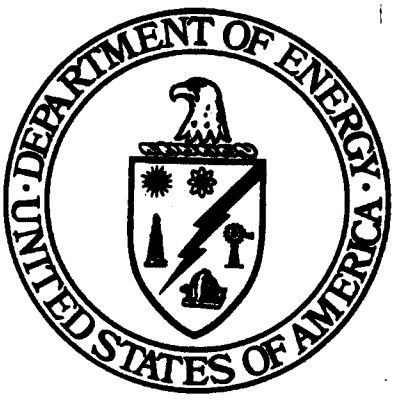
PROJECT SPECIFIC PLAN FOR THE AREA 9, PHASE I PRECERTIFICATION REAL-TIME SCAN

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT FERNALD, OHIO



JULY 1998

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20702-PSP-0001
REVISION 3

1747

PROJECT SPECIFIC PLAN
FOR THE AREA 9, PHASE I
PRECERTIFICATION REAL-TIME SCAN

Project Number 50.03.75.02

Revision 3
July 23, 1998

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LIST OF ACRONYMS AND ABBREVIATIONS

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A1PI	Area 1, Phase I
A1PII	Area 1, Phase II
A9PI	Area 9, Phase I
A9PII	Area 9, Phase II
ASCOC	area-specific constituent of concern
ASL	analytical support level
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
CU	certification unit
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
FDF	Fluor Daniel Fernald
FEMP	Fernald Environmental Management Project
FRL	final remediation level
GIS	Graphical Information System
GPS	global positioning system
HPGe	high purity germanium
LAN	Local Area Network
NaI	sodium iodide
OEPA	Ohio Environmental Protection Agency
OU5	Operable Unit 5
PSP	Project Specific Plan
PWID	Project Waste Identification Document
QA/QC	quality assurance/quality control
RI	Remedial Investigation
ROD	Record of Decision
RSS	Radiation Scanning System
RTRAK	Radiation Tracking System
RWP	Radiological Work Permit
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
TAL	Target Analyte List
V/FCN	Variance/Field Change Notice

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1.0 INTRODUCTION

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1.1 BACKGROUND

Soil constituent of concern (COC) data collected during the Fernald Environmental Management Project (FEMP) Remedial Investigation (RI) identified areas of soil contamination along the eastern portion of the site within Area 1, Phase I (A1PI) and Area 1, Phase II (A1PII). As a result of this contamination, Fluor Daniel Fernald (FDF) and the Department of Energy (DOE) plan to certify some off-property soil adjacent to the FEMP's eastern boundary. Off-property certification will take place after the adjacent portion of the FEMP property is certified as attaining final remediation levels (FRLs) for all area-specific COCs (ASCOCs) to prevent cross-contamination of off-property soils during on-property remediation.

Remediation of A1PI, the northeast portion of the FEMP, was completed in Summer 1997. Consequently, the off-property area east of A1PI, designated as Area 9, Phase I (A9PI, Figure 1-1), will be the first off-property area to undergo soil certification. Area 9, Phase II (A9PII), east of A1PII, will be evaluated after certification of A1PII soil.

Based on agreements with the U.S. Environmental Protection Agency (EPA) and Ohio Environmental Protection Agency (OEPA), the suite of ASCOCs to be analyzed during certification of off-property soil is identical to the adjacent FEMP soil remediation area. Therefore, the ASCOCs for A9PI are identical to the suite of ASCOCs for A1PI. All ASCOCs will be certified to the more stringent off-property soil FRLs identified in the Operable Unit 5 (OU5) Record of Decision (ROD). The certification strategy for this area will vary slightly from that specified in the Sitewide Excavation Plan (SEP) because much of the soil in this area has been plowed, thus eliminating the original surface layer of soil. Based on agreements with the property owner, certification sampling will be conducted to a depth of three feet in areas that have been plowed in order to represent the entire plowed layer. Other details of the certification strategy for plowed soil are still being planned, and when finalized, will be presented in the A9PI Certification Design Letter.

Before certification sampling and analysis, precertification scanning activities will take place to establish certification unit (CU) boundaries through identified patterns of gross radiological (gamma) counts. According to the SEP, the larger (500 feet x 500 feet) Group 2 CUs will be established in

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areas where contamination is not anticipated, as Group 2 CUs require less dense certification sampling. Because off-property certification justifies a higher level of assurance that contamination above the FRL is not present, more conservative criteria will be used to establish the CUs for off-property soil in off-property areas planned for certification, as follows:

- Where excavation took place on-site to remove above-FRL contamination, Group 1 (250 feet x 250 feet) CUs will traverse the off-property soil along the FEMP property boundary. This will result in a greater certification sampling density along the fence line to provide more assurance that, following certification, no contamination remains.

- Group 2 CUs will be established immediately east of the Group 1 CUs. This will provide a second level of assurance that off-property soil meets the certification requirements.

- If no excavation took place at adjacent on-site property (because no soil contamination was identified), and the soil passed subsequent certification sampling and analysis, then it is unlikely that contamination extended to off-property soil. However, a Group 2 CU may be located off-property adjacent to the FEMP boundary if soil contamination data or process history indicate the need for additional assurance that the soil is not contaminated above the off-property FRLs.

This is the minimal CU configuration for off-property areas. If the Precertification Phase I data warrant, the number of CUs will be increased. For instance, if precertification data show higher levels of contamination in areas planned for Group 2 CUs, Group 1 CUs will be established instead. In addition to providing information to help establish CU boundaries, precertification data will be used to identify any residual patterns of radiological soil contamination, and then to quantify levels of individual radiological ASCOCs. Soil that is above-FRL that could result in a CU failing certification will be excavated and removed before certification activities begin.

1.2 PURPOSE

The purposes of precertification scanning activities detailed in this PSP are to: 1) provide information to aid in establishing CU boundaries, 2) evaluate any patterns of residual surface soil contamination, and 3) determine if soil excavation is necessary for the CU to pass certification. Phase I and Phase II of precertification real-time scanning will serve these purposes, as follows:

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1) Precertification Phase I scanning will provide as close as possible to 100 percent mobile NaI scanning coverage of the off-property area to 750 feet east of the FEMP property line. The data obtained from this scan will be used to determine patterns of gamma counts and potential hot spots where total uranium, radium-226 or thorium-232 exceed 3x the FRL throughout the surface soil of A9PI. Based on this information and other relevant factors as discussed in Section 3.3.3.2 of the SEP, CU boundaries will be established in A9PI according to the criteria for establishing off-property CUs (see Section 1.1 of this PSP).

2) During Precertification Phase II, a minimum of one high purity germanium (HPGe) reading will be obtained within each identified CU to confirm the mobile NaI highest readings obtained during Precertification Phase I. This will be done by quantifying surface soil concentrations of resolvable primary COCs. The HPGe reading(s) will take place at the locations of highest gamma counts. If the HPGe results show concentrations to be below the FRLs of primary radiological ASCOCs at the point of highest gamma counts, then the assumption can be made that the points of lower gamma counts are also below the FRL based on known contamination patterns. HPGe readings will also be obtained to confirm any location(s) where potential hot spots were identified during Precertification Phase I. If confirmed, the hot-spot will be delineated and removed.

As a whole, precertification data will be used to determine if A9PI is ready for certification activities. If data indicate ASCOC concentrations are low enough to likely pass certification statistical analysis, then certification sampling will be initiated under a separate PSP. If not, an excavation plan will be developed to delineate and excavate the contaminated soil appropriately prior to the initiation of certification activities.

1.3 SCOPE

The scope of this PSP is limited to precertification scanning activities within A9PI. All precertification scanning activities will be consistent with Sections 3.3.3 and 4.5 (Approach E) of the SEP, while taking additional conservative measures to account for the concerns of the property owner. Details of the real-time scanning approach must be consistent with the User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site (hereinafter referred to at the Real-Time User's Manual). Field activities must be consistent with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ), and Data Quality Objective (DQO) SL-049, Rev. 1 (Appendix A). All scanning will be conducted using real-time gamma detectors.

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In accordance with the strategy for off-property certification documented in the Addendum to the Operable Unit 5 Work Plan for Soil Remediation, a small area north of the FEMP will also be included in A9PI certification because A1PI CU O-20 failed certification for total uranium. However this area, which will be established immediately north of O-20, will not be included in the precertification scanning activities under this PSP due to its terrain and vegetation.

1.4 KEY PERSONNEL

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

TABLE 1-1
KEY PERSONNEL

TITLE	PRIMARY	ALTERNATE
DOE Contact	Kathi Nickel	Rob Janke
Project Manager	Eric Woods	Craig Straub
Characterization Lead	Craig Straub	Joan White
Real-Time Program Lead	Joan White	Dale Seiller
Surveying Lead	Jim Schwing	Jim Capannari
Data Management Contact	Jeff Maple	Susan Marsh
Quality Assurance	Reinhard Friske	Mary Eleton
Health and Safety	Debbie Grant	Lewis Wiedeman

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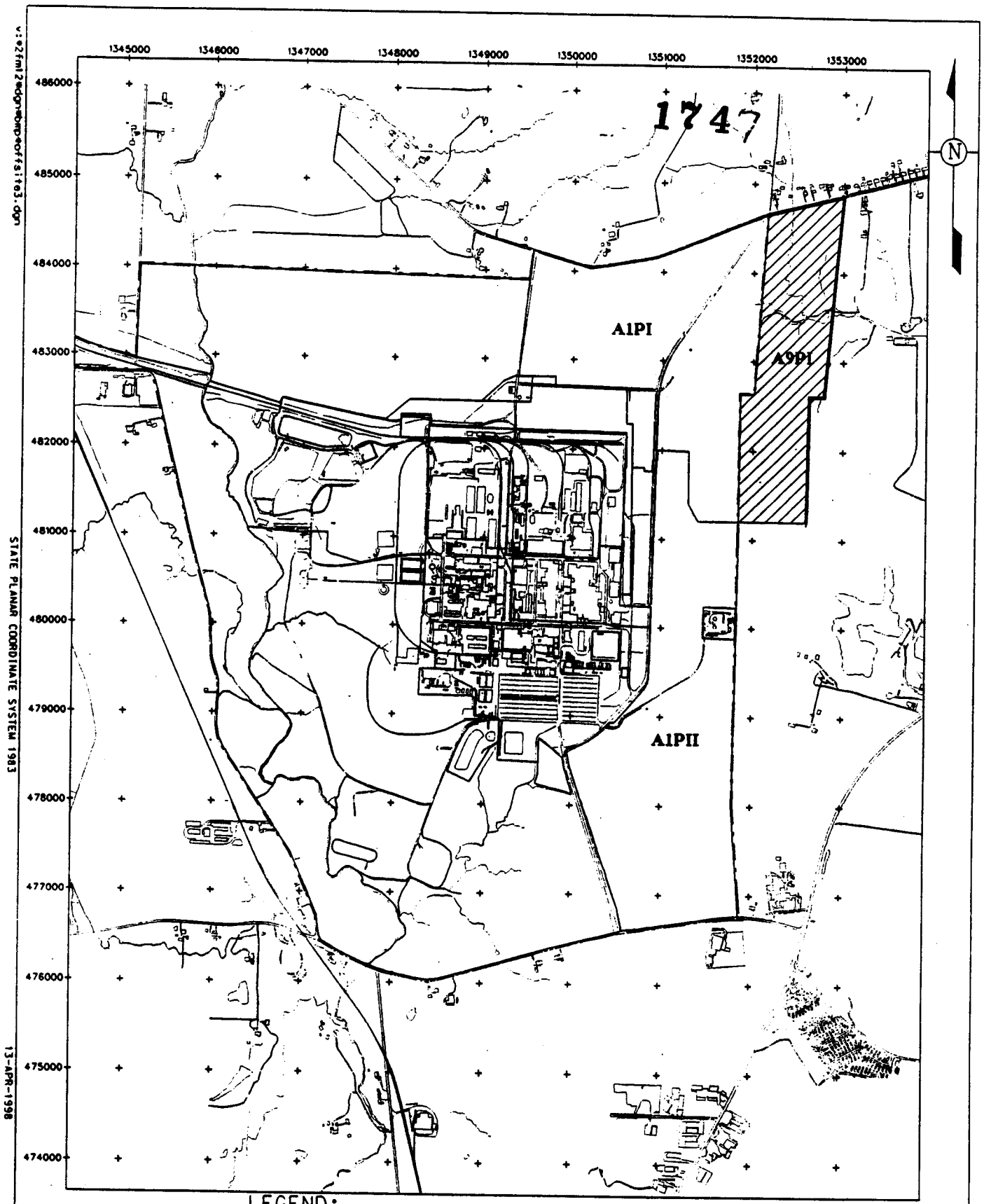

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FIGURE 1-1. AREA 9, PHASE I LOCATION MAP

2.0 PRECERTIFICATION SCANNING PROGRAM

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Before beginning precertification scanning activities on private property, the proper access agreements must be obtained from the property owner. The real-time precertification investigation of A9PI will take place in two phases. During Precertification Phase I, the Radiation Tracking System (RTRAK) and the Radiation Scanning System (RSS), if approved by OEPA and EPA, will provide as close as possible to 100 percent coverage of the area to determine patterns of gross gamma counts, as discussed in Section 2.1. RTRAK operation will be performed in accordance with procedure EQT-30, Operation of Radiation Tracking Vehicle Sodium Iodide Detection System. If the RSS is approved by OEPA and EPA, it will be operated in accordance with procedure EQT-34, Operation of the Radiological Scanning System. In areas that are physically inaccessible to both mobile NaI detectors, the HPGe will be used to scan surface soil. HPGe detector operation will be consistent with procedure EQT-23, Operation of High Purity Germanium Detectors. Information obtained through the NaI scan will be considered when establishing CU boundaries within A9PI.

Based on these Precertification Phase I results, HPGe detectors will be used during Precertification Phase II to evaluate concentrations of the primary ASCOCs. A minimum of one HPGe reading location per CU, as established by the Characterization Lead, will be based on the NaI gross counts data obtained during the NaI scan. HPGe detectors will be used to characterize areas, as defined in Section 2.1 through 2.3. Soil moisture measurements collected in to support scanning activities will be performed in accordance with procedure EQT-32, Troxler 3440 Series Surface Moisture/Density Gauge - Calibration, Operation, and Maintenance. Background radon monitoring will also take place in support HPGe measurements. System calibration activities for HPGe detectors will be performed in accordance with procedure EQT-22, High Purity Germanium Detector In-Situ Efficiency Calibration.

2.1 PRECERTIFICATION PHASE I

Gross gamma counts surveying will consist of maximum possible coverage of A9PI using real-time screening with gamma sensitive NaI detector systems. Real-time NaI detector system coverage will be limited to the surface soil and will be as extensive as possible without jeopardizing worker safety or destroying root systems of trees and shrubs. The mobile NaI detectors' acquisition time will be set to four seconds, and data will be collected at a speed of 1.0 mile per hour. Adjacent passes will be conducted with a 0.4 meter overlap, which corresponds to a separation of the centerline of the passes

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by 2 meters. RTRAK will be the primary tool used to collect surface soil gross gamma counts data, and the RSS (if approved by OEPA and EPA) will be used in areas that the RTRAK cannot access. The detector system configuration and performance of the RSS will be equivalent to the RTRAK. The onboard Global Positioning System (GPS) will be used to obtain positioning information for each detector measurement.

In areas inaccessible to both mobile NaI detectors, HPGe detectors will be used for surface soil scanning. If the HPGe is used, readings will be obtained at a detector height of 1 meter and a count time of 900 seconds (15 minutes). The 99.1 percent coverage option will be employed to scan the appropriate area. If the HPGe identifies a total uranium concentration greater than the FRL when set at the 1-meter height, another reading will be obtained at that location with a detector height of 31 cm and a count time of 15 minutes. This strategy for collecting HPGe readings during Precertification Phase I will be documented in the next revision of the Real-Time User's Manual.

As identified in Figure 2-1, some portions of A9PI are likely to be inaccessible to the RTRAK, RSS and HPGe as a result of dense vegetation and/or steep terrain. If this is the case, these areas will be omitted from this real-time investigation. The data obtained from Precertification Phase I scanning will be used to determine patterns of gross gamma counts in A9PI. In addition, a two-point moving average of consecutive mobile NaI measurements will be mapped to determine if any total uranium, radium-226 and/or thorium-232 hot spots (concentrations greater than 3x FRL) are present. The area(s) of highest gross counts all potential hot spots, as identified during Precertification Phase I, will be confirmed during Precertification Phase II.

Information obtained through the Precertification Phase I will be considered when determining CU boundaries in A9PI, along with other information discussed in Section 3.3.3.2 of the SEP. CUs delineation will also follow the criteria for establishing off-property CUs described in Section 1.1. The number of CUs may be increased based on patterns of gross gamma counts. For example, in the unanticipated event that an area of higher counts is identified at an off-property location planned for a Group 2 CU (i.e., more than 250 feet from the fence line or immediately adjacent to the fence line where no excavation took place), it will be re-designated as Group 1 CUs. The Characterization Lead is responsible for defining CU boundaries and documenting this decision in the Certification Design Letter for A9PI.

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2.2 PRECERTIFICATION PHASE II

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2.2.1 Confirming Highest RTRAK Readings/Hot Spots

Precertification Phase II Readings will be obtained to confirm the highest RTRAK gross counts readings, along with any hot spots (i.e., RTRAK/RSS two-point moving average results above 3x FRL) identified during Precertification Phase I. To confirm the highest RTRAK readings, at least one HPGe reading will be obtained in the vicinity of the highest gross gamma counts within each established CU. If the data reveal several areas of higher counts, a corresponding number of HPGe readings will be obtained within a CU. If no area of highest gross gamma counts is identified, the HPGe reading will be obtained at the center of the CU. The number of HPGe measurements and their locations will be determined by the Characterization Lead, considering the consequences of decision errors identified in DQO SL-049, Rev. 1. To confirm any hot spots, the HPGe measurement will be made at the location of the maximum result where the RTRAK two-point average was greater than 3x FRL.

Per guidelines established in Section 3.3.2 of the Real-Time User's Manual, all Precertification Phase II readings will be obtained at two different detector heights: 31 cm (1 foot) and 1 meter. The HPGe detector system acquisition time will be set to 15 minutes for both readings. All HPGe measurement locations will be surveyed and marked with the sample location as identified in Section 2.2.1. The Precertification Phase II HPGe Target Analyte List (TAL) is shown in Table 2-1. A hot spot is confirmed if a HPGe measurement at either detector height exceeds 2x FRL for any ASCOC.

2.2.2 Delineating Hot Spots

If a hot spot (a result above 2x FRL) is confirmed in A9PI, it will be delineated for excavation using the HPGe at a detector height of 15 cm. The results of the 1 m and 31 cm HPGe readings at the hot spot along with surrounding real-time results will affect how the delineation is carried out; however, the strategy must be consistent with guidelines documented in Section 3.3.3 of the Real-Time User's Manual. If necessary, details of the hot-spot delineation will be documented in a V/FCN.

2.3 HPGe MEASUREMENT IDENTIFICATION

Supplemental HPGe readings obtained during Precertification Phase I (those collected in areas inaccessible to the RTRAK) will be identified as follows: The HPGe measurement numbering format will consist of a prefix designating the area name (A9P1, note that a numerical "1" is used in place of the roman numeral "I" for data management purposes), followed by letters designating the purpose

("P1" for Precertification Phase I), followed by a number representing the surveyed acre in which the reading was obtained (1 through x), followed by the reading number within in the area (1 through x), followed by a letter designating the type of sample ("G" for Gamma). For example, A9P1-P1-2-4-G is the fourth gamma reading obtained in the second identified acre of A9PI. If a second reading at a detector height of 31 cm is necessary during Phase I (due to a total uranium result >50 mg/kg), the reading number will include the letter "A". So if the above sample required a second reading, it would be identified as A9P1-P1-2-1A-G.

HPGe readings obtained during Precertification Phase II will be identified as follows: The HPGe measurement numbering format will consist of a prefix designating the area name (A9P1, again, note that a numerical "1" is used in place of the roman numeral "I" for data management purposes), followed by letters designating the purpose ("P2" for Precertification Phase II), followed by a CU number (01 through x), followed by the location number within in the CU (1 through x), followed by a letter designating the type of sample ("G" for Gamma). For example, A9P1-P2-02-1-G is the first gamma reading obtained in the second identified CU of A9PI. If HPGe readings are obtained for hot spot delineation, the sample identification scheme will be identical, but the purpose will be identified as "HS" (for hot spot delineation) instead of "P2".

2.4 Surface Soil Moisture Gauge Measurements

Surface moisture gauge measurements will be taken to determine soil moisture content and used to correct the real-time data so the readings are representative of environmental conditions. Surface moisture measurements will be obtained at a minimum of two per acre where the mobile NaI detectors were used for the Precertification Phase I scan. When the HPGe is used during Precertification, one surface moisture measurement will be obtained per HPGe reading. All surface moisture gauge measurements will be conducted within eight hours of collecting the real-time measurements if environmental conditions are not expected to change. Technicians cannot collect these measurements simultaneously with the NaI or HPGe measurements because internal radioactive sources contained in the moisture gauge can cause interference with the HPGe or NaI measurements. If surface soil conditions are unsuitable for moisture measurements, a soil core will be collected and submitted to the on-site laboratory for moisture analysis.

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2.5 Background Radon Monitoring

A background radon monitor will be utilized during the collection of HPGe measurements to obtain background radon information from the time that data collection begins until after the final measurement is completed. The monitor will be placed in one location for the day where it will be set at the same height as the HPGe to collect continuous data and record background radon information at 15-minute intervals.

2.6 PHYSICAL SAMPLES

No physical soil samples are planned for collection under this PSP. A separate PSP (ECDC #20702-PSP-0002) was developed for the collection of precertification physical samples in A9PI to investigate the effects of plowing on distribution of COCs in soil. If physical samples are needed to verify the HPGe readings at the request of the Characterization Lead, the locations, depths, sample numbers, collection methods, analytical requirements and QC requirements will be identified on a Variance/Field Change Notice (V/FCN). If collected, physical samples will follow the data quality objectives identified in DQO SL-048.

2.7 WASTE DISPOSITION

Because no wastes are anticipated to be generated during the real-time scan, a Project Waste Identification Document (PWID) will not be prepared to support field activities under this PSP.

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TABLE 2-1
TARGET ANALYTE LIST FOR A9PI PRECERTIFICATION PHASE II HPGe SCANNING

TAL 50.03.75.02-A

HPGe Detector Scanning		
1	ASL B*	Total Uranium (FRL = 50 mg/kg)
2	ASL B*	Thorium-228 (FRL = 1.5 pCi/g)
3	ASL B*	Thorium-232 (FRL = 1.4 pCi/g)
4	ASL B*	Radium-226 (FRL = 1.5 pCi/g)
5	ASL B*	Radium-228 (FRL = 1.4 pCi/g)

* The ASL applies only to Precertification Phase II readings. All HPGe and Mobile NaI readings obtained during Precertification Phase I will be classified as ASL A.

Precertification Scanning

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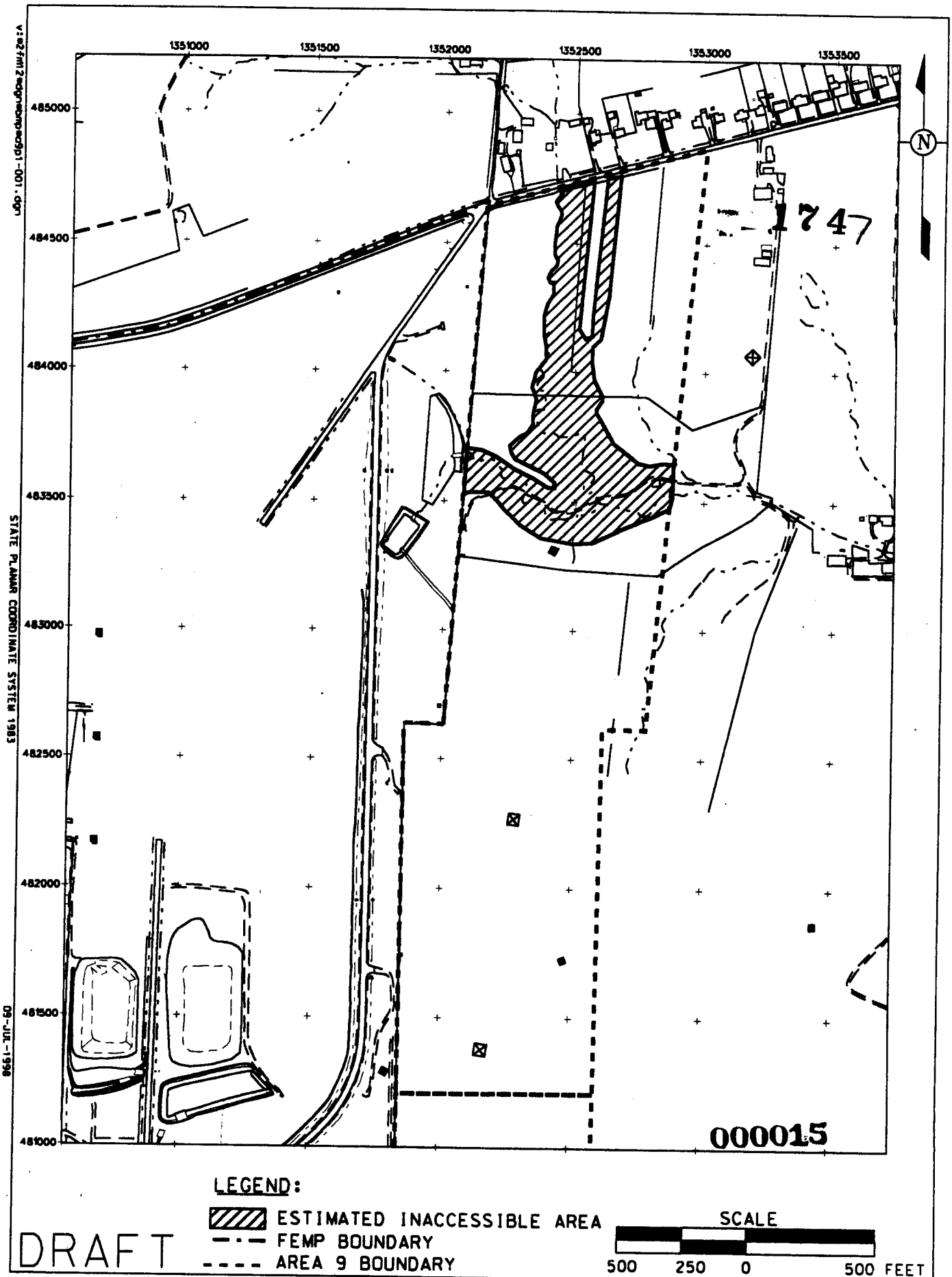

FIGURE 2-1. PORTIONS OF A9PI ESTIMATED TO BE INACCESSIBLE TO RTRAK AND HPGE SCANNING DUE TO DENSE VEGETATION/STEEP TERRAIN

3.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

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3.1 QUALITY CONTROL MEASUREMENTS

In accordance with DQO SL-049, Rev. 1 (Appendix A), all Precertification Phase I mobile NaI and HPGe measurements will be classified as ASL A. Precertification Phase II HPGe measurements will be classified as ASL B. Per the Real-Time User's Guide, duplicate readings will be taken at 1 for every 20 measurements.

3.2 PROJECT REQUIREMENTS FOR SURVEILLANCES

Project management has ultimate responsibility for the quality of the work processes and the results of the scanning activities covered by this PSP. The FEMP Quality Assurance (QA) organization may conduct independent assessments of the work process and operations to assure the quality of performance. The assessment encompasses technical and procedural requirements of this PSP and the SCQ. Independent assessment may be performed by conducting surveillances.

3.3 FIELD CHANGES TO THE PSP

If field conditions require changes or variances, written approval must be obtained from the Project Lead and QA before the changes may be implemented (electronic mail is acceptable). Changes to the PSP will be noted in the applicable Field Activity Logs and on a Variance/Field Change Notice Form (V/FCN). QA must receive the completed V/FCN, with the signatures of the Project Manager, Characterization Lead and the QA Representative, within seven working days of granting approval.

3.4 APPLICABLE PROCEDURES

Work performed under this PSP will be conducted in accordance with the following procedures:

ADM-02, Field Project Prerequisites
EQT-05, Geodimeter 4000 Surveying System - Operation, Maintenance, and Calibration
EQT-22, High Purity Germanium Detector In-Situ Efficiency Calibration
EQT-23, Operation High Purity Germanium Detectors
EQT-30, Operation of the Radiation Tracking Vehicle Sodium Iodide Detection System
EQT-32, Troxler 3440 Series Surface Moisture/Density Gauge-Calibration, Operation, and Maintenance
EQT-33, Real-time Differential Global Positioning System Operation
EQT-34, Operation of the Radiation Scanning System [RSS].

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4.0 HEALTH AND SAFETY

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Technicians will conform to precautionary surveys performed by personnel representing Industrial Hygiene and Radiological Control as applicable. All work performed on this project will be performed according to applicable EM procedures, RM-0020 (Radiological Control Requirements Manual), RM-0021 (Safety Performance Requirements Manual), FDF work permit, Radiological Work Permit (RWP), and other applicable permits. Concurrence with applicable safety permits is required by each technician in the performance of their assigned duties. A safety briefing will be conducted prior to the initiation of field activities.

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5.0 DATA MANAGEMENT

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A data management process will be implemented so information collected during the investigation will be properly managed following completion of the field activities. As specified in Section 5.1 of the SCQ, daily activities will be recorded on the Field Activity Log, with sufficient detail to be able to reconstruct a situation. At least weekly, a copy of all field logs will be sent to the Characterization Lead.

Electronically recorded data from the GPS, HPGe, and NaI systems will be downloaded to disks on a daily basis or as the project requires. Geodimeter data may be transferred to the Data Management Contact via cc-mail. Technicians or the Surveying Lead will review the data for completeness and accuracy and then download it onto the Local Area Network (LAN). Once on the LAN, the Data Management Contact within the Soils Characterization and Excavation Project will perform an evaluation, then transfer the data into useable format with the EGAS software. Once complete, the data will be sent to the loader where it will be loaded onto the Sitewide Environmental Database (SED) and an error log will be generated. The data will then be made available to users through both the Graphical Information System (GIS) and Microsoft Access Software. Technicians will archive all downloaded data for future reference.

Field documentation, such as the Field Activity Log, Gamma Spectrometry Field Worksheet, Geodimeter Survey Files and the Nuclear Field Density/Moisture Worksheet will undergo an internal QA/QC review by the technicians. Copies will then be generated and will be delivered to the Data Management Contact who will perform an evaluation of the data and create the appropriate links between the electronically-recorded data and the paper-generated data within the SED. Field logs may be completed in the field and maintained in loose-leaf form. Loose-leaf pages will be numbered, and all recordings will be in ink. The Remediation Data Management Group will provide a map of plotted gross counts along with other requested mapped data to the Characterization Lead. The final data plot will contain the final locations of HPGe readings and will identify the method of deriving the final plotted counts.

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APPENDIX A

DATA QUALITY OBJECTIVE SL-049, Rev. 1

Control Number _____

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Fernald Environmental Management Project

Data Quality Objectives

Title: Real Time Precertification Scanning

Number: SL-049

Revision: 1

Final Draft: 7/16/98

Contact Name: Eric Kroger

Approval: William D. Kelley **Date:** 7-17-98
William D. Kelley
DQO Coordinator

Approval: Joan H White **Date:** 7/19/98
Joan White
Real-Time Program Manager

Rev. #	0	1					
Effective Date:	10/15/97						

Data Quality Objectives
Real Time Precertification Scanning

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1.0 Statement of Problem

Conceptual Model of the Site

The general soil remediation process at the Fernald Environmental Management Project (FEMP) includes field sampling and scanning for several purposes. Initially, pre-design investigations define excavation boundaries. During excavation, sampling for waste disposition issues occurs. After planned excavations are complete, precertification activities are carried out to verify that residual contamination is low enough to pass certification. Finally, certification sampling is performed to verify that clean up goals (i.e., Final remediation levels, [FRLs]) have been obtained, and therefore, remediation is complete in that portion of the FEMP.

Precertification activities include real-time scanning, as discussed in this DQO. In addition, physical soil samples may also be collected during precertification per the latest revision of DQO SL-048. Precertification scanning involves a field survey of the surface soil using mobile and stationary gamma-discerning real-time equipment. Real-time precertification scanning will take place within a soil remediation area or phased area when the expected concentrations of primary radiological constituents of concern (COCs) are below the respective final remediation levels (FRLs). As identified in Section 3.3.3 of the Sitewide Excavation Plan (SEP), this scanning may take place over an excavated surface. When SEP Approach E applies, the scan will take place over an unexcavated surface since no above-FRL contamination is anticipated. Precertification scanning activities must follow the guidelines established in the SEP and the most current version of the User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site (hereinafter referred to as the Real Time Users Manual). As discussed in these documents, precertification scanning consists of two separate activities:

- Precertification Phase I includes a mobile sodium iodide (NaI) detector scan of as much of the area as is accessible. If parts of the area of interest are inaccessible to the mobile NaI detectors, then the stationary High Purity Germanium (HPGe) detector readings will be obtained in those areas. Target parameters for Precertification Phase I are gross gamma activity and 3-times the FRL (3x FRL) values of total uranium, radium-226 and/or thorium-232, as calculated by a moving two-point average of consecutive readings.

- Precertification Phase II includes stationary detector readings to verify the highest readings obtained by the mobile NaI detector. It also may include "hot spot evaluation," or stationary detector readings at locations where two-point averaging of total uranium, radium-226 and/or thorium-232 has

identified resolvable ASCOC concentrations greater than 3-times the FRL (3x FRL). Target parameters for Precertification Phase II are all resolvable radiological ASCOCs.

Available Resources

Time: Precertification of remediation areas or phased areas must be accomplished by the field team of real-time instrumentation operators (and samplers if necessary), to provide required information in time to support the soil certification effort.

Project Constraints: FEMP remediation activities are being performed in support of the Accelerated Remediation Plan, and soil remediation activities must be consistent with the SEP. Precertification scanning, and if necessary, sampling and analytical testing, must be performed with existing manpower and instrumentation, considering instrument availability, to support the remediation and certification schedule. The results of Precertification Phase I will determine Phase II HPGe sample number and location, which, if necessary, will determine physical sample number and location. Certification and regrading of the site to meet final land use commitments is dependent on successful completion of this work.

Instrumentation: Real-time monitoring includes a mobile sodium iodide (NaI) system mounted on a tractor (the RTRAK), a mobile NaI system mounted on a smaller pushable NaI unit (the RSS), and stationary germanium detectors mounted on a tripod (the HPGe). These insturments can significantly accelerate the pace of necessary characterization by detecting soil contaminated with radiological COCs in a rapid and non-intrusive manner.

2.0 Identify the Decision

Decision

Precertification real-time scanning consists of two decision levels:

Decision1: The Precertification Phase I screening will be the basis of a decision for the location(s) and number of Precertification Phase II HPGe readings to collect within the area of interest. These readings may be collected to confirm the highest RTRAK activity readings and/or to evaluate a hot-spot.

Decision 2: The Precertification Phase II reading(s) will be the basis of a decision to either:

1) excavate residual contaminated soil or conduct additional sampling and/or screening to evaluate potential residual contamination. The decision to excavate would be made if residual contamination could possibly cause

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certification failure; or,

2) make the assumption that an area is likely to pass certification, and therefore, is ready for certification to begin.

Possible Results of Decision 1

The location and number of HPGe readings to be obtained will be established based on Precertification Phase I data, and the target level specified in the PSP. Two-point averaging of the NaI readings will determine ASCOC concentrations or activities with regard to 3x FRL, and this processed data will be mapped for review. This data will also be considered when establishing CUs.

Possible Results of Decision 2

Possible results are as follows:
1) The HPGe results of all target parameters indicate that the CU is likely to pass certification for widespread contamination and the hot-spot criteria. If this is the case, the area of interest is ready for certification.
2) The HPGe results of all target parameters indicate that the CU is not likely to pass certification for widespread contamination and/or the hot-spot criteria. If this is the case, additional real-time screening data and/or physical samples will be collected to delineate the contaminated soil for remedial excavation.

3.0 Identify Inputs That Affect the Decision

Required Informational Input

Estimates of surface soil contamination and estimates of the variation in surface soil contamination in areas scheduled for certification will be obtained by reviewing and performing spatial analyses on existing analytical data. An area will not be subjected to precertification scanning if above-FRL contamination is still demonstrated to be present.

Sources of Informational Input

Precertification measurements for discernible radiological COCs will involve readings from mobile and stationary in-situ equipment. Physical samples may be necessary to verify real-time measurements.

Action Levels

FRLs established in the OU2 and OU5 Records of Decision are specific for radiological COC, and in some cases, vary between remediation areas. The FRLs were developed to account for health risks, cross media impact, background

concentrations, and applicable or relevant and appropriate requirements (ARARs) and represent not-to-be exceeded contaminant-specific average soil concentrations. Real time HPGe readings may also be taken to support excavation to ALARA requirements. Physical samples may be necessary to verify HPGe readings and determine whether applicable FRLs or other target levels are met.

The 3x FRL concentrations/activities obtained through two-point averaging of mobile NaI scan data have been developed based on the ability of the instrumentation to resolve these levels. Refer to the Real-Time User's Manual for additional details.

Methods of Data Collection

Precertification Phase I readings will be utilized for semi-quantitative coverage of the areas of concern, and additional quantitative information will be obtained during Precertification Phase II by strategic stationary HPGe readings. Analysis and data management for Precertification Phase I data will be conducted at ASL A, while Precertification Phase data will be conducted at ASL B. All readings will be performed in compliance with operating procedures, the Real-Time User's Manual, and the SEP.

The Precertification Phase I data will be utilized to establish general radiological concentration isolines and detect areas of elevated radiological activity. The Precertification Phase II HPGe gamma detectors will be used when more refined supporting quantitative resolution is required. Daily source checks of real-time detectors will be conducted as directed in the systems' operational procedure. Sample data will be reviewed at least daily by Field Supervisor of the sampling team.

Surface physical samples may be collected to verify HPGe readings in confirming action levels for FRL and WAC attainment. If needed, physical sampling will be identified in precertification PSPs to verify that HPGe readings are below FRLs or other target levels. The data quality of these samples will be consistent with the latest revision of DQO SL-048.

4.0 The Boundaries of the Situation

Spatial Boundaries

Domain of the Decision: Boundaries are limited to surface soils of areas planned for certification, and adjacent areas, as defined in the individual work plans.

Population of Soils: The soils affected are surface soils (to a nominal depth of 6 inches), which include recently excavated surfaces and undisturbed soils

associated with excavation areas as designated in the individual work plans.

Temporal Boundaries

Time Constraints on Real-Time Scanning: The scheduling of precertification scanning is closely associated with the excavation schedule. Precertification real-time scanning must be conducted after excavation, if any, and before certification activities begin. The scanning data must be returned and processed into useable format in time for the information to be useful within the current remediation schedule.

Practical Considerations: In-situ gamma spectrometry measurements cannot be made during snow coverage or standing water conditions or during precipitation. Field analytical methods should also be limited to unsaturated soils. Most areas undergoing scanning are flat, open terrain, and are readily accessible to the equipment. Some areas may require preparation, such as cutting of grass or removal of undergrowth, fencing and other obstacles. In situ measurements will require coordination with appropriate maintenance personnel for site preparation. Physical and environmental parameters will be recorded and assessed during data collection. Refer to the Real-Time User's Manual for additional details.

5.0 Develop a Logic Statement

Parameters of Interest

For Precertification Phase I, parameters of interest are gross gamma activity and 3-times the FRL values of total uranium, radium-226 and thorium-232, as calculated by a moving two-point average of consecutive readings. For Precertification Phase II, parameters of interest are all HPGe-discernable radiological ASCOCs.

Precertification Target Levels

For Precertification Phase I, target levels are the highest gross gamma activity readings, and 3x FRL for total uranium, radium-226 and thorium-232. For Precertification Phase II, target levels are the FRLs of all discernable radiological ASCOCs.

Decision Rules

Following Precertification Phase I, any areas or patterns of high gross gamma activity will be scanned with the HPGe. Also, any individual activities/ concentrations greater than 3x FRL will be scanned with the HPGe for hot spot evaluation per section 3.3 of the Real-Time User's Manual.

Following Precertification Phase II, if HPGe results that indicate a CU could fail certification the soil may be evaluated further with physical sampling or HPGe scanning. Remedial excavations followed by additional real-time scanning of the new surface could result if certification failure appears likely. Also, any identified hot-spot will be removed prior to initiating certification sampling. A CU will be considered ready for certification when these results indicate no wide-spread contamination, or localized contamination (i.e., hot-spots).

6.0 Establish Constraints on the Uncertainty of the Decision

Range of Parameter Limits

The range of soil concentrations anticipated will be from background (natural concentrations) to greater than the maximum subsurface value indicated in the RI database. It is anticipated that the concentrations will be below the FRL prior to the onset of precertification sampling.

Types of Decision Errors and Consequences

Decision Error 1: This decision error occurs when the decision maker decides an area is ready for certification when the average soil concentration in an area is still above the FRL, or soil still contains COC concentrations above two-times the FRL (the hot-spot criteria). This decision error would lead to the area failing certification and/or hot spot criteria. If an area fails certification sampling and analytical testing, remobilization and further excavation, precertification, and certification sampling would be necessary.

Decision Error 2: This decision error occurs when the decision maker decides that additional HPGe and/or physical samples are necessary based on Precertification Phase II results; or the decision maker directs the excavation (or additional excavation) of soils, when they actually have average radiological COC concentrations below the FRLs and no ASCOC hot spots (i.e., concentrations above two-times the FRL). This would result in added sampling and analytical costs and/or added costs due to the excavation of clean soils and an increased volume in the OSDF. This is not as severe as Decision Error 1. The addition of clean soil to the OSDF would result in further reduction, although minimally, to human health risk in the remediated areas.

True State of Nature for the Decision Errors

The true state of nature for Decision Error 1 is that the actual concentrations of radiological ASCOCs are greater than their FRLs and/or the hot spot criteria. The true state of nature for Decision Error 2 is that the true concentrations of COCs are below their FRLs and/or hot spot criteria. Decision Error 1 would be the more

severe error.

7.0 Optimize a Design for Obtaining Quality Data

As discussed in Section 3.3.3 of the SEP, precertification scanning consists of two separate activities. Refer to Section 1.0 of this DQO for a general overview of Precertification Phase I and Precertification Phase II.

Real-time radiological COC data will be generated by two methods: 1) the mobile sodium iodide (NaI) detection system currently mounted on the RTRAK or RSS, which will provide a semi-quantitative radiological activity in surface soil, and 2) the high purity germanium (HPGe) systems that will provide stationary readings and quantitative measurements of radiological COCs. If necessary, physical samples will also be collected for HPGe data verification and precertification decision making.

Sodium Iodide (NaI) System

The NaI detectors will be used to achieve coverage of the entire area, or as possible, taking into consideration the topographic and vegetative constraints which limit access by NaI systems. The NaI systems currently mounted on the RTRAK or RSS will be used to obtain measurements over an area specified in a PSP to detect radiological activity patterns and elevated radiological activity. The NaI detector system(s) will be used at speeds and count times specified in the PSP, and consistent with the Real-time User's Manual, and agreed to by the EPA. The mobile systems will be electronically coupled with a global positioning system (GPS) rover and base unit to record each reading location. The 0.4 meter overlap option will be used, as discussed in Section 4.3.1 of the Real-time User's Manual. Counting and positioning information will be recorded continuously on a field personal computer (PC) and stored on disk or hard drive for future downloading on the site soil database and Graphical Information System (GIS) system.

Information from the NaI/GPS system will be recorded on the PC and transferred to the Unix system through the local area network on a regular (at least daily) basis. The information will be plotted on the FEMP GIS system and isolines and elevated radiological activity identified for review. The RTRAK system will attempt to provide complete coverage of the area. With the output, isolines of "relative" contamination can be developed and locations of elevated activity/concentrations can be identified.

Data reduction is an important aspect of NaI system data use. Individual total uranium, radium-226 and thorium-232 concentrations will undergo two-point averaging. The two-point averaged values will be mapped and evaluated with respect to 3x FRL.

Precertification Phase I measurements will not be used for precertification decision making; however, they will be used to determine the location and number of Precertification Phase II HPGe measurements.

In-Situ HPGe Detectors

The HPGe detector may be used during Precertification Phase I or Precertification Phase II, as follows:

- During Precertification Phase I, the HPGe will only be used in areas where topographic or vegetative constraints prevent mobile NaI detector access. The density of an HPGe grid used to cover the area will depend on the mode and expected areal extent of contamination, as established through RI/FS data or process knowledge. The density of HPGe grids, detector height and count times will be specified in the PSP and consistent with the most current version of the Real-Time User's Manual.

- During Precertification Phase II, the HPGe detector will be used at strategic locations established thorough the Precertification Phase I screening. These locations are where the highest readings of gross gamma activity were identified and/or where individual ASCOC concentrations were identified as hot spots. The HPGe will be used to quantify radiological COC levels, which in turn provide information on if an area is likely to pass certification.

Surface moisture readings will be obtained in conjunction with the HPGe using the Troxler nuclear moisture and density gauge, as specified in the PSP. If conditions do not permit the use of the Troxler, soil samples will be collected and submitted to the on-site laboratory for percent moisture analysis. The soil moisture data will be used as is discussed in Section 4.11 of the Real-Time User's Manual. The data will be computer corrected for the moisture data via Lab View software. Background radon monitoring will also occur in conjunction with the HPGe, as specified in the PSP. Refer to the Section 5.3 of the Real-Time User's Manual for a discussion of how soil moisture and background data are used.

Physical Soil Sampling

Physical samples may be collected and analyzed for target radiological COCs to verify the HPGe measurements and/or to delineate above-FRL contaminated soil. If this is the case, physical sampling will be consistent with Data Quality Objectives SL-048. Criteria for obtaining physical samples, such as sample density, will be specified in the Precertification PSP, if necessary. As specified in DQO SL-048, the minimum data quality acceptable for this purpose will be ASL B. Field QC, ASL and Validation requirements will be consistent with the SCQ and the more

stringent Soil Characterization and Excavation Project requirements.

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Data Quality Objectives
Real Time Precertification Scanning

1A. Task/Description: Precertification real-time scanning.

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

RI ☐ FS ☐ RD ☐ RA ☒ R_vA ☐ OTHER ☐

1.C. DQO No.: SL-049, Rev. 1 DQO Reference No.: SL-048

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

Air ☐ Biological ☐ Groundwater ☐ Sediment ☒ Soil ☒

Waste ☐ Wastewater ☐ Surface water ☐ Other (specify) _____

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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
A ☒ B ☒ C ☐ D ☐ E ☐

Risk Assessment
A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives
A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design
A ☐ B ☐ C ☐ D ☐ E ☐

Monitoring during remediation activities
A ☒ B ☒ C ☐ D ☐ E ☐

Other: Precertfication
A ☒ B ☒ C ☐ D ☐ E ☐

4.A. Drivers: Applicable or Relevant and Appropriate Requiremnts (ARARs), Operable Unit 5 Record of Decision (ROD), the Real-Time User's Manual, the Sitewide Excavation Plan and the Pre-certification Project-Specific Plan (PSP).

4.B. Objective: To determine if the area of interest is likely to pass certification for all HPGe discernable radiological COCs

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5. Site Information (Description): The OU2 and OU5 RODs have identified areas at the

FEMP that require remediation activities. The RODs specify that the soils in these areas will be clean and demonstrated to be below the FRLs. Pre-certification will be necessary for areas of the site with soils that are scheduled for certification.

6.A. 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	☒*	3. BTX	☐
	Temperature	☐		Full Rad.	☒*	TPH	☐
	Spec.Conductance	☐		Metals	☐	Oil/Grease	☐
	Dissolved Oxygen	☐		Cyanide	☐		
	Technitium-99	☐		Silica	☐		
4.	Cations	☐	5.	VOA	☐	6. Other (specify)	
	Anions	☐		ABN	☐	Percent Moisture	
	TOC	☐		Pesticides	☐		
	TCLP	☐		PCB	☐		
	CEC	☐					
	COD	☐					

* If specified in the PSP

6.B. Equipment Selection and SCQ Reference:

Equipment Selection		Refer to SCQ Section	
ASL A	Mobile NaI, HPGe (Precert. Phase I)	SCQ Section:	Not Applicable
ASL B	HPGe (Precertification Phase II)	SCQ Section:	App. G , Table 1
ASL C	_____	SCQ Section:	_____
ASL D	_____	SCQ Section:	_____
ASL E	_____	SCQ Section:	_____

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

Biased [X] Composite [ ] Environmental [ ] Grab [X] Grid [X]

Intrusive [ ] Non-Intrusive [X] Phased [ ] Source [ ]

7.B. Sample Work Plan Reference: The DQO is being established prior to completion of the Project-Specific Plans.
Background samples: OU5 RI/FS

7.C. Sample Collection Reference:
-EQT-22, *Characterization of Gamma Sensitive Detectors*
-EQT-23, *Operation of High Purity Germanium Detectors*
-EQT-30, *Operation of the Radiation Tracking Vehicle Sodium Iodide Detection System*
-User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site

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8. Quality Control Samples: (Place an "X" in the appropriate selection box.)

8.A. Field Quality Control Samples:

Trip Blanks	[ ]	Container Blanks	[ ]
Field Blanks	[ ]	Duplicate Samples	[X]*
Equipment Rinsate Samples	[ ]	Split Samples	[ ]
Preservative Blanks	[ ]	Performance Evaluation Samples	[ ]

Other (specify) _____
* If specified in the PSP.

8.B. Laboratory Quality Control Samples:

Method Blank	[ ]	Matrix Duplicate/Replicate	[ ]
Matrix Spike	[ ]	Surrogate Spikes	[ ]

Other (specify) _____

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