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PROJECT SPECIFIC PLAN FOR AREA 7, PHASE I PRECERTIFICATION PHYSICAL SAMPLING AND REAL-TIME SCAN

SOIL AND DISPOSAL FACILITY PROJECT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

OCTOBER 3, 2002

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20500-PSP-0003
REVISION 0

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PROJECT SPECIFIC PLAN FOR AREA 7, PHASE I PRECERTIFICATION PHYSICAL SAMPLING AND REAL-TIME SCAN

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Revision 0

October 3, 2002

APPROVAL:

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

A7PI	Area 7, Phase I
ASCOC	area-specific constituent of concern
ASL	analytical support level
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DOE	U.S. Department of Energy
DQO	Data Quality Objectives
EMS	Environmental Monitoring System
FACTS	Fernald Analytical Computerized Tracking System
FAL	Field Activity Log
FEMP	Fernald Environmental Management Project
FRL	final remediation level
GFAA	graphite-furnace atomic absorption spectrometry
GIS	Geographic Information System
GPS	global positioning system
HPGe	high-purity germanium detector
ICP/AES	inductively coupled plasma/atomic emission spectroscopy
ICP/MS	inductively coupled plasma/mass spectrometry
LAN	Local Area Network
mg/kg	milligrams per kilogram
NaI	sodium iodide
pCi/g	picoCuries per gram
PSP	Project Specific Plan
QA/QC	Quality Assurance/Quality Control
RSS	Radiation Scanning System
RTIMP	Real-Time Instrumentation Measurement Program
RTRAK	Radiation Tracking System
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SDFP	Soil and Disposal Facility Project
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
TAL	Target Analyte List
V/FCN	Variance/Field Change Notice
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization

1.0 INTRODUCTION

1.1 BACKGROUND

As described in the Sitewide Excavation Plan (SEP), the Fernald Environmental Management Project (FEMP) has been divided into ten areas for remediation of soil and at- and below-grade structures and debris as required under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Area 7 includes the portion of the FEMP property in the vicinity of the K-65 Silos (Figure 1-1). This plan addresses Area 7, Phase I (A7PI).

1.2 PURPOSE

The objectives of precertification activities detailed in this project specific plan (PSP) are to: 1) evaluate any patterns of residual surface soil contamination in A7PI, and 2) ensure that all accessible impacted material has been removed prior to construction activities related to the Silos Treatment Facility, it's associated warehouse, and rail spurs. The real-time scanning results, coupled with the results of any physical samples, will provide a level of confidence that the excavation has captured all of the impacted material that is available. If data collected under this plan indicate radiological and arsenic concentrations are low enough to likely pass certification statistical analysis, then remedial activities will be discontinued. Otherwise, soil impacted above the final remediation level (FRL) will be removed. This analytical activity is an interim step in the remediation of Area 7.

This effort is in part to prepare a remediated footprint for construction of the Silos Project Remediation Facility and support structures at the FEMP. This activity will follow general excavation and grading as well as removal of at- and below-grade structures and utilities following decontamination and dismantlement of the area.

1.3 SCOPE

The scope of this PSP covers A7PI precertification surface scanning and physical sampling activities, including confirmation measurements and, if necessary, hot spot delineation. All precertification activities will be consistent with Sections 3.3.3 and 4.5 (Approach E) of the SEP.

Physical sampling activities will be conducted in accordance with procedure SMPL-01, Solids Sampling. All samples are to be transported from the field to the on-site laboratory, where they will be analyzed or shipped to an off-site laboratory, as appropriate.

Details of the real-time scanning approach are consistent with the User Guidelines, Measurement Strategies, and Operational Factors for Deployment of *In-Situ* Gamma Spectrometry at the Fernald Site (User's Manual) and Real-Time Instrumentation Measurement Program (RTIMP) protocols. Field activities must be consistent with the Sitewide CERCLA Quality Assurance Project Plan (SCQ) and Data Quality Objectives (DQO) SL-054, Revision 0 (Appendix A). All scanning will be conducted using real-time, gamma-sensitive detectors that have been approved by the Ohio Environmental Protection Agency and U.S. Environmental Protection Agency.

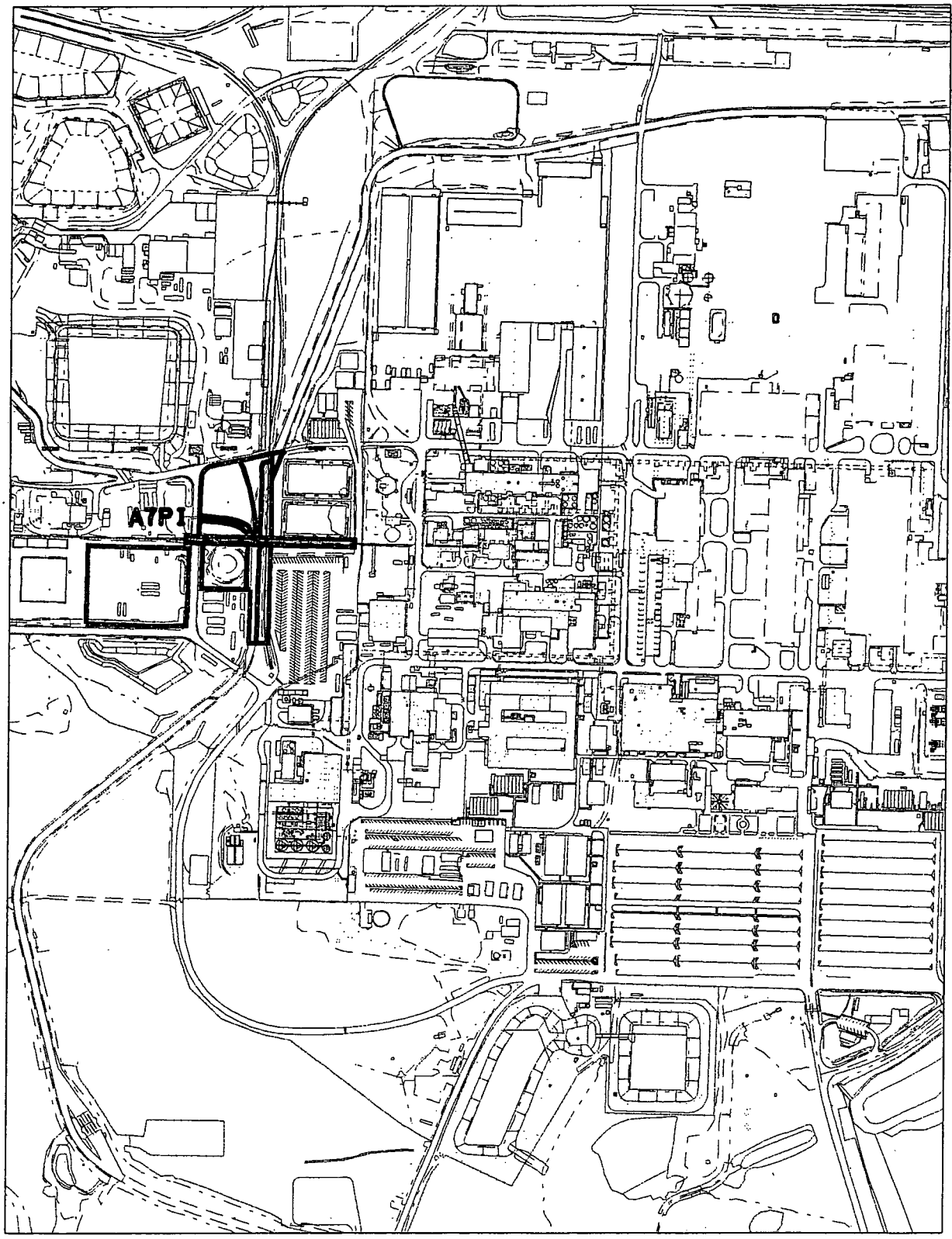
1.4 KEY PERSONNEL

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

TABLE 1-1
KEY PERSONNEL

Title	Primary	Alternate
DOE Contact	Robert Janke	Kathi Nickel
SDFP Management	Jyh-Dong Chiou	Tom Beasley
Characterization Manager	Frank Miller	Eric Kroger
Field Sampling Lead	Tom Buhrlage	Jim Hey
RTIMP Manager	Rich Abitz	Dale Seiller
RTIMP Field Lead	Brian McDaniel	Jerry Smith
Surveying Manager	Jim Schwing	Andy Clinton
WAO Contact	Linda Barlow	June Love
Laboratory Contact	Heather Medley	Justin Burke
Data Management Contact	Eric Kroger	Frank Miller
Data Validation Contact	James Chambers	Andy Sandfoss
Field Data Validation Contact	Dee Dee Early	Andy Sandfoss
FACTS/SED Database Contact	Cara Sue Schaefer	Susan Marsh
QA/QC Contact	Reinhard Friske	Mike Godber
Health and Safety Contact	Gregg Johnson	Jeff Middaugh/ Pete Bolig

FACTS – Fernald Analytical Computerized Tracking System
QA/QC – Quality Assurance/Quality Control
SDFP – Soil and Disposal Facility Project
SED – Sitewide Environmental Database
WAO – Waste Acceptance Organization



LEGEND:

A7PI EXCAVATION BOUNDARIES

SCALE

500 250 0 500 FEET

FIGURE 1-1. A7PI LOCATION MAP

2.0 PRECERTIFICATION PROGRAM

Precertification involves obtaining surface radiological scanning measurements as well as surface (0 to 6 inches) physical samples. These data will determine whether the soil in A7PI meets approved certification criteria for the indicator area-specific constituents of concern (ASCOCs). The final list of A7PI ASCOCs for certification will be defined in the Certification Design Letter.

2.1 REAL-TIME SCANNING

The real-time precertification scanning of A7PI will take place in two phases. During Precertification Phase 1, the Radiation Tracking System (RTRAK), Radiation Scanning System (RSS), Environmental Monitoring System (EMS) and the Gator will be used as appropriate. These instruments will provide as close as possible to 100 percent coverage of the area to determine total gamma activity patterns. Operation of real-time equipment will be consistent with the User's Manual, RTIMP protocols and the RTIMP field manual. In areas that are physically inaccessible to the mobile sodium iodide (NaI) detectors, the high-purity germanium detector (HPGe) will be used to scan surface soil.

During Precertification Phase 2, HPGe detectors will be used to evaluate areas of highest gamma activity identified during Phase 1. In addition, the HPGe will be used to confirm any hot spots, as defined in the User's Manual and discussed further in Section 2.1.2 of this PSP. If a hot spot is confirmed, delineation will take place as another phase of precertification under this PSP. The real-time equipment and corresponding equipment configurations used during each phase of precertification are summarized in Table 2-1. Soil moisture measurements and background radon monitoring will also be collected to support mobile NaI and HPGe measurements, as discussed in Sections 2.1.4 and 2.1.5 respectively. Radon monitoring will be conducted only if radium-226 hot spots are identified and delineated.

2.1.1 Precertification Phase 1

Precertification Phase 1 scanning will consist of maximum possible coverage of A7PI using real-time, gamma-sensitive NaI detector systems to evaluate residual soil contamination patterns. One or more batch files will be acquired for each subarea.

Real-time NaI detector system coverage will be limited to the surface soil and will be as extensive as possible without jeopardizing worker safety. The mobile NaI detectors' acquisition time will be set to

four seconds with a detector height of 31 cm and a nominal speed of 1.0 mile per hour. Adjacent passes will be conducted to approximate a 0.4-meter overlap, which corresponds to a separation of the centerlines of the passes by 2 meters. The RSS and EMS will be the primary NaI platforms used to collect total gamma activity data for surface soil. The onboard Global Positioning System (GPS) will be used to obtain positioning information for each detector measurement.

If areas are inaccessible to mobile NaI detectors, the HPGe detectors will be used for surface scanning, and readings will be obtained at a detector height of 1 meter and a count time of 300 seconds (5 minutes) using a triangular grid with 11-M nodes (approximately 95 percent coverage). If the HPGe identifies a total uranium concentration greater than two times the FRL (2x FRL) when set at the 1-meter height, Phase 2 measurements will be obtained at that location with a detector height of 31 cm to confirm and delineate the hot spot, as necessary.

The data obtained from the Precertification Phase 1 scan will be used to determine contamination patterns. Total gamma activity and a two-point moving average of consecutive NaI measurements will be mapped to determine if total uranium, radium-226 and/or thorium-232 hot spots (concentrations greater than 3x FRL) are present. HPGe results will be plotted to determine if total uranium, radium-226 and/or thorium-232 hot spots (2x FRL) are present.

2.1.2 Precertification Phase 2

All Precertification Phase 2 confirmation readings will be obtained using the HPGe detectors. These readings will be obtained at a minimum of one location per NaI batch file to evaluate the areas of highest activity identified during Phase 1. In addition, Phase 2 readings will be obtained to confirm any NaI potential hot spots (i.e., two-point moving average results above 3x FRL) and HPGe hot spots (above 2x FRL) identified during Phase 1. The Characterization Manager is responsible for evaluating the mapped NaI data and determining the number and location of Phase 2 HPGe measurements while considering the consequences of decision errors identified in DQO SL-054.

Precertification Phase 2 readings will be obtained as specified in the RTIMP Protocols (31-cm detector height; 5-minute acquisition time). All HPGe measurement locations will be surveyed and marked with the measurement location, as identified according to Section 2.1.3. One duplicate HPGe reading will also be collected per 20 Phase 2 [i.e., Analytical Support Level (ASL) B] measurements at locations

selected by the RTIMP Field Manager. The Precertification Phase 2 HPGe Target Analyte List (TAL) is shown in Table 2-2. A hot spot is confirmed if a HPGe measurement at either detector height exceeds 2x FRL for total uranium, thorium-232 or radium-226.

If a hot spot is confirmed (i.e., a Phase 2 HPGe result above 2x FRL at either detector height), it will be delineated and removed. Project Management will determine the delineation approach after considering all surrounding real-time results; however, the strategy must be consistent with RTIMP protocols. Details of the hot spot delineation, if necessary, will be documented in a Variance/Field Change Notice (V/FCN).

After the hot spot is removed, Precertification Phase 2 measurements will be obtained to verify all delineated contamination has been removed. NaI and HPGe detectors will be used in accordance with RTIMP protocols.

2.1.3 Real-Time Measurement Identification

All NaI detector data files will be assigned a unique identifier, which will include the area/phase where collected in the numbers in the file names. Supplemental HPGe readings obtained during Precertification Phase 1 (those collected in areas inaccessible to the mobile NaI detectors) will be identified as *A7P1-P1-x-QC-G*, where:

A7P1 = the remediation area in which the reading was collected. For data management purposes a numerical "1" is used in place of the Roman numeral I
P1 = Phase 1 of Precertification
x = reading number; if a second reading (detector height = 31 cm) is necessary at that same location, the reading number will include the letter "A"
QC = "D" for Duplicate reading, if applicable. No dash will separate the reading # and the "D"
G = Gamma reading

For example, A7P1-P1-1-G is the first HPGe reading obtained in A7PI. Note that the surveyed acres will be documented in a V/FCN to aid real-time technicians in the field.

Precertification Phase 2 will be identified as *A7P1-P2-reading#-QC-G*, where:

A7P1	=	the remediation area in which the reading was collected (again, a numerical "1" is used in place of the Roman numeral I for data management purposes).
P2	=	Phase 2 of Precertification
reading #	=	reading number (collected at a height of 31 cm)
QC	=	"D" for Duplicate reading, if applicable. No dash will separate the reading # and the "D"
G	=	Gamma reading

For example, A7P1-P2-1-G is the first HPGe reading obtained during Precertification Phase 2 in A7PI, collected at a detector height of 31 cm. A7P1-P2-1D-G would be the duplicate reading collected at the same location.

If HPGe readings are necessary for hot spot delineation, the sample identification scheme will be the same as that for Precertification Phase 2; however, the purpose will be identified as "HS" (for hot spot delineation) instead of "P2". Also, the detector height identifier will be dropped, since all readings would be collected at a height of 31 cm. For example, the fourth hot spot delineation reading in A7PI would be identified as A7P1-HS-4-G.

Radon measurements will be identified as *A7P1-RADON-reading#*, where:

A7P1	=	the remediation area in which the reading was collected (again, a numerical "1" is used in place of the Roman numeral "I" for data management purposes)
RADON	=	Radon measurement
reading #	=	sequential reading number

2.1.4 Surface Soil Moisture Gauge Measurements

The Zeltex® Infrared Moisture Meter will be used to obtain soil moisture content measurements. Instrument operation is explained in the equipment manuals. These measurements will be used to correct the real-time data so the readings are representative of environmental conditions. At least two surface moisture measurements per acre will be obtained where the mobile NaI detectors were used for the Precertification Phase 1 scan. When the HPGe is used during precertification, a surface moisture measurement will be obtained for each HPGe reading. All surface moisture gauge measurements will be collected within eight hours of collecting the real-time measurements if environmental conditions are not expected to change.

2.1.5 Background Radon Monitoring

A background radon monitor will be used during the collection of HPGe measurements if radium-226 hot spots are being evaluated. The monitor will be placed in one location for the day where it will be set at the same height as the HPGe detector being used to collect the soil radiation measurements. The background radon data will be used to correct the radium-226 data per the User's Manual.

2.2 PHYSICAL SAMPLES

Precertification physical sample locations are shown on Figure 2-1. Boring depths and the number of required samples are determined by the current data set. Extensive sampling has already been conducted in A7PI under the PSP for Waste Acceptance Criteria (WAC) Attainment Sampling of Area 7 Soils and related V/FCNs. Additional sampling is being conducted following excavation of the following A7PI components:

- K-65 Trench
- Remediation Facility Footprint
- High Nitrate Tank (18M) Footprint
- Warehouse Footprint
- Railroad Embankment
- Impacted Material Haul Road.

Prior to excavation, sample results indicated above-FRL concentrations of arsenic and radium-226 in the Remediation Facility footprint, arsenic in the Warehouse footprint, the immediate vicinity of the Impacted Material Haul Road and railroad embankment, and arsenic, beryllium and radium in the soil north and south of the K-65 trench. Real-time scanning will detect any post-excavation radium-226 concentrations in the surface soil; therefore, physical sampling for this constituent will not be necessary. Since the beryllium has been bounded through physical sampling, and the portion of the K-65 trench where above-FRL concentrations were found has been excavated, further sampling for beryllium will not be necessary. Physical sampling will be conducted to confirm that the unbound concentrations of arsenic are below FRL (see Table 2-3).

It should be noted that not all of the unbound, above-FRL locations have been excavated at the time this PSP is being issued. Therefore, additional precertification sampling will be conducted at a later date when excavation is complete in these areas. These additional sample locations are shown on Figure 2-2. The original sample IDs used for the Area 7 WAC Attainment PSP are shown on Figure 2-2; the new

sample IDs will be documented in a V/FCN after these locations have been excavated and sampling can be conducted.

The only above-WAC material found in A7PI was technetium-99; high concentrations were detected in the K-65 trench. The trench was excavated from approximately 20 feet west of the East Silos Access Road to the east, and west of the Former Production Area near the southeast corner of the Lime Sludge Ponds. The residue, concrete and approximately 2 feet of soil alongside and underlying the concrete were excavated. A portion of the trench could not be excavated due to proximity to the Silos Project infrastructure. In order to prevent potential recontamination of the excavated area, two grout plugs were installed within the remaining portion of the trench. The excavated portion of the trench was re-sampled to ensure no residual concentrations of technetium-99 remained; results indicated that all above-FRL concentrations of technetium-99 have been removed. Therefore, additional sampling under this PSP will not be necessary.

All physical sampling will be conducted in accordance with SMPL-01. The boring IDs and coordinates are provided in Table 2-3, and the TAL is provided in Table 2-4. Sampling and analytical requirements are provided in Table 2-5.

2.2.1 Sample Collection Methods

For all locations except in the sample points in the immediate vicinity of the K-65 trench, samples will be collected as specified in SMPL-01. At each sampling location, any surface vegetation within a 6-inch radius will be removed using a stainless steel trowel or by hand using clean nitrile gloves while taking care to minimize soil removal. All soil samples will be collected from a discrete 6-inch depth interval and recorded as such on the field documentation.

For sample points in the immediate vicinity of the K-65 trench, which are inaccessible to physical samplers, samples will be collected from the bucket of a trackhoe; i.e., the excavator will scoop new material into the bucket and then lower the bucket onto the ground for the sampling team to collect the required amount of material. Any material remaining in the bucket after sampling will be placed back in the trench at the same point from which it was originally excavated.

2.2.1.1 Manual Sampling Methods

Since only shallow sampling is required, soil samples will be collected using a hand auger (typically 3 inches in diameter), manual core sampler or direct-push liner in accordance with SMPL-01. The hand auger or core sampler will be advanced through the target depth intervals for the soil samples specified in Table 2-3. For surface samples, a direct-push liner (6-inch length) may be used to collect the sample from the 0 to 6-inch interval. All holes deeper than 6 inches will be backfilled with bentonite grout pellets and hydrated.

2.2.2 Sample Identification

All physical soil samples collected for laboratory analysis will be assigned a unique sample identifier (customer number), as listed in Table 2-3. The laboratory will use FACTS identification numbers to track the sample through the analytical and data review process. All FEMP soil samples collected for laboratory analysis will be assigned a unique sample ID as follows:

A7-PCx-1-M

Where:

A7 = Area 7
PC = precertification sample
x = boring number
1 = twice the depth of the sample interval collected; in this instance, the 0 to 6-inch interval.
M = metal analytes

Alpha/beta screens will not be required for this sampling activity since a sufficient amount of data exists to serve this purpose.

2.2.3 Equipment Decontamination

Sampling equipment will be decontaminated before transport to the field. All equipment that comes into contact with sample media, such as the core sampler cutting shoe, hand auger buckets, collection tools, etc., must also be decontaminated. Level II decontamination will be done per SMPL-01. The core barrel portion of the core sampler will be wiped down between sample intervals and locations to remove visible soil or material. Decontamination of the core barrel will not be necessary because the core barrel will not come into contact with the sample when using a liner insert.

2.2.4 Sample Handling and Shipping

Samples will be processed in accordance with SMPL-01. This will ensure that samples are properly documented and that chains of custody and sample integrity are maintained. All samples will be transported from the field to the sample processing laboratory for analysis on site or transport off site.

TABLE 2-1
REAL-TIME EQUIPMENT AND DETECTOR CONFIGURATIONS USED DURING EACH PHASE OF PRECERTIFICATION

Precertification Phase	Equipment Used	ASL	Detector Configuration
Phase 1 – Scanning	RTRAK/RSS Gator	A	Speed = 1 mph Acquisition Time = 4 seconds
	HPGe[a]	A	Height = 100 cm, Acquisition Time = 5 minutes
Phase 2 – Hot Spot Confirmation and Delineation	HPGe	B	Height = 31 cm Acquisition Time = 5 minutes

[a] The HPGe will only be used during Phase 1 if areas are inaccessible to the mobile NaI detectors.

TABLE 2-2
TARGET ANALYTE LIST FOR PRECERTIFICATION HPGe SCANNING OF A7PI

TAL A7P1-PRECERT-A

HPGe Detector		
1	ASL B*	Total Uranium (FRL = 82 mg/kg)
2	ASL B*	Thorium-228 (FRL = 1.7 pCi/g)**
3	ASL B*	Thorium-232 (FRL = 1.5 pCi/g)
4	ASL B*	Radium-226 (FRL = 1.7 pCi/g)
5	ASL B*	Radium-228 (FRL = 1.8 pCi/g)**

mg/kg – milligrams per kilogram
pCi/g – picoCuries per gram

* The ASL applies only to Precertification Phase 2 and hot spot delineation readings. All HPGe and Mobile NaI readings obtained during Precertification Phase 1 will be classified as ASL A.

** Not measured directly; assumed to be in secular equilibrium with thorium-232.

TABLE 2-3
PHYSICAL SAMPLING LOCATIONS

Precertification Boring ID	Original Boring ID	Northing	Easting	TAL
A7-PC1-1-M	A7-E3	480486.2	1347920.2	A
A7-PC2-1-M	A7-E6	480575.3	1347880.8	A
A7-PC3-1-M	A7-F9	480300	1347600.1	A
A7-PC4-1-M	A7-F13	480389.99	1347500.1	A
A7-PC5-1-M	A7-F14	480400	1347600.1	A
A7-PC6-1-M	A7-HR9	480744.31	1348072.41	A
A7-PC7-1-M	A7-HR23	480175.147	1348025.364	A
A7-PC8-1-M	A7-K11	480476.01	1347959.95	A
A7-PC9-1-M	A7-K17	480446.55	1348193.96	A

TABLE 2-4
TARGET ANALYTE LIST FOR
PRECERTIFICATION PHYSICAL SAMPLING OF A7PI

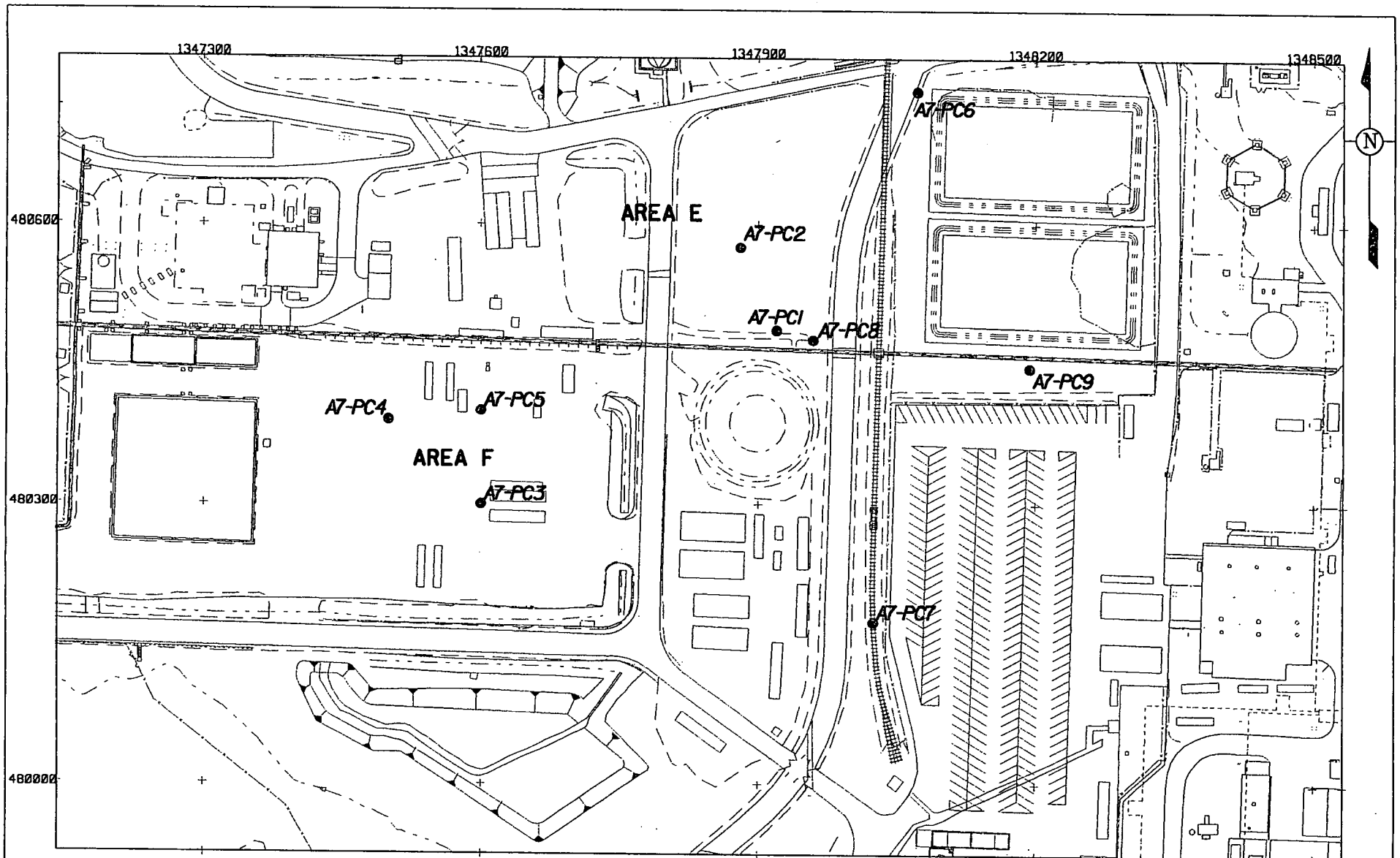
TAL-20500-PSP-0003-A
ASL B

Analyte	FRL	Minimum Detectable Concentration
Arsenic	12.0 mg/kg	1.2 mg/kg

TABLE 2-5
SAMPLING AND ANALYTICAL REQUIREMENTS FOR THE OFF-SITE LABORATORY

Analyte	Method	Sample Matrix	ASL	Preserve	Holding Time	Sample Mass	TAL
Arsenic	ICP/AES, ICP/MS, or GFAA	Solid	B	Cool, 4° C	6 months	150 grams	A

ICP/AES – inductively coupled plasma/atomic emission spectroscopy
ICP/MS – inductively coupled plasma/mass spectrometry
GFAA – graphite-furnace atomic absorption spectrometry



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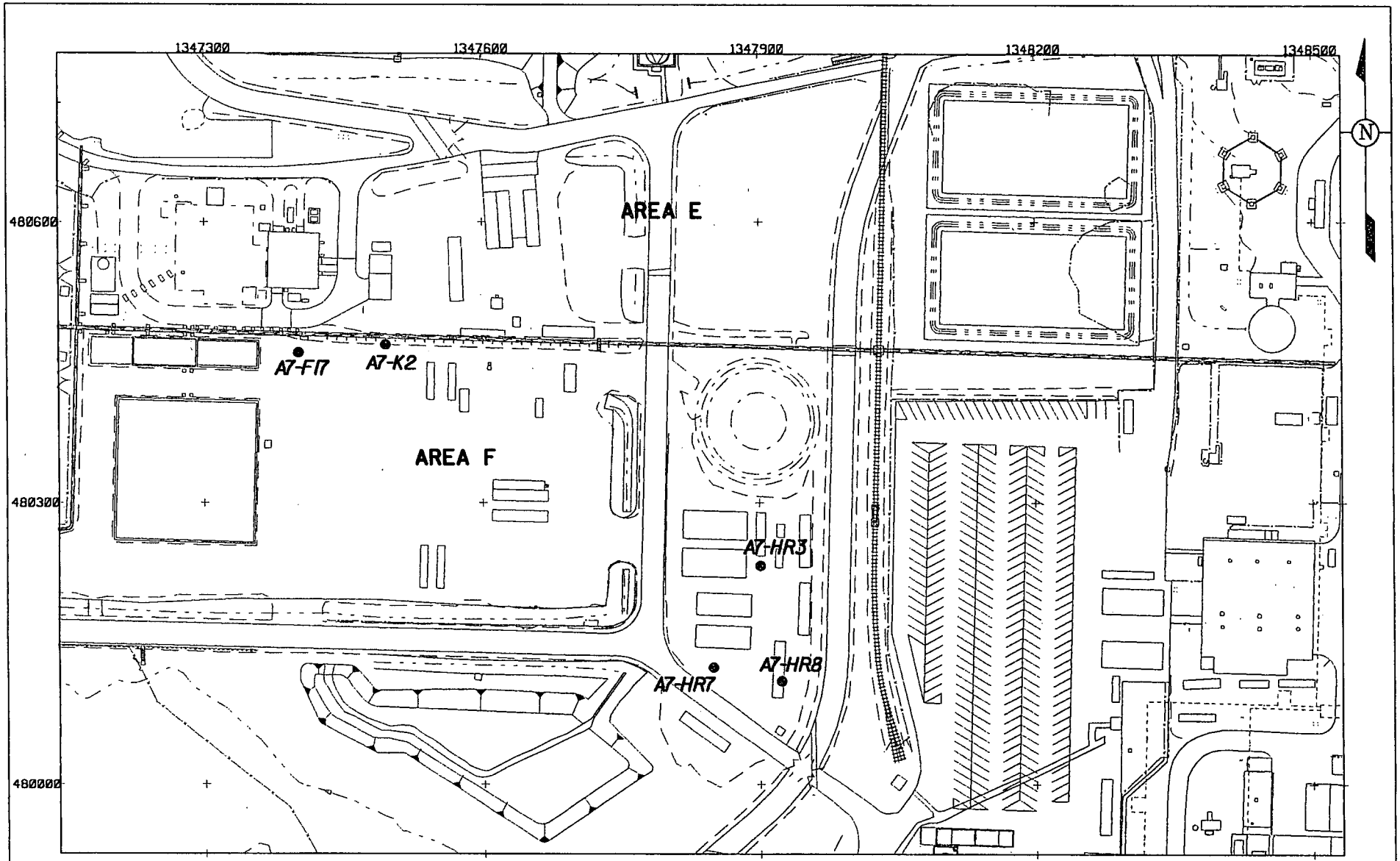
STATE PLANAR COORDINATE SYSTEM 1983

24-JUL-2002

FIGURE 2-1. A7P1 SAMPLE LOCATIONS



v:\2fm12\dgn\area7_p1_002.dgn
STATE PLANAR COORDINATE SYSTEM 1983

24-JUL-2002

FIGURE 2-2. A7P1 FUTURE SAMPLE LOCATIONS

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3.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

3.1 QUALITY CONTROL MEASUREMENTS

In accordance with DQO SL-054, Revision 0 (Appendix A), all Precertification Phase 1 real-time measurements will be classified as ASL A. Precertification Phase 2 and Phase 3 HPGe measurements will be classified as ASL B, per the User's Manual. Duplicate readings will be taken at a frequency of one for every 20 ASL B measurements.

For physical samples, one field duplicate sample will be collected for every 20 samples. The field duplicate will be collected using a co-located sample point within 6 inches of the corresponding field sample location. No rinsates are required for field sampling equipment; however, all equipment shall be decontaminated by Level II methods per SMPL-01.

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 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/QC before the changes may be implemented (electronic mail is acceptable). Changes to the PSP will be noted in the applicable Field Activity Logs (FALs) and on a V/FCN. QA/QC must receive the completed V/FCN, with the signatures of the Project Manager, Characterization Lead and the QA/QC Representative, within seven working days of granting approval. Any field changes that may impact the safety of the field team will also be approved by Health and Safety.

3.4 APPLICABLE DOCUMENTS, MANUALS AND PROCEDURES

- RTIMP-001, Administrative Manual
- RTIMP-002, Field Manual
- RM-0020, Radiological Control Requirements Manual

- RM-0021, Safety Performance Requirements Manual
- SH-1006, Event Investigation and Reporting
- SMPL-01, Solids Sampling
- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- Sitewide Excavation Plan (SEP)
- PSP for WAC Attainment Sampling of Area 7 Soils
- User Guidelines, Measurement Strategies, and Operational Factors for Deployment of *In-Situ* Gamma Spectrometry at the Fernald Site (User's Manual)

4.0 HEALTH AND SAFETY

Technicians will schedule a project walkdown with Health and Safety (Radiological Control, Industrial Hygiene, and Safety) and any other groups that may be working in the same or an adjacent area before the start of the project. Weekly walkdowns will be conducted throughout the course of the project in accordance with SPR 1-10, Safety Walk-Throughs. All work on this project will be performed according to applicable Environmental Monitoring procedures, the documents identified in Section 3.4, Fluor Fernald work permit, Radiological Work Permit, and other applicable permits as determined by project management. Concurrence with applicable safety permits is required by each technician in the performance of their assigned duties. A job/safety briefing will be conducted before field activities begin each day; the project lead or designee will document the briefing on form FS-F-2955. Personnel will also be briefed on any health and safety documents (such as Travelers) that may apply to the project work scope.

Technicians will provide two-way radios for all remote locations. The field sampling lead or designee will have direct radio communication with Fluor Fernald Communication. This communication will be provided by FEMP site radios. This will ensure timely notification of site emergencies and severe weather.

- To report emergencies by site phone, dial 6511.
- To report by cellular phone, dial 648-6511 and ask for CONTROL.
- To report by Radio call "CONTROL".

5.0 DATA MANAGEMENT

A data management process will be implemented so information collected during the investigation will be properly managed after completion of field activities. As specified in Section 5.1 of the SCQ, daily activities will be recorded on the RTIMP Field Continuation Sheet with sufficient detail to enable a situation to be reconstructed without reliance on memory. Field logs will be kept on file for review by the Characterization Lead.

Per the User's Manual and the RTIMP Field Manual, all electronically recorded data will have the Checklist for Verification of Quality Control and the Data Review Elements for Real-Time Measurements, which are to be completed after each data collection event. The most recent versions of these checklists can be found on forms FS-F-5508 (for the mobile NaI detectors) and FS-F-5509 (for the HPGe).

Electronically recorded data from the GPS, HPGe, and mobile NaI systems will be downloaded on a daily basis to disks, or to the Local Area Network (LAN) using the Ethernet connection. The RTIMP group will review electronic data for completeness and accuracy before downloading it onto the LAN. Once complete, the data will be sent to the loader where it will be loaded onto the SED and an error log will be generated. The data will then be made available to users through both the Geographic Information System (GIS) and Microsoft Access Software. The RTIMP group will archive all downloaded data for future reference.

Field documentation, such as the FAL, Gamma Spectrometry Field Worksheet, Survey Files and the Nuclear Field Density/Moisture Worksheet will undergo an internal QA/QC review by the RTIMP group. Copies will then be generated and delivered to the Field Validation 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. All Mobile NaI data and the Phase 1 HPGe data will be considered ASL A. The Phase 2 and Phase 3 HPGe data will be considered ASL B.

The RTIMP group will provide maps displaying the precertification results to the Characterization Lead. These maps include total activity, total uranium, radium-226, and thorium-232 HPGe readings. Maps will be produced for all Phase 1, 2 and 3 measurements. The data file of these results will be forwarded electronically to the Characterization Manager for inclusion in the Certification Design Letter.

Information collected during the physical sampling activities will be properly managed to satisfy data end use requirements after completion. As specified in Section 5.1 of the SCQ, sampling teams will describe daily activities on the FAL, which should be sufficient for accurate reconstruction of the events at a later date without reliance on memory. FALs and Sample Collection Logs will be completed according to protocols specified in Appendix B of the SCQ and in applicable procedures. These forms will be maintained in loose-leaf form and uniquely numbered following the field sampling event.

Field documentation, such as the FAL, Sample Collection Log, Lithologic Log, and Borehole Abandonment Record will undergo an internal QA/QC review by the Sample Technicians. A second QA/QC review of the records will be performed on 10 percent of the field data packages by FEMP QA personnel. Copies of the records will then be generated and delivered to data entry personnel for input into the Oracle System.

A list of planned sample points and associated locations will be maintained by the data manager. Data will be entered into the FACTS, then transferred to the SED by Analytical Data Management personnel according to standard protocol. Hard-copy data reports and documents are kept in permanent storage in the project files.

APPENDIX A

DATA QUALITY OBJECTIVES SL-054, Rev. 0

Control Number _____

Fernald Environmental Management Project

Data Quality Objectives

Title: Real Time Precertification Monitoring

Number: SL-054

Revision: 0

Effective Date: 6/03/99

Contact Name: Joan White

Approval: _____ Date: 6/3/99
James Chambers
DQO Coordinator

Approval: Joan H. White Date: 6/3/99
Joan White
Real-Time Instrumentation Measurement
Program Manager

Rev. #	0						
Effective Date:	6/03/99						

Data Quality Objectives
Real Time Precertification Monitoring

1.0 Statement of Problem

Conceptual Model of the Site

The general soil remediation process at the Fernald Environmental Management Project (FEMP) includes real-time *in-situ* gamma spectrometry (real-time) measurements and physical sampling during different phases of the remediation process. Initially, pre-design investigations define excavation boundaries. During excavation, real-time measurements and/or sampling for waste disposition issues occurs. After planned excavations are complete, real-time measurements and/or physical sampling precertification activities are carried out to verify that residual contamination is low enough to pass certification. Finally, certification physical sampling is performed to verify that clean up goals (i.e., Final Remediation Levels, [FRLs]) have been achieved, and therefore, remediation is complete in that portion of the FEMP.

This DQO describes the real-time in-situ gamma spectrometry methods used during precertification. Any physical soil samples collected during precertification will be collected under a separate DQO. Real-time precertification measurements involves field surveys of the surface soil using mobile and stationary gamma-discernable real-time equipment. Real-time precertification measurements take place within a soil remediation area when the expected concentrations of primary radiological constituents of concern (COCs) are expected to be below the respective final remediation levels (FRLs). This may occur over an excavated surface or on an unexcavated surface where no above-FRL contamination is anticipated.

Precertification scanning activities must follow the guidelines established in the *Sitewide Excavation Plan* (SEP) and the most current version of the document *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 measurements are conducted in two separate activities:

- Precertification Phase I includes a mobile sodium iodide (NaI) detector scan of as much of the area as accessible. If parts of the area of interest are inaccessible to the mobile NaI detectors, then the stationary High Purity Germanium (HPGe) detector will be used to obtain measurements in those areas. Target parameters for Precertification Phase I NaI measurements 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 measurements, or as indicated by 3x FRL in single measurements using the HPGe detectors.

- Precertification Phase II includes stationary HPGe detector measurements to verify the highest values obtained by the mobile NaI detector. It also includes stationary HPGe "hot spot evaluation" measurements at Phase I locations where the two-point average of total uranium, radium-226 and/or thorium-232 has identified resolvable ASCOC concentrations greater than 3-times the FRL (3x FRL) using the RMS systems, or where single HPGe measurement from Phase I are greater than 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 measurement 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 2 mobile sodium iodide (NaI) systems referred to as the Radiation Measurement Systems (RMS). They are the RTRAK (mounted on a tractor) and the RSS (mounted on a small pushcart). In addition, the stationary germanium detectors mounted on a tripod (the HPGe), are also used. These instruments can significantly accelerate the pace of necessary characterization by detecting soil contaminated with resolvable radiological Area Specific Contaminants of Concern (ASCOCs) in a rapid and non-intrusive manner.

2.0 Identify the Decision

Decision

Precertification real-time measurements support two decisions:

Decision 1: Precertification Phase I measurements will be the basis of a decision for the location(s) and number of Precertification Phase II HPGe measurements to collect within an area potentially exceeding 3x FRL, and for Phase II measurements to confirm the highest mobile NaI systems total activity locations.

Decision 2: Precertification Phase II measurements will be the basis of a decision to either:

1) excavate residual contaminated soil, conduct additional real-time measurements, or conduct physical sampling to evaluate potential residual contamination. The decision to excavate would be made if residual contamination could possibly cause 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 Phase II HPGe measurements to be obtained will be established based on Precertification Phase I NaI and HPGe measurements, and the target level specified in the PSP. Two-point averaging of the Phase I NaI measurements, and/or single HPGe measurements will determine ASCOC concentrations or activities with regard to 3x FRL, and this data will be mapped for review. This data will also be considered when establishing Certification Units (CUs).

If the area potentially exceeding 3x FRL exhibits a visible contamination boundary, the Project may determine that Phase II measurements may not need to be collected. In this event, the area of interest may be excavated, and Phase II HPGe measurements will be obtained on the newly excavated surface to ensure the area is now below 3x FRL.

Possible Results of Decision 2

Possible results are as follows:
1) The Phase II HPGe results for all gamma discernable 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 Phase II HPGe results for all gamma discernable 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 measurements and/or physical samples may be collected to delineate the contaminated soil for remedial excavation.

3.0 Identify Inputs That Affect the Decision

Required Informational Input

An area will not be subjected to precertification if above-FRL contamination is known to be present. Real-time precertification measurements will be used to estimate the surface soil contamination and the variation in surface soil contamination in areas scheduled for certification. In addition, physical samples

may be collected and/or a review of existing physical sample data, process knowledge, or visible observation may be performed.

Sources of Informational Input

Precertification measurements for discernible radiological COCs will involve measurements from mobile and stationary in-situ gamma spectrometry equipment. Physical samples may be collected to verify real-time measurements, or to precertify for non-gamma resolvable ASCOCs.

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 measurements may also be taken to support excavation to ALARA requirements. Physical samples may be used to verify HPGe readings and to precertify for non-gamma resolvable ASCOCs.

The 3x FRL concentrations/activities obtained through two-point averaging of mobile NaI measurements 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 measurements will be utilized to obtain as close to complete coverage of the areas of concern. Hot spot confirmation and delineation measurements will be obtained during Precertification Phase II by strategically placed stationary HPGe measurements. Analysis and data management for Precertification Phase I data will be conducted at ASL A. Precertification Phase II data may be conducted at either ASL A or ASL B, at the discretion of the Project. The decision to collect Phase II data at ASL A, or ASL B will depend on the Project's need for validated data. Only ASL B data is subject to validation. Real-time data collection for Phase II ASL A and ASL B measurements are identical. All measurements 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 patterns and detect areas of elevated total gamma activity, as well as provide isotopic information for resolvable ASCOCs. The Precertification Phase II HPGe gamma detectors will be used to confirm and delineate Phase I potential hot spot measurements, as needed. All real-time Phase I and Phase II

measurements will be collected in accordance with the procedures identified in Section 7.C of this DQO.

Surface physical samples may be collected to verify HPGe measurements and to precertify for non-gamma resolvable ASCOCs. If physical sampling is needed, it will be identified in precertification PSPs. The data quality of these samples will be consistent with the latest sampling DQO.

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 Measurements: 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 Phase I NaI areas exhibiting patterns of high gross gamma activity will be measured with the HPGe. Also, any Phase I HPGe measurements 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 indicate a CU could fail certification, the soil may be evaluated further with additional HPGe measurements or physical samples, or undergo remedial excavations. If remedial excavations are performed, the excavated area will be measured with post-excavation HPGe measurements to ensure removal of the contamination. Once the remediation is confirmed completed by the HPGe, the area will be considered ready for certification. Certification readiness means there i is no indication of wide-spread contamination, or localized contamination (i.e., hot-spot).

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 above the FRL, or the soil contains ASCOC concentrations above two-times the FRL (the hot-spot criteria). This decision error would lead to the area failing certification for average radiological COC concentrations above the FRL or for 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 activities.

Real-time measurements are generated by two methods: 1) the mobile sodium iodide (NaI) detection systems (RTRAK or RSS) which provide semi-quantitative radiological data, and 2) the stationary high purity germanium (HPGe) system that provides quantitative measurements of radiological COCs. If necessary, physical samples may also be collected for HPGe data verification, and to precertify for non-gamma resolvable ASCOCs.

Surface moisture readings are obtained in conjunction with Phase I and Phase II the NaI and HPGe system measurements using the Troxler nuclear moisture and density gauge or the Zeltex moisture meter, as specified in the PSP. If conditions do not permit the use of the moisture meters, a soil moisture sample may be collected and submitted to the on-site laboratory for percent moisture analysis, or a default moisture value of 20% may be used. The soil moisture data will be used as is discussed in Sections 3.8, 4.11 and 5.2 of the Real-Time User's Manual. The gamma data will be computer corrected for moisture by the Lab View software.

Background radon monitoring will also occur in conjunction with Phase I and Phase II NaI and HPGe system measurements, as specified in the PSP. Refer to the Section 5.3 of the Real-Time User's Manual for a discussion on radium-226 corrections.

Sodium Iodide (NaI) System

The mobile NaI detector systems are collectively called the Radiation Measurement Systems (RMS). They are used to achieve as close to complete coverage of the area as possible, taking into consideration the topographic and vegetative constraints which limit access. The NaI systems currently are used to obtain measurements over an area specified in a PSP to detect radiological total activity patterns and elevated radiological activity. The NaI detector systems are used at speeds and count times specified in the PSP, and are consistent with the Real-time User's Manual. The 0.4 meter overlap option is used, as discussed in Section 4.3.1 of the Real-time User's Manual, unless directed differently in the PSP. If the total uranium FRL is 20 ppm or lower, the NaI systems should not be used for precertification; the HPGe system should be used.

The mobile NaI systems are electronically coupled with Satloc global positioning system (GPS) rover and base unit to record each reading location. Counting and positioning information is 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, or transferred directly to the Local Area Network (LAN) by Ethernet.

Information from the NaI/GPS system is recorded on the PC and transferred to the Unix system through the local area network on a regular (at least daily) basis. The information is plotted on the FEMP GIS system, or in the field using Surfer software. With the output, patterns of elevated total activity, and locations of elevated 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.

NaI measurements may be used for precertification decision making if the measurements clearly indicate below FRL criteria have been met. They may also be used to determine the location and number of Precertification Phase II HPGe measurements, if required.

In-Situ HPGe Detectors

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

- During Precertification Phase I, the HPGe is used in areas where topographic or vegetative constraints prevent mobile NaI detector access or if the NaI systems are out of service. The HPGe is used in a 99.1% coverage grid over the accessible area. Detector height and count times are specified in

the PSP and are consistent with the most current version of the Real-Time User's Manual.

- During Precertification Phase II, the HPGe detector is 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 is used to quantify radiological COC levels, which in turn provide information concerning the ability to pass certification.

Physical Soil Sampling

Physical samples may be collected and analyzed for target radiological COCs to verify the HPGe measurements and/or to precertify for non-gamma discernable ASCOCs. If physical samples are required, they will be collected in compliance with the applicable sampling DQO. Criteria for obtaining physical samples, such as sample density, will be specified in the Precertification PSP, if necessary. The minimum data quality acceptable for this purpose will be identified in the applicable sampling DQO. Field QC, ASL and Validation requirements will be consistent with the SCQ and the more stringent Soil Characterization and Excavation Project requirements.

Data Quality Objectives
Real Time Precertification Measurements

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

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

RI ☐ FS ☐ RD ☐ RA ☒ R_vA ☐ OTHER ☐

1.C. DQO No.: SL-054, Rev. 0 DQO Reference No.: Current Sampling DQO

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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) and HPGe (Precert. Phase II)*	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: _____

* Choosing the ASL level for Phase II precertification HPGe measurements is at the discretion of the project considering the project need for validated data.

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-32, *Troxler 3440 Series Surface Moisture Gauge*
-EQT-33, *Real Time Differential Global Positioning System*
-EQT-39, *Zeltex Infrared Moisture Meter*
-EQT-40, *Satloc Real-time Differential Global Positioning System*
-EQT-41, *Radiation Measurement Systems*
-ADM-16, *In-Situ Gamm Spectrometry Quality Control*
-User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site, 20701-RP-0006

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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	[ ]	PE 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.