://www.waterboards.ca.gov/ust/electronic_submittal.

To comply with the above referenced regulation, you are required to upload all technical reports, documents, and well data to GeoTracker by the due dates specified in the Regional Board letters and orders issued to you or for the Site. However, the Regional Board may request that you submit hard copies of selected documents and data in addition to electronic submittal of information to GeoTracker.