2099

PROJECT SPECIFIC PLAN FOR AREA 9, PHASE I PRECERTIFICATION PHYSICAL SAMPLING

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

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U.S. DEPARTMENT OF ENERGY
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PROJECT SPECIFIC PLAN FOR AREA 9, PHASE I PRECERTIFICATION PHYSICAL SAMPLING

Project Number 50.03.75.01

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LIST OF ACRONYMS AND ABBREVIATIONS

A1PI	Area 1, Phase I
A9PI	Area 9, Phase I
ASCOC	area-specific constituent of concern
ASL	analytical support level
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CU	certification unit
DOE	Department of Energy
DQO	data quality objective
FACTS	Fernald Analytical Customer Tracking System
FAL	Field Activity Log
FEMP	Fernald Environmental Management Project
FDF	Fluor Daniel Fernald
FRL	final remediation level
GFAA	Graphite Furnace Atomic Absorption
ICPMS	Inductively Coupled Plasma Mass Spectroscopy
PSP	Project Specific Plan
PWID	Project Waste Identification Document
QA/QC	Quality Assurance/Quality Control
SCEP	Soil Characterization and Excavation Project
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SEP	Sitewide Excavation Plan
TAL	Target Analyte List
UCL	upper confidence limit
V/FCN	Variance/Field Change Notice

1.0 INTRODUCTION

1.1 BACKGROUND

The Department of Energy (DOE) plans to certify a portion of the off-property soil adjacent to the Fernald Environmental Management Project (FEMP) as attaining the off-property soil final remediation levels (FRLs) for all area-specific constituents of concern (ASCOCs). The first off-property area to be certified is located adjacent to Area 1, Phase I (A1PI). This off-property area has been designated Area 9, Phase I (A9PI, Figure 1-1), consistent with Soil Characterization and Excavation Project (SCEP) terminology. Per agreements with the Agencies, A9PI ASCOCs are the same as those for A1PI. Other details of the A9PI certification strategy can be found in the Project Specific Plan for A9PI Precertification Real-Time Scanning.

As identified in the Sitewide Excavation Plan (SEP), certification samples are to be collected from surface soil (i.e., the top 6 inches). However, over half of the soil in A9PI has been plowed, so the normal certification strategy cannot be applied in the plowed zone because there is no true surface soil layer. To evaluate the effects of plowing on the distribution of ASCOCs in the soil, the DOE proposes to collect precertification physical soil samples within the plowed portion of A9PI. The collection of precertification physical samples, as proposed in this Project Specific Plan (PSP), will be carried out in conjunction with precertification real-time scanning of A9PI (ECDC #20701-PSP-0001). Real-time scanning will be conducted over the entire extent of A9PI, including the plowed zone. The activities proposed in both PSPs will constitute the precertification activities for A9PI. Because these precertification activities would result in a major disturbance to the crops planted in A9PI, these activities will not be conducted until after the crops are harvested in the Fall of 1999.

1.2 PURPOSE

The purpose of the precertification physical sampling under this PSP is to collect soil cores from A9PI to evaluate the depth of the plowed zone and the distribution and expected concentrations of several ASCOCs within the plowed portions of A9PI. These ASCOCs include total uranium, radium-226, radium-228, thorium-228 and thorium-232 (the primary radiological constituents of concern), along with arsenic, beryllium and manganese. These three metal ASCOCs are being analyzed because certification results from several A1PI certification units (CUs) along the fenceline showed their concentrations to be near the on-property soil FRLs. If these results were compared to the more

conservative off-property soil FRLs, certification failures would occur in several instances, with the A1PI 95 percent upper confidence limit (UCL) on the mean being greater than the off-property FRL. Therefore, an initial evaluation of the off-property soil concentrations against the off-property FRL is warranted. Analytical results collected under this PSP will be used to determine the optimal certification strategy in A9PI to assure that the soil will meet the certification criteria defined in the SEP for the conservative off-property soil FRLs.

1.3 SCOPE

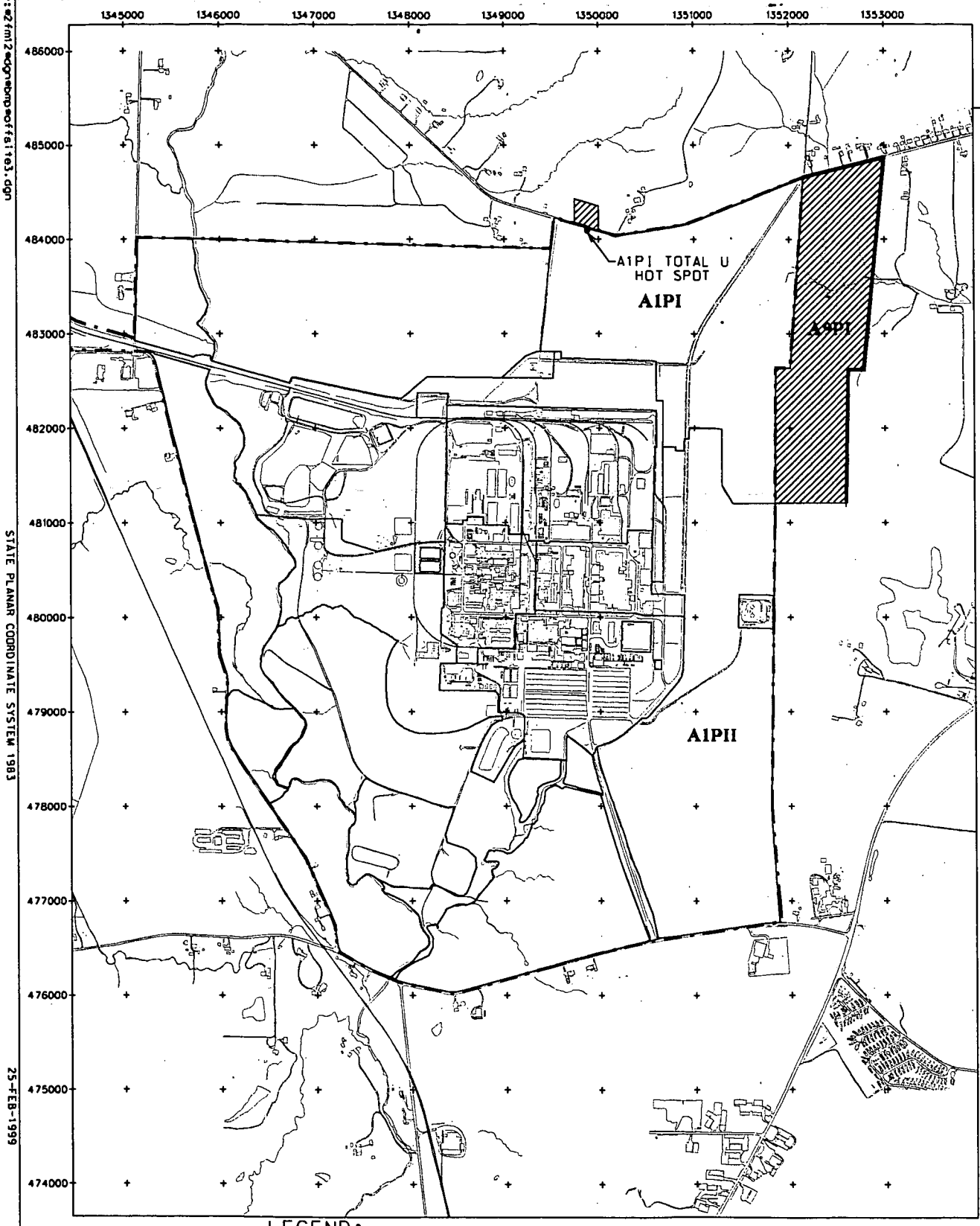
The scope of this PSP includes only the precertification physical sampling in the plowed portion of A9PI. All sampling and analytical activities will be consistent with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ), the SEP and Data Quality Objective (DQO) SL-048, Rev. 5 (Appendix A).

1.4 KEY PERSONNEL

Key personnel for the A9PI precertification physical sampling project are listed in Table 1-1.

TABLE 1-1
KEY PERSONNEL

Title	Primary	Alternate
DOE Contact	Kathi Nickel	Rob Janke
Area 9 Project Manager	Eric Woods	Eric Kroger
Area 9 Characterization Lead	Eric Kroger	Craig Straub
Field Sampling Lead	Mike Frank	Tom Buhrlage
Surveying Lead	Jim Schwing	Dean Shanklin
Waste Acceptance Operations (WAO) Contact	Linda Barlow	Dave Lockerd
Laboratory Contact	Bill Westerman	Keith Tomlinson
Data Validation Contact	Jim Chambers	Jenine Rogers
Data Management Contact	Susan Marsh	Jeff Maple
Quality Assurance Contact	Reinhard Friske	Ervin O'Bryan
Health and Safety Contact	Debbie Grant	Lewis Wiedeman



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STATE PLANAR COORDINATE SYSTEM 1983

25-FEB-1999

LEGEND:

NOTE: ONLY THE PORTION OF A9PI LOCATED EAST OF THE FEMP WILL BE PRECERTIFIED.

FEMP BOUNDARY

AREA 9, PHASE I CERTIFICATION BOUNDARY

SCALE

1500 750 0 1500 FEET

DRAFT

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

2.0 SAMPLING PROGRAM

Before any precertification activities can be conducted on private property, an access agreement must be obtained from the property owner (Section 2.5.12 of the SEP). One access agreement will be obtained for both the physical sampling and real-time scanning activities. A total of nine biased boring locations have been selected within the plowed zone of A9PI (Figure 2-1). Several of the sample locations were selected in an effort to focus on off-property areas adjacent to on-property areas where contamination was found during A1PI remediation. The remainder of the sample locations were intended to provide information representations of the entire plowed portion of A9PI. Data obtained from these borings will be sufficient to determine the distribution of ASCOCs throughout the cultivated portions of A9PI soil, both vertically and horizontally. The locations were selected over the entire area to be representative of the entire cultivated area from north to south, and at varying distances from the fenceline to be representative of the cultivated area from east to west. The four locations closest to the fenceline were positioned near the A1PI CU (Q18-40) that failed certification for radium-226. All boring locations and sample identification numbers are listed in Appendix B.

2.1 SOIL SAMPLE COLLECTION

Soil cores will be obtained at each of the nine boring locations using the Geoprobe® Macro-core sampler in accordance with procedure EQT-06, Geoprobe® Model 5400 - Operation and Maintenance. Prior to collection of the soil cores, the field sampling technician will remove all surface vegetation within a 6-inch radius of the points to be sampled using a stainless steel trowel or a gloved hand. The Geoprobe® sampler will be driven to an initial depth of 3 feet. Upon removal, the cores will be laid on clean plastic visually inspected by a field geologist to determine the maximum depth of the plowed zone and recorded in the Field Activity Log (FAL). If the plowed zone is deeper than 3 feet, the soil core will be collected down to a depth of 6 inches beneath the plowed zone. Each core will then be divided into 6-inch intervals (Appendix B). Any additional 6-inch intervals collected below 3 feet will be documented in a Variance/Field Change Notice (V/FCN). Each 6-inch interval will then be frisked using a beta/gamma frisker, and the activity of each will be recorded (as corrected counts per minute) in the FAL. Finally, each 6-inch interval will be placed into individual 500 ml sample containers and assigned a unique sample identification number according to Section 2.4. All 54 samples (plus any additional samples needed to get below the plowed zone) will be taken to the clean side of the sample processing laboratory. If analyses need to be performed off site, the samples will then be prepared for

shipment to an off-site laboratory according to procedure S.P. 766-S-1000, Shipping Samples to Offsite Laboratories. If samples are sent to an off-site laboratory, appropriate data (e.g., historical, real-time scanning, location) will be provided to determine appropriate radiological compliance requirements.

If surface or subsurface obstacles prevent sample collection at any of the original locations identified in Appendix B, the location may be moved up to 3 feet in radius from the original location. The distance and direction moved will be noted on the FAL. If the new location is greater than 3 feet away from the originally planned sample point, the change will be documented on a V/FCN form and the location will be re-surveyed.

Customer sample numbers and Fernald Analytical Customer Tracking System (FACTS) identification numbers will be assigned to all samples collected. Sample labels will be completed with sample collection information. Technicians will complete a FAL, Sample Collection Log, Chain of Custody/Request for Analysis, and Borehole Abandonment Log in the field before submitting the samples for analysis.

2.2 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 has been decontaminated before transporting to the sampling location. Equipment that comes into contact with the sample will be decontaminated at Level II in the field between sample collection intervals, and again after the sampling performed under this PSP is completed (Section K.11 of the SCQ). Clean disposable wipes may be used instead of air drying the equipment.

Decontamination of the sample liners (plastic core tubes) is not necessary if the liners are maintained in the manufacturer's packaging (or equivalent) to prevent contamination. Other sampling tools that do not come into contact with sample media (i.e., Macro-core sampler body, etc.) will be wiped down using clean disposable towels until visibly clean.

2.3 BOREHOLE ABANDONMENT

Each borehole formed by the Geoprobe® will be backfilled with unused portion of the soil core. At the discretion of the Field Sampling Lead, additional soil from around the boring location may be used for additional backfilling of the borehole, if needed.

2.4 SAMPLE IDENTIFICATION

Each sample will be assigned a unique sample identification number, as follows:

A9PI-P-Boring-DepthRM-QC, where:

A9PI = Sample collected from A9PI
P = Precertification sample
Boring = Boring number (1 through 9)
Depth = The 0"-6" sample ="1", the 6"-12" sample = "2", and so on
Suite = "RM" designates that the sample will be submitted for both radiological and metals analysis (samples will be submitted to the lab together and an aliquot will be separated for metals analysis).
QC = Quality control sample. An "X" followed by a sequential number indicates a rinsate sample (e.g., A9PI-P-*boring-depth*-X1).

Therefore, the 18 to 24-inch soil sample from Boring 2 would be identified as A9PI-P-2-4.

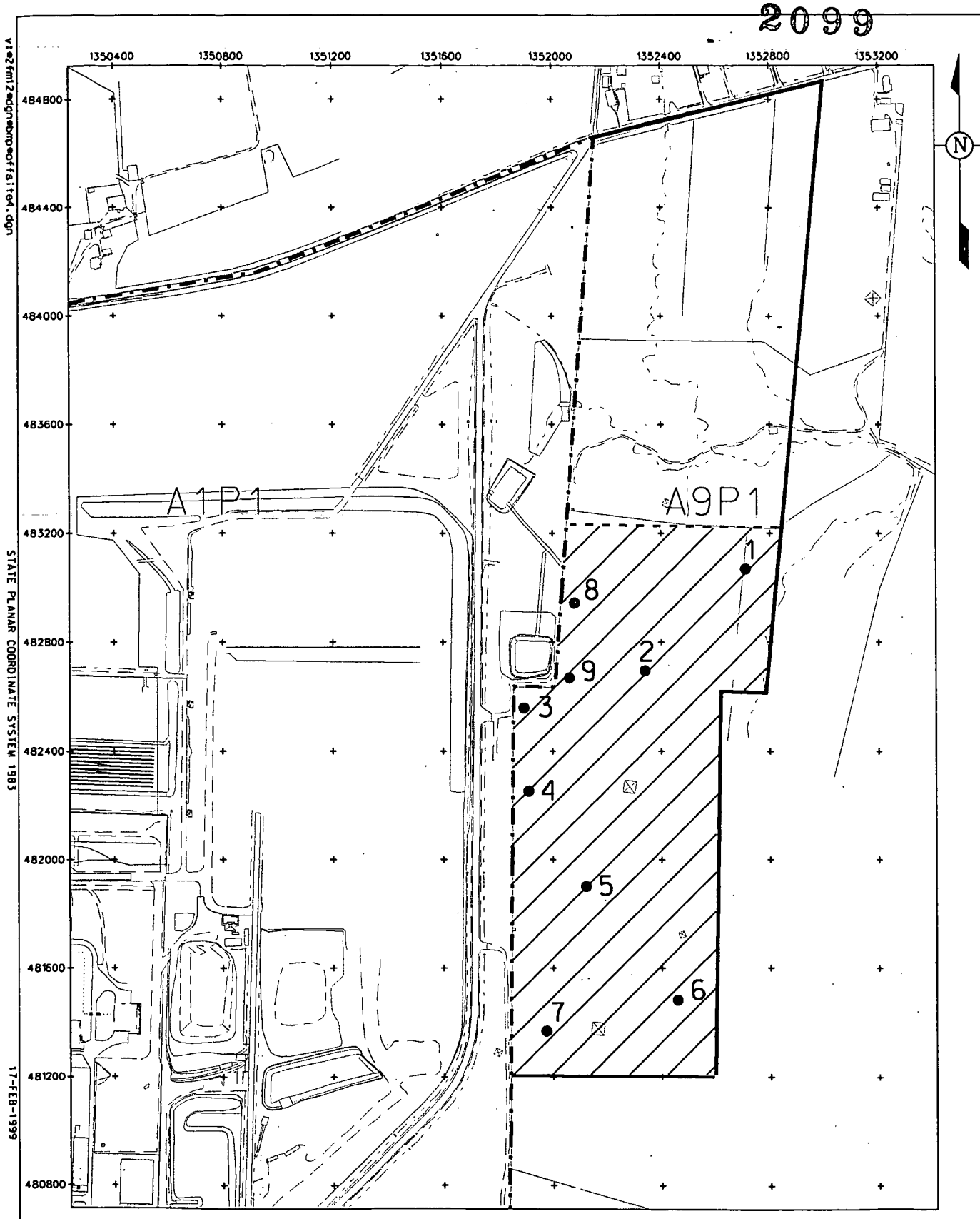

FIGURE 2-1. AREA 9, PHASE I PRE-CERTIFATION PHYSICAL SAMPLING LOCATIONS

3.0 SAMPLE ANALYSIS

The necessary volume of all samples collected will be prepared per the SCQ and SW846, as appropriate. The radiological constituents of concern will be analyzed by alpha or gamma spectroscopy, and the metals will be analyzed by Inductively Coupled Plasma Mass Spectroscopy (ICPMS). Arsenic may be analyzed by ICPMS or Graphite Furnace Atomic Absorption (GFAA). The selected analytical method must be sufficient to resolve the target analytes at concentrations below their respective off-property FRLs and per analytical support level (ASL) B analysis. Sampling and analytical requirements, along with the off-property FRLs, are listed in Table 3-1. The target analyte list (TAL 50.03.75.01-A) is presented in Table 3-2.

TABLE 3-1
SAMPLING AND ANALYTICAL REQUIREMENTS

Target Analytes	Off-Property FRL	Method	Sample Matrix	Lab	ASL	Preservation	Holding Time	Container[a]
Total Uranium	50 mg/kg	Alpha or Gamma Spectroscopy	Solid	On-site or Off-site	B	None	12 months	500 ml Glass or Plastic
Radium-226	1.5 pCi/g							
Radium-228	1.4 pCi/g							
Thorium-228	1.5 pCi/g							
Thorium-232	1.4 pCi/g							
Arsenic	9.6 mg/kg	ICPMS or GFAA	Solid	On-site or Off-site	B	Cool to 4°C	6 months	
Beryllium	0.62 mg/kg	ICPMS						
Manganese	1400 mg/kg							
All Above (TAL A)	Same as above	Same as above	Liquid (Rinsate)	On-site or Off-site	B	HNO_3 to pH < 2; Cool to 4°C	6 months	1 liter polyethylene
Activity (ccpm)	n/a	beta/gamma frisker	Solid	Field	n/a	n/a	n/a	n/a

[a] A minimum of 250 grams of each soil sample are necessary for all laboratory analyses

Note: Alpha/beta screen samples to be collected at the direction of the Field Sampling Lead.

TABLE 3-2
TARGET ANALYTE LIST

Area 9, Phase I Precertification Physical Sampling
Project Number 50.03.75.01

TAL 50.03.75.01-A

Alpha or Gamma Spectroscopy Method		
1	ASL B	Total Uranium
2	ASL B	Thorium-228
3	ASL B	Thorium-232
4	ASL B	Radium-228
5	ASL B	Radium-232
ICPMS or GFAA		
1	ASL B	Arsenic
ICPMS		
1	ASL B	Beryllium
2	ASL B	Manganese

4.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

4.1 QUALITY CONTROL SAMPLES

One rinsate will be collected for the project from one in 20 pieces of equipment that comes into contact with the samples, then analyzed for TAL 50.03.75.01-A. For analytical validation purposes, the rinsate will be associated with the next soil sample collected with the equipment used to take the rinsate.

4.2 PROJECT REQUIREMENTS FOR SURVEILLANCES

Project management has ultimate responsibility for the quality of the work processes and the results of the sampling activities under this PSP. The FEMP QA organization will conduct independent assessments of work processes and operations. These assessments will evaluate technical and procedural requirements of this PSP and the SCQ. Independent assessments will be performed by conducting assessments during implementation of this PSP, which will involve monitoring/observing on-going project activity and work areas to verify conformance to specified requirements. Surveillances will be planned and documented according to Section 12.3 of the SCQ.

4.3 FIELD CHANGES TO THE FIELD IMPLEMENTATION PLAN

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

4.4 APPLICABLE PROCEDURES AND REFERENCES

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

ADM-02, Field Project Prerequisites
EQT-05, Geodimeter 4000 Surveying System - Operation, Maintenance, and Calibration
EQT-06, Geoprobe® Model 5400 - Operation and Maintenance
SMPL-01, Solids Sampling
SMPL-21, Collection of Field Quality Control Samples
S.P. 766-S-1000, Shipping Samples to Offsite Laboratories.

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, 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.

6.0 DISPOSITION OF WASTES

During sampling activities, field personnel may generate small amounts of soil, water, and contact waste. Management of these waste streams will be coordinated with WAO through the Project Waste Identification Document (PWID) process. Soils will be returned to bore hole spread at the point of origin (i.e., sampling locations). 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 facility, either directly or indirectly, through the storm water collection system. Contact waste generation will be minimized by limiting contact with sample media, and by only using disposable materials which are necessary. This contact waste will be disposed of in a dumpster in the uncontrolled area. PWID number 482 has been developed specifically to support these sampling activities.

7.0 DATA MANAGEMENT

Information collected during the investigation will be properly managed to satisfy data end use requirements after completion of the field activities. As specified in Section 5.1 of the SCQ, sampling teams will describe daily activities on the FAL which should be sufficient for accurate reconstruction of the events at a later date without reliance on memory. FALs and Sample Collection Logs will be completed according to protocols specified in Appendix B of the SCQ and in applicable procedures. These forms will be maintained in loose-leaf form and uniquely numbered following the field sampling event. In addition, a copy of these completed forms will be sent to the Area 9 Characterization Lead on at least a weekly basis.

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

A list of planned sample points and associated locations will be entered into the Soils Master List by the data manager. This table serves as the starting point for tracking sample data. All analytical data will require a Certificate of Analysis. In addition, a minimum 10 percent of the data will require QA/QC results and will be validated to Level B. Data will be entered into the FACTS, then transferred to the Sitewide Environmental Database by Analytical Data Management personnel according to standard protocol. Hard-copy data reports and documents are kept in permanent storage in the project files. The frisker and analytical data will be used to plot concentration and activity profiles for each boring and each parameter.

APPENDIX A

DATA QUALITY OBJECTIVE SL-048, Rev. 5

Control Number 2099

Fernald Environmental Management Project

Data Quality Objectives

Title: Delineating the Extent of Constituents of Concern During Remediation Sampling

Number: SL-048

Revision: 5

Effective Date: 2/26/99

Contact Name: Eric Kroger

Approval: _____ **Date:** 2/25/99
James E. Chambers
DQO Coordinator

Approval: _____ **Date:** 2/26/99
J.D. Chiou
SCEP Project Director

Rev. #	0	1	2	3	4	5	6
Effective Date:	9/19/97	10/3/97	4/15/98	6/17/98	7/14/98	2/26/99	

DATA QUALITY OBJECTIVES
Delineating the Extent of Constituents of Concern During Remediation Sampling

Members of Data Quality Objectives (DQO) Scoping Team

The members of the DQO team include a project lead, a project engineer, a field lead, a statistician, a lead chemist, a sampling supervisor, and a data management lead.

Conceptual Model of the Site

Media is considered contaminated if the concentration of a constituent of concern (COC) exceeds the final remediation levels (FRLs). The extent of specific media contamination was estimated and published in the Operable Unit 5 Feasibility Study (FS). These estimates were based on kriging analysis of available data for media collected during the Remedial Investigation (RI) effort and other FEMP environmental characterization studies. Maps outlining contaminated media boundaries were generated for the Operable Unit 5 FS by overlaying the results of the kriging analysis data with isoconcentration maps of the other constituents of concern (COCs), as presented in the Operable Unit 5 RI report, and further modified by spatial analysis of maps reflecting the most current media characterization data. A sequential remediation plan has been presented that subdivides the FEMP into seven construction areas. During the course of remediation, areas of specific media may require additional characterization so remediation can be carried out as thoroughly and efficiently as possible. As a result, additional sampling may be necessary to accurately delineate a volume of specific media as exceeding a target level, such as the FRL or the Waste Attainment Criterion (WAC). Each individual Project-Specific Plan (PSP) will identify and describe the particular media to be sampled. This DQO covers all physical sampling activities associated with Pre-design Investigations, precertification sampling, WAC attainment sampling or regulatory monitoring that is required during site remediation.

1.0 Statement of Problem

If the extent (depth and/or area) of the media COC contamination is unknown, then it must be defined with respect to the appropriate target level (FRL, WAC, or other specified media concentration).

2.0 Identify the Decision

Delineate the horizontal and/or vertical extent of media COC contamination in an area with respect to the appropriate target level.

3.0 Inputs That Affect the Decision

Informational Inputs - Historical data, process history knowledge, the modeled extent of COC contamination, and the origins of contamination will be required to

establish a sampling plan to delineate the extent of COC contamination. The desired precision of the delineation must be weighed against the cost of collecting and analyzing additional samples in order to determine the optimal sampling density. The project-specific plan will identify the optimal sampling density.

Action Levels - COCs must be delineated with respect to a specific action level, such as FRLs and On-Site Disposal Facility (OSDF) WAC concentrations. Specific media FRLs are established in the OU2 and OU5 RODs, and the WAC concentrations are published in the OU5 ROD. Media COCs may also require delineation with respect to other action levels that act as remediation drivers, such as Benchmark Toxicity Values (BTVs).

4.0 The Boundaries of the Situation

Temporal Boundaries - Sampling must be completed within a time frame sufficient to meet the remediation schedule. Time frames must allow for the scheduling of sampling and analytical activities, the collection of samples, analysis of samples and the processing of analytical data when received.

Scale of Decision Making - The decision made based upon the data collected in this investigation will be the extent of COC contamination at or above the appropriate action level. This delineation will result in media contaminant concentration information being incorporated into engineering design, and the attainment of established remediation goals.

Parameters of Interest - The parameters of interest are the COCs that have been determined to require additional delineation before remediation design can be finalized with the optimal degree of accuracy.

5.0 Decision Rule

If existing data provide an unacceptable level of uncertainty in the COC delineation model, then additional sampling will take place to decrease the model uncertainty. When deciding what additional data is needed, the costs of additional sampling and analysis must be weighed against the benefit of reduced uncertainty in the delineation model, which will eventually be used for assigning excavation, or for other purposes.

6.0 Limits on Decision Errors

In order to be useful, data must be collected with sufficient areal and depth coverage, and at sufficient density to ensure an accurate delineation of COC concentrations. Analytical sensitivity and reproducibility must be sufficient to differentiate the COC concentrations below their respective target levels.

Types of Decision Errors and Consequences

Decision Error 1 - This decision error occurs when the decision maker determines that the extent of media contaminated with COCs above action levels is not as extensive as it actually is. This error can result in a remediation design that fails to incorporate media contaminated with COC(s) above the action level(s). This could result in the re-mobilization of excavation equipment and delays in the remediation schedule. Also, this could result in media contaminated above action levels remaining after remediation is considered complete, posing a potential threat to human health and the environment.

Decision Error 2 - This decision error occurs when the decision maker determines that the extent of media contaminated above COC action levels is more extensive than it actually is. This error could result in more excavation than necessary, and this excess volume of materials being transferred to the OSDF, or an off-site disposal facility if contamination levels exceed the OSDF WAC.

True State of Nature for the Decision Errors - The true state of nature for Decision Error 1 is that the maximum extent of contamination above the FRL is more extensive than was determined. The true state of nature for Decision Error 2 is that the maximum extent of contamination above the FRL is not as extensive as was determined. Decision Error 1 is the more severe error.

7.0 Optimizing Design for Useable Data

7.1 Sample Collection

A sampling and analytical testing program will delineate the extent of COC contamination in a given area with respect to the action level of interest. Existing data, process knowledge, modeled concentration data, and the origins of contamination will be considered when determining the lateral and vertical extent of sample collection. The cost of collecting and analyzing additional samples will be weighed against the benefit of reduced uncertainty in the delineation model. This will determine the sampling density. Individual PSPs will identify the locations and depths to be sampled, the sampling density necessary to obtain the desired accuracy of the delineation, and if samples will be analyzed by the on-site or off-site laboratory. The PSP will also identify the sampling increments to be selectively analyzed for concentrations of the COC(s) of interest, along with field work requirements. Analytical requirements will be listed in the PSP. The chosen analytical methodologies are able to achieve a detection limit capable of resolving the COC action level. Sampling of groundwater monitoring wells may require different purge requirements than those stated in the SCQ (i.e., dry well definitions or small purge volumes). In order to accommodate sampling of wells that go dry prior to completing the purge of the necessary well volume, attempts to sample the

monitoring wells will be made 24 hours after purging the well dry. If, after the 24 hour period, the well does not yield the required volume, the analytes will be collected in the order stated in the applicable PSP until the well goes dry. Any remaining analytes will not be collected. In some instances, after the 24 hour wait the well may not yield any water. For these cases, the well will be considered dry and will not be sampled.

7.2 COC Delineation

The media COC delineation will use all data collected under the PSP, and if deemed appropriate by the Project Lead, may also include existing data obtained from physical samples, and if applicable, information obtained through real-time screening. The delineation may be accomplished through modeling (e.g. kriging) of the COC concentration data with a confidence limit specific to project needs that will reduce the potential for Decision Error 1. A very conservative approach to delineation may also be utilized where the boundaries of the contaminated media are extended to the first known vertical and horizontal sample locations that reveal concentrations below the desired action level.

7.3 QC Considerations

Laboratory work will follow the requirements specified in the SCQ. If analysis is to be carried out by an off-site laboratory, it will be a Fluor Daniel Fernald approved full service laboratory. Laboratory quality control measures include a media prep blank, a laboratory control sample (LCS), matrix duplicates and matrix spike. Typical Field QC samples are not required for ASL B analysis. However the PSPs may specify appropriate field QC samples for the media type with respect to the ASL in accordance with the SCQ, such as field blanks, trip blanks, and container blanks. All field QC samples will be analyzed at the associated field sample ASL. Data will be validated per project requirements, which must meet the requirements specified in the SCQ. Project-specific validation requirements will be listed in the PSP.

Per the Sitewide Excavation Plan, the following ASL and data validation requirements apply to all **soil and soil field QC samples** collected in association with this DQO:

- If samples are analyzed for Pre-design Investigations and/or Precertification, 100% of the data will be analyzed per ASL B requirements. For each laboratory used for a project, 90% of the data will require only a Certificate of Analysis, the other 10% will require the Certificate of Analysis and all associated QA/QC results, and will be validated to ASL B. Per Appendix H of the SEP, the minimum detection level (MDL) for these analyses will be established at approximately 10% of the action level (the action level for precertification is the

FRL; the action level for pre-design investigations can be several different action levels, including the FRL, the WAC, RCRA levels, ALARA levels, etc.). If this MDL is different from the SCQ-specified MDL, the ASL will default to ASL E, though other analytical requirements will remain as specified for ASL B.

- If samples are analyzed for WAC Attainment and/or RCRA Characteristic Areas Delineation, 100% of the data will be analyzed and reported to ASL B with 10% validated. The ASL B package will include a Certificate of Analysis along with all associated QA/QC results. Total uranium analyses using a higher detection limit than is required for ASL B (10 mg/kg) may be appropriate for WAC attainment purposes since the WAC limit for total uranium is 1,030 mg/kg. In this case, an ASL E designation will apply to the analysis and reporting to be performed under the following conditions:

  - all of the ASL B laboratory QA/QC methods and reporting criteria will apply with the exception of the total uranium detection limit

  - the detection limit will be ≤10% of the WAC limit (e.g., ≤103 mg/kg for total uranium).

- If delineation data are also to be used for certification, the data must meet the data quality objectives specified in the Certification DQO (SL-043).

- Validation will include field validation of field packages for ASL B or ASL D data.

All data will undergo an evaluation by the Project Team, including a comparison for consistency with historical data. Deviations from QC considerations resulting from evaluating inputs to the decision from Section 3, must be justified in the PSP such that the objectives of the decision rule in Section 5 are met.

7.4 Independent Assessment

Independent assessment shall be performed by the FEMP QA organization by conducting surveillances. Surveillances will be planned and documented in accordance with Section 12.3 of the SCQ.

7.5 Data Management

Upon receipt from the laboratory, all results will be entered into the SED as qualified data using standard data entry protocol. The required ASL B, D or E data will undergo analytical validation by the FEMP validation team, as required (see Section 7.3). The Project Manager will be responsible to determine data usability as it pertains to supporting the DQO decision of determining delineation of media

COC's.

7.6 Applicable Procedures

Sample collection will be described in the PSP with a listing of applicable procedures. Typical related plans and procedures are the following:

- Sitewide Excavation Plan (SEP)
- Sitewide CERCLA Quality Assurance Project Plan (SCQ).
- SMPL-01, *Solids Sampling*
- SMPL-02, *Liquids and Sludge Sampling*
- SMPL-21, *Collection of Field Quality Control Samples*
- EQT-06, *Geoprobe® Model 5400 Operation and Maintenance*
- EQT-23, *Operation of High Purity Germanium Detectors*
- EQT-30, *Operation of Radiation Tracking Vehicle Sodium Iodide Detection System*

Data Quality Objectives
Delineating the Extent of Constituents of Concern During Remediation Sampling

1A. Task/Description: Delineating the extent of contamination above the FRLs

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

RI ☐ FS ☐ RD ☒ RA ☐ R_vA ☐ OTHER ☐

1.C. DQO No.: SL-048, Rev. 5 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 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 A☒ B☒ C☐ D☒ E☒	Other A☐ B☐ C☐ D☐ E☐

4.A. Drivers: Remedial Action Work Plans, Applicable or Relevant and Appropriate Requirements (ARARs) and the OU2 and/or OU5 Record of Decision (ROD).

4.B. Objective: Delineate the extent of media contaminated with a COC (or COCs) with respect to the action level(s) of interest.

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5. Site Information (Description):

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	X *	2. Uranium	X *	3. BTX	
Temperature	X *	Full Radiological	X *	TPH	
Specific Conductance	X *	Metals	X *	Oil/Grease	
Dissolved Oxygen	X *	Cyanide			
Technetium-99	X *	Silica			

4. Cations		5. VOA	X *	6. Other (specify)
Anions		BNA	X *	
TOC		Pesticides	X *	
TCLP	X *	PCB	X *	
CEC		COD		

*If constituent is identified for delineation in the individual PSP.

6.B. Equipment Selection and SCQ Reference:

Equipment Selection		Refer to SCQ Section	
ASL A		SCQ Section:	
ASL B	X	SCQ Section:	App. G Tables G-1&G-3
ASL C		SCQ Section:	
ASL D	X	SCQ Section:	App. G Tables G-1&G-3
ASL E	X (See sect. 7.3, pg. 6)	SCQ Section:	App. G Tables G-1&G-3

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

Biased	X	Composite		Environmental	X	Grab	X	Grid	X
Intrusive	X	Non-Intrusive		Phased		Source			

DQO Number: SL-048, Rev. 5

7.B. Sample Work Plan Reference: This DQO is being written prior to the PSPs.

Background samples: OU5 RI

7.C. Sample Collection Reference:

Sample Collection Reference: SMPL-01, SMPL-02, EQT-06

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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)			

* For volatile organics only
** Split samples will be collected where required by EPA or OEPA.
*** If specified in PSP.
\+ Collected at the discretion of the Project Manager (if warranted by field conditions)
++ One per Area and Phase Area per container type (i.e. stainless steel core liner/plastic core liner/Geoprobe tube).

8.B. Laboratory Quality Control Samples:

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

Other (specify) Per SCQ

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

SAMPLING LOCATION AND IDENTIFICATION NUMBERS OF A9PI PRECERTIFICATION PHYSICAL SAMPLES

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SAMPLING LOCATION AND IDENTIFICATION NUMBERS OF A9PI PRECERTIFICATION PHYSICAL SAMPLES

Boring Location (see Figure 2-1)	Easting Coordinate ('83)	Northing Coordinate ('83)	Sample Depth	Sample Identification Number
1	1352711.23	483069.27	0"-6"	A9PI-P-1-1
			6"-12"	A9PI-P-1-2
			12"-18"	A9PI-P-1-3
			18"-24"	A9PI-P-1-4
			24"-30"	A9PI-P-1-5
			30"-36"	A9PI-P-1-6
2	1352339.12	482697.16	0"-6"	A9PI-P-2-1
			6"-12"	A9PI-P-2-2
			12"-18"	A9PI-P-2-3
			18"-24"	A9PI-P-2-4
			24"-30"	A9PI-P-2-5
			30"-36"	A9PI-P-2-6
3	1351895.71	482559.01	0"-6"	A9PI-P-3-1
			6"-12"	A9PI-P-3-2
			12"-18"	A9PI-P-3-3
			18"-24"	A9PI-P-3-4
			24"-30"	A9PI-P-3-5
			30"-36"	A9PI-P-3-6
4	1351911.52	482253.14	0"-6"	A9PI-P-4-1
			6"-12"	A9PI-P-4-2
			12"-18"	A9PI-P-4-3
			18"-24"	A9PI-P-4-4
			24"-30"	A9PI-P-4-5
			30"-36"	A9PI-P-4-6

APPENDIX B

SAMPLING LOCATION AND IDENTIFICATION NUMBERS OF A9PI PRECERTIFICATION PHYSICAL SAMPLES (Continued)

Boring Location (see Figure 2-1)	Easting Coordinate ('83)	Northing Coordinate ('83)	Sample Depth	Sample Identification Number
5	1352120.97	481900.88	0"-6"	A9PI-P-5-1
			6"-12"	A9PI-P-5-2
			12"-18"	A9PI-P-5-3
			18"-24"	A9PI-P-5-4
			24"-30"	A9PI-P-5-5
			30"-36"	A9PI-P-5-6
6	1352457.69	481482.80	0"-6"	A9PI-P-6-1
			6"-12"	A9PI-P-6-2
			12"-18"	A9PI-P-6-3
			18"-24"	A9PI-P-6-4
			24"-30"	A9PI-P-6-5
			30"-36"	A9PI-P-6-6
7	1351974.92	481367.95	0"-6"	A9PI-P-7-1
			6"-12"	A9PI-P-7-2
			12"-18"	A9PI-P-7-3
			18"-24"	A9PI-P-7-4
			24"-30"	A9PI-P-7-5
			30"-36"	A9PI-P-7-6
8	1352082.32	482944.86	0"-6"	A9PI-P-8-1
			6"-12"	A9PI-P-8-2
			12"-18"	A9PI-P-8-3
			18"-24"	A9PI-P-8-4
			24"-30"	A9PI-P-8-5
			30"-36"	A9PI-P-8-6

APPENDIX B

SAMPLING LOCATION AND IDENTIFICATION NUMBERS OF A9PI PRECERTIFICATION PHYSICAL SAMPLES (Continued)

Boring Location (see Figure 2-1)	Easting Coordinate ('83)	Northing Coordinate ('83)	Sample Depth	Sample Identification Number
9	1352061.9	482669.12	0"-6"	A9PI-P-9-1
			6"-12"	A9PI-P-9-2
			12"-18"	A9PI-P-9-3
			18"-24"	A9PI-P-9-4
			24"-30"	A9PI-P-9-5
			30"-36"	A9PI-P-9-6