

**SOIL SAMPLING PLAN TO EVALUATE SITE CONDITIONS FOR CLOSURE**

**ECOLOGY CONTROL INDUSTRIES  
13738 SLOVER AVENUE  
FONTANA, CALIFORNIA**

Prepared for:

Ecology Control Industries  
19500 Normandie Avenue  
Torrance, California 90502

Prepared by:

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Shaw Project No. 119731.01

March 2006





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March 7, 2006

Mr. Mohinder Sandhu  
DTSC  
Standardized Permitting and Corrective Action Branch  
8800 Cal Center Drive  
Sacramento, California 95826-3200

**RE: Soil Sampling Plan and Revised Closure Plan**  
**Ecology Control Industries (EPA ID Number CAD982484933)**  
**13738 Slover Avenue**  
**Fontana, California**

Dear Mr. Sandhu,

On behalf of Ecology Control Industries (ECI), Shaw Environmental, Inc. (Shaw) is pleased to submit the Soil Sampling Plan that was prepared for the above-referenced facility. The plan was written in response to deficiencies noted in the memorandum dated December 14, 2005 that was prepared by the DTSC's Geological Services Unit. This memorandum requested that certain edits be made to ECI's Section VI-Standardized Permit Closure Plan (January 2003) and that a separate Soil Sampling Plan be prepared in order to facilitate site closure activities.

Shaw has prepared the enclosed Soil Sampling Plan and edited the Section VI-Standardized Permit Closure Plan which is included as Appendix B to the Plan. As requested, the edits were made in a different color (red) to make it easier for the DTSC to review the changes. Three copies of the report are enclosed and an electronic copy of the report will also be sent. Part H (Closure Cost Estimate) of the Closure Plan is still being revised and will be forwarded shortly.

If you have any questions please contact me at 925-288-2119. Thank you for your assistance.

Sincerely,

Shaw Environmental, Inc.

Original Signed by Sydney Geels

Sydney Geels  
Program Manager

Cc: Alan Weir, Ecology Control Industries

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B	Ecology Control Industries; Section VI – Standardized Permit Closure Plan,

## **1.0 Introduction**

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Ecology Control Industries (ECI) submitted a Closure Plan (Section VI) within a Standardized Permit Application (revised November 2004) to the California Department of Toxic Substances Control (DTSC) in order to facilitate clean closure of the ECI facility located at 13738 Slover Avenue in Fontana, California (Figure 1). Upon review of the Closure Plan, the Northern California Geological Services Unit (GSU) of the DTSC noted deficiencies in the plan. A memorandum from the GSU dated December 14, 2005 provided detailed comments regarding deficiencies found in the report and recommended that a formal soil sampling plan be written for the site.

To resolve the noted deficiencies in the Closure Plan, ECI contracted Shaw Environmental, Inc. (Shaw) to write a formal soil sampling plan for the facility. The following sections detail proposed field activities, and incorporate the DTSC-requested revisions to the original Soil Sampling Plan prepared by ECI and submitted as Section VI of the Standardized Permit Application. The project objectives and scope of work presented in this work plan have been prepared according to the directives issued by the DTSC.

### **1.1 Project Description**

Described in this work plan are the procedures planned for the collection and analysis of shallow soil samples from the vicinity of the former tank unloading area, on and around the rinse pad, near the aboveground storage tank (AST) area, and at locations suitable for collecting background soil samples. Sample analytical data will be reviewed to evaluate shallow soil quality and the results will be compiled in a report.

### **1.2 Site Location and Description**

The subject property is located at 13738 Slover Avenue in Fontana, California (Figure 1). The property occupies approximately 1.4 acres of land and contains a single-story office building on the southern portion of the property. A parking area is located adjacent to the building. The tank processing and waste storage areas are located on the northern portion of the property. A tank pad which was used to decommission fuel storage tanks is located on the northern portion of the property.

The property is located in a predominately industrial area and is bounded to the north and west by the Superior Trailer manufacturing yard, to the south by Slover Avenue, and to the east by Sammy's Pallet Service.

### **1.3 Site History**

The subject property was previously leased by Erickson Tank Services (Erickson) from Superior Trailer. Property development included the construction and operation of the tank processing area in the northern portion of the site. Erickson operated the facility as an environmental services and maintenance yard until 1999/2000 when the business was sold to ECI. ECI then assumed the property lease. ECI operations at the facility have been similar to those conducted by Erickson during their occupation of the site.

## **2.0 Site Assessment**

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In accordance with the stipulations and directives issued by the DTSC, an initial soil quality assessment will include the collection and chemical analysis of shallow soil samples from beneath specified locations in the tank processing area located on the northern portion of the property. The assessment will be completed in accordance with all applicable regulatory codes and guidelines. Methods and procedures planned to complete soil quality assessment are described in the following sections.

### **2.1 Work Plan and Permitting**

Prior to initiating field activities, this work plan will be submitted to the DTSC for review and approval. All required permits will be obtained in advance of field activities. Copies of applicable permits will be provided to DTSC in the final report of activities.

### **2.2 Health and Safety and Underground Utility Location**

The proposed drilling locations will be marked and Underground Service Alert (USA) will be contacted and notified of the anticipated locations and date of drilling. Additionally, a private utility locating service may be contracted to search for underground utilities near the anticipated drilling locations if field inspection indicates this action is warranted. A site-specific health and safety plan will be developed to identify and discuss potential hazards associated with the planned scope of work. The Health and Safety plan will be reviewed during a tailgate safety meeting conducted at the beginning of each day of the field work.

### **2.3 Proposed Soil and Concrete Sampling Locations and Depths**

Prior to collecting any soil or concrete samples at the former ECI facility, the concrete and asphalt-paved structures will be decontaminated with a detergent mixture and pressure washer. The rinsate water will be collected using a vacuum truck and transported off-site for recycling. Following decontamination of the concrete rinse pad and asphalt-paved tank unloading area, shallow soil samples will be collected to evaluate soil quality near the tank unloading area, on and around the rinse pad, and near the AST and drum storage area. Concrete core samples will be co-located with select soil sampling locations. Figure 2 depicts proposed sampling locations. Biased sampling locations have been selected based on areas that had the potential to be impacted by contaminants. This includes areas where tank decommissioning operations took place and where equipment and wastes were stored. ECI's original Confirmation Soil Sampling Plan proposed twelve soil sampling locations in the tank processing area. After reviewing the plan, the GSU recommended that three additional samples be collected in the tank unloading area and that two additional samples be collected in the AST and drum storage area for a total of 17 soil samples in the tank processing area. A total of seven concrete core samples will be collected from the rinse pad and drum/AST storage areas. Ten background soil samples will be collected in the southern portion of the property, which is the area away from all tank processing operations.

Two soil samples will be collected at each planned sampling location, at depths of 6 inches below grade and 2 feet below grade. Thirty four soil samples will be collected from the operations portion of the facility and ten background samples will be collected from the area away from operations activities. This is a total of forty four soil samples. One field duplicate sample will also be collected for every ten samples collected (four field duplicate samples planned) for quality control purposes. Shaw will also provide the analytical laboratory the Matrix Spikes and Matrix Spike Duplicate samples. A copy of the Quality Control Plan prepared for the planned investigation is included in Appendix A. Concrete core samples will be collected at the seven specified soil sampling locations discussed below.

#### **Former Tank Unloading Area**

Soil samples will be collected from six locations in the former tank unloading area where ASTs and USTs were first brought for decommissioning. The area, which is asphalt-paved, is approximately 3,605 square feet and should be sampled due to the possibility that tanks initially brought to the facility could have contained residual product. The GSU indicated in its Memorandum dated December 14, 2005 that six soil sampling locations within the area

boundary should be sufficient to characterize an area of that size. In order to assess whether contamination has penetrated the asphalt, the collection of shallow soil samples, approximately 6 inches below the asphalt, is proposed in the former tank unloading area. As analyzing the actual asphalt for the presence of petroleum hydrocarbons will not yield representative results, shallow soil samples will be collected beneath the asphalt at all six sampling locations to determine whether contaminants of concern have impacted the subsurface. Soil samples will also be collected at 2 feet below surface grade (bsg).

### **Rinse Pad**

Soil samples will be collected from four locations on the concrete rinse pad and four locations adjacent to the rinse pad. As tanks were rinsed on the pad, there is a possibility that residual product in the tanks could have impacted the concrete and subsequently the subsurface and/or surrounding soil. Concrete core samples will be collected from the same four soil sampling locations on the concrete pad. Two soil sampling locations are proposed immediately to the east of the rinse pad where a metal storage container is currently located. The portable storage structure will be moved prior to sampling activities. Two soil sampling locations are also proposed on the west side of the rinse pad, which is an unpaved area. Sampling locations are planned on either side of the rinse pad due to the possibility that run-off from tank rinsing activities could have impacted the adjacent areas. The GSU approved the eight soil sampling locations that were proposed in ECI's original Confirmation Soil Sampling Plan.

### **AST and Drum Storage Area**

There are three soil sampling locations proposed in the rinsate AST and drum storage area located south of the rinse pad. ECI originally proposed to collect one soil sample in the northwestern portion of the storage area; however, the GSU stated that this was insufficient to characterize an area of this size that was subject to potential releases of contaminants. The two additional borings will be in the following locations: one near and south of the larger rinsate AST and one in the center of the southern portion of the area where drum storage occurred. Concrete core samples will be collected at each of the three soil sampling locations. Additional borings may be performed, as warranted, based on observed site conditions at the time of field activities.

### **Background Soil Sampling**

ECI's original Confirmation Soil Sampling Plan proposed to collect one background soil sample in order to determine existing background metal concentrations on the property. The GSU stated in its Memorandum that one background sample was not enough to provide a statistically robust

dataset and suggested that at least 10 background soil samples be collected per the 1992 Environmental Protection Agency (EPA) document *Supplemental Guidance to RAGS: Calculating the Concentration Term*. Therefore, ten soil samples will be collected from the southern portion of the property at five different locations and two depths (6 inches and 2 feet bsg). The ten background soil-sample locations are shown on Figure 2.

No groundwater sampling is proposed at this time. Soil quality data collected during this initial investigation will be reviewed and the necessity for additional soil and/or groundwater sampling will be evaluated and recommendations will be presented in the investigation report.

#### **2.4 Geological/Lithological Soil Logging**

All sample locations will be logged by a field geologist working under the direct supervision of a California Professional Geologist. Stratigraphic correlations will be noted where apparent. The original boring logs, indicating sample collection depths, lithologic descriptions and field observations will be presented in the investigation report.

#### **2.5 Soil and Concrete Sampling Procedures**

A truck-mounted, direct-push sampling rig equipped with a 2-foot long, 2-inch diameter core barrel sampler lined with clear acetate sample tubes will be used to obtain continuous core of the soil to the desired depths at each sample location. Soil samples collected at 6 inches below grade and 2 feet below grade from each boring will be retained for laboratory analysis.

Immediately upon retrieval, a portion of the soil sample to be analyzed for volatile organic compounds will be tightly packed into a five-gram EnCore sampler, in accordance with U.S. EPA Method No. 5035. The EnCore sampling system consists of a coring sleeve equipped with a plunger and a sealing cap. The coring sleeve will be placed into a T-handle, which will then be pushed into the soil being sampled. The sealing cap will then be screwed onto the coring sleeve. Following collection of the EnCore sample, the remaining portion of the soil sample will be sealed with Teflon tape and capped with polyethylene end caps.

The seven concrete core samples will be collected using a concrete saw at the selected soil sampling locations. A 4-inch diameter section of the concrete will be cored and the upper 1/8-inch (minimum) portion of the core will be chipped off and placed in a laboratory-supplied glass sample container.

The samples will be labeled with a discrete sample number, sampling location, collection date, collection time, sample collectors name and site name. The samples will be stored in separate plastic bags in a cooler with blue ice or cubed ice and maintained under chain-of-custody control until delivered to the designated analytical laboratory.

## 2.6 Sample Analysis

In accordance with DTSC requirements, samples will be submitted to an Environmental Laboratory Accreditation Program (ELAP)-certified laboratory for analysis. Taking into account the GSU's specific requirements, ECI proposes to analyze all soil samples collected in the vicinity of the operations portion of the facility for the following: gasoline, diesel, and oil range petroleum hydrocarbons, CAM 17 metals, volatile aromatic hydrocarbons (benzene, toluene, ethylbenzene, and xylenes (BTEX), fuel oxygenates, volatile organic compounds, semi-volatile organic compounds, polynuclear aromatic hydrocarbons, and polychlorinated biphenols. Should pentachlorophenol (PCP) be detected in the semi-volatile organic compound analysis of a soil sample, that sample will additionally be analyzed for dioxins, furans, and pesticides.

All concrete core samples will be tested for the same analytes as the soil samples collected in the vicinity of the tank operations portion of the facility. The background soil samples will only be analyzed for CAM 17 metals. The analysis and the specific test methods are shown in the following table.

Constituent	Sample Containers	Preparation method	Analysis Method	Detection Limit <sup>1</sup>	Preservative
TPH-gasoline TPH-diesel	One 6-inch acetate sleeve	Extraction 5035/3550 <i>Soil</i>	8015M	1-10 mg/kg	Ice
TPH-oil	One 6-inch acetate sleeve	Extraction 3550	1664A	100 mg/kg	Ice
VOCs, fuel oxygenates, BTEX	One 5-gram Encore Sampler	EPA method 5035	8260B	5-100 µg/kg	Ice
SVOCs, PAHs	One 6-inch acetate sleeve	3540C	8270C	330-1,700 µg/kg	Ice
PCBs	One 6-inch acetate sleeve	3540C	8082	33-67 µg/kg	Ice
Title 22 Metals	One 6-inch acetate sleeve	3010/3005	6010B	0.5-500 µg/kg	Ice
* Dioxins, furans	One 6-inch acetate sleeve	8290	8290	2-10 pg/g	Ice
* Pesticides	One 6-inch acetate sleeve	3540/3550	8081A	1.7-100 µg/kg	Ice

Notes:

<sup>1</sup> - approximate detection limits

Pg/g-picogram per gram

TPH-gasoline – Total Petroleum Hydrocarbons as gasoline

TPH-diesel – Total Petroleum Hydrocarbons as diesel

TPH- oil – Total Petroleum Hydrocarbons as oil

VOCs- Volatile Organic Compounds

BTEX – Benzene, Toluene, Ethyl Benzene and Xylenes

SVOCs- Semi-Volatile Organic Compounds

PAHs- Polynuclear Aromatic Hydrocarbons

PCBs- Polychlorinated Biphenols

\*- only analyzed if Pentachlorophenol is detected in the SVOC analysis

## **2.7 Decontamination Procedures**

All down-hole boring and sampling equipment will be decontaminated before use by scrubbing with laboratory-grade detergent wash and double rinsing with tap water. To avoid cross contamination between sampling locations, soil sampling equipment will be decontaminated before initial use and in between sampling points, using the same decontamination procedure. Rinsate water will be containerized in a 55-gallon, Department of Transportation (DOT)-certified, labeled drum. The drum(s) will be stored near the sampling locations until completion of planned field activities. The rinsate water will then be transported off-site for disposal.

## **2.8 Soil Borehole Abandonment**

Soil cores removed at each sampling location will be stockpiled adjacent to each boring. Once soil samples have been collected, each bore will be abandoned by placing the cuttings into their respective boreholes. The remainder of each borehole will be filled with Portland cement to bring the level to grade.

## **2.9 Report of Initial Soil Quality Investigation**

A report of activities and findings will be prepared for submission to the DTSC upon completion of field work and receipt of the laboratory reports. This report will include:

- Description of field methods.
- Disposition of waste materials.

- Map depicting sampling locations and analytical results.
- Chain of custody documents for samples.
- Certified analytical test results for samples.
- Data evaluation and conclusions.
- Recommendations, if appropriate.

Recommendations for additional assessment and/or clean-up actions will be made based on an evaluation of the data obtained during execution of this work plan. Analytical data will be evaluated based on the potential risk to groundwater, or to potential receptors such as site workers and/or adjacent property occupants and the environment.

### **3.0 Project Schedule**

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ECI will notify the DTSC at least two weeks prior to commencing field activities. A site specific Health and Safety Plan will be prepared and submitted to the DTSC, prior to initiation of field activities at the site. Underground Service Alert will be contacted at least 48 hours prior to digging. Any required permits and/or oversight agency notifications will be made in advance of field activities. Soil borings and sample collection can be completed in one to two field days. Analysis of soil and concrete samples will be completed within five to ten days of sample receipt by the designated laboratory. An initial soil quality assessment report will be prepared and provided to DTSC within twenty days of receipt of the final laboratory analytical data.

### **4.0 Limitations**

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This work plan has been prepared for the exclusive use of Ecology Control Industries, with specific application to the site located at 13738 Slover Avenue in Fontana, California. The use of this report, its contents, or any part of it, by anyone other than Client or authorized designee, is not allowed.

### **5.0 References**

Ecology Control Industries, *Section VI – Standardized Permit Closure Plan*, (January, 2003).

Department of Toxic Substances Control, Northern California Geological Services Unit, *Memorandum-Closure Plan, Ecology Control Industries, San Bernardino County, Fontana, California, Project No. 22045/400991-48/6-HWMP*, (December 14, 2005).

## 6.0 Signatures

---

The work described in this work plan will be performed under the direct supervision of a California State Registered Geologist.

Report prepared by:

Original Signed by Megan Curran

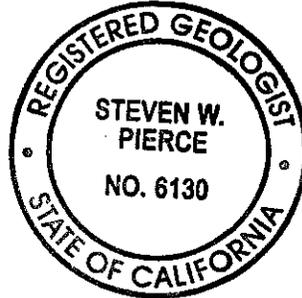
Megan Curran  
Project Scientist  
Shaw Environmental, Inc.

Report reviewed by:

Original Signed by Sydney Geels

Sydney Geels  
Program Manager/QA/QC Officer  
Shaw Environmental, Inc.

Report reviewed by:

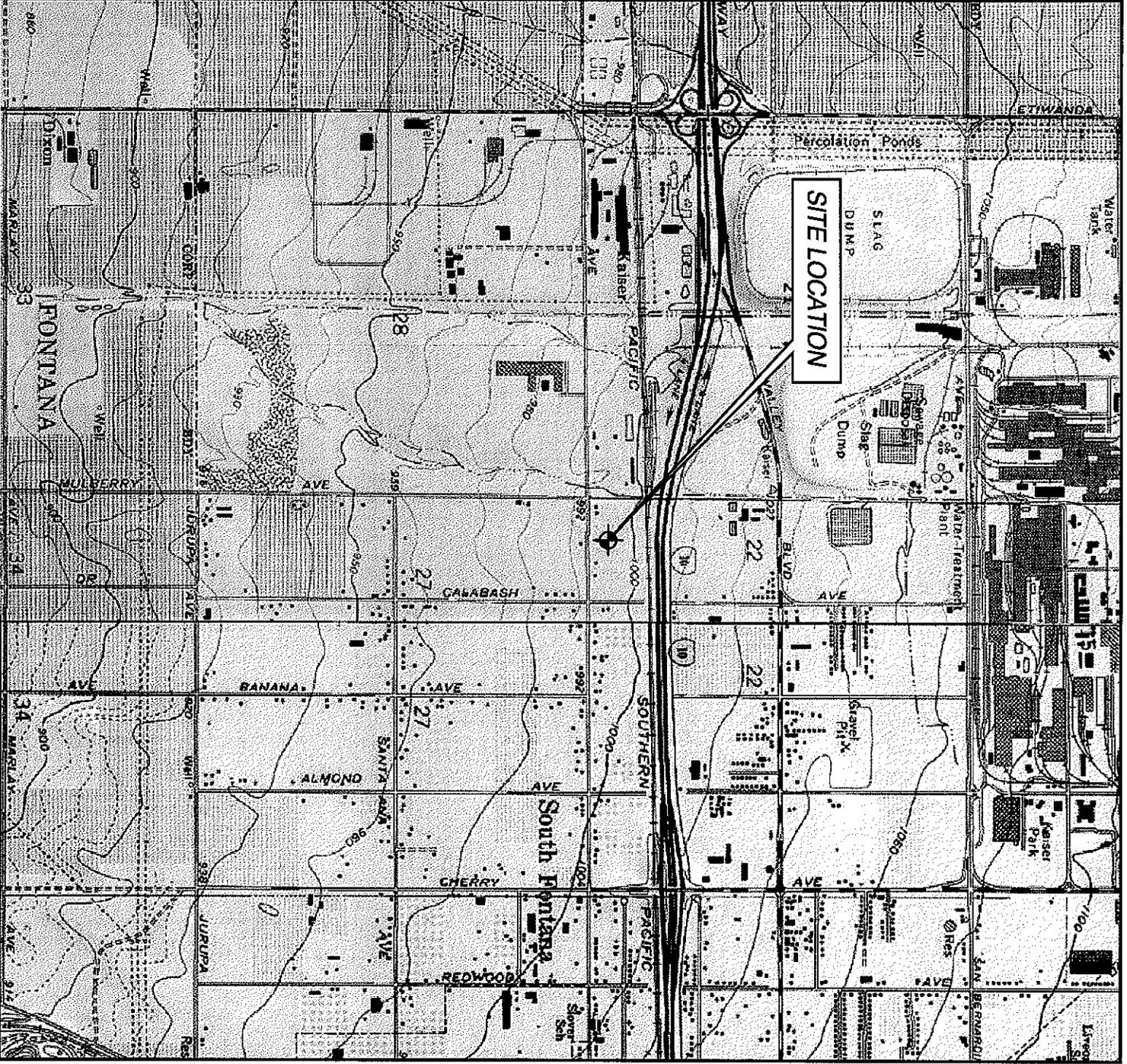


Original Signed by Steven Pierce

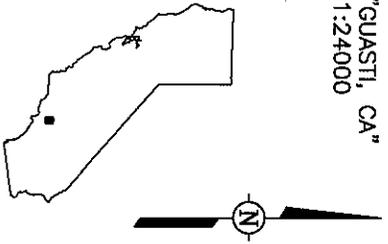
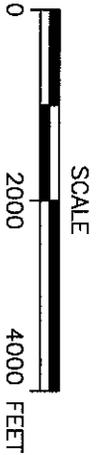
Steven Pierce  
California Professional Geologist  
No. 6130 (Expires 03/31/06)  
Shaw Environmental, Inc.

## FIGURES

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
FONTANA	---	Concord	SCHAEFFER	3/7/06		119731-A1



REFERENCE:  
 7.5' USGS TOPOGRAPHIC QUADRANGLE OF "GUASTI, CA"  
 DATED 1978; PHOTOREVISED 1981; SCALE=1:24000



**Shaw** Shaw Environmental, Inc.

ECOLOGY CONTROL INDUSTRIES  
 TORRANCE, CALIFORNIA

FIGURE 1

SITE VICINITY MAP  
 ECI FACILITY  
 13738 SLOYER AVENUE  
 FONTANA, CALIFORNIA

DRAWING NUMBER 119731-A2

APPROVED BY

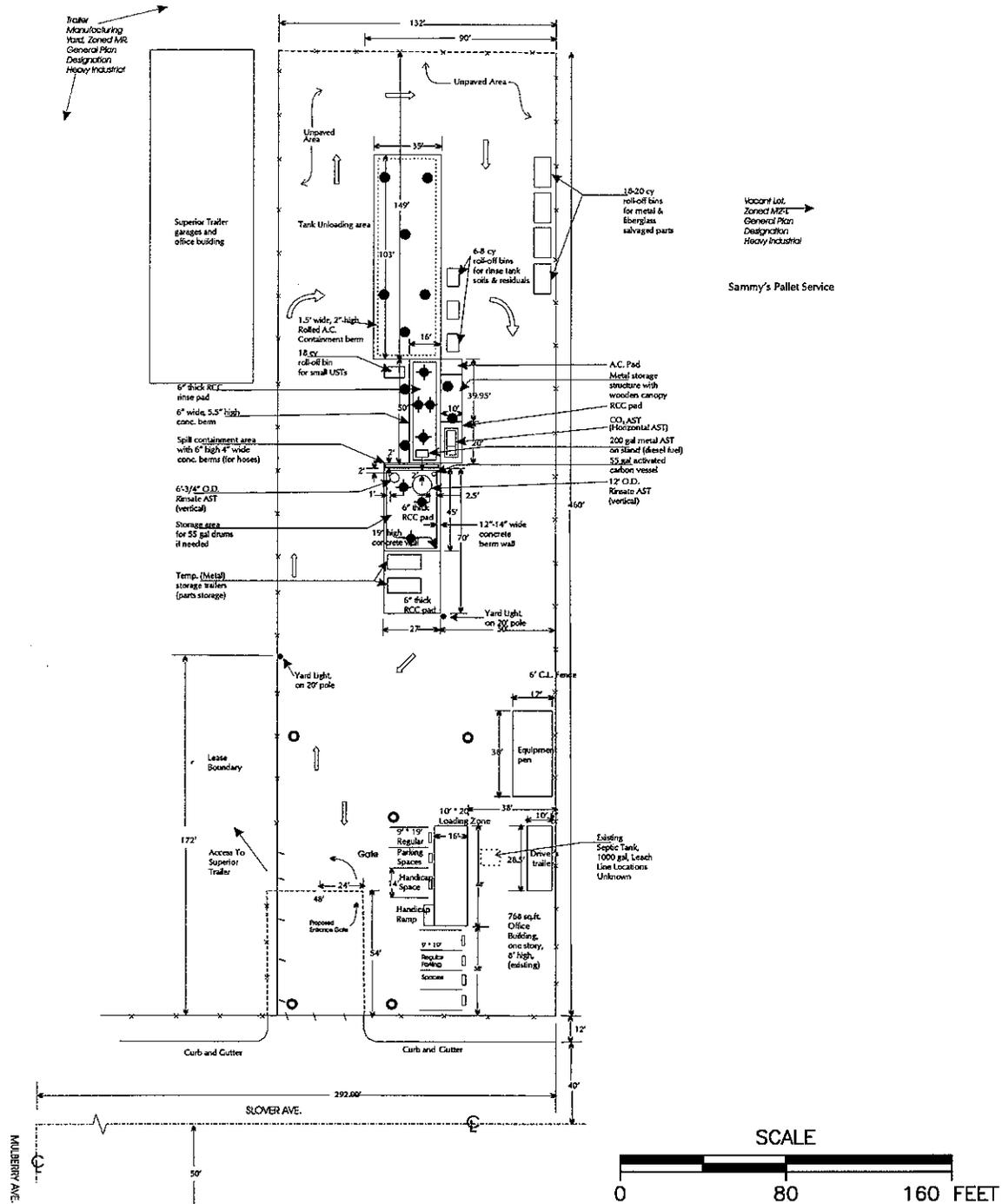
CHECKED BY

DRAWN BY SCHAEFFER 3/7/06

OFFICE Concord

X-REF ---

CONFIRM



LEGEND

- SOIL SAMPLING POINT, COLLECTED 6" AND 2' BELOW SURFACE GRADE
- ◆ CO-LOCATED SOIL AND CONCRETE CORE SAMPLING LOCATIONS, SOIL COLLECTED AT 6" AND 2' BELOW SURFACE GRADE
- BACKGROUND SAMPLES
- FENCE



ECOLOGY CONTROL INDUSTRIES  
TORRANCE, CALIFORNIA

FIGURE 2  
CONFIRMATION SOIL SAMPLE  
LOCATIONS  
ECI FACILITY  
13738 SLOVER AVENUE  
FONTANA, CALIFORNIA

## **APPENDIX A**

# **QUALITY CONTROL PLAN FOR INITIAL ASSESSMENT OF SOIL QUALITY AT THE ECI FONTANA FACILITY**

**QUALITY CONTROL PLAN FOR INITIAL ASSESSMENT  
OF SOIL QUALITY AT THE ECI FONTANA FACILITY**

**ECOLOGY CONTROL INDUSTRIES  
13738 SLOVER AVENUE  
FONTANA, CALIFORNIA**

Prepared for:

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19500 Normandie Avenue  
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Prepared by:

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4005 Port Chicago Highway  
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Shaw Project No. 119731.01

March 2006



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## **1.0 Introduction and Objectives**

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This Quality Control Plan (QCP) was prepared by Shaw Environmental, Inc. on behalf of Ecology Control Industries (ECI), to comply with the Department of Toxic Substances Control's (DTSC)'s request to further define quality assessment/quality control procedures that will be implemented during assessment activities at ECI's facility in Fontana, California. This plan discusses sampling procedures, analytical test methods and data review procedures to be used during the proposed investigation. The objective of the plan is to assure that the chemical data collected during this investigation have a well defined need, use or purpose; are technically defensible; comply with applicable specifications and standards and can be used for project decisions.

## **2.0 Sampling and Analytical Program**

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This section discusses the representative sampling methods and analytical procedures to be employed at the site.

### **2.1 Soil Sampling**

The twenty-two planned direct-push soil borings (17 for investigation and 5 for background sampling) will be continuously advanced to a total depth of 2 feet below surface grade (bsg). Upon retrieval, samples will be collected for laboratory analysis from 6 inches and 2 feet bsg (for a total of forty-four soil samples). The portion of the sample to be analyzed for volatile organic compounds will be collected using an EnCore sampler (or equivalent). A 6-inch long portion of the sample core liner will then be sealed at both ends using Teflon tape and polyethylene caps. Approximately one field duplicate sample will be collected for every ten samples collected (for a total of four field duplicate samples). The remainder of the sample will be used for headspace screening using a photo-ionization detector, calibrated using manufacturer's instructions, and for lithological evaluation.

The sample containers will be labeled, enclosed in a plastic bag, and placed into an insulated cooler containing blue ice or cubed ice to maintain low sample temperature. The coolers will be affixed with a custody seal and delivered to the laboratory within 24 hours of sample collection.

## **2.2 Sampling Containers, Preservatives and Holding Times**

The manufacturer will provide cleaned EnCore sampling containers. The contract Environmental Laboratory Accreditation Program (ELAP)-certified lab will keep the manufacturer's certificates that confirm that the containers have been cleaned.

All samples will be packaged in coolers with blue ice or cubed ice and shipped or hand delivered to the contract lab for analysis. There will be enough blue ice or cubed ice in the sample cooler to maintain a temperature of 4° C or less during transportation. Shaw will include a temperature blank (40-ml VOA) in the cooler. The laboratory will record the temperature and condition of the temperature blank at the time of receipt. Upon receipt at the laboratory, if the temperature of the temperature blank is greater than 4°C, the lab will notify the project manager and an appropriate course of action will take place, which may include collection of new samples. Sample holding times are analytical test dependent.

## **2.3 Sample Handling and Custody**

This section presents sample identification, preparation and shipping, and field documentation procedures that will be used by field personnel.

### **2.3.1 Sample Identification**

Samples will be collected in containers appropriately labeled to uniquely identify each sample. All sample containers will be labeled with the following information:

- Sample ID
- Date and time collected.
- Sample location and type.
- Preservation method
- Analytical parameters
- Name of sample technician
- Project name and number.

### **2.3.2 Sample Shipping**

The shipping of samples to the analytical laboratory will be performed according to the Department of Transportation (DOT) regulations. Transportation methods will be selected to assure that the samples arrive at the laboratory in time to permit testing according to established holding times and project schedules. No samples will be accepted by the receiving laboratory

without a properly prepared analysis request and chain-of-custody (ARCOC) and properly labeled and sealed shipping container(s).

### **2.3.3 Sample Custody**

Sample information will be recorded on an ARCOG. ARCOGs are used to track custody of the sample from the field to the laboratory. The ARCOGs will contain the following information:

- Sample identification number
- Date and time of sample collection
- Name and signature of the sample collector
- Matrix type
- Preservative(s) used
- Volume of the sampling container
- Analytical method(s) to be used
- Date the samples are relinquished to the laboratory
- Signature of the person relinquishing samples
- Signature of the person receiving the samples
- Special field notes or instructions pertinent to the sample analyses.

ARCOCs will accompany all sample shipments. The ARCOG will be used as evidence of sample collection, shipment, laboratory receipt and laboratory custody until disposal. A sample is considered in custody if it is:

- In actual possession or in view of the person who collected the samples
- Locked in a secure area
- Placed in an area restricted to authorized personnel
- Placed in a container and secured with an official seal, such that the sample cannot be reached without breaking the seal.

Sample custody is the responsibility of the field sampling technician from the time of sampling until the samples are accepted by the contract lab or a courier service for delivery to the lab. Thereafter, the laboratory performing the analysis will maintain custody.

## **2.4 Analytical Testing**

In addition to providing a custody exchange record for the samples, the ARCOG serves as a formal request for sample analysis. After the lab receives the samples, the sample custodian will

inventory each shipment before signing for it, and note any discrepancy in the number of samples, the temperature of the cooler or broken samples. The lab will notify Shaw immediately of many problems identified with the shipped samples.

The samples will be submitted to an ELAP-certified for analysis for:

Constituent	Sample Containers	Preparation method	Analysis Method	Detection Limit <sup>1</sup>	Preservative
TPH-gasoline TPH-diesel	One 6-inch acetate sleeve	Extraction 5035/3550	8015M	1-10 mg/kg	Ice
TPH-oil	One 6-inch acetate sleeve	Extraction 3550	1664A	100 mg/kg	Ice
VOCs, fuel oxygenates, BTEX	One 5-gram Encore Sampler	EPA method 5035	8260B	5-100 µg/kg	Ice
SVOCs, PAHs	One 6-inch acetate sleeve	3540C	8270C	330-1,700 µg/kg	Ice
PCBs	One 6-inch acetate sleeve	3540C	8082	33-67 µg/kg	Ice
Title 22 Metals	One 6-inch acetate sleeve	3010/3005	6010B	0.5-500 µg/kg	Ice
* Dioxins, furans	One 6-inch acetate sleeve	8290	8290	2-10 pg/g	Ice
* Pesticides	One 6-inch acetate sleeve	3540/3550	8081A	1.7-100 µg/kg	Ice

Notes:

<sup>1</sup>- approximate detection limits

Pg/g-picogram per gram

TPH-gasoline – Total Petroleum Hydrocarbons as gasoline

TPH-diesel – Total Petroleum Hydrocarbons as diesel

TPH- oil – Total Petroleum Hydrocarbons as oil

VOCs- volatile organic compounds

BTEX – Benzene, Toluene, Ethyl Benzene and Xylenes

SVOCs- semi-volatile organic compounds

PAHs- polynuclear aromatic hydrocarbons

PCBs- polychlorinated biphenols

\*- only analyzed if Pentachlorophenol is detected in the SVOC analysis

### **3.0 Quality Control Requirements**

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This section discusses the types of Quality Control (QC) samples to be collected and the process for laboratory Quality Control and evaluation of the data.

#### **3.1 QC Samples**

To verify the reliability of field sampling procedures and materials, field QC samples will be collected for each sampled media, each sample shipment, and each sampling event. Field QC samples are necessary for establishing data comparability, determining the total measurement error (the overall precision of the measurement system from sample collection to analysis) and for QC purposes during sample handling and shipment. Field QC samples to be collected will include field duplicate samples.

**Field Duplicates:** Field duplicates are samples collected at the same time and from the same source as their corresponding primary samples. The identity of the duplicate is concealed or "blinded" from the laboratory. The purpose of duplicate samples is to assess the overall precision of the sampling effort; the purpose of submitting them blind is to assess the laboratory's precision. Field duplicates will represent approximately 10% of all field samples.

#### **3.2 Quality Control Objectives for Contract Lab**

The objective of the laboratory QC program is to provide a system operating in a state of statistical control where errors have been reduced to acceptable levels. The contract laboratory QC program will include the following elements:

- Certification of operator competence.
- Internal QC checks, such as recovery of known additions through use of surrogate standards, matrix spikes and laboratory control samples.
- Analysis of externally supplied standards.
- Analysis of reagent blanks.
- Calibration with standards using internal or external standard procedures.
- Calibration verification with second source standard.
- Analysis of duplicates.
- Maintenance of control charts.

Strict adherence to Good Laboratory Practices (GLP) and consistent use of Standard Operating Procedures (SOPs) are also essential for a successful QC program. The laboratory will have the current revisions of the SOPs readily available for all staff. At a minimum, SOPs will be written for the following procedures and methods: sample receipt/control/disposal, sample preparation/extraction, sample analysis, result calculation, database management, health and safety, and corrective action.

### **3.2.1 Internal Laboratory QC Checks**

The recovery of known additions is a part of laboratory analytical protocols. The use of known additives allows detecting the matrix interferences and estimating the impact of these interferences, when present. It also allows evaluating the efficiency of extraction procedures and overall accuracy of analysis. Internal QC checks will include:

- Laboratory Control Samples (LCS)/Laboratory Control Duplicates (LCD).
- Matrix Spikes/Matrix Spike Duplicates.
- Laboratory Sample Duplicates (SD).
- Surrogate Standards.
- Internal Standards.
- Method Blanks.
- Instrument Blanks.
- Post-Digestion Sikes/Method of Standard Additions (MSA).

**Laboratory Control Samples/Laboratory Control Duplicates:** Laboratory control sample and laboratory control duplicate are matrix-equivalent QC check samples (analyte-free water, laboratory sand, or sodium sulfate) spiked with a known quantity of specific analytes that are carried through the entire sample preparation and analysis process. The spiking solution used for LCS/LCD preparation is of a source different from the stock that was used to prepare calibration standards.

**Matrix Spikes and Matrix Spike Duplicates:** Matrix spike and matrix spike duplicate are QC check samples that measure matrix-specific method performance. A matrix spike sample is prepared by adding a known quantity of target analytes to a sample prior to sample digestion or extraction. In general for organic-compound and metal analyses, a MS/MSD pair is prepared and analyzed with each preparation batch or for every 20 field samples. For inorganic-compound analysis, a single MS and a laboratory sample duplicate are often prepared and analyzed with each batch. The LCS results, together with matrix-spike results, allow verifying

the presence of matrix effects. Shaw will provide the analytical laboratory the MS/MSD samples.

**Laboratory Sample Duplicates:** For laboratory sample duplicate analyses, a sample is prepared and analyzed twice. Laboratory sample duplicates are prepared and analyzed with each batch of samples for most inorganic analyses.

**Surrogate Standards:** Organic compound analyses include the addition, subsequent quantitation, and ultimate recovery calculation of surrogate standards. Surrogate standards are selected to meet all of the following requirements:

- Compounds not requested for analysis
- Compounds that do not interfere with the determination of required analytes
- Compounds that are not naturally occurring, yet chemically similar to the required analytes
- Compounds exhibiting similar response to analytes under determination.

Surrogate standards are added to every analytical and QC check sample at the beginning of the sample preparation. The surrogate recovery is used to monitor matrix effects and losses during sample preparation. Surrogate standard control criteria are applied to all analytical and QC check samples, and if surrogate criteria are not met, re-extraction and re-analysis may be performed.

**Internal Standards:** Some organic compound analyses include the addition, subsequent quantitation, and ultimate recovery calculation of internal standards. Internal standards are compounds that meet the above-described requirements for surrogate standards. They are added to sample extracts at the time of instrument analysis, and are used to quantitate results through the internal standards calibration procedure.

Internal standard recoveries are used to correct for injection and detector variability. Gas chromatography/mass spectrometry must use internal standards and have acceptability limits for internal standard areas. Use of internal standard quantitation for gas chromatography methods is optional.

**Method Blank:** A method blank is used to monitor the laboratory preparation and analysis systems for interferences and contamination from glassware, reagents, sample manipulations, and the general laboratory environment. A method blank is carried through the entire sample preparation process, and is included with each batch of samples.

**Instrument Blank.** An instrument blank is used to monitor the cleanliness of the instrument portion of a sample analysis process. Instrument blanks are usually just the solvent or acid solution of the standard used to calibrate the instrument. Routine metal analyses receive an instrument blank every ten samples. Instrument blanks are also analyzed on an as-needed basis for troubleshooting. Some methods of inorganic analysis do not have a distinctive preparation step. For these tests the instrument blank, which contains all reagents used with samples, is considered to be the method blank.

**Post-Digestion Spikes and the Method of Standard Addition (MSA):** A post-digestion spike is used during metal analysis to assess analytical interferences that may be caused by general matrix effects or high concentrations of analytes present in the sample. A digested sample is spiked with the analyte of interest at a known concentration, and the spike recovery is used to estimate the presence and magnitude of interferences.

If a post-digestion spike recovery fails to meet acceptance criteria, the MSA will be used to quantify the sample result. The MSA technique compensates for a sample constituent that enhances or depresses the analyte signal. To perform the MSA, known amounts of a standard at different concentrations are added to 2-3 aliquots of digested sample, and each spiked sample and the original unspiked sample are analyzed. The absorbance is then plotted against the concentration, and the resulting line is extrapolated to zero absorbance. The point of interception with the concentration axis is the indigenous concentration of the analyte in the sample.

### **3.2.2 Data Quality Indicators**

The quality of analytical data is assessed in terms of its precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters. Because precision and accuracy information is expressed in several ways, a laboratory analytical chemist or statistician will carefully review the data obtained for this project. The application of PARCC parameters to assess data quality is described below.

### **3.2.2.1 Precision**

Precision measures the reproducibility of measurements under a given set of conditions. The relative percent difference (RPD) can be calculated to assess a method's precision.

The laboratory uses MS/MSD pairs to assess the precision of analytical procedures, with one MS/MSD pair analyzed for every batch of up to 20 samples.

LCS/LCD are used when matrix spikes are not practical due to the nature of sample or analytical method used. In such cases they are prepared and analyzed with each batch of samples instead of MS/MSD. LCS/LCD may also be prepared in place of MS/MSD in the case that a sufficient sample volume was not obtained in the field to perform the MS/MSD analysis. For inorganic analyses, analytical precision is usually calculated based on the sample and sample duplicate results.

Statistically based acceptability limits for RPDs have been established for each method of analysis and sample matrix. The laboratory reviews the QC samples to ensure that internal QC data lie within the limits of acceptability. Any suspect trends are investigated and corrective actions taken. The analytical-precision acceptability limits will be as follows:

Soil - 20% for metals and 30% for all other analyses  
Water - 20% for all analyses

Precision of sampling procedures is evaluated by collecting and analyzing "blind" field duplicate samples (field QC samples) at a rate of one for every 10 samples. Sampling precision will be evaluated based on the RPD for field duplicate samples. The field-precision acceptability limits will be as follows:

Soil - 50% for all analyses  
Water - 20% for all analyses

Field precision will be monitored for evaluating sampling techniques and sample handling procedures. Analytical data will not be qualified during data validation process based on the field precision values.

### **3.2.2.2 Accuracy**

Accuracy measures the bias of an analytical system by comparing the difference of a measurement with a reference value, or established concentration, independent of routine

calibration. The percent recovery of an analyte, which has been added to the environmental samples at a known concentration before extraction and analysis, provides a quantitation tool for analytical accuracy.

Percent recoveries for MS, MSD, and LCS that are analyzed for every batch of up to 20 samples, serve as a measure of analytical accuracy. Surrogate standards are added to all samples, blanks, MS, MSD and LCS analyzed for organic contaminants to evaluate the method's accuracy and help to determine matrix interferences.

As a general rule, the recovery of most organic compounds spiked into samples should fall within a range of 70-130% that represents the EPA advisory acceptability limits for MS, MSD and LCS for all organic analysis methods. The surrogate standard advisory acceptability limits are also 70-130% for all organic analyses with the exception of GC/MS methods, where these limits are specified in the methods for each matrix. Laboratories may use the advisory limits until the in-house, statistically-based control limits are developed for each method of organic analysis and sample matrix. The EPA SW-846 recovery acceptance limits for metal analysis are at 75%-125%.

Statistical control limits are defined as the mean recovery, plus or minus three standard deviations, of the 20 data points, with the warning limits set as the mean plus or minus two standard deviations. The laboratory will review the QC samples and surrogate standards on a per-run basis to ensure that internal QC data lie within the limits of acceptability. Any suspect trends will be investigated and corrective actions taken.

### **3.2.2.3 Representativeness**

Unlike precision and accuracy, which can be expressed in quantitative terms, representativeness is a qualitative parameter. Representativeness is the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point or an environmental condition. It is a qualitative parameter that depends on proper design of the sampling program.

Field personnel will be responsible for ensuring that samples are representative of field conditions by collecting and handling samples according to approved field protocols. Errors in sample collection, packaging, preservation, or chain-of-custody procedures may result in samples being judged non-representative and form the basis for rejecting the data.

Data generated by the laboratory must be representative of the laboratory database of accuracy and precision measurements for analytes in different matrices. Laboratory procedures for sample preparation ensure that samples used for analysis are representative of the whole sample. Samples to be analyzed for volatile parameters will be collected using EnCore samplers in accordance with U.S. EPA method 5035 to minimize loss of volatile compounds during sampling.

#### **3.2.2.4 Comparability**

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another, whether it was generated by a single laboratory or during inter-laboratory studies. The use of standardized field and analytical procedures ensures comparability of analytical data.

Sample collection and handling procedures will adhere to approved protocols. Laboratory procedures will follow standard analytical protocols, use standard units, standardized report formats, follow the calculations as referenced in approved analytical methodologies, and use a standard statistical approach for QC measurements.

#### **3.2.2.5 Completeness**

Completeness is a measure of whether all the data necessary to meet the objectives of the project have been collected. For the data to be considered complete, they must meet all acceptance criteria including accuracy and precision and any additional criteria specified for the specific analytical method. Data are reviewed to keep invalid data from being processed through data collection.

The goal for completeness for all QC parameters, except holding times, will be 90%. The goal for holding times will be 100%. If these goals are not achieved, the sources of non-conformances will be evaluated to determine whether re-sampling and re-analysis is necessary.

#### **3.2.3 Batch Quality Control**

Many analytical laboratory processes are batch processes, and the batch is a basic unit for the frequency of some quality control elements. A batch is a group of samples of similar matrix that behave similarly with respect to the procedures being employed. The following two types of batches can be identified at the analytical laboratory:

- Preparation batch.
- Instrument batch.

A preparation batch is a group up to twenty field samples which are prepared (e.g., extracted or digested) simultaneously or sequentially without interruption. Samples in each batch are of similar matrix (e.g., soil, sludge, liquid waste, water), are treated in a similar manner, and are processed with the same lots of reagents. For organic-compound analyses each batch will contain a method blank, a LCS and a MS/MSD pair. For inorganic compound analyses, each batch will contain a method blank, a LCS, MS and a SD. These QC check samples are not counted into the maximum batch size of 20.

An instrument batch is a group of samples, which are analyzed within the same analytical run sequence. If the continuous operation of an instrument is interrupted (shut down for maintenance, etc.), a new instrument batch must be started. The instrument batch includes an instrument blank, calibration check standards, extracts/digestates of the field samples and QC check samples. The number of samples in the analytical batch is not limited, but the frequency of the calibration check standard and instrument blank analysis is mandated in each particular method.

For volatile-organic-compound analyses by GC or GC/MS, the preparation and instrument batch are the same, since the sample preparation (purge and trap) is performed as part of the instrument analysis. For these analyses, a batch is defined as a group of up to 20 field samples that are sequentially loaded on the instrument and analyzed as a single-analytical-run sequence. Laboratory QC check samples (method blank, a LCS, MS/MSD pair) will be analyzed as part of the batch in addition to 20 field samples.

#### **3.2.4 Statistical Control Limits**

Control charts, which are essential instruments for quality control, are used to determine if an analytical system is in a state of control and to visualize or to monitor the relative variability of repetitive data. Although EPA provides advisory limits for analyte spikes and surrogate standard recoveries, laboratories are required to develop internal control limits in order to detect and prevent occurrence of any out-of-control conditions associated with sample preparation and analysis. The control charts will be based on the LCS and surrogate standard recoveries for each method and for each matrix.

The means charts will be created from the average and the standard deviation of 20 data points. Each control chart will consist of a centerline representing the average percent recovery (%R), upper and lower warning limits (UWL and LWL), and upper and lower control limits (UCL and LCL). A standard deviation (S) will be used to calculate warning and control limits as two times the standard deviation and three times the standard deviation, respectively.

Any trends, originating from changes in personnel or instrumental conditions, may be timely detected by implementing updates of the charts. A laboratory process will be considered outside of statistical control whenever any of certain conditions as revealed by control charts are observed. These conditions, which are indicative of shifts, trends and biases related to out-of-control situations during sample preparation and analysis, may be as follows:

- Any point outside the control limits.
- Any three consecutive points are outside the warning limits.
- Any eight consecutive points are on the same side of the centerline.
- Any six consecutive points are such that each point is larger or smaller than its immediate predecessor (a trend is observed).
- Any obvious cyclic pattern is seen in the points.

If, at any time during the analysis, the process is out of control and data quality and usability are affected, corrective action will be taken and documented. The corrective action will be conducted through the following steps:

- 1) What actions were taken to bring the process back into control.
- 2) What actions were taken to prevent reoccurrence of the out-of-control situation.
- 3) What was done with the data collected while the process was out of control.

The laboratory will document the corrective action steps in corrective action reports, including proof that the changes were effective.

### **3.2.5 Detection Limits**

Sensitivity of an analytical method can be expressed in several different ways through definitions of detection and quantitation limits. The laboratory will determine the Method Detection Limits (MDLs) for each method, instrument, analyte and matrix. The MDL is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

An MDL study involves preparation/digestion and analysis of seven replicates of a given matrix spiked with target analytes at concentrations 2-5 times greater than the estimated MDL. The MDLs for metals in soil will be derived from the MDLs for metals in water. At a minimum, the laboratory will conduct annual MDL studies.

The SW-846 and CLP methods for metal analysis will require annual and quarterly Instrument Detection Limit (IDL) studies, respectively. The IDL studies are conducted with standard solutions in water according to the MDL procedure.

The Practical Quantitation Limit (PQL) is the lowest level that can be reliably achieved within specified limits for accuracy and precision during routine laboratory operations. The PQLs are usually established at 2-10 times greater than the corresponding MDLs, and they are often affected by dilutions and matrix interferences.

Project data will be routinely reported at the method detection limits.

### **3.2.6 Analytical Standards and Reagents**

The accuracy of sample target analyte quantitation is directly related to the accuracy of the standards used. To ensure the highest quality standard, primary reference standards used by the laboratory will be NIST-traceable. When standards are received at the laboratory, unique identification numbers, dates of receipt, supplier, lot number, purity, concentration and expiration dates are recorded in a standards logbook. Vendor certifications sent with the standards will be also filed. The laboratory will have a written policy and a SOP on standard traceability within the laboratory, standard re-validation and expiration time.

Organic-free reagent water will be used for organic-compound analysis. Laboratory reagent water for inorganic analysis that meets the resistivity requirement of Type II water (greater than 1 meg-ohm-cm at 25<sup>0</sup>C), will be measured and recorded in a logbook. Method blanks made with

reagent water will be prepared with each preparation batch and tested to show that the water is free of method's interferences.

Reagent-grade chemicals will be purchased as required by each test method, and the date received, batch or lot, lot number, supplier, and date opened will be documented.

### **3.2.7 Calibration Requirements**

All instruments will be calibrated and the calibration-acceptance criteria met before samples are analyzed. Calibrations will be prepared with NIST-traceable standards and analyzed per methods requirements. Initial calibration acceptance criteria will be per the CLP SOW, SW-846 or other applicable guidance documents. In addition, initial calibration will meet one of the following requirements:

- The lowest concentration of the calibration standard will be less than or equal to the PQL based on the final volume of extract or sample.
- For each target analyte, at least one of the calibration standards will be at or below the regulatory limit (action level).

Before samples are analyzed, initial calibration will be verified with a second source standard prepared at the mid-point of the calibration curve. Initial calibration verification will meet the acceptance criteria of the CLP SOW, SW-846, or other applicable guidance documents. Daily calibration verification will be conducted at the method-prescribed frequencies, and will meet the acceptance criteria of the CLP SOW, SW-846, or other applicable guidance documents. Daily calibration verification will not be used for quantitation of target analytes.

Calibration data (calibration tables, chromatograms, instrument printouts and laboratory logbooks) will be clearly labeled to identify the source and preparation of the calibration standard and, therefore, will be traceable to the standard preparation records.

### **3.2.8 Training**

The laboratory will have an established policy and procedure on training and documenting of the analyst's competency. Each staff member that performs sample preparation and analysis will demonstrate their proficiency through preparation and analysis of four LCSs as described in SW-846. Analyst will be considered proficient if the acceptance criteria for method accuracy and precision are met. The laboratory will maintain all training records on file.

### **3.3 Laboratory Corrective Action**

Corrective action takes place when a circumstance arises that has a negative impact on the quality of the analytical data generated during sample analysis. For corrective action to be initiated, awareness of a problem must exist. In most instances, the individuals performing laboratory analyses can best recognize problems that will affect data quality. Keen awareness on their part can frequently detect minor instrument changes, drifts, or malfunctions which can then be corrected, thus preventing a major breakdown in the quality control system in place. If major problems arise, they are in the best position to recommend the proper corrective action and initiate it immediately, thus minimizing data loss. Therefore, the laboratory personnel will have a prime responsibility for recognizing a nonconformance and the need for implementing and documenting the corrective action. If a situation arises requiring corrective action, the following closed-loop corrective action process will be used:

- 1) Define the problem.
- 2) Assign responsibility for investigating the problem.
- 3) Investigate and determine the cause of the problem.
- 4) Determine corrective action course to eliminate the problem.
- 5) Assign responsibility for implementing the corrective action.
- 6) Determine the effectiveness of the corrective action and implement the correction.
- 7) Verify that the corrective action has eliminated the problem.
- 8) If not completely successful, return to step 1.

The personnel identifying or originating a nonconformance will document it to include the following items:

- Identification of the individual (s) identifying or originating the nonconformance.
- Description of the nonconformance.
- Any required approval signatures.
- Method (s) for corrective action or description of the variance granted.
- Schedule for completing corrective action.

All affected project samples will be listed on the Nonconformance/Corrective Action Report. The laboratory Project Manager will notify the Shaw Project Manager of any laboratory nonconformance affecting the samples.

### **3.3.1 Batch Corrective Action**

Method quality control acceptance criteria determine whether a method is performing within acceptable limits of precision and accuracy. There is a method component and a "matrix" component to this determination. The method component measures the performance of the laboratory analytical processes during the sample analyses. The matrix component measures the method performance on a specific matrix. Some quality control elements uniquely measure the laboratory component of method performance but all QC elements measuring the matrix component also measure the method component.

Method blanks and laboratory control samples uniquely measure the method performance. Matrix spikes, matrix spike duplicates, laboratory sample duplicates, surrogate standards, post-digestion spikes measure the matrix component of method performance.

**Method Blank:** The method blank measures laboratory introduced contamination for the sample batch, and batch corrective action is initiated when contamination is found. It may include re-analysis of the blank, re-analysis of the samples, re-preparation and re-analysis of the blank, QC and samples, and assessment of the impact of the contamination on batch sample data. Although it is a goal to have no detected target analytes in the method blanks, analytes may be periodically detected in blanks due to the nature of the analysis or the reporting limit for the analyte. For example, common laboratory contaminants methylene chloride, acetone, and 2-butanone (MEK) may sometimes be found in blanks for volatile organic compound analysis.

A method blank will be considered acceptable if the following conditions are met:

- Target analytes are present at concentrations less than one half of the PQLs.
- Target analytes are present at concentrations less than 5% of the regulatory limits for these analytes.
- Target analytes are present at concentrations less than 5% of the sample results for these analytes.

If the method blank results do not meet these acceptance criteria, the laboratory will initiate corrective action.

The first step of corrective action is to assess the effect on the samples. For example, if an analyte is found only in the blank but not in any of the associated samples or if the target analyte in the blank is less than 5% of the value in the sample, no corrective action is necessary.

If corrective action is required, the method blank and any samples containing the same contaminant will be re-analyzed. If the contamination remains, the contaminated samples of the batch would be re-extracted and re-analyzed with a new method blank and QC check samples.

**Laboratory Control Sample:** For the batch to be considered acceptable, LCS must meet the accuracy acceptance criteria for target analytes. If the target analytes are outside of the acceptance limits, corrective action will be initiated. Corrective action will include re-extraction and re-analysis of the whole batch, including method blank, samples, and QC check samples.

If MS/MSD analyses are not conducted, a LCS/LCD pair will be analyzed with each batch of samples. If the LCS/LCD are outside method acceptance criteria for accuracy and precision, the whole batch will be re-extracted and re-analyzed, including method blank, samples and QC check samples.

**Matrix Spike and Matrix Spike Duplicate:** An MS/MSD pair is included with each batch of samples for organic compound and metal analyses, and a MS and laboratory sample duplicate are included with each batch of samples for inorganic compound analysis. These QC check samples allow evaluating the accuracy and precision of analysis and the influence of matrix effects.

Matrix spike data evaluation is more complex than blank or LCS data evaluation since matrix spikes measure matrix effects in addition to sample preparation and analysis effects. Sample heterogeneity, lithological composition of soils, and the presence of interfering chemical compounds often negatively affect accuracy and precision of analysis. If the native concentration of target analytes in the sample chosen for spiking is high relative to the spiking concentration, the differences in the native concentration between the unspiked sample and the spiked samples may contribute a significant error in the precision and accuracy. The accuracy and precision in this case are not representative of the true method and matrix performance. If the accuracy of MS/MSD analysis is outside the acceptability limits for any target analyte, the LCS will be evaluated. If the LCS accuracy limits are met, the MS/MSD recovery problem will be identified as matrix effect and no further action will be required. If the LCS accuracy limits are not met, corrective action will be implemented, and the affected samples and associated QC samples will be re-prepared and re-analyzed.

If the MS/MSD or sample/sample duplicate pair fail in precision due to observed matrix interferences, sample inhomogeneity, or the nature of the contaminant, corrective action will not be required, and the laboratory will make an appropriate notation in the case narrative.

### **3.3.2 Individual Sample Corrective Action**

In addition to batch corrective action, individual samples within a batch may also require corrective action. Re-extraction and re-analysis of individual samples will take place in the following situations:

- Surrogate standard recoveries are outside acceptability limits.
- Internal standard areas for GC/MS analyses are outside acceptability limits.
- Errors have been made during sample preparation, and results of analysis are not conclusive.

## **3.4 Data Reduction, Verification and Reporting**

All analytical data generated by the laboratory will be reviewed to assure the validity of reported data. This internal laboratory data review process will consist of data reduction and three levels of documented review followed by data reporting. Review processes will be documented using appropriate checklist forms, or logbooks, that will be signed and dated by the reviewer(s).

### **3.4.1 Data Reduction**

Data reduction involves the mathematical or statistical calculations used by the laboratory to convert raw data to the reported data. Reduction of analytical data will be performed by laboratory as specified in each of the appropriate analytical methods and laboratory SOPs. For each method, all raw data results will be recorded using method-specific forms or a standardized output from each of the various instruments. All data calculations will be verified and initialed by personnel both generating and approving them.

### **3.4.2 Laboratory Data Verification and Review**

The laboratory analyst who generates the analytical data will have the primary responsibility for the correctness and completeness of data. Each step of this verification and review process will involve the evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of data is essential in ensuring that data of known quality are generated consistently. All data generated and reduced will follow well-documented in-house protocols.

**Level 1 - Technical (Peer) Data Review:** Analysts will review the quality of their work based on an established set of guidelines, including the QC criteria established in each method. This review will, at a minimum, ensure that the following conditions have been met:

- Sample preparation information is correct and complete.
- Analysis information is correct and complete.
- Appropriate SOPs have been followed.
- Calculations are verified.
- There are no data transposition errors.
- Analytical results are correct and complete.
- QC samples are within established control limits.
- Blanks and laboratory control samples are within appropriate QC limits.
- Special sample preparation and analytical requirements have been met.
- Documentation is complete; for example, any anomalies and holding times have been documented and forms have been completed.

**Level 2 - Technical Data Review:** This review will be performed by a supervisor or data review specialist whose function is to provide an independent review of data packages. This review will also be conducted according to an established set of guidelines and will be structured to verify the following findings of Level 1 data review:

- All appropriate laboratory SOPs have been followed.
- Calibration data are scientifically sound, appropriate to the method, and completely documented.
- QC samples are within established guidelines.
- Qualitative identification of contaminants is correct.
- Manual integrations are justified and properly documented.

- Quantitative results and calculations are correct.
- Verification that data are qualified correctly.
- Documentation is complete; for example, any anomalies and holding times have been documented and appropriate forms have been completed.
- Data are ready for incorporation into the final report.
- The data package is complete and is in compliance with contract requirements.

The Level 2 review will be structured so that all calibration data and QC sample results are reviewed and all of the analytical results from at least 10% of the samples are checked back to the sample preparation and analytical bench sheets. If no problems are found with the data package, Level 2 review will be considered complete.

If any problems are found with the data package, an additional 10% of the sample results will be checked back to the sample preparatory and analytical bench sheets. This cycle will then be repeated until either no errors are found in the data set checked or until all data have been checked. All errors and corrections noted will be documented.

***Level 3 - Administrative (QA) Data Review:*** The Laboratory QA Manager will review 10% of all data packages. This review should be similar to the review as provided in Level 2 except that it will provide a total overview of the data package to ensure its consistency and compliance with project requirements. All errors noted will be corrected and documented.

### ***3.4.3 Internal Shaw Data Review***

The Project Manager or QC Manager will review the standard laboratory data packages to establish that the holding times for extraction and analysis, the calibration and internal QC check requirements have been met.

**APPENDIX B**

**ECOLOGY CONTROL INDUSTRIES; SECTION VI –  
STANDARDIZED PERMIT CLOSURE PLAN,  
EDITED MARCH 2006**

## SECTION VI - STANDARDIZED PERMIT CLOSURE PLAN

### PURPOSE

This guidance document was developed by the Department of Toxic Substances Control (Department) to assist owners and operators of facilities applying for standardized permit to produce a workable closure plan. This guidance document takes the owners and operators through a step by step closure plan preparation process. By completing this section, the owners and operators will meet the closure plan requirement for standardized permit.

For further closure plan guidance, the following documents may be referenced:

- Permit Writer Instructions for Closure of Storage & Treatment Facilities, 1993.
- RCRA Guidance Manual for Subpart G closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements, OSWER Policy Directive #9476.00-5, 1987.
- Clean Closure of Hazardous Waste Tank Systems and Container Units, EPA/530-SW-88-0005, OSWER Policy Directive 9476.00-11, 1987.
- Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), EPA #530-SW-86-036, OSWER Policy Directive Number 9476.00-6.

The first document may be obtained from Hossein Nassiri at the Department at (916)327-4493. The last three documents may be obtained from National Technical information Services at (703)487-4650 or U.S. EPA, Public Information Center at (415)744-1500.

### INSTRUCTION

1. Carefully read each instruction and question.
2. Provide answers to all requested information. The answers can be given in the blanks provided or in a separate document. If more space is needed than the space given, attach additional pages.
3. Check to see that all sections of the closure plan have been addressed.



2. Provide an estimate of waste that will be generated from closure activities (i.e. wash water generated, sand from sand blasting, etc.).  
 Note: The following figures can be used to estimate the quantity of waste generated from closure activities.

High-Pressure Washing

10 gallons of washwater generated per 1 drum cleaned.

50 gallons of washwater generated for 1 pump & lines cleaned.

4 gallons of washwater generated per square foot of surface cleaned.

Steam Cleaning

4 gallons of washwater generated per square foot of surface cleaned.

Sand Blasting

0.62 gallons of sand per square foot of surface cleaned.

- a) Calculate the amount of waste generated from the decontamination of containers and container areas.

**N/A.**

- b) Calculate the amount of waste generated from the decontamination of tanks and tank areas.

**Tank Decontamination Water:**

**600 gallons rinsate water from poly tanks and associated piping**

**1.75 cubic yards of solids from tank bottom**

**Structure and Equipment Decontamination Water:**

**12,400 gallons (3,100 square feet x 4gallons/foot) from cleaning Tank Holding Pad**

**3,420 gallons (885 square feet x 4gallons/foot) from cleaning Tank Cleaning Pad**

**4,860 gallons (1,215 square feet x4 gallons/foot) from cleaning secondary containment area**

**100 gallons from cleaning 1 double diaphragm pump and shovels**

- c) Calculate the waste generated from the decontamination of other areas.

**N/A**

**C. WASTE REMOVAL/TREATMENT**

(66265.112 (b)(4))

Describe how the final batch of waste will be removed from the facility or treated from the facility. The wastes can be removed/treated by the following methods:

- a) Processing the waste through the facility's process.

**N/A**

- b) Taking the waste off-site to a treatment facility.

***The rinsate water will be transported off-site for recycling.***

- c) Taking the waste off-site to a disposal facility.

**N/A**

- d) Other.

**N/A**

#### **D. DECONTAMINATION PROCEDURE**

(66265.112 (b) (4))

This section of the closure plan identifies all structures, buildings, and equipment that the facility plans to decontaminate.

1. Circle all equipment, structures, and buildings the facility plans to decontaminate. Identify all circled items on a plot plan. If an item cannot be identified on the plot plan, give a brief description including the number, size and material of construction. **See Attachment 3.**

- a) **Tanks. Rinsate Tank**

- b) Containers. **N/A**

- c) Treatment Process Units (e.g., evaporators, metal recovery). **N/A**

- d) **Secondary Containment Systems. For Rinsate Tank**

- e) Floors & Walls of Buildings. **N/A**

- f) **Pipes, Pumps, Valves, Hoses**

- g) **Loading and Unloading Pads. Asphalt Holding Pad, Concrete Processing Pad**

- h) Equipment (e.g., forklifts, dollies, pallets, **shovels**).

- i) Others.

2. Describe the procedures used to decontaminate equipment, buildings and structures identified in the previous question. The decontamination methods should be selected from the methods given in table 1. The decontamination methods should be selected based on criteria such as waste contaminants, level of contamination and surface materials being cleaned.

#### **Decontamination Procedures**

**The facilities equipment, tank pads and rinsate tank will be decontaminated by a triple rinse pressure washing as follows below. If necessary a degreasing solution such as "simple green" will be utilized.**

**Rinsate Tank: Tank entry will follow standard confined space entry procedures.**

- 1) Pumps and piping must be drained and blinded prior to tank entry.**

- 2) ***Prior to tank entry, vapor space will be tested and monitored utilizing a 4 gas confined space meter to assure the atmosphere is safe for entry and continued occupation.***
- 3) ***The tank entry/decontamination team will consist of a minimum of three people. The job requires a "confined space entry supervisor" to complete the ECI confined space entry permit. A minimum of one "hole watch", and one entrant are required whenever it is necessary to enter into a tank. Entrants remove contaminated soils and sludge with a shovel or scraping tool. The tank will then be triple rinsed with a pressure washer. The rinse water will be pumped to the rinsate holding tank with an air driven diaphragm pump.***
- 4) ***Upon completion of the cleaning, the tank will be visually inspected for residues.***

***Facility Equipment: Facility equipment such as: pumps, hoses, shovels and piping associated with the rinsate tank, will be triple rinsed on the processing pad. The rinsate water will be collected with a vacuum truck for off-site recycling.***

***Tank Holding Pad & Tank Processing Pad: Both pads will be triple rinsed using a pressure washer or if necessary a steam cleaner. A "simple green" cleaning solution will be utilized on heavily stained areas. The rinsate water will be collected using the above mentioned vacuum truck and transported off-site for recycling.***

## **E. CONFIRMATION SAMPLING PLAN FOR STRUCTURES, EQUIPMENT AND BUILDINGS**

(66265.112(b)(4))

This section of the closure plan shall describe a sampling plan that will demonstrate the ability of the facility to meet the clean-up standards. There are basically, two clean up levels that are used to achieve clean closure. The two clean-up levels are:

**Non-Detect** - Non-Detect is the detection limit for a specific analytical method. (e.g., method 8080, Aldrin, 0.004 ug/L).

**Background** - Background clean-up level is applicable only for soil samples and inorganic (metals) constituents. Background clean-up level is the level of inorganic content that exists in natural soil without any outside influence.

If the clean-up levels based on non-detect and background cannot be met, the facility may submit a risk assessment that will provide a new clean-up level that does not pose a substantial present or potential threat to human health and the environment.

**Note: The following two flowcharts can be used as a general guideline in determining the course of action for the closure operation.**

The sampling plan is used to verify the effectiveness of the decontamination operation or to demonstrate that no contamination has ever taken place. The sampling should be performed only after a thorough visual inspection and a proper decontamination.

There are generally two sampling methods that are used to determine the locations and number of sampling points: biased (judgmental) and statistical (random). They are as follows:

**Biased Sampling** - Used in situations where locations of point sources of the contamination are known or suspected. For example, a biased sample would be taken from areas that are either visibly contaminated or suspected to be contaminated.

**Statistical Sampling** - Used in situations where there is no information or knowledge available about the sampling area. The statistical sampling method is especially useful for covering large unknown sampling area.

There are four surface sampling methods that are used for the closure of treatment and storage facilities. They are as follows:

**Wipe Sampling** - This method is used for sampling smooth, impervious and solid surfaces such as metal tanks, epoxy coated concrete, vinyl liner, etc. One wipe sample, at a minimum, should be taken from each tank. A typical wipe sample area is 1 square foot. The samples should be taken using filter paper or gauze pad moistened with a solvent that will remove the contaminant from the surface.

**Chip Sampling** - This method is used for sampling porous surfaces such as asphalt, concrete and wood. In this method, the surface of the material is chipped out using tools such as a chisel or an electric hammer. The chip sample should have a size approximately 10 cm x 10 cm in area and 1/8 inch in depth.

**Cleaning Solution Sampling** - This method is used for sampling items such as pumps, pipes, filters and equipment. This method is used for sampling parts that are physically difficult to get to or too small to sample individually.

**Polychlorinated Biphenyls (PCB) Wipe Sampling** - A specific procedure for sampling PCB is available in the EPA document, Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup, Interim Report #3, Work Assignment 37.

There is no specific guidance on the number of samples required for sampling structures, equipment, and buildings. However, the sampling number should be large enough to prove that all structures, equipment, and buildings have been properly decontaminated. For each sample and each sample set that is taken at the site, a quality control measure is required to establish the data's quality for each analytical result. Therefore, additional quality control samples are required.

Additional information about sampling methods described above can be obtained from the following EPA guidance document, Compendium of Waste Sampling Procedures, EPA/540/P-91/008.

All sampling should follow the procedure specified in the document, EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846.

NOTE: The EPA guidance documents may be obtained from National Technical Information Services at (703)487-4650 or U.S. EPA, Public Information Center at (415)744-1500.

Describe the sampling procedures to be used for sampling buildings, equipment and structures for contamination. The description should discuss the number of samples to be taken, sampling methods, location of sampling points and rationale used for selecting sampling point locations. All structures, equipment and buildings that were identified in section D.1. should be included in the sampling description.

### **Sampling Locations and Rationale**

***Demolition and disposal of the tank pads will only be completed if the analytical results of the concrete core samples and the soil samples collected beneath the concrete and asphalt reveal contamination. ECI proposes to collect seven concrete core samples, which will be co-located with soil sampling locations. Four concrete samples will be collected from the rinse pad where tanks were cleaned prior to destruction. This area will be sampled as it may have been impacted by residual product contained in tanks brought to the facility for decommissioning. Three concrete samples will be collected from the AST/drum storage area located south of the rinse pad as this area may have been impacted due to the storage of waste. In order to determine impact to the asphalt pad area located at the tank unloading area, six shallow soil sampling locations have been selected. Please refer to Figure 2 Confirmation Soil Sample Locations for specific sample locations.***

### **Sample Collection Methods**

***The seven concrete core samples will be collected using a concrete saw at the selected soil sampling locations. A 4-inch diameter by approximately 1/8-inch thick section of the concrete will be cored and placed in a glass sample container.***

***ECI will make every effort to assure that its' sampling protocols will provide representative analytical results at the time of closure. Following proper decontamination procedures and a thorough visual inspection, ECI will co-locate the concrete core samples with selected soil sampling locations.***

### **Structures:**

- 1). **Rinsate Tank Secondary Containment**  
***Drill 3 - 2" diameter borings and collect 6 soil samples (6 inches and 2 feet bsg)***  
***Collect a 4" diameter concrete core sample from the top of each boring (3 cores total)***
- 2). **Tank Rinse Pad**  
***Drill 4 - 2" diameter borings and collect 8 soil samples (6 inches and 2 feet bsg)***  
***Collect a 4" diameter concrete core sample from the top of each boring (4 cores total)***
- 3). **Drummed Waste: 80 drums**  
***Composite 10 drums/sample. Collect 8 composite liquid samples***
- 4). **Drummed Storage Area: Same as rinsate tank secondary containment.**

**5). Asphalt Pad at Tank Unloading Area**

**Shallow soil samples collected beneath the pad will be used to determine whether releases occurred in the asphalt areas. Please see Section F below or refer to the Soil Sampling Plan prepared March 2006.**

**Sample Analysis**

**E** Modified 8-11-04 **s will be utilized as clean-up standards for inorganic metals. Non-Detect will be utilized as the clean-up standard for total petroleum hydrocarbons as gasoline, diesel and oil, BTEX constituents, fuel oxygenates, volatile organic compounds, semi-volatile organic compounds, polynuclear aromatic hydrocarbons, and polychlorinated biphenols. All samples will be either hand delivered or properly shipped to the laboratory.**

**All sampling will follow proper chain-of-custody procedures and will employ proper QA/QC procedures. Please see Appendix A of the stand-alone Soil Sampling Plan prepared for the facility, which discusses in detail the laboratory quality control procedures. A field duplicate sample will be collected for every 10 samples collected.**

**Samples will be analyzed by an Environmental Laboratory Accreditation Program (ELAP)-certified laboratory for the following analytes:**

**Total Petroleum hydrocarbons as gasoline (TPH-G) and TPH-diesel by EPA method 8015M**

**Total Petroleum hydrocarbons in the oil range by EPA method 1664A**

**Fuel Oxygenates, VOCs, and BTEX constituents by EPA method 8260B**

**Semi-volatile organic compounds with PAHs by EPA method 8270C**

**Polychlorinated biphenols by EPA method 8082**

**\* if pentachlorophenol (PCP) is detected by 8270C, samples will be analyzed for dioxins and furans by EPA method 8290 and pesticides by EPA method 8081A.**

**F. CONFIRMATION SOIL SAMPLING PLAN**

**(66265.112(b)(4))**

A soil sampling plan may or may not be required for a facility's closure plan. Soil sampling may be required based on current and/or future conditions of the facility. As discussed in the previous section, either biased or statistical sampling methods can be utilized for the soil sampling plan. Regardless of the chosen sampling method, the soil samples shall be taken from the surface and at a certain depth, typically 1 to 2 foot, from the surface. If the soil is covered, such as under a concrete pad or asphalted surface, soil sampling may be required at the time of the closure depending on the cover condition (i.e. cracks in concrete).

The number of samples required depends on conditions such as area to be sampled, degree of contamination and contaminants of concern. For this guidance purpose, a minimum of 4 soil samples is recommended for each storage and treatment area.

Additionally, a soil sampling plan is required to have background samples. Background soil samples are used to determine that no soil contamination has occurred. The background sample locations must be from areas that are known to be uncontaminated. All sampling shall follow the procedures specified in the document, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd edition 1986.

Describe the soil sampling procedure to be used for each storage and treatment area. Discuss the number of samples to be taken, sampling methods, location of sampling points and rationale used for selecting sampling point locations. ***For a detailed description of soil sampling locations and procedures, please see the Soil Sampling Plan prepared for the facility (March 2006).***

### **Former Tank Unloading Area**

Six soil sampling locations are proposed in the former tank unloading area where ASTs and USTs were first brought for decommissioning (See figure 2). The area, which is asphalt-paved, is approximately 3,605 square feet and should be sampled due to the possibility that tanks initially brought to the facility could have contained residual product. In order to assess whether contamination has penetrated the asphalt, the collection of shallow soil samples, approximately 6 inches below the asphalt, is proposed in the former tank unloading area. As analyzing the actual asphalt for the presence of petroleum hydrocarbons will not yield representative results, shallow soil samples will be collected beneath the asphalt at all six sampling locations to determine whether contaminants of concern have impacted the subsurface. Samples will also be collected at 2 feet below surface grade (bsg).

### **Rinse Pad**

There are four soil sampling locations proposed on the concrete rinse pad. As tanks were rinsed on the pad, there is a possibility that residual product in the tanks could have impacted the concrete and subsequently the subsurface. Concrete core samples will be collected from the same four soil sampling locations on the concrete pad. Two soil sampling locations are proposed immediately to the east of the rinse pad where a metal storage container is currently located. The portable storage structure will be moved prior to sampling activities. Two soil sampling locations are also proposed on the west side of the rinse pad, which is an unpaved area. Sampling locations are planned on either side of the rinse pad due to the possibility that run-off from tank rinsing activities could have impacted the adjacent areas.

### **AST and Drum Storage Area**

There are three soil sampling locations proposed in the rinsate AST and drum storage area located south of the rinse pad. This area was subject to potential releases of contaminants. One of the borings is located near and south of the larger rinsate AST, one is between the two rinsate ASTs, and one is located in the center of the southern portion of the area where drum storage occurred. Concrete core samples will be collected at each of the three soil sampling locations.

### **Sampling Methods and Procedures**

Two soil samples will be collected at each planned sampling location, at depths of 6 inches below grade and 2 feet below grade. This will total 34 soil samples collected. One field duplicate sample will also be collected for every ten samples collected (three

field duplicate samples planned) for quality assurance purposes. A copy of the Quality Control Plan prepared for the planned investigation is included in Appendix A of the separate Soil Sampling Plan. Concrete core samples will be collected at the seven specified soil sampling locations discussed above.

A truck mounted, direct push sampling rig equipped with a 2-foot long , 2-inch diameter core barrel sampler lined with clear acetate samples tubes will be used to obtain continuous core of the soil to the desired depths. Soil samples collected at 6 inches below grade and 2 feet below grade from each boring will be retained for laboratory analysis.

Immediately upon retrieval, a portion of the soil sample to be analyzed for volatile organic compounds will be immediately tightly packed into a five-gram EnCore sampler, in accordance with U.S. EPA Method No. 5035. The EnCore sampling system consists of a coring sleeve equipped with a plunger and a sealing cap. The coring sleeve will be placed into a T-handle, which will then be pushed into the soil being sampled. The sealing cap will then be screwed onto the coring sleeve. Following collection of the EnCore sample, the remaining portion of the soil sample will be sealed with Teflon tape and capped with polyethylene end caps.

The seven concrete core samples will be collected at the selected soil sampling locations. A 4-inch diameter by 1/8-inch thick (minimum) section of the concrete will be cored and placed in a sample container.

The samples will be labeled with a discrete sample number, sampling location, collection date, collection time, sample collectors name and site name. The samples will be stored in separate plastic bags in a cooler with blue ice or cubed ice and maintained under chain of custody control until delivered to the designated analytical laboratory.

#### Decontamination Procedures

All down-hole boring and sampling equipment will be decontaminated before use by scrubbing with a laboratory-grade detergent wash and double rinsing with tap water. To avoid cross contamination between sampling locations, soil sampling equipment will be decontaminated before initial use and in between sampling points, using the same decontamination procedure. Rinsate water will be containerized in a 55-gallon, Department of Transportation (DOT certified), labeled drum. The drum(s) will be stored near the sampling locations until completion of planned field activities. The rinsate water will then be transported off-site for disposal.

2. Describe the background soil sampling procedure. The description shall discuss the number of samples taken, sampling methods, location of sampling points, and rationale used for selecting sampling point locations.

***It is appropriate to use background levels for soil samples and inorganic (metals) constituents. Background levels will be utilized as the minimum clean-up standard used to achieve closure. These samples will indicate the level of inorganic content that exists naturally in the soil without any***

***outside influence.*****Background Samples**

In order to determine existing background metal concentrations on the property, ten background soil samples will be collected. It is proposed that the ten soil samples be collected from the southern portion of the property, away from the tank processing area. The samples will be collected at five different locations at two depths (6 inches and 2 feet bsg) for a total of ten samples. The locations of the ten background soil samples are shown on Figure 2 Confirmation Soil Sample Locations.

The background samples will be collected in the same manner as the samples described above. Two soil samples will be collected at each planned sampling location, at depths of 6 inches below grade and 2 feet below grade. One field duplicate sample will also be collected for every ten samples collected (one field duplicate sample for background samples) for quality assurance purposes. A copy of the Quality Assurance Plan prepared for the planned investigation is included in Appendix A of the separate Soil Sampling Plan.

A truck mounted, direct push sampling rig equipped with a 2-foot long, 2-inch diameter core barrel sampler lined with clear acetate samples tubes will be used to obtain continuous core of the soil to the desired depths. Soil samples collected at 6 inches below grade and 2 feet below grade from each boring will be retained for laboratory analysis.

The soil sample will be sealed with Teflon tape and capped with polyethylene end caps.

The samples will be labeled with a discrete sample number, sampling location, collection date, collection time, sample collector's name and site name. The samples will be stored in separate plastic bags in a cooler with blue ice or cubed ice and maintained under chain of custody control until delivered to the designated analytical laboratory. The background samples will only be analyzed for metals.

**G. ANALYTICAL TEST METHODS**

(66265.112(b)(4))

Note 1: All laboratory analyses shall be performed at a California Certified Analytical Laboratory.

Note 2: If explanation or assistance is needed with this section, contact the Treatment Standards Unit at (916)322-0349.

All analytical methods used for closure must be from methods found in Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Edition 1986 and Title 22, California Code of Regulation, Section 66261.126, Appendix III. There are two types of methods required for analysis: Sample Preparation methods (i.e., method 3050: Acid Digestion of Sediments, Sludge, and Soils) and Analytical methods (i.e., Methods 7020: Aluminum, AA, Direct Aspiration).

For many waste constituents, there are generally at least two analytical methods available (general and specific). To develop a clean closure standard, the method with the lowest detection limit should be used.

Describe the analysis that will be performed on samples. The analysis description shall include: waste constituents being analyzed, preparation method, analysis method and detection limit.

Constituent	Sample Containers	Preparation method	Analysis Method	Detection Limit <sup>1</sup>	Preservative
TPH-gasoline TPH-diesel	One 6-inch acetate sleeve	Extraction 5035/3550	8015M	1-10 mg/kg	Ice
TPH-oil	One 6-inch acetate sleeve	Extraction 3550	1664A	100 mg/kg	Ice
VOCs, fuel oxygenates, BTEX	One 5-gram Encore Sampler	EPA method 5035	8260B	5-100 µg/kg	Ice
SVOCs, PAHs	One 6-inch acetate sleeve	3540C	8270C	330-1,700 µg/kg	Ice
PCBs	One 6-inch acetate sleeve	3540C	8082	33-67 µg/kg	Ice
Title 22 Metals	One 6-inch acetate sleeve	3010/3005	6010B	0.5-500 µg/kg	Ice
* Dioxins, furans	One 6-inch acetate sleeve	8290	8290	2-10 pg/g	Ice
* Pesticides	One 6-inch acetate sleeve	3540/3550	8081A	1.7-100 µg/kg	Ice

Notes:

<sup>1</sup>- approximate detection limits

Pg/g-picogram per gram

TPH-gasoline – Total Petroleum Hydrocarbons as gasoline

TPH-diesel – Total Petroleum Hydrocarbons as diesel

TPH- oil – Total Petroleum Hydrocarbons as oil

VOCs- Volatile Organic Compounds

BTEX – Benzene, Toluene, Ethyl Benzene and Xylenes

SVOCs- Semi-Volatile Organic Compounds

PAHs- Polynuclear Aromatic Hydrocarbons

PCBs- Polychlorinated Biphenols

\*- only analyzed if Pentachlorophenol is detected in the SVOC analysis