2317

PROJECT SPECIFIC PLAN FOR AREA 2, PHASE III PART ONE CERTIFICATION SAMPLING

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

JUNE 1999

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20460-PSP-0002
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PROJECT SPECIFIC PLAN FOR AREA 2, PHASE III PART ONE CERTIFICATION SAMPLING

2317

Project Number 20460

Revision 0
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APPROVAL:

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Soil Characterization and Excavation Project — Date: 6/10/99

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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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A2PIII	Area 2, Phase III
APM	Area Project Manager
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
D&D	decontamination and dismantlement
dpm	disintegrations per minute
DQO	data quality objective
EM	Environmental Monitoring
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
HAMDC	highest allowable minimum detection concentration
HPGe	High Purity Germanium detector
LAN	Local Area Network
MDC	minimum detection concentration
PSP	Project Specific Plan
PWID	Project Waste Identification Document
QA/QC	Quality Assurance/Quality Control
RI	Remedial Investigation
RWP	radiological work permit
SCEP	Soil Characterization and Excavation Project
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SPL	Sample Processing Laboratory
TAL	target analyte list
V/FCN	Variance/Field Change Notice
WAC	waste acceptance criteria
WAO	Waste Acceptance Operations

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Project Specific Plan (PSP) is to describe the certification sampling and analysis necessary to certify Area 2, Phase III (A2PIII) Part One soil and stockpile soil to demonstrate risk-based area-specific constituents of concern (ASCOCs) final remediation levels (FRLs) have been met. A2PIII Part One consists of approximately 70 acres of land located in the south-central portion of the Fernald Environmental Management Project (FEMP) (see Figure 1-1). This includes the portion of the FEMP property north of Willey Road and west of the South Access Road. There are four soil stockpiles also included in this certification; three are located within the A2PIII boundary east of the Storm Sewer Outfall line, and one soil stockpile is located near the Equipment Wash Facility in the Area 2, Phase II footprint. The area has remained relatively nonimpacted by former production operations due to its perimeter location, although several underground piping installations and other construction activities have occurred within the area footprint.

1.2 SCOPE

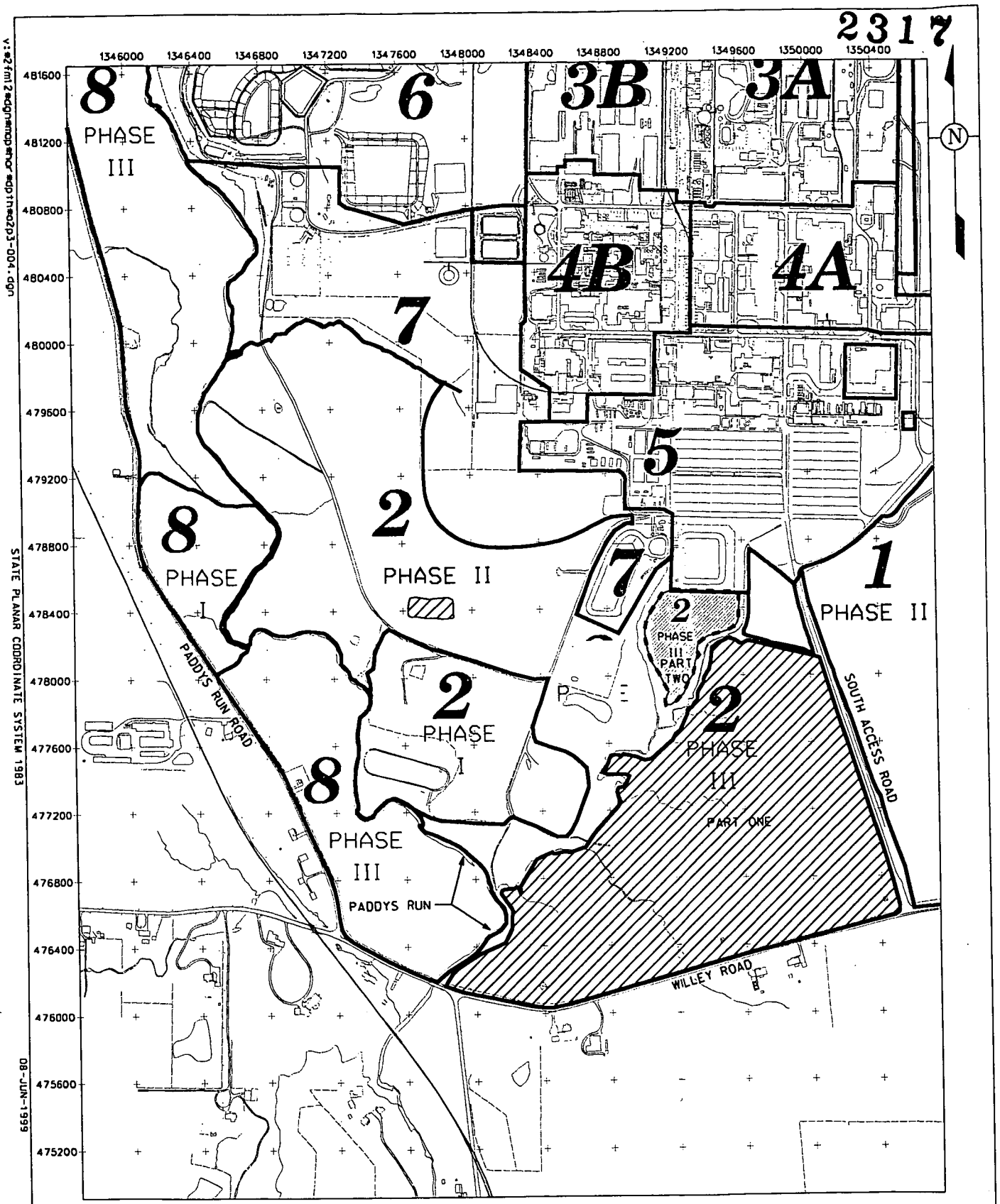
This PSP covers all physical sampling associated with A2PIII Part One certification. The certification design is consistent with the Certification Design Letter (CDL) for A2PIII Part One, 20460-RP-0001, Rev. 0. All sampling and analysis activities will be consistent as possible with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ), Section 3.4 of the Sitewide Excavation Plan (SEP), and Data Quality Objective (DQO) SL-052, Rev. 1. DQO SL-052 is included as 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	Rob Janke	Kathi Nickel
Area Project Manager	Tom Crawford	Jyh-Dong Chiou
Characterization Lead	Mike Rolfes	John Centers
Field Sampling Lead	Mike Frank	Tom Buhrlage
Surveying Lead	Jim Schwing	Jim Capannari
Waste Acceptance Operations	Linda Barlow	TBD
Laboratory Contact	Bill Westerman	Grace Ruesink
Data Validation Contact	Jim Chambers	Jim Cross
Data Management Contact	Deanna Diallo	Jeff Maple
Quality Assurance Contact	Reinhard Friske	Ervin O'Bryan
Health and Safety Contact	Debra Grant	Lewis Wiedeman



LEGEND:

AREA BOUNDARY

A2PIII PART ONE AREA (Except for tributaries)

A2PIII PART TWO AREA

000008

SCALE

800 400 0 800 FEET

FIGURE 1-1. A2PIII LOCATION MAP

2.0 CERTIFICATION SAMPLING PROGRAM

2.1 CERTIFICATION DESIGN

Details and logic of the certification design for A2PIII Part One are described in the A2PIII Part One CDL. The certification design and sampling strategy generally follows Section 3.4 of the SEP except for the soil stockpile certification units (CUs). The A2PIII Part One area has two separate CU sampling designs (as shown in Figure 2-1). The areas to be certified consist of the following:

- Fourteen Open Field Group 2 CUs (as described in Section 4.1.1 of the A2PIII Part One CDL)
- Eight Stockpile Group 2 CUs (as described in Section 4.1.2 of the A2PIII Part One CDL).

2.1.1 Open Field

The 14 open field Group 2 CUs, which can be as large as 250,000 square feet, are identified and depicted in Figure 2-2. The CUs along the eastern boundary are adjacent to the west side of the South Access Road. The CUs along the southern boundary extend to Willey Road. The CUs bounded by Paddys Run, the Storm Sewer Outfall Line, and the unnamed tributaries extend only partially down the sidebanks to allow for potential backup during extreme rain events and flooding.

Certification sampling will consist of the collection of 16 randomly selected physical soil samples within each CU per Section 3.4.2.1 in the SEP. Sample locations were generated by dividing each CU into 16 approximately equal sub-CUs, then randomly selecting easting and northing coordinates within each sub-CU boundary. The selected locations must also meet the minimum distance criterion, 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. The minimum distance criterion is discussed in detail in Section 4.1 of the A2PIII Part One CDL. Additional alternative random sample locations were also generated in case the original random sample location did not meet the minimum distance criterion. If this was the case, then the first alternative location was selected and all the locations were re-tested against the minimum distance criterion. This process was continued until all 16 random locations in each CU met this criterion.

Random number generation was used to determine which samples would be archived and which would have duplicate samples taken.

Of the 16 certification samples to be collected, a total of 12 will be submitted for analysis. In order to determine which samples to analyze while still providing sufficient areal coverage, each CU was divided into quadrants, with each quadrant containing four sample locations. Three of the four samples from each quadrant were then randomly selected for analysis, resulting in a total of 12 samples analyzed per CU. The other four samples from each CU, as shown in Appendix B, are to be archived and will be analyzed only if necessary. If archived samples are analyzed, a variance/field change notice (V/FCN) will be generated listing the archives pulled for analyses and the appropriate TAL. Appendix C lists all the samples per CU including coordinates and analytical disposition. See Table 3-1 for TAL parameters.

2.1.2 Stockpile CU Sampling

Although the soil generated in creation of the stockpiles is considered nonimpacted, the sampling approach will be different than other areas within A2PIII. Each one of the four stockpiles will be designated as two CUs. One CU is for the footprint underneath the stockpile at which native soil begins. The other CU is the stockpile CU, where random depth intervals will be sampled. This totals eight stockpile Group 2 CUs. The four stockpiles are shown in Figure 2-1 and 2-2. Sixteen sample locations will be generated for A2P3-2S, 2SF, 3S, and 3SF. Eighteen sample locations will be generated for A2P3-4S and 4SF due to the large size of the pile. Only 12 sample locations will be generated for A2P3-1S and A2P3-1SF due to the small size of the pile. Appendix B illustrates each stockpile sample location. Appendix D lists all the samples per CU, including the depth intervals, coordinates, and TALs.

2.2 SURVEYING

The NAD83 State Planar coordinates have been determined for each sample location, listed in Appendix B. Before collection, sample locations will be identified and flagged using standard land surveying methods. If surface features prevent the collection of soil samples at the planned location, the sample location may be field adjusted to accommodate safe and reasonable sample locations but may not cross CU boundaries. Any sample location moved more than three feet from the planned location must be approved by the Characterization Lead or designee and documented in a V/FCN. In

one exception, the Characterization Lead or designee must be notified prior to any movement of sample locations A2P3-C-01-15 and A2P3-C-01-16 due to the minimum distance constraints.

2.3 PHYSICAL SOIL SAMPLE COLLECTION

All soil samples will be collected using a 3-inch x 6-inch long diameter plastic or stainless steel liner except for stockpiles (as identified in procedure SMPL-01) and will be sealed using plastic end caps. A variety of sampling equipment and methods will potentially be utilized for sampling locations dependent on the surface conditions. More specifically, the surface soil sampling locations in areas covered by grass will be sampled using a 3-inch diameter plastic or stainless steel liner. The liner is manually driven six inches into the ground using a slide hammer and adaptor attached to the top of the liner. For surface soil sample locations in gravel areas, either a Geoprobe® core sampler (Macro-core tool) or hand auger will be used to penetrate the gravel to reach the original surface soil. For the soil stockpiles accessible with a vehicle, Geoprobe® core sampling equipment will be used. Otherwise, a hand auger or other manual core sampling equipment will be utlized in accordance with procedure SMPL-01, "Solids Sampling," to prevent cross-contamination. At the discretion of the Field Sampling Lead, samples may be collected using other methods with concurrence from the Characterization Lead as specified in SMPL-01.

Prior to collection of the soil cores, the field sampling technician will remove all surface vegetation within a six-inch radius of the points to be sampled using a gloved hand or stainless steel trowel, taking care not to remove any of the surface soil. Regardless of the sample collection apparatus, the surface soil samples will be collected from the 0 to 6 inch interval at each location. IF a sample point is located within the footprint of a gravel/paved pad or road, the sample will be taken to a depth of six inches below the gravel/asphalt base. To meet the quality control requirements, twice the sample volume will be collected at the sample locations (identified in Appendices C and D). These duplicate soil samples will be collocated within a 1 foot radius and not composited. All samples, including duplicates, will be assigned a unique sample identification number as identified in Section 2.3.2 and Appendix B.

Stockpile base footprint CU samples will follow the same protocol established in Section 3.4.2 of the SEP and will be collected at the planned depth identified in Appendix D. Lithological information to determine stockpile and native soil interface will be recorded for the sampling at the stockpile and

footprint location. If native soil is not encountered at the planned depth for the footprint interval, sampling will proceed until native soil is reached. Each soil core will be beta/gamma frisked in the field. All six-inch intervals which exhibit greater than background beta/gamma measurements (corrected counts per minute) will supercede the randomly identified six-inch interval and be submitted for analysis. If no interval exhibits greater than background beta/gamma, the original identified interval will be submitted.

Note: If the randomly identified six-inch interval is superceded by an interval that exhibits greater than background beta/gamma measurements, the new depth interval submitted for analysis will be documented on a V/FCN. If the native soil interface for stockpile footprint samples is not at the planned depth, the new interval will be documented on a V/FCN.

If surface or subsurface obstacles prevent sample collection at any of the original locations identified in Appendix B or C, the location may be moved up to one foot in radius from the original location. The distance and direction moved will be noted on the Field Activity Log (FAL). If the new location is greater than one foot in radius from the originally planned sample point, the change will be documented on a V/FCN form. If any certification sampling location is moved, it must remain within the boundary of the same sub-CU. Customer sample numbers and Fernald Analytical Customer 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 FAL, Sample Collection Log, and Chain of Custody/Request for Analysis; this documentation is to be completed in the field prior to submitting of the samples.

All samples collected from one CU (including QC samples) will be batched and submitted to the Sample Processing Laboratory (SPL) on one Chain-of-Custody form as one analytical release. Archive samples (see Appendix B) will be kept under the Chain-of-Custody of the field crew and will not be submitted to the SPL. Upon completion of sample collection, boreholes will be collapsed.

2.3.1 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 has been decontaminated prior to transport to the field sampling site. Decontamination is only necessary in the field when sampling equipment is reused; therefore, core

liners do not require decontamination. 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. Equipment that comes into contact with the sample will be decontaminated at Level II (Section K.11, SCQ) in the field. Clean disposable wipes may be used to replace air drying of the equipment.

2.3.2 Certification Physical Sample Identification

Each certification soil sample will be assigned a unique sample identification code, as follows:

A2P3-C-CU-Location-Suite-QC, where:

A2P3	=	Sample collected from Remediation Area 2, Phase III (Note that the number "3" is used in place of the roman numeral "III" in the ID number for data management purposes)
C	=	Certification Sample
CU	=	Certification unit from which sample was collected (Either: 02, 03, 04, etc. for Open Field CUs, 1S, 2S, 3S, 4S for Stockpile CUs, or 1SF, 2SF, 3SF, or 4SF for Footprint CUs)
Location	=	Sample location number within each CU (1 through 18)
Suite	=	"R", for radiological, "V" for archive
QC	=	Quality control sample, if applicable. A "D" indicates a duplicate sample, "X" indicates a rinsate, "Y" indicates a container blank sample.

Note: The A2PIII Part One CUs start with 02. A2P3-01 is reserved for A2PIII Part Two samples identified in a separate PSP.

Therefore, a duplicate sample taken from the 15th sample location from within CU-02 would be identified as A2P3-C-02-15-R-D.

000013

1346700 1347000 1347300 1347600 1347900 1348200 1348500 1348800 1349100 1349400 1349700 1350000 1350300 1350600 1350900

478500 478200 477900 477600 477300 477000 476700 476400 476100

A2P3-02 A2P3-03 A2P3-04 A2P3-05 A2P3-06 A2P3-07 A2P3-08 A2P3-09 A2P3-10 A2P3-11 A2P3-12 A2P3-13 A2P3-14 A2P3-15

LEGEND:

A2PIII PART ONE OPEN FIELD CU BOUNDARIES

A2PIII PART ONE OPEN FIELD CU SAMPLES

A2PIII PART ONE SOIL STOCKPILES (SEE APPENDIX FOR CU SAMPLE LOCATIONS)

000014

SCALE

300 150 0 300 FEET

v:\a2fm12\dgn\map\hor\dpthea2p3-011.dgn STATE PLANAR COORDINATE SYSTEM 1983 09-JUN-1999

FIGURE 2-1. A2PIII PART ONE OPEN FIELD CU SAMPLE LOCATIONS

1346800 1347150 1347600 1347850 1348200 1348650 1348900 1349250 1349600 1349950 1350300 1350650 1351000 1351350 1351700

478800 478450 478100 477750 477400 477050 476700 476350 476000

A2P3-4S
A2P3-4SF
A2P3-1S
A2P3-1SF
A2P3-02
TRIBUTARIES
A2P3-04
A2P3-05
A2P3-03
A2P3-2S
A2P3-2SF
A2P3-06
A2P3-08
A2P3-07
A2P3-3SF
A2P3-3S
A2P3-09
A2P3-10
A2P3-15
A2P3-14
A2P3-12
A2P3-13
A2P3-11

N

y:#2fm12#dgn#map#hor#dpth#a2p3-cu.dgn

LEGEND:

——— CU BOUNDARIES

000015

SCALE

350 175 0 350 FEET

y:#2fm12#dgn#map#hor#dpth#a2p3-cu.dgn STATE PLANAR COORDINATE SYSTEM 1983 09-JUN-1999

FIGURE 2-2. A2PIII PART ONE CERTIFICATION UNITS

3.0 CERTIFICATION SAMPLE ANALYSIS

The necessary volume of all samples collected will be prepared for the appropriate analytical method per requirements of the SCQ. Sampling and analytical requirements are listed in Table 3-1. The TAL is shown in Appendix E.

If the Area Project Manager (APM) decides to analyze samples subject to methods not described in the SCQ, the APM shall ensure that:

- A variance is issued to include references confirming that the new method is sufficient to support data needs
- Variations from the SCQ methodology are documented in the PSP, or
- The APM may request data validation for affected samples or communicate to the lab that Data Qualifier Codes of J and R be attached to detected and nondetected constituents of concern, respectively.

TABLE 3-1
SAMPLING AND ANALYTICAL REQUIREMENTS

ANALYTE	METHOD	SAMPLE MATRIX	LAB	ASL	PRESERVE	HOLDING TIME	CONTAINER
Total uranium, Radium-226, Radium-228, Thorium-228, Thorium-232	Alpha or Gamma Spectroscopy	Solid	On-site or off-site	D*	None	12 months	Plastic or stainless steel core liner or 500 ml glass or plastic Container
Total uranium, Radium-226, Radium-228, Thorium-228, Thorium-232	Alpha or Gamma Spectroscopy	Liquid (rinsate/ container blank)	On-site or off-site	D*	HNO_3 to pH < 2	6 months	6 liter polyethylene

* The SCQ Highest Allowable Minimum Detectable Concentration (HAMDC) for total uranium by gamma spectroscopy at ASL D is 0.1 ppm. The MDC needed for this certification event is 8 ppm which is less stringent than the ASL D. The data deliverable for total uranium analysis by gamma spectroscopy will be identical in specifications for ASL D except for the HAMDC. As a result, the total uranium gamma spectroscopy data is considered ASL E.

000017

4.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

4.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS AND DATA VALIDATION

The field quality control, analytical, and data validation requirements are as follows:

- Field quality control requirements include one duplicate for each CU, as noted in Appendix B and further described in 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 1 per 20 certification samples where reusable equipment (e.g. hand augers, push tubes) is used for collection. All field QC samples will be analyzed per TAL 20460-PSP-0002-A.

- All analyses will be performed at ASL D with one exception. The analytical package for total uranium analysis by gamma spectroscopy will be identical in specifications for ASL D except for the HAMDC. As a result, the total uranium gamma spectroscopy data is considered ASL E.

- All field data will be validated. An ASL D analytical package will be provided for ten percent of the samples and an ASL B package at a minimum for ninety percent of the samples. Ten percent of the analytical data will be validated to ASL D and ninety percent to ASL B. This will be obtained by validating to ASL D three randomly chosen CUs; A2P3-03, A2P3-07, and A2P3-10. If any result is rejected, all data from the laboratory with the rejected result will then be validated to determine the integrity of the results from that laboratory. This change will be documented in a variance to this PSP.

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. This work is being performed per the requirements as stated in DQO SL-052 (Appendix A).

4.2 PROCEDURES AND MANUALS

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.

- ADM-02, Field Project Prerequisites
- EQT-33, Real Time Differential Global Positioning System Operation
- Sitewide CERCLA Quality Assurance Project Plan
- SMPL-01, Solids Sampling
- SMPL-21, Collection of Field Quality Control Samples
- S.P. 766-S-1000, Shipping Samples to Offsite Laboratories

000018

- Trimble Pathfinder Pro-XL GPS Operation Manual

4.3 INDEPENDENT ASSESSMENT

Independent assessment will be performed by the FEMP Quality Assurance (QA) organization by conducting a surveillance, consisting of monitoring/observing ongoing project activities and work areas to verify conformance to specified requirements. Surveillances will be planned and documented in accordance with Section 12.3 of the SCQ.

4.4 IMPLEMENTATION OF CHANGES

Before implementating 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 Area Project Manager, QA, and the Characterization Lead for the changes to the PSP, the changes may be implemented. Changes to the PSP will noted in the applicable field activity logs and on a V/FCN. QA must receive the completed V/FCN, which includes the signatures of the Characterization Lead, Sampling Manager, Area Project Manager, and QA within seven working days of implementation of the change.

5.0 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), penetration permits, and other applicable permits. Concurrence with applicable safety permits is required by each technician in the performance of their assigned duties. A safety briefing will be conducted prior to the initiation of field activities.

All emergencies shall be reported immediately on extension 911, or to the Site Communications Center at 648-6511 (if using a cellular phone), or using a radio and contacting "CONTROL" on Channel 11.

6.0 DATA MANAGEMENT

A data management process will be implemented to collect and manage certification information collected during the investigation. 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.

Electronically recorded data from the Geodimeter and global positioning system (GPS) will be downloaded to disks on a daily basis or as the project requires. Survey team members will review the data for completeness and accuracy and then download it onto the Local Area Network (LAN). Once on the LAN, the Data Management Contact will perform an evaluation of the coordinate data. 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 Access Software. Survey field team members will retain all downloaded data on disk for future reference and archive.

Field documentation, such as the FAL, Geodimeter Survey Files, the Sample Collection Log, the Lithological Log (required for stockpile CUs) 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 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.

All records associated with this PSP should reference the PSP number and eventually forwarded to Engineering/Construction Document Control to be placed in the project file.

APPENDIX A

DATA QUALITY OBJECTIVE
(DQO SL-052, Rev. 0)

Control Number 2317

Fernald Environmental Management Project

Data Quality Objectives

Title: Sitewide Certification Sampling and Analysis without using HPGe Detectors

Number: SL-052

Revision: 1

Effective Date: June 10, 1999

Contact Name: Mike Rolfes

Approval: Frank Thompson FOR James Chambers
DQO Coordinator

Date: 6/10/99

Approval: J.D. Chiou
SCEP Project Director

Date: 6/10/99

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

DATA QUALITY OBJECTIVES
Sitewide Certification Sampling and Analysis

Members of Data Quality Objectives (DQO) Scoping Team

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

Conceptual Model of the Site

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

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

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

1.0 Statement of Problem

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

Exposure to Soil

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

Available Resources

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

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

with the CU-specific COC FRLs to release the designated Remediation Area for planned interim grading, eventual restoration under the Natural Resources Restoration Plan (NRRP), and other final land use activities.

2.0 Identify the Decision

Decision

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

Possible Results

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

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

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

3.0 Inputs That Affect the Decision

Required Information

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

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

Contaminant-Specific Action Levels
The cleanup levels are the soil FRLs published in the OU5 and OU2 RODs. BTVs being considered in the remediation process are published in the OU5 Ecological Risk Assessment and are being reviewed for site consideration in 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 and stockpile soil in areas that are undergoing certification as part of FEMP remediation.

Population of Soil: Soil includes all excavated surfaces, defined sub-surface intervals, and undisturbed, relatively unimpacted native soil 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 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_o: 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 cells (or 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 criteria. The minimum distance criteria 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 used to establish the minimum distance between random location pairs is as follows:

$$\text{distance} = \sqrt{\left(\text{easting}_1 - \text{easting}_0\right)^2 + \left(\text{northing}_1 - \text{northing}_0\right)^2}$$

The equation used to check the minimum distance criteria is

$$\text{MD} = \frac{\sqrt{\text{Area}_{sub-CU}}}{\sqrt{16}} \times \frac{1}{2} \text{ or } \frac{\sqrt{\text{Area}_{sub-CU}}}{8}$$

This equation was derived under the following assumptions:

- $\sqrt{\text{Area}_{sub-CU}}$ = the average length of a CU side

since the area of a CU (in its simplest form, a square) is equal to height time width;

- $\sqrt{16}$ = **the average number of *sub-CUs* on a side of the CU**

since the number of cells or sub-CUs (in its simplest form, a 4x4 configuration) is equal to 4; and ½ was chosen to allow sample points to be only as close as ½ of the average sub-CU side length.

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

Physical Samples

Physical soil certification samples will be collected according to SMPL-01 at all 16 locations per CU except for A2P3-1S, A2P3-1SF, A2P3-4S, and A2P3-4SF. Only 12 sample locations will be generated for CUs A2P3-1S and A2P3-1SF due to the small size of the pile, as identified in the area certification PSP. Eighteen sample locations will be generated for CUs A2P3-4S and A2P3-4SF due to the larger size of the pile, as identified in the area certification PSP. Sample collection depth will be 0"-6", unless otherwise noted in the PSP. As defined in the PSP, 8 to 18 samples per CU will be submitted to the on-site laboratory or a FDF approved off-site laboratory for analysis at ASL D requirements per the SCQ.

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 data package. The remaining analytical data will be validated to a minimum of ASL B and will require an ASL B data package. If any result is rejected, all data from the laboratory with the rejected result will then be validated to determine the integrity of the results from that laboratory. This change will be documented in a variance to this PSP.

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: Certification Sampling and Analysis

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

RI ☐ FS ☐ RD ☐ RA ☒ R_vA ☐ OTHER_____

1.C. DQO No.: SL-052, Rev. 0 DQO Reference No.:_____

---

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

Air ☐ Biological ☐ Groundwater ☐ Sediment ☐ Soil ☒

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

---

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

Site Characterization
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 (Certification)
A ☐ B ☐ C ☐ D ☒ * E ☐

4.A. 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).

4.B. 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.

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 Radiological	☒*	TPH	☐
Spec. Conductance	☐	Metals	☒*	Oil/Grease	☐
Dissolved Oxygen	☐	Cyanide	☐		
Technetium-99	☒*	Silica	☐		
4. Cations	☐	5. VOA	☒*	6. Other (specify)	
Anions	☐	BNA	☐		
TOC	☐	Pesticides	☒*		
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)

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

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

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

Background samples: OU5 RI

7.C. Sample Collection Reference:

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

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

8.A. Field Quality Control Samples:

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

Other (specify)
*Collected for volatile organic sampling
**As noted in the PSP
*** Split samples will be collected where required by the EPA.

8.B. Laboratory Quality Control Samples:

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

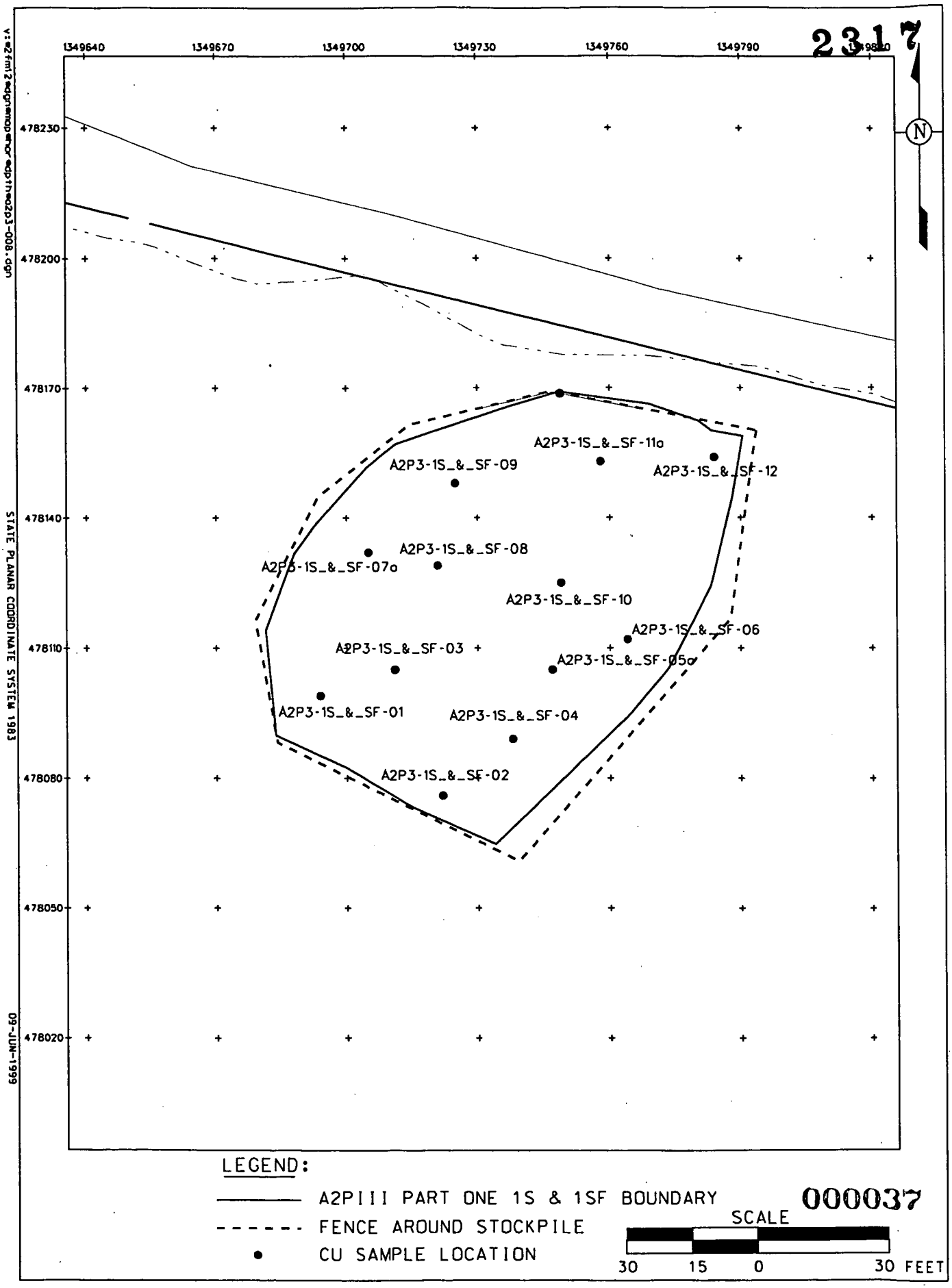
Other (specify) _____

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

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

APPENDIX B

AREA 2, PHASE III PART ONE STOCKPILE CU CERTIFICATION SAMPLING LOCATIONS



LEGEND:

——— A2PIII PART ONE 1S & 1SF BOUNDARY

- - - - - - FENCE AROUND STOCKPILE

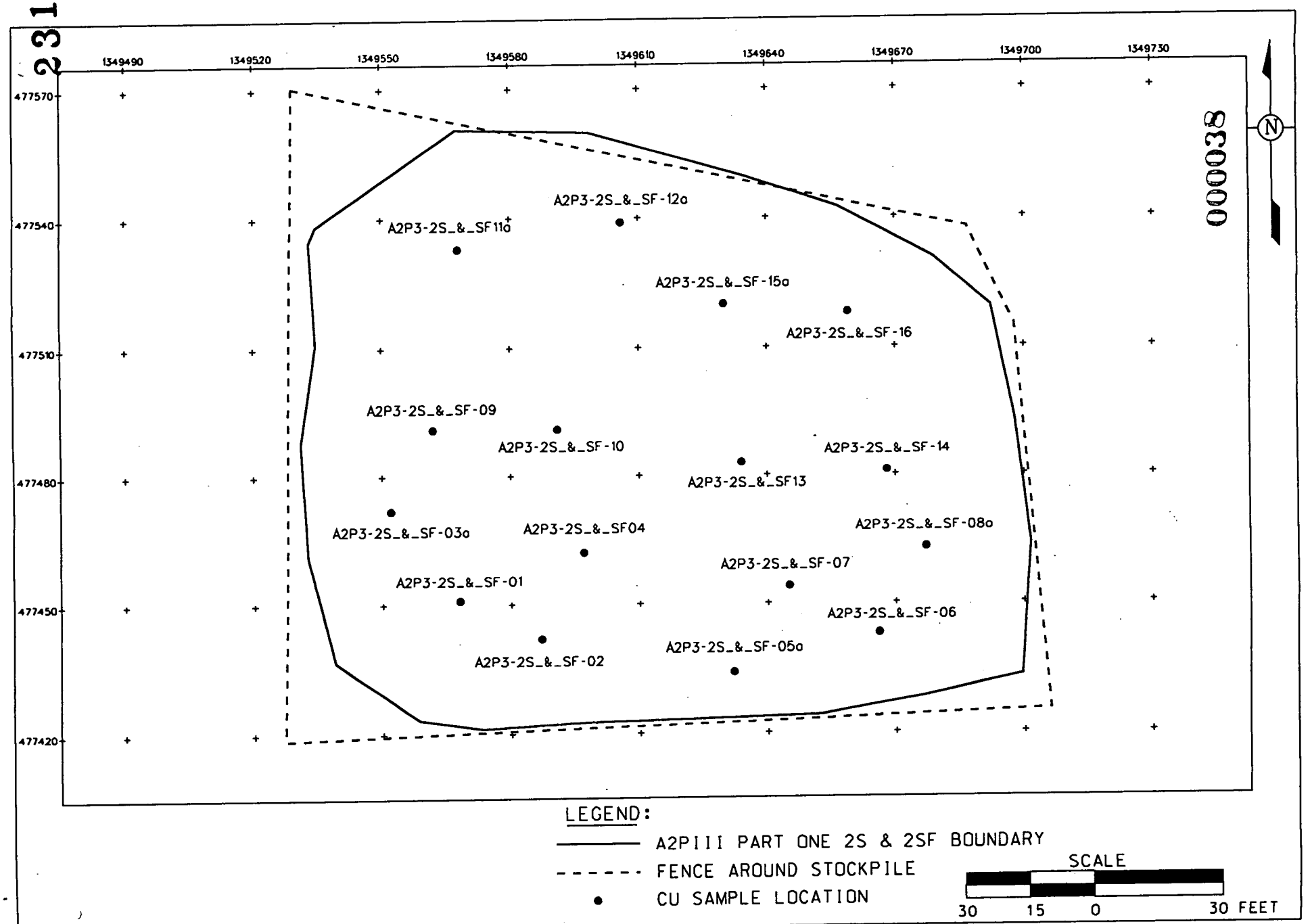
● CU SAMPLE LOCATION

000037

SCALE

30 15 0 30 FEET

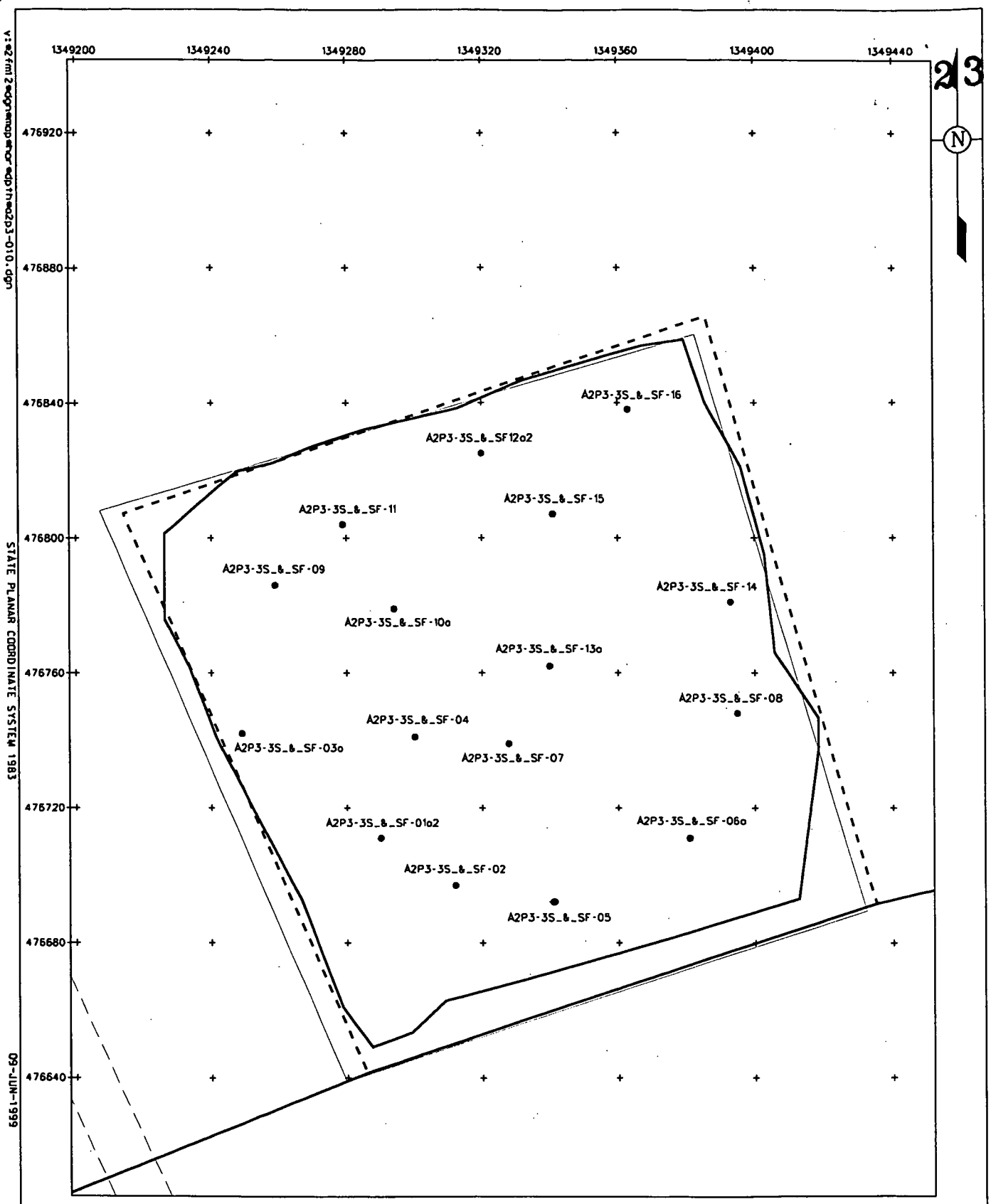
APPENDIX B. A2PIII PART ONE 1S AND 1SF CU SAMPLE LOCATIONS



000038

y:\e2fm12\dgn\mapshor\dpthm02p3-009.dgn
STATE PLANAR COORDINATE SYSTEM 1983

APPENDIX B. A2PIII PART ONE 2S AND 2SF CU SAMPLE LOCATIONS



LEGEND:

——— A2PIII PART ONE 3S & 3SF BOUNDARY

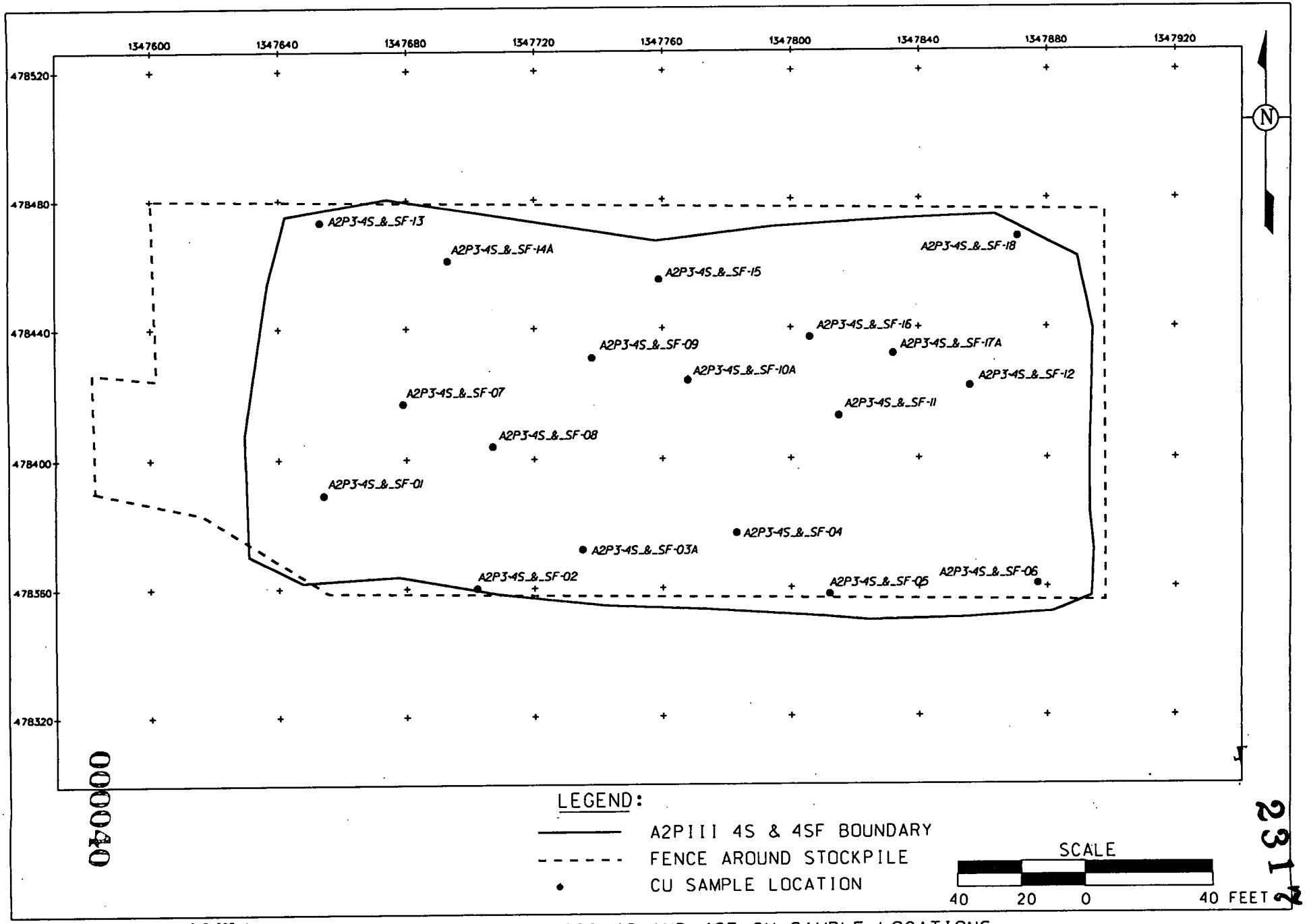
- - - - - - FENCE AROUND STOCKPILE

• CU SAMPLE LOCATION

SCALE 000039

40 20 0 30 FEET

APPENDIX B. A2PIII PART ONE 3S AND 3SF CU SAMPLE LOCATIONS



0000040

2312

v:\e2fm12\dgn\map\hor\dpthea2p3-007.dgn
STATE PLANAR COORDINATE SYSTEM 1983

APPENDIX B. A2PIII 4S AND 4SF CU SAMPLE LOCATIONS

APPENDIX C

AREA 2, PHASE III PART ONE OPEN FIELD CU SAMPLES/COORDINATES/IDENTIFICATION

APPENDIX C
AREA 2 PHASE III PART ONE OPEN FIELD CERTIFICATION SAMPLES

CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING
A2P3-02	A2P3-C-02-01-R	TAL A	477809	1349296
A2P3-02	A2P3-C-02-02-R	TAL A	477957	1349374
A2P3-02	A2P3-C-02-02-R-D	TAL A	477957	1349374
A2P3-02	A2P3-C-02-03-V	ARCHIVE	477817	1349507
A2P3-02	A2P3-C-02-04-R	TAL A	477882	1349564
A2P3-02	A2P3-C-02-05-V	ARCHIVE	478015	1349473
A2P3-02	A2P3-C-02-06-R	TAL A	477984	1349539
A2P3-02	A2P3-C-02-07-R	TAL A	478193	1349447
A2P3-02	A2P3-C-02-08-R	TAL A	478099	1349632
A2P3-02	A2P3-C-02-09-R	TAL A	477836	1349730
A2P3-02	A2P3-C-02-10-R	TAL A	477886	1349789
A2P3-02	A2P3-C-02-11-R	TAL A	478009	1349735
A2P3-02	A2P3-C-02-12-V	ARCHIVE	478097	1349798
A2P3-02	A2P3-C-02-13-R	TAL A	477909	1349924
A2P3-02	A2P3-C-02-14-R	TAL A	477896	1350020
A2P3-02	A2P3-C-02-15-R	TAL A	478078	1349917
A2P3-02	A2P3-C-02-16-V	ARCHIVE	478041	1350006
A2P3-03	A2P3-C-03-01-V	ARCHIVE	477413	1348914
A2P3-03	A2P3-C-03-02-R	TAL A	477324	1348994
A2P3-03	A2P3-C-03-03-R	TAL A	477519	1348826
A2P3-03	A2P3-C-03-04-R	TAL A	477495	1348977
A2P3-03	A2P3-C-03-05-R	TAL A	477283	1349124
A2P3-03	A2P3-C-03-06-V	ARCHIVE	477370	1349092
A2P3-03	A2P3-C-03-07-R	TAL A	477451	1349138
A2P3-03	A2P3-C-03-08-R	TAL A	477549	1349106
A2P3-03	A2P3-C-03-09-R	TAL A	477282	1349247
A2P3-03	A2P3-C-03-09-R-D	TAL A	477282	1349247
A2P3-03	A2P3-C-03-10-V	TAL A	477373	1349353
A2P3-03	A2P3-C-03-11-R	TAL A	477424	1349276
A2P3-03	A2P3-C-03-12-R	TAL A	477462	1349388
A2P3-03	A2P3-C-03-13-V	ARCHIVE	477542	1349303
A2P3-03	A2P3-C-03-14-R	TAL A	477606	1349411
A2P3-03	A2P3-C-03-15-R	TAL A	477680	1349316
A2P3-03	A2P3-C-03-16-R	TAL A	477693	1349397
A2P3-04	A2P3-C-04-01-V	ARCHIVE	477280	1349540
A2P3-04	A2P3-C-04-02-R	TAL A	477314	1349603
A2P3-04	A2P3-C-04-02-R-D	TAL A	477314	1349603
A2P3-04	A2P3-C-04-03-R	TAL A	477412	1349440
A2P3-04	A2P3-C-04-04-R	TAL A	477348	1349543
A2P3-04	A2P3-C-04-05-R	TAL A	477255	1349653
A2P3-04	A2P3-C-04-06-R	TAL A	477274	1349816
A2P3-04	A2P3-C-04-07-V	ARCHIVE	477328	1349718
A2P3-04	A2P3-C-04-08-R	TAL A	477384	1349798
A2P3-04	A2P3-C-04-09-R	TAL A	477595	1349460
A2P3-04	A2P3-C-04-10-R	TAL A	477632	1349532
A2P3-04	A2P3-C-04-11-V	ARCHIVE	477720	1349525
A2P3-04	A2P3-C-04-12-R	TAL A	477748	1349595
A2P3-04	A2P3-C-04-13-R	TAL A	477506	1349815
A2P3-04	A2P3-C-04-14-R	TAL A	477595	1349713
A2P3-04	A2P3-C-04-15-V	ARCHIVE	477710	1349687

APPENDIX C
AREA 2 PHASE III PART ONE OPEN FIELD CERTIFICATION SAMPLES

2317

CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING
A2P3-04	A2P3-C-04-16-R	TAL A	477807	1349690
A2P3-05	A2P3-C-05-01-V	ARCHIVE	477301	1349945
A2P3-05	A2P3-C-05-02-R	TAL A	477354	1350010
A2P3-05	A2P3-C-05-02-R-D	TAL A	477354	1350010
A2P3-05	A2P3-C-05-03-R	TAL A	477392	1349888
A2P3-05	A2P3-C-05-04-R	TAL A	477469	1349968
A2P3-05	A2P3-C-05-05-V	ARCHIVE	477314	1350075
A2P3-05	A2P3-C-05-06-R	TAL A	477321	1350196
A2P3-05	A2P3-C-05-07-R	TAL A	477393	1350076
A2P3-05	A2P3-C-05-08-R	TAL A	477406	1350203
A2P3-05	A2P3-C-05-09-R	TAL A	477580	1349829
A2P3-05	A2P3-C-05-10-V	ARCHIVE	477660	1349984
A2P3-05	A2P3-C-05-11-R	TAL A	477722	1349826
A2P3-05	A2P3-C-05-12-R	TAL A	477790	1349936
A2P3-05	A2P3-C-05-13-R	TAL A	477538	1350088
A2P3-05	A2P3-C-05-14-R	TAL A	477663	1350157
A2P3-05	A2P3-C-05-15-R	TAL A	477726	1350036
A2P3-05	A2P3-C-05-16-V	ARCHIVE	477868	1350092
A2P3-06	A2P3-C-06-01-R	TAL A	476820	1348877
A2P3-06	A2P3-C-06-02-R	TAL A	476884	1348906
A2P3-06	A2P3-C-06-03-V	ARCHIVE	476994	1348748
A2P3-06	A2P3-C-06-04-R	TAL A	476953	1348888
A2P3-06	A2P3-C-06-05-V	ARCHIVE	476729	1348969
A2P3-06	A2P3-C-06-06-R	TAL A	476813	1349094
A2P3-06	A2P3-C-06-07-R	TAL A	476884	1349023
A2P3-06	A2P3-C-06-08-R	TAL A	476981	1348986
A2P3-06	A2P3-C-06-09-R	TAL A	477100	1348860
A2P3-06	A2P3-C-06-09-R-D	TAL A	477100	1348860
A2P3-06	A2P3-C-06-10-R	TAL A	477130	1348948
A2P3-06	A2P3-C-06-11-V	ARCHIVE	477196	1348852
A2P3-06	A2P3-C-06-12-R	TAL A	477201	1349008
A2P3-06	A2P3-C-06-13-V	ARCHIVE	477082	1349146
A2P3-06	A2P3-C-06-14-R	TAL A	477032	1349201
A2P3-06	A2P3-C-06-15-R	TAL A	477181	1349179
A2P3-06	A2P3-C-06-16-R	TAL A	477194	1349303
A2P3-07	A2P3-C-07-01-R	TAL A	476643	1349157
A2P3-07	A2P3-C-07-02-V	ARCHIVE	476730	1349172
A2P3-07	A2P3-C-07-03-R	TAL A	476887	1349160
A2P3-07	A2P3-C-07-04-R	TAL A	476879	1349319
A2P3-07	A2P3-C-07-05-R	TAL A	476720	1349464
A2P3-07	A2P3-C-07-06-R	TAL A	476817	1349564
A2P3-07	A2P3-C-07-07-V	ARCHIVE	476859	1349646
A2P3-07	A2P3-C-07-08-R	TAL A	476798	1349710
A2P3-07	A2P3-C-07-09-V	ARCHIVE	476944	1349217
A2P3-07	A2P3-C-07-10-R	TAL A	476941	1349397
A2P3-07	A2P3-C-07-11-R	TAL A	477039	1349324
A2P3-07	A2P3-C-07-12-R	TAL A	477106	1349362
A2P3-07	A2P3-C-07-12-R-D	TAL A	477106	1349362
A2P3-07	A2P3-C-07-13-R	TAL A	476999	1349526
A2P3-07	A2P3-C-07-14-R	TAL A	476942	1349648

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APPENDIX C
AREA 2 PHASE III PART ONE OPEN FIELD CERTIFICATION SAMPLES

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CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING
A2P3-07	A2P3-C-07-15-R	TAL A	477066	1349445
A2P3-07	A2P3-C-07-16-V	ARCHIVE	477205	1349463
A2P3-08	A2P3-C-08-01-V	ARCHIVE	476879	1349809
A2P3-08	A2P3-C-08-02-R	TAL A	476888	1349933
A2P3-08	A2P3-C-08-03-R	TAL A	476991	1349750
A2P3-08	A2P3-C-08-04-R	TAL A	476997	1349921
A2P3-08	A2P3-C-08-05-R	TAL A	476961	1350035
A2P3-08	A2P3-C-08-06-V	ARCHIVE	477029	1350092
A2P3-08	A2P3-C-08-07-R	TAL A	476930	1350210
A2P3-08	A2P3-C-08-08-R	TAL A	476991	1350383
A2P3-08	A2P3-C-08-09-R	TAL A	477143	1349664
A2P3-08	A2P3-C-08-09-R-D	TAL A	477143	1349664
A2P3-08	A2P3-C-08-10-R	TAL A	477159	1349798
A2P3-08	A2P3-C-08-11-R	TAL A	477061	1349877
A2P3-08	A2P3-C-08-12-V	ARCHIVE	477145	1349959
A2P3-08	A2P3-C-08-13-R	TAL A	477182	1350034
A2P3-08	A2P3-C-08-14-R	TAL A	477143	1350144
A2P3-08	A2P3-C-08-15-V	ARCHIVE	477101	1350222
A2P3-08	A2P3-C-08-16-R	TAL A	477204	1350292
A2P3-09	A2P3-C-09-01-R	TAL A	476510	1348546
A2P3-09	A2P3-C-09-02-R	TAL A	476585	1348496
A2P3-09	A2P3-C-09-03-V	ARCHIVE	476632	1348504
A2P3-09	A2P3-C-09-04-R	TAL A	476702	1348509
A2P3-09	A2P3-C-09-05-R	TAL A	476703	1348300
A2P3-09	A2P3-C-09-06-R	TAL A	476695	1348348
A2P3-09	A2P3-C-09-07-V	ARCHIVE	476660	1348405
A2P3-09	A2P3-C-09-08-R	TAL A	476704	1348415
A2P3-09	A2P3-C-09-09-V	ARCHIVE	476760	1348264
A2P3-09	A2P3-C-09-10-R	TAL A	476753	1348338
A2P3-09	A2P3-C-09-11-R	TAL A	476808	1348321
A2P3-09	A2P3-C-09-12-R	TAL A	476891	1348368
A2P3-09	A2P3-C-09-12-R-D	TAL A	476891	1348368
A2P3-09	A2P3-C-09-13-R	TAL A	476736	1348401
A2P3-09	A2P3-C-09-14-V	ARCHIVE	476763	1348434
A2P3-09	A2P3-C-09-15-R	TAL A	476818	1348426
A2P3-09	A2P3-C-09-16-R	TAL A	476846	1348405
A2P3-10	A2P3-C-10-01-R	TAL A	476580	1348610
A2P3-10	A2P3-C-10-02-V	ARCHIVE	476638	1348600
A2P3-10	A2P3-C-10-03-R	TAL A	476759	1348515
A2P3-10	A2P3-C-10-04-R	TAL A	476697	1348585
A2P3-10	A2P3-C-10-05-R	TAL A	476654	1348656
A2P3-10	A2P3-C-10-06-V	ARCHIVE	476559	1348734
A2P3-10	A2P3-C-10-07-R	TAL A	476574	1348802
A2P3-10	A2P3-C-10-08-R	TAL A	476638	1348934
A2P3-10	A2P3-C-10-09-R	TAL A	476836	1348481
A2P3-10	A2P3-C-10-10-R	TAL A	476856	1348630
A2P3-10	A2P3-C-10-11-R	TAL A	476932	1348514
A2P3-10	A2P3-C-10-12-V	ARCHIVE	476939	1348626
A2P3-10	A2P3-C-10-13-R	TAL A	476705	1348724
A2P3-10	A2P3-C-10-14-R	TAL A	476710	1348818

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APPENDIX C
AREA 2 PHASE III PART ONE OPEN FIELD CERTIFICATION SAMPLES

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CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING
A2P3-10	A2P3-C-10-15-R	TAL A	476811	1348690
A2P3-10	A2P3-C-10-15-R-D	TAL A	476811	1348690
A2P3-10	A2P3-C-10-16-V	ARCHIVE	476886	1348685
A2P3-11	A2P3-C-11-01-V	ARCHIVE	476166	1347852
A2P3-11	A2P3-C-11-02-R	TAL A	476154	1348014
A2P3-11	A2P3-C-11-03-R	TAL A	476237	1347899
A2P3-11	A2P3-C-11-04-R	TAL A	476233	1348002
A2P3-11	A2P3-C-11-05-R	TAL A	476140	1348128
A2P3-11	A2P3-C-11-06-V	ARCHIVE	476078	1348293
A2P3-11	A2P3-C-11-07-R	TAL A	476273	1348164
A2P3-11	A2P3-C-11-08-R	TAL A	476156	1348249
A2P3-11	A2P3-C-11-09-R	TAL A	476348	1348052
A2P3-11	A2P3-C-11-09-R-D	TAL A	476348	1348052
A2P3-11	A2P3-C-11-10-R	TAL A	476390	1348121
A2P3-11	A2P3-C-11-11-V	ARCHIVE	476335	1348175
A2P3-11	A2P3-C-11-12-R	TAL A	476511	1348246
A2P3-11	A2P3-C-11-13-R	TAL A	476611	1348237
A2P3-11	A2P3-C-11-14-R	TAL A	476641	1348292
A2P3-11	A2P3-C-11-15-R	TAL A	476609	1348427
A2P3-11	A2P3-C-11-16-V	ARCHIVE	476673	1348193
A2P3-12	A2P3-C-12-01-R	TAL A	476148	1348366
A2P3-12	A2P3-C-12-02-V	ARCHIVE	476079	1348453
A2P3-12	A2P3-C-12-03-R	TAL A	476267	1348266
A2P3-12	A2P3-C-12-04-R	TAL A	476240	1348451
A2P3-12	A2P3-C-12-05-V	ARCHIVE	476082	1348525
A2P3-12	A2P3-C-12-06-R	TAL A	476150	1348672
A2P3-12	A2P3-C-12-07-R	TAL A	476236	1348546
A2P3-12	A2P3-C-12-08-R	TAL A	476263	1348655
A2P3-12	A2P3-C-12-09-R	TAL A	476351	1348318
A2P3-12	A2P3-C-12-10-R	TAL A	476320	1348377
A2P3-12	A2P3-C-12-10-R-D	TAL A	476320	1348377
A2P3-12	A2P3-C-12-11-R	TAL A	476468	1348334
A2P3-12	A2P3-C-12-12-V	ARCHIVE	476407	1348374
A2P3-12	A2P3-C-12-13-V	ARCHIVE	476353	1348526
A2P3-12	A2P3-C-12-14-R	TAL A	476342	1348606
A2P3-12	A2P3-C-12-15-R	TAL A	476474	1348492
A2P3-12	A2P3-C-12-16-R	TAL A	476464	1348581
A2P3-13	A2P3-C-13-01-R	TAL A	476217	1348708
A2P3-13	A2P3-C-13-02-V	ARCHIVE	476163	1348788
A2P3-13	A2P3-C-13-03-R	TAL A	476288	1348696
A2P3-13	A2P3-C-13-04-R	TAL A	476347	1348792
A2P3-13	A2P3-C-13-05-V	ARCHIVE	476258	1348901
A2P3-13	A2P3-C-13-06-R	TAL A	476315	1349014
A2P3-13	A2P3-C-13-07-R	TAL A	476218	1349051
A2P3-13	A2P3-C-13-08-R	TAL A	476304	1349152
A2P3-13	A2P3-C-13-09-R	TAL A	476373	1348714
A2P3-13	A2P3-C-13-09-R-D	TAL A	476373	1348714
A2P3-13	A2P3-C-13-10-R	TAL A	476442	1348802
A2P3-13	A2P3-C-13-11-R	TAL A	476501	1348661
A2P3-13	A2P3-C-13-12-V	ARCHIVE	476537	1348803

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APPENDIX C
AREA 2 PHASE III PART ONE OPEN FIELD CERTIFICATION SAMPLES

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CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING
A2P3-13	A2P3-C-13-13-R	TAL A	476382	1348988
A2P3-13	A2P3-C-13-14-V	ARCHIVE	476411	1349064
A2P3-13	A2P3-C-13-15-R	TAL A	476529	1348993
A2P3-13	A2P3-C-13-16-R	TAL A	476487	1349058
A2P3-14	A2P3-C-14-01-V	ARCHIVE	476385	1349275
A2P3-14	A2P3-C-14-02-R	TAL A	476330	1349457
A2P3-14	A2P3-C-14-03-R	TAL A	476475	1349184
A2P3-14	A2P3-C-14-04-R	TAL A	476418	1349501
A2P3-14	A2P3-C-14-05-R	TAL A	476380	1349626
A2P3-14	A2P3-C-14-06-R	TAL A	476490	1349645
A2P3-14	A2P3-C-14-07-V	ARCHIVE	476519	1349724
A2P3-14	A2P3-C-14-08-R	TAL A	476513	1349830
A2P3-14	A2P3-C-14-09-R	TAL A	476566	1349219
A2P3-14	A2P3-C-14-10-R	TAL A	476521	1349354
A2P3-14	A2P3-C-14-11-V	ARCHIVE	476551	1349439
A2P3-14	A2P3-C-14-12-R	TAL A	476637	1349462
A2P3-14	A2P3-C-14-12-R-D	TAL A	476637	1349462
A2P3-14	A2P3-C-14-13-V	ARCHIVE	476565	1349613
A2P3-14	A2P3-C-14-14-R	TAL A	476612	1349777
A2P3-14	A2P3-C-14-15-R	TAL A	476671	1349659
A2P3-14	A2P3-C-14-16-R	TAL A	476744	1349783
A2P3-15	A2P3-C-15-01-R	TAL A	476474	1349905
A2P3-15	A2P3-C-15-02-R	TAL A	476540	1350018
A2P3-15	A2P3-C-15-03-R	TAL A	476605	1349884
A2P3-15	A2P3-C-15-04-V	ARCHIVE	476627	1350127
A2P3-15	A2P3-C-15-05-R	TAL A	476549	1350278
A2P3-15	A2P3-C-15-06-R	TAL A	476560	1350380
A2P3-15	A2P3-C-15-07-V	ARCHIVE	476693	1350290
A2P3-15	A2P3-C-15-08-R	TAL A	476712	1350365
A2P3-15	A2P3-C-15-09-R	TAL A	476741	1349839
A2P3-15	A2P3-C-15-10-V	ARCHIVE	476681	1349936
A2P3-15	A2P3-C-15-11-R	TAL A	476710	1350163
A2P3-15	A2P3-C-15-12-R	TAL A	476831	1350078
A2P3-15	A2P3-C-15-13-R	TAL A	476822	1350285
A2P3-15	A2P3-C-15-14-R	TAL A	476785	1350398
A2P3-15	A2P3-C-15-14-R-D	TAL A	476785	1350398
A2P3-15	A2P3-C-15-15-V	ARCHIVE	476896	1350188
A2P3-15	A2P3-C-15-16-R	TAL A	476947	1350377

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APPENDIX D

AREA 2, PHASE III PART ONE STOCKPILE CU SAMPLES/COORDINATES/IDENTIFICATION

APPENDIX D
AREA 2 PHASE III PART ONE STOCKPILE CERTIFICATION SAMPLES

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STOCKPILE CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING	DEPTH INTERVAL	TOP DEPTH	BOTTOM DEPTH
A2P3-1S	A2P3-1S-01-V	ARCHIVE	478099	1349694	1.5-2	577.3	576.8
A2P3-1S	A2P3-1S-02-R	TAL A	478076	1349722	0-0.5	579.2	578.7
A2P3-1S	A2P3-1S-03-R	TAL A	478105	1349711	1-1.5	579.0	578.5
A2P3-1S	A2P3-1S-04-R	TAL A	478089	1349738	0-0.5	582.1	581.6
A2P3-1S	A2P3-1S-05-V	ARCHIVE	478105	1349747	1.5-2	579.2	578.7
A2P3-1S	A2P3-1S-06-R	TAL A	478112	1349764	2-2.5	576.8	576.3
A2P3-1S	A2P3-1S-07-V	ARCHIVE	478124	1349706	1.5-2	577.1	576.6
A2P3-1S	A2P3-1S-08-R	TAL A	478129	1349721	2-2.5	577.8	577.3
A2P3-1S	A2P3-1S-09-R	TAL A	478148	1349725	1.5-2	578.4	577.9
A2P3-1S	A2P3-1S-09-R-D	TAL A	478148	1349725	1.5-2	578.4	577.9
A2P3-1S	A2P3-1S-10-R	TAL A	478125	1349749	5.5-6	576.4	575.9
A2P3-1S	A2P3-1S-11-V	ARCHIVE	478153	1349758	5.5-6	579.2	578.7
A2P3-1S	A2P3-1S-12-R	TAL A	478154	1349784	1-1.5	578.2	577.7
A2P3-2S	A2P3-2S-01-R	TAL A	477451	1349568	1-1.5	576.1	575.6
A2P3-2S	A2P3-2S-02-R	TAL A	477442	1349587	1.5-2	576.3	575.8
A2P3-2S	A2P3-2S-03-V	ARCHIVE	477472	1349552	0.5-1	576.4	575.9
A2P3-2S	A2P3-2S-04-R	TAL A	477462	1349597	5-5.5	576.6	576.1
A2P3-2S	A2P3-2S-05-V	ARCHIVE	477434	1349632	1-1.5	576.3	575.8
A2P3-2S	A2P3-2S-06-R	TAL A	477443	1349666	0-0.5	577.6	577.1
A2P3-2S	A2P3-2S-07-R	TAL A	477454	1349645	0-0.5	579.6	579.1
A2P3-2S	A2P3-2S-08-V	ARCHIVE	477463	1349677	0.5-1	577.2	576.7
A2P3-2S	A2P3-2S-09-R	TAL A	477491	1349562	1.5-2	577.0	576.5
A2P3-2S	A2P3-2S-10-R	TAL A	477491	1349591	4.5-5	577.8	577.3
A2P3-2S	A2P3-2S-11-V	ARCHIVE	477533	1349568	0-0.5	576.2	575.7
A2P3-2S	A2P3-2S-12-V	ARCHIVE	477539	1349606	1.5-2	576.7	576.2
A2P3-2S	A2P3-2S-13-R	TAL A	477483	1349634	5-5.5	578.3	577.8
A2P3-2S	A2P3-2S-13-R-D	TAL A	477483	1349634	5-5.5	578.3	577.8
A2P3-2S	A2P3-2S-14-R	TAL A	477481	1349668	0.5-1	579.3	578.8
A2P3-2S	A2P3-2S-15-V	ARCHIVE	477520	1349630	0.5-1	580.3	579.8
A2P3-2S	A2P3-2S-16-R	TAL A	477518	1349659	1.5-2	577.6	577.1
A2P3-3S	A2P3-3S-01-V	ARCHIVE	476711	1349290	2-2.5	579.7	579.2
A2P3-3S	A2P3-3S-02-R	TAL A	476697	1349312	2-2.5	579.5	579.0
A2P3-3S	A2P3-3S-03-V	ARCHIVE	476742	1349249	1-1.5	577.7	577.2
A2P3-3S	A2P3-3S-04-R	TAL A	476741	1349300	3-3.5	580.3	579.8
A2P3-3S	A2P3-3S-05-R	TAL A	476692	1349341	0.5-1	581.3	580.8
A2P3-3S	A2P3-3S-06-V	ARCHIVE	476711	1349381	0.5-1	582.9	582.4
A2P3-3S	A2P3-3S-07-R	TAL A	476739	1349328	0.5-1	584.8	584.3
A2P3-3S	A2P3-3S-08-R	TAL A	476748	1349395	2-2.5	582.9	582.4
A2P3-3S	A2P3-3S-09-R	TAL A	476786	1349259	0-0.5	579.4	578.9
A2P3-3S	A2P3-3S-10-V	ARCHIVE	476779	1349294	1-1.5	582.2	581.7
A2P3-3S	A2P3-3S-11-R	TAL A	476804	1349279	0-0.5	580.8	580.3
A2P3-3S	A2P3-3S-11-R-D	TAL A	476804	1349279	0-0.5	580.8	580.3
A2P3-3S	A2P3-3S-12-V	ARCHIVE	476825	1349320	1-1.5	581.6	581.1
A2P3-3S	A2P3-3S-13-V	ARCHIVE	476762	1349340	0.5-1	586.1	585.6
A2P3-3S	A2P3-3S-14-R	TAL A	476781	1349393	0.5-1	582.1	581.6
A2P3-3S	A2P3-3S-15-R	TAL A	476807	1349341	2.5-3	582.7	582.2
A2P3-3S	A2P3-3S-16-R	TAL A	476838	1349363	0.5-1	582.6	582.1
A2P3-4S	A2P3-4SF-01-R	TAL A	478389	1347653	0.5-1	571.6	571.1
A2P3-4S	A2P3-4SF-02-R	TAL A	478360	1347701	0-0.5	572.5	572.0

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APPENDIX D
AREA 2 PHASE III PART ONE STOCKPILE CERTIFICATION SAMPLES

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STOCKPILE CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING	DEPTH INTERVAL	TOP DEPTH	BOTTOM DEPTH
A2P3-4S	A2P3-4SF-03-V	ARCHIVE	478372	1347734	1.5-2	575.0	574.5
A2P3-4S	A2P3-4SF-04-R	TAL A	478377	1347782	4-4.5	575.3	574.8
A2P3-4S	A2P3-4SF-05-R	TAL A	478358	1347811	0.5-1	576.4	575.9
A2P3-4S	A2P3-4SF-06-R	TAL A	478361	1347876	1.5-2	576.2	575.7
A2P3-4S	A2P3-4SF-07-R	TAL A	478417	1347678	0-0.5	574.3	573.8
A2P3-4S	A2P3-4SF-08-R	TAL A	478404	1347706	3-3.5	574.1	573.6
A2P3-4S	A2P3-4SF-08-R-D	TAL A	478404	1347706	3-3.5	574.1	573.6
A2P3-4S	A2P3-4SF-09-R	TAL A	478431	1347737	3.5-4	575.9	575.4
A2P3-4S	A2P3-4SF-10-V	ARCHIVE	478424	1347767	5-5.5	576.1	575.6
A2P3-4S	A2P3-4SF-11-R	TAL A	478413	1347814	8-8.5	576.1	575.6
A2P3-4S	A2P3-4SF-12-R	TAL A	478422	1347855	5.5-6	579.9	579.4
A2P3-4S	A2P3-4SF-13-R	TAL A	478473	1347652	0-0.5	575.3	574.8
A2P3-4S	A2P3-4SF-14-V	ARCHIVE	478461	1347692	1.5-2	576.9	576.4
A2P3-4S	A2P3-4SF-15-R	TAL A	478455	1347758	2-2.5	577.3	576.8
A2P3-4S	A2P3-4SF-16-R	TAL A	478437	1347805	4.5-5	579.4	578.9
A2P3-4S	A2P3-4SF-17-V	ARCHIVE	478432	1347831	7-7.5	577.9	577.4
A2P3-4S	A2P3-4SF-18-R	TAL A	478468	1347870	0-0.5	576.6	576.1

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APPENDIX D
AREA 2 PHASE III PART ONE STOCKPILE FOOTPRINT CERTIFICATION SAMPLES

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STOCKPILE CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING	ESTIMATED TOP DEPTH	ESTIMATED BOTTOM DEPTH
A2P3-1SF	A2P3-1SF-01-V	ARCHIVE	478099	1349694	575.6	575.1
A2P3-1SF	A2P3-1SF-02-R	TAL A	478076	1349722	576.2	575.7
A2P3-1SF	A2P3-1SF-03-R	TAL A	478105	1349711	576.3	575.8
A2P3-1SF	A2P3-1SF-04-R	TAL A	478089	1349738	576.1	575.6
A2P3-1SF	A2P3-1SF-05-V	ARCHIVE	478105	1349747	576.2	575.7
A2P3-1SF	A2P3-1SF-06-R	TAL A	478112	1349764	576.1	575.6
A2P3-1SF	A2P3-1SF-07-V	ARCHIVE	478124	1349706	576.4	575.9
A2P3-1SF	A2P3-1SF-08-R	TAL A	478129	1349721	576.3	575.8
A2P3-1SF	A2P3-1SF-09-R	TAL A	478148	1349725	576.3	575.8
A2P3-1SF	A2P3-1SF-09-R-D	TAL A	478148	1349725	576.3	575.8
A2P3-1SF	A2P3-1SF-10-R	TAL A	478125	1349749	576.3	575.8
A2P3-1SF	A2P3-1SF-11-V	ARCHIVE	478153	1349758	576.3	575.8
A2P3-1SF	A2P3-1SF-12-R	TAL A	478154	1349784	575.7	575.2
A2P3-2SF	A2P3-2SF-01-R	TAL A	477451	1349568	575.4	574.9
A2P3-2SF	A2P3-2SF-02-R	TAL A	477442	1349587	575.7	575.2
A2P3-2SF	A2P3-2SF-03-V	ARCHIVE	477472	1349552	575.2	574.7
A2P3-2SF	A2P3-2SF-04-R	TAL A	477462	1349597	575.2	574.7
A2P3-2SF	A2P3-2SF-05-V	ARCHIVE	477434	1349632	575.8	575.3
A2P3-2SF	A2P3-2SF-06-R	TAL A	477443	1349666	575.5	575.0
A2P3-2SF	A2P3-2SF-07-R	TAL A	477454	1349645	575.4	574.9
A2P3-2SF	A2P3-2SF-08-V	ARCHIVE	477463	1349677	575.1	574.6
A2P3-2SF	A2P3-2SF-09-R	TAL A	477491	1349562	574.8	574.3
A2P3-2SF	A2P3-2SF-09-R-D	TAL A	477491	1349562	574.8	574.3
A2P3-2SF	A2P3-2SF-10-R	TAL A	477491	1349591	574.7	574.2
A2P3-2SF	A2P3-2SF-11-V	ARCHIVE	477533	1349568	574.4	573.9
A2P3-2SF	A2P3-2SF-12-V	ARCHIVE	477539	1349606	573.9	573.4
A2P3-2SF	A2P3-2SF-13-R	TAL A	477483	1349634	575.1	574.6
A2P3-2SF	A2P3-2SF-14-R	TAL A	477481	1349668	574.8	574.3
A2P3-2SF	A2P3-2SF-15-V	ARCHIVE	477520	1349630	574.6	574.1
A2P3-2SF	A2P3-2SF-16-R	TAL A	477518	1349659	574.2	573.7
A2P3-3SF	A2P3-3SF-01-V	ARCHIVE	476711	1349290	578.5	578.0
A2P3-3SF	A2P3-3SF-02-R	TAL A	476697	1349312	579.2	578.7
A2P3-3SF	A2P3-3SF-03-V	ARCHIVE	476742	1349249	577.4	576.9
A2P3-3SF	A2P3-3SF-04-R	TAL A	476741	1349300	578.8	578.3
A2P3-3SF	A2P3-3SF-05-R	TAL A	476692	1349341	580.1	579.6
A2P3-3SF	A2P3-3SF-05-R-D	TAL A	476692	1349341	580.1	579.6
A2P3-3SF	A2P3-3SF-06-V	ARCHIVE	476711	1349381	581.1	580.6
A2P3-3SF	A2P3-3SF-07-R	TAL A	476739	1349328	579.6	579.1
A2P3-3SF	A2P3-3SF-08-R	TAL A	476748	1349395	581.4	580.9
A2P3-3SF	A2P3-3SF-09-R	TAL A	476786	1349259	577.9	577.4
A2P3-3SF	A2P3-3SF-10-V	ARCHIVE	476779	1349294	579.2	578.7
A2P3-3SF	A2P3-3SF-11-R	TAL A	476804	1349279	578.6	578.1
A2P3-3SF	A2P3-3SF-12-V	ARCHIVE	476825	1349320	580.3	579.8
A2P3-3SF	A2P3-3SF-13-V	ARCHIVE	476762	1349340	579.9	579.4
A2P3-3SF	A2P3-3SF-14-R	TAL A	476781	1349393	581.5	581.0
A2P3-3SF	A2P3-3SF-15-R	TAL A	476807	1349341	580.6	580.1
A2P3-3SF	A2P3-3SF-16-R	TAL A	476838	1349363	581.3	580.8
A2P3-4SF	A2P3-4SF-01-R	TAL A	478389	1347653	570.0	569.5
A2P3-4SF	A2P3-4SF-02-R	TAL A	478360	1347701	571.8	571.3

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APPENDIX D
AREA 2 PHASE III PART ONE STOCKPILE FOOTPRINT CERTIFICATION SAMPLES

2317

STOCKPILE CERTIFICATION UNIT	SAMPLE ID	ANALYSIS	NORTHING	EASTING	ESTIMATED TOP DEPTH	ESTIMATED BOTTOM DEPTH
A2P3-4SF	A2P3-4SF-03-V	ARCHIVE	478372	1347734	572.6	572.1
A2P3-4SF	A2P3-4SF-04-R	TAL A	478377	1347782	573.9	573.4
A2P3-4SF	A2P3-4SF-05-R	TAL A	478358	1347811	574.9	574.4
A2P3-4SF	A2P3-4SF-06-R	TAL A	478361	1347876	575.0	574.5
A2P3-4SF	A2P3-4SF-07-R	TAL A	478417	1347678	572.0	571.5
A2P3-4SF	A2P3-4SF-08-R	TAL A	478404	1347706	572.0	571.5
A2P3-4SF	A2P3-4SF-08-R-D	TAL A	478404	1347706	572.0	571.5
A2P3-4SF	A2P3-4SF-09-R	TAL A	478431	1347737	574.0	573.5
A2P3-4SF	A2P3-4SF-10-V	ARCHIVE	478424	1347767	574.0	573.5
A2P3-4SF	A2P3-4SF-11-R	TAL A	478413	1347814	574.5	574.0
A2P3-4SF	A2P3-4SF-12-R	TAL A	478422	1347855	576.0	575.5
A2P3-4SF	A2P3-4SF-13-R	TAL A	478473	1347652	574.8	574.3
A2P3-4SF	A2P3-4SF-14-V	ARCHIVE	478461	1347692	575.0	574.5
A2P3-4SF	A2P3-4SF-15-R	TAL A	478455	1347758	575.0	574.5
A2P3-4SF	A2P3-4SF-16-R	TAL A	478437	1347805	575.0	574.5
A2P3-4SF	A2P3-4SF-17-V	ARCHIVE	478432	1347831	575.2	574.7
A2P3-4SF	A2P3-4SF-18-R	TAL A	478468	1347870	577.5	577.0

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APPENDIX E

AREA 2, PHASE III PART ONE CERTIFICATION SAMPLING TARGET ANALYTE LIST

AREA 2, PHASE III PART ONE CERTIFICATION SAMPLING TARGET ANALYTE LIST

TAL 20460-PSP-0002-A
Alpha or Gamma Spectroscopy Method
(ASL D*)

Analyte	FRL limit	MDC
Total Uranium	82 ppm	8 ppm
Thorium-228	1.7 pCi/g or ml	.17 pCi/g or L
Thorium-232	1.5 pCi/g or ml	.15 pCi/g or L
Radium-228	1.8 pCi/g or ml	.18 pCi/g or L
Radium-226	1.7 pCi/g or ml	.17 pCi/g or L

* The SCQ Highest Allowable Minimum Detectable Concentration (HAMDC) for total uranium by gamma spectroscopy at ASL D is 0.1 ppm. The MDC needed for this certification event is 8 ppm which is less stringent than the ASL D. The data deliverable for total uranium analysis by gamma spectroscopy will be identical in specifications for ASL D except for the HAMDC. As a result, the total uranium gamma spectroscopy data is considered ASL E.