

# U.S. Department of Energy

Oakland Operations Office, Oakland, California

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## **SAMPLING AND ANALYSIS PLAN FOR WASTE CHARACTERIZATION DURING REMOVAL ACTIONS AT THE SOUTHWEST TRENCHES AREA**

at the

**LABORATORY FOR ENERGY-RELATED HEALTH  
RESEARCH (LEHR)  
UNIVERSITY OF CALIFORNIA AT DAVIS, CALIFORNIA**

*Prepared for:*

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

*Prepared by:*

**Weiss Associates**  
5500 Shellmound Street  
Emeryville, CA 94608-2411

August 17, 1998  
Rev. 0

DOE Oakland Operations Contract DE-AC03-96SF20686

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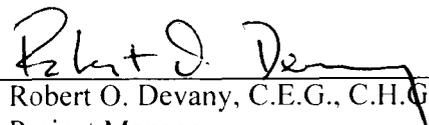
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Approved by:  for \_\_\_\_\_ Date: 8/17/98  
Mary Stallard, C.E.G.  
Project Quality Assurance Manager  
Weiss Associates

Approved by:  \_\_\_\_\_ Date: 8/17/98  
Robert O. Devany, C.E.G., C.H.G.  
Project Manager  
Weiss Associates

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## ACRONYMS

cy	Cubic yard
RA	Removal Action
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
TCLP	Toxicity Characteristic Leaching Procedure
WA	Weiss Associates

## 1. SOUTHWEST TRENCHES SAMPLING AND ANALYSIS PLAN

This sampling and analysis plan (SAP) has been prepared to characterize the waste being removed from the Southwest Trenches Area during the 1998 CERCLA removal action (RA). The objective of this sampling is to gather analytical data where there is a lack of previous data for waste profiling and designation. Specifically, in the waste trenches along grid W8 and grid W10 (Figure 1) where chlordane may be present and a potential for encountering mixed waste exists, sampling objectives are designed to minimize the volume of potential mixed waste by increasing the sampling and analysis frequency. In addition, in the waste trenches along grid W1 to grid W7 (Figure 1) where tritium may be present, no previous analytical data are available. In this area, sampling objectives are designed to provide the information for waste profiling and designation.

### 1.1 Grid W8 and W10

#### 1.1.1 Sampling Plan

Along Grids W8 and W10, two sampling activities are planned. First, as each B-25 box is being filled, one sample will be collected for chlordane analysis. Excavation in this area will proceed with caution due to the potential for encountering chlordane concentrations at levels that will generate mixed waste. Each B-25 box will be tracked to specific vertical and horizontal coordinates within the excavation. Hence, each sample collected from the box will correlate to a given coordinate in the excavation. This will allow for both characterization of the removed waste and contouring (trend analysis) of the chlordane concentrations in the excavation. The samples will be collected from the excavator bucket using a hand trowel and placed in an 8-oz glass jar. The bucket to be sampled will be randomly selected using a random number generator. Field duplicate samples will be collected at the rate of 5%. Samples will be sent to an off-site lab for chlordane analysis by SW-846 Method 8080. Samples with total chlordane results above 600  $\mu\text{g}/\text{kg}$  (i.e. 20 x 0.03 mg/L) will also be analyzed for chlordane by the Toxicity Characteristic Leaching Procedure (TCLP).

The second sampling activity consists of collecting one composite sample per 50 cubic yards (cy) of waste. This sampling activity was described in Draft Final Work Plan for the RA, Revision D, Dated July 22, 1998 (in Attachment I - SAP, Section 2.1.7.4). One four-point composite sample will be collected for every 16 B-25 boxes (or approximately 50 cy of waste). The boxes to be sampled will be selected on a random basis using a random number generator. Samples will be collected from the excavator bucket and placed in 8-oz glass jars. The jars will be sealed and shipped to an off-site laboratory, which in turn will composite the four 8-oz jars and analyze the sample as described in the following section. Field duplicate samples will be collected at the rate of 5%; one rinsate blank will be collected.

Sample collection and handling procedures will be performed according to the Draft Work Plan for the RA, Revision D, dated July 22, 1998 and the LEHR Standard Operating Procedures (SOPs).

### 1.1.2 Analytical Plan

The 4-point composite samples will be analyzed as specified in Table 1.

Table 1. Laboratory Analytical Methods for Waste Characterization, Southwest Trenches Area, LEHR Site, UC Davis, California

Parameter	Analytical Method	Required Detection Limit (pCi/g for radionuclides, mg/kg for chemicals)
<u>Radionuclides:</u>		
Americium-241	Lab SOP	0.01
Carbon-14	Lab SOP	0.1
<u>Gamma Emitters</u>		
Actinium-228	EPA Method 901.1	0.1
Bismuth-212	EPA Method 901.1	0.1
Bismuth-214	EPA Method 901.1	0.1
Cesium-137	EPA Method 901.1	0.01
Cobalt-60	EPA Method 901.1	0.005
Lead-210	EPA Method 901.1	0.5
Lead-212	EPA Method 901.1	0.1
Lead-214	EPA Method 901.1	0.1
Potassium-40	EPA Method 901.1	1
Radium-223	EPA Method 901.1	2
Radium-228	EPA Method 901.1	0.1
Radium-226*	EPA Method 901.1	0.1
Thallium-208	EPA Method 901.1	0.05
Thorium-228	Lab SOP	0.1
Thorium-230	Lab SOP	0.05
Thorium-232	Lab SOP	0.05
Thorium-234	EPA Method 901.1	0.5
Gross Alpha	EPA Method 9310	1
Gross Beta	EPA Method 9310	1
Plutonium-241	Lab SOP	0.5
Strontium-90	EPA Method 905.0	0.05
Tritium	EPA Method 906.0	1
Uranium-233/234	Lab SOP	0.025
Uranium-235	Lab SOP	0.01
Uranium-238	Lab SOP	0.025

Parameter	Analytical Method	Required Detection Limit (pCi/g for radionuclides, mg/kg for chemicals)
<u>Metals/Other Inorganics:</u>		
Antimony	EPA Method 6010/7000s	0.5
Arsenic	EPA Method 6010/7000s	2
Barium	EPA Method 6010/7000s	40
Beryllium	EPA Method 6010/7000s	1
Cadmium	EPA Method 6010/7000s	0.25
Chromium (total)	EPA Method 6010/7000s	1
Chromium (+6)	EPA Method 3060A/7196	0.05
Cobalt	EPA Method 6010/7000s	10
Copper	EPA Method 6010/7000s	0.25
Iron	EPA Method 6010/7000s	20
Lead	EPA Method 6010/7000s	0.3
Manganese	EPA Method 6010/7000s	3
Mercury	EPA Method 6010/7000s	0.1
Molybdenum	EPA Method 6010/7000s	0.1
Nickel	EPA Method 6010/7000s	1
Selenium	EPA Method 6010/7000s	1
Silver	EPA Method 6010/7000s	0.1
Thallium	EPA Method 6010/7000s	0.5
Vandium	EPA Method 6010/7000s	1
Zinc	EPA Method 6010/7000s	4
<u>General Chemistry</u>		
Nitrate	EPA Method 300.0	1
Formaldehyde	AOAC Method 20.062	1
pH	EPA Method 9045	0.1 (pH unit)
Reactive Cyanide	EPA Method 7.3.3.2	250
Reactive Sulfide	EPA Method 7.3.4.2	500
Paint Filter	EPA Method 9095	---
Total Organic Carbon	EPA Method 415.1	100
Ammonia	EPA Method 350.1	1
Total Kjeldahl Nitrogen	EPA Method 351.2	2
<u>Organics:</u>		
Volatile Organic Compounds	EPA Method 8260	As specified in method
Semi-Volatile Organic Compounds	EPA Method 8270	As specified in method
Organochlorine Pesticides (and PCBs)	EPA Method 8080	As specified in method

\* Radium-226 will be analyzed with 30-day in-growth and 1000-minute count time.

EPA = U.S. Environmental Protection Agency

AOAC = Association of Analytical Chemists

## 1.2 Tritium Area

### 1.2.1 Sampling Plan

The tritium area encompasses the southern portion of the site from grid W1 to grid W7 (Figure 1) where excavation trenches and pits contain laboratory waste with tritium contamination. In this area, samples will be collected at a rate of one 4-point composite sample per 50 cy of waste. As described in Section 1.1.1, samples will be collected from four of every 16 B-25 boxes filled with waste. The boxes to be sampled will be selected on a random basis using a random number generator. Samples will be collected from the excavator bucket and placed in 8-oz glass jars. An off-site laboratory will composite the four 8-oz jars and analyze the sample as described in the following section. Field duplicate samples will be collected at the rate of 5%. Based on characterization results of the laboratory waste, additional sampling and analysis may be performed.

Sample collection and handling procedures will be performed according to the Draft Work Plan for the RA, Revision D, dated July 22, 1998 and the LEHR SOPs.

### 1.2.2 Analytical Plan

The 4-point composite samples will be analyzed as specified in Table 1.

## 2. REFERENCES

Weiss Associates (WA), 1998, Draft Work Plan for Removal Action at the Southwest Trenches, Ra/Sr Treatment Systems, and the Domestic Septic System Areas, Revision D, July 1998.

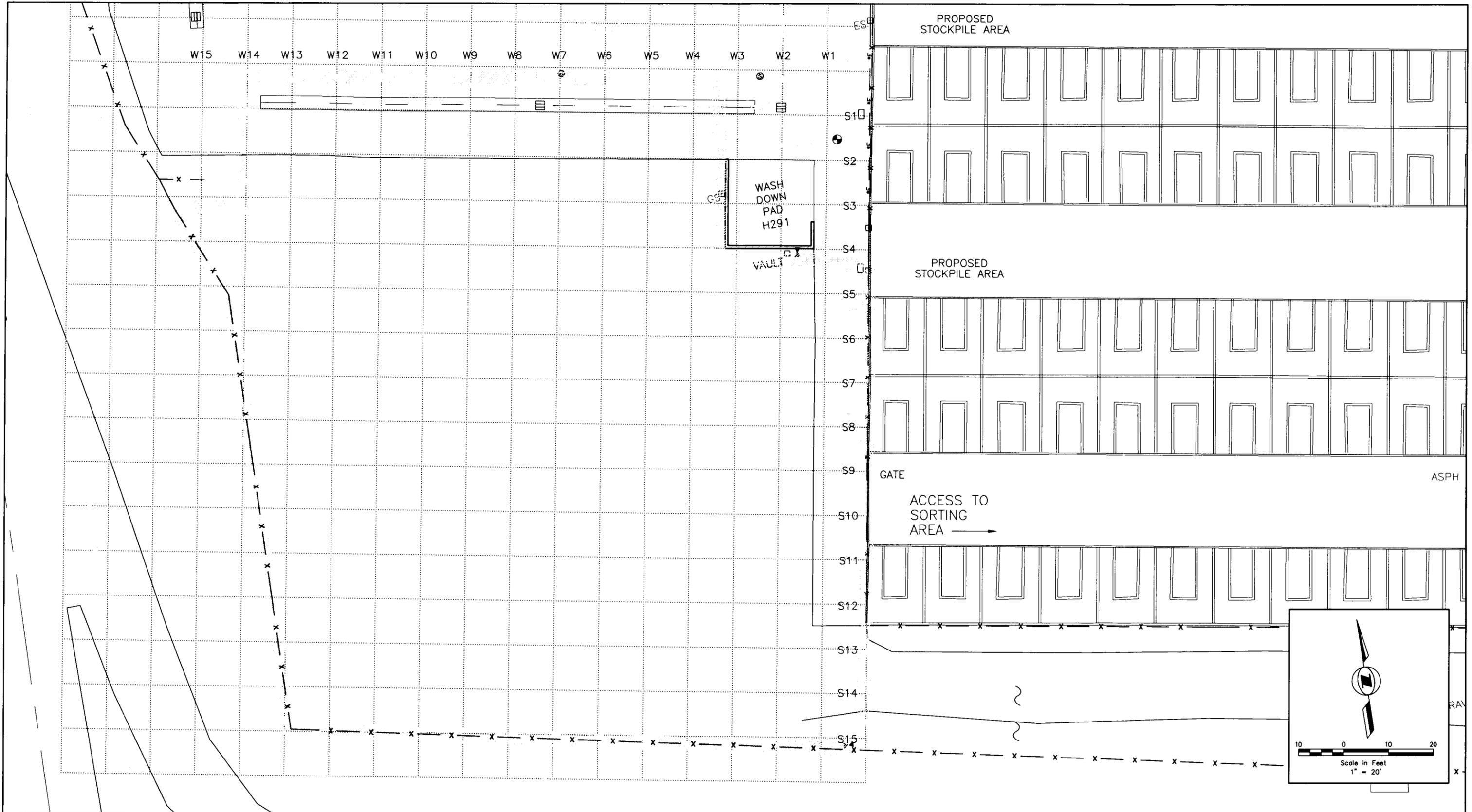


Figure 1. Southwest Trenches Area