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5979

SEP | 2005

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DOE-0316-05

Mr. Thomas Schneider, Project Manager  
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Southwest District Office  
401 East Fifth Street  
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

**TRANSMITTAL OF THE DRAFT CERTIFICATION DESIGN LETTER AND  
CERTIFICATION PROJECT SPECIFIC PLAN FOR AREA 2, PHASE II -SUBAREA 3  
TRAILER COMPLEX AREA AND AQUIFER PROJECT LAYDOWN AREA**

Enclosed for your review is the draft Certification Design Letter and Certification Project Specific Plan for Area 2, Phase II - Subarea 3 Trailer Complex Area and Aquifer Project Laydown Area.

If you have any questions or require additional information, please contact Johnny Reising at (513) 648-3139.

Sincerely,

*Johnny Reising*  
for William J. Taylor  
Director

FCP:Reising

0316

Mr. James A. Saric  
Mr. Thomas Schneider

Enclosure

cc w/enclosure:

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**CERTIFICATION DESIGN LETTER AND  
CERTIFICATION PROJECT SPECIFIC PLAN  
FOR AREA 2, PHASE II - SUBAREA 3  
TRAILER COMPLEX AREA AND  
AQUIFER PROJECT LAYDOWN AREA**

**FERNALD CLOSURE PROJECT  
FERNALD, OHIO**



**AUGUST 2005**

**U.S. DEPARTMENT OF ENERGY  
FERNALD AREA OFFICE**

**20450-PSP-0009  
REVISION A  
DRAFT**

**CERTIFICATION DESIGN LETTER AND  
CERTIFICATION PROJECT SPECIFIC PLAN  
FOR AREA 2, PHASE II - SUBAREA 3  
TRAILER COMPLEX AREA AND  
AQUIFER PROJECT LAYDOWN AREA**

**Document Number 20450-PSP-0009  
Draft Revision A**

**August 2005**

**APPROVAL:**

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Jyh-Dong Chiou, Project Manager  
Environmental Closure Project

Date

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Frank Miller, Characterization Manager  
Environmental Closure Project

Date

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Tom Buhrlage, Sampling Manager  
Environmental Closure Project

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Safety, Health and Quality Division

Date

**FERNALD CLOSURE PROJECT**

**Fluor Fernald, Inc.  
P.O. Box 538704  
Cincinnati, Ohio 45253-8704**

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## LIST OF ACRONYMS AND ABBREVIATIONS

A2PIIS3	Area 2, Phase II - Subarea 3
AQL	Aquifer Project LaydownArea
ASCOC	area-specific constituent of concern
ASL	Analytical Support Level
CDL	Certification Design Letter
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
CRDL	contract required detection limit
CU	certification unit
DOE	U.S. Department of Energy
DQO	Data Quality Objectives
EPA	U.S. Environmental Protection Agency
EWf	Equipment Wash Facility
FACTS	Fernald Analytical Computerized Tracking System
FAL	Field Activity Log
FCP	Fernald Closure Project
FRL	final remediation level
GPS	Global Positioning System
HWMU	hazardous waste management unit
IMHR	Impacted Material Haul Road
µg/L	micrograms per Liter
MDC	minimum detectable concentration
MDL	minimum detectable level
mg/kg	milligrams per kilogram
NAD83	North American Datum of 1983
OEPA	Ohio Environmental Protection Agency
OU5	Operable Unit 5
QA/QC	Quality Assurance/Quality Control
pCi/g	picoCuries per gram
PSP	Project Specific Plan
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RTIMP	Real-Time Instrumentation Measurement Program
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SFA	South-Field Extraction System Valve House Area
SPL	Sample Processing Laboratory
SSOD	Storm Sewer Outfall Ditch
SUB	Subcontractor Laydown Area
SWRB	Storm Water Retention Basin
TAL	Target Analyte List
TCA	Trailer Complex Area

## LIST OF ACRONYMS AND ABBREVIATIONS

UCL	Upper Confidence Limit
UST	underground storage tank
V/FCN	Variance/Field Change Notice
VSL	Validation Support Level
WAO	Waste Acceptance Organization



## 1.0 INTRODUCTION

This Certification Design Letter (CDL)/Certification Sampling Project Specific Plan (PSP) describes the certification design, sampling, analysis, and validation necessary to demonstrate that soil in Area 2, Phase II - Subarea 3 (A2PIIS3) Trailer Complex Area (TCA) and Aquifer Project Laydown Area (AQL) has met the final remediation levels (FRLs) for all area-specific constituents of concern (ASCOCs). Certification demonstrates that risk-based ASCOCs meet the FRLs. The format of this document follows (in general) guidelines presented in the Sitewide Excavation Plan (SEP, DOE 1998) and SEP Addendum (DOE 2001a). Accordingly, it consists of ten sections:

- 1.0 Introduction - Presentation of the purpose, objectives, and scope of this CDL
- 2.0 Historical and Precertification Data - Presentation and discussion of historical soil data and presentation of precertification data from A2PIIS3 - TCA/AQL
- 3.0 Area-Specific Constituents of Concern - Discussion of selection criteria and ASCOCs for A2PIIS3 - TCA/AQL
- 4.0 Certification Design and Sampling Program - Presentation of design, surveying, sampling and analytical methodologies
- 5.0 Schedule
- 6.0 Quality Assurance/Quality Control Requirements - Presents the field Quality Control (QC), analytical, and data validation requirements
- 7.0 Health and Safety
- 8.0 Disposition of Waste
- 9.0 Data Management

### References

The major remediation actions for these areas included the removal and excavation of the road that runs north to south on the west side of the area, the removal of gravel overburden and some of the below-grade utilities in the TCA/AQL area, and the excavation of the above-FRL radium-226 located in the TCA area. The six certifications units (CUs) in this area are clearly defined within this document as shown in Figure 4-1.

Just as with other parts of Area 2, certification of A2PIIS3 is being performed in several phases based on the required action for each of the different sections to be found in this area. The scope of this document pertains only with the TCA/AQL. The Impacted Material Haul Road (IMHR), Subcontractor Laydown

1 Area (SUB), Equipment Wash Facility (EWF), and South-Field Extraction System Valve House Area  
2 (SFA) will be submitted for certification under different documentation. Also, several above and below  
3 grade utilities such as telephone poles and the main gas and water lines, and water lines will not be  
4 removed during the certification process in this area due to their continued usage at the site. These areas of  
5 direct concern related to the remaining utilities and their associated footprints will be submitted for  
6 certification under separate documentation related to Area 10.

### 8 1.1 OBJECTIVES

9 The primary objectives of this document are to:

- 11 • Define the boundaries of the areas to be certified under the guidance of this CDL/Certification  
12 PSP;
- 13 • Define the ASCOC selection process and list the selected A2PIIS3 - TCA/AQL ASCOCs;
- 14 • Present the CU boundaries and proposed certification sampling strategy;
- 15 • Present the details of certification sampling, analysis and validation that will take place;
- 16 • Summarize the analytical requirements and the statistical methodology employed;
- 17 • Present maps for acquired real-time precertification data; and
- 18 • Present the proposed schedule for the certification activities.

### 20 1.2 SCOPE AND AREA DESCRIPTION

21 The scope of this CDL/Certification PSP includes details of certification sampling, analysis and validation  
22 that will take place in the TCA/AQL, an area consisting of approximately 8.01 acres. Figure 1-1 depicts  
23 the boundaries, location, and layout of the TCA/AQL.

25 Just as with other parts of Area 2, certification of A2PIIS3 is being performed in several phases based on  
26 the required action for each of the defined sections to be found in this area. This document only deals with  
27 the TCA/AQL. The IMHR, SUB, EWF, and SFA will all be submitted for certification under separate  
28 documentation.

30 Field activities for A2PIIS3 - TCA/AQL will be consistent with the Sitewide Comprehensive  
31 Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan  
32 (SCQ) and Section 3.4 of the SEP. This certification sampling program as discussed in Section 4.0 of this  
33 document will be consistent with Data Quality Objective (DQO) SL-052, Revision 3, which is included as  
34 Appendix B.

36 The TCA/AQL area is a flat irregularly shaped area in the southwest portion of the site. It is bordered on  
37 the east by the Storm Sewer Outfall Ditch (SSOD), the north by the Storm Water Retention Basin

(SWRB), the west by the Area 2, Phase I certification area, and the south by the former active flyash pile (see Figure 1-1). This area once contained both paved and gravel covered areas which were removed during the excavation process. The remainder is undeveloped grassland.

The ASCOCs for the CUs in the TCA/AQL are total uranium, thorium-228, thorium-232, radium-226, and radium-228 [the sitewide primary radiological constituents of concern (COCs)].

Numerous above and below-ground utilities were present in this area. Those concerned with ongoing site activities or post-closure ground water monitoring are excluded from this certification effort and will be removed as part of the Area 10 remediation process. All others were removed a part of the remediation effort for the TCA/AQL Area.

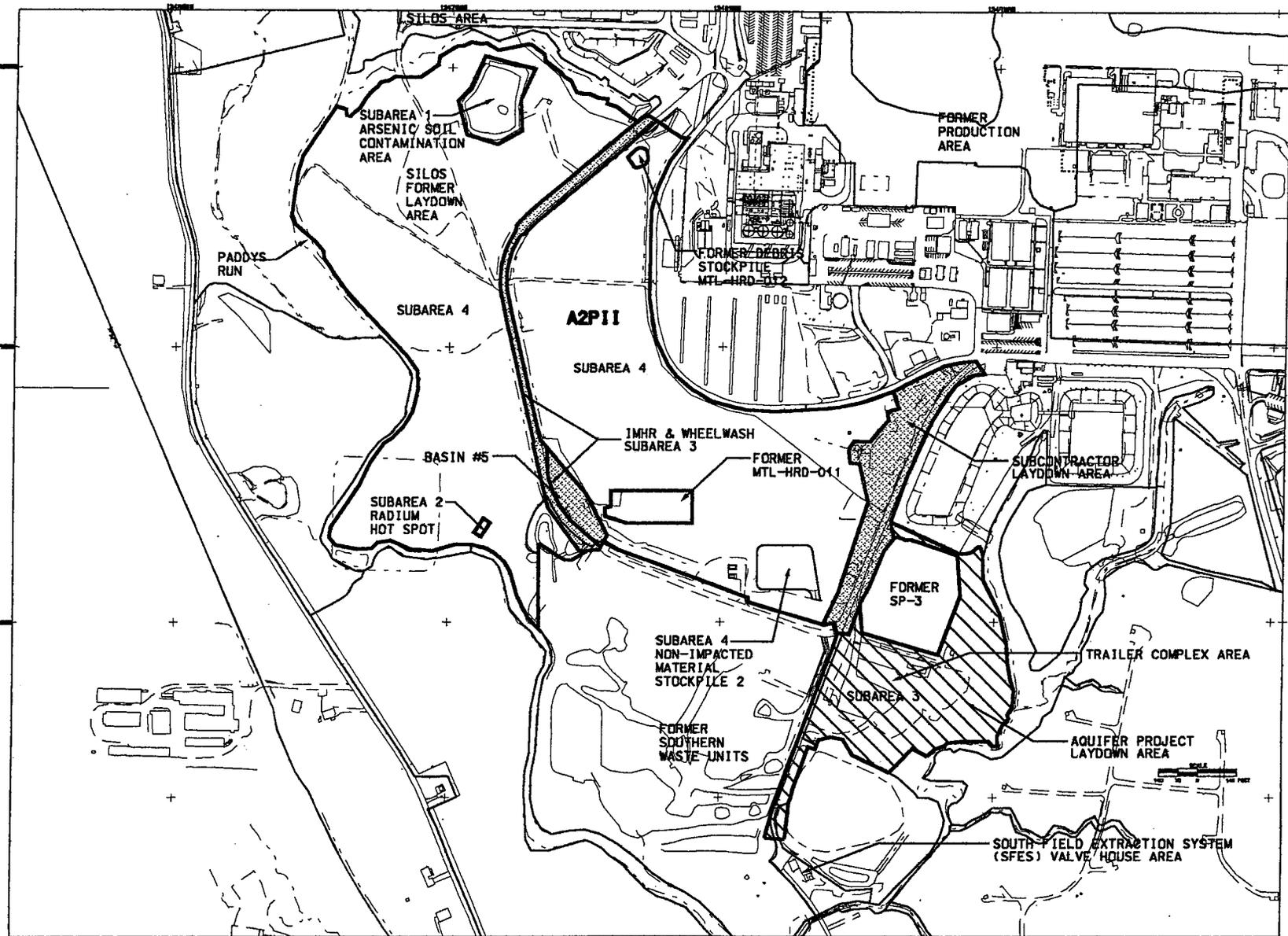
### 1.3 KEY PROJECT PERSONNEL

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

**TABLE 1-1  
 KEY PERSONNEL**

Title	Primary	Alternate
Department of Energy (DOE) Contact	Johnny Reising	TBD
Project Manager	Jyh-Dong Chiou	Frank Miller
Characterization Manager	Frank Miller	Debbie Brennan
A2PIIS3 Characterization Lead	Debbie Brennan	Krista Flaugh
RTIMP Manager	Mike Frank	Dale Seiller
Field Sampling Manager	Tom Buhrlage	Jim Hey
Surveying Manager	Jim Schwing	Andy Clinton/Eric Harman
WAO Contact	Linda Barlow	Lawrence Love
Laboratory Contact	Paul McSwigan	Amy Meyer
Data Validation Contact	Jim Chambers	Baohe Chen
Field Data Validation Contact	Dee Dee Edwards	Jim Chambers
Data Management Lead	Debbie Brennan	Krista Flaugh
FACTS/SED Database Contact	Kym Lockard	Susan Marsh
Quality Assurance Contact	Reinhard Friske	Darren Wessel
Safety and Health Contact	Gregg Johnson	Pete Bolig

FACTS - Fernald Analytical Computerized Tracking  
 RTIMP - Real-Time Instrumentation Measurement Program  
 SED - Sitewide Environmental Database  
 WAO - Waste Acceptance Organization



**LEGEND:**



A2P II BOUNDARY AND  
SUBAREA BOUNDARIES



SUBAREA 3  
TCA/AQL AREA



SUBAREA 3 COVERED  
UNDER SEPARATE  
DOCUMENTATION

**NOTES:**

- 1) SUBAREA 3 INCLUDES UNDERGROUND UTILITIES AND ASSOCIATED SUBGRADE WITHIN AREA2/PHASE II NOT RELATED TO GROUNDWATER REMEDIATION.
- 2) UNDERGROUND UTILITIES NOT SHOWN OUTSIDE AREA2/PHASE II BOUNDARY.

## 2.0 HISTORICAL AND PRECERTIFICATION DATA

In accordance with the SEP, prior to conducting precertification and certification activities, all soil demonstrated to contain contamination above the associated FRLs or other applicable action levels must be evaluated for remedial actions.

The purpose of gathering real-time scanning and/or physical sampling data within A2PIIS3 - TCA/AQL is to determine if the area is ready for certification. Characterization data have been collected from A2PIIS3 - TCA/AQL as part of the sampling activities prescribed by the PSP for the Predesign of A2PII - Subarea 3 (Supplement to 20300-PSP-0011) (DOE 2004). Real-time scanning data have been collected as specified in the PSP for the Excavation Control of A2PII - Subarea 3 Trailer Complex Area and Aquifer Project Laydown Area (Supplement to 20300-PSP-0011) (DOE 2005a). Based on the results of the above activities as well as excavation control sampling activities, it was determined that no further remedial actions will be required prior to certification activities for A2PIIS3 - TCA/AQL beginning.

### 2.1 TRAILER COMPLEX/AQUIFER PROJECT LAYDOWN AREA

#### 2.1.1 Historical, Predesign and Excavation Control

There is a minimal amount of Remedial Investigation and Feasibility Study (RI/FS, DOE 1995a and 1995b) data available for the TCA/AQL. The predesign data for this area is presented in the Addendum No. 2 to the Implementation Plan for A2PII - Subarea 3 (Infrastructure) Trailer Complex and Aquifer Project Laydown Area (DOE 2005b).

Excavation of the TCA/AQL began in June 2005. Existing concrete foundations, as well as any gravel present were removed as part of the excavation effort. Likewise, all underground utilities not needed for site support or post-closure ground water monitoring were removed. Flyash was removed in the southwest portion of the area and pursued until the excavation impinged upon utilities that will be removed as part of the Area 10 remediation effort. These activities are presented in the Excavation Control PSP. All contaminated materials were excavated as described in the A2PII Implementation Plan Subarea 3 TCA/AQL Addendum.

Those utilities removed as part of the remediation process were taken from areas where no contamination had been found either during predesign physical sampling or through real-time scanning. Precertification was performed on the trench created by the removal of these utilities prior to being backfilled with clean soil.

07/23

1    2.1.2 Precertification

2    According to guidelines established in Section 3.3.3 of the SEP, precertification activities were conducted  
3    to evaluate residual radiological contamination patterns as specified in the Excavation Control PSP for the  
4    TCA/AQL. Precertification real-time scanning results are provided in Appendix A.

### 3.0 AREA-SPECIFIC CONSTITUENTS OF CONCERN

In the Operable Unit (OU5) Record of Decision (ROD) (DOE 1996), there are 80 soil COCs with established FRLs. These COCs were retained for further investigation based on a screening process that considered the presence of the constituent in site soil and the potential risk to a receptor exposed to soil containing this contaminant. In spite of the conservative nature of this COC retention process, many of the COCs with established FRLs have a limited distribution in site soil or the presence of the COC is based on high contract required detection limits (CRDLs). When FRLs were established for these COCs in the OU5 ROD, the FRLs were initially screened against site data presented on spatial maps to establish a picture of potential remediation areas.

By reviewing existing RI/FS data presented on spatial distribution maps, the sitewide list of soil COCs in the OU5 ROD was reduced from 80 to 30. This reduction was possible because the majority of the COCs with FRLs listed in the OU5 ROD have no detections above their corresponding FRL, thus eliminating them from further consideration. The 30 remaining sitewide COCs account for over 99 percent of the combined risk to a site receptor model, and they comprise the list from which all of the remediation ASCOCs are drawn. When planning certification for a remediation area, additional selection criteria are used to derive a subset of these 30 COCs. This subset of COCs is passed along to the certification process.

#### 3.1 SELECTION CRITERIA

All of the sitewide primary ASCOCs (total uranium, radium-226, radium-228, thorium-232, and thorium-228) will be retained as ASCOCs for certification. The selection process for retaining secondary ASCOCs for a remediation area is driven by applying a set of decision criteria. A soil contaminant will be retained as an ASCOC if:

- It is listed as a soil COC in the OU5 ROD, and it is listed as an ASCOC in Table 2-7 of the SEP for the Remediation Area of interest;
- It is listed as a COC for a hazardous waste management unit (HWMU) or underground storage tank (UST) that lie within the certified area boundary;
- Analytical results show that a contaminant is present above its FRL, and the above-FRL concentrations are not attributable to false positives or elevated CRDLs;
- It can be traced to site use, either through process knowledge or known release of the constituent to the environment; or
- Physical characteristics of the contaminant, such as degradation rate and volatility, indicate it is likely to persist in the soil between time of release and remediation.

1 Using the above process, the ASCOCs were refined to those listed in Table 2-7 of the SEP. The list of  
2 ASCOCs is also presented in Table 3-1 with their respective FRLs.

3

## 4 3.2 ASCOC SELECTION PROCESS

### 5 3.2.1 ASCOC Selection

6 Each ASCOC on the Area 2 ASCOC list (see Table 3-1) was evaluated for its relevance to the TCA/AQL  
7 Area. Table 3-2 presents the reasoning for either retaining or eliminating the ASCOCs. Total uranium,  
8 radium-226, radium-228, thorium-228 and thorium-232 are sitewide primary ASCOCs, and will be  
9 retained as ASCOCs for the A2PIIS3 CUs. The list of COCs that are going to be retained for certification  
10 can be found in Table 3-3.

1  
2  
3

**TABLE 3-1**  
**ASCOCs FOR A2PIIS3**

<b>Primary COCs</b>	<b>Secondary COCs</b>
Radium-226	Aroclor-1254
Radium-228	Aroclor-1260
Thorium-228	Arsenic
Thorium-232	Benzo(a)pyrene
Total Uranium	Beryllium
	Bromodichloromethane
	Cesium-137
	Dibenzo(a,h)anthracene
	1,1-Dichloroethene
	Dieldrin
	Lead
	Neptunium-237
	Technetium-99
	Thorium-230

4  
5  
6

**TABLE 3-2**  
**ASCOC LIST FOR A2PIIS3 - TCA/AQL**

Area 2 ASCOCs	Retained As ASCOC?	Justification	CUs
<b>PRIMARY ASCOCs</b>			
Radium-226	Yes	Retained as primary ASCOC	All
Radium-228	Yes	Retained as primary ASCOC	All
Thorium-228	Yes	Retained as primary ASCOC	All
Thorium-232	Yes	Retained as primary ASCOC	All
Total Uranium	Yes	Retained as primary ASCOC	All
<b>SECONDARY ASCOCs</b>			
Aroclor-1254	No	No results at or greater than FRL	None
Aroclor-1260	No	No results at or greater than FRL	None
Arsenic	No	No results above-background*	None
Benzo(a)pyrene	No	No results at or greater than FRL	None
Beryllium	No	No results at or greater than FRL	None
Bromodichloromethane	No	No results at or greater than FRL	None
Cesium-137	No	No results at or greater than FRL	None
Dibenzo(a,h)anthracene	No	No results at or greater than FRL	None
1,1-Dichloroethene	No	No results at or greater than FRL	None
Dieldrin	No	No results at or greater than FRL	None
Lead	No	No results at or greater than FRL	None
Neptunium-237	No	No results at or greater than FRL	None
Technetium-99	No	No results at or greater than FRL	None
Thorium-230	No	No results at or greater than FRL	None

\* Based on the approved Excavation Plan, although arsenic was present at above-FRL levels in this area, it is consistent with the background levels as identified in the CERCLA/RCRA Soil Background Study (DOE 1993) and it's associated addendum (DOE 2001b). Therefore, arsenic will not be retained as an ASCOC for this area certification effort.

1  
 2  
 3  
 4  
 5  
 6  
 7  
 8

**TABLE 3-3**  
**ASCOC LIST FOR A2PIIS3 - TCA/AQL CERTIFICATION UNITS**

ASCOC	MDC	FRL
Total Uranium	8.2 mg/kg	82 mg/kg
Radium-226	0.17 pCi.g	1.7 pCi/g
Radium-228	0.18 pCi/g	1.8 pCi/g
Thorium-228	0.17 pCi/g	1.7 pCi/g
Thorium-232	0.15 pCi/g	1.5 pCi/g

MDC - minimum detectable concentration  
 mg/kg - milligrams per kilogram  
 pCi/g - picoCuries per gram

## 4.0 CERTIFICATION DESIGN AND SAMPLING PROGRAM

### 4.1 CERTIFICATION DESIGN

The intent of this effort is to certify the soil within the TCA/AQL Area. The certification design for A2PIIS3 - TCA/AQL follows the general approach outlined in Section 3.4 of the SEP. The CU design and sample locations are depicted in Figures 4-1 through 4-3. Six CUs were designed to represent the TCA/AQL Area. As discussed in Section 3.0 of this document, the five primary ASCOCs (total uranium, radium-226, radium-228, thorium-228, thorium-232) will be retained in each CU.

Several factors were taken into consideration when determining the boundaries for each CU within the TCA/AQL Area. Some of these include: historical land use, proximity to other areas of the site, and COC data. Additionally, because the areas contain impacted material, it will be comprised of Group 1 CUs to allow for more concentrated sampling and ensure excavation activities and removal of above and below grade structures had no effect on the soil.

#### 4.1.1 Certification Unit Design

The TCA/AQL Area consists of six Group 1 CUs that were designed around a combination of former land use, location, and COCs for each area. See Figure 4-1 for the locations of the six CUs.

#### 4.1.2 Sample Location Design

The selection of certification sampling locations was conducted according to Section 3.4.2 of the SEP. Each CU was first divided into 16 approximately equal sub-CUs. Sample locations were then generated by randomly selecting an easting and northing coordinate within the boundaries of each sub-CU, then testing those locations against the minimum distance criteria of the CU. If the minimum distance criteria were not met, an alternative random location was selected for that sub-CU and all the locations were re-tested. This process continued until all 16 random locations met the minimum distance criteria.

All TCA/AQL sub-CUs and planned certification sampling locations are shown on Figures 4-2 and 4-3. Four of the 16 sample locations in each CU are designated with a "V", indicating archive sample locations. One sample location per CU is designated with a "D", indicating a field duplicate sample collection location. The sample locations, field duplicate samples, and archive samples are identified in Appendix C.

### 4.2 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 the TCA/AQL CU boundaries are shown on Figure 4-1. Appendix C and Figures 4-2 and 4-3 show the

1 sub-CU boundaries as well as tentative certification sampling locations, all of which meet the minimum  
2 distance criterion.

### 3 4 4.3 PHYSICAL SOIL SAMPLE COLLECTION

#### 5 4.3.1 Sample Collection

6 Certification samples will be collected according to procedure SMPL-01, Solids Sampling, using 3-inch  
7 diameter, 6-inch long, plastic or stainless steel liners. At the discretion of the Field Sampling Lead,  
8 samples may be collected using alternative methods specified in SMPL-01, as long as sufficient volume is  
9 collected from the appropriate depth to perform the prescribed analyses. If necessary, the soil core shall be  
10 divided and placed into the proper sample containers. Samples will be collected from 12 of the 16 sample  
11 locations in the CU, including one field duplicate sample. The archive locations will not be collected  
12 unless necessary. Thirteen samples from the CU (12 plus one field duplicate) will be submitted for  
13 analysis. Upon completion of sample collection, the 0 to 6-inch boreholes will be collapsed and no  
14 additional abandonment is necessary.

15  
16 Quality control requirements will include a duplicate field sample and two container blanks as outlined in  
17 Section 6.1, and will be collected per procedure SMPL-21, Collection of Field Quality Control Samples.  
18 For the duplicate field sample, twice the soil volume (a second core) will be collected at one location in the  
19 CU, and will not be homogenized with the original sample. The location that requires the collection of a  
20 duplicate sample is identified in Appendix C. Container blanks will be collected (as specified in  
21 Section 6.1) from both the core liner and the end caps that will be used to seal it. All samples will be  
22 assigned unique sample identification numbers.

23  
24 If a subsurface obstacle prevents sample collection at the specified location, it can be moved according to  
25 the following guidelines:

- 26  
27 • The distance moved must be as small as possible (less than 3 feet);
- 28  
29 • It must remain within the boundary of the same CU and sub-CU, and must still meet the minimum  
30 distance criterion; and
- 31  
32 • If the distance moved is greater than 3 feet, the move must be documented in a Variance/Field  
33 Change Notice (V/FCN), considered as significant, which will be approved by the agencies prior  
34 to collection.
- 35  
36 • Anytime a location is moved, Figures 4-2 or 4-3 should be used to determine the best direction to  
37 move the point to adhere to the above guidelines. The Characterization Manager or designee  
38 should be contacted when a sample location is moved. All final sampling locations will be  
39 documented in the A2PIIS3 - EWF/SUB/TCA/AQL/SFA Certification Report.

1 Customer sample numbers and FACTS identification numbers will be assigned to all samples collected.  
 2 The sample labels will be completed with sample collection information, and technicians will complete a  
 3 Field Activity Log (FAL), a Sample Collection Log, and a Chain of Custody/Request for Analysis form in  
 4 the field prior to submittal of the samples.

6 All soil samples from the CU with like analyses (including the field duplicate) will be batched and  
 7 submitted to the Sample Processing Laboratory (SPL) under one set of Chain of Custody/Request for  
 8 Analysis forms which will represent one analytical release. The container blanks will be listed on a  
 9 separate Chain of Custody/Request for Analysis form. No alpha/beta screens will be required, as historical  
 10 information can be used for shipping purposes.

12 4.3.2 Equipment Decontamination

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

23 4.3.3 Physical Sample Identification

24 Each soil certification sample will be assigned a unique sample identification number as  
 25 *Remediation Area-CU Number/Identifier-Location^Depth Interval-Analysis-QC*, where:

- 27 A2P2 = Sample collected from A2PIIS3 – TCA/AQL (Note that the number “2” is used in  
 28 place of the roman numeral “II” in the ID for data management purposes)
- 30 TCA1 = Certification sample representing the 1<sup>st</sup> certification unit from the TCA/AQL Area  
 31 (the 5 subsequent CUs will be consecutively numbered)
- 33 Location = Sample Location number within each CU (1 through 16)
- 35 ^ = Separates Location from Depth Interval
- 37 Depth Interval = Equals twice the bottom depth (in feet) (i.e. “1” = 0.0 to 0.5’, “2” = 0.5 to 1.0’, etc.)
- 39 Analysis = “R” indicates radiological analysis, “V” indications an archive sample.

1 QC = Quality control sample, if applicable. A "D" indicates a field duplicate sample;  
2 "Y" indicates a container blank sample; and "X" indicates a rinsate.  
3

4 For example, a field duplicate sample taken from the tenth sample location from the 2<sup>nd</sup> TCA/AQL CU for  
5 radiological analysis would be identified as A2P2-TCA2-10<sup>1</sup>-R-D.  
6

#### 7 4.4 ANALYTICAL METHODOLOGY

8 All samples will be prepared for shipment to off-site laboratories per procedure 9501, Shipping Samples to  
9 Off-site Laboratories. Samples will only be shipped to off-site laboratories that are listed on the  
10 Fluor Fernald Approved Laboratories List. The total uranium value from predesign sample boring  
11 A2P2-AQL5, 11.5 mg/kg, will be used to ship the samples off site. This is the highest total uranium result  
12 from the area.  
13

14 As soon as the samples arrive at the laboratory where the analysis will take place, all samples should be  
15 prepared for analysis (including homogenization), and radiological samples should be sealed to begin the  
16 in-growth period for radium analysis.  
17

18 The sampling and analytical requirements are listed in Table 4-1 and the Target Analyte Lists (TAL) are  
19 shown in Table 4-2.  
20

21 All soil samples from the CU with like analyses (including the field duplicate) will be batched and  
22 submitted to SPL under one set of Chain of Custody/Request for Analysis forms which will represent one  
23 analytical release. Container blanks will be listed under a separate Chain of Custody/Request for Analysis  
24 form but may be batched together in one analytical release.  
25

26 Laboratory analysis of certification samples will be conducted using an approved analytical method, as  
27 discussed in Appendix H of the SEP. The CRDL is set at 10 percent of the FRL. Analyses will be  
28 conducted to either Analytical Support Level (ASL) D or E. All requirements for ASL E are the same as  
29 for ASL D except the minimum detection level for the selected analytical method must be at least  
30 10 percent of FRL. All results will be validated to Validation Support Level (VSL) B, and a minimum of  
31 10 percent of the results will be validated to VSL D. The CU to be validated to VSL D will be randomly  
32 selected. Samples rejected during validation will be re-analyzed, or an alternate sample may be collected  
33 and substituted if there is insufficient material available from the initial sample. If any sample fails  
34 validation, all data from the laboratory with the rejected result will then be validated to VSL D to  
35 determine the integrity of all data from that laboratory. Once data are validated, results will be entered into  
36 the SED.  
37

1 4.5 STATISTICAL ANALYSIS

2 Once data are entered into the SED, a statistical analysis will be performed to evaluate the pass/fail criteria  
3 for each CU. The statistical approach is discussed in Section 3.4.3, Appendix G of the SEP, and  
4 Section 3.4.8 of the SEP Addendum.

5  
6 Two criteria must be met for the CU to pass certification. If the data distribution is normal or lognormal,  
7 the first criterion compares the 95 percent Upper Confidence Limit (UCL) on the mean of each primary  
8 COC to its FRL, or the 90 percent UCL on the mean of each secondary ASCOC. On an individual  
9 CU basis, any ASCOC with the 95 percent UCL above the FRL for primary ASCOCs (or 90 percent UCL  
10 above the FRL results for secondary COCs) results in that CU failing certification. If the data distribution  
11 is not normal or lognormal, the appropriate nonparametric approach discussed in Appendix G of the SEP  
12 will be used to evaluate the second criterion. The second criterion is the hotspot criterion, which states that  
13 primary or secondary ASCOC results must not exceed two times the FRL. When the given UCL on the  
14 mean for each COC is less than its FRL and the hot spot criterion is met, the CU will be considered  
15 certified.

16  
17 In the event that the CU fails certification, the following scenarios will be evaluated: 1) a high variability  
18 in the data set, 2) localized contamination, and 3) widespread contamination. Details on the evaluation and  
19 responses to these possible outcomes are provided in Section 3.4.5 of the SEP. When the CU within the  
20 scope of this CDL has passed certification, a certification report will be issued. The Certification Report  
21 will be submitted to the U.S.Environmental Protection Agency (EPA) and the Ohio Environmental  
22 Protection Agency (OEPA) to receive acknowledgement that the pertinent operable unit remedial action  
23 was completed and the individual CU is certified to be released for interim or final land use. Section 7.4 of  
24 the SEP provides additional details and describes the required content of the Certification Reports.

**TABLE 4-1  
 SAMPLING AND ANALYTICAL REQUIREMENTS**

Analyte	Method	Sample Matrix	ASL	Preservation	Hold Time	Container <sup>b</sup>	Minimum Mass
Radiological (TAL A)	Gamma Spec	Liquid (rinsate <sup>d</sup> )	D/E <sup>a</sup>	HNO <sub>3</sub> pH<2	6 months	Glass or Polyethylene	4 liters
Radiological (TAL A)	Gamma Spec	Solid	D/E <sup>a</sup>	None	12 months	Glass or Polyethylene	300 g (900 g) <sup>c</sup>

<sup>a</sup> Samples will be analyzed according to ASL D requirements but the minimum detection level may cause some analyses to be considered ASL E.

<sup>b</sup> Sample 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.

<sup>c</sup> At 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".

<sup>d</sup> If "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.

**TABLE 4-2  
 TARGET ANALYTE LIST**

**20450-PSP-0009-A  
 (ASL D/E\*)**

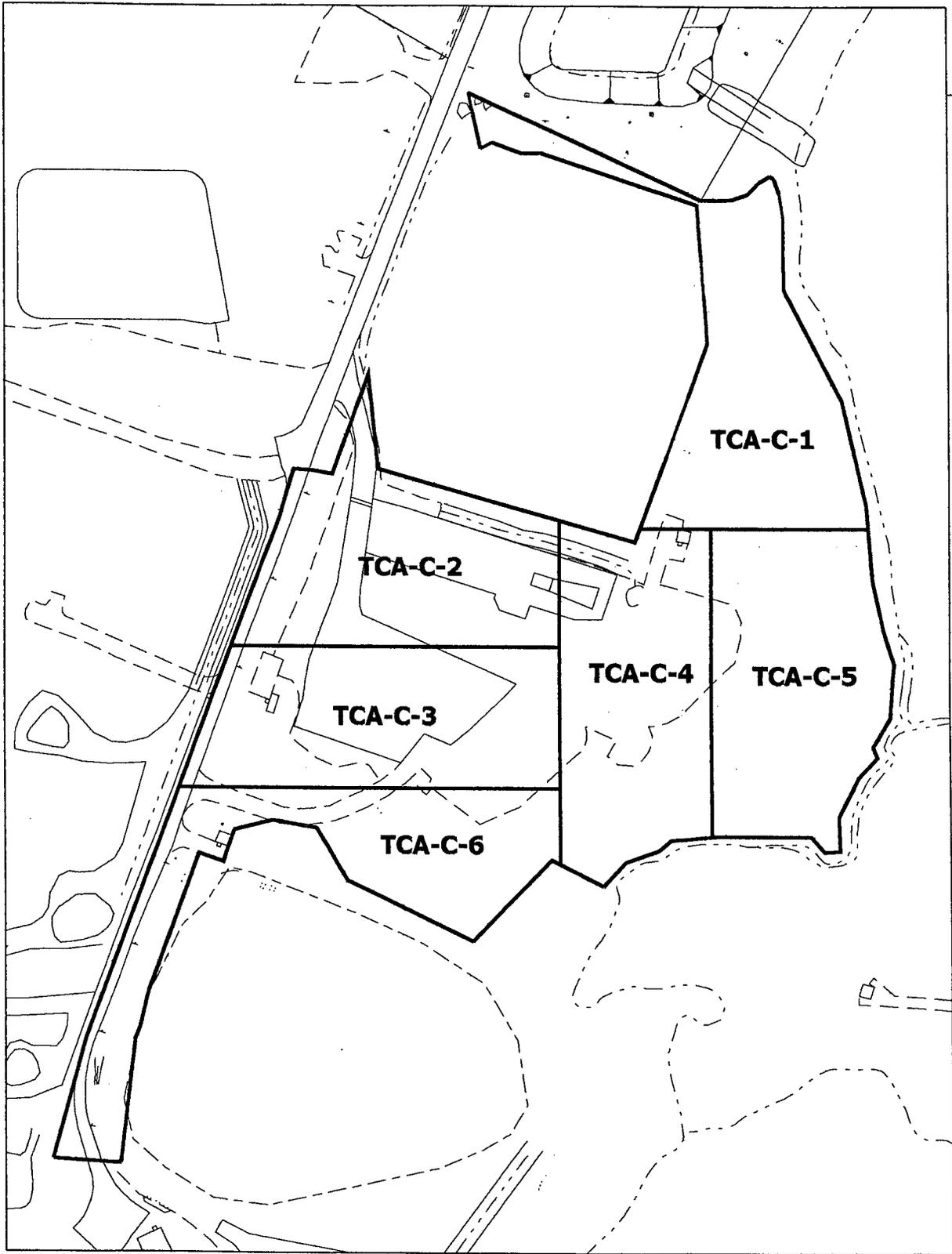
Analyte	On-Property FRL	MDL	MDL (water)
Total Uranium	82 mg/kg	8.2 mg/kg	300 µg/L
Radium-226	1.7 pCi/g	0.17 pCi/g	50 pCi/L
Radium-228	1.8 pCi/g	0.18 pCi/g	50 pCi/L
Thorium-228	1.7 pCi/g	0.17 pCi/g	50 pCi/L
Thorium-232	1.5 pCi/g	0.15 pCi/g	50 pCi/L

\*Analytical requirements will meet ASL D but the MDL may cause some analyses to be considered ASL E.

MDL - minimum detectable level

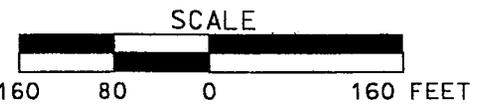
µg/L - micrograms per liter

mg/kg - milligram per kilogram



**LEGEND:**

 CERTIFICATION  
 BOUNDARY



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FIGURE 4-1. A2PIIS3 TCA/AQL CU LOCATION MAP

V:\2005\24\AUG\24-001.dgn

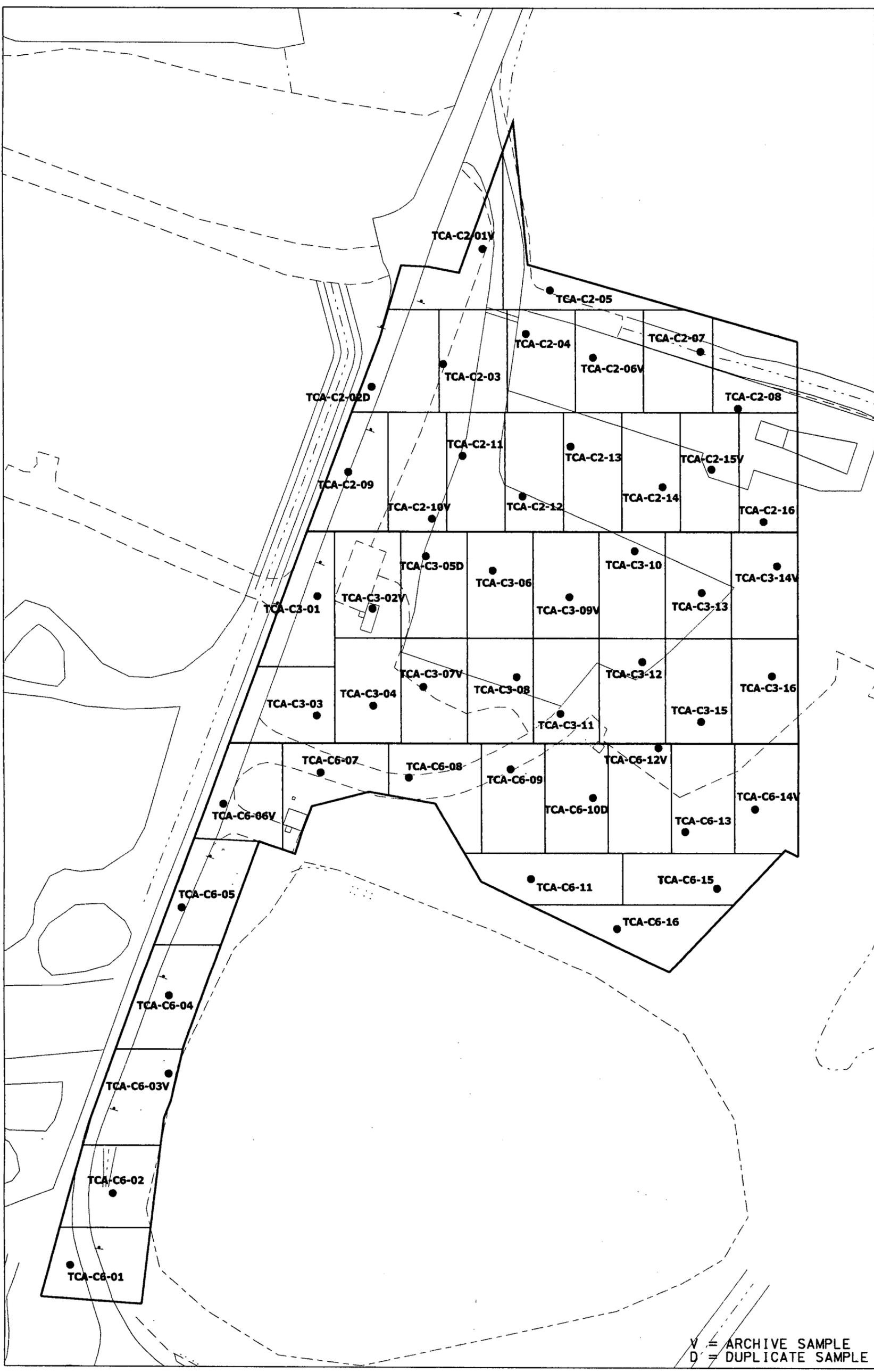
STATE PLANAR COORDINATE SYSTEM 1983

24-AUG-2005

VI 271112 240917 TCA.dwg 1:003 .dgn

STATE PLANNING COORDINATE SYSTEM 1983

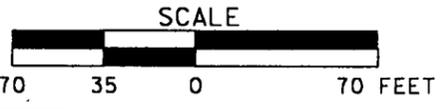
24-AUG-2005



**LEGEND:**

● SAMPLE LOCATION

V = ARCHIVE SAMPLE  
D = DUPLICATE SAMPLE



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FIGURE 4-2. A2PIIS3 TCA/AQL SUB CU AND SAMPLE LOCATION MAP FOR CU's 2, 3 & 6

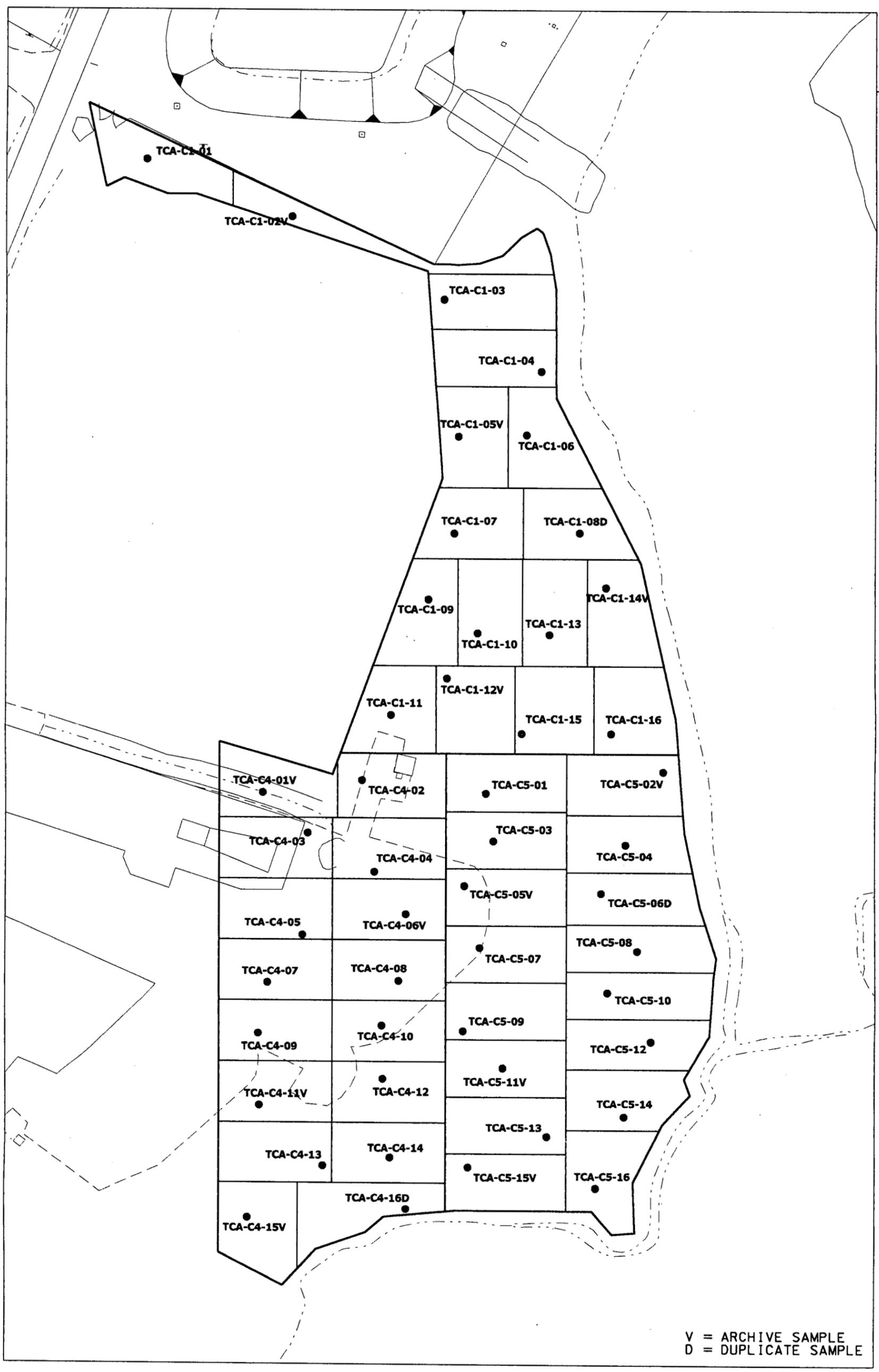
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vs:sg:tm12:acq:trc:001\_004.dgn

STATE PLANNER COORDINATE SYSTEM 1983

24-AUG-2005

N

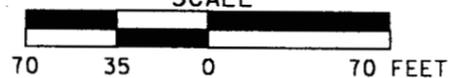


V = ARCHIVE SAMPLE  
D = DUPLICATE SAMPLE

LEGEND:

● SAMPLE LOCATION

SCALE



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FIGURE 4-3. A2PIIS3 TCA/AQL SUB CU AND SAMPLE LOCATION MAP FOR CU's 1, 4 & 5

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## 6.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

### 6.1 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 the CU, as noted in Section 4.3 and identified in Appendix B. The field duplicate sample 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 (see Table 4-2). 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.
- All analyses will be performed at ASL D or E, where E meets the MDL 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. A minimum of 10 percent of the laboratory data will be validated to VSL D with the remainder validated to VSL B. The following CU will be validated to VSL D: A2P2-TCA4. 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 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 **6.2 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 and in the  
10 References section.

- 11
- 12 • 20100-HS-0002, Soil and Disposal Facility Project Integrated Health and Safety Plan
  - 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 **6.3 INDEPENDENT ASSESSMENT**

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

28  
29 **6.4 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 Manager, and QA/QC within seven days of implementation of the change. The EPA and OEPA  
36 will be given a 15-day review period prior to implementing the change(s) for any V/FCNs identified as  
37 “significant” per project guidelines.

## 7.0 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 911 and 648-6511.** Announcements for severe weather will be provided to select  
23 company issued cell phones and alpha-numeric pagers. Pagers and cellular phones are provided to the  
24 Technicians by FCP, as needed. As soon as possible, field personnel are to contact their supervisor and  
25 Health and Safety Representative after any unplanned event or injury.

## 8.0 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.

## 9.0 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 4.3 and listed in Appendix C.  
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.

31  
32 To ensure that correct coordinates and survey information are tied to the final sample locations in the  
33 database, the following process will take place. Upon surveying all locations identified in the PSP, the  
34 Surveying Manager will provide the Data Management Lead (i.e., Characterization) with an electronic file  
35 of all surveyed coordinates and surface elevations. The Sampling Manager will provide the Data  
36 Management Lead with a list of any locations that must be moved during penetration permitting or sample  
37 collection, and the Data Management Lead will update the electronic file with this information. After

0708

- 1 sample collection is complete, the Data Management Lead will provide this electronic file to the Database
- 2 Contact for uploading to SED.

## REFERENCES

- 1  
2  
3 U.S. Department of Energy, 1993, "CERCLA/RCRA Background Soil Study," Final, Fernald  
4 Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.  
5  
6 U.S. Department of Energy, 1995a, "Remedial Investigation for Operable Unit 5," Final, Fernald  
7 Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.  
8  
9 U.S. Department of Energy, 1995b, "Feasibility Study for Operable Unit 5," Final, Fernald Environmental  
10 Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.  
11  
12 U.S. Department of Energy, 1996, "Record of Decision for Remedial Action at Operable Unit 5," Final,  
13 Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.  
14  
15 U.S. Department of Energy, 1998, "Sitewide Excavation Plan," Final, Fernald Environmental Management  
16 Project, DOE, Fernald Area Office, Cincinnati, Ohio.  
17  
18 U.S. Department of Energy, 2001a, "Addendum to the Sitewide Excavation Plan," Final, Fernald  
19 Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.  
20  
21 U.S. Department of Energy, 2001b, "Addendum to the CERCLA/RCRA Background Soil Study," Final,  
22 Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.  
23  
24 U.S. Department of Energy, 2004, "Project Specific Plan for the Predesign of Area 2, Phase II - Subarea 3  
25 (Supplement to 20300-PSP-0011)," Revision 1, Fernald Closure Project, DOE, Fernald Area Office,  
26 Cincinnati, Ohio.  
27  
28 U.S. Department of Energy, 2005a, "Project Specific Plan for the Excavation Control of Area 2, Phase II -  
29 Subarea 3 Trailer Complex Area and Aquifer Project Laydown Area (Supplement to 20300-PSP-0011),"  
30 Revision 0, Fernald Closure Project, DOE, Fernald Area Office, Cincinnati, Ohio.  
31  
32 U.S. Department of Energy, 2005b, "Addendum No. 2 to the Implementation Plan for Area 2, Phase II -  
33 Subarea 3 (Infrastructure) Trailer Complex and Aquifer Project Laydown Area," Final, Fernald Closure  
34 Project, DOE, Fernald Area Office, Cincinnati, Ohio.

**APPENDIX A**

**REAL-TIME DATA MAPS FOR  
AREA 2, PHASE II - SUBAREA 3 TCA/AQL**

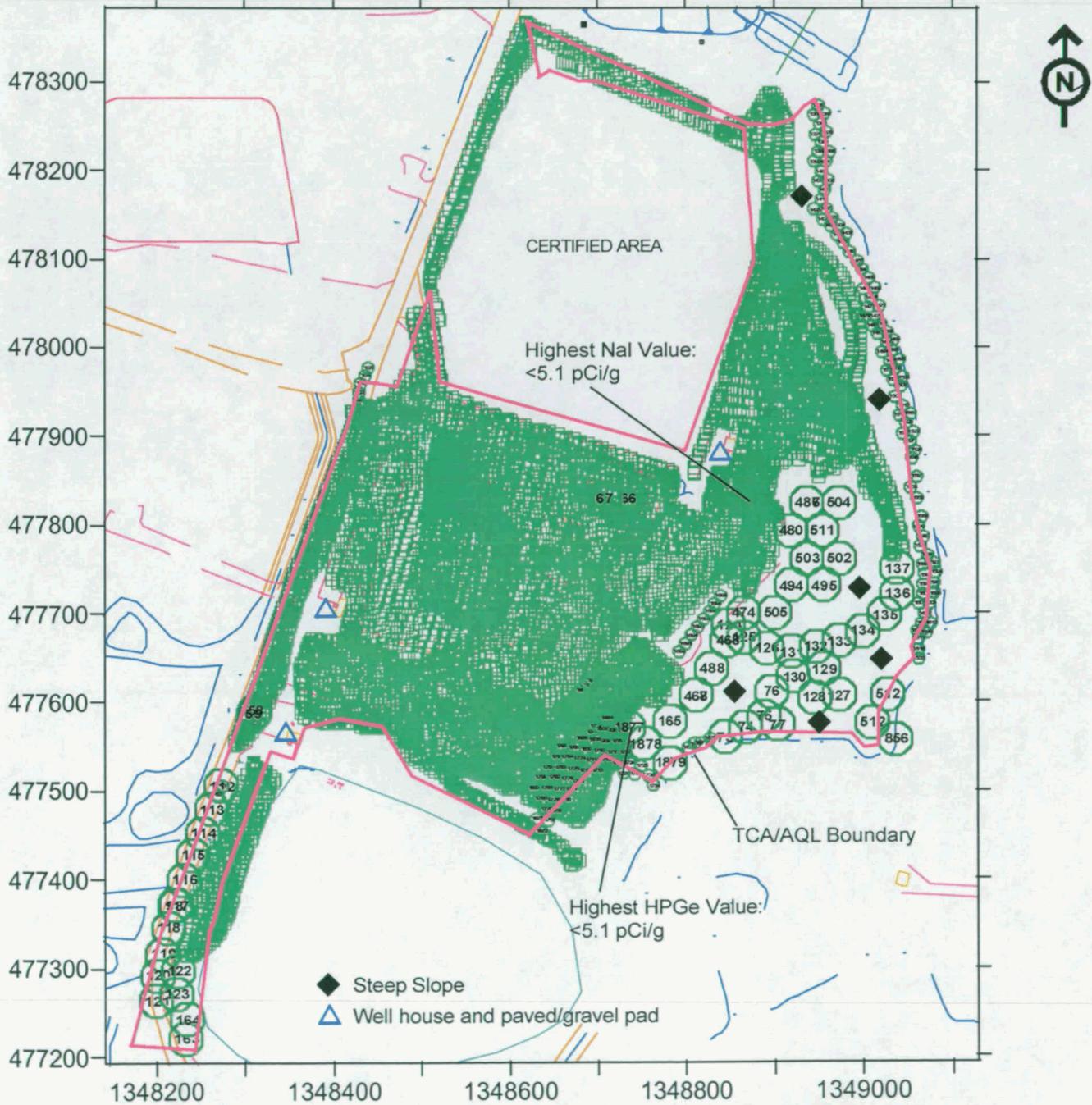
# Figure A-1 Area 2, Phase 2, Subarea 3, Trailer Complex Area/Aquifer Project Laydown Area - Precertification Phase 1 - Radium-226

Field of View to Scale

Nal Data: RSS1\_1456\_11/15/04, 1985\_6/23/05, 1988\_6/24/05, 2002\_6/28/05, 2010\_6/30/05; 2018\_7/6/05, 2021\_7/7/05; RSS2\_1116\_7/28/05; RSS3\_590\_11/15/04, 616\_12/1/04, 886\_6/20/05, 892\_6/21/05; RSS4\_87\_6/29/05, 178\_7/25/05

HPGe Data: 31265\_10/2/03, 4/30/05, 5/1/05, 5/3/05, 5/5/05, 5/6/05, 5/7/05, 6/27/05; 40743\_10/2/03, 5/6/05, 5/7/05, 5/10/05, 5/22/05, 6/6/05, 6/7/05, 6/8/05, 6/9/05, 6/10/05, 6/20/05, 7/11/05, 7/12/05; 30699\_10/24/03; 40293\_4/30/05, 5/1/05; 30687\_5/13/05, 5/17/05, 5/18/05, 6/10/05, 6/15/05, 6/17/05, 6/21/05, 6/24/05, 7/15/05, 7/20/05, 7/23/05, 8/17/05; 40227\_6/8/05, 7/26/05; 31204\_7/23/05, 7/25/05

Measurement Dates: 10/2/03 - 7/28/05



Nal Ra-226 (pCi/g)	
□	-9999 to 5.1
□	5.1 to 9999

HPGe @ 100 cm Ra-226 (pCi/g)	
○	0 to 5.1
○	5.1 to 9999

HPGe @ 31 cm Ra-226 (pCi/g)	
○	0 to 1.7
○	1.7 to 3.4
○	3.4 to 5.1
○	5.1 to 9999

RTIMP DWG Title: A2P2\_SA3\_TCA\_P1\_RA.srf  
 Project Name: Gen Char for Site Soil Remediation  
 Project #: 20300-PSP-0011  
 Verified By: Curt Baumann/78329 8/29/05  
 Support Data: A2P2\_SA3\_TCA\_P1\_Nal.xls  
 A2P2\_SA3\_TCA\_P1\_HPGe\_31cm\_v3.xls  
 A2P2\_SA3\_TCA\_P1\_HPGe\_100cm\_v3.xls  
 A2P2\_SA3\_TCA\_P1\_HPGe\_100cm\_v2.xls

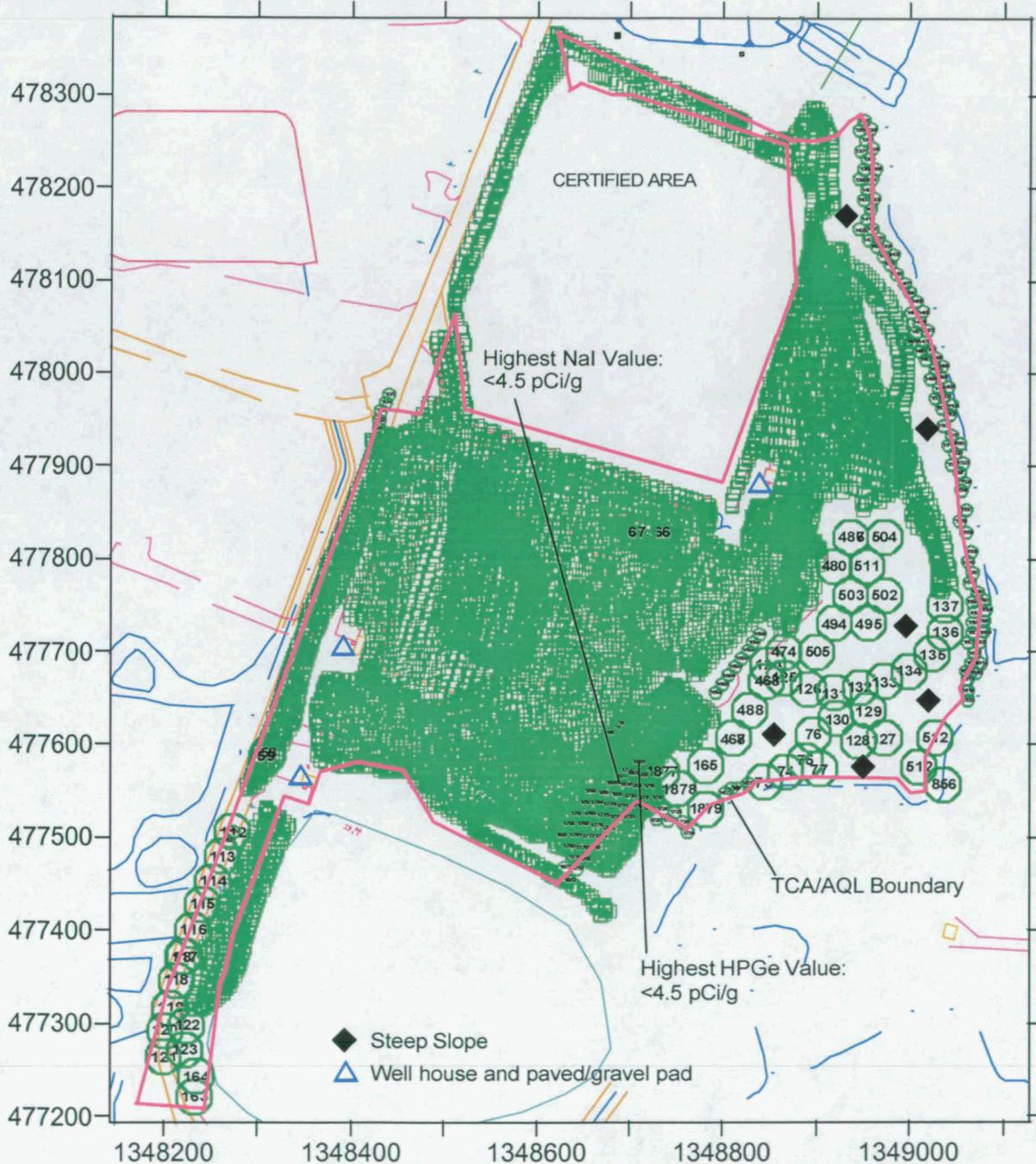
# Figure A-2 Area 2, Phase 2, Subarea 3, Trailer Complex Area/Aquifer Project Laydown Area - Precertification Phase 1 - Thorium-232

Field of View to Scale

Nal Data: RSS1\_1456\_11/15/04, 1985\_6/23/05, 1988\_6/24/05, 2002\_6/28/05, 2010\_6/30/05; 2018\_7/6/05, 2021\_7/7/05; RSS2\_1116\_7/28/05; RSS3\_590\_11/15/04, 616\_12/1/04, 886\_6/20/05, 892\_6/21/05; RSS4\_87\_6/29/05, 178\_7/25/05

HPGe Data: 31265\_10/2/03, 4/30/05, 5/1/05, 5/3/05, 5/5/05, 5/6/05, 5/7/05, 5/7/05, 5/10/05, 5/22/05, 6/6/05, 6/7/05, 6/8/05, 6/9/05, 6/10/05, 6/20/05, 7/11/05, 7/12/05; 30699\_10/24/03; 40293\_4/30/05, 5/1/05; 30687\_5/13/05, 5/17/05, 5/18/05, 6/10/05, 6/15/05, 6/17/05, 6/21/05, 6/24/05, 7/15/05, 7/20/05, 7/23/05, 8/17/05; 40227\_6/8/05, 7/26/05; 31204\_7/23/05, 7/25/05

Measurement Dates: 10/2/03 - 7/28/05



Nal Th-232 (pCi/g)	
□	-9999 to 4.5
□	4.5 to 9999

HPGe @ 100 cm Th-232 (pCi/g)	
○	0 to 4.5
○	4.5 to 9999

HPGe @ 31 cm Th-232 (pCi/g)	
○	0 to 1.5
○	1.5 to 3
○	3 to 4.5
○	4.5 to 9999

RTIMP DWG Title: A2P2\_SA3\_TCA\_P1\_TH.srf  
 Project Name: Gen Char for Site Soil Remediation  
 Project #: 20300-PSP-0011  
 Verified By: Curt Baumann/78329 8/29/05  
 Support Data: A2P2\_SA3\_TCA\_P1\_Nal.xls  
 A2P2\_SA3\_TCA\_P1\_HPGe\_31cm\_v3.xls  
 A2P2\_SA3\_TCA\_P1\_HPGe\_100cm\_v3.xls  
 A2P2\_SA3\_TCA\_P1\_HPGe\_100cm\_v2.xls

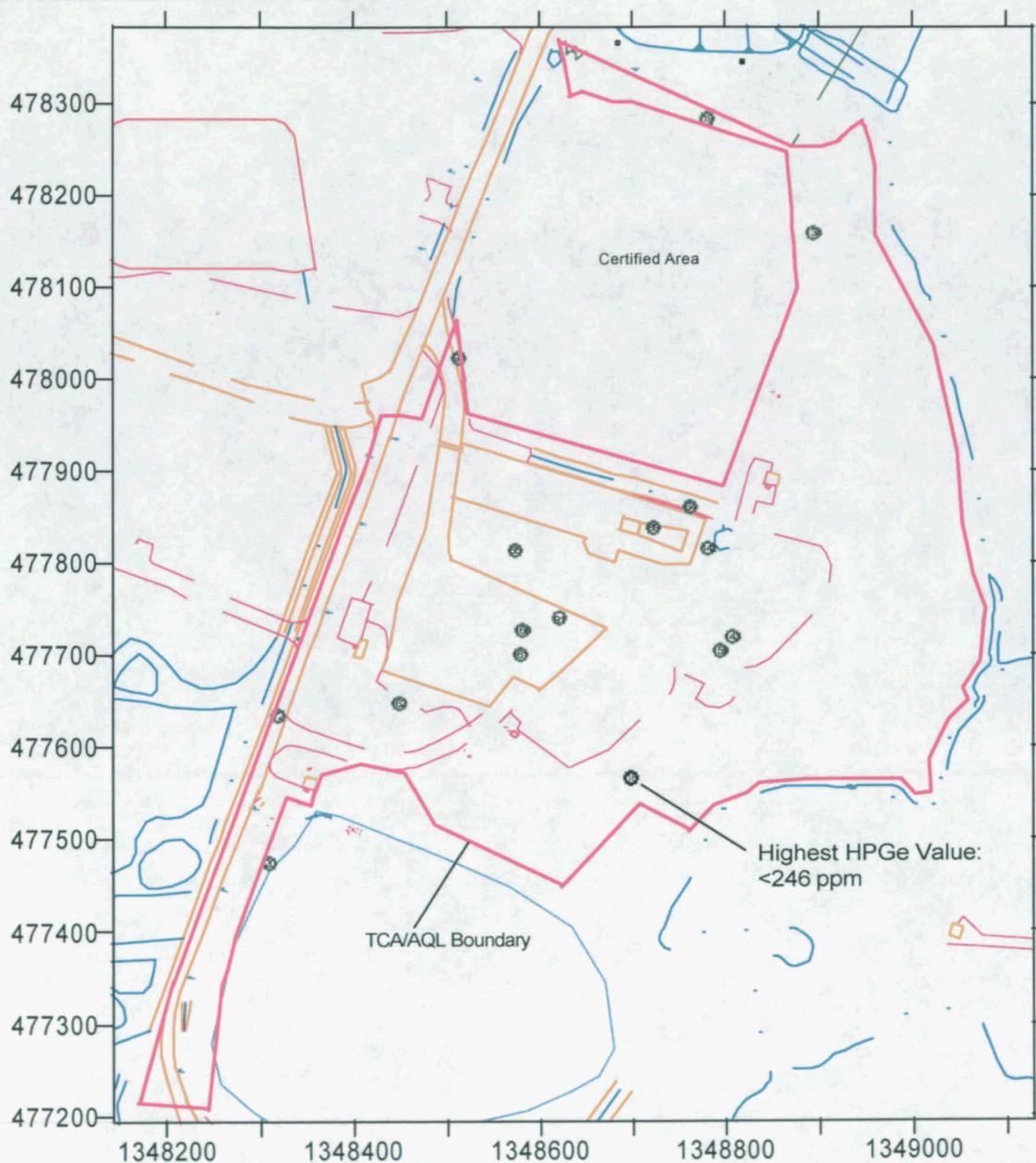


# Figure A-4 Area 2, Phase 2, Subarea 3, Trailer Complex Area/Aquifer Project Laydown Area - Precertification Phase 2 - Total Uranium

Field of View to Scale

HPGe Data: 40227\_11/23/04, 12/1/04, 7/26/05; 30687\_6/21/05, 6/24/05, 7/8/05, 7/28/05, 8/17/05; 31265\_6/28/05

Measurement Dates: 11/23/04 - 8/17/05



HPGe @ 31 cm Total U (ppm)	
○	0 to 82
○	82 to 168
○	168 to 246
○	246 to 9999

RTIMP DWG Title: A2P2\_SA3\_TCA\_P2\_TU.srf  
 Project Name: Gen Char for Site Soil Remediation  
 Project #: 20300-PSP-0011  
 Prepared By: Curt Baumann/78329 8/29/05  
 Support Data: A2P2\_SA3\_TCA\_P2\_HPGe\_31cm.xls

**APPENDIX B**

**DATA QUALITY OBJECTIVES SL-052, REV. 3**

Control Number \_\_\_\_\_

Fernald Environmental Management Project

Data Quality Objectives

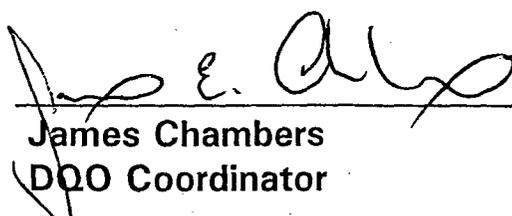
Title: Sitewide Certification Sampling and Analysis

Number: SL-052

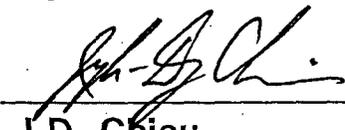
Revision: 3

Effective Date: March 13, 2000

Contact Name: Mike Rolfes

Approval:   
James Chambers  
DQO Coordinator

Date: 3/13/00

Approval:   
J.D. Chiou  
SCEP Project Director

Date: 3/13/00

Rev. #	0	1	2	3			
Effective Date:	4/28/99	6/10/99	2/3/00	3/13/00			

## 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.

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.

## 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                | <input type="checkbox"/>              | 2. Uranium        | <input checked="" type="checkbox"/> * | 3. BTX             | <input type="checkbox"/> |
| Temperature          | <input type="checkbox"/>              | Full Radiological | <input checked="" type="checkbox"/> * | TPH                | <input type="checkbox"/> |
| Specific Conductance | <input type="checkbox"/>              | Metals            | <input checked="" type="checkbox"/> * | Oil/Grease         | <input type="checkbox"/> |
| Dissolved Oxygen     | <input type="checkbox"/>              | Cyanide           | <input type="checkbox"/>              |                    |                          |
| Technetium-99        | <input checked="" type="checkbox"/> * | Silica            | <input type="checkbox"/>              |                    |                          |
| 4. Cations           | <input type="checkbox"/>              | 5. VOA            | <input checked="" type="checkbox"/> * | 6. Other (specify) |                          |
| Anions               | <input type="checkbox"/>              | BNA               | <input type="checkbox"/>              |                    |                          |
| TOC                  | <input type="checkbox"/>              | PEST              | <input checked="" type="checkbox"/> * |                    |                          |
| TCLP                 | <input type="checkbox"/>              | PCB               | <input checked="" type="checkbox"/> * |                    |                          |
| CEC                  | <input type="checkbox"/>              | COD               | <input type="checkbox"/>              |                    |                          |

\* 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&amp;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"/> <sup>1</sup>	Container Blanks	<input checked="" type="checkbox"/>
Field Blanks	<input checked="" type="checkbox"/> <sup>2</sup>	Duplicate Samples	<input checked="" type="checkbox"/>
Equipment Rinsate Blanks	<input checked="" type="checkbox"/>	Split Samples	<input checked="" type="checkbox"/> <sup>3</sup>
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 C**

**AREA 2, PHASE II - SUBAREA 3 TCA/AQL  
CU SAMPLE LOCATIONS AND IDENTIFIERS**

## APPENDIX C

## AREA 2, PHASE II - SUBAREA 3 TCA/AQL CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
TCA-C1	C1-01	0.0' - 0.5'	TCA-C1-01^1-R	A	1348664.08	478326.84
	C1-02V	0.0' - 0.5'	TCA-C1-02^1-V	archive	1348768.64	478286.05
	C1-03	0.0' - 0.5'	TCA-C1-03^1-R	A	1348878.48	478226.52
	C1-04	0.0' - 0.5'	TCA-C1-04^1-R	A	1348948.84	478174.86
	C1-05V	0.0' - 0.5'	TCA-C1-05^1-V	archive	1348888.89	478128.03
	C1-06	0.0' - 0.5'	TCA-C1-06^1-R	A	1348938.31	478129.12
	C1-07	0.0' - 0.5'	TCA-C1-07^1-R	A	1348886.1	478057.63
	C1-08D	0.0' - 0.5'	TCA-C1-08^1-R	A	1348976.83	478058.17
			TCA-C1-08^1-R-D	A		
	C1-09	0.0' - 0.5'	TCA-C1-09^1-R	A	1348867.47	478009.83
	C1-10	0.0' - 0.5'	TCA-C1-10^1-R	A	1348902.98	477985.68
	C1-11	0.0' - 0.5'	TCA-C1-11^1-R	A	1348840.67	477926.18
	C1-12V	0.0' - 0.5'	TCA-C1-12^1-V	archive	1348880.94	477952.83
	C1-13	0.0' - 0.5'	TCA-C1-13^1-R	A	1348955.18	477984.84
	C1-14V	0.0' - 0.5'	TCA-C1-14^1-V	archive	1348996.12	478018.61
	C1-15	0.0' - 0.5'	TCA-C1-15^1-R	A	1348935.11	477912.66
C1-16	0.0' - 0.5'	TCA-C1-16^1-R	A	1348999.96	477912.91	
TCA-C2	C2-01V	0.0' - 0.5'	TCA-C2-01^1-V	archive	1348490.19	477973.18
	C2-02D	0.0' - 0.5'	TCA-C2-02^1-R	A	1348410.1	477873.77
			TCA-C2-02^1-R-D			
	C2-03	0.0' - 0.5'	TCA-C2-03^1-R	A	1348461.63	477890.22
	C2-04	0.0' - 0.5'	TCA-C2-04^1-R	A	1348521.44	477911.99
	C2-05	0.0' - 0.5'	TCA-C2-05^1-R	A	1348538.9	477943.37
	C2-06V	0.0' - 0.5'	TCA-C2-06^1-R	archive	1348569.7	477895.06
	C2-07	0.0' - 0.5'	TCA-C2-07^1-R	A	1348647.3	477899.39
	C2-08	0.0' - 0.5'	TCA-C2-08^1-R	A	1348674.25	477858.48
	C2-09	0.0' - 0.5'	TCA-C2-09^1-R	A	1348393.34	477812.37
	C2-10V	0.0' - 0.5'	TCA-C2-10^1-R	archive	1348453.43	477778.47
	C2-11	0.0' - 0.5'	TCA-C2-11^1-R	A	1348475.61	477824.15
	C2-12	0.0' - 0.5'	TCA-C2-12^1-R	A	1348518.81	477794.91
	C2-13	0.0' - 0.5'	TCA-C2-13^1-R	A	1348553.51	477831.02
	C2-14	0.0' - 0.5'	TCA-C2-14^1-R	A	1348619.89	477801.85
	C2-15V	0.0' - 0.5'	TCA-C2-15^1-R	archive	1348655.04	477814.59
C2-16	0.0' - 0.5'	TCA-C2-16^1-R	A	1348692.58	477776.52	

APPENDIX C

AREA 2, PHASE II - SUBAREA 3 TCA/AQL CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
TCA-C3	C3-01	0.0' - 0.5'	TCA-C3-01^1-R	A	1348370.94	477722.95
	C3-02V	0.0' - 0.5'	TCA-C3-02^1-V	archive	1348410.46	477714.1
	C3-03	0.0' - 0.5'	TCA-C3-03^1-R	A	1348370.42	477636.91
	C3-04	0.0' - 0.5'	TCA-C3-04^1-R	A	1348410.89	477644.21
	C3-05D	0.0' - 0.5'	TCA-C3-05^1-R	A	1348448.92	477751.52
			TCA-C3-05^1-R-D			
	C3-06	0.0' - 0.5'	TCA-C3-06^1-R	A	1348497.13	477741.26
	C3-07V	0.0' - 0.5'	TCA-C3-07^1-V	archive	1348446.94	477657.81
	C3-08	0.0' - 0.5'	TCA-C3-08^1-R	A	1348514.25	477665.12
	C3-09V	0.0' - 0.5'	TCA-C3-09^1-V	archive	1348552.58	477722.4
	C3-10	0.0' - 0.5'	TCA-C3-10^1-R	A	1348599.73	477755.42
	C3-11	0.0' - 0.5'	TCA-C3-11^1-R	A	1348545.84	477638.39
	C3-12	0.0' - 0.5'	TCA-C3-12^1-R	A	1348605.04	477676.13
	C3-13	0.0' - 0.5'	TCA-C3-13^1-R	A	1348647.82	477725.58
	C3-14V	0.0' - 0.5'	TCA-C3-14^1-V	archive	1348702.19	477744.57
	C3-15	0.0' - 0.5'	TCA-C3-15^1-R	A	1348647.21	477632.74
C3-16	0.0' - 0.5'	TCA-C3-16^1-R	A	1348698.33	477665.88	
TCA-C4	C4-01V	0.0' - 0.5'	TCA-C4-01^1-V	archive	1348748.42	477869.74
	C4-02	0.0' - 0.5'	TCA-C4-02^1-R	A	1348819.76	477878.77
	C4-03	0.0' - 0.5'	TCA-C4-03^1-R	A	1348780.84	477840.74
	C4-04	0.0' - 0.5'	TCA-C4-04^1-R	A	1348828.9	477812.39
	C4-05	0.0' - 0.5'	TCA-C4-05^1-R	A	1348777.21	477766.39
	C4-06V	0.0' - 0.5'	TCA-C4-06^1-V	archive	1348851.49	477781.68
	C4-07	0.0' - 0.5'	TCA-C4-07^1-R	A	1348752.18	477731.41
	C4-08	0.0' - 0.5'	TCA-C4-08^1-R	A	1348846.37	477732.66
	C4-09	0.0' - 0.5'	TCA-C4-09^1-R	A	1348745.38	477694.32
	C4-10	0.0' - 0.5'	TCA-C4-10^1-R	A	1348834.32	477700.14
	C4-11V	0.0' - 0.5'	TCA-C4-11^1-V	archive	1348746.23	477642.15
	C4-12	0.0' - 0.5'	TCA-C4-12^1-R	A	1348835.13	477661.45
	C4-13	0.0' - 0.5'	TCA-C4-13^1-R	A	1348792.02	477597.78
	C4-14	0.0' - 0.5'	TCA-C4-14^1-R	A	1348840.49	477603.97
	C4-15V	0.0' - 0.5'	TCA-C4-15^1-V	archive	1348737.76	477559.82
	C4-16D	0.0' - 0.5'	TCA-C4-16^1-R	A	1348851.97	477566.39
TCA-C4-16^1-R-D						

## APPENDIX C

## AREA 2, PHASE II - SUBAREA 3 TCA/AQL CU SAMPLE LOCATIONS AND IDENTIFIERS

CU	Location	Depth (feet)	Sample ID	TAL	Northing	Easting
TCA-C5	C5-01	0.0' - 0.5'	TCA-C5-01^1-R	A	1348909.42	477869.64
	C5-02V	0.0' - 0.5'	TCA-C5-02^1-V	archive	1349037.7	477885.47
	C5-03	0.0' - 0.5'	TCA-C5-03^1-R	A	1348914.82	477835.26
	C5-04	0.0' - 0.5'	TCA-C5-04^1-R	A	1349010.48	477832.64
	C5-05V	0.0' - 0.5'	TCA-C5-05^1-V	archive	1348893.94	477802.38
	C5-06D	0.0' - 0.5'	TCA-C5-06^1-R	A	1348993.02	477797.43
			TCA-C5-06^1-R-D			
	C5-07	0.0' - 0.5'	TCA-C5-07^1-R	A	1348904.98	477757.39
	C5-08	0.0' - 0.5'	TCA-C5-08^1-R	A	1349019.15	477755.18
	C5-09	0.0' - 0.5'	TCA-C5-09^1-R	A	1348893.16	477696.43
	C5-10	0.0' - 0.5'	TCA-C5-10^1-R	A	1348997.56	477724.67
	C5-11V	0.0' - 0.5'	TCA-C5-11^1-V	archive	1348921.91	477669.49
	C5-12	0.0' - 0.5'	TCA-C5-12^1-R	A	1349029.16	477689.05
	C5-13	0.0' - 0.5'	TCA-C5-13^1-R	A	1348953.75	477619.68
	C5-14	0.0' - 0.5'	TCA-C5-14^1-R	A	1349009.71	477634.47
	C5-15V	0.0' - 0.5'	TCA-C5-15^1-V	archive	1348896.73	477597.09
C5-16	0.0' - 0.5'	TCA-C5-16^1-R	A	1348989.21	477582.11	
TCA-C6	C6-01	0.0' - 0.5'	TCA-C6-01^1-R	A	1348192.89	477237.47
	C6-02	0.0' - 0.5'	TCA-C6-02^1-R	A	1348223.56	477289.52
	C6-03V	0.0' - 0.5'	TCA-C6-03^1-V	A	1348263.71	477376.8
	C6-04	0.0' - 0.5'	TCA-C6-04^1-R	A	1348264.08	477433.2
	C6-05	0.0' - 0.5'	TCA-C6-05^1-R	A	1348273.37	477497.44
	C6-06V	0.0' - 0.5'	TCA-C6-06^1-V	A	1348303.28	477572.62
	C6-07	0.0' - 0.5'	TCA-C6-07^1-R	A	1348373.19	477595.39
	C6-08	0.0' - 0.5'	TCA-C6-08^1-R	A	1348436.5	477591.8
	C6-09	0.0' - 0.5'	TCA-C6-09^1-R	A	1348509.77	477597.99
	C6-10D	0.0' - 0.5'	TCA-C6-10^1-R	A	1348569.16	477577.35
			TCA-C6-10^1-R-D			
	C6-11	0.0' - 0.5'	TCA-C6-11^1-R	A	1348524.26	477518.44
	C6-12V	0.0' - 0.5'	TCA-C6-12^1-V	archive	1348616.51	477613.46
	C6-13	0.0' - 0.5'	TCA-C6-13^1-R	A	1348635.71	477552.67
	C6-14V	0.0' - 0.5'	TCA-C6-14^1-V	archive	1348685.99	477569.21
	C6-15	0.0' - 0.5'	TCA-C6-15^1-R	A	1348658.39	477511.47
C6-16	0.0' - 0.5'	TCA-C6-16^1-R	A	1348586.37	477482.41	