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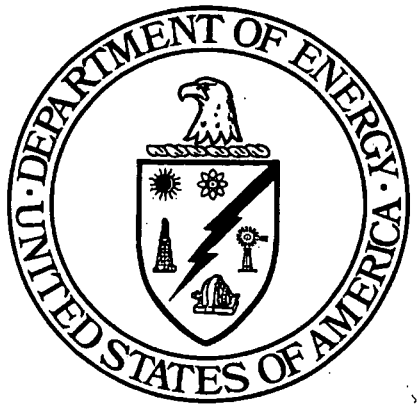
PROJECT SPECIFIC PLAN FOR INVESTIGATION OF SOIL STAGED IN QUONSET HUT NO. 1

SOIL AND DISPOSAL FACILITY PROJECT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO



FOR INFORMATION ONLY

OCTOBER 3, 2002

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

20803-PSP-0001
REVISION 0

PROJECT SPECIFIC PLAN FOR INVESTIGATION OF SOIL STAGED IN QUONSET HUT NO. 1

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Revision 0

October 3, 2002

APPROVAL:

Jyh-Dong Chiou, Project Director — Date
Soil and Disposal Facility Project

Frank Miller, Characterization Manager — Date
Soil and Disposal Facility Project

Tom Buhrlage, Sampling Manager — Date
Environmental Monitoring Project

Linda Barlow, Waste Acceptance Organization — Date
Waste Management Project

Reinhard Friske, Quality Assurance — Date
Maintenance and Infrastructure Support

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

ASL	analytical support level
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DCE	dichloroethene
DOE	U.S. Department of Energy
DQO	Data Quality Objectives
FACTS	Fernald Analytical Customer Tracking System
FRL	final remediation level
MDC	minimum detectable concentration
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliter
PCE	perchloroethene
PID	photoionization detector
PSP	Project Specific Plan
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RWP	Radiological Work Permit
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SDFP	Soil and Disposal Facility Project
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SP-3	Soil Stockpile 3
TAL	Target Analyte List
TCE	trichloroethene
TCLP	Toxicity Characteristic Leachate Procedure
V/FCN	Variance/Field Change Notice
VOC	volatile organic compound
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization
yd^3	cubic yards

1.0 INTRODUCTION

1.1 BACKGROUND

During the predesign investigation for Area 3A/4A, an area of soil located on the north side of the former Maintenance Building (Building 12) was identified as "characteristic" per the Resource Conservation and Recovery Act (RCRA). This was the result of several trichloroethene analyses failing the toxicity characteristic leachate procedure (TCLP) [i.e., TCLP results exceeded the regulatory limit of 0.5 milligrams per liter (mg/L)]. In late 2001, approximately 600 cubic yards (yd^3)of soil were excavated from this area and taken directly to Quonset Hut No. 1 for temporary staging and treatment until the soil can be placed in the OSDF. Note that the Implementation Plan for Area 3A/4A stated that this soil would be staged at the Soil Stockpile 3 (SP-3) area. However, Quonset Hut No. 1 was later identified as a more ideal location per Letter DOE-0148-02, "Request for Concurrence to Initiate Soil Stockpiles," dated November 21, 2001 and the subsequent concurrences. Figure 1-1 shows the location of Quonset Hut No. 1, as well as the area behind the Maintenance Building where this soil originated. Refer to the Implementation Plan for Area 3A/4A for more information on this RCRA soil.

The soil is stockpiled in the Quonset Hut in such a manner to allow pedestrian access around the entire perimeter of the pile. Prior to placement of the RCRA soil in the Quonset Hut, concrete "jersey" barriers were placed inside of the north, south and west perimeters of the structure, within approximately 4 feet of the walls. The soil was transported in through the doors on the eastern side of the building, and placement began at the far western end inside of the barriers, continuing eastward. The footprint of the pile occupies an approximately 30-foot by 80-foot area inside of the Hut. The height of the pile varies, with a maximum of approximately 8 to 10 feet at its apex.

1.2 PURPOSE AND SCOPE

This project specific plan (PSP) has been developed to investigate volatile organic compound concentrations present in the soil staged in Quonset Hut No. 1 and determine if the soil still contains target volatile organic compound (VOC) concentrations that exceed the RCRA limit based on the toxicity characteristic leachate procedure. This investigation includes two stages. Stage 1, which took place under a previous revision of this PSP (Revision A), consisted of an informal sampling round; the purpose of which was to establish the concentrations of target VOCs throughout this pile since excavation and its transfer of the soil to the Quonset Hut. It included the collection of 12 samples

representative of various portions of this pile. The samples were collected from each of four quadrants (northeast, southeast, southwest, northwest), and from each of three depths (top one-third, middle one-third, and bottom one-third) in each quadrant. All were analyzed on the field-portable gas chromatography unit for the four VOCs that are also Area 3A/4A ASCOCs: 1,1-Dichloroethene (DCE), 1,2-DCE, trichloroethene (TCE), and perchloroethene (PCE).

The data collected during Stage 1 showed three PCE concentrations exceeding the 20-times level of 14 milligrams per kilogram (mg/kg) for potential characteristic soil, thus indicating potential RCRA material. These concentrations were found in the deeper portions of the western side of this pile, as follows:

- Southwest quadrant, bottom third: PCE = 17.11 mg/kg
- Southwest quadrant, middle third: PCE = 19.76 mg/kg
- Northwest quadrant, bottom third: PCE = 14.86 mg/kg.

The 1,1-DCE, 1,2-DCE and TCE results were well below the "20-times" level and/or OSDF waste acceptance criteria (WAC) level. All analytical results from Stage 1 of this investigation are provided in Appendix A of this PSP.

Stage 2 of this investigation is detailed in Section 2 of this PSP. It includes a second round of 12 samples collected throughout the pile, plus five additional biased samples collected at locations determined by Stage 1 results. All Stage 2 samples will be analyzed by the TCLP to determine if the soil is still RCRA characteristic, and therefore, requires treatment prior to placement in the OSDF.

Sampling activities conducted under this PSP will be performed in accordance with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ), the Sitewide Excavation Plan (SEP), and Data Quality Objectives (DQO) SL-048, Revision 5 (Appendix B).

1.3 KEY PROJECT PERSONNEL

The team members responsible for coordination of work in accordance with this PSP are listed in Table 1-1.

TABLE 1-1
KEY PERSONNEL

Title	Primary	Alternate
DOE Contact	Rób Janke	Kathi Nickel
SDFP Management	Jyh-Dong Chiou	Tom Beasley
Characterization Manager	Frank Miller	Eric Kroger
Field Sampling Manager	Tom Buhrlage	Jim Hey
Surveying Manager	Jim Schwing	Andy Clinton
WAO Contact	Linda Barlow	Krista Walls
Laboratory Contact	Heather Medley	Amy Meyer
Data Management Lead	Eric Kroger	Krista Blades
Data Validation Contact	James Chambers	Andy Sandfoss
FACTS/SED Contact	Cara Sue Schaefer	Susan Marsh
QA/QC Contact	Reinhard Friske	Mike Godber
Health and Safety Contact	Gregg Johnson	Pete Bolig/ Jeff Middaugh

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

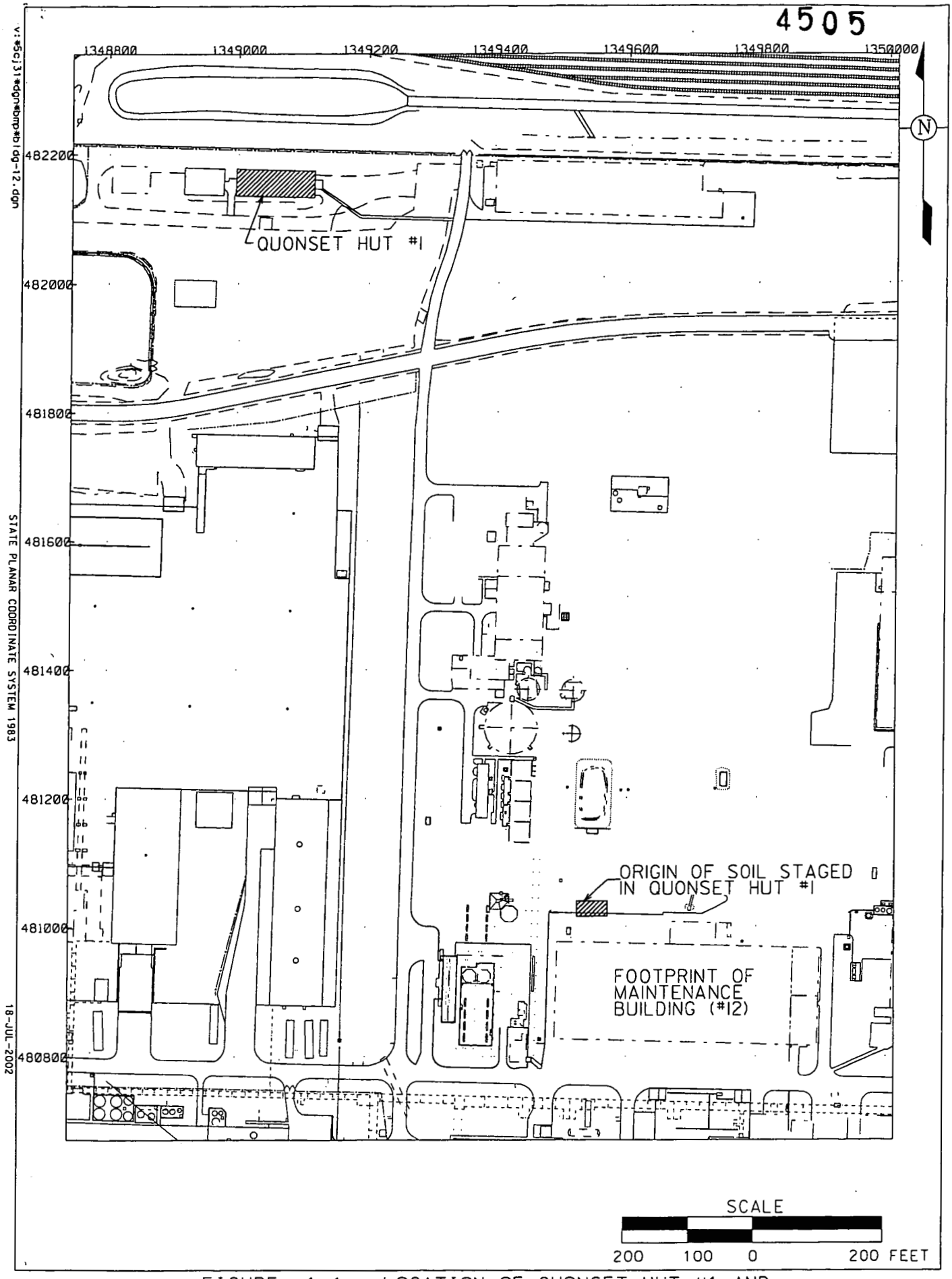


FIGURE 1-1. LOCATION OF QUONSET HUT #1 AND ORIGIN OF RCRA CHARACTERISTIC SOIL STAGED THERE

2.0 SAMPLING STRATEGY

2.1 SAMPLING STRATEGY

The goal of the Stage 2 sampling is to conduct a thorough investigation of the soil staged in Quonset Hut No. 1 to clearly demonstrate if the soil is still characteristic under RCRA. This will include the collection of five biased samples (based on Stage 1 sample results), plus the collection of 12 additional samples (random boring location, biased sample collection) from within the pile. This sampling density (17 TCLP analyses for 600 yd^3) will provide an extremely thorough evaluation of this soil.

Three of the five biased samples will be collected from approximately the same location as the Stage 1 samples with PCE results exceeding the "20-times rule" (SW-6 and SW-9, and NW-10). These approximate locations are shown on Figure 2-1. The other two biased samples will be collected from the base of the pile (i.e., just above the Quonset Hut pad) at the QHUT-NW and QHUT-SW locations.

To collect the 12 additional samples, a boring location will be field-identified by the field sampling lead – one within each of the four quadrants of the pile. Again, these locations should be identified, to the extent possible, in the deepest portions of the pile and at a reasonable distance (preferably at least 3 feet) away from the Stage 1 sampling location. This will increase the likelihood that the material being sampled is from a different point of origin. At each location, samples will be collected from each one-third layer of the pile (bottom one-third, middle one-third, and top one-third layer). The sample collected from each layer will be selected in a biased manner through use of the photoionization detector (PID), where the sample from each layer will be collected at the location of the highest PID reading. If no discernable difference exists, then the sample will be collected from the deepest portion of each layer. The complete list of samples collected under this PSP is provided in Appendix C.

All samples collected under this PSP will be analyzed at an off-site laboratory by the TCLP method. Target analytes include PCE and TCE [Target Analyte List (TAL) B]. PCE will be analyzed since it was identified at concentrations exceeding the 20-times level during the Stage 1 sampling and during excavation control sampling. TCE will be analyzed because it was identified at concentrations exceeding the RCRA TCLP level during predesign investigation sampling. DCE (1,1- and 1,2-) will not be analyzed by TCLP since no previous sampling [remedial investigation/feasibility study (RI/FS),

predesign, excavation control, or Stage 1 investigation sampling] has shown concentrations anywhere near their potentially characteristic (i.e., 20-times) or WAC levels. The TAL is included in Appendix D.

2.1.1 Sample Collection Methods

All samples will be collected in accordance with SMPL-01, Solids Sampling. All borings should be performed through vertical direct-pushes at each location. The actual field-selected sampling locations should be documented at the time of collection by identifying them, as accurately as possible on a sketch of the area, or on a copy of Figure 2-1. This documentation should be included with the Sample Collection Logs.

Because the Geoprobe cannot access the inner (and deepest) portions of the pile, soil samples will be collected using a slam hammer or other methods specified in SMPL-01. Borehole collapse will be monitored during core sampling to ensure sidewall slough is accounted for during sample collection. Regardless of sample collection method, multiple cores may be collected at each sampling location (not to exceed 1 foot apart), if necessary to obtain sufficient sample volume for analysis. All borehole will be manually collapsed following sample collection. Borehole abandonment and Borehole abandonment logs are not required.

Following collection, the soil cores will be laid out on clean plastic and subjected to the PID scan. The portion of each of the three layers (top, middle and bottom thirds) per core with the highest PID reading will be separated and containerized as a sample. If there is no clear sample increment with the highest PID reading, the sample will be collected from the deepest portion of the layer. The depth below the surface of the pile should be noted on the Sample Collection Log. Any debris contained in a sample interval will be removed from the sample in the field and described on the Field Activity Log. Sampling and analytical requirements are summarized in Table 2-1. All samples will be transported to the Sample Processing Laboratory where they will be prepared for shipment to an off-site laboratory.

2.2 SAMPLE IDENTIFICATION

All soil samples will be assigned a unique sample identifier, as follows:

1. Area Designator: The identifier "QHUT" will be used to identify a sample collected from soil staged in Quonset Hut No. 1.

//

2. Location Designator: This will be an abbreviation for the quarter division of the pile where the sample was collected, where NE = northeast, SE = southeast, SW = southwest, and NW = northwest. A number 1 will be added to the quadrant (e.g., SW1) to designate resampling at the Stage 1 locations; a number 2 will immediately follow the quadrant designator to distinguish the new sampling locations identified for Stage 2.

3. Depth Interval Designator: *For resampling the Stage 1 locations*:
The sequential depth identifier (i.e., a number equal to two-times the bottom depth of the increment) will be used to designate the depth into the pile that the sample was collected (see Appendix C).

For Stage 2 locations:
T = sample collected from the top one-third layer
M = sample collected from the middle one-third layer
B = sample collected from the bottom one-third layer

4. Measurement Designator: L = Volatile Organic Analysis

For example, the resample of the soil from the middle layer in the southwest quadrant (which was measured during the Stage 1 sampling at 3 feet into the pile) would be identified as QHUT-SW1-6-L. The deepest sample collected from the new randomly selected location in the Northeast quadrant would be identified as "QHUT-NE2-B-L". There is no need to replace the "B" with a sequential depth identification number.

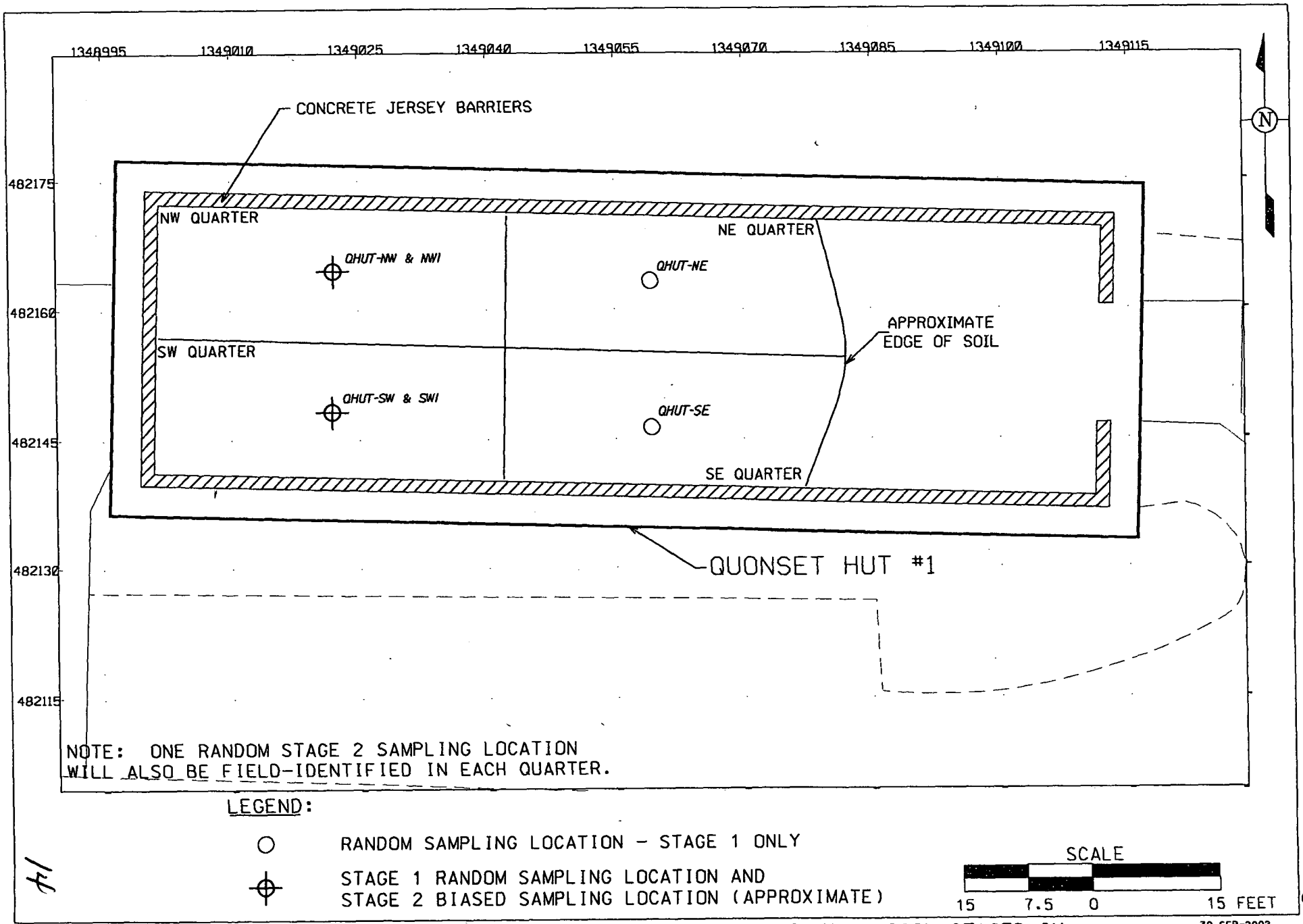
2.3 EQUIPMENT DECONTAMINATION

Sampling equipment will be decontaminated (Level II) before transporting to the sampling site. Additionally, all equipment that comes into contact with the soil core and is re-used will be decontaminated in the field. If used, the core barrel portion of the core sampler will be wiped down between sample intervals and locations to remove visible soil or material.

TABLE 2-1
SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte	Sample Matrix	Lab	ASL	Preservative	Holding Time	Container	Sample Mass (minimum)
Trichloroethene Tetrachloroethene (TAL B)	Solid (TCLP)	Off-site	B	Cool 2°-6° C°	14 days	1-60 ml glass with Teflon-lined septa and no head space	120 g
Trichloroethene Tetrachloroethene (TAL B)	Liquid	Off-site	B	Cool 2°-6° C°, H_2SO_4 to pH<2	14 days	3-40 ml glass with Teflon-lined septa and no head space	120 mL

ASL – analytical support level



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STATE PLANAR COORDINATE SYSTEM 1983

30-SEP-2002

FIGURE 2-1. APPROXIMATE SIZE AND LOCATION OF SOIL STAGED IN QUONSET HUT #1 AND APPROXIMATE SAMPLING LOCATIONS

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3.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

3.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS, AND DATA VALIDATION

In accordance with the requirements of DQO SL-048, Revision 5, the field QC, analytical, and data validation requirements are as follows:

- All analyses will be performed at ASL B
- All analytical data will require a certificate of analysis and 10 percent of the analytical data will also require the associated QA/QC results. All field data forms will be validated, but no analytical validation is necessary
- Trip blanks are required, one for each day that samples are collected.

If any sample collection or analysis methods are used that are not in accordance with the SCQ, the Project Manager and Characterization Lead must determine if the qualitative data from the samples will be beneficial decision-making. If the data will be beneficial, the Project Manager and Characterization Lead will ensure that:

- The PSP is revised through a Variance/Field Change Notice (V/FCN) to include references confirming that the new method is sufficient to support data needs, or
- Variations from the SCQ methodology are documented in the PSP.

3.2 PROJECT-SPECIFIC PROCEDURES, MANUALS AND DOCUMENTS

To assure consistency and data integrity, field activities in support of this PSP will follow the requirements and responsibilities outlined in controlled procedures and manufacturer operational manuals. Applicable procedures and manuals include the following:

- SMPL-01, Solids Sampling
- EW-1023, Management of Stockpiles
- EQT-06, Geoprobe® Model 5400 Operation and Maintenance Manual
- EW-0002, Chain of Custody/Request for Analysis Record for Sample Control
- 9501, Shipping Samples to Off-Site Laboratories
- 9505, Using the FACTS Database to Process Samples

- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- Sitewide Excavation Plan (SEP)
- DQO SLO-048, Rev. 5
- 602-5004, "Industrial Hygiene Instrument Repair, Calibration, and Tracking System"
- 602-5024, "Industrial Hygiene Air Sampling Program"
- ToxiRAE Pocket Photoionization Detector (PID) Operation and Maintenance Manual (Document No. 007-4001 Rev. B), RAE Systems Inc.

3.3 PROJECT REQUIREMENTS FOR INDEPENDENT ASSESSMENTS

Project management has ultimate responsibility for the quality of the work processes and the results of the sampling activities covered by this PSP. Project management can schedule independent assessments of the work processes or operations to assure quality of performance. Assessment will encompass project requirements as defined in this PSP and the SCQ.

3.4 IMPLEMENTATION OF FIELD CHANGES

If field conditions require changes or variances, the Characterization Lead must prepare a V/FCN. The completed V/FCN must contain the signatures of all affected organizations, which at a minimum includes the Project Manager, Characterization Manager, WAO, and QA/QC but may also include Field Sampling and/or the Analytical Program Manager, as appropriate. A time-critical variance may be obtained in cases where expedited approval is needed to avoid costly project delays. In the case of a time-critical variance, verbal or written approval must be received from the Characterization Lead and from QA/QC (for major changes in scope) prior to implementing the variance. The completed approved V/FCN form must be completed within five working days after the time-critical variance is approved. All significant field changes to the PSP will require regulatory agency approval.

4.0 HEALTH AND SAFETY

The Health and Safety Lead, Field Sampling Leads, and team members will assess the safety of performing sampling activities in the vicinity of each boring location. This will include vehicle/equipment positioning limitations and fall hazards.

Technicians will conform to precautionary surveys performed by Radiological Control, Safety, and Industrial Hygiene personnel. All work on this project will be performed in accordance with applicable Environmental Monitoring procedures, RM-0020 (Radiological Control Requirements Manual), RM-0021 (Safety Performance Requirements Manual), Fluor Fernald work permit, Radiological Work Permit (RWP), penetration permit and other applicable permits. Concurrence with applicable safety permits (as indicated by the signature of each field team member assigned to this project) is required by each team member in the performance of their assigned duties.

The Field Sampling Lead will ensure that each technician performing work related to this project has been trained to the relevant sampling procedures including safety precautions. Technicians who do not sign project safety and technical briefing forms will not participate in any activities related to the completion of assigned project responsibilities. A copy of applicable safety permits/surveys issued for worker safety and health will be posted in the affected area during field activities.

A safety briefing will be conducted prior to the initiation of field activities. All emergencies will be reported immediately to the site communication center at 648-6511 by cell phone, 911 on-site phone, or by contacting "CONTROL" on the radio.

4.1 Project-Specific Health and Safety Measures

Because this sampling will take place inside a closed building, several measures must be taken to minimize exposure to airborne contaminants. During the entire sampling event, the double doors at both ends of the Quonset Hut should be fully opened to maximize ventilation. In addition, one member of the field team should wear a personal PID (with the alarm set to go off at an action level of 25 parts per million). If gas or diesel powered equipment are used, carbon monoxide should also be monitored for during sampling activities.

5.0 DATA MANAGEMENT

A data management process will be implemented so 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 a Field Activity Log, which should be sufficient for accurate reconstruction of the events without reliance on memory. Sample Collection Logs will be completed according to protocol 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 sampling event. At least weekly, a copy of all field logs will be sent to the Characterization Lead.

All field measurements, observations, and sample collection information associated with physical sample collection will be recorded, as applicable, on the Sample Collection Log, the Field Activity Log, and the Chain of Custody/Request for Analysis Form, as required. The method of sample collection will be specified in the Field Activity Log. The PSP number will be on all documentation associated with these sampling activities.

Samples will be assigned a unique sample number as explained in Section 2.2 and listed in Appendix C. This unique sample identifier will appear on the Sample Collection Log and will be used to identify the samples during analysis, data entry, and data management. Technicians will review all field data for completeness and accuracy and then forward the data package to the Field Data Validation Contact for final review. The field data package will be filed in the records of the Environmental Management Project. Analytical data that is designated for data validation (per Section 3.1) will be forwarded to the Data Validation Group. Analytical data from the on- and off-site laboratories will be reviewed by the Data Management Lead prior to transfer of the data to the SED from the FACTS database.

Following field and analytical data validation, the Sample Data Management organization will perform data entry into the SED. After entry into the SED, a data group form will be completed for each material tracking location (as identified by WAO) and transmitted to WAO for WAC documentation.

APPENDIX A

ALYTICAL RESULTS OF STAGE 1 SAMPLES

APPENDIX A
RESULTS OF STAGE 1 SAMPLING

Quadrant	Depth	Location ID	Parameter	Result	20x Level	Unit
Northeast	1 foot	QHUT-NE-2-L	1,1-Dichloroethene	0.00	14	mg/kg
Northeast	1 foot	QHUT-NE-2-L	1,2-Dichloroethene	0.00	NA	mg/kg
Northeast	1 foot	QHUT-NE-2-L	Trichloroethene	0.00	10	mg/kg
Northeast	1 foot	QHUT-NE-2-L	Perchloroethene	0.12	14	mg/kg
Northeast	3.5 feet	QHUT-NE-7-L	1,1-Dichloroethene	0.00	14	mg/kg
Northeast	3.5 feet	QHUT-NE-7-L	1,2-Dichloroethene	0.00	NA	mg/kg
Northeast	3.5 feet	QHUT-NE-7-L	Trichloroethene	0.00	10	mg/kg
Northeast	3.5 feet	QHUT-NE-7-L	Perchloroethene	0.40	14	mg/kg
Northeast	6.5 feet	QHUT-NE-13-L	1,1-Dichloroethene	0.00	14	mg/kg
Northeast	6.5 feet	QHUT-NE-13-L	1,2-Dichloroethene	0.04	NA	mg/kg
Northeast	6.5 feet	QHUT-NE-13-L	Trichloroethene	0.04	10	mg/kg
Northeast	6.5 feet	QHUT-NE-13-L	Perchloroethene	0.94	14	mg/kg
Southeast	1 foot	QHUT-SE-2-L	1,1-Dichloroethene	0.00	14	mg/kg
Southeast	1 foot	QHUT-SE-2-L	1,2-Dichloroethene	0.00	NA	mg/kg
Southeast	1 foot	QHUT-SE-2-L	Trichloroethene	0.00	10	mg/kg
Southeast	1 foot	QHUT-SE-2-L	Perchloroethene	0.04	14	mg/kg
Southeast	4 feet	QHUT-SE-8-L	1,1-Dichloroethene	0.00	14	mg/kg
Southeast	4 feet	QHUT-SE-8-L	1,2-Dichloroethene	0.00	NA	mg/kg
Southeast	4 feet	QHUT-SE-8-L	Trichloroethene	0.00	10	mg/kg
Southeast	4 feet	QHUT-SE-8-L	Perchloroethene	0.08	14	mg/kg
Southeast	7 feet	QHUT-SE-14-L	1,1-Dichloroethene	0.00	14	mg/kg
Southeast	7 feet	QHUT-SE-14-L	1,2-Dichloroethene	0.00	NA	mg/kg
Southeast	7 feet	QHUT-SE-14-L	Trichloroethene	0.00	10	mg/kg
Southeast	7 feet	QHUT-SE-14-L	Perchloroethene	0.04	14	mg/kg
Southwest	1 foot	QHUT-SW-2-L	1,1-Dichloroethene	0.00	14	mg/kg
Southwest	1 foot	QHUT-SW-2-L	1,2-Dichloroethene	0.00	NA	mg/kg
Southwest	1 foot	QHUT-SW-2-L	Trichloroethene	0.00	10	mg/kg
Southwest	1 foot	QHUT-SW-2-L	Perchloroethene	1.46	14	mg/kg
Southwest	3 feet	QHUT-SW-6-L	1,1-Dichloroethene	0.04	14	mg/kg
Southwest	3 feet	QHUT-SW-6-L	1,2-Dichloroethene	0.16	NA	mg/kg
Southwest	3 feet	QHUT-SW-6-L	Trichloroethene	0.20	10	mg/kg
Southwest	3 feet	QHUT-SW-6-L	Perchloroethene	17.11	14	mg/kg
Southwest	5.5 feet	QHUT-SW-11-L	1,1-Dichloroethene	0.32	14	mg/kg
Southwest	5.5 feet	QHUT-SW-11-L	1,2-Dichloroethene	0.64	NA	mg/kg
Southwest	5.5 feet	QHUT-SW-11-L	Trichloroethene	0.60	10	mg/kg
Southwest	5.5 feet	QHUT-SW-11-L	Perchloroethene	19.76	14	mg/kg
Northwest	1 foot	QHUT-NW-2-L	1,1-Dichloroethene	0.00	14	mg/kg
Northwest	1 foot	QHUT-NW-2-L-D	1,1-Dichloroethene	0.00	14	mg/kg
Northwest	1 foot	QHUT-NW-2-L	1,2-Dichloroethene	0.04	NA	mg/kg
Northwest	1 foot	QHUT-NW-2-L-D	1,2-Dichloroethene	0.00	NA	mg/kg

APPENDIX A
RESULTS OF STAGE 1 SAMPLING

Quadrant	Depth	Location ID	Parameter	Result	20x Level	Unit
Northwest	1 foot	QHUT-NW-2-L	Trichloroethene	0.04	10	mg/kg
Northwest	1 foot	QHUT-NW-2-L-D	Trichloroethene	0.04	10	mg/kg
Northwest	1 foot	QHUT-NW-2-L	Perchloroethene	3.02	14	mg/kg
Northwest	1 foot	QHUT-NW-2-L-D	Perchloroethene	4.92	14	mg/kg
Northwest	3 feet	QHUT-NW-6-L	1,1-Dichloroethene	0.03	14	mg/kg
Northwest	3 feet	QHUT-NW-6-L	1,2-Dichloroethene	0.03	NA	mg/kg
Northwest	3 feet	QHUT-NW-6-L	Trichloroethene	0.14	10	mg/kg
Northwest	3 feet	QHUT-NW-6-L	Perchloroethene	4.01	14	mg/kg
Northwest	5 feet	QHUT-NW-10-L	1,1-Dichloroethene	0.08	14	mg/kg
Northwest	5 feet	QHUT-NW-10-L	1,2-Dichloroethene	0.12	NA	mg/kg
Northwest	5 feet	QHUT-NW-10-L	Trichloroethene	0.39	10	mg/kg
Northwest	5 feet	QHUT-NW-10-L	Perchloroethene	14.86*	14	mg/kg
*Shading indicates results exceeding the 20-times level for potential RCRA material.						
NA = Not applicable. 1,2-Dichloroethene results can be compared to the WAC level of 11.4 mg/kg.						

APPENDIX B

DATA QUALITY OBJECTIVES SL-048, REV. 5

4505

Control Number _____

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: February 26, 1999

Contact Name: Eric Kroger

Approval: (signature on file) Date: 2/25/99
James E. Chambers
DQO Coordinator

Approval: (signature on file) 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,A ☐ 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	

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7.B. Sample Work Plan Reference: This DQO is being written prior to the PSPs. 450

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 C

STAGE 2 SAMPLES COLLECTED FROM SOIL STAGED IN QUONSET HUT No. 1 FOR TCLP ANALYSIS

APPENDIX C
SAMPLES COLLECTED FOR STAGE 2
OF THE INVESTIGATION OF SOIL STAGED IN QUONSET HUT NO. 1

Pile Quarter	Location ID	Depth Layer	Depth ID	Analysis	Sample ID
Northwest	QHUT-NW1 [a] *(Stage 1)*	Bottom	10	TAL B	QHUT-NW1-10-L
		At Floor	12	TAL B	QHUT-NW1-12-L
Southwest	QHUT-SW1 [a] *(Stage 1)*	Middle	6	TAL B	QHUT-NW1-6-L
		Bottom	11	TAL B	QHUT-NW1-11-L
		At Floor	13	TAL B	QHUT-NW1-13-L
Northeast	QHUT-NE2 [b] *(Stage 2)*	Top	T	TAL B	QHUT-NE-T-L
		Middle	M	TAL B	QHUT-NE-M-L
		Bottom	B	TAL B	QHUT-NE-B-L
Southeast	QHUT-SE2 [b] *(Stage 2)*	Top	T	TAL B	QHUT-SE-T-L
		Middle	M	TAL B	QHUT-SE-M-L
		Bottom	B	TAL B	QHUT-SE-B-L
Southwest	QHUT-SW2 [b] *(Stage 2)*	Top	T	TAL B	QHUT-SW-T-L
		Middle	M	TAL B	QHUT-SW-M-L
		Bottom	B	TAL B	QHUT-SW-B-L
Northwest	QHUT-NW2 [b] *(Stage 2)*	Top	T	TAL B	QHUT-NW-T-L
		Middle	M	TAL B	QHUT-NW-M-L
		Bottom	B	TAL B	QHUT-NW-B-L

[a] Resampled Stage 1 Location

[b] Stage 2 location - will be field-located per Section 2 of the PSP

APPENDIX D

TARGET ANALYTE LISTS

APPENDIX D
TARGET ANALYTE LISTS

TAL A
20803-PSP-0001-A

Field Analysis, Portable Gas Chromatography, 12 Samples Analyzed Under Rev. A of this PSP

Analyte	ASL	FRL	WAC Limit	Requested MDC
Trichloroethene	B	25 mg/kg	128 mg/kg	0.09 mg/kg
Tetrachloroethene	B	3.6 mg/kg	128 mg/kg	0.09 mg/kg
1,1-Dichloroethene	B	0.41 mg/kg	11.4 mg/kg	0.13 mg/kg
1,2-Dichloroethene (total)	B	0.16 mg/kg	11.4 mg/kg	(see below)
cis-1,2-Dichloroethene	B	--	--	0.10 mg/kg
trans-1,2-Dichloroethene	B	--	--	0.17 mg/kg

TAL B
20803-PSP-0001-B

TCLP Analysis, Off-Site, ASL B, 17 Samples Specified in Rev. 0 of this PSP

Analyte	WAC Limit	Potential RCRA "20-Times" Level	RCRA Characteristic Level	Requested MDC
Trichloroethene	128 mg/kg	10 mg/kg	0.5 mg/L	0.05 mg/L
Tetrachloroethene	128 mg/kg	14 mg/kg	0.7 mg/L	0.07 mg/L

FRL – Final Remediation Level
MDC – minimum detectable concentrations