2809

PROJECT SPECIFIC PLAN FOR AREA 1, PHASE III CERTIFICATION SAMPLING

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

FEBRUARY 17, 2000

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20720-PSP-0001
REVISION 1

000001

2809

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20720-PSP-0001
Revision 1

February 17, 2000

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

A1PIII	Area 1, Phase III
ASCOC	area-specific constituent of concern
ASL	analytical support level
AWWT	Advanced Wastewater Treatment (Facility)
CDL	Certification Design Letter
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
FACTS	Fernald Analytical Customer Tracking System
FAL	Field Activity Log
FEMP	Fernald Environmental Management Project
FDF	Fluor Daniel Fernald
FRL	final remediation level
GIS	Graphical Information System
GPS	Global Positioning System
HPGe	high-purity germanium
LAN	Local Area Network
ml	milliliter
mg/kg	milligrams per kilogram
NaI	sodium iodide
OEPA	Ohio Environmental Protection Agency
pCi/g	picoCuries per gram
PSP	project specific plan
PWID	Project Waste Identification Document
QA/QC	Quality Assurance/Quality Control
RSS	Radiation Scanning System
RTIMP	Real Time Instrumentation Measurement Program
RTRAK	Real Time Radiation Tracking System
RWP	Radiation Worker Permit
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SDFP	Soil and Disposal Facility Project
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SPL	Sample Processing Laboratory
TAL	target analyte list
V/FCN	Variance/Field Change Notice
WAO	Waste Acceptance Organization

1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE

Area 1, Phase III (A1PIII) is a 107.4-acre area located on the northern side of the Fernald Environmental Management Project (FEMP, see Figure 1-1). It has remained relatively unimpacted by former production operations due to its perimeter and upwind location, and also because it is upgradient from other portions of the site. The purpose of certification is to verify that residual soil costituent of concern (COC) concentrations meet the final remediation levels (FRLs) when evaluated by statistical criteria documented in the Sitewide Excavation Plan (SEP).

1.2 SCOPE

This Project Specific Plan (PSP) has been revised for consistency with the revised A1PIII Certification Design Letter (CDL). It includes details of certification sampling and real-time scanning that will be conducted to supplement the certification sampling. All field activities will be consistent with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ) and Section 3.4 of the SEP.

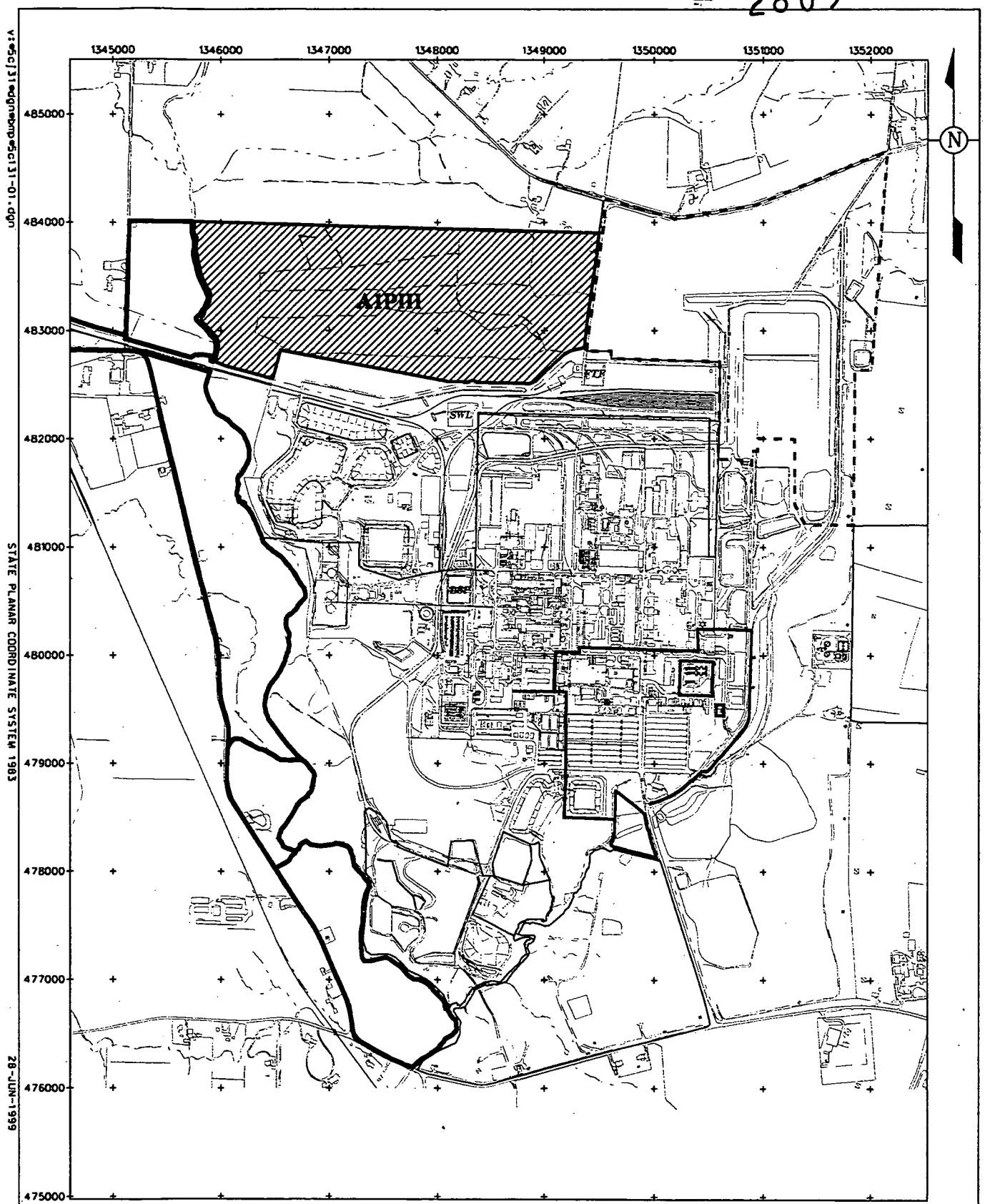
The supplemental real-time scanning, as discussed in Section 2.0 of this PSP, will be consistent with Data Quality Objectives (DQO) SL-054, Revision 0. The certification sampling program, as discussed in Section 3.0, will be consistent with DQO SL-052, Revision 2. Both DQOs are in Appendix A of this PSP.

1.3 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
A1PIII Project Manager	Eric Woods	Jyh-Dong Chiou
A1PIII Characterization Lead	Eric Kroger	John Homer
Field Sampling Lead	Tom Buhrlage	TBD
Real Time Instrumentation Measurement Program (RTIMP) Manager	Joan White	Dave Allen
Surveying Lead	Jim Schwing	Andy Clinton
Waste Acceptance Operations (WAO) Contact	Linda Barlow	Sue Lorenz
Laboratory Contact	Audrey Hannum	Grace Ruesink
Data Validation Contact	Jim Chambers	Jim Cross
Data Management Contact	Susan Marsh	TBD
Quality Assurance Contact	Reinhard Friske	Mary Eleton
Health and Safety Contact	Debra Grant	Lewis Wiedeman



LEGEND:

AREA 1 PHASE III BOUNDARY

SCALE

1250 625 0 1250 FEET

DRAFT

FIGURE 1-1. AREA 1, PHASE III LOCATION MAP

2.0 SUPPLEMENTAL REAL-TIME SCANNING

A traditional precertification scan could not be performed in A1PIII due to the dense vegetation. However, real-time scanning will be performed in the disturbed portions of A1PIII as added verification that remediation goals are attained. The methods and goals of this scan are similar to precertification. However, it is not a traditional precertification scan since this implies that coverage will be as close as possible to 100 percent of the entire area, and that the data will be used to delineate certification units (CUs). Since this is not the case, this will be referred to as "supplemental real-time scanning;" but it will still meet DQOs outlined in SL-054 (Appendix A). The results from this scan will be presented in the A1PIII Certification Report. Note that Section 2.1 of this PSP (Revision 1) includes the supplemental scanning from the original PSP (Revision 0), along with the additional real-time scanning work described in Variance/Field Change Notice (V/FCN) 20720-PSP-0001-1. This V/FCN has already been approved by the Ohio Environmental Protection Agency (OEPA) and U.S. Environmental Protection Agency (EPA).

2.1 SURFACE SCANNING

Figure 2-1 shows the areas to be scanned in A1PIII. The Real-Time Radiation Tracking System (RTRAK), Radiation Scanning System (RSS), the high-purity germanium (HPGe) detector, and the Gator (as approved by the Agencies of January 2000) will be used to scan as close as possible to 100 percent of these areas. Use of this instrumentation will be consistent with procedure EQT-41, Radiation Measurement Systems.

The mobile sodium iodide (NaI) detectors will be used to conduct this scan where possible (including the cleared paths, the excavated strip, and the disturbed area along the railyard), as follows:

- Coverage will be as close as possible to 100 percent. At a minimum, two passes will be made along each cleared strip, one along each side to detect any isolated contamination from alongside these areas
- The acquisition time will be set at 4 seconds
- The detector speed will be set at 1 mile per hour.

Because the tree cover will be dense near most of the areas scanned, the on-board Global Positioning System (GPS) may lose the satellite signal, thus preventing locations from being tied to the readings. When this is the case, the locations can be determined by flagging set distances along the paths, then using the count time, detector speed, and/or the time it takes to travel the set distance to calculate the location of each reading.

Target analytes for this scan are total uranium, thorium-232 and radium-226. These results will be 2-point averaged, then mapped to display results as less than one times the FRL (1xFRL), 1xFRL to 3xFRL, and greater than 3xFRL. Any mobile NaI 2-point averaged result above 3xFRL will be considered a "hot spot" and will need to be confirmed and delineated with the HPGe detector. This will be done according to the User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site (Users Manual).

The fill areas on the northeast and southwest corners of A1PIII will need to be scanned with the HPGe due to dense vegetation. Readings will be comparable to Precertification Phase 1 readings (1-meter shots, 15-minute read time, using the 99.1 percent coverage option to the extent practical). Consistent with the Users Manual, any result above 1xFRL will automatically trigger a second reading at that location at a height of 31 cm and a 15-minute acquisition time. Any HPGe result above 2xFRL indicates a hot spot.

2.2 CONFIRMATION

Any 2-point averaged mobile NaI result exceeding 3xFRL (i.e., a hot spot) will need to be confirmed with the HPGe. This will be accomplished by obtaining an HPGe measurement at each location where the mobile NaI detector revealed a result above 3xFRL. Per the Users Manual, all confirmation readings will be obtained at detector heights of 31 cm 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 measurement location, as identified in Section 2.6. The target analytes for these readings will again be total uranium, thorium-232 and radium-226. A hot spot is confirmed if a HPGe measurement at either detector height exceeds the 2xFRL level for any resolvable area-specific constituents of concern (ASCOCs).

As mentioned in the CDL, several small soil/debris piles are located along the southern boundary of A1PIII. Since these piles pose a higher probability for containing contamination, HPGe confirmation readings will be collected on top of these piles to further characterize them as part of this supplemental scan. This work was originally documented in V/FCN 20720-PSP-0001-1. These readings will also be collected at detector heights of 1 meter and 31 cm, with an acquisition time of 15 minutes for both readings, and the data will be included with the Certification Report.

2.3 HOT SPOT DELINEATION

If a hot spot is confirmed, it must be delineated per the Users Manual prior to removal. This will be accomplished by collecting four readings at the estimated perimeter of the hot spot (detector height of 15 cm, reading time of 15 minutes). If any result exceeds the 2xFRL level, another reading will be obtained at a distance of 2 meters further outside of the hot spot. Once all four perimeter readings indicate concentrations below 2xFRL, the hot spot will be bounded at those four locations. Within that bounded area, all soil will be excavated to a depth of 6 inches.

Following excavation, removal of the hot spot will be confirmed with HPGe readings (detector height of 31 cm, 15-minute reading time) to provide 100 percent coverage of the excavated area. If results are below 2xFRL, the hot spot is removed. If results still exceed 2xFRL, an additional 6 inches of soil will be removed. This process will be repeated until the hot spot is confirmed removed.

2.4 SURFACE SOIL MOISTURE GAUGE MEASUREMENTS

The Troxler® Moisture/Density Gauge or the Zeltex® Infrared Moisture Meter will be used to obtain soil moisture content measurements according to procedures EQT-32 and EQT-39, respectively. These measurements will be 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 scanned, and additional measurements will be collected if soil moisture conditions vary sufficiently, at the discretion of the Real-Time Field Lead. 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 Troxler® measurements simultaneously with real-time instrument measurements because internal radioactive sources contained in the Troxler® moisture gauge can cause interference with these measurements; however, the Zeltex® Infrared Moisture Meter can be used along side these detectors.

2.5 BACKGROUND RADON MONITORING

A background radon monitor will be utilized during the collection of real-time 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 detector being used to collect the soil radiation measurements (mobile NaI detectors' height = 31 cm). The background radon data will be used per Section 5.3 of the Users Manual to correct the radium-226 data.

2.6 REAL-TIME MEASUREMENT IDENTIFICATION

2.6.1 Surface Scan Measurements

All mobile NaI data files will be uniquely identified as *A1P3-CU/Location-run#*, where:

A1P3	=	reading in A1PIII
CU/Location	=	CU in which the mobile NaI run was made. Runs obtained along the south fenceline (adjacent to the railyard) will be identified with "fence" instead of the CU number since this run will cross several CU boundaries
Run#	=	Sequential run number within that location/CU.

For example, A1P3-01-31 would be run number 31 performed in CU A1P3-01; A1P3-fence-12 would be run number 12 performed along the south fenceline.

The HPGe readings that are comparable to Precertification Phase I will be identified as *A1P3-P1-location-reading#-G height-QC,* where:

A1P3	=	reading in A1PIII
P1	=	comparable to a Precertification Phase 1 reading
Location	=	"NE" for readings in the northeast fill area, "SW" for readings in the southwest fill area
reading#	=	sequential number for that area
heightG	=	number to represent the detector height, where "1" = 1 m, and "2" = 31 cm. A "G" for gamma reading, immediately follows with no dash
QC	=	"D" indicates a duplicate sample, as applicable.

For example, A1P3-P1-SW-19-1G is the 19th HPGe shot collected in the southwest fill area of A1PIII during Phase 1 of precertification, with a detector height of 1 meter.

2.6.2 Confirmation Measurement Identification

HPGe confirmation measurements will be identified as *A1P3-P2-Location-reading#-height-QC*, where:

A1P3	=	Reading collected in A1PIII
P2	=	Phase 2 reading
Location	=	CU number (where applicable), fence along the south fenceline, or NE or SW in the areas of fill per Section 2.6.1
reading#	=	sequential number for that area
heightG	=	number to represent the detector height, where "1" = 1 m and "2" = 31 cm. A "G" for gamma reading, immediately follows with no dash
QC	=	"D" indicates a duplicate sample, as applicable.

The HPGe readings obtained on the small piles in A1PIII along the railyard will be identified as *A1P3PILE#P2-height*, where:

A1P3PILE	=	reading to scan the piles found in A1PIII, immediately followed by a sequential number (as flagged and marked in the field) to identify the pile;
P2	=	Precertification Phase 2
heightG	=	number to represent the detector height, where "1" = 1 m and "2" = 31 cm. A "G" for gamma reading, immediately follows with no dash.

2.6.3 Hot Spot Delineation Measurement Identification

Should HPGe measurements need to be obtained to delineate a confirmed hot spot, they will be identified as *A1P3-HS-hotspot #-height-#*, where:

A1P3	=	reading obtained in A1PIII
HS	=	HS indicates hot spot delineation
hotspot#	=	a sequential number to identify each confirmed hot spot
height	=	"3" since all delineation measurements are obtained at 15 cm
#	=	sequential number for that hot spot.

2.6.4 Radon Monitor Identification

The radon monitors will be identified by A1P3 (the area name), followed by SS (supplemental scan), followed by the word RADON, followed by a detector height designator (A = 100 m, B = 31 cm, C = 15 cm), followed by the next sequential radon monitor number under the PSP. For example, A1P3-SS-RADON-B-1 would be the first radon monitor under this PSP with a 31-cm detector height.

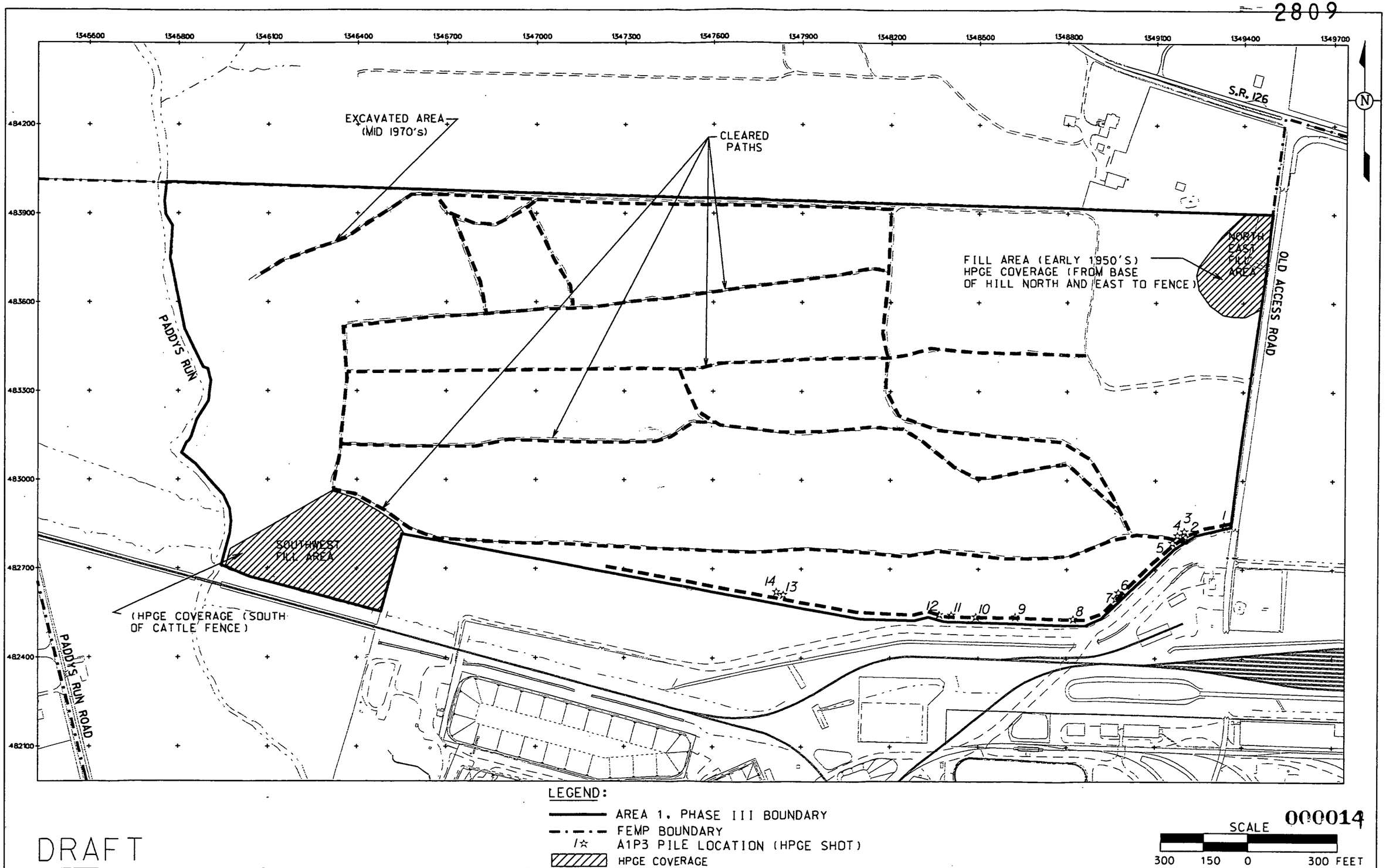


FIGURE 2-1. AREAS PLANNED FOR SUPPLEMENTAL REAL-TIME SCANNING IN A1PIII

3.0 CERTIFICATION SAMPLING PROGRAM

3.1 CERTIFICATION DESIGN

Details and logic of the certification design are described in the A1PIII CDL. Within A1PIII, 25 Group 2 CUs have been established, and 16 certification sampling locations have been established within each. In non-fill CUs, certification sampling will consist of sample collection at 12 of the 16 randomly selected locations, plus one duplicate sample within each CU. The selected locations must also meet the minimum distance criterion, as discussed in the SEP and the A1PIII CDL. All 12 samples plus the duplicate from each CU will be analyzed for the primary radiological ASCOCs, and all samples form eight CUs will also be analyzed for beryllium. The planned sample locations, duplicate samples, and archive samples are identified in Appendix B. Note that the sampling approach for the three CUs containing fill (CUs 21, 24, and 25) will be based on the results of the supplemental scan, as discussed in Section 3.3.1.

3.2 SURVEYING

Because of the dense vegetation in A1PIII, the surveying effort was quite time consuming. Prior to certification sampling, the NAD83 State Planar coordinates for each selected location were surveyed and identified in the field with a flag. Appendix B and Figure 3-1 shows the final surveyed certification sampling locations, which all meet the minimum distance criterion.

3.3 PHYSICAL SOIL SAMPLE COLLECTION

Certification samples will be collected according to procedure SMPL-01, Solids Sampling. Physical certification sampling can begin in non-fill CUs (CUs 01-20, 22, and 23) as soon as this PSP and the CDL are approved by EPA and OEPA. Fill CUs (CUs 21, 24 and 25) will not be sampled until results from the supplemental scan have been evaluated, per Section 3.3.1.

Certification samples will be collected using a 3-inch diameter, 6-inch long plastic or stainless steel liners that will be sealed using plastic end caps. In many locations, the prevalence of tree roots may restrict sample collection to only a stainless steel liner. At the discretion of the Field Sampling Lead, samples may be collected using other methods specified in SMPL-01, as long as sufficient volume is collected to perform the prescribed analyses.

In CUs where samples will also be analyzed for beryllium (CUs 04, 05, 14, 15, 16, 19, 23 and 25), sample collection will be the same. Samples that will be analyzed for beryllium will be stored and transported in a non-metallic container, and the necessary soil volume for beryllium analysis will be separated from the total sample at the laboratory.

Only the 12 certification samples per CU that are planned for analysis will be collected. Samples designated as archives (i.e., a "V" in the sample ID) will be identified in the field, but will not be collected unless the need arises. If this is the case, collection will be accomplished according to this PSP, and a V/FCN will be issued to specify the additional samples to collect and analyze.

Prior to collection of the soil borings/samples, the field sampling technician will remove all surface vegetation within 6 inches of the locations to be sampled using a gloved hand or stainless steel trowel and taking care not to remove any of the surface soil. If the sample lies on the gravel air monitoring access road, the gravel (and fabric liner if present) will be removed and the sample will be collected from the top 6 inches of soil beneath the fabric liner.

To meet the quality control requirements for duplicate samples, twice the soil volume (a second core) will be collected at one location per CU, as identified in Appendix B. The duplicate soil samples will be collected according to procedure SMPL-21, Section 6.5, and will not be homogenized. All samples, including duplicates, will be assigned a unique sample identification number as shown in Appendix B. The container blanks will be collected (see Section 5.1) from both the core liner and the end caps that will be used to seal it.

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

- the distance moved must be as small as possible
- it must remain within the boundary of the same CU and sub-CU, and must still meet the minimum distance criterion
- if the distance moved is greater than 3 feet, the move must be documented in a V/FCN, and the minimum distance must be re-checked prior to collection.

Anytime a location is moved, Figure 3-1 should be used to determine the best direction to move the point to adhere to the above guidelines. All final sampling locations will be documented in the A1PIII Certification Report.

Customer sample numbers and Fernald Analytical Computerized Tracking System (FACTS) identification numbers will be assigned to all samples collected. The sample labels will be completed with sample collection information, and technicians will complete a Field Activity Log (FAL), a Sample Collection Log, and a Chain of Custody/Request for Analysis form in the field prior to submittal of the samples. All soil samples collected from one CU (including duplicates) will be batched and submitted to the Sample Processing Laboratory (SPL) under one set of Chain of Custody forms. All samples originating from a single CU will represent one analytical release. Rinsates/container blanks must be batched with the CU with which they are associated. Upon completion of sample collection, the boreholes will be collapsed and no additional abandonment is necessary. Based on historical data and process knowledge, no photoionization detector survey or radiological survey will be necessary.

3.3.1 Certification Sample Collection in Fill CUs

As discussed in the A1PIII CDL, HPGe results will be used to dictate the certification sampling approach in the CUs that contain fill (CUs 21, 24 and 25).

- If all HPGe results in a CU are below their respective FRLs, the standard certification approach (as described in Section 3.3) will be utilized.
- If HPGe readings show isolated results above the FRL in a CU, the standard certification approach will be still utilized, however all 16 locations will be sampled and analyzed as an additional conservative measure.
- If HPGe readings show widespread FRL results or a hot spot is identified within a CU, that CU will be certified with borings in a manner similar to stockpile CUs (such as those found in A2PIII). A boring will be conducted at each of the 16 predetermined locations to a depth of 6 inches below native soil, as determined by a geologist. If the geologist determines that no fill is present at the location, only a surface (6-inch) sample will need to be collected, as outlined in Section 3.0. The entire core will be then frisked with a beta/gamma frisker, and the 6-inch interval with the highest activity will be submitted for analysis. This information will be recorded on the FAL, and the samples will be identified according to Section 3.3.4 of this PSP.

Note that a fill CU will not be certified as two CUs (like the stockpile CU), since it is likely that not enough of the sample locations for statistical analysis will be located in fill for a particular CU. After reviewing the supplemental HPGe results with project personnel, the characterization lead will inform the field sampling lead of how the three fill CUs will be certified.

3.3.2 Equipment Decontamination

Decontamination is performed to protect worker health and safety, and to prevent the introduction of contaminants from sampling equipment to subsequent soil samples. Field Technicians will ensure that sampling equipment (core tubes and caps) have been decontaminated prior to transport to the field. As described in SMPL-01, all sampling equipment will have been decontaminated before it is transported to the field site, and the core liners will be decontaminated using the Level II (Section K.11 of the SCQ) procedure upon receipt from the manufacturer. Decontamination is also necessary in the field if sampling equipment is reused. If an alternate sampling method is used, equipment will be decontaminated between collection of sample intervals, and again after the sampling performed under this PSP is completed. All equipment that comes into contact with the sample will be decontaminated at Level II in the field. Clean disposable wipes may be used to replace air drying of the equipment.

3.3.3 Physical Sample Identification

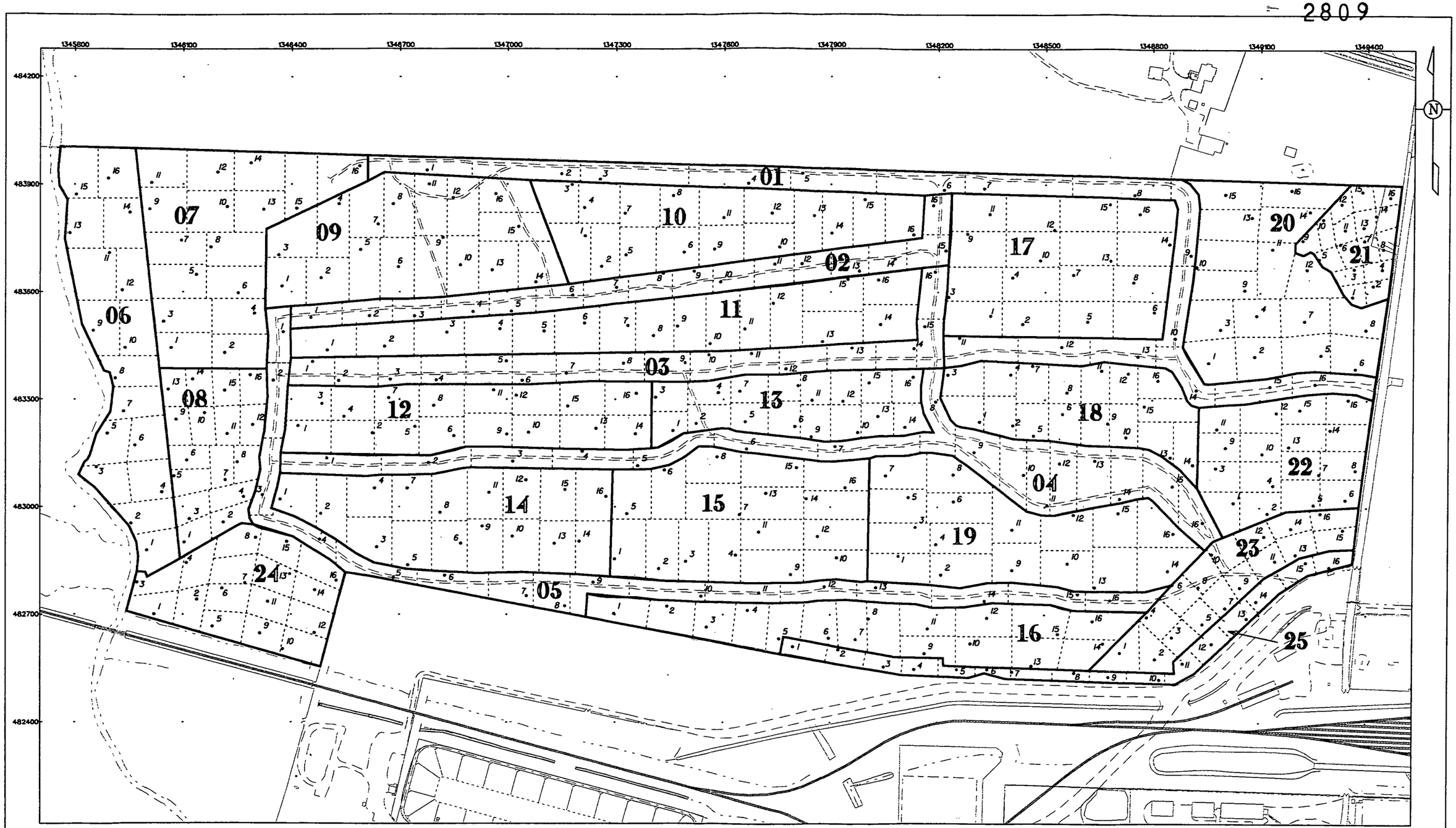
Each soil certification sample will be assigned a unique sample identification number as *A1P3-C-CU-LocationAnalysis-QC,* where:

A1P3	=	Sample collected from Remediation A1PIII (Note that the number "3" is used in place of the roman numeral "III" in the ID for data management purposes)
C	=	Certification Sample
CU	=	certification unit from which sample was collected (numbered as 01 to 23)
Location	=	Sample Location number within each CU (1 through 16)
Analysis	=	"R" indicates radiological analysis, "RM" indicates radiological and metal analysis (applies to CUs 04, 05, 14, 15, 16, 19, 23 and 25). Archives will be identified with a "V." Note that a dash (-) will not be used to separate the location and analysis in the sample ID
QC	=	Quality control sample, if applicable. A "D" indicates a duplicate sample. "X" indicates a rinsate sample; a "Y" indicates a container blank sample.

For example, a duplicate sample taken from the 15th sample location from CU-02 for radiological analysis would be identified as A1P3-C-02-15R-D. A sample collected at the 8th location in CU 15 (radiological and metal analysis) would be identified as A1P3-C-15-8RM. Rinsates and container blanks

will be identified as A1P3-C-X and A1P3-C-Y, respectively, followed by a sequential number (X1, X2, etc). The analyte code (-RM) will be also be added.

If the samples need to be collected at depth in the fill CUs, a depth ID (0 to 6-inch increment = "1", 6 to 12-inch increment "2", etc.) will be added to the sample ID between the CU and location. For example, a sample collected at 18 to 24 inches at location 6 of CU 23 would be identified as A1P3-C-23-4-6R.



LEGEND:

- • SAMPLE LOCATION
- —— CU/SUB CU BOUNDARY
- 18 CU NUMBER

DRAFT

000020

SCALE

250 125 0 250 FEET

v:\5o]31\dgn\bmp\a1p3-012.dgn STATE PLANAR COORDINATE SYSTEM 1983 17-FEB-2000

FIGURE 3-1. A1PIII SUB-CUs AND CERTIFICATION SAMPLING LOCATIONS

4.0 CERTIFICATION SAMPLE ANALYSIS

All samples will be analyzed at the on-site laboratory provided the laboratory has the capacity. Otherwise, the samples will be prepared for shipment to an off-site laboratory from the FDF Approved Laboratories List per procedure S.P. 766-S-1000, Shipping Samples to Offsite Laboratories. Radiological COCs will be analyzed by gamma spectroscopy; beryllium will be analyzed by an SEP-approved method.

Immediately upon arrival at the laboratory where the analysis will take place, samples from CUs 04, 05, 14, 15, 16, 19, 23 and 25 will have the necessary volume of soil removed in order to conduct the beryllium analysis. In addition, all samples should be prepared and sealed to begin the ingrowth period for radium analysis. Sampling and analytical requirements are listed in Table 4-1. The Target Analyte Lists (TAL) are listed in Tables 4-2 and 4-3.

TABLE 4-1
SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte/ TAL	Sample Matrix	Lab	ASL	Preserve	Holding Time	Volume Required	Container [a]
Primary Radiological/ TAL A	Solid	On-site or off-site	E [b]	None	6 months	300 g	Plastic or Stainless Steel Core Liner or 500 ml Glass or Plastic
Primary Radiological and Beryllium/ TAL B	Solid	On-site or off-site	E [b]	Cool to 4°C	6 months	300 g	Same as above
Alpha/Beta Screens [c]	Solid	On-site	N/A	None	None	10 g	Any (need at least 10 g)
Primary Radiological and Beryllium/ TAL B	Liquid	On-site or off-site	E [b]	HNO_3 to pH<2; Cool to 4°C	6 months	7 liters (6 liters for rads, 1 liter for beryllium)	One 6-liter and one 1-liter polyethylene

[a] Sample container types may be changed at the direction of the Field Sampling Lead, as long as the volume requirements and SCQ requirements are met
[b] Soil total uranium and thorium analyses will meet all Analytical Support Level (ASL) D requirements, except the detection level will be set at 10 percent of the FRL
[c] Only required if samples will be shipped to an off-site laboratory

TABLE 4-2
TARGET ANALYTE LIST (TAL) A1P3CERT-A

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

* Analytical requirements will meet ASL D with a minimum detection level set at 10 percent of the FRL

TABLE 4-3
TARGET ANALYTE LIST (TAL) A1P3CERT-B

Gamma Spectroscopy Analysis		
1	ASL E*	Total Uranium (FRL = 82 mg/kg)
2	ASL E*	Radium-226 (FRL = 1.7 pCi/g)
3	ASL E*	Radium-228 (FRL = 1.8 pCi/g)
4	ASL E*	Thorium-228 (FRL = 1.7 pCi/g)
5	ASL E*	Thorium-232 (FRL = 1.5 pCi/g)
SEP Approved Method of Analysis		
1	ASL E*	Beryllium (FRL = 1.5 mg/kg)

* Analytical requirements will meet ASL D, with a minimum detection level set at 10 percent of the FRL

000022

5.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

5.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS AND DATA VALIDATION

Per requirements of the SEP and DQO SL-052, Revision 1, the field quality control, analytical and data validation requirements are as follows:

- Field Quality Control (QC) requirements include one duplicate for each CU, as noted in Appendix B and Section 2.4. Two container blanks will be collected - one before sample collection begins and one at the conclusion of sample collection - for the push tubes. If an alternate sample collection method is used, one rinsate will be collected at a minimum frequency of one per 20 pieces of equipment re-used in the field. All field QC samples will be analyzed for the same TAL as the CU with which they are associated. Container blanks will be analyzed for TAL B.

- All analyses will be performed at ASL E, where the minimum detection level of 10 percent of the FRLs is above the SCQ ASL D detection level, but the analyses meet all other SCQ ASL D criteria. An ASL D data package will be provided for at least 10 percent of the data, with an ASL B data package for the remaining 90 percent.

- All field data will be validated. All laboratory results will be validated to ASL B, and a minimum 10 percent of the results will be validated to ASL D. Since each CU represents one analytical release, an ASL D package will be provided for each sample from three of the 25 CUs (to be determined by the Characterization Lead), including one CU where beryllium is analyzed. If any result is rejected during validation, the sample will be re-analyzed or an archive sample will be analyzed in its place. If necessary, this change will be documented in a V/FCN.

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

5.2 PROJECT-SPECIFIC PROCEDURES, MANUALS AND DOCUMENTS

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

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

- Sitewide Excavation Plan (SEP)
- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site (Users Manual)
- Certification Design Letter for Area 1, Phase III
- ADM-02, Field Project Prerequisites
- EQT-32, Troxler® 3440 Series Surface Moisture/Density Gauge-Calibration, Operation, and Maintenance
- EQT-33, Real-time Differential Global Positioning System Operation
- EQT-39, Operation of the Zeltex® Infrared Moisture Meter
- EQT-41, Radiation Measurement Systems
- SMPL-01, Solids Sampling
- SMPL-21, Collection of Field Quality Control Samples
- S.P. 766-S-1000, Shipping Samples to Offsite Laboratories
- Trimble Pathfinder Pro-XL GPS Operation Manual

5.3 INDEPENDENT ASSESSMENT

Independent assessment will be performed by the FEMP QA organization by conducting a surveillance, consisting of monitoring/observing on-going project activities and work areas to verify conformance to specified requirements. The surveillance will be planned and documented in accordance with Section 12.3 of the SCQ.

5.4 IMPLEMENTATION OF CHANGES

Before the implementation of changes, the Field Sampling Lead will be informed of the proposed changes. Once the Field Sampling Lead has obtained written or verbal approval (electronic mail is

acceptable) from the Characterization Lead and QA for the changes to the PSP, the changes may be implemented. Changes to the PSP will be noted in the applicable FALs and on a V/FCN. QA must receive the completed V/FCN, which includes the signatures of the Characterization and Sampling Manager, Area Project Manager, and QA within seven days of implementation of the change. OEPA and EPA will be given a 14-day review period prior to implementing the change(s) for any V/FCNs identified as "significant" per SDFP guidelines.

6.0 HEALTH AND SAFETY

Technicians will conform to precautionary surveys performed by personnel representing the Utility Engineer, Industrial Hygiene, and Radiological Control as applicable. All work performed on this project will be performed in accordance to applicable Environmental Monitoring project procedures, RM-0020 (Radiological Control Requirements Manual), RM-0021 (Safety Performance Requirements Manual), Fluor Daniel Fernald (FDF) work permit, Radiological Work Permit (RWP), and other applicable permits. Each technician must concur with all safety permits applicable to performance of their assigned duties, and a safety briefing will be conducted prior to the initiation of field activities.

All emergencies shall be reported immediately to the site communication center at 648-6511 or contact "control" on the radio.

Health and safety considerations specific to A1PIII include dense vegetation including multiflora rose (a.k.a., thorn bushes), discarded barbed wire, and uneven footing. Field Technicians and their supervisor should walk down the area prior to sampling. Appropriate safety precautions should be taken by following applicable Safety Performance Requirements in RM-0021 and FDF work permits.

7.0 DISPOSITION OF WASTES

During completion of physical sampling activities, field personnel may generate small amounts of soil, sediment, water, and contact waste. Management of these waste streams will be coordinated with WAO through the Project Waste Identification Document (PWID) process. Sample material, including archived certification samples that are no longer needed, will be spread at the point of origin, (i.e., sampling locations) after agency approval of the Certification Report. Generation of decontamination waters will be minimized in the field, and whenever possible, equipment will be decontaminated at a facility that discharges to the Advanced Wastewater Treatment (AWWT) Facility, either directly or indirectly, through the stormwater collection system. Contact waste generation will be minimized by limiting contact with sample media, and by only using disposable materials that are necessary. This waste stream will be evaluated against dumpster criteria during the PWID process. If it does not meet these criteria, an alternative disposition will be identified. PWID #458 has been revised to support these sampling activities.

8.0 DATA MANAGEMENT

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 FAL, with sufficient detail to be able to reconstruct a particular situation without reliance on memory. Sample Collection Logs will be completed according to procedure ADM-02, Field Prerequisites. Field records and real-time data files should include the PSP number for project records management.

All electronically recorded field data will have the RMS or HPGe Data Verification Checklist (Section 5.4 of the User's Manual), which will be completed after each data collection event. Field documentation, such as the Nuclear Field Density/Moisture Worksheet, will undergo an internal review by the RTIMP. Electronically recorded data from the GPS, HPGe, and RMS systems will be downloaded on a daily basis to disks, or to the Local Area Network (LAN) using the ethernet connection. The Characterization Lead will be informed by the RTIMP Lead (or designee) when RTIMP equipment measurements do not meet data quality control checklist criteria.

Once the survey and real-time electronic data have been placed on the LAN and SED, the Data Management Contact will perform an evaluation prior to placement on the Soil and Disposal Facility Project (SDFP) website. The evaluation may involve a comparison check between the electronic data, hard copy maps and summary reports for accuracy and completeness. The evaluation will be documented on the Real-Time Electronic Data Quality Control checklist (Figure 6-1), dated and signed. Once complete, the data will be sent to the loader where it will be loaded onto the Oracle system 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 (MS) Access Software. Field Team Members will retain all downloaded data on disk for future reference and archive. The real-time maps specified in Section 2.3 will be created using data that has already been checked and corrected for radon and moisture.

Field documentation, such as the Field Activity Log, the Sample Collection Log, the Gamma Spectrometry Field Worksheet, and the Sample Request/Sample Analysis Chain of Custody Log will undergo an internal QA/QC review by the field team members. Copies will then be generated and 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. The paper-generated data will be sent to data entry personnel for input into the Oracle System. Field logs may be completed in the field and maintained in loose-leaf form. Field packages will be validated by the QA validation team.

Analytical data from on-site and off-site laboratories will be reported in preliminary form to the Area Project Manager's designee and the Characterization Lead on at least a weekly basis. This will be done by the laboratory contact as soon as the data are available in the FACTS database. Following required validation of the data for each sample release, the data from that release will be reported to the Characterization Lead in the final data report format. Qualified data will be entered into the SED, after which time statistical analysis may be performed to determine certification pass/fail status.

APPENDIX A

DATA QUALITY OBJECTIVES
SL-052, REV. 2 AND SL-054, REV. 0

2809

Control Number _____

Fernald Environmental Management Project

Data Quality Objectives

Title: Sitewide Certification Sampling and Analysis

Number: SL-052

Revision: 2

Effective Date: February 3, 2000

Contact Name: Mike Rolfes

Approval: _____ Date: 2/10/00
James Chambers
DQO Coordinator

Approval: _____ Date: 2/14/00
J.D. Chiou
SCEP Project Director

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

Members of Data Quality Objectives (DQO) Scoping Team

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

Conceptual Model of the Site

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

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

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

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

2.0 Identify the Decision

Decision

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

Possible Results

1. The average concentration of each CU-specific COC is demonstrated to be below the FRLs within the confidence level, with no single result for any CU-specific COC greater than two times the associated FRL. The CU can then be certified as attaining remediation goals.

2. The average concentration of at least one CU-specific COC is demonstrated to be above the FRL at the given confidence level. The CU will fail certification and require additional remedial action, per Section 3.4.5 of the final SEP.

3. If a result(s) of one or more CU-specific COC is demonstrated to be at or above two times the FRL, the CU will fail certification. The CU will fail certification and require additional remedial action per Section 3.4.5 of the final SEP. A combination of results 2 and 3 also constitutes certification failure.

3.0 Inputs That Affect the Decision

Required Information

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

Source of Information

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

1.0 Statement of Problem

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

Exposure to Soil

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

Available Resources

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

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

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

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

4.0 The Boundaries of the Situation

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

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

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

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

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

5.0 Decision Rule

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

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

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

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

6.0 Limits on Decision Errors

Types of Decision Errors and Consequences

Definition

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

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

True State of Nature for the Decision Errors

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

Null Hypothesis

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

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

False Positive and False Negative Errors

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

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

7.0 Design for Obtaining Quality Data

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

Soil Sample Locations

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

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

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

Physical Samples

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

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

Laboratory Analysis

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

Validation

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

8.0 Use of Data to Test Null Hypothesis

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

Data Quality Objectives
Sitewide Certification Sampling and Analysis

1A. Task Description:

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

RI☐ FS☐ RD☐ RA☒ RvA☐ Other (specify) _____

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

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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 Ananlytical Support Level (A-E): (Put an X in the appropriate Analytical Support Level selection(s) beside each applicable data use)

Site Characterization	Risk Assessment
A☐ B☐ C☐ D☐ E☐	A☐ B☐ C☐ D☐ E☐
Evaluation of Alternatives	Engineering Design
A☐ B☐ C☐ D☐ E☐	A☐ B☐ C☐ D☐ E☐
Monitoring During Remediation	Other
A☐ B☐ C☐ D☐ E☐	A☐ B☐ C☐ D☒ E☐

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

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

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5. Site Information (Description):

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

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

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

* As identified in the area certification PSP

6.B. Equipment Selection and SCQ Reference:

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

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

Biased☐ Composite☐ Grab☒ Environmental☐ Grid☐
Intrusive☒ Non-Intrusive☐ Phased☐ Source☐ Random☒*
*Systematic random samples, selected one per cell and meeting the minimum distance criterion

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

Background samples: OU5 RI

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

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

8A. Field Quality Control Samples:

Trip Blanks	☒[1]	Container Blanks	☐
Field Blanks	☒[2]	Duplicate Samples	☒
Equipment Rinsate Blanks	☒	Split Samples	☒[3]
Preservative Blanks	☐	Performance Evaluation Samples	☐

Other (specify) _____

1) Collected for volatile organic sampling
2) As noted in the PSP
3) Split samples will be taken where required by the EPA

8B. Laboratory Quality Control Samples:

Method Blank	☒	Matrix Duplicate/Replicate	☒
Matrix Spike	☒	Surrogate Spikes	☒
Tracer Spike	☒	Other (specify) _____	

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

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

Control Number 2809

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) _____

---

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.

APPENDIX B

AREA 1, PHASE III CERTIFICATION SAMPLES

APPENDIX B
A1PIII CERTIFICATION SAMPLES

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CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-01	1	A1P3-C-01-1V	1346776.1	483939.9	Archive*
A1P3-01	2	A1P3-C-01-2R	1347148.9	483929.1	TAL A
A1P3-01	3	A1P3-C-01-3R	1347255.1	483914.4	TAL A
A1P3-01	4	A1P3-C-01-4R	1347668.2	483901.6	TAL A
A1P3-01	5	A1P3-C-01-5R	1347818.9	483931.1	TAL A
A1P3-01	6	A1P3-C-01-6V	1348215.9	483885.0	Archive*
A1P3-01	7	A1P3-C-01-7R	1348329.1	483889.2	TAL A
A1P3-01	7	A1P3-C-01-7R-D	1348329.1	483889.2	TAL A
A1P3-01	8	A1P3-C-01-8R	1348749.6	483872.7	TAL A
A1P3-01	9	A1P3-C-01-9R	1348906.5	483704.5	TAL A
A1P3-01	10	A1P3-C-01-10V	1348864.0	483471.9	Archive*
A1P3-01	11	A1P3-C-01-11R	1348262.4	483472.9	TAL A
A1P3-01	12	A1P3-C-01-12R	1348547.5	483447.5	TAL A
A1P3-01	13	A1P3-C-01-13R	1348760.6	483421.3	TAL A
A1P3-01	14	A1P3-C-01-14R	1348923.0	483328.4	TAL A
A1P3-01	15	A1P3-C-01-15V	1349128.9	483337.4	Archive*
A1P3-01	16	A1P3-C-01-16R	1349254.0	483344.9	TAL A
A1P3-02	1	A1P3-C-02-1R	1346453.0	483528.0	TAL A
A1P3-02	2	A1P3-C-02-2R	1346615.9	483532.7	TAL A
A1P3-02	3	A1P3-C-02-3R	1346740.4	483533.3	TAL A
A1P3-02	4	A1P3-C-02-4V	1346904.1	483545.1	Archive*
A1P3-02	5	A1P3-C-02-5R	1347012.1	483546.0	TAL A
A1P3-02	6	A1P3-C-02-6R	1347179.8	483590.4	TAL A
A1P3-02	7	A1P3-C-02-7R	1347303.1	483612.7	TAL A
A1P3-02	8	A1P3-C-02-8V	1347430.6	483652.8	Archive*
A1P3-02	9	A1P3-C-02-9V	1347517.9	483658.3	Archive*
A1P3-02	10	A1P3-C-02-10R	1347590.5	483629.0	TAL A
A1P3-02	10	A1P3-C-02-10R-D	1347590.5	483629.0	TAL A
A1P3-02	11	A1P3-C-02-11R	1347741.8	483676.8	TAL A
A1P3-02	12	A1P3-C-02-12R	1347818.3	483679.0	TAL A
A1P3-02	13	A1P3-C-02-13R	1347979.2	483659.6	TAL A
A1P3-02	14	A1P3-C-02-14V	1348078.1	483693.5	Archive*
A1P3-02	15	A1P3-C-02-15R	1348220.1	483717.0	TAL A
A1P3-02	16	A1P3-C-02-16R	1348186.6	483842.1	TAL A
A1P3-03	1	A1P3-C-03-1V	1346457.5	483405.7	Archive*
A1P3-03	2	A1P3-C-03-2R	1346531.6	483352.1	TAL A
A1P3-03	3	A1P3-C-03-3R	1346674.0	483355.4	TAL A
A1P3-03	4	A1P3-C-03-4R	1346802.3	483355.4	TAL A
A1P3-03	4	A1P3-C-03-4R-D	1346802.3	483355.4	TAL A
A1P3-03	5	A1P3-C-03-5R	1346998.4	483407.2	TAL A
A1P3-03	6	A1P3-C-03-6V	1347042.3	483353.5	Archive*

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APPENDIX B
A1PIII CERTIFICATION SAMPLES

CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-03	7	A1P3-C-03-7R	1347163.2	483373.3	TAL A
A1P3-03	8	A1P3-C-03-8R	1347322.3	483401.0	TAL A
A1P3-03	9	A1P3-C-03-9R	1347492.4	483402.6	TAL A
A1P3-03	10	A1P3-C-03-10R	1347559.5	483426.0	TAL A
A1P3-03	11	A1P3-C-03-11R	1347678.6	483428.1	TAL A
A1P3-03	12	A1P3-C-03-12V	1347774.0	483386.1	Archive*
A1P3-03	13	A1P3-C-03-13R	1347958.9	483444.3	TAL A
A1P3-03	14	A1P3-C-03-14V	1348132.1	483444.6	Archive*
A1P3-03	15	A1P3-C-03-15R	1348163.1	483503.6	TAL A
A1P3-03	16	A1P3-C-03-16R	1348192.5	483657.3	TAL A
A1P3-04	1	A1P3-C-04-1V	1346498.1	483136.1	Archive*
A1P3-04	2	A1P3-C-04-2RM	1346781.2	483123.0	TAL B
A1P3-04	3	A1P3-C-04-3RM	1347017.0	483128.0	TAL B
A1P3-04	4	A1P3-C-04-4RM	1347208.1	483154.4	TAL B
A1P3-04	5	A1P3-C-04-5RM	1347362.1	483114.7	TAL B
A1P3-04	5	A1P3-C-04-5RM-D	1347362.1	483114.7	TAL B
A1P3-04	6	A1P3-C-04-6RM	1347665.0	483162.4	TAL B
A1P3-04	7	A1P3-C-04-7V	1347913.9	483168.7	Archive*
A1P3-04	8	A1P3-C-04-8RM	1348193.2	483293.5	TAL B
A1P3-04	9	A1P3-C-04-9RM	1348303.5	483153.4	TAL B
A1P3-04	10	A1P3-C-04-10RM	1348441.2	483090.2	TAL B
A1P3-04	11	A1P3-C-04-11RM	1348507.4	483004.9	TAL B
A1P3-04	12	A1P3-C-04-12V	1348542.0	483122.0	Archive*
A1P3-04	13	A1P3-C-04-13V	1348638.9	483129.8	Archive*
A1P3-04	14	A1P3-C-04-14RM	1348710.1	483024.3	TAL B
A1P3-04	15	A1P3-C-04-15RM	1348857.8	483061.3	TAL B
A1P3-04	16	A1P3-C-04-16RM	1348941.8	482958.4	TAL B
A1P3-05	1	A1P3-C-05-1RM	1346377.9	483487.3	TAL B
A1P3-05	2	A1P3-C-05-2RM	1346350.4	483352.1	TAL B
A1P3-05	3	A1P3-C-05-3RM	1346320.1	483032.9	TAL B
A1P3-05	4	A1P3-C-05-4V	1346478.4	482909.2	Archive*
A1P3-05	5	A1P3-C-05-5RM	1346683.9	482802.9	TAL B
A1P3-05	6	A1P3-C-05-6RM	1346827.1	482806.3	TAL B
A1P3-05	7	A1P3-C-05-7RM	1347055.3	482752.3	TAL B
A1P3-05	8	A1P3-C-05-8V	1347160.0	482724.4	Archive*
A1P3-05	9	A1P3-C-05-9RM	1347238.3	482790.0	TAL B
A1P3-05	10	A1P3-C-05-10RM	1347539.1	482751.3	TAL B
A1P3-05	11	A1P3-C-05-11RM	1347700.1	482760.5	TAL B
A1P3-05	12	A1P3-C-05-12V	1347883.7	482777.8	Archive*
A1P3-05	13	A1P3-C-05-13V	1348027.1	482775.0	Archive*
A1P3-05	14	A1P3-C-05-14RM	1348333.5	482738.3	TAL B

APPENDIX B
A1PIII CERTIFICATION SAMPLES

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CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-05	15	A1P3-C-05-15RM	1348592.9	482758.0	TAL B
A1P3-05	16	A1P3-C-05-16RM	1348682.9	482741.2	TAL B
A1P3-05	16	A1P3-C-05-16RM-D	1348682.9	482741.2	TAL B
A1P3-06	1	A1P3-C-06-1R	1345999.4	482878.7	TAL A
A1P3-06	2	A1P3-C-06-2V	1345957.0	482954.0	Archive*
A1P3-06	3	A1P3-C-06-3R	1346041.9	483040.9	TAL A
A1P3-06	4	A1P3-C-06-4R	1345860.5	483111.4	TAL A
A1P3-06	5	A1P3-C-06-5R	1345891.0	483205.0	TAL A
A1P3-06	6	A1P3-C-06-6R	1345966.8	483171.4	TAL A
A1P3-06	7	A1P3-C-06-7V	1345936.2	483266.7	Archive*
A1P3-06	8	A1P3-C-06-8R	1345914.4	483360.1	TAL A
A1P3-06	9	A1P3-C-06-9R	1345851.8	483490.3	TAL A
A1P3-06	10	A1P3-C-C-06-10V	1345940.6	483443.6	Archive*
A1P3-06	11	A1P3-C-06-11R	1345896.8	483709.8	TAL A
A1P3-06	12	A1P3-C-06-12R	1345931.1	483603.4	TAL A
A1P3-06	13	A1P3-C-06-13R	1345786.8	483765.0	TAL A
A1P3-06	14	A1P3-C-06-14R	1345953.1	483822.2	TAL A
A1P3-06	15	A1P3-C-06-15V	1345804.3	483874.7	Archive*
A1P3-06	16	A1P3-C-06-16R	1345893.1	483916.0	TAL A
A1P3-06	16	A1P3-C-06-16R-D	1345893.1	483916.0	TAL A
A1P3-07	1	A1P3-C-07-1R	1346067.9	483443.7	TAL A
A1P3-07	2	A1P3-C-07-2R	1346214.9	483430.3	TAL A
A1P3-07	3	A1P3-C-07-3R	1346046.0	483517.0	TAL A
A1P3-07	4	A1P3-C-07-4V	1346297.1	483540.2	Archive*
A1P3-07	5	A1P3-C-07-5V	1346137.7	483647.8	Archive*
A1P3-07	6	A1P3-C-07-6R	1346251.8	483597.5	TAL A
A1P3-07	7	A1P3-C-07-7R	1346095.3	483744.5	TAL A
A1P3-07	8	A1P3-C-07-8R	1346177.9	483726.0	TAL A
A1P3-07	8	A1P3-C-07-8R-D	1346177.9	483726.0	TAL A
A1P3-07	9	A1P3-C-07-9R	1346007.3	483830.9	TAL A
A1P3-07	10	A1P3-C-07-10V	1346222.7	483837.2	Archive*
A1P3-07	11	A1P3-C-07-11R	1346013.1	483903.9	TAL A
A1P3-07	12	A1P3-C-07-12R	1346195.3	483930.5	TAL A
A1P3-07	13	A1P3-C-07-13R	1346321.8	483829.1	TAL A
A1P3-07	14	A1P3-C-07-14R	1346286.4	483959.4	TAL A
A1P3-07	15	A1P3-C-07-15R	1346413.2	483833.0	TAL A
A1P3-07	16	A1P3-C-07-16V	1346588.5	483951.8	Archive*
A1P3-08	1	A1P3-C-08-1R	1346104.3	482901.7	TAL A
A1P3-08	2	A1P3-C-08-2V	1346211.9	482957.1	Archive*
A1P3-08	3	A1P3-C-08-3R	1346118.9	482966.8	TAL A
A1P3-08	4	A1P3-C-08-4R	1346268.0	483028.2	TAL A

APPENDIX B
A1PIII CERTIFICATION SAMPLES

CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-08	5	A1P3-C-08-5R	1346075.7	483085.2	TAL A
A1P3-08	6	A1P3-C-08-6R	1346110.3	483129.0	TAL A
A1P3-08	7	A1P3-C-08-07V	1346216.8	483074.7	Archive*
A1P3-08	8	A1P3-C-08-8R	1346250.2	483124.8	TAL A
A1P3-08	9	A1P3-C-08-9R	1346080.8	483243.9	TAL A
A1P3-08	10	A1P3-C-08-10V	1346160.1	483261.3	Archive*
A1P3-08	11	A1P3-C-08-11R	1346221.6	483204.9	TAL A
A1P3-08	12	A1P3-C-08-12R	1346293.9	483228.0	TAL A
A1P3-08	13	A1P3-C-08-13R	1346059.8	483327.3	TAL A
A1P3-08	14	A1P3-C-08-14R	1346126.8	483355.3	TAL A
A1P3-08	15	A1P3-C-08-15V	1346214.4	483325.2	Archive*
A1P3-08	16	A1P3-C-08-16R	1346286.1	483367.7	TAL A
A1P3-08	16	A1P3-C-08-16R-D	1346286.1	483367.7	TAL A
A1P3-09	1	A1P3-C-09-1R	1346372.8	483616.0	TAL A
A1P3-09	2	A1P3-C-09-2R	1346482.1	483638.7	TAL A
A1P3-09	3	A1P3-C-09-3R	1346364.6	483702.5	TAL A
A1P3-09	4	A1P3-C-09-4V	1346531.2	483845.5	Archive*
A1P3-09	5	A1P3-C-09-5R	1346592.0	483718.6	TAL A
A1P3-09	5	A1P3-C-09-5R-D	1346592.0	483718.6	TAL A
A1P3-09	6	A1P3-C-09-6R	1346697.0	483670.7	TAL A
A1P3-09	7	A1P3-C-09-7R	1346639.8	483789.8	TAL A
A1P3-09	8	A1P3-C-09-8V	1346681.0	483845.0	Archive*
A1P3-09	9	A1P3-C-09-9R	1346818.4	483750.3	TAL A
A1P3-09	10	A1P3-C-09-10V	1346867.7	483674.6	Archive*
A1P3-09	11	A1P3-C-09-11R	1346781.2	483900.2	TAL A
A1P3-09	12	A1P3-C-09-12R	1346847.3	483862.7	TAL A
A1P3-09	13	A1P3-C-09-13R	1346958.0	483660.9	TAL A
A1P3-09	14	A1P3-C-09-14R	1347078.8	483628.0	TAL A
A1P3-09	15	A1P3-C-09-15V	1347031.4	483782.2	Archive*
A1P3-09	16	A1P3-C-09-16R	1346966.6	483873.2	TAL A
A1P3-10	1	A1P3-C-10-1V	1347214.2	483756.2	Archive*
A1P3-10	2	A1P3-C-10-2R	1347260.7	483671.5	TAL A
A1P3-10	3	A1P3-C-10-3R	1347176.7	483900.5	TAL A
A1P3-10	4	A1P3-C-10-4R	1347212.7	483834.5	TAL A
A1P3-10	5	A1P3-C-10-5V	1347327.9	483703.2	Archive*
A1P3-10	6	A1P3-C-10-6R	1347487.1	483711.2	TAL A
A1P3-10	7	A1P3-C-10-7R	1347325.6	483819.7	TAL A
A1P3-10	8	A1P3-C-10-8R	1347457.3	483869.2	TAL A
A1P3-10	8	A1P3-C-10-8R-D	1347457.3	483869.2	TAL A
A1P3-10	9	A1P3-C-10-9R	1347574.7	483720.2	TAL A
A1P3-10	10	A1P3-C-10-10V	1347755.1	483725.2	Archive*

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APPENDIX B
A1PIII CERTIFICATION SAMPLES

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CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-10	11	A1P3-C-10-11R	1347598.8	483807.7	TAL A
A1P3-10	12	A1P3-C-10-12R	1347732.6	483819.2	TAL A
A1P3-10	13	A1P3-C-10-13R	1347852.6	483814.8	TAL A
A1P3-10	14	A1P3-C-10-14R	1347902.0	483763.4	TAL A
A1P3-10	15	A1P3-C-10-15V	1347993.6	483858.4	Archive*
A1P3-10	16	A1P3-C-10-16R	1348131.8	483761.4	TAL A
A1P3-11	1	A1P3-C-11-1R	1346499.0	483438.0	TAL A
A1P3-11	2	A1P3-C-11-2R	1346657.9	483448.3	TAL A
A1P3-11	3	A1P3-C-11-3V	1346831.8	483488.2	Archive*
A1P3-11	4	A1P3-C-11-4R	1346980.7	483497.7	TAL A
A1P3-11	5	A1P3-C-11-5V	1347102.2	483491.0	Archive*
A1P3-11	6	A1P3-C-11-6R	1347213.1	483513.3	TAL A
A1P3-11	7	A1P3-C-11-7R	1347334.2	483506.2	TAL A
A1P3-11	8	A1P3-C-11-8R	1347404.3	483478.6	TAL A
A1P3-11	9	A1P3-C-11-9R	1347471.0	483505.6	TAL A
A1P3-11	9	A1P3-C-11-9R-D	1347471.0	483505.6	TAL A
A1P3-11	10	A1P3-C-11-10R	1347562.7	483456.2	TAL A
A1P3-11	11	A1P3-C-11-11V	1347658.6	483497.7	Archive*
A1P3-11	12	A1P3-C-11-12R	1347737.8	483567.7	TAL A
A1P3-11	13	A1P3-C-11-13V	1347884.8	483460.7	Archive*
A1P3-11	14	A1P3-C-11-14R	1348031.1	483505.5	TAL A
A1P3-11	15	A1P3-C-11-15R	1347942.0	483631.7	TAL A
A1P3-11	16	A1P3-C-11-16R	1348048.7	483637.6	TAL A
A1P3-12	1	A1P3-C-12-1V	1346416.1	483224.7	Archive*
A1P3-12	2	A1P3-C-12-2R	1346625.2	483206.2	TAL A
A1P3-12	2	A1P3-C-12-2R-D	1346625.2	483206.2	TAL A
A1P3-12	3	A1P3-C-12-3R	1346484.4	483288.3	TAL A
A1P3-12	4	A1P3-C-12-4R	1346547.7	483252.8	TAL A
A1P3-12	5	A1P3-C-12-5R	1346743.0	483224.3	TAL A
A1P3-12	6	A1P3-C-12-6V	1346852.9	483197.8	Archive*
A1P3-12	7	A1P3-C-12-7R	1346670.0	483303.5	TAL A
A1P3-12	8	A1P3-C-12-8R	1346795.2	483283.1	TAL A
A1P3-12	9	A1P3-C-12-9R	1347000.9	483203.1	TAL A
A1P3-12	10	A1P3-C-12-10R	1347061.0	483207.2	TAL A
A1P3-12	11	A1P3-C-12-11V	1346963.7	483326.5	Archive*
A1P3-12	12	A1P3-C-12-12R	1346026.0	483311.3	TAL A
A1P3-12	13	A1P3-C-12-13R	1347246.3	483219.9	TAL A
A1P3-12	14	A1P3-C-12-14R	1347356.0	483204.7	TAL A
A1P3-12	15	A1P3-C-12-15V	1347167.5	483281.0	Archive*
A1P3-12	16	A1P3-C-12-16R	1347358.4	483317.2	TAL A
A1P3-13	1	A1P3-C-13-1R	1347458.0	483212.8	TAL A

APPENDIX B
A1PIII CERTIFICATION SAMPLES

CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-13	2	A1P3-C-13-2R	1347523.4	483235.1	TAL A
A1P3-13	3	A1P3-C-13-3V	1347410.9	483306.2	Archive*
A1P3-13	4	A1P3-C-13-4R	1347586.7	483320.2	TAL A
A1P3-13	5	A1P3-C-13-5R	1347661.0	483239.0	TAL A
A1P3-13	6	A1P3-C-13-6R	1347799.0	483225.3	TAL A
A1P3-13	7	A1P3-C-13-7V	1347645.9	483323.1	Archive*
A1P3-13	8	A1P3-C-13-8R	1347807.3	483338.7	TAL A
A1P3-13	9	A1P3-C-13-9R	1347847.2	483196.6	TAL A
A1P3-13	9	A1P3-C-13-9R-D	1347847.2	483196.6	TAL A
A1P3-13	10	A1P3-C-13-10V	1347976.6	483208.7	Archive*
A1P3-13	11	A1P3-C-13-11R	1347848.1	483297.8	TAL A
A1P3-13	12	A1P3-C-13-12R	1347934.3	483297.0	TAL A
A1P3-13	13	A1P3-C-13-13V	1348031.4	483254.0	Archive*
A1P3-13	14	A1P3-C-13-14R	1348107.4	483223.3	TAL A
A1P3-13	15	A1P3-C-13-15R	1348006.6	483345.9	TAL A
A1P3-13	16	A1P3-C-13-16R	1348129.2	483362.2	TAL A
A1P3-14	1	A1P3-C-14-1V	1346369.7	483020.7	Archive*
A1P3-14	2	A1P3-C-14-2RM	1346480.8	482981.0	TAL B
A1P3-14	3	A1P3-C-14-3RM	1346638.3	482887.2	TAL B
A1P3-14	3	A1P3-C-14-3RM-D	1346638.3	482887.2	TAL B
A1P3-14	4	A1P3-C-14-4RM	1346628.5	483051.9	TAL B
A1P3-14	5	A1P3-C-14-5V	1346724.9	482838.9	Archive*
A1P3-14	6	A1P3-C-14-6RM	1346871.3	482898.2	TAL B
A1P3-14	7	A1P3-C-14-7RM	1346722.1	483053.0	TAL B
A1P3-14	8	A1P3-C-14-8RM	1346814.6	482985.0	TAL B
A1P3-14	9	A1P3-C-14-9RM	1346932.2	482946.0	TAL B
A1P3-14	10	A1P3-C-14-10RM	1347016.6	482917.5	TAL B
A1P3-14	11	A1P3-C-14-11RM	1346951.9	483040.0	TAL B
A1P3-14	12	A1P3-C-14-12V	1347053.1	483075.1	Archive*
A1P3-14	13	A1P3-C-14-13RM	1347130.4	482897.2	TAL B
A1P3-14	14	A1P3-C-14-14V	1347200.6	482902.1	Archive*
A1P3-14	15	A1P3-C-14-15RM	1347160.6	483048.5	TAL B
A1P3-14	16	A1P3-C-14-16RM	1347274.4	483027.4	TAL B
A1P3-15	1	A1P3-C-15-1RM	1347298.7	482855.7	TAL B
A1P3-15	2	A1P3-C-15-2V	1347420.2	482828.9	Archive*
A1P3-15	3	A1P3-C-15-3RM	1347495.4	482848.5	TAL B
A1P3-15	4	A1P3-C-15-4RM	1347635.3	482866.6	TAL B
A1P3-15	5	A1P3-C-15-5RM	1347331.4	482981.4	TAL B
A1P3-15	6	A1P3-C-15-6V	1347436.0	483100.7	Archive*
A1P3-15	7	A1P3-C-15-7RM	1347646.1	482980.0	TAL B
A1P3-15	8	A1P3-C-15-8RM	1347582.9	483139.3	TAL B

CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-15	9	A1P3-C-15-9V	1347789.1	482812.2	Archive*
A1P3-15	10	A1P3-C-15-10RM	1347918.6	482859.6	TAL B
A1P3-15	11	A1P3-C-15-11RM	1347930.3	482699.6	TAL B
A1P3-15	12	A1P3-C-15-12RM	1347865.9	482920.0	TAL B
A1P3-15	13	A1P3-C-15-13V	1347719.7	483038.3	Archive*
A1P3-15	14	A1P3-C-15-14RM	1347832.2	483023.9	TAL B
A1P3-15	15	A1P3-C-15-15RM	1347804.1	483110.0	TAL B
A1P3-15	16	A1P3-C-15-16RM	1347940.8	483054.0	TAL B
A1P3-15	16	A1P3-C-15-16RM-D	1347940.8	483054.0	TAL B
A1P3-16	1	A1P3-C-16-1RM	1347297.9	482703.0	TAL B
A1P3-16	2	A1P3-C-16-2RM	1347443.2	482723.2	TAL B
A1P3-16	3	A1P3-C-16-3RM	1347554.9	482665.6	TAL B
A1P3-16	4	A1P3-C-16-4V	1347668.7	482713.3	Archive*
A1P3-16	5	A1P3-C-16-5RM	1347755.8	482633.6	TAL B
A1P3-16	6	A1P3-C-16-6RM	1347897.4	482635.4	TAL B
A1P3-16	7	A1P3-C-16-7V	1347970.7	482631.1	Archive*
A1P3-16	8	A1P3-C-16-8RM	1348005.7	482687.6	TAL B
A1P3-16	9	A1P3-C-16-9RM	1348164.0	482592.4	TAL B
A1P3-16	10	A1P3-C-16-10RM	1348293.9	482619.7	TAL B
A1P3-16	11	A1P3-C-16-11V	1348173.5	482660.1	Archive*
A1P3-16	12	A1P3-C-16-12RM	1348342.7	482691.5	TAL B
A1P3-16	12	A1P3-C-16-12RM-D	1348342.7	482691.5	TAL B
A1P3-16	13	A1P3-C-16-13RM	1348464.0	482558.5	TAL B
A1P3-16	14	A1P3-C-16-14RM	1348664.0	482621.3	TAL B
A1P3-16	15	A1P3-C-16-15V	1348538.6	482647.5	Archive*
A1P3-16	16	A1P3-C-16-16RM	1348634.3	482683.9	TAL B
A1P3-17	1	A1P3-C-17-1R	1348349.0	483535.2	TAL A
A1P3-17	2	A1P3-C-17-2R	1348436.9	483511.0	TAL A
A1P3-17	3	A1P3-C-17-3V	1348231.0	483586.5	Archive*
A1P3-17	4	A1P3-C-17-4R	1348409.2	483642.6	TAL A
A1P3-17	5	A1P3-C-17-5V	1348618.8	483520.4	Archive*
A1P3-17	6	A1P3-C-17-6R	1348805.4	483544.9	TAL A
A1P3-17	7	A1P3-C-17-7R	1348580.0	483648.0	TAL A
A1P3-17	8	A1P3-C-17-8R	1348747.1	483629.2	TAL A
A1P3-17	9	A1P3-C-17-9R	1348283.9	483763.7	TAL A
A1P3-17	10	A1P3-C-17-10R	1348486.8	483688.9	TAL A
A1P3-17	11	A1P3-C-17-11V	1348345.8	483819.0	Archive*
A1P3-17	12	A1P3-C-17-12R	1348524.8	483773.8	TAL A
A1P3-17	13	A1P3-C-17-13V	1348681.9	483687.5	Archive*
A1P3-17	14	A1P3-C-17-14R	1348848.0	483735.1	TAL A
A1P3-17	15	A1P3-C-17-15R	1348683.3	483847.7	TAL A

APPENDIX B
A1PIII CERTIFICATION SAMPLES

CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-17	16	A1P3-C-17-16R	1348764.4	483820.6	TAL A
A1P3-17	16	A1P3-C-17-16R-D	1348764.4	483820.6	TAL A
A1P3-18	1	A1P3-C-18-1R	1348317.2	483237.6	TAL A
A1P3-18	2	A1P3-C-18-2R	1348410.9	483228.2	TAL A
A1P3-18	3	A1P3-C-18-3V	1348227.6	483369.1	Archive*
A1P3-18	4	A1P3-C-18-4R	1348404.0	483371.5	TAL A
A1P3-18	5	A1P3-C-18-5R	1348468.0	483199.2	TAL A
A1P3-18	6	A1P3-C-18-6V	1348549.2	483260.2	Archive*
A1P3-18	7	A1P3-C-18-7R	1348465.2	483393.4	TAL A
A1P3-18	8	A1P3-C-18-8R	1348561.9	483320.0	TAL A
A1P3-18	9	A1P3-C-18-9R	1348674.6	483233.2	TAL A
A1P3-18	9	A1P3-C-18-9R-D	1348674.6	483233.2	TAL A
A1P3-18	10	A1P3-C-18-10V	1348726.3	483196.2	Archive*
A1P3-18	11	A1P3-C-18-11R	1348656.8	483380.6	TAL A
A1P3-18	12	A1P3-C-18-12R	1348732.6	483373.1	TAL A
A1P3-18	13	A1P3-C-18-13R	1348851.2	483140.2	TAL A
A1P3-18	14	A1P3-C-18-14R	1348913.4	483119.9	TAL A
A1P3-18	15	A1P3-C-18-15V	1348778.3	483282.0	Archive*
A1P3-18	16	A1P3-C-18-16R	1348815.7	483354.0	TAL A
A1P3-19	1	A1P3-C-19-1RM	1348089.1	482863.1	TAL B
A1P3-19	2	A1P3-C-19-2V	1348208.9	482811.2	Archive*
A1P3-19	3	A1P3-C-19-3RM	1348136.7	482945.7	TAL B
A1P3-19	4	A1P3-C-19-4RM	1348197.9	482895.6	TAL B
A1P3-19	5	A1P3-C-19-5RM	1348116.8	483027.5	TAL B
A1P3-19	6	A1P3-C-19-6RM	1348245.0	483014.9	TAL B
A1P3-19	7	A1P3-C-19-7RM	1348053.3	483087.0	TAL B
A1P3-19	8	A1P3-C-19-8V	1348243.3	483089.7	Archive*
A1P3-19	9	A1P3-C-19-9RM	1348410.0	482822.8	TAL B
A1P3-19	10	A1P3-C-19-10RM	1348565.0	482845.3	TAL B
A1P3-19	11	A1P3-C-19-11V	1348409.7	482935.2	Archive*
A1P3-19	12	A1P3-C-19-12RM	1348581.4	482978.5	TAL B
A1P3-19	13	A1P3-C-19-13RM	1348640.9	482777.0	TAL B
A1P3-19	14	A1P3-C-19-14V	1348845.8	482824.0	Archive*
A1P3-19	15	A1P3-C-19-15RM	1348705.4	482984.9	TAL B
A1P3-19	15	A1P3-C-19-15RM-D	1348705.4	482984.9	TAL B
A1P3-19	16	A1P3-C-19-16RM	1348860.1	482927.6	TAL B
A1P3-20	1	A1P3-C-20-1R	1348956.9	483404.5	TAL A
A1P3-20	2	A1P3-C-20-2R	1349084.5	483422.2	TAL A
A1P3-20	3	A1P3-C-20-3R	1348989.8	483497.8	TAL A
A1P3-20	4	A1P3-C-20-4V	1349091.0	483536.2	Archive*
A1P3-20	5	A1P3-C-20-5R	1349270.7	483426.3	TAL A

APPENDIX B
A1PIII CERTIFICATION SAMPLES

CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-20	6	A1P3-C-20-6R	1349368.0	483387.7	TAL A
A1P3-20	7	A1P3-C-20-7V	1349224.3	483521.7	Archive*
A1P3-20	8	A1P3-C-20-8R	1349397.0	483497.0	TAL A
A1P3-20	9	A1P3-C-20-9R	1349054.8	483607.1	TAL A
A1P3-20	10	A1P3-C-20-10V	1348923.3	483671.7	Archive*
A1P3-20	11	A1P3-C-20-11R	1349132.9	483722.0	TAL A
A1P3-20	12	A1P3-C-20-12R	1349230.0	483665.0	TAL A
A1P3-20	13	A1P3-C-20-13R	1349076.0	483810.0	TAL A
A1P3-20	14	A1P3-C-20-14R	1349237.8	483826.7	TAL A
A1P3-20	15	A1P3-C-20-15R	1349001.2	483875.6	TAL A
A1P3-20	15	A1P3-C-20-15R-D	1349001.2	483875.6	TAL A
A1P3-20	16	A1P3-C-20-16V	1349186.3	483886.0	Archive*
A1P3-21	1	A1P3-C-21-1R	1349359.3	483589.3	TAL A
A1P3-21	2	A1P3-C-21-2R	1349416.4	483620.2	TAL A
A1P3-21	2	A1P3-C-21-2R-D	1349416.4	483620.2	TAL A
A1P3-21	3	A1P3-C-21-3R	1349363.0	483666.6	TAL A
A1P3-21	4	A1P3-C-21-4V	1349440.9	483665.9	Archive*
A1P3-21	5	A1P3-C-21-5R	1349264.1	483694.7	TAL A
A1P3-21	6	A1P3-C-21-6V	1349323.0	483736.0	Archive*
A1P3-21	7	A1P3-C-21-7R	1349392.0	483745.7	TAL A
A1P3-21	8	A1P3-C-21-8R	1349444.2	483722.9	TAL A
A1P3-21	9	A1P3-C-21-9R	1349219.0	483745.5	TAL A
A1P3-21	10	A1P3-C-21-10R	1349275.2	483805.5	TAL A
A1P3-21	11	A1P3-C-21-11R	1349337.2	483776.8	TAL A
A1P3-21	12	A1P3-C-21-12V	1349327.0	483848.0	Archive*
A1P3-21	13	A1P3-C-21-13R	1349389.9	483783.2	TAL A
A1P3-21	14	A1P3-C-21-14V	1349424.4	483814.9	Archive*
A1P3-21	15	A1P3-C-21-15R	1349385.7	483881.2	TAL A
A1P3-21	16	A1P3-C-21-16R	1349463.8	483867.7	TAL A
A1P3-22	1	A1P3-C-22-1V	1349025.8	483013.3	Archive*
A1P3-22	2	A1P3-C-22-2R	1349122.5	482984.2	TAL A
A1P3-22	3	A1P3-C-22-3R	1348977.0	483109.8	TAL A
A1P3-22	4	A1P3-C-22-4R	1349136.5	483061.6	TAL A
A1P3-22	5	A1P3-C-22-5R	1349250.8	483007.2	TAL A
A1P3-22	6	A1P3-C-22-6V	1349347.9	483022.6	Archive*
A1P3-22	7	A1P3-C-22-7R	1349265.6	483091.5	TAL A
A1P3-22	8	A1P3-C-22-8R	1349368.6	483102.3	TAL A
A1P3-22	9	A1P3-C-22-9R	1349004.0	483166.9	TAL A
A1P3-22	10	A1P3-C-22-10V	1349106.7	483149.8	Archive*
A1P3-22	11	A1P3-C-22-11R	1348979.9	483219.1	TAL A
A1P3-22	12	A1P3-C-22-12R	1349146.1	483264.8	TAL A

APPENDIX B
A1PIII CERTIFICATION SAMPLES

CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-22	12	A1P3-C-22-12R-D	1349146.1	483264.8	TAL A
A1P3-22	13	A1P3-C-22-13R	1349181.3	483170.4	TAL A
A1P3-22	14	A1P3-C-22-14V	1349297.2	483215.0	Archive*
A1P3-22	15	A1P3-C-22-15R	1349211.5	483274.6	TAL A
A1P3-22	16	A1P3-C-22-16R	1349348.1	483300.4	TAL A
A1P3-23	1	A1P3-C-23-1RM	1348712.6	482595.8	TAL B
A1P3-23	2	A1P3-C-23-2RM	1348810.1	482576.6	TAL B
A1P3-23	3	A1P3-C-23-3RM	1348859.7	482639.8	TAL B
A1P3-23	3	A1P3-C-23-3RM-D	1348859.7	482639.8	TAL B
A1P3-23	4	A1P3-C-23-4V	1348787.0	482694.7	Archive*
A1P3-23	5	A1P3-C-23-5RM	1348940.8	482676.0	TAL B
A1P3-23	6	A1P3-C-23-6RM	1348858.9	482785.9	TAL B
A1P3-23	7	A1P3-C-23-7RM	1349005.8	482721.1	TAL B
A1P3-23	8	A1P3-C-23-8V	1348928.0	482778.3	Archive*
A1P3-23	9	A1P3-C-23-9RM	1349046.3	482777.1	TAL B
A1P3-23	10	A1P3-C-23-10RM	1348967.0	482870.2	TAL B
A1P3-23	11	A1P3-C-23-11RM	1349144.4	482851.1	TAL B
A1P3-23	12	A1P3-C-23-12V	1349113.9	482920.1	Archive*
A1P3-23	13	A1P3-C-23-13RM	1349201.2	482869.8	TAL B
A1P3-23	14	A1P3-C-23-14V	1349188.4	482942.1	Archive*
A1P3-23	15	A1P3-C-23-15RM	1349334.9	482939.9	TAL B
A1P3-23	16	A1P3-C-23-16RM	1349270.6	482984.6	TAL B
A1P3-24	1	A1P3-C-24-1R	1346021.1	482701.4	TAL A
A1P3-24	2	A1P3-C-24-2R	1346139.8	482741.8	TAL A
A1P3-24	3	A1P3-C-24-3R	1345974.5	482790.3	TAL A
A1P3-24	4	A1P3-C-24-4V	1346110.2	482844.6	Archive*
A1P3-24	5	A1P3-C-24-5R	1346182.1	482667.8	TAL A
A1P3-24	6	A1P3-C-24-6R	1346208.7	482773.9	TAL A
A1P3-24	7	A1P3-C-24-7R	1346271.5	482788.2	TAL A
A1P3-24	8	A1P3-C-24-8V	1346301.2	482914.3	Archive*
A1P3-24	9	A1P3-C-24-9R	1346313.8	482649.1	TAL A
A1P3-24	10	A1P3-C-24-10R	1346376.3	482604.8	TAL A
A1P3-24	11	A1P3-C-24-11R	1346332.4	482735.4	TAL A
A1P3-24	11	A1P3-C-24-11R-D	1346332.4	482735.4	TAL A
A1P3-24	12	A1P3-C-24-12V	1346463.8	482649.3	Archive*
A1P3-24	13	A1P3-C-24-13V	1346396.3	482813.5	Archive*
A1P3-24	14	A1P3-C-24-14R	1346465.0	482767.7	TAL A
A1P3-24	15	A1P3-C-24-15R	1346387.3	482902.6	TAL A
A1P3-24	16	A1P3-C-24-16R	1346527.8	482795.5	TAL A
A1P3-25	1	A1P3-C-25-1RM	1347795.6	482611.7	TAL B
A1P3-25	2	A1P3-C-25-2RM	1347922.9	482602.7	TAL B

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APPENDIX B
A1PIII CERTIFICATION SAMPLES

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CU	Sub-CU	Sample ID	Easting	Northing	Analysis
A1P3-25	3	A1P3-C-25-3RM	1348048.7	482554.9	TAL B
A1P3-25	3	A1P3-C-25-3RM-D	1348048.7	482554.9	TAL B
A1P3-25	4	A1P3-C-25-4V	1348134.7	482548.1	Archive*
A1P3-25	5	A1P3-C-25-5RM	1348256.0	482549.0	TAL B
A1P3-25	6	A1P3-C-25-6V	1348341.2	482548.1	Archive*
A1P3-25	7	A1P3-C-25-7RM	1348411.7	482541.5	TAL B
A1P3-25	8	A1P3-C-25-8RM	1348584.1	482537.1	TAL B
A1P3-25	9	A1P3-C-25-9RM	1348679.2	482528.0	TAL B
A1P3-25	10	A1P3-C-25-10RM	1348822.0	482519.8	TAL B
A1P3-25	11	A1P3-C-25-11V	1348887.8	482564.9	Archive*
A1P3-25	12	A1P3-C-25-12RM	1348969.0	482619.1	TAL B
A1P3-25	13	A1P3-C-25-13RM	1349064.8	482691.3	TAL B
A1P3-25	14	A1P3-C-25-14V	1349094.2	482735.0	Archive*
A1P3-25	15	A1P3-C-25-15RM	1349229.7	482847.3	TAL B
A1P3-25	16	A1P3-C-25-16RM	1349296.1	482833.9	TAL B

* Note that Archive sampels will not be collected initially (see Section 3.3 of the PSP).