- 2961

WASTE ACCEPTANCE CRITERIA ATTAINMENT REPORT FOR SOIL STOCKPILE 3

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

MAY 2000

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20450-RP-0001
REVISION A
DRAFT

2961

TABLE OF CONTENTS

1.0 Introduction 1-1

2.0 Stockpile Description and Sampling Design 2-1
- 2.1 Stockpile Description 2-1
- 2.2 Real-Time Scanning 2-1
- 2.3 Physical Sampling 2-2

3.0 Data Summary and Conclusions 3-1
- 3.1 Real-Time Data 3-1
- 3.2 Field Screening Results 3-1
  - 3.2.1 Beta/Gamma Screening Results 3-1
  - 3.2.2 PID Screening Results 3-1
- 3.3 Analytical Data 3-1
- 3.4 Conclusion 3-1

References R-1

Appendix A Variances to the Project Specific Plan for Sampling of Soil Stockpile 3 for OSDF WAC Attainment

LIST OF TABLES

Table 3-1 Summary of HPGe Total Uranium Results
Table 3-2 Stockpile 3 Physical Sample Results

LIST OF FIGURES

Figure 3-1 SP3 - RTRAK/RSS/HPGe Coverage Map

LIST OF ACRONYMS AND ABBREVIATIONS

2961

ccpm	corrected counts per minute
COCs	constituents of concern
HPGe	high-purity germanium (detector)
MDC	minimum detectable concentration
mg/kg	milligrams per kilogram
OSDF	On-Site Disposal Facility
pCi/g	picoCuries per gram
PID	photoionization detector
ppm	parts per million
PSP	Project Specific Plan
RMS	Radiation Measuring Systems
RSS	Radiological Scanning System
RTRAK	Radiation Tracking System
SP3	Soil Stockpile 3
SWRB	Stormwater Retention Basin
VOC	volatile organic compound
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization

3

2961

1.0 INTRODUCTION

This report summarizes the recent sampling and analytical results for Soil Stockpile 3 (SP3). Soil sampling was conducted to evaluate attainment of the On-Site Disposal Facility (OSDF) waste acceptance criteria (WAC). Excavation of the soil and debris of this stockpile is scheduled to begin in May 2000. WAC attainment will be visually verified by Waste Acceptance Organization (WAO) personnel during excavation.

Summaries of the strategies and methods of sampling for this stockpile are included in this report. The Project Specific Plan (PSP) for Sampling of SP3 for OSDF WAC Attainment (DOE 2000) should be referenced for the complete background and/or specific details on sampling design and physical sampling activities for the attainment of WAC data.

4

2.0 STOCKPILE DESCRIPTION AND SAMPLING DESIGN

2961

2.1 STOCKPILE DESCRIPTION

SP-3 (Material Tracking Location W800053) is located northeast of the Southern Waste Units within of Remediation Area 2 and south of the Stormwater Retention Basins (SWRB). The footprint of SP-3 is on a former softball field constructed in the early 1950s for use by site employees. Based on topographic survey measurements conducted in December 1999, the stockpile consists of approximately 54,000 cubic yards of soil and soil-like material. The stockpile was created in 1988 with the placement of excavated material from the SWRB project. The soil pile has grown to accommodate other excess soil generated from various previously uncontrolled areas. As determined in the PSP, the WAC constituents of concern (COCs) are total uranium and technetium-99 and the WAC limits are 82 parts per million (ppm) and 29.1 picoCuries per gram (pCi/g), respectively.

2.2 REAL-TIME SCANNING

A real-time total uranium surface scan of the stockpile was performed using the Radiation Measuring Systems (RMS) and high-purity germanium (HPGe) detectors. The real-time measurements covered as much of the stockpile surface as practical without jeopardizing worker safety. A few areas on SP3 were inaccessible to all available real-time equipment (see Figure 3-1). Approximately 90 percent of the stockpile was covered with the RMS.

The RMS detector acquisition time was set to 4 seconds and data was collected at a speed of 1 mile per hour. The onboard Global Positioning System was used to obtain positioning information with each detector measurement. If any single RMS measurement had exceeded 721 milligrams per kilogram (mg/kg) total uranium, a HPGe measurement would have been taken to confirm the RMS measurement. The highest RMS reading was 103.3 mg/kg therefore, no HPGe confirmation measurements were needed for the stockpile.

The HPGe detector system spectral acquisition time was set to 300 seconds (5 minutes). The detector height was set at 1 meter above ground surface. All HPGe locations were surveyed. HPGe measurements were needed to complete surface coverage.

5

Infrared Moisture Meter soil moisture readings were collected in the area covered. These moisture readings were necessary to compensate for soil moisture as related to RMS and HPGe measurements.

2.3 PHYSICAL SAMPLING

The physical sampling strategy for WAC attainment determination for SP3 was a combination of random and biased sampling throughout the stockpile. The number of samples determined to adequately characterize SP3 was based on the current data set, process knowledge of the stockpile, and sampling density in previous soil stockpile sampling projects. Based on these guidelines, 24 random sample locations were selected and 48 random sample intervals were collected from the stockpile.

To determine the locations and depths of random samples, a systematic approach was used to establish a sample grid over the stockpile surface. The grid pattern was based on surface area and consisted of 24 grid blocks of approximately equal size. A random sample location (northing and easting) was selected within each block. Depth intervals were randomly selected at each sampling location. Alternate random depths and alternate random locations were also selected in case of refusal at a boring location.

Biased samples were to be collected based on readings from a beta/gamma (Geiger-Mueller) survey meter. Six-inch soil intervals with beta/gamma readings above 400 corrected counts per minute (ccpm), as established in Appendix D of the Area 2, Phase I Integrated Remedial Design Package DOE 1998), would have been collected and analyzed for total uranium. However, no beta/gamma readings exceeded 400 ccpm for this stockpile, thus no biased radiological samples were collected.

In addition, biased samples were to be collected based on readings from a photoionization detector (PID). Six-inch soil intervals with a reading 5 ppm above-background would be collected and subjected to a headspace analysis. If the result from the headspace analysis was above 10 ppm, the sample interval would have been submitted for volatile organic compound (VOC) analysis. However, no PID readings exceeded 5 ppm above background, therefore no biased VOC samples were collected.

Soil cores were collected using either a hand auger or the Geoprobe® Model 5400. Three of the 24 boring locations were moved to the alternate location due to debris or inaccessibility (i.e., steep hill side). One of the 24 boring locations was moved approximately 25 feet to the north, without crossing

grid lines. Both the original and alternate location were inaccessible for the sampling team. All sample locations were moved in accordance with the PSP guidelines and documented in a variance (Appendix A).

3.0 DATA SUMMARY AND CONCLUSIONS

3.1 REAL-TIME DATA

Over 1614 measurements were acquired by the Radiation Tracking System (RTRAK), with the maximum result as 103.3 ppm. Over 536 measurements were acquired by the Radiation Scanning System (RSS), with the maximum result as 91.5 ppm. Twenty-one HPGe measurements were collected in areas which were inaccessible to the RTRAK and RSS. HPGe data are depicted in Table 3-1. RMS data are depicted in Figure 3-1.

3.2 FIELD SCREENING RESULTS

3.2.1 Beta/Gamma Screening Results

All borings collected at the sample locations were advanced to the 1 foot below the base of the pile and surveyed. All beta/gamma measurements were less than background.

3.2.2 PID Screening Results

All borings collected at the sample locations were advanced to 1 foot below the base of the pile and screened with a PID. All PID concentrations were below background.

3.3 ANALYTICAL DATA

The laboratory results of the soil samples are summarized in Tables 3-2 and 3-3. Results for total uranium analyses ranged from 1.37 ppm at SP3-11-42-R to 22.9 ppm at SP3-20-14-12-R. Technetium-99 results ranged from nondetects [at less than 1 pCi/g to 1.1 pCi/g at SP3-6-10-R.

3.4 CONCLUSION

The evaluation of the real-time results, beta/gamma surveying results, PID screening results and sampling analytical results indicate SP3 meets WAC and can be placed in the OSDF. Based on the low constituent concentrations throughout the pile, excavation monitoring with the RMS and/or HPGe and radiological control monitoring will not be necessary during excavation. Visual inspection for prohibited items will be conducted by WAO personnel.

Figure 3-1
STOCKPILE 3

2961

Moisture Corrected Total Uranium
RSS batch # 552,553,554
RTRAK batch #785
Single Spectra in ppm
Coverage Plot (Field of View 2.4 m radius)
Measurement Dates: 3/1/00, 3/2/00, 3/7/00

N

ppm Total Uranium

- -23.23 to 100.00
- 100.00 to 400.00
- 400.00 to 721.00
- 721.00 to 10000.00

RTIMP DWG Title: SP3-TU-1PT-MC
Project #: 20450-PSP-0002
Project Name: Sampling of Soil Pile 3 for WAC
Prepared By: David Allen
File: SP3_TU_1PT_MC.srf
Date Prepared: 3/15/00

9

REFERENCES

U.S. Department of Energy, 1998, "Area 2, Phase I Integrated Remedial Design Package," Final, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

U.S. Department of Energy, 2000, "Project Specific Plan for Sampling of Soil Stockpile 3 for OSDF WAC Attainment," Revision 0, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.

TABLE 3-1
SUMMARY OF HPGe TOTAL URANIUM RESULTS

Location ID	Northing	Easting	Detector Height	Total Uranium (ppm)
SP3-1-G	477973.70	1348537.20	100cm	< MDC
SP3-2-G	477943.10	1348567.10	100cm	< MDC
SP3-3-G	477937.26	1348604.79	100cm	< MDC
SP3-4-G	477927.97	1348637.96	100cm	< MDC
SP3-5-G	477923.30	1348678.97	100cm	< MDC
SP3-6-G	477912.88	1348700.50	100cm	< MDC
SP3-7-G	477907.57	1348731.86	100cm	< MDC
SP3-8-G	477898.62	1348761.96	100cm	< MDC
SP3-9-G	477885.11	1348788.69	100cm	23.2
SP3-10-G	477929.40	1348715.51	100cm	< MDC
SP3-11-G	477942.34	1348692.36	100cm	0
SP3-12-G	477949.16	1348661.50	100cm	5.3
SP3-13-G	477952.19	1348625.26	100cm	9.58
SP3-14-G	478297.51	1348650.96	100cm	12.4
SP3-15-G	478278.61	1348637.45	100cm	11.4
SP3-16-G	478273.08	1348657.12	100cm	10.7
SP3-17-G	478290.55	1348669.53	100cm	11.5
SP3-18-G	478258.16	1348657.99	100cm	19.5
SP3-19-G	478275.75	1348696.89	100cm	6.78
SP3-20-G	478253.16	1348693.73	100cm	7.43
SP3-20-G-D	478253.16	1348693.73	100cm	< MDC
SP3-21-G	478231.73	1348707.54	100cm	9.49
SP3-21-D-G	478231.73	1348707.54	100cm	9.96

MDC- mininum detection concentration

TABLE 3-2
STOCKPILE 3 PHYSICAL SAMPLE RESULTS

2961

Sample ID	Sample Depths at Boring Location (feet)	Total Uranium (ppm)	Qualifier	Tech-99 (pCi/g)	Qualifier
SP3-1-1-R	0.0-0.5	4.5	-	0.78	U
SP3-2-9-R	4.0-4.5	2.17	NV	0.84	UNV
SP3-2-16-R	7.5-8.0	2.8	NV	0.93	UNV
SP3-3-1-R	0.0-0.5	3	-	0.91	U
SP3-3-10-R	4.5-5.0	3.06	-	0.88	U
SP3-4-1-R	0.0-0.5	5.5	-	0.86	U
SP3-5-5-R	2.0-2.5	11.2	-	0.84	U
SP3-5-12-R	5.5-6.0	10.2	-	0.86	U
SP3-6-10-R	4.5-5.0	12	NV	1.1	NV
SP3-6-15-R	7.0-7.5	3.06	NV	0.92	UNV
SP3-7-13-R	6.0-6.5	11.9	NV	0.77	UNV
SP3-7-24-R	11.5-12.0	2.06	NV	0.82	UNV
SP3-8-7-R	3.0-3.5	10.7	NV	0.97	UNV
SP3-8-9-R	4.0-4.5	10.9	NV	0.9	UNV
SP3-9-3-R	1.0-1.5	13.3	-	0.84	U
SP3-9-16-R	7.5-8.0	2.52	-	0.85	U
SP3-10-14-R	6.5-7.0	8.23	NV	1.4	UNV
SP3-10-34-R	16.5-17.0	2.7	NV	1.3	UNV
SP3-11-3-R	1.0-1.5	5.6	NV	0.84	UNV
SP3-11-21-R	10.0-10.5	1.85	NV	0.88	UNV
SP3-11-42-R	20.5-21.0	1.37	NV	1	UNV
SP3-12-12-R	5.5-6.0	14.9	NV	1.3	UNV
SP3-12-37-R	18.0-18.5	4.18	NV	1.3	UNV
SP3-13-1-R	0.0-0.5	3.27	-	0.88	U
SP3-13-17-R	8.0-8.5	7.95	-	0.77	U
SP3-14-3-R	1.0-1.5	6.36	NV	0.8	UNV
SP3-14-33-R	16.0-16.5	5.8	NV	1.2	UNV
SP3-14-52-R	25.5-26.0	3.44	NV	1.3	UNV
SP3-15-8-R	3.5-4.0	17.4	NV	0.9	UNV
SP3-15-34-R	16.5-17.0	15.3	NV	1.1	UNV
SP3-15-53-R	26.0-26.5	2.3	NV	0.85	UNV
SP3-16-4-R	1.5-2.0	2.7	NV	1	UNV
SP3-16-13-R	6.0-6.5	2.17	NV	1.1	UNV
SP3-17-3-R	1.0-1.5	8.51	NV	0.96	UNV
SP3-18-11-R	5.0-5.5	5.98	NV	1.3	UNV
SP3-18-17-R	8.0-8.5	6.92	NV	1.4	UNV
SP3-18-35-R	17.0-17.5	11.2	NV	1.2	UNV
SP3-19-10-R	4.5-5.0	4.36	NV	1.2	UNV
SP3-19-21-R	10.0-10.5	9.28	NV	1.2	UNV
SP3-19-42-R	20.5-21.0	2.47	NV	1.3	UNV
SP3-20-1-R	0.0-0.5	13.8	NV	0.95	UNV
SP3-20-14-R	6.5-7.0	22.9	NV	0.93	UNV
SP3-21-1-R	0.0-0.5	18	-	0.86	U
SP3-22-7-R	3.0-3.5	6.27	NV	0.87	UNV
SP3-23-9-R	4.0-4.5	17.8	NV	1	UNV
SP3-23-20-R	9.5-10.0	6.63	NV	1.1	UNV
SP3-24-6-R	2.5-3.0	5.55	NV	0.98	UNV
SP3-24-13-R	6.0-6.5	13	NV	0.93	UNV

U undected at minimum detectable concentration (MDC)
UNV undected at minimum detectable concentration, non validated
NV non validated
- no data qualifier for positive result

APPENDIX A

VARIANCES TO THE PROJECT SPECIFIC PLAN FOR SAMPLING OF SOIL STOCKPILE 3 FOR OSDF WAC ATTAINMENT

VARIANCE / FIELD CHANGE NOTICE	V/F 20450PSP2-1
WBS NO.: Project/Document/EDCD #20450-PSP-0002 Rev 0	Page 1 of 2
PROJECT TITLE: PSP for Sampling of Soil Stockpile 3 for OSDF WAC Attainment	Date 4/7/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Replace Table 2-1 with the attached table. This modified table includes the all the predesign analytes (total uranium, thorium-228, thorium-232, radium-226, and radium-228) and the correct sample mass required. The sample mass required is 300 grams.

2961

Justification:
The predesign analytes (TAL C) require more sample mass for the lab to conduct their analysis.

ORIGINAL

REQUESTED BY: Deanna Diallo
Date: 4/7/00

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X RT	QUALITY ASSURANCE R Huske for F Thompson	4-20-00	X [signature]	AREA 2 PROJECT MANAGER	4-10-00
	DATA QUALITY MANAGEMENT		X Deanna Diallo	SP3 Characterization Lead	4/7/00
X	[signature]	04/07/00		RTIMP Manager	
	OTHER		X	Sampling Manager Thomas Bahlage	4/10/00

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

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PROJECT MANAGER:	DOCUMENT CONTROL: Jeannie Rosser	OTHER:
QUALITY ASSURANCE:	OTHER:	OTHER:
FIELD MANAGER:	OTHER:	OTHER:

14

TABLE 2-1
SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte	TAL	Sample Matrix	Lab	ASL*	Preservative	Holding Time	Container	Sample Mass (minimum)
Total Uranium Technetium-99	A, B	Solid	On-Site	B	None	12 months	250-ml plastic or glass	40 g
Total Uranium Technetium-99 Thorium-228 Thorium-232 Radium-226 Radium-228	C	Soil	On-Site	B	None	12 months	Plastic or glass	300 g
Bromodichloromethane 1,1-Dichloroethene Tetrachloroethene	D	Solid	Off-site	B	Cool to 2° to 6°C	14 days	60-ml widemouth glass with Teflon	Fill container to top (no head space)
Alpha/beta screen	N/A	Solid	On-site	N/A	None	None	Any container	10 g

* Analytical Support Level

Notes: Sample container sizes for radiological samples may be changed in the field at the Field Sampling Lead's discretion.

The alpha/beta screen is only required for samples destined for off-site laboratories (TAL D). Off-site samples should be recorded on a separate Chain of Custody form from the on-site samples.

VARIANCE / FIELD CHANGE NOTICE	V/F 20450PSP2-2
WBS NO.: Project/Document #20450-PSP-0002, Rev. 0	Page 1 of 1
PROJECT TITLE: PSP For Sampling of SP 3 for OSDF WAC Attainment	Date 4/19/00

VARIANCE / FIELD CHANGE NOTICE (Include justification):

Field Change Notice:

2961

Sample locations were moved from the primary location due to inaccessibility and/or debris.

The following borings were moved to the alternate location listed in the PSP and the alternate sample intervals identified in the PSP were submitted:
SP3-8
SP3-19
SP3-22

Refer to Table C-2 in the PSP for the coordinate and depth interval information.

One boring was inaccessible at both the primary and alternate location. It was moved approximately 25 feet to the north of the primary location. The depth of the new location was calculated and new random intervals were generated. The following is the new coordinates and sample intervals:

Sample ID	Northing	Easting	Estimated Depth	Depth Interval
SP3-16-4-R	478100.52	1348816.20	15.7	1.5-2.0
SP2-16-13-R	478100.52	1348816.20	15.7	6.0-6.5

Justification:
Per Section 2.0 of the PSP, any primary location which is moved will be documented in a variance.

ORIGINAL

REQUESTED BY: Deanna Diallo
Date: 4/19/00

X IF REQD	VARIANCE/FCN APPROVAL	DATE	X IF REQD	VARIANCE/FCN APPROVAL	DATE
X	QUALITY ASSURANCE Frank Thompson	4-20-00	X	PROJECT MANAGER for T. Crawford	4/19/00
	DATA QUALITY MANAGEMENT		X	Characterization Lead Deanna Diallo	4/19/00
	ANALYTICAL CUSTOMER SUPPORT			RTIMP Manager	
X	WAC Linda Barlow	4/19/00	X	Sampling Manager for Tom Burbridge	4/21/00

VARIANCE/FCN APPROVED [X]YES [ ]NO

REVISION REQUIRED: [ ]YES [x]NO

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FIELD MANAGER:	OTHER:	OTHER:

16