



U.S. Department of Energy

Oakland Operations Office, Oakland, California

SAMPLING AND ANALYSIS PLAN ADDENDUM SOUTHWEST TRENCHES OVERBURDEN STOCKPILES

at the:

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

Prepared for:

United States Department of Energy
Oakland Operations Office
1301 Clay Street
Oakland, California 94612-5208

Prepared by:

Weiss Associates
5801 Christie Ave., Suite 600
Emeryville, California 94608-1827

March 20, 2001
Rev. 0

DOE Oakland Operations Contract DE-AC03-96SF20686

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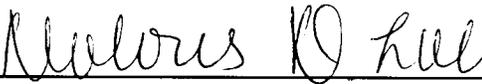
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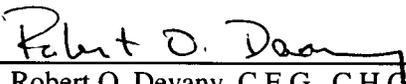
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ACRONYMS AND ABBREVIATIONS

EPA	U.S. Environmental Protection Agency
ID	identification
LEHR	Laboratory for Energy-Related Health Research
mg/kg	milligrams per kilogram
no.	number
ounce	oz
Ra/Sr	Radium/Strontium
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
STLC	Soluble Threshold Limit Concentration
SWT	Southwest Trenches
TCLP	Toxicity Characteristic Leaching Procedure
WET	California Title 22 Waste Extraction Test

1. SAMPLING AND ANALYSIS PLAN ADDENDUM

This Sampling and Analysis Plan (SAP) is prepared as an addendum to the *Sampling and Analysis Plan for Removal Actions in the Southwest Trenches, Ra/Sr Treatment Systems, and Domestic Septic System Areas* (Attachment 1 of the *Work Plan for Removal Actions in the Southwest Trenches, Ra/Sr Treatment Systems, and Domestic Septic System Areas*) (WA, 2000). The objectives are (1) to verify the antimony results for the Southwest Trenches (SWT) overburden stockpile LEHR0651 and cadmium results for the SWT overburden stockpiles LEHR0652 and LEHR0653 and (2) to obtain Toxicity Characteristic Leaching Procedure (TCLP) and Soluble Threshold Limit Concentration (STLC) metal data for the stockpiles LEHR0651, LEHR0652, and LEHR0653.

1.1 Background

Antimony was detected in the LEHR0651 samples at concentrations slightly above the background value of 1.4 milligrams per kilogram (mg/kg) (sample results were 1.5 mg/kg and 1.6 mg/kg); cadmium was detected in the LEHR0652 and LEHR0653 samples at concentrations slightly above the background value of 0.51 mg/kg (sample results were 0.63 mg/kg to 0.96 mg/kg). Chromium is present in all the overburden stockpile samples at concentrations above 20 times the TCLP value; chromium and nickel are present in all the overburden stockpile samples at concentrations above 10 times the STLC values. It is anticipated that due to elevated chlordane, a portion of stockpile LEHR0652 will be segregated and disposed independently from the remainder of the stockpile.

The minimum detection limits for isotopes analyzed by gamma spectroscopy from previous sampling activities are not sufficient for Authorized Release Modeling for all three stockpiles. Therefore, additional radiological samples will be collected to achieve the designed detection limit for input into the residual radioactive model.

1.2 Sampling and Analysis Plan

1.2.1 Stockpile LEHR0651

One four-point composite sample will be collected from stockpile LEHR0651, which is located in the Former Cobalt-60 Field, and analyzed for (1) antimony, chromium, and nickel by U.S. Environmental Protection Agency (EPA) SW-846 Method 6010; (2) TCLP-chromium by EPA Methods 1311/6010; and (3) STLC-chromium and STLC-nickel by California Title 22 Waste

Extraction Test (WET)/EPA Method 6010. In addition, one four-point composite sample will be collected for gamma spectroscopy analysis.

Sample locations are presented in Figure 1-1 (Sample Identification Numbers [ID Nos.] CWDTTC113 and CWDTTC114). Sample locations were selected based on a grid pattern that was laid out across the entire stockpile; a random number generator was used to select the grid locations to be sampled. Discrete samples will be composited in the field and transferred into an 8-ounce (oz) glass jar and a 2-liter plastic container. Sampling and analysis protocols are summarized in Table 1-1.

1.2.2 Stockpile LEHR0652

The entire stockpile, which is located in Aisle 2 of the Western Dog Pens, will be sampled (four-point composites) and analyzed for cadmium by EPA Method 6010. A total of five samples will be collected (Sample ID Nos. CWDTTC107 through 111). In addition, one 20-point composite sample will be collected for gamma spectroscopy analysis (Sample ID No. CWDTTC115).

The Sample ID No. CWDTTC109, collected from the locations with the maximum detected concentrations of chromium and nickel (i.e., Sample ID No. CWDTTC048 grids 3, 4, 6, and 13; Figure 1-2), will also be analyzed for (1) chromium and nickel by EPA SW-846 Method 6010, (2) TCLP-chromium by EPA Methods 1311/6010, and (3) STLC-chromium and STLC-nickel by WET/6010.

A section containing elevated chlordane (i.e., Sample ID No. CWDTTC075 grids 2, 5, 14, and 18 and Sample ID No. CWDTTC078 grids 9, 11, 13, and 18; Figure 1-3) will be sampled and analyzed for (1) chromium and nickel by EPA SW-846 Method 6010, (2) TCLP-chromium by EPA Methods 1311/6010, (3) STLC-chromium and STLC-nickel by WET/6010, and (4) other waste characterization tests (Table 1-1). The sample (Sample ID No. CWDTTC112) will consist of an eight-point composite in locations specified in Figure 1-3.

Sample locations are presented in Figures 1-2 and 1-3 (Sample ID Nos. CWDTTC107 through CWDTTC112 and CWDTTC115). Discrete samples will be composited in the field and transferred into 8-oz glass jars and a 2-liter plastic container for gamma spectroscopy. Sampling and analysis protocols are summarized in Table 1-1.

1.2.3 Stockpile LEHR0653

The entire stockpile, which is located in Aisle 2 of the Western Dog Pens, will be sampled (four-point composites) and analyzed for cadmium by EPA Method 6010. A total of three samples and one field duplicate will be collected (Sample ID Nos. CWDTTC103 through CWDTTC106). In addition, one 12-point composite sample will be collected for gamma spectroscopy analysis (Sample ID No. CWDTTC116).

The Sample ID No. CWDTTC104 and the field duplicate CWDTTC105, collected from the locations with the maximum detected concentrations of chromium and nickel (i.e., Sample ID No. CWDTTC43 grids 5, 7, 12, and 14, Figure 1-4), will also be analyzed for (1) chromium and nickel by EPA SW-846 Method 6010, (2) TCLP-chromium by EPA Methods 1311/6010, and (3) STLC-chromium and STLC-nickel by WET/6010.

Sample locations are presented in Figure 1-4 (Sample ID Nos. CWDTTC103 through CWDTTC106 and CWDTTC116). Discrete samples will be composited in the field and transferred into 8-oz glass jars and a 2-liter plastic container for gamma spectroscopy. Sampling and analysis protocols are summarized in Table 1-1.

1.2.4 Chain-of-Custody

Sample chain-of-custody records will be prepared according to LEHR Standard Operating Procedure (SOP) 1.1, Chain of Custody (WA, 1999). Sample handling, packaging, and shipping will be conducted in accordance with SOP 2.1, Sample Handling, Packaging and Shipping (WA, 1999). The chain-of-custody that will be used are shown in Attachment 1.

2. REFERENCES

- Weiss Associates (WA), 2000, Work Plan for Removal Actions in the Southwest Trenches, Ra/Sr Treatment Systems, and Domestic Septic System Areas at the Laboratory for Energy-Related Health Research (LEHR), University of California at Davis, California, July.
- WA, 1999, Final Standard Operating Procedures for the: Environmental Restoration/Waste Management Laboratory for Energy-Related Health Research (LEHR), University of California at Davis, California, December.

TABLE

Table 1-1. Sampling and Analysis Protocols

LEHR Stockpile	Storage Location	Sample ID Nos. to be Collected	Corresponding Figure	Sample Strategy	Containers	Cadmium (6010)	Cr and Ni (6010)	TCLP-Cr (1311 and 6010)	STLC-Cr and STLC-Ni (WET and 6010)	Antimony (6010)	Gamma Spec
0651	Former Co-60 Field	CWDTC113	1-1	4-pt Composite	1 x 8-oz Glass Jar		X	X	X	X	
		CWDTC114	1-1	4-pt Composite	1 x 2-L Plastic						X
0652	Western Dog Pens, Aisle 2	CWDTC107	1-2	4-pt Composite	1 x 8-oz Glass Jar	X					
		CWDTC108	1-2	4-pt Composite	1 x 8-oz Glass Jar	X					
		CWDTC109	1-2	4-pt Composite	1 x 8-oz Glass Jar	X	X	X	X		
		CWDTC110	1-2	4-pt Composite	1 x 8-oz Glass Jar	X					
		CWDTC111	1-2	4-pt Composite	1 x 8-oz Glass Jar	X					
		CWDTC115	1-2	20-pt Composite	1 x 2-L Plastic						X
		CWDTC112*	1-3	8-pt Composite	2 x 8-oz Glass Jar			X	X	X	
0653	Western Dog Pens, Aisle 2	CWDTC103	1-4	4-pt Composite	1 x 8-oz Glass Jar	X					
		CWDTC104	1-4	4-pt Composite	1 x 8-oz Glass Jar	X	X	X	X		
		CWDTC105	1-4	4-pt Composite	1 x 8-oz Glass Jar	X	X	X	X		
		CWDTC106	1-4	4-pt Composite	1 x 8-oz Glass Jar	X					
		CWDTC116	1-4	12-pt Composite	1 x 2-L Plastic						X

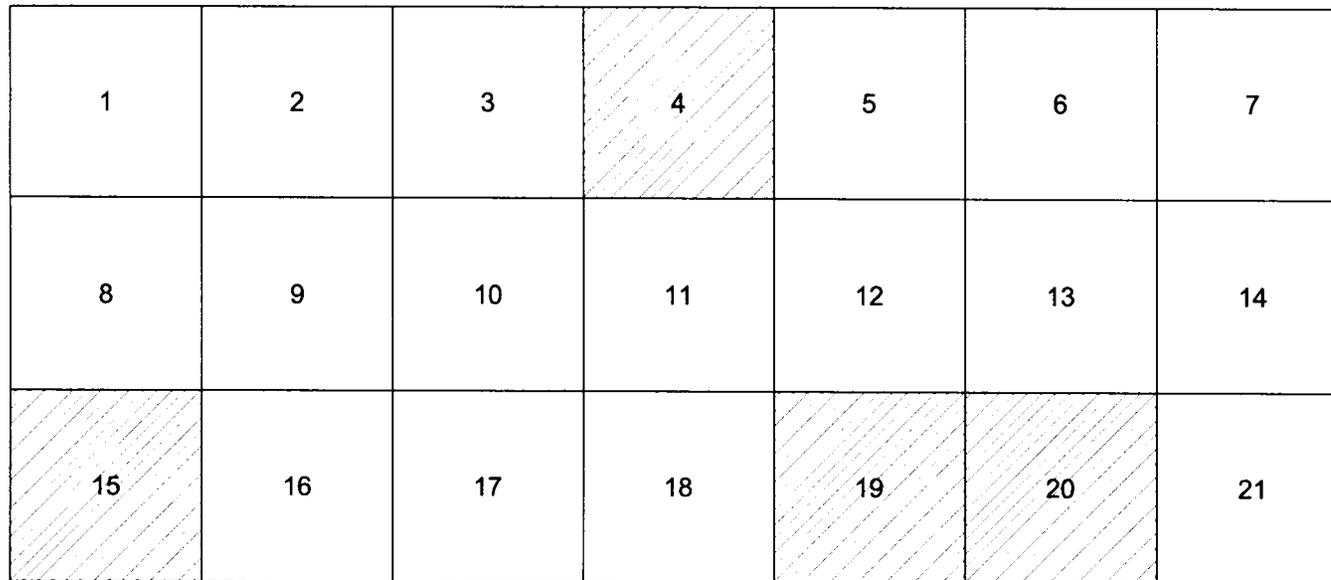
Note:

* Sample ID No. CWDTC112 will also be analyzed for herbicides, reactive cyanide, reactive sulfide, paint filter, formaldehyde, pH, ignitability, and total plate count.

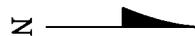
Abbreviations

Co-60	Cobalt-60	L	liter	pt	point
Cr	chromium	Ni	nickel	STLC	Soluble Threshold Limit Concentration
ID	Identification	No.	Number	TCLP	Toxicity Characteristic Leaching Procedure
LEHR	Laboratory for Energy-Related Health Research	oz	ounce	WET	California Title 22 Waste Extraction Test

FIGURES



SAMPLES COLLECTED PREVIOUSLY	CWDTC062 CWDTC063
SAMPLES TO BE COLLECTED	CWDTC113 CWDTC114



GRID SIZE =
APPROXIMATELY 5' X 5'



GRID LOCATION TO BE
SAMPLED

Figure 1-1. Stockpile LEHR0651 Grid Sampling Locations

1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3
6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	6	7	8	9	10	4	5	6
11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	11	12	13	14	15	7	8	9
16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	16	17	18	19	20	10	11	12

SAMPLES COLLECTED PREVIOUSLY	CWDT046	CWDT047	CWDT048	CWDT049	CWDT050
SAMPLES TO BE COLLECTED	CWDT107	CWDT108	CWDT109	CWDT110	CWDT111

CWDT115 = COMPOSITE OF CWDT107, -108, -109, -110, AND -111

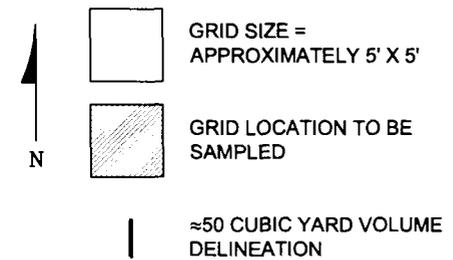
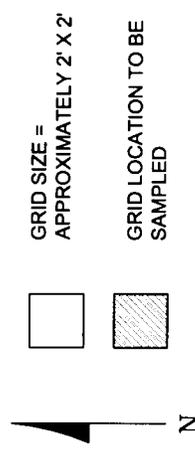
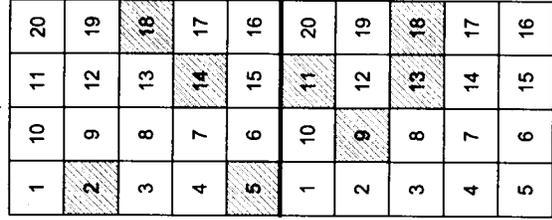
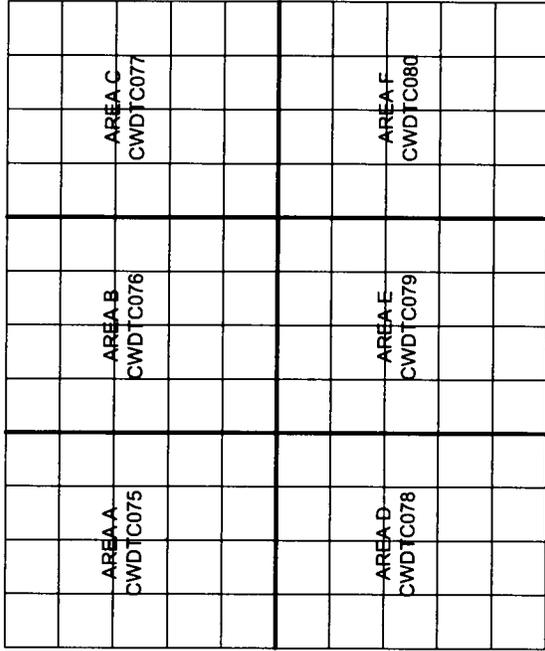


Figure 1-2. Stockpile LEHR0652 Grid Sampling Locations

SECTION CWDT C047



CWDT C112

Figure 1-3. Sample ID No. CWDT C112 Grid Sampling Locations

1	2	3	4	1	2	3	4	1	2	3	4	5
5	6	7	8	5	6	7	8	6	7	8	9	10
9	10	11	12	9	10	11	12	11	12	13	14	15
13	14	15	16	13	14	15	16	16	17	18	19	20

SAMPLES COLLECTED PREVIOUSLY	CWDTC042	CWDTC043	CWDTC044 CWDTC045
SAMPLES TO BE COLLECTED	CWDTC103	CWDTC104 CWDTC105	CWDTC106

CWDTC116 = COMPOSITE OF CWDTC103, -104, AND -106

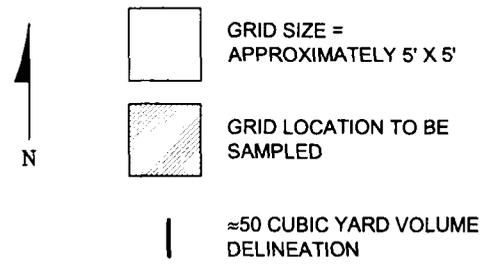


Figure 1-4. Stockpile LEHR0653 Grid Sampling Locations

ATTACHMENT 1

CHAIN-OF- CUSTODY RECORD

