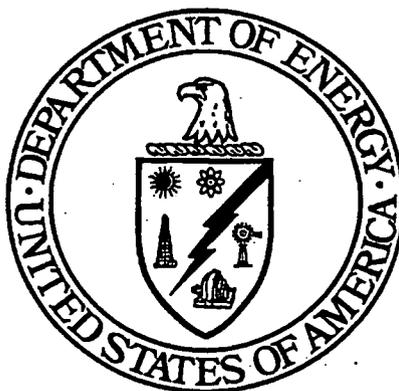


**PROJECT SPECIFIC PLAN
FOR AREA 1, PHASE IV PART TWO
CERTIFICATION SAMPLING**

**FERNALD CLOSURE PROJECT
FERNALD, OHIO**



MAY 2004

U.S. DEPARTMENT OF ENERGY

**20730-PSP-0004
REVISION A
DRAFT**

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LIST OF ACRONYMS AND ABBREVIATIONS

A1PIV	Area 1, Phase IV
ASL	analytical support level
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
CU	certification unit
CVAA	cold vapor atomic absorption
DOE	U.S. Department of Energy
DQO	Data Quality Objectives
FACTS	Fernald Analytical Computerized Tracking System
FAL	Field Activity Log
FCP	Fernald Closure Project
FRL	final remediation level
GC/MS	gas chromatography mass spectroscopy
GPS	Global Positioning System
MDL	minimum detection level
mg/kg	milligrams per kilogram
NAD83	North American Datum of 1983
pCi/g	picoCuries per gram
OSDF	On-Site Disposal Facility
PSP	project specific plan
QA/QC	Quality Assurance/Quality Control
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SPL	Sample Processing Laboratory
TAL	Target Analyte List
V/FCN	Variance/Field Change Notice
VOC	volatile organic compound
VSL	validation support level
WAO	Waste Acceptance Organization

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1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

This Project Specific Plan (PSP) describes the certification sampling and analysis necessary to certify Area 1, Phase IV (A1PIV) Part Two. Certification demonstrates that risk-based, area-specific constituents of concern (ASCOCs) meet final remediation levels (FRLs). Certification of A1PIV Part Two must be obtained prior to subgrade preparation activities of the On-Site Disposal Facility (OSDF) Cell 8 footprint. A1PIV is located southeast of the Former Production Area and is surrounded almost completely by Area 1, Phase II with the southwest corner bound by Area 7. A1PIV Part Two is located in the central portion of A1PIV, and a location map is provided on Figure 1-1. A1PIV Part Two consists of two certification units (CUs), which will be sampled following remediation and precertification scanning of the area.

1.2 SCOPE

The scope of this Project Specific Plan (PSP) includes details of certification sampling, analysis and validation that will take place in A1PIV Part Two. Due to the timing of subsequent OSDF construction work in A1PIV, certification will be broken down into several parts. Each certification effort in A1PIV will be covered in separate Certification Design Letter (CDL) and PSP submittals.

Field activities for A1PIV Part Two will be consistent with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ) and Section 3.4 of the SEP. The certification sampling program, as discussed in Section 2.0 of this PSP, will be consistent with Data Quality Objective (DQO) SL-052, Revision 3, which is included as Appendix A of this PSP.

1.3 KEY PROJECT PERSONNEL

Key project personnel responsible for performance of the project are listed in Table 1-1.

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 2
 3

**TABLE 1-1
 KEY PROJECT PERSONNEL**

Title	Primary	Alternate
DOE Contact	Nina Akgunduz	Johnny Reising
Project Manager	Jyh-Dong Chiou	Rich Abitz
Characterization Manager	Frank Miller	Denise Arico
Field Sampling Manager	Tom Buhrlage	Jim Hey
Surveying Manager	Jim Schwing	Andy Clinton
WAO Contact	Linda Barlow	Laura Spriggs
Laboratory Contact	Heather Medley	Kathy Leslie
Data Management Contact	Denise Arico	Krista Blades
Data Validation Contact	James Chambers	Andy Sandfoss
Field Data Validation Contact	Dee Dee Early	James Chambers
FACTS/SED Database Contact	Kym Lockard	Susan Marsh
QA/QC Contact	Reinhard Friske	Darren Wessel
Safety and Health Contact	Gregg Johnson	Pete Bolig/Jeff Middaugh

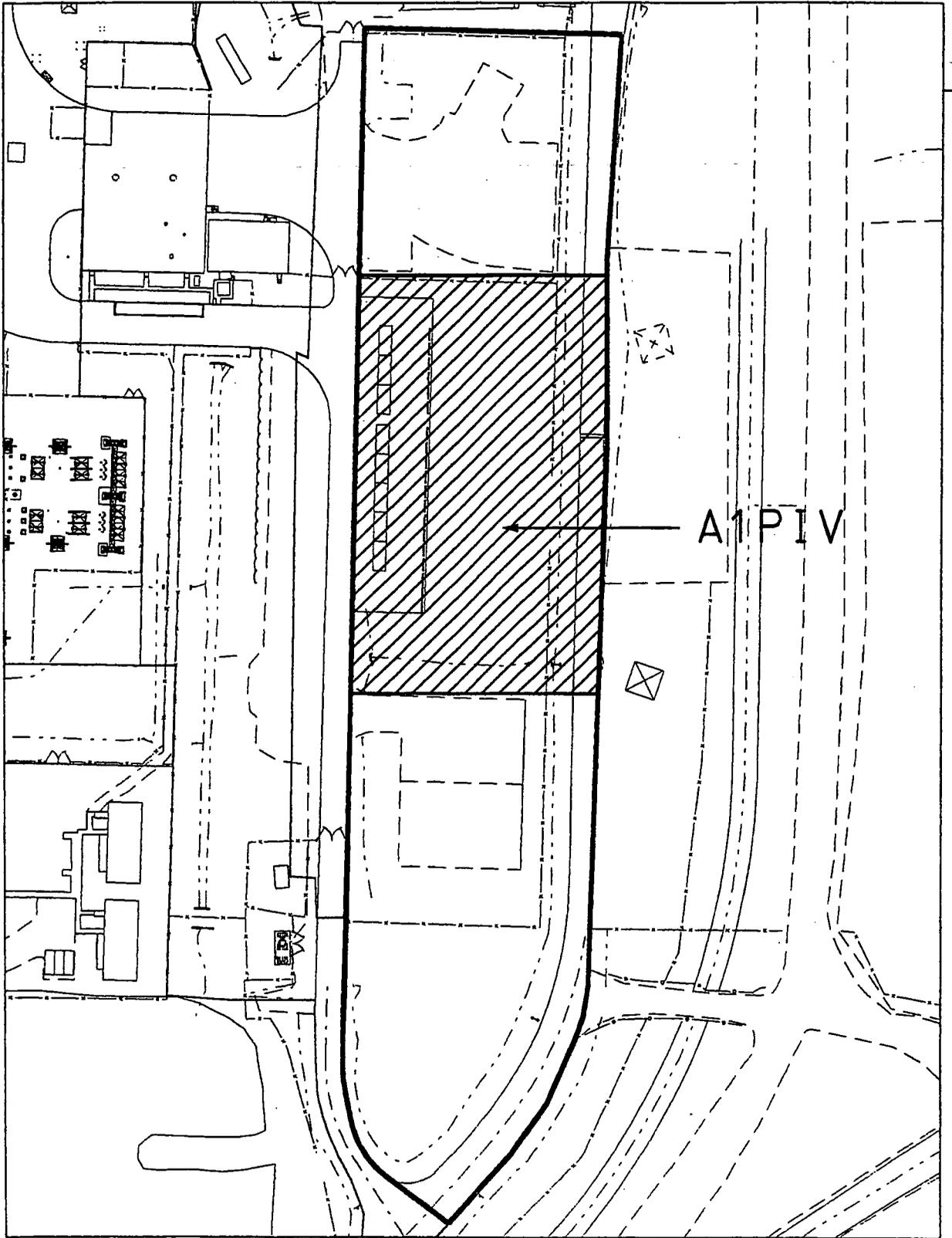
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- FACTS – Fernald Analytical Computerized Tracking System
- QA/QC – Quality Assurance/Quality Control
- SED – Sitewide Environmental Database
- WAO – Waste Acceptance Organization

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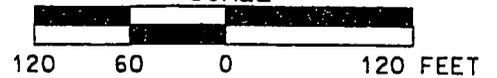


LEGEND:



A1PIV PART TWO

SCALE



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FIGURE 1-1. AREA 1, PHASE IV PART TWO LOCATION MAP

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2.0 CERTIFICATION SAMPLING PROGRAM

2.1 CERTIFICATION DESIGN

Details and logic of the certification design are described in the A1PIV Part Two CDL. Within A1PIV Part Two, two Group 1 certification units (CUs) has been established. Each CU is divided into 16 sub-CUs. Within each sub-CU, one random certification sample location has been identified. All sample locations in the CU were tested against the minimum distance criterion as defined in the SEP. Certification sampling will consist of sample collection at 12 of the 16 selected locations, plus one field duplicate sample within each CU. The four archive locations will only be sampled if results from the initial 12 locations indicate that additional data are necessary. The sample locations, field duplicate samples, and archive samples are identified in Appendix B.

2.2 SURVEYING

Before certification sampling activities begin, the North American Datum of 1983 (NAD83) State Planar coordinates for each selected sampling location will be surveyed and identified in the field with a flag. All locations will be field verified to ensure no surface obstacles will prevent collection at the planned location. Appendix B and Figure 2-1 show the tentative certification sampling locations, all of which meet the minimum distance criterion.

2.3 PHYSICAL SOIL SAMPLE COLLECTION

Certification samples will be collected according to procedure SMPL-01, Solids Sampling, using 3-inch diameter, 6-inch long, plastic or stainless steel liners. At the discretion of the Field Sampling Lead, samples may be collected using alternative methods specified in SMPL-01, as long as sufficient volume is collected from the appropriate depth to perform the prescribed analyses.

Quality control requirements will include a duplicate field sample, a trip blank, and a container blank, and will be collected per procedure SMPL-21, Collection of Field Quality Control Samples. For the duplicate field sample, twice the soil volume (a second core) will be collected at one location in the CU, and will not be homogenized with the original sample. The location that requires the collection of a duplicate sample is identified in Appendix B. A container blank will be collected (see Section 4.1) from both the core liner and the end caps that will be used to seal it. A trip blank will be collected each day that volatile organic compound (VOC) samples are collected, or one per 20 VOC samples that are collected, or one per cooler that will be shipped, whichever is more frequent. All samples will be assigned unique sample identification numbers.

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1 If a subsurface obstacle prevents sample collection at the specified location, it can be moved according to
2 the following guidelines:

- 3
- 4 • The distance moved must be as small as possible (less than 3 feet);
- 5
- 6 • It must remain within the boundary of the same CU and sub-CU, and must still meet the minimum
7 distance criterion;
- 8
- 9 • If the distance moved is greater than 3 feet, the move must be documented in a Variance/Field
10 Change Notice (V/FCN), considered as significant, which will be approved by the agencies prior
11 to collection.
- 12

13 Anytime a location is moved, Figure 2-1 should be used to determine the best direction to move the point
14 to adhere to the above guidelines. The Characterization Manager or designee should be contacted when a
15 sample location is moved. All final sampling locations will be documented in the A1PIV Part Two
16 Certification Report.

17

18 Customer sample numbers and FACTS identification numbers will be assigned to all samples collected.
19 The sample labels will be completed with sample collection information, and technicians will complete a
20 Field Activity Log (FAL), a Sample Collection Log, and a Chain of Custody/Request for Analysis form in
21 the field prior to submittal of the samples. All soil samples from the CU with like analyses (including the
22 field duplicate) will be batched and submitted to the Sample Processing Laboratory (SPL) under one set of
23 Chain of Custody/Request for Analysis forms which will represent one analytical release. The container
24 blank will be listed on a separate Chain of Custody/Request for Analysis form. No alpha/beta screens will
25 be required, as historical information can be used for shipping purposes.

26

27 2.3.1 Sample Collection

28 Samples will be collected from 0 to 6-inches using 3-inch diameter, 6-inch long, plastic or stainless steel
29 liners, or any other approved method identified in SMPL-01. If necessary, the soil core shall be divided
30 and placed into the proper sample containers. Samples will be collected from 12 of the 16 sample
31 locations in each CU, including one field duplicate sample. The archive locations will not be collected
32 unless necessary. Thirteen samples from each CU (12 plus one field duplicate) will be submitted for
33 analysis. Upon completion of sample collection, the 0 to 6-inch boreholes will be collapsed and no
34 additional abandonment is necessary.

1 2.3.2 Equipment Decontamination

2 Decontamination is performed to prevent the introduction of contaminants from sampling equipment to
3 subsequent soil samples. Field Technicians will ensure that sampling equipment (core tubes and caps) has
4 been decontaminated prior to transport to the field. As described in SMPL-01, all sampling equipment will
5 have been decontaminated before it is transported to the field site, and the 6-inch core liners will be
6 decontaminated using the Level II (Section K.11 of the SCQ) procedure upon receipt from the
7 manufacturer. Decontamination is also necessary in the field if sampling equipment is reused. If an
8 alternate sampling method is used, equipment will be decontaminated between collection of sample
9 intervals, and again after the sampling performed under this PSP is completed. Following
10 decontamination, clean disposable wipes may be used to replace air-drying of the equipment.

11
12 2.3.3 Physical Sample Identification

13 Each soil certification sample will be assigned a unique sample identification number as

14 *A1P4-C#-Location^Analysis-QC*, where:

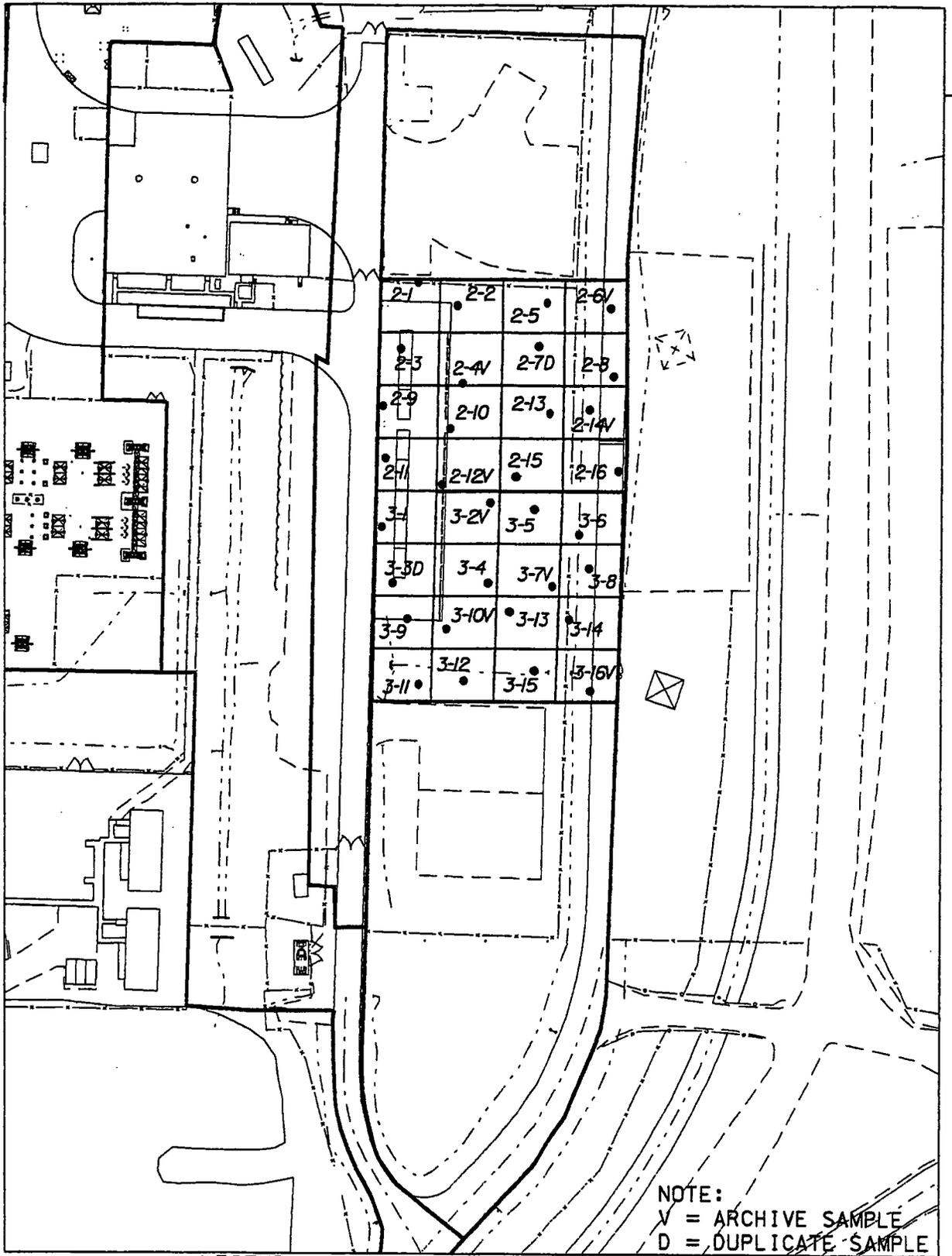
15		
16	A1P4	= Sample collected from Remediation A1PIV (Note that the number "4" is used in
17		place of the roman numeral "IV" in the ID for data management purposes)
18		
19	C#	= Certification sample representing certification unit from which sample was
20		collected (C2 or C3)
21		
22	Location	= Sample Location number within the CU (1 through 16)
23		
24	Analysis	= "R" indicates radiological analysis, "M" indicates metals, "P" indicates PCBs,
25		and "L" indicates VOCs
26		
27	QC	= Quality control sample, if applicable. A "D" indicates a field duplicate sample;
28		"Y" indicates a container blank sample; "X" indicates a rinsate; "TB1" indicates
29		the first trip blank collected, and each additional trip blank collected will be
30		consecutively numbered.
31		

32 For example, a field duplicate sample taken from the 3rd sample location from CU 3 for radiological
33 analysis would be identified as A1P4-C3-3^R-D. The container blank will be identified as A1P4-C3-Y,
34 and the analysis code will also be added. For example, the container blank will be identified as
35 A1P4-C3-R-Y. A trip blank will be identified as A1P4-C3-TB#, and the analysis code will be added. The
36 first trip blank will be identified as A1P4-C3-L-TB1.

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- SAMPLE LOCATION
- SAMPLE NO.
- CU NO.

NOTE:
 V = ARCHIVE SAMPLE
 D = DUPLICATE SAMPLE

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120 60 0 120 FEET

FIGURE 2-1. A1PIV PART TWO CU AND SUB-CU BOUNDARY AND CERTIFICATION SAMPLING LOCATIONS

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3.0 CERTIFICATION SAMPLE ANALYSIS

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3 All samples will be prepared for shipment to off-site laboratories per procedure 9501, Shipping Samples to
4 Off-site Laboratories. Samples will only be shipped to off-site laboratories that are listed on the
5 Fluor Fernald Approved Laboratories List. The total uranium value from boring ZONE 2-147,
6 45.4 milligrams per kilogram (mg/kg), will be used to ship the samples off-site. This is the highest total
7 uranium result from the area.

8

9 As soon as the samples arrive at the laboratory where the analysis will take place, all samples should be
10 prepared for analysis (including homogenization for non-VOC samples), and radiological samples should
11 be sealed to begin the in-growth period for radium analysis. A 25-day turnaround time will be required for
12 sample analysis.

13

14 The sampling and analytical requirements are listed in Table 3-1 and the Target Analyte Lists (TAL) are
15 shown in Table 3-2.

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**TABLE 3-1
 SAMPLING AND ANALYTICAL REQUIREMENTS**

Analyte	Method	Sample Matrix	ASL	Preserve	Hold Time	Container ^b	Minimum Mass
Radiological (TAL A & B)	Gamma Spec or GPC	Solid	D/E ^a	None	12 months	Plastic or stainless steel core liner or glass or polyethylene sample container	300 g (900 g) ^c
Radiological (TAL A & C)	Gamma Spec	Solid	D/E ^a	Cool, 4° C	12 months	Glass with Teflon-lined lid	450 g (1350 g) ^c
Metals (TAL C)	CVAA				28 days		
PCBs (TAL C)	GC				14 days		
VOCs (TAL D)	GC/MS	Solid	D/E ^a	Cool, 4° C	14 days	Glass with teflon-liner	20 g (60 g) ^c Fill to minimize headspace
Radiological (TAL A)	Gamma Spec	Liquid (rinsate ^d)	D/E ^a	HNO ₃ pH<2	6 months	Glass or Polyethylene	4 liters
VOCs (TAL D)	GC/MS	Liquid (trip blank)	D/E ^a	Cool, 4° C H ₂ SO ₄ pH<2	14 days	3 x 40-ml glass with teflon-lined septa	120 ml (no headspace)

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^aSamples will be analyzed according to Analytical Support Level (ASL) D requirements but the minimum detection level may cause some analyses to be considered ASL E.

^bSample container types may be changed at the direction of the Field Sampling Lead, as long as the volume requirements, container compatibility requirements, and SCQ requirements are met.

^cAt the direction of the Field Sampling Lead, triple the specified volume must be collected for all samples at one location in the CU in order for the contract laboratory to perform the required quality control analysis. The samples shall be identified on the Chain of Custody/Request for Analysis forms as "designated for laboratory QC".

^dIf "push tubes" are used for sampling, the off-site laboratories will be sent container blanks. If an alternative sample method is used, a rinsate will be collected by the Field Technicians.

CVAA – cold vapor atomic absorption

GC/MS – gas chromatography mass spectroscopy

GPC – gas proportional counting

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**TABLE 3-2
TARGET ANALYTE LISTS**

**20730-PSP-0004-A
(ASL D/E*)**

Analyte	On-Property FRL	MDL
Total Uranium	82 mg/kg	8.2 mg/kg
Radium-226	1.7 pCi/g	0.17 pCi/g
Radium-228	1.8 pCi/g	0.18 pCi/g
Thorium-228	1.7 pCi/g	0.17 pCi/g
Thorium-232	1.5 pCi/g	0.15 pCi/g

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10

**20730-PSP-0004-B
(ASL D/E*)**

Analyte	On-Property FRL	MDL
Technetium-99	29.1 pCi/g	2.91 pCi/g

11
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13
14
15

**20730-PSP-0004-C
(ASL D/E*)**

Analyte	On-Property FRL	MDL
Thorium-230	280 pCi/g	28 pCi/g
Mercury	7.5 mg/kg	0.75 mg/kg
Aroclor-1254	0.13 mg/kg	0.013 mg/kg
Aroclor-1260	0.13 mg/kg	0.013 mg/kg

16
17
18
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**20730-PSP-0004-D
(ASL D/E*)**

Analyte	On-Property FRL	MDL – Soil	MDL – Water
1,1,1-Trichloroethane**	4.3 mg/kg	0.43 mg/kg	10 ug/l
Carbon Tetrachloride	2.1 mg/kg	0.21 mg/kg	10 ug/l
Trichloroethene	25 mg/kg	2.5 mg/kg	10 ug/l

21
22
23

**1,1,1-Trichloroethane does not have an associated FRL. Therefore, to assess impact to the area, the FRL for 1,1,2-Trichloroethane will be used.

24
25
26

*Analytical requirements will meet ASL D but the minimum detection level may cause some analyses to be considered ASL E

27
28

MDL – minimum detection level
pCi/g – picoCuries per gram

4.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

4.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS AND DATA VALIDATION

Per requirements of the SEP and DQO SL-052, Revision 3, the field quality control, analytical and data validation requirements are as follows:

- Field QC requirements include one field duplicate for each CU, as noted in Appendix B and Section 2.3. The field duplicate samples will be analyzed for the ASCOCs from the CU in which they were collected. If “push tubes” are used for sample collection, two container blanks will be collected – one before sample collection begins and one at the conclusion of sample collection. The container blank samples will be analyzed for the primary radiological COCs that are identified in TAL A. If an alternate sample collection method is used, one rinsate will be collected at a minimum frequency of one per 20 pieces of equipment reused in the field. A trip blank is required if VOC samples are being collected. The frequency for a trip blank is one per day, or one per batch of 20 VOC samples collected, or one per cooler to be shipped, whichever is more frequent.
- All analyses will be performed at ASL D or E, where E meets the minimum detection level of 10 percent of the FRL and is above the SCQ ASL D detection level, but the analyses meet all other SCQ ASL D criteria. An ASL D data package will be provided for all of the data.
- All field data will be validated, and all laboratory data will be validated to validation support level (VSL) D. If any result is rejected during validation, the sample will be re-analyzed or an archive location will be sampled and analyzed in its place. If necessary, this change will be documented in a V/FCN.

Once all data are validated as required, results will be entered into the SED and a statistical analysis will be performed to evaluate the pass/fail criteria for the each CU. The statistical approach is discussed in Section 3.4.3 and Appendix G of the SEP.

If any sample collection or analytical methods are used that are not in accordance with the SCQ, the Project Manager and Characterization Manager must determine if the qualitative data from the samples will be beneficial to certification decision making. If the data will be beneficial, the Project Manager and Characterization Manager will ensure that:

- A variance to the PSP will be written to document references confirming that the new method supports data needs,
- variations from the SCQ methodology are documented in a variance to the PSP, or
- data validation of the affected samples is requested or qualifier codes of J (estimated) and R (rejected) be attached to detected and non-detected results, respectively.

1 4.2 PROJECT SPECIFIC PROCEDURES, MANUALS AND DOCUMENTS

2 Programs supporting this work are responsible for ensuring team members work to and are trained to
3 applicable documents. Additionally, programs supporting this work are responsible for ensuring team
4 members in their organizations are qualified and maintain qualification for site access requirements. The
5 Project Manager will be responsible for ensuring any project-specific training required to perform work per
6 this PSP is conducted.

7
8 To ensure consistency and data integrity, field activities in support of the PSP will follow the requirements
9 and responsibilities outlined in the procedures and guidance documents referenced below.

- 10
- 11 • 20100-HS-0002, Soil and Disposal Facility Project Integrated Health and Safety Plan
- 12 • Sitewide Excavation Plan (SEP)
- 13 • Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- 14 • SH-1006, Event Investigation and Reporting
- 15 • ADM-02, Field Project Prerequisites
- 16 • EQT-06, Geoprobe[®] Model 5400 and Model 6600
- 17 • EQT-33, Real-Time Differential Global Positioning System
- 18 • SMPL-01, Solids Sampling
- 19 • SMPL-21, Collection of Field Quality Control Samples
- 20 • 9501, Shipping Samples to Off-site Laboratories
- 21 • Trimble Pathfinder Pro-XL GPS Operation Manual
- 22

23 4.3 INDEPENDENT ASSESSMENT

24 An independent assessment may be performed by the FCP QA/QC organization by conducting a
25 surveillance, consisting of monitoring/observing on-going project activities and work areas to verify
26 conformance to specified requirements. The surveillance will be planned and documented in accordance
27 with Section 12.3 of the SCQ.

28 29 4.4 IMPLEMENTATION OF CHANGES

30 Before the implementation of changes, the Field Sampling Lead will be informed of the proposed changes.
31 Once the Field Sampling Lead has obtained written or verbal approval (electronic mail is acceptable) from
32 the Characterization Manager and QA/QC for the changes to the PSP, the changes may be implemented.
33 Changes to the PSP will be noted in the applicable FALs and on a V/FCN. QA/QC must receive the
34 completed V/FCN, which includes the signatures of the Characterization and Sampling Managers,
35 Project Director, and QA/QC within seven days of implementation of the change. The U.S. Environmental
36 Protection Agency and Ohio Environmental Protection Agency will be given a 15-day review period prior
37 to implementing the change(s) for any V/FCNs identified as "significant" per project guidelines.

5.0 HEALTH AND SAFETY

1
2
3 Technicians will schedule a project walkdown with Health and Safety (Radiological Control,
4 Industrial Hygiene, and Safety) and any other groups that may be working in the same or an adjacent area
5 before the start of the project. Any hazards identified during the project walkdown must be
6 corrected/controlled prior to the start of work. Weekly walkdowns will be conducted throughout the
7 course of the project in accordance with SPR 1-10, Safety Walk-Throughs. All work on this project will
8 be performed according to applicable Environmental Monitoring procedures, the documents identified in
9 Section 3.4, Fluor Fernald work permit, Radiological Work Permit, and other applicable permits as
10 determined by project management. Concurrence with applicable safety permits is required by each
11 technician in the performance of their assigned duties.
12

13 A job/safety briefing will be conducted before field activities begin each day. The project lead or designee
14 will document the briefing on form FS-F-2955. Personnel will also be briefed on any health and safety
15 documents (such as Travelers) that may apply to the project work scope. During the course of this project,
16 no operating heavy-duty equipment within a 50-foot buffer zone will be permitted. Additional safety
17 information can be found in 20100-HS-0002, Soil and Disposal Facility Project Integrated Health and
18 Safety Plan. All personnel have stop-work authority for imminent safety hazards or other hazards resulting
19 from noncompliance with the applicable safety and health practices.
20

21 Technicians will be provided with cellular phones for all sampling activities, and **all emergencies will be**
22 **reported by dialing 648-6511 and asking for "CONTROL"**. Announcements for severe weather will
23 be provided on the Emergency Message System and by alphanumeric page. Pagers and cellular phones are
24 provided to the Technicians by FCP.

6.0 DISPOSITION OF WASTE

1
2
3 During sampling activities, field personnel may generate small amounts of soil, water, and contact waste.
4 Excess soil generated during sample collection will be replaced in the borehole. Contact waste generation
5 will be minimized by limiting contact with sample media, and by only using disposable materials that are
6 necessary. Contact waste will be bagged and brought back to site for disposal in an uncontrolled area
7 dumpster. Generation of decontamination waters will be minimized in the field. Decontamination water
8 that is generated will be contained in a plastic bucket with a lid and returned to site for disposal. A
9 wastewater discharge form must be completed for disposal. On-site decontamination of equipment will
10 take place at a facility that discharges to the Advanced Wastewater Treatment Facility, either directly or
11 indirectly, through the storm water collection system.

12
13 Following analysis, any remaining soil and/or sample residuals will remain at the off-site laboratories for a
14 specified period of time as defined in their contracts with Fluor Fernald. Prior authorization must be
15 obtained from the Characterization Manager, or designee, to disposition samples collected under this PSP.

7.0 DATA MANAGEMENT

1
2
3 A data management process will be implemented so information collected during the investigation will be
4 properly managed to satisfy data end use requirements after completion of field activities. As specified in
5 Section 5.1 of the SCQ, sampling teams will describe daily activities on a FAL, which should be
6 sufficiently detailed for accurate reconstruction of the events without reliance on memory. Sample
7 Collection Logs will be completed according to protocols specified in Appendix B of the SCQ and in
8 applicable procedures. These forms will be maintained in loose-leaf form and uniquely numbered
9 following the sampling event.

10
11 All field measurements, observations, and sample collection information associated with physical sample
12 collection will be recorded, as applicable, on the Sample Collection Log, the FAL, the Chain of
13 Custody/Request for Analysis form, the Lithologic Log, and Borehole Abandonment Record. The
14 PSP number will be on all documentation associated with these sampling activities.

15
16 Samples will be assigned a unique sample number as explained in Section 2.3 and listed in Appendix B.
17 This unique sample identifier will appear on the Sample Collection Log and Chain of Custody/Request for
18 Analysis form and will be used to identify the samples during analysis, data entry, and data management.

19
20 Technicians will review all field data for completeness and accuracy then forward the field data package to
21 the Field Data Validation Contact for final QA/QC review. Analytical data will be entered into the SED
22 by Sample Data Management personnel. Analytical data that is designated for data validation will be
23 forwarded to the Data Validation Group. The PSP requirements for analytical data validation are outlined
24 in Section 4.1. Analytical data will be reviewed by the Data Management Lead upon receipt from the
25 off-site laboratories.

26
27 Following field and analytical data validation, the Sample Data Management organization will perform
28 data entry into the SED. The original field data packages, original analytical data packages, and original
29 documents generated during the validation process will be maintained as project records by the
30 Sample Data Management organization.

1 To ensure that correct coordinates and survey information are tied to the final sample locations in the
2 database, the following process will take place. Upon surveying all locations identified in the PSP, the
3 Surveying Manager will provide the Data Management Lead (i.e., Characterization) with an electronic file
4 of all surveyed coordinates and surface elevations. The Sampling Manager will provide the
5 Data Management Lead with a list of any locations that must be moved during penetration permitting or
6 sample collection, and the Data Management Lead will update the electronic file with this information.
7 After sample collection is complete, the Data Management Lead will provide this electronic file to the
8 Database Contact for uploading to SED.

APPENDIX A

DATA QUALITY OBJECTIVES SL-052, REV. 3

DQO #: SL-052, Rev. 3
 Effective Date: March 3, 2000

Control Number _____

Fernald Environmental Management Project

Data Quality Objectives

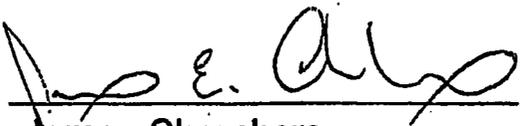
Title: Sitewide Certification Sampling and Analysis

Number: SL-052

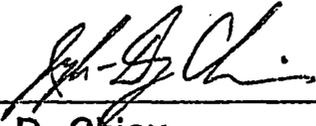
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DATA QUALITY OBJECTIVES Sitewide Certification Sampling and Analysis

Members of Data Quality Objectives (DQO) Scoping Team

The members of the scoping team included individuals with expertise in QA, analytical methods, field sampling, statistics, laboratory analytical methods and data management.

Conceptual Model of the Site

Soil sampling was conducted at the Fernald Environmental Management Project (FEMP) during the Operable Unit 5 (OU5) Remedial Investigation/Feasibility Study (RI/FS). Final Remediation Levels (FRLs) for constituents of concern (COCs), along with the extent of soil contaminated above the FRLs, were identified in the OU5 Record of Decision (ROD). Actual soil remediation activities now fall under the guidance of the final Sitewide Excavation Plan (SEP).

As outlined in the SEP, the FEMP has been divided into individual Remediation Areas (or phased areas within a Remediation Area) to sequentially carry out soil remedial activities. Under the strategy identified in the SEP, pre-design investigations are first conducted to better define the limits of soil excavation requirements. Following any necessary excavation, pre-certification real-time scanning activities are conducted to evaluate residual patterns of soil contamination. Pre-certification scan data should provide a level of assurance that the FRLs will be achieved. When pre-certification data indicate that remediation goals are likely to be met, they are used to define certification units (CUs) within the Remediation Area of interest. Table 2-9 of the final SEP identifies a list of area-specific COCs (ASCOCs) for each Remediation Area at the FEMP. Based on existing data and production knowledge, a subset of these ASCOCs are conservatively identified within each CU as potentially present in the CU. This suite of CU-specific COCs is the subset of the ASCOCs to be evaluated against the FRLs within that CU. At a minimum, the five primary radiological COCs (total uranium, radium-226, radium-228, thorium-228, thorium-232) will be retained as CU-specific COCs for certification of each CU.

Delineation and justification for the final CU boundaries, along with each corresponding suite of CU-specific ASCOCs is documented in a Certification Design Letter. Upon approval of the Certification Design Letter by the EPA, certification activities can begin. Section 3.4 of the final SEP presents the general certification strategy.

1.0 Statement of Problem

FEMP soil and potentially impacted adjacent off-property soil must be certified on a CU by CU basis for compliance with the FRLs of all CU-specific ASCOCs. The appropriate sampling, analytical and information management criteria must be developed to provide the required qualified data necessary to demonstrate attainment of certification statistical criteria. For every area undergoing certification, a sampling plan must be in place that will direct soil samples to be collected which are representative of the CU-specific COC concentrations within the framework of the certification approach identified in the final SEP. The appropriate analytical methodologies must be selected to provide the required data.

Exposure to Soil

The cleanup standards, or FRLs, were developed for a final site land use as an undeveloped park. Under this exposure scenario, receptors could be directly exposed to contaminated soil through dermal contact, external radiation, incidental ingestion, and/or inhalation of fugitive dust while visiting the park. Exposure to contaminated soil by the modeled receptor is expected to occur at random locations within the boundaries of the FEMP and would not be limited to any single area. Some soil FRLs were developed based on the modeled cross-media impact potential of soil contamination to the underlying aquifer. In these instances, potential exposure to contaminants would be indirect through the groundwater pathway, and not directly linked to soil exposure. Off-site soil FRLs were established at more conservative levels than the on-property soil FRLs, based on an agricultural receptor. Benchmark Toxicity Values (BTVs) are also being considered in the cleanup process by assessing habitat impact of individual BTVs under post-remedial conditions.

Available Resources

Time: Certification sampling will be accomplished by the field sampling team prior to interim or final regrading or release of soil for construction activities. The certification sampling schedule must allow sufficient time, in the event additional remediation is required, to demonstrate certification of FRLs prior to permanent construction or regrading. Certification sampling will have to be completed and analytical results validated and statistical analysis completed prior to submission of a Certification Report to the regulatory agencies.

Project Constraints: Certification sampling and analytical testing must be performed with existing manpower, materials and equipment to support the certification effort. Remediation areas are prioritized for certification sampling and analysis according to the date required for initiation of sequential construction activities in those areas. Fluor Daniel Fernald (FDF) and DOE must demonstrate post-remedial compliance with the CU-specific COC FRLs to release the designated Remediation Area for

planned interim grading, eventual restoration under the Natural Resources Restoration Plan (NRRP), and other final land use activities.

2.0 Identify the Decision

Decision

Demonstrate within each CU if all CU-specific COCs pass the certification criteria. These criteria are as follows: 1) The average concentration of each CU-specific COC is below the FRL and within the agreed upon confidence limits (95% for primary ASCOCs and 90% for secondary ASCOCs); and 2) the hot-spot criteria, that no result for any CU-specific COC is more than two times the associated soil FRL. The certification criteria are discussed in greater detail in Section 3.4.4 of the final SEP.

Possible Results

1. The average concentration of each CU-specific COC is demonstrated to be below the FRLs within the confidence level, with no single result for any CU-specific COC greater than two times the associated FRL. The CU can then be certified as attaining remediation goals.
2. The average concentration of at least one CU-specific COC is demonstrated to be above the FRL at the given confidence level. The CU will fail certification and require additional remedial action, per Section 3.4.5 of the final SEP.
3. If a result(s) of one or more CU-specific COC is demonstrated to be at or above two times the FRL, the CU will fail certification. The CU will fail certification and require additional remedial action per Section 3.4.5 of the final SEP. A combination of results 2 and 3 also constitutes certification failure.

3.0 Inputs That Affect the Decision

Required Information

Certification data will be obtained through physical soil sampling. Based on the certification analytical results, the average concentrations of each CU-specific COC with specified confidence levels will be calculated using the statistical methods identified in Appendix G of the final SEP.

Source of Information

Per the SEP, analysis of certification samples for each CU-specific COC will be conducted at analytical support level (ASL) D in accordance with methods and QA/QC standards in the FEMP Sitewide CERCLA Quality Assurance Project Plan [SCQ].

Contaminant-Specific Action Levels

The cleanup levels are the soil FRLs published in the OU5 and OU2 RODs. BTVs being considered in the remediation process are discussed for consideration during certification in Appendix C of the NRRP.

Methods of Sampling and Analysis

Physical soil samples will be collected in accordance with the applicable site sampling procedures. Per the SEP, laboratory analysis will be conducted at ASL D using QA/QC protocols specified in the SCQ. Full raw data deliverables will be required from the laboratory to allow for appropriate data validation. For FEMP-approved on- and off-site laboratories, the analytical method used will meet the required precision, accuracy and detection capabilities necessary to achieve FRL analyte ranges.

4.0 The Boundaries of the Situation

Spatial Boundaries

Domain of the Decision: The boundaries of this certification DQO extend to all surface, stockpile and fill soil in areas that are undergoing certification as part of FEMP remediation.

Population of Soil: Soil includes all excavated surfaces, undisturbed relatively unimpacted native soil, and sub-surface intervals (stockpile or fill areas only) in areas undergoing certification sampling and analysis.

Scale of Decision Making

Based on considerations of the final certification units and the COC evaluation process, the CU-specific COCs are determined. The area undergoing certification will be evaluated on a CU basis, based on physical sample results, as to whether it has passed or failed the criteria for attainment of certification (final SEP Section 3.4.4).

Temporal Boundaries

Time frame: Certification sampling must be performed in time to sequentially release certified areas for scheduled interim grading, restoration, and other final land use activities. Certification sampling data received from the laboratory will be validated and statistically evaluated. Certification results and findings will be documented in Certification Reports, which must be submitted to and approved by the regulatory agencies prior to release of the areas for scheduled interim grading, restoration, and other final land use activities.

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Practical Considerations: Some areas undergoing remediation will not be accessible for certification sampling until decontamination/demolition and remedial excavation activities are complete. Other areas, such as wood lots, that are relatively uncontaminated and not planned for excavation, may require preparation, such as cutting of grass or removal of undergrowth prior to certification sampling, thus requiring coordination with FEMP Maintenance personnel.

5.0 Decision Rule

Successful certification of soil within the boundaries of a certification unit (CU) demonstrates that the certified soil (surface or subsurface) has concentrations of CU-specific COC(s) that meet the established criteria for attainment of Certification.

Parameters of Interest

The parameters of interest are the individual and average surface soil concentrations of CU-specific COCs and confidence limits on the calculated average within a CU. OU2 and OU5 ROD identify all applicable soil FRLs. The SEP identifies the ASCOCs, a subset of which will be used to establish CU-specific COCs within each Remediation Area undergoing certification sampling and analysis.

Action Levels

The applicable action levels are the on- and off-property soil FRLs published in the OU5 or OU2 ROD for each ASCOC.

Decision Rules

If the average concentration for each CU-specific COC is demonstrated to be below the FRLs within the agreed upon confidence level (95% for primary COCs; 90% for secondary COCs), and no analytical result exceeds two times the soil FRL, then the CU can be certified as complying with the cleanup criteria. If a CU does not meet the FRLs within the agreed upon confidence level for one or more CU-specific COCs, or one or more analytical results for one or more CU-specific COCs is greater than two times the associated soil FRL, then the CU fails certification and requires further assessment as per the SEP.

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6.0 Limits on Decision Errors

Types of Decision Errors and Consequences

Definition

Decision Error 1: This decision error occurs when the decision maker decides that a CU has met the certification criteria, when in reality, the certification criteria have not been met. This situation could result in an increased risk to human health and the environment. In addition, this type of error could result in regulatory fees and penalties.

Decision Error 2: This decision error occurs when the decision maker decides a CU does not meet the certification criteria, when actually, the certification criteria have been met. This error would result in unnecessary added costs due to the excavation of soil containing COC concentrations below their FRLs, and an increased volume of soil assigned to the OSDF. In addition, unnecessary delays in the remediation schedule may result.

True State of Nature for the Decision Errors

The true state of nature for Decision Error 1 is that the certification criteria are not met (average CU-specific COC concentrations not below the FRL within the specified confidence limits; or a single sample result above two times the FRL). The true state of nature for Decision Error 2 is that certification criteria are met (average CU-specific COC concentrations are below the FRL within the specified confidence limits, and no result is above two times the FRL). Decision Error 1 is the more severe error due to the potential threat this poses to human health and the environment.

Null Hypothesis

H_0 : The average concentration of at least one CU-specific COC within a CU is equal to or greater than the associated FRL.

H_1 : The average concentration of all CU-specific COCs within a CU is less than the action levels.

False Positive and False Negative Errors

A false positive is Decision Error 1: less than or equal to five percent ($p = .05$) is considered the acceptable decision error in determination of compliance with FRLs for primary ASCOCs, while ten percent ($p = .10$) is acceptable for secondary ASCOCs.

A false negative is Decision Error 2: less than or equal to 20 percent is considered the acceptable decision error. This decision error is controlled through the determination of sample sizes (see Section G.1.4.1 of the final SEP).

7.0 Design for Obtaining Quality Data

Section 3.4.2 of the final SEP presents the specifics of the certification sampling design. The following text describes the general certification sampling design.

Soil Sample Locations

In order to select certification sampling locations, each CU is divided into 16 approximately equal sub-CUs. Certification sample locations are then generated by randomly selecting an easting and northing coordinate within the boundaries of each cell. Additional alternative sample locations are also generated in case the original random sample location fails the minimum distance criterion. The minimum distance criterion is defined as the minimum distance allowed between random sample locations in order to eliminate the chance of random sample points clustering within a small area. This clustering would tend to over emphasize a small area and, conversely, under represent a large area in certification determination. By not allowing sample locations to be too closely arranged, the sample locations are spread out and provide a more uniform coverage, thus reducing the possibility of large unsampled areas. The equation for determining minimum distance criterion is presented in Section 3.4.2.1 of the SEP.

In the event that the original random sample location failed the minimum distance criterion, the first alternate location was selected and all the locations were retested. This process continued until all 16 random locations passed the minimum distance criteria.

Each CU is also divided into four quadrants, each of which contains 4 sub-CUs and 4 sample locations. Three of the four locations per quadrant (12 per CU) are then selected for sample collection and analysis. The other one per quadrant (4 per CU) are designated as "archives", and samples will not be collected and analyzed unless need arises due to analytical or validation problems warrant. Per Section 3.4.2 of the SEP, as few as 8 samples may be collected from Group 2 CUs for analysis of secondary COCs.

Physical Samples

Physical soil certification samples will be collected from the surface according to SMPL-01 at locations identified in the PSP (generally 12 of the 16 locations per CU).

If stockpiled soil is to be certified, two CUs will be established, one for the stockpile and one for the underlying soil (i.e., the "footprint"). To certify the stockpile, samples will be collected from predetermined random intervals from within the stockpiled soil at each certification sampling location identified in the PSP. To certify the footprint, the first 6-inches of native soil present at each sampling location will also be collected for certification. If fill soil is to be certified, the strategy (surface or sampling at depth) will be based on results from the precertification scan of the fill area(s), as discussed in the Certification Design Letter and the certification PSP.

Laboratory Analysis

As defined in the PSP, a minimum of 8 to 12 samples per CU will be submitted to the on-site laboratory or a FDF approved off-site laboratory for analysis. All certification analyses will meet ASL D requirements per the SCQ except for the HAMDC. Samples will be analyzed for all CU-specific ASCOCs, with minimum detection levels set according to the SCQ and applicable project guidelines.

Validation

All field data will be validated. Also, a minimum of 10 percent of the analytical data from each laboratory will be subject to analytical validation to ASL D requirements in the SCQ, and will require an ASL D package. The remaining analytical data will be validated to a minimum of ASL B, and will require an ASL B package.

8.0 Use of Data to Test Null Hypothesis

Appendix G of the final SEP discusses in detail, the statistical evaluations of certification data used to determine attainment of certification criteria.

Data Quality Objectives
Sitewide Certification Sampling and Analysis

1A. Task Description:

1B. Project Phase: (Put an X in the appropriate selection.)

RI FS RD RA RvA Other (specify) _____

1C. DQO No.: SL-052, Rev. 2 DQO Reference No.: _____

2. Media Characterization: (Put an X in the appropriate selection.)

Air Biological Groundwater Sediment Soil
Waste Wastewater Surface Water Other (specify) _____

3. Data Use with Analytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable data use)

Site Characterization	Risk Assessment
A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/>	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/>
Evaluation of Alternatives	Engineering Design
A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/>	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/>
Monitoring During Remediation	Other
A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/>	A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input checked="" type="checkbox"/> E <input type="checkbox"/>

4A. Drivers: Remediation Area Remedial Action Work Plans, Applicable or Relevant and Appropriate Requirements (ARARs) and Operable Unit 2 and Operable Unit 5 Records of Decision: (ROD), Sitewide Excavation Plan (SEP).

4B. Objective: Confirmation that remediation areas at the FEMP, or adjacent off-property areas, have met certification criteria on a CU by CU basis.

5. Site Information (Description):

The OU2 and OU5 RODs have identified areas at the FEMP that require soil remediation activities. The RODs specify that the soil in these areas will be demonstrated to be below the FRLs. Certification is necessary for all FEMP soil and some adjacent off-property soil to demonstrate that the residual soil does not contain COC contamination exceeding the FRL at a specified confidence level.

6A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

- 1. pH 2. Uranium *
- Temperature Full Radiological *
- Specific Conductance Metals *
- Dissolved Oxygen Cyanide
- Technetium-99 * Silica
- 3. BTX
- TPH
- Oil/Grease
- 4. Cations 5. VOA *
- Anions BNA
- TOC PEST *
- TCLP PCB *
- CEC COD
- 6. Other (specify)

* As identified in the area certification PSP

6.B. Equipment Selection and SCQ Reference:

Equipment Selection	Refer to SCQ Section
ASL A _____	SCQ Section _____
ASL B _____	SCQ Section _____
ASL C _____	SCQ Section _____
ASL D <u>Per SCQ and PSP</u>	SCQ Section <u>Appendix G, Tbls. 1&3</u>
ASL E <u>Per PSP</u>	SCQ Section <u>Appendix H (final)</u>

7A. Sampling Methods: (Put an X in the appropriate selection.)

- Biased Composite Grab Environmental Grid
- Intrusive Non-Intrusive Phased Source Random *

*Systematic random samples, selected one per cell and meeting the minimum distance criterion

7B. Sample Work Plan Reference: Project Specific Plan for the associated Remediation area Remedial Action Work Plan

Background samples: OU5 RI

7C. Sample Collection Reference: Associated PSP(s), SMPL-01

8. Quality Control Samples: (Put an X in the appropriate selection.)

8A. Field Quality Control Samples:

Trip Blanks	<input checked="" type="checkbox"/>	¹	Container Blanks	<input checked="" type="checkbox"/>
Field Blanks	<input checked="" type="checkbox"/>	²	Duplicate Samples	<input checked="" type="checkbox"/>
Equipment Rinsate Blanks	<input checked="" type="checkbox"/>		Split Samples	<input checked="" type="checkbox"/>
Preservative Blanks	<input type="checkbox"/>		Performance Evaluation Samples	<input type="checkbox"/>

Other (specify) _____

1) Collected for volatile organic sampling

2) As noted in the PSP

3) Split samples will be taken where required by the EPA

8B. Laboratory Quality Control Samples:

Method Blank	<input checked="" type="checkbox"/>	Matrix Duplicate/Replicate	<input checked="" type="checkbox"/>
Matrix Spike	<input checked="" type="checkbox"/>	Surrogate Spikes	<input checked="" type="checkbox"/>
Tracer Spike	<input checked="" type="checkbox"/>	Other (specify) _____	

9. Other: Please identify any other germane information that may impact the data quality or gathering of this particular objective, task, or data use.

Sample density will be dependent upon the CU size (Group 1 [250'x250'] or Group 2 [500'x500']), as determined by historical and pre-certification scan data.

APPENDIX B

SAMPLE LOCATION AND IDENTIFIERS

APPENDIX B

AIPIV PART ONE CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Sample ID	Analysis	Northing	Easting
2	2-1	A1P4-C2-1^R	TAL A & B	480038.33	1350707.67
	2-2	A1P4-C2-2^R	TAL A & B	480019.67	1350740.8
	2-3	A1P4-C2-3^R	TAL A & B	479984.48	1350693.35
	2-4V	A1P4-C2-4^V	Archive	479956.88	1350745.27
	2-5	A1P4-C2-5^R	TAL A & B	480021.99	1350811.42
	2-6V	A1P4-C2-6^V	Archive	480017.6	1350863.25
	2-7D	A1P4-C2-7^R	TAL A & B	479987.08	1350804.32
		A1P4-C2-7^R-D	TAL A & B		
	2-8	A1P4-C2-8^R	TAL A & B	479962.56	1350865.44
	2-9	A1P4-C2-9^R	TAL A & B	479938.42	1350678.57
	2-10	A1P4-C2-10^R	TAL A & B	479920.19	1350734.96
	2-11	A1P4-C2-11^R	TAL A & B	479896.25	1350680.74
	2-12V	A1P4-C2-12^V	Archive	479874.87	1350728.36
	2-13	A1P4-C2-13^R	TAL A & B	479932.68	1350814.11
	2-14V	A1P4-C2-14^V	Archive	479935.55	1350846.41
	2-15	A1P4-C2-15^R	TAL A & B	479881.14	1350786.54
2-16	A1P4-C2-16^R	TAL A & B	479886.01	1350869.36	
3	3-1	A1P4-C3-1^RMP	TAL A & C	479840.23	1350677.61
		A1P4-C3-1^L	TAL D		
	3-2V	A1P4-C3-2^V	Archive	479859.92	1350766.93
	3-3D	A1P4-C3-3^RMP	TAL A & C	479794.39	1350686.77
		A1P4-C3-3^L	TAL D		
		A1P4-C3-3^RMP-D	TAL A & C		
		A1P4-C3-3^L-D	TAL D		
	3-4	A1P4-C3-4^RMP	TAL A & C	479794.4	1350764.72
		A1P4-C3-4^L	TAL D		
	3-5	A1P4-C3-5^RMP	TAL A & C	479854.86	1350800.91
		A1P4-C3-5^L	TAL D		
	3-6	A1P4-C3-6^RMP	TAL A & C	479834.18	1350838.16
		A1P4-C3-6^L	TAL D		
	3-7V	A1P4-C3-7^V	Archive	479792.04	1350816.57
	3-8	A1P4-C3-8^RMP	TAL A & C	479806.74	1350846.19
		A1P4-C3-8^L	TAL D		
	3-9	A1P4-C3-9^RMP	TAL A & C	479765.13	1350699.07
		A1P4-C3-9^L	TAL D		
	3-10V	A1P4-C3-10^V	Archive	479757.08	1350732.04
	3-11	A1P4-C3-11^RMP	TAL A & C	479711.62	1350708.32
		A1P4-C3-11^L	TAL D		
	3-12	A1P4-C3-12^RMP	TAL A & C	479714.75	1350746.23
		A1P4-C3-12^L	TAL D		
	3-13	A1P4-C3-13^RMP	TAL A & C	479771.07	1350781.82
A1P4-C3-13^L		TAL D			
3-14	A1P4-C3-14^RMP	TAL A & C	479765.1	1350829.85	
	A1P4-C3-14^L	TAL D			
3-15	A1P4-C3-15^RMP	TAL A & C	479723.23	1350800.85	
	A1P4-C3-15^L	TAL D			
3-16V	A1P4-C3-16^V	Archive	479706.47	1350847.12	

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