

# U.S. Department of Energy

Oakland Operations Office, Oakland, California

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## DRAFT DESIGNATED LEVEL SAMPLING AND ANALYSIS PLAN FOR THE SOUTHWEST TRENCHES AREA

at the

LABORATORY FOR ENERGY-RELATED  
HEALTH RESEARCH  
UNIVERSITY OF CALIFORNIA AT DAVIS, CALIFORNIA

*Submitted to:*

**United States Department of Energy**  
Oakland Operations Office  
1301 Clay Street  
Oakland, California 95612-5208

*Prepared by:*

**Weiss Associates**  
5801 Christie Avenue, Suite 600  
Emeryville, California 94608

August 24, 1999

Rev. D

DOE Oakland Operations Contract DE-AC03-96SF20686

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Approvals Page

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Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Mary Stallard, R.G.  
Project Quality Assurance Manager  
Weiss Associates

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Robert O. Devany, R.G., C.H.G.  
Project Manager  
Weiss Associates

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Michael D. Dresen, R.G., C.E.G., C.H.G.  
Program Manager  
Weiss Associates

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## FIGURE

Figure 1. Proposed Designated Level Soil Boring Locations

## TABLE

Table 1. Proposed Southwest Trenches Designated Level Analysis Plan

## ACRONYMS

|        |   |
|--------|---|
| bgs    | below ground surface                          |
| C-14   | carbon-14                                     |
| COC    | constituent of concern                        |
| Cs-137 | cesium-137                                    |
| DL     | Designated Level                              |
| H-3    | tritium                                       |
| LEHR   | Laboratory for Energy-Related Health Research |
| RA     | Removal Action                                |
| SWT    | Southwest Trenches                            |
| UCD    | University of California Davis                |
| USCS   | Unified Soil Classification System            |
| WA     | Weiss Associates                              |

## 1. SAMPLING AND ANALYSIS PLAN

This document describes the sampling and analysis plan for Designated Level (DL) sampling in the Southwest Trenches (SWT) Area, at the Laboratory for Energy-Related Health Research (LEHR) facility, University of California Davis (UCD), California. The objective of this sampling and subsequent evaluation of the data is to estimate whether residual concentrations of specific constituents in soil will potentially impact ground water. These specific constituents were identified during the DL analysis performed as part of the SWT Removal Action (RA) Phase II Data Evaluation. The results of the SWT RA Phase II Data Evaluation are presented in the Draft SWT RA Confirmation Report (WA, 1999).

The DL evaluation identified three constituents of concern (COCs) that require additional DL sampling: cesium-137 (Cs-137), tritium (H-3), and carbon-14 (C-14). These are subsequently referred to as DL COCs.

### 1.1 Sampling Plan

This sampling plan describes the location and number of samples that will be collected to evaluate potential impact to ground water by the DL COCs. In general, samples will be collected at two locations for each DL COC. The locations are those with the highest and second highest activity for each COC as indicated by confirmation sample analytical data. Samples will be collected every five feet, with the first sample collected five feet below ground surface (bgs), and the last sample collected just above the water table. The water table is estimated to be thirty feet bgs; therefore, approximately six samples will be collected from each boring. Figure 1 shows the approximate locations of the six borings along with the boring ID and target COC (see also Table 1). In the event ground water is encountered at 30 ft bgs, a water sample will also be collected and analyzed for the DL COC specific to that location.

Each boring will be continuously cored using a direct-push sampling rig, to a total depth of approximately 30 feet bgs. Soil samples will be collected in a core barrel lined with a butyrate liner. The diameter of the boring will be 1-11/16 inches. The collected soil cores will be screened by the field geologist and radiological technician for indications of contamination. The field geologist, using the Unified Soil Classification System (USCS), will describe and document the lithology of the soil cores. One soil sample will be collected every five feet from each boring for laboratory analysis. The butyrate liner will be cut to provide a 6-inch long sample that will be labeled for laboratory analysis. The ends of the liner will be covered with Teflon sheets and capped with tight fitting plastic caps. The samples will be given unique ID numbers and placed in a cooler for transport to

the laboratory under chain-of-custody procedures. In addition, 10% duplicate samples will be collected for quality control.

All downhole drilling equipment will be steam cleaned prior to arrival on-site, and will be cleaned between each borehole and each sampling event using an Alconox detergent-water wash, potable water rinse, and a final de-ionized water rinse. Upon completion of the fieldwork, all borings will be grouted to the surface with a cement grout containing 3-5% bentonite by weight.

Soil samples will be collected, handled and shipped to an offsite laboratory according to LEHR Standard Operating Procedure 2.1, Sample Handling, Packaging and Shipping.

## 1.2 Analytical Plan

The soil samples will be analyzed as specified in Table 1.

## 2. REFERENCES

Weiss Associates (WA), 1999, Draft Southwest Trenches Area Removal Action Confirmation Report for the Laboratory for Energy-Related Health Research (LEHR), University of California at Davis, April.

**FIGURE**

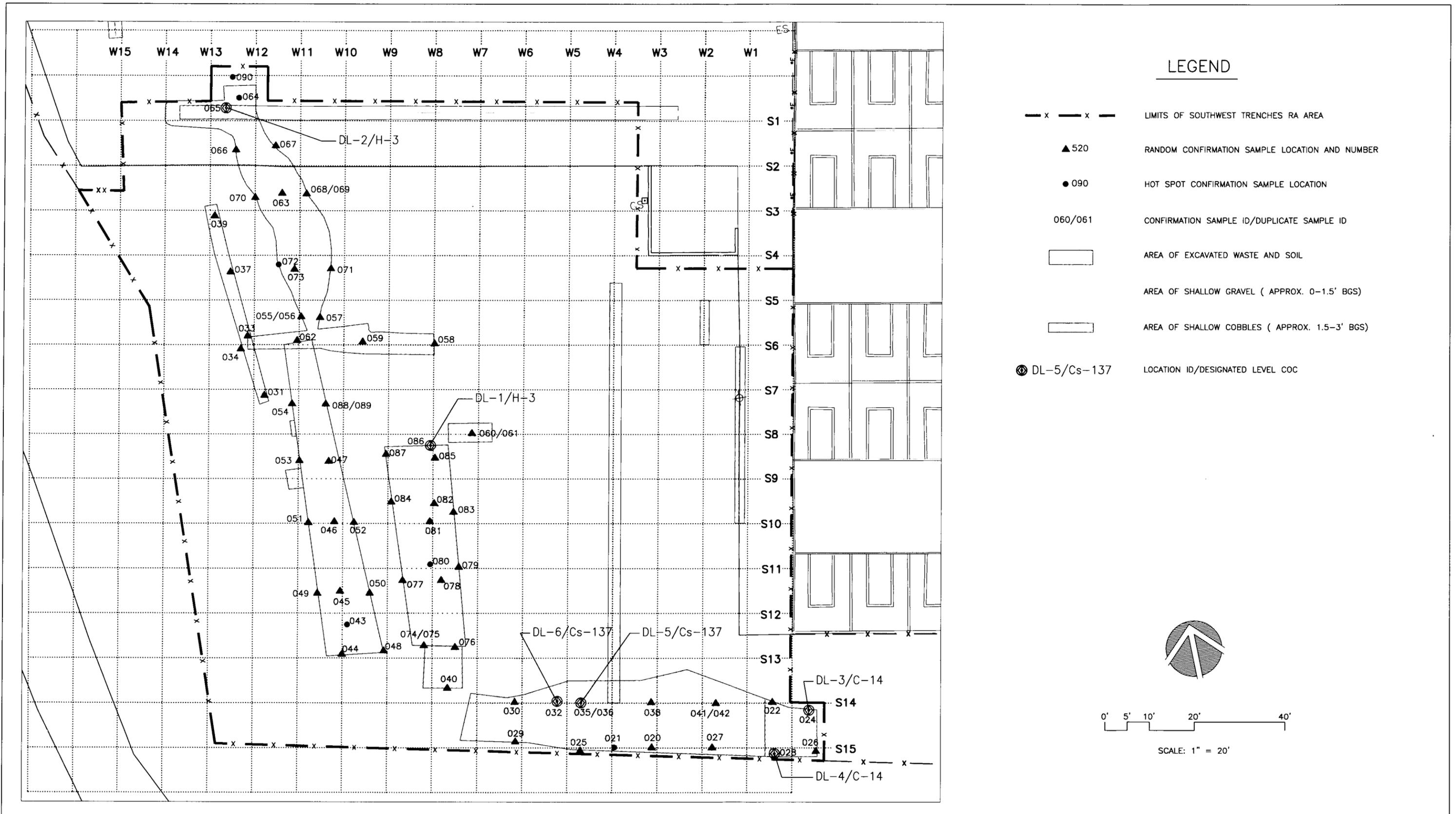


FIGURE 1. PROPOSED DESIGNATED LEVEL SOIL BORING LOCATIONS

**TABLE**

Table 1. Proposed Southwest Trenches Designated Level Analysis Plan

| Parameter  | Confirmation Sample with Highest DL <sup>(1)</sup> COC <sup>(2)</sup> Activity | Boring Identification <sup>(3)</sup> | Analytical Method <sup>(4)</sup> | Required Detection Limit pCi/g |
|------------|--|--------------------------------------|----------------------------------|--------------------------------|
| Tritium    | SSDTC086   | DL-1                                 | EPA Method 906.0                 | 1.00                           |
| Tritium    | SSDTC065   | DL-2                                 | EPA Method 906.0                 | 1.00                           |
| Carbon-14  | SSDTC027   | DL-3                                 | Lab SOP <sup>(5)</sup>           | 0.10                           |
| Carbon-14  | SSDTC028   | DL-4                                 | Lab SOP                          | 0.10                           |
| Cesium-137 | SSDTC035   | DL-5                                 | EPA Method 901.1                 | 0.01                           |
| Cesium-137 | SSDTC032   | DL-6                                 | EPA Method 901.1                 | 0.01                           |

Notes:

- (1) DL = Designated Level
- (2) COC = Constituent of Concern
- (3) Samples will be collected in each boring from 5, 10, 15, 20, 25, and 30 ft bgs.
- (4) Holding time is 6 months. Samples will be collected in 2 x 16-oz plastic/glass jars.
- (5) SOP = Standard Operating Procedure