1995

PROJECT SPECIFIC PLAN FOR AREA 2, PHASE I SOUTH FIELD EXCAVATION CHARACTERIZATION

SOIL CHARACTERIZATION AND EXCAVATION PROJECT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

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PROJECT SPECIFIC PLAN FOR AREA 2, PHASE I SOUTH FIELD EXCAVATION CHARACTERIZATION

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LIST OF ACRONYMS AND ABBREVIATIONS

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A2PI	Area 2, Phase I
AFP	Active Flyash Pile
ASL	analytical support level
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
DQO	Data Quality Objective
ECDC	Engineering/Construction Document Control
FDF	Fluor Daniel Fernald
FEMP	Fernald Environmental Management Project
FRL	final remediation level
GPS	global positioning system
HPGe	high purity germanium
IFP	Inactive Flyash Pile
IRDP	Integrated Remedial Design Package
LAN	Local Area Network
mg/kg	milligrams per kilogram
NaI	sodium iodide
OSDF	On-Site Disposal Facility
pCi/g	picoCuries per gram
PPE	personal protective equipment
ppm	parts per million
PSP	Project Specific Plan
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RCTs	Radiological Control Technicians
RI/FS	Remedial Investigation/Feasibility Study
RSS	Radiation Scanning System
RTIMP	Real-Time Instrumentation Measurement Program
RTRAK	Radiation Tracking System
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
SF	South Field
SP5	Stockpile 5
TCLP	Toxicity Characteristic Leaching Procedure
V/FCN	Variance/Field Change Notice
WAC	Waste Acceptance Criteria
WAO	Waste Acceptance Organization
XRF	X-Ray Fluorescence

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1.0 INTRODUCTION

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This project specific plan (PSP) describes the data collection activities during excavation of the South Field [including Lead (Pb) Contaminated Soil Area, temporary haul roads and associated areas] at the Fernald Environmental Management Project (FEMP) as outlined in the Area 2, Phase I (A2PI) Integrated Remedial Design Package (IRDP) which includes the Area 2, Phase I Southern Waste Units Implementation Plan for Operable Unit 2, 2502-WP-0029, Revision 0, July 1998. The data collected under this plan will be used to determine whether primarily soil and soil-like material excavated from the area meets the waste acceptance criteria (WAC) as defined in the Sitewide Excavation Plan (SEP), the Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility (OSDF), and the Impacted Materials Placement Plan.

All excavation characterization data collection activities will conform to the requirements of the documents listed below and in Section 6.0.

- Sitewide Excavation Plan, 2500-WP-0028, Revision 0, July 1998
- Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility, 20100-PL-0014, Revision 0, June 1998
- Impacted Materials Placement Plan, 20100-PL-0007, Revision 0, January 1998
- User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectroscopy at the Fernald Site (User's Manual), 20701-RP-0006, Revision B, July 1998
- Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality (SCQ) Assurance Project Plan, Procedure FD-1000, Revision 1, September 1998
- In-Situ Gamma Spectroscopy Addendum to the Sitewide CERCLA Quality Assurance Project Plan, FD-1000, August 1998
- Real-Time Instrumentation Measurement Program Quality Assurance Plan, 20300-PL-002, May 1998
- Excavation Monitoring for Total Uranium Waste Acceptance Criteria (WAC), Data Quality Objective (DQO) SL-051, Revision 1, June 1998

- Delineating the Extent of Constituents of Concern in Pre-design Investigation and Remediation Sampling, Data Quality Objective (DQO) SL-048, Revision 4, July 1998.

1.1 PURPOSE

The purpose of this PSP is to describe the collection of data and the decision process required to determine if soil and soil-like material in the South Field meet the total uranium WAC of 1,030 ppm (1,030 mg/kg or 346 pCi/g of U-238) for placement in the OSDF. The data collected may also be used to determine the disposition of debris dispersed within the soil (expected to be less than 15 percent of the total volume of impacted material excavated). As described in the technical specifications of the A2PI IRDP, the excavation contractor will excavate and remediate the South Field [including Lead (Pb) Contaminated Soil Area, temporary haul roads and associated areas]. The South Field will be excavated in horizontal lifts (3 ± 1 foot) or as noted in the excavation specifications. Each lift surface will be scanned with real-time *in situ* gamma spectroscopy instrumentation. The excavation characterization data will supplement historical data, predesign investigation data, and visual observation/inspection of the material being excavated in the determination of WAC attainment.

Visual material observations and/or radiological surveys in between the lift scans may indicate potential above-WAC radiological concerns. These areas will be treated as special material areas and measured with the appropriate real-time instrumentation (Section 2.3.4).

If visual observations or radiological surveys indicate any Safety and Health concerns during excavation, additional real-time *in situ* gamma spectroscopy measurements may also be necessary (Section 2.3.5).

1.2 SCOPE

The scope of this PSP is to characterize material that is awaiting excavation from the South Field [including Lead (Pb) Contaminated Soil Area, temporary haul roads and associated areas] to determine appropriate disposition. The shaded section of the flowchart in Figure 1-1 depicts the work processes addressed in this plan. The necessary procedures and guiding documents to perform the work are linked to the appropriate functions in the flowchart in Figure 1-2. Section 6.0 lists the Applicable Documents, Methods, and Standards.

This excavation characterization plan addresses the acquisition of survey data and real-time *in situ* gamma spectroscopy data, data deliverables and documents generated from these measurements, field quality assurance/quality control (QA/QC), and management of generated data. Total uranium is the only WAC constituent of concern (COC) in the A2PI area and is therefore the only WAC COC addressed in this PSP.

Data collection for the Inactive Flyash Pile (IFP), Active Flyash Pile (AFP), MTL-SWU-004 (South Field Impacted Material Stockpile), MTL-SWU-030 (IFP soil and related stockpiles west of MTL-SWU-004), and Equipment Wash Facility sediments are covered by the Project Specific Plan for Excavation Characterization for the Inactive Flyash Pile and Soil Stockpile 5 (SP5), 20300-PSP-0004. Lead precertification data collection for the Lead (Pb) Contaminated Soil Area excavation within the South Field will be covered under a separate PSP. In addition, precertification or certification measurements/sampling and analysis efforts for final remediation levels (FRLs) will be covered under a separate PSP.

As established for site soil excavation in contaminated areas and described in more detail in Section 4.0, three safety and health related work zones will be used for the A2PI excavation activities:

- Zone 1 - Within 50 feet of active loading, dumping operations or potential airborne generating activities - Defined in the field by Radiological Control and Safety and Health - Requires at least full anti-contamination (anti-Cs), full-face respirator, hard hat, traffic safety vest, and steel-toed shoes

- Zone 2 - Remainder of A2PI contamination area - Denoted by Radiological Control with yellow construction type fence and/or yellow rope with radiological control signs - Requires at least full anti-Cs, safety glasses, hard hat, traffic safety vest, and steel-toed shoes

- Zone 3 - Outside of A2P1 contamination area but within the A2PI construction area (denoted with orange construction fencing) where construction related activities occur (i.e., equipment maintenance, fueling, unloading of supplies, etc.) - Defined by Safety and Health - Personal protective equipment (PPE) for this zone is activity driven, but generally consists of safety glasses, construction vest, hard hat and steel-toed shoes.

Personnel performing activities within the designated Lead-Contaminated Soil Area will not require additional PPE over the requirements described above. The contractor will obtain a FDF Chemical/Hazardous Material Waste Permit, keep nuisance dust levels below their action levels and

collect air samples to ensure that workers are not exposed to lead above action levels. Workers will be required to attend Hazard Communication training on Lead and to wash hands and face at breaks, before lunch, and at the end of their shift.

The Support Area (construction field trailers, mapping van, and personal vehicle parking) is also an area within A2PI construction area but located outside of Zone 3 and does not require PPE.

Personnel performing activities described in this PSP, within the designated soil contamination areas (Zones 1 and 2), require RAD Worker II and Asbestos Awareness training. If applicable, training for the procedures listed in Section 6.0 is also required. Additional requirements will be listed on the Radiological Work Permit (RWP) and/or Work Permit. Changing conditions will cause re-evaluation and re-establishment of zones.

In situ gamma spectroscopy measurements will be conducted in Zone 2 (at least 50 feet beyond active loading, dumping operations or potential airborne generating activities). The mapping van will be located outside of Zone 3.

1.3 KEY PERSONNEL

Personnel responsible for conducting work in accordance with this PSP include team members from the Waste Acceptance Organization (WAO) and Soil Characterization and Excavation Project (SCEP) organizations, specifically Characterization, Real-Time Instrumentation Measurement Program (RTIMP), Surveying, Construction, Safety and Health, Radiological Control, and QA personnel. Communications with the Excavation Contractor will be through FDF Construction personnel. Key project personnel are listed in Table 1.

TABLE 1-1
KEY PERSONNEL

TITLE	PRIMARY	ALTERNATE
DOE Contact	Rob Janke	Kathi Nickel
A2PI Area Project Manager	Tom Crawford	Jyh-Dong Chiou
Characterization Lead	Mike Rolfes	John Centers
RTIMP Program Manager	Joan White	Dale Seiller
RTIMP Field Lead	Dave Allen	Dale Seiller
Surveying Lead	Jim Schwing	Jim Capannari
Data Management Lead	Deanna McDonald	Jeff Maple
SWU Construction	Lee McDaniel	Frank Flack
Safety and Health Contact	Lewis Wiedeman	Debra Grant
Radiological Control Contact	Cory Fabricante	Dan Stempfley
Quality Assurance Contact	Reinhard Friske	Mary Eleton
Waste Acceptance Organization Contact	Dave Lockerd	Linda Barlow

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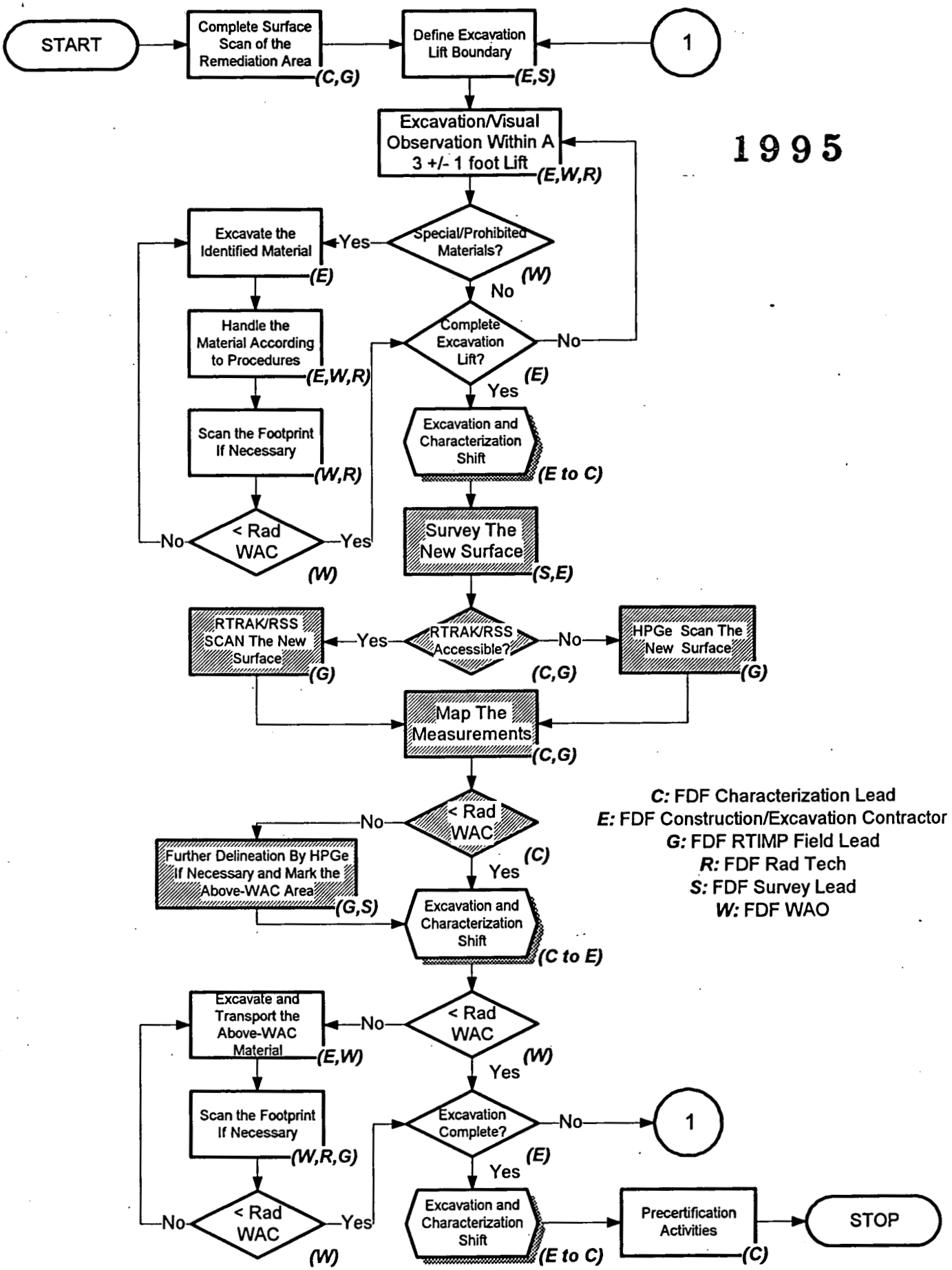

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FIGURE 1-1 SOUTH FIELD EXCAVATION AND CHARACTERIZATION CONTROL PROCESS

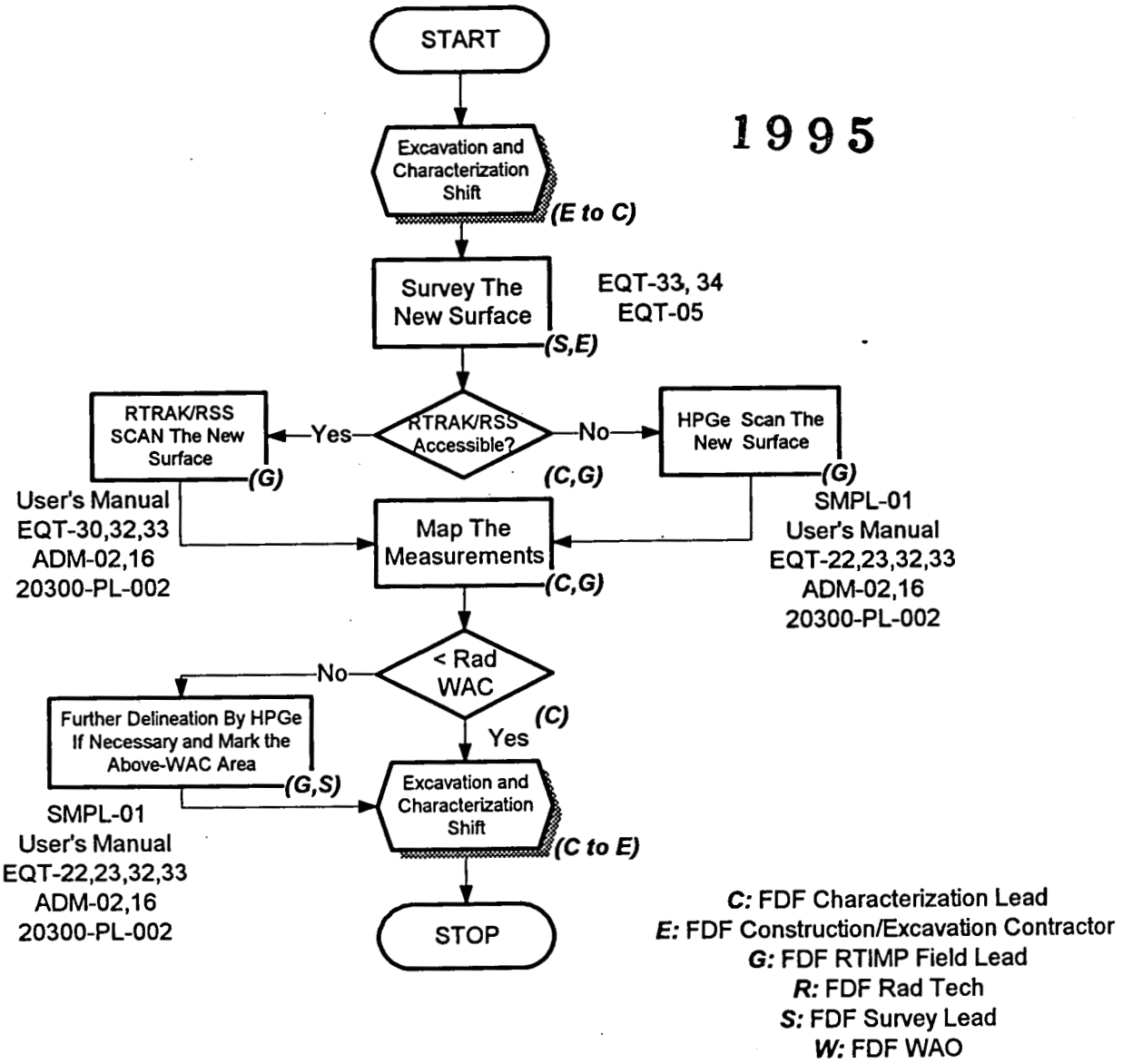

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FIGURE 1-2 APPLICABLE OPERATING PROCEDURES AND GUIDING DOCUMENTS

2.0 EXCAVATION CHARACTERIZATION PROGRAM

As identified in Figures 1-1 and 1-2, data collection during excavation characterization involves the following process (which is discussed in more detail in following sections):

- Survey the excavation lift area - Section 2.1
- Determine the appropriate real-time monitoring equipment [Radiation Tracking System (RTRAK), Radiation Scanning System (RSS), and/or High Purity Germanium Detector (HPGe)] - Section 2.2
- Scan the excavation lift areas with the appropriate real-time equipment (detection phase) - Section 2.3
- Map and/or display the collected real-time data - Section 2.4
- Determine the need for additional HPGe measurements (confirmation and/or delineation) - Section 2.5
- Track and manage the characterization data - Section 2.6.

These activities will be completed within two consecutive dry working days following lift excavation in each designated area (assuming the area has been inspected and determined ready for scanning by the Characterization Lead or designee and that the lift area is typically 100 feet by 200 feet or approximately 0.5 acres).

2.1 EXCAVATION LIFT AREA SURVEYING

Fluor Daniel Fernald (FDF) Construction personnel will inform the Characterization Lead or designee when excavation of a lift area is complete and ready for *in situ* gamma spectroscopy measurements. The Characterization Lead will then coordinate with the Surveying Lead to survey the defined lift area and its boundary, determine the average elevation, and coordinate with the RTIMP Lead for the deployment of the appropriate real-time equipment. Northing (Y), Easting (X), and elevation (Z) coordinate values (Ohio South Zone, #3402) will be determined using standard survey practices and standard positioning instrumentation [electronic total stations and Global Positioning System (GPS) receivers]. An average elevation will be generated for the excavation lift area scanning footprint. This average elevation will normally include only the horizontal areas of the lift and no side walls (only the toe) or slopes (only the top). An average lift elevation will not be required for the surface scan at final

excavation grade to demonstrate below-WAC attainment. Field locations (i.e., lift area boundaries, measurement locations, grid points, above-WAC delineation if necessary) will be marked in a manner easily identifiable by all field personnel using survey stakes or flags. Survey information (coordinate data) will be downloaded at the completion of each survey job (or at the end of each day) and transferred electronically to the Survey Lead. This information will be forwarded to the RTIMP and Characterization Leads or designees.

2.2 *IN SITU* GAMMA SPECTROSCOPY EQUIPMENT DETERMINATION

The excavation lift area will be characterized using *in situ* gamma spectroscopy equipment (RTRAK or RSS which utilizes a NaI detector system, and/or the HPGe detector system), consistent with DQO SL-051 and the User's Manual. Typically for the detection phase, the RTRAK is utilized for larger (approximately 0.5 acre and larger) flat areas that are readily accessible. The RSS is utilized for smaller areas, gradual slopes or areas not accessible by the RTRAK. The HPGe is utilized for areas that are inaccessible to both the RTRAK or RSS, and for confirmation and delineation of areas above the detection phase trigger limits for the RTIMP equipment.

A walk-down of the area by representatives from Characterization and/or RTIMP may be required to determine the type of *in situ* gamma spectroscopy equipment to use and if the excavation lift area is ready for *in situ* gamma spectroscopy measurements (i.e., accessible by RTIMP equipment, boundaries marked or readily visible, no operating heavy duty equipment within 50-foot buffer zone, no excessive moisture or puddles, no soft spots, free of obstructions or depressions that might damage equipment, reasonable grade and slopes, etc.).

Excavation lift characterization involves the use of the RTRAK or RSS to initially scan the excavation face of a lift (detection phase), followed by confirmation and delineation of elevated RTRAK or RSS total uranium measurements with HPGe measurements. The HPGe will always be used for the confirmation and delineation process (Section 2.5). The overall use of *in situ* gamma spectroscopy for excavation characterization is described in detail in Sections 2.1, 2.3, 3.4, and 3.5 of the User's Manual.

In areas where the RTRAK or RSS cannot gain access due to topography (narrow ditches and deep excavations), excessive moisture, or other limiting conditions, the HPGe shall be used for initial

screening. The decision to use any of these evaluation techniques will be made by the Characterization Lead or designee in consultation with the RTIMP Field Lead or designee.

2.3 REAL-TIME *IN SITU* GAMMA SPECTROSCOPY MEASUREMENT OF THE EXCAVATION LIFT AREA

The RTIMP equipment will be used to scan as close as possible to 100 percent of each excavation lift area. A mapping van stationed outside the contamination area will receive, process, and generate maps of collected measurement data. The scanning and collection of measurement data will be conducted according to the applicable procedures and documents listed in Figure 1-2 and in Section 6.0. Relevant information from these procedures and documents is summarized and guidance provided relative to RTIMP equipment in Sections 3.1, 3.2, 4.1, 4.2, 4.3, and 5.7 of the User's Manual.

2.3.1 RTRAK or RSS Data Acquisition

The sodium iodide (NaI) detection systems (RTRAK or RSS) will be used to provide as close to 100 percent coverage as possible of the accessible excavation lift area. The spectral acquisition time will be 4 seconds with data collected at a detector speed of 1 mile per hour as determined by the on-board GPS. The RTRAK or RSS passes will typically be in a back and forth pattern after two perimeter passes have been completed. Alternatively, a circular pattern may be more appropriate. The overlapping passes are achieved by placing the innermost tire track in the former outermost tire track from the previous passes, achieving an approximate 0.4 m scanning overlap. Stakes or other markers may be used to stay on track. The RTRAK or RSS single measurement trigger level (Section 4.5 of the User's Manual) potentially requiring confirmation and delineation by the HPGe for total uranium will be 721 parts per million (ppm). If initial RTRAK or RSS scans indicate all total uranium data is below 721 ppm as shown on the RTIMP maps (Section 2.4), no further confirmation or delineation with the HPGe is necessary.

The RTRAK or RSS measurements will be accompanied by GPS Northing and Easting coordinates and by the average elevation designated by Surveying to represent each lift. GPS operations are described in Section 5.8 of the User's Manual.

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2.3.2 HPGe Data Acquisition

As discussed in Section 2.2 of this plan, the HPGe shall be used for the initial scanning of an excavation lift area if the RTRAK or RSS is not used. If the HPGe is used without prior scanning by the RTRAK or RSS, a triangular grid (if practical) will be established with minimal overlap of measurement areas to achieve approximately 99.1 percent coverage (see Section 4.10 and Figure 4.10-1 of the User's Manual). A detector height of 1 meter and a spectral acquisition time of 5 minutes will be used. If more than one HPGE measurement is required, the center of the measurements should be located nominally 11 meters (approximately 36 feet) apart to achieve the 99.1 percent coverage.

The HPGe trigger level requiring potential confirmation and delineation for 1 meter HPGe measurements is 400 ppm for total uranium. If this initial HPGe scan indicates all data is below 400 ppm for total uranium, then no further confirmation or delineation with the HPGe is necessary. A trigger level of 400 ppm allows detection of total uranium WAC exceedances with a 1.5 m radius (Section 3.4.1 of the User's Manual).

HPGe measurements will be accompanied by GPS Northing and Easting coordinates and by the average elevation coordinate designated to represent each lift. One duplicate HPGe measurement will be collected for every 20 HPGe measurements performed. The duplicate will be collected immediately after the initial measurement at the same acquisition time and detector height.

2.3.3 Surface Moisture Measurements

Surface moisture measurements are used to correct *in situ* RTIMP equipment gamma spectroscopy measurement data in order to report data on a dry weight basis prior to mapping. Surface moisture measurements will be collected with an *in situ* moisture measurement instrument (i.e., Troxler moisture gauge or Zeltex Infrared Moisture Meter) within 8 hours of the collection of the *in situ* RTIMP equipment gamma spectroscopy measurement data. Moisture measurements may be taken more frequently if ambient weather or soil moisture conditions change or are expected to change (including watering for dust control). Field conditions (such as weather) will be noted on the applicable electronic field worksheet.

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In addition, at least one surface moisture measurement will be collected for each excavation lift that is approximately 0.5 acre (100 feet by 200 feet) in size or smaller. More than one moisture measurement can be collected for each lift if the surface moisture appears visibly different over the lift area. If more than one moisture measurement is obtained, the average of the measurements will be used to correct NaI real-time data for the lift. If a large difference in measurements is noted by the RTIMP Lead or designee, the data will be re-evaluated.

When the HPGe is being used for confirmation, delineation or special materials, one surface moisture measurement will be collected and recorded at each HPGe measurement location.

If conditions prevent the use of a field moisture instrument, a default moisture value of 20 percent (which will overcorrect data in dry conditions and under correct in wet conditions) may be used or a soil moisture core can be collected to a depth of 4 inches and submitted to the on-site laboratory for moisture analysis only. Moisture analysis turn-around time must meet the real-time/construction two day turn-around schedule. The percent moisture information will be used to correct RTIMP equipment data. Field moisture measurements and moisture-corrected data are discussed in detail in Sections 3.8 and 5.2 of the User's Manual.

2.3.4 Special Materials

The Characterization Lead, or designee, may be contacted by a Construction and/or WAO Lead or designees to take a gamma measurement over the residual soil where special materials were located and removed during excavation or where elevated (greater than 200 K disintegrations per minute) beta/gamma levels have been detected with field monitoring instruments. This process is shown in Figure 2-1. If alpha field instrument measurements are less than beta/gamma measurements, the gamma measurements can be taken with either the RTRAK, RSS, or HPGe depending on the configuration of the special materials excavation footprint. If beta/gamma field instrument measurements are less than alpha measurements, the gamma measurements must be taken with HPGe. If RTRAK or RSS is deployed, use the same parameters as described in Section 2.3.1 of this PSP (single measurement trigger level potentially requiring confirmation and delineation by the HPGe for total uranium will be 721 ppm). If the HPGe is deployed, use the most appropriate detector height for the applicable field of view with a spectral acquisition time of 5 minutes. The HPGe potential WAC

exceedance trigger level for total uranium is 928 ppm for 15 or 31 cm measurements and 400 ppm for 1 meter measurements. The measurement numbering scheme is as follows:

Excavation Area-Special Materials-Sequential Number-HPGe Measurement

Where: Excavation Area = South Field (SF)
Special Materials = SM
Sequential Number = 1, 2, 3, etc.
HPGe Measurement (if applicable) = G

Example: SF-SM-2-G where: SF =South Field
SM= Special Materials
2 = second measurement in South Field
G = gamma measurement

Each Special Material measurement location will be surveyed to obtain a unique northing, easting, and elevation.

2.3.5 Safety and Health Concerns

If safety and health concerns are raised regarding visual observations or elevated measurements on hand-held radiological survey instruments, the Characterization Lead, or designee, may be requested by Construction and/or Radiological Control to take a gamma measurement over the material where the visual observation or elevated measurements are located. This process is also shown in Figure 2-1. The gamma measurements must be taken with a HPGe detector in order to determine if other than uranium isotopes are present. Use the most appropriate detector height for the applicable field of view with a spectral acquisition time of 5 minutes. The measurement numbering scheme is as follows:

Excavation Area-Safety and Health-Sequential Number-HPGe Measurement

where: Excavation Area = South Field (SF)
Safety and Health = SH
Sequential Number = 1, 2, 3, etc.
HPGe Measurement (if applicable) = G

Example: SF-SH-3-G where: SF = South Field
SH = Safety and Health
3 = third measurement in South Field
G = gamma measurement

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Each measurement location will be surveyed to obtain a unique northing, easting, and elevation. The data obtained from this gamma measurement will be used only to evaluate PPE requirements and is not required for WAC determination.

2.4 DATA MAPPING

As the measurements are acquired by the Survey and RTIMP Teams, the data will be electronically loaded into mapping software through manual file transfer or Ethernet. A set of maps and/or data summaries will be given to A2PI Characterization Lead and WAO. Maps will be generated showing Northing (Y) and Easting (X) coordinate values (Ohio South Zone, #3402) as determined using standard survey practices and standard positioning instrumentation (electronic total stations and GPS receivers). The map will depict the following:

Surface Scan Coverage Map(s)

- RTRAK or RSS Location Map - showing field of view squares that are color coded for total uranium concentration and denotes batch numbers in title.
- HPGe Location Map - showing field of view circles that are color coded for total uranium concentration and that denotes identification number for each HPGe measurement. Also attach data printout that summarizes each HPGe measurement parameters and shows total uranium concentration.

  (Note both results can be shown on the same map)

HPGe Confirmation/Delineation Map(s)

- HPGe Location Map - showing field of view circles that are color coded for total uranium concentration and that denotes identification number for each HPGe measurement. Also attach data printout that summarizes each HPGe measurement parameters and shows total uranium concentration.

HPGe Special Material or Safety and Health Data

- HPGe Location Map - showing field of view circles that are color coded for nuclide of interest as requested by Characterization Lead or designee and that denotes identification number for each HPGe measurement. Also attach data printout that summarizes each HPGe measurement parameters and shows nuclide of interest concentration.

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The map and/or HPGe data summary printouts will be used to provide the Characterization Lead or designee with information to determine if additional scanning, confirmation, or delineation measurements are required.

2.5 DETERMINING NEED FOR ADDITIONAL HPGe MEASUREMENTS

If RTRAK, RSS scans or 1 meter detector height HPGe measurements are greater than trigger level concentrations, confirmation and delineation may be required (Section 2.3). This confirmation and delineation process is documented in the User's Manual (Section 3.4). The circumscribed boundary of the RTRAK, RSS, or 1 meter HPGe measurement above trigger limits will be located and marked (flags and/or stakes) in the excavation lift area by the Characterization and/or Survey Lead or designee. The location of the maximum activity will be identified in the field using a hand-held frisker or equivalent instrument. HPGe detectors will be used for all confirmation and delineation measurements. Confirmation measurements shall be made using detector heights of 15 cm and/or 31 cm (depending on required field of view) and a spectral acquisition time of 5 minutes at the suspect above-WAC location to reliably determine above-WAC boundaries. If either confirmation measurement exceeds the trigger level of 928 ppm, then the area exceeding the trigger level (i.e., above-WAC) shall be further delineated with the HPGe. The boundary of confirmed above-WAC material area shall be refined (delineated) using a detector height of 15 cm with a spectral acquisition time of 5 minutes on a 2-meter triangular grid covering the entire area indicated by the detection and confirmation measurements. The excavation of the above-WAC area will be bounded by HPGe measurements that are lower than the HPGe WAC trigger levels.

Confirming and delineating the extent of contamination with 31 cm and 15 cm HPGe measurements is at the discretion of the Characterization Lead or designee. Conditions may arise which warrant a different decision process for defining the extent of contamination (i.e., cost effectiveness, need for timely response, obvious discoloration in the soil, brown/clear glass, process residue or other special materials may require immediate excavation, photoionization detector monitoring, or physical sampling). The decision process for the unusual condition will be documented in applicable field activity logs and, if determined to be appropriate by the Characterization Lead or designee, with a Variance/Field Change Notice (V/FCN) as described in Section 3.2.

Duplicate measurements will be performed in the same manner described in Section 2.3.2, one per 20 measurements taken.

2.6 TRACKING/MANAGING DATA COLLECTION

All RTIMP equipment measurements will be assigned a unique identification for data tracking purposes. There are three essential components in the numbering scheme regardless of which measurement technique is used:

- Excavation area
- Lift area within the excavation area (if appropriate)
- Lift sequence in lift area.

These three components, combined with additional designators and differentiated by their location (northing, easting, and elevation) and time, will allow for unique identification.

All RTIMP equipment measurements will contain some or all of the following designators.

1. Excavation area: Denotes major excavation area: South Field (SF)

2. Lift area: Denotes location of lift within the excavation area, if appropriate. For example, the initial surface scan of the SF will not require a lift designation. These lift areas are designated as follows:

   D = Lead (Pb) Contaminated Soil Area
   E = Temporary Haul Road (if used)

   The SF lift Area D can be found in Figure 2-2. Additional lift area designations may be required and documented in a V/FCN.

   Note that the following designations have already been used for other areas/PSP's, and should not be used again to avoid confusion:

   A = East Section Impacted Material Stockpile (used in previous variance to PSP 20300-PSP-0004)
   B = Basin, Site Preparation (used in Area 2, Phase 1 Areas Sampling Project PSP 20401-PSP-0001)
   C = West Section Impacted Material Stockpile (used in previous variance to PSP 20300-PSP-0004)

3. Lift sequence: Designates the lift sequence (if used) with the surface lift starting as 1 and all subsequent lifts following sequentially (2, 3, 4, etc.)

4. HPGe Measurement Number (if applicable): Designates the sequential numbering of HPGe measurements from a particular lift. The first measurement taken from a lift is 1 and any subsequent measurements are numbered sequentially (2, 3, 4, etc.).

5. Measurement designator: G = gamma measurements and associated moisture measurement

6. Quality control designators (as necessary): D = duplicate measurement

Using these guidelines, the unique identification scheme for each measurement technique is as follows:

RTRAK or RSS Measurement Identification: use 1, 2 (if appropriate), 3 designators above.

Example: SF-2 where:
SF = South Field excavation area
2 = second lift

SF-E-2 where:
SF = South Field excavation area
E = Temporary Haul Road (if used)
2 = second lift

HPGe Measurement Identification: use 1, 2 (if appropriate), 3, 4, 5, and possibly 6 designators above.

Example: SF-2-3-G-D where:
SF = South Field excavation area
2 = second lift
3 = third measurement in the active lift
G = gamma measurement
D = duplicate

Northing (Y) and easting (X) coordinates will be associated for each data point mapped from the RTIMP equipment in a lift area. An average elevation (Z) coordinate will be associated with each lift area and, therefore, each RTRAK or RSS batch and each set of lift HPGe measurements.

The maps generated from the real-time monitoring of the excavation lift area will be attached to the Excavation Monitoring Form (Figure 2-3). This form contains relevant information pertaining to the data collection, Characterization review of the data, and WAO acceptance of the characterization. The

use of this form is referenced in Procedure EW-1022, On-Site Tracking and Manifesting of Bulk Excavated Material. The RTIMP Lead, Characterization Lead, and WAO representative or designees will complete this form for each lift area. The original forms will be placed in the WAO project files as part of the reports section.

Significant or unusual daily events will be recorded in field logs or log books by the appropriate organization.

2.7 MISCELLANEOUS FIELD SAMPLING

Occasions may arise during the excavation which warrant the need for physical sampling and laboratory analysis. Examples of this are: discoloration of standing water or soil, surface and core sampling, unusual odor in soil, water, or sediment, etc. While real-time *in situ* gamma spectroscopy is the data collection approach for WAC attainment, physical sampling may be needed to collect data for safety, health and regulatory concerns. For matrices and data needs not amenable for *in situ* gamma spectroscopy, sampling and analytical needs will be determined on a case-by-case basis consistent with DQO SL-048 (Appendix B) and be documented with a variance.

2.8 LEAD (Pb) CONTAMINATED SOIL AREA

Some material at the former firing range contains potentially hazardous concentrations of lead [having Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic Leaching Procedure (TCLP) characteristics]. The boundaries of this lead-contaminated material have been defined through predesign sampling and are identified within a fenced area. Based on RI/FS and predesign information, approximately 100 yd^3 of soil will be excavated (as shown on drawing 92X-5900-G-00285) to remove material showing TCLP characteristics. Since the soil is also radioactively contaminated with uranium, the material will be classified as a radioactive mixed waste when excavated, which requires packaging for off-site treatment and disposal.

Once this delineated contaminated soil is removed, containerized, and staged, pending off-site treatment and disposal, RTIMP radiological monitoring will be performed to detect potentially above-WAC radiological contamination during excavation of fill material and any remaining above-FRL (lead and uranium) material.

When the contaminated soil has been removed, a visual inspection for lead bullet fragments within the excavation footprint may be performed. Surface soil scoops may be taken in a random pattern and visually inspected for any lead bullet fragments that may have penetrated deeper than anticipated. The surface soil scoops may also be sieved using a soil sieve to facilitate visual identification of bullet fragments. *In situ* analyses or discrete soil samples may also be collected from within the limits of the lead excavation. An X-Ray Fluorescence (XRF) analysis via a field portable XRF spectrometer may be used to obtain preliminary verification that the above-lead FRL soil has been removed. The XRF, if utilized, would be in accordance with EQT-09, Spectrace® 9000 Field Portable X-Ray Fluorescence, and documented with a V/FCN.

Precertification or certification measurements/sampling and analysis efforts for FRLs will be covered under a separate PSP.

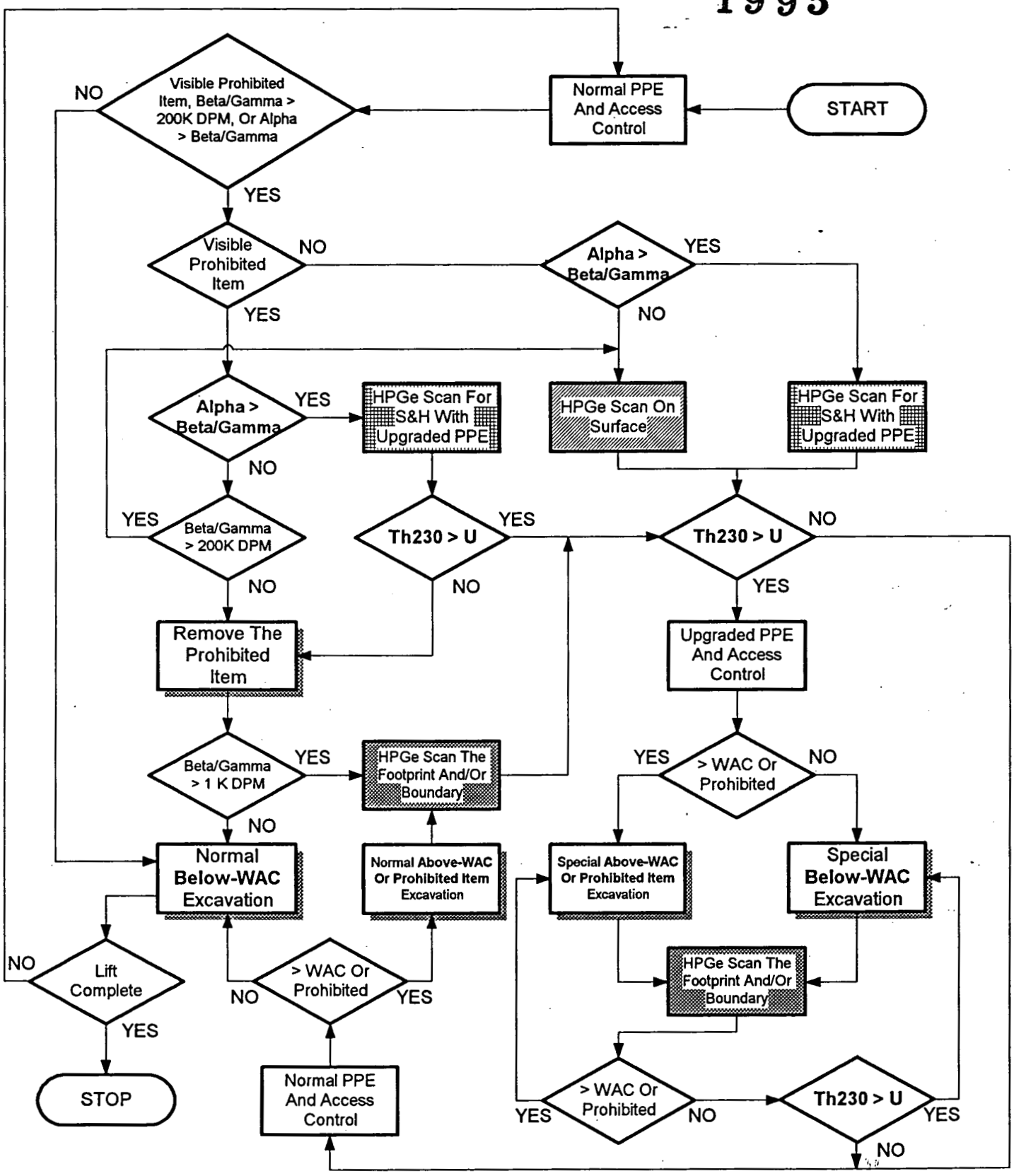

FIGURE 2-1 GENERAL DECISION MAKING PROCESS FOR REAL-TIME SCAN UNDER SPECIAL CONDITIONS BETWEEN EXCAVATION LIFTS

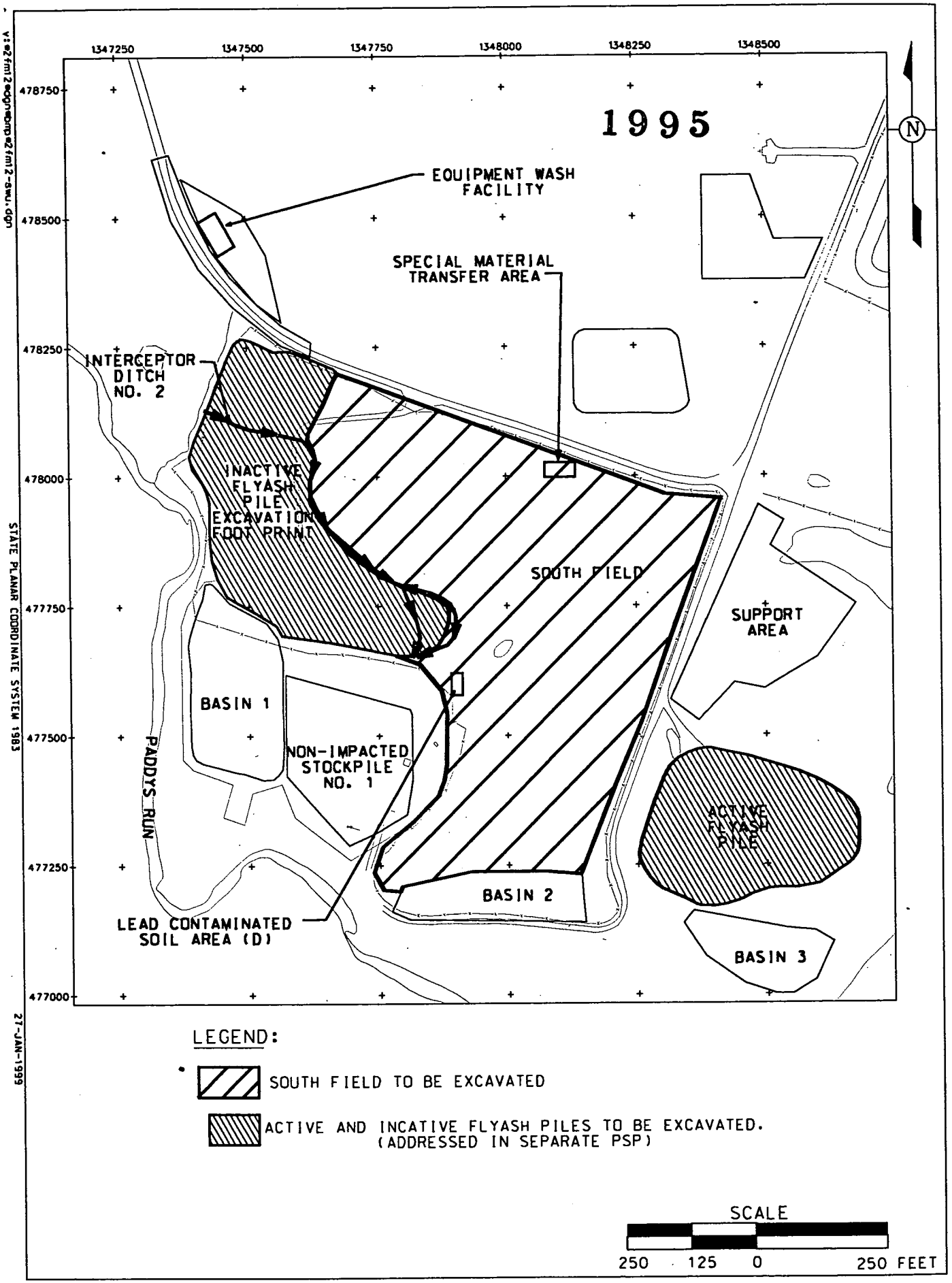

FIGURE 2-2. A2PI SOUTHERN WASTE UNIT

EXCAVATION MONITORING FORM **1995**

1. Area Description:_____ Area ID (Lift Area / SM / EWF):_____
Comments:_____ PWID #:_____

2. Section 1 - Data Collection
Equipment Used ☐ RTRAK ☐ RSS ☐ HPGe Unit No: _____

Calibration Acceptable ☐ Yes Date: _____
Note: If not in calibration, do not use equipment until calibration is acceptable

3. RTRAK / RSS	4. HPGe
Map attached? ☐ Yes ☐ No	Data Report attached? ☐ Yes ☐ No
List of Batch #s: Coverage in accordance with PSP? ☐ Yes ☐ No If "No": ☐ Equipment Malfunction ☐ Rough Terrain ☐ Weather ☐ Standing Water ☐ Other:_____ Data Verification Checklist attached? ☐ Yes ☐ No	List of Data Points: Data Verification Checklist attached? ☐ Yes ☐ No

5. This signature indicates the data generated for this area by this equipment on this day is correct and valid within the confines of equipment performance and as defined in PSP #: _____

_____ (Signature) _____ (Signature Date)

6. Section 2 - Characterization
Review real-time data
Sufficient real-time coverage? ☐ Yes ☐ No

Further action required: _____

All data points < total uranium WAC? ☐ Yes ☐ No
If no, define > WAC area(s) and extent with HPGe if applicable (see attached real-time map) as defined in PSP.

The signature indicates this area has been characterized using the real-time data generated in Section 1 above and in accordance with PSP listed in Box 5.

_____ (Signature) _____ (Signature Date)

7. Section 3 - WAO
Review attached documentation ☐ Yes MTL Designation _____

This signature indicates this area can be excavated and dispositioned in accordance with the characterization provided in Section 2 above. ☐ Yes ☐ No and Reason:_____

_____ (Signature) _____ (Signature Date)

Assigned Data Group for HPGe from WAO System Controls: _____

FS-F-5195
REV.1: 08/28/98

Instructions for form completion are provided

FIGURE 2-3 Excavation Monitoring Form

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Instructions for the Excavation Monitoring Form: 1995

Box 1 Enter the Area Description (excavation area), Area ID [Lift Area / Special Material (SM) / Equipment Wash Facility (EWF)], Comments (if additional clarification is required) and PWID No.

Box 2 Check all the equipment used and enter the identification number for the HPGe detector used. If equipment is not in calibration, do not use until calibration is acceptable. Check yes if the calibration is acceptable and enter the date the calibration was performed. If more than one unit is used, a separate sheet for each unit number must be used.

Box 3 Check yes or no if a RTRAK map is attached. List the Batch Numbers associated with the referenced lift ID. Check yes or no if coverage is in accordance with the PSP. If the answer is no, give the reason that coverage was not in accordance with the PSP. If 'Other' is chosen as the reason, add a description of the reason. Check yes or no if the data verification checklist is attached. If the data verification checklist is not attached, explain why.

Box 4 Check yes or no if an HPGe data report is attached. List all the data points associated with the identified lift. Check yes or no if the data verification checklist is attached. If the data verification checklist is not attached, explain why.

Box 5 Enter the appropriate PSP number. Sign and date.

Box 6 Check yes or no if the real-time coverage is in accordance with applicable PSP. If the coverage is not as specified in the PSP, identify any further action required. Check yes if all the data points are less than Total Uranium WAC, if not check no. If data points are not all below WAC, define areas above-WAC and extent by filling out a separate form and attaching applicable map(s). Sign and date.

Box 7 Check yes if reviewed attached documentation. Enter Material Tracking Location (MTL) designator. Check yes if area can be excavated or no and explain why not. Sign and date. Fill in assigned (unique IIMS data group designator) data group for HPGe from WAO Systems Control.

NOTE:

Box 1 will be completed by the SCEP representative and/or WAO representative.
Boxes 2-5 will be completed by the RTIMP representative.
Box 6 will be completed by the SCEP representative.
Box 7 will be completed by the WAO representative.

3.0 QUALITY ASSURANCE REQUIREMENTS

Real-time data collection will be performed in accordance with the requirements in the latest revision of the SCQ and SCQ Addendum. The DQO for real-time excavation characterization under this plan is identified in DQO SL-051 (Appendix A).

3.1 SURVEILLANCE

Project management has the ultimate responsibility for the quality of the work processes and the results of the monitoring activities covered by this plan. The FEMP Quality Assurance (QA) organization may conduct independent assessments of the work process and operations to assure the quality of performance. The assessment will encompass technical and procedural requirements of this PSP and the SCQ. Independent assessments may be performed by conducting surveillances.

3.2 IMPLEMENTATION OF FIELD CHANGES

If field conditions require changes or variances, verbal approval must be obtained from the Characterization Lead, Real-Time Monitoring Manager, and QA Representative before the changes can be implemented (electronic mail is acceptable to document approval). Changes to the PSP will be noted in the applicable Field Activity Logs and on a V/FCN. QA must receive the completed V/FCN, with the signatures of the Project Manager, Characterization Lead, Real-Time Monitoring Manager, and the QA Representative within seven working days of the granting of the verbal approval.

4.0 SAFETY AND HEALTH

Personnel will conform to precautionary surveys by FEMP personnel representing the Utility Engineer, Industrial Hygiene, Occupational Safety, and Radiological Control.

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), FDF Work Permit, Radiological Work Permit (RWP), penetration permits, and other applicable permits. Concurrence with all applicable safety permits is required by all personnel in the performance of their assigned duties.

All personnel performing measurements related to this project will be briefed on the Contractor Safe Work Plan for the A2PI specific work area and the briefing will be documented. Personnel who do not receive a briefing on these requirements will not participate in the execution of excavation activities related to the completion of assigned project responsibilities.

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.

5.0 DATA MANAGEMENT

The RTIMP group will provide hard copy maps and/or summary reports to the Characterization Lead and Data Management Contact or designees. All Real-Time data collection (RTRAK, RSS, and HPGe) will be collected and reported at Analytical Support Level (ASL) A. All physical samples (if taken) will be collected and reported at ASL B. All electronically recorded field data will have the Checklist for Verification of Quality Control (QC) and Data Review Elements for RTRAK/RSS or HPGe Measurements (Section 5.4 of the Real-Time User's Manual), which will be completed after each data collection event. Field documentation, such as the Nuclear Field Density/Moisture Worksheet, will undergo an internal review by the RTIMP.

Electronically recorded data from the GPS, HPGe, and NaI systems will be downloaded on a daily basis to disks, or to the Local Area Network (LAN) using the ethernet connection. The Characterization Lead or designee will be informed by the RTIMP Lead or designee when RTIMP equipment measurements do not meet data quality control checklist criteria. The Characterization Lead or designee will determine whether additional scanning, confirmation, or delineation measurements are required.

Once the electronic data has been placed on the LAN and Sitewide Environmental Database (SED), the Data Management Contact will perform an evaluation prior to placement on the SCEP website. The evaluation may involve a comparison check between the electronic data, hard copy maps and summary reports for accuracy and completeness. The evaluation will be documented, dated and initialed.

The original completed Excavation Monitoring Form, the real-time map(s), and HPGe summary data (if applicable) will be forwarded to WAO for placement in the WAO project files. Copies of other field documentation may be generated and provided to the Characterization Lead or Data Management Contact upon request and maintained in SCEP project files until dispositioned to Engineering/Construction Document Control (ECDC). RTIMP will maintain all the real-time files and survey data will be maintained by the Survey Lead or designee. All records associated with this PSP should reference the PSP number and eventually be forwarded to ECDC to be placed in the project file.

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6.0 APPLICABLE DOCUMENTS, METHODS, AND STANDARDS

Excavation characterization activities described in this plan shall follow the requirements outlined in the following documents, procedures, and standard methods:

- Area 2, Phase I (A2PI) Integrated Remedial Design Package (IRDP) which includes the Area 2, Phase I Southern Waste Units Implementation Plan for Operable Unit 2, 2502-WP-0029, Revision 0, July 1998
- Sitewide Excavation Plan, 2500-WP-0028, Revision 0, July 1998
- Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility, 20100-PL-0014, Revision 0, June 1998
- Impacted Materials Placement Plan, 20100-PL-0007, Revision 0, January 1998
- User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectroscopy at the Fernald Site (User's Manual), 20701-RP-0006, Revision B (1998)
- Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality (SCQ) Assurance Project Plan, Procedure FD-1000, Revision 1, September 1998
- In-Situ Gamma Spectroscopy Addendum to the Sitewide CERCLA Quality Assurance Project Plan, Procedure FD-1000 Appendix H, August 1998
- Real-Time Instrumentation Measurement Program Quality Assurance Plan, 20300-PL-002, May 1998
- Excavation Monitoring for Total Uranium Waste Acceptance Criteria (WAC), Data Quality Objective (DQO) SL-051, Revision 1, June 1998
- Delineating the Extent of Constituents of Concern in Pre-design Investigation and Remediation Sampling, Data Quality Objective (DQO) SL-048, Revision 4, July 1998
- ADM-02 Field Project Prerequisites
- ADM-16 In-Situ Gamma Spectrometry Quality Control Measurement
- ADM-17 In-Situ Gamma Spectrometry Data Verification
- EQT-05 Geodimeter® 4000 Surveying System
- EQT-09 Spectrace® 9000 Field Portable X-Ray Fluorescence

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•	EQT-22	High Purity Germanium Detector In-Situ Efficiency Calibration
•	EQT-23	High Purity Germanium Detectors
•	EQT-30	Operation of Radiation Tracking Vehicle Sodium Iodide Detection System
•	EQT-32	Troxler 3440 Series Surface Moisture/Density Gauge
•	EQT-33	Real-Time Differential Global Positioning System Operation
•	EQT-34	Radiation Scanning System
•	EQT-39	Zeltex Infrared Moisture Meter
•	EW-1022	On-Site Tracking and Manifesting of Bulk Excavated Material
•	SMPL-01	Solids Sampling

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APPENDIX A

DATA QUALITY OBJECTIVES SL-051, Rev. 1

UNCONTROLLED

Control Number UNCONTROLLED

1995

Fernald Environmental Management Project

Data Quality Objectives

Title: Excavation Monitoring For Total Uranium Waste Acceptance Criteria (WAC)

Number: SL-051

Revision: 1

UNCONTROLLED

Final Draft: 6/15/98

Contact Name: Keith Nelson

Approval: (Signature on File) Date: 06/15/98
William D. Kelley
DQO Coordinator

Approval: (Signature on File) Date: 06/15/98
Alan Theyken for J. D. Chiou
SCEP Project Director

Rev. #	0	1					
Effective Date:	6/09/98	6/15/98					

UNCONTROLLED

DATA QUALITY OBJECTIVES
Excavation Monitoring for Total Uranium Waste Acceptance Criteria (WAC)

Members of Data Quality Objectives (DQO) Scoping Team

The members of the scoping team included individuals with expertise in QA, analytical methods, field construction, statistics, laboratory analytical techniques, waste management, waste acceptance, data management, and excavation monitoring.

Conceptual Model of the Site

Fernald Environmental Management Project (FEMP) remediation includes the construction of an on-site disposal facility (OSDF) to be used for the safe permanent disposal of materials at or above the site final remediation levels (FRLs), but below the waste acceptance criteria (WAC) for constituents of concern (WAC COCs). The WAC concentrations for several constituents, including total uranium, were developed using fate and transport modeling, and were established to prevent a breakthrough of unacceptable levels of contamination (greater than a specified Maximum Contaminant Level to the underlying Great Miami Aquifer) over a 1000-year period of OSDF performance. The WAC for total uranium and other area-specific WAC COCs as referenced in the Operable Unit 5 (OU5) and Operable Unit 2 (OU2) Records Of Decision (RODs), the Waste Acceptance Plan for the On-Site Disposal Facility (WAC Plan), and the OSDF Impacted Materials Placement Plan (IMPP), must be achieved for all soil and soil-like materials that have been identified for disposal in the OSDF.

The extent of soil contamination requiring remediation was estimated and published in both the Operable Unit 5 and Operable Unit 2 Feasibility Studies (FS). These estimates were based on modeling analysis of available uranium data from soil samples collected during the Remedial Investigation (RI) efforts and from other environmental studies conducted at the FEMP. Maps outlining boundaries of soil contamination were generated for both the Operable Unit 5 and Operable Unit 2 FS documents by overlaying the results of the modeling analysis of uranium data with isoconcentration maps of other COCs. The soil contamination maps were further modified by conducting spatial analysis on the most current soil characterization data.

A sequential remediation plan has been presented which subdivides the FEMP into ten (10) independent remediation areas. Extensive historical sampling has demonstrated that in each of these 10 areas potentially above-WAC concentrations may not be present, may be limited to one WAC COC, or consist of a subset of WAC COCs. According to the Sitewide Excavation Plan (SEP) only WAC COCs

with a demonstrated or likely presence in an area will be evaluated during remedial design and implementation. This DQO will be used to define the WAC decision-making process using excavation monitoring instrumentation in areas where soil and soil-like material is being excavated and total uranium is a WAC COC.

1.0 Statement of Problem

Adequate information must be available to demonstrate excavated soils are acceptable or unacceptable for disposal in the OSDF, based on the total uranium WAC.

Available Resources

Time: WAC decision-making information of sufficient quality must be made available to the Project Manager (or designee), characterization representative, and Waste Acceptance Operations representative (decision makers) prior to excavation and disposition of soil and soil-like materials.

Project Constraints: WAC decision-making information must be collected and assimilated with existing manpower and instrumentation to support the remediation schedule. Successful remediation of applicable areas, including excavation and placement of soil and soil-like material in the OSDF, is dependent on the performance of this work.

Summary of the Problem

Excavated soil must be classified as either of the following:

1. Having concentrations of total uranium at or above the WAC, and therefore, unacceptable for disposal in the OSDF, or

2. Having concentrations of total uranium below the WAC, and therefore, acceptable for disposal in the OSDF.

2.0 Identify the Decision

Decision

The WAC decision-making process will result in the classification of defined soil volumes as either meeting or exceeding the 1,030 ppm total uranium WAC.

Possible Results

1. A defined volume of soil has concentrations of total uranium at or above the WAC. This material is classified as unacceptable for placement in the OSDF, and will be identified, excavated, and segregated pending off-site disposition.

2. A defined volume of soil has concentrations of total uranium below the total uranium WAC. This soil is classified as acceptable for placement in the OSDF and is transported directly from the excavation to the OSDF for placement.

3.0 Identify Inputs That Affect the Decision

Required Information

The total uranium WAC published in the Waste Acceptance Criteria Attainment Plan for the OSDF, historical data, pre-design investigation data, and in-situ monitoring information collected prior to and during excavation are required to determine whether a specified volume of soil meets or exceeds the total uranium WAC.

Source of Informational Input

The list of sitewide OSDF WAC COCs identified in the OU2 and OU5 RODs and the WAC Plan will be referenced. Historical area specific data from the Sitewide Environmental Database (SED) will also be retrieved and evaluated for both radiological and chemical WAC constituents. This information will be utilized to determine area specific WAC COCs.

Non-invasive excavation monitoring in areas where total uranium is a WAC concern will involve measurements collected with mobile and/or stationary in-situ equipment such as the RTRAK and HPGe systems. These measurements will be collected from the surface of each excavation lift prior to excavation. Information compiled from this real-time monitoring will be assimilated and reviewed by decision makers to classify lifts or sections of lifts as either acceptable or unacceptable for placement in the OSDF.

Methods of Analysis

The most practical measurement methods with the required resolution will be employed to determine total uranium levels in the evaluated material in relation to the not-to-exceed (NTE) total uranium WAC in applicable areas.

4.0 The Boundaries of the Situation

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Spatial Boundaries

Domain of the Decision: The boundaries where excavation monitoring for total uranium will be used is limited to soils and/or soil-like materials in remediation areas where total uranium is a WAC COC, excavation is planned, and material is designated for disposition in the OSDF.

Population of Soils:

Includes all at-and below-grade material (soils and soil-like materials) impacted with total uranium potentially exceeding the WAC and planned for disposition in the OSDF.

Scale of Decision Making

Areas designated for excavation will be evaluated as to whether the soil or soil-like material is below or above the OSDF WAC for total uranium. Excavation monitoring will be conducted on each excavation lift. Based on the information obtained as a result of reviewing and modeling existing data coupled with newly acquired excavation monitoring information, a decision will be made whether an individual excavation lift, or portion of a lift, meets or exceeds the OSDF WAC for total uranium.

Temporal Boundaries

Time frame: Real-time excavation monitoring information must be acquired and processed in time for review and use in decision making prior to excavation and disposition of excavated material.

Time Constraints on Monitoring: The scheduling of WAC excavation monitoring is directly tied to the excavation schedule. WAC excavation monitoring will be performed and a disposition decision made prior to excavation of each designated lift. Acquired information must be processed and reviewed by the project decision-makers prior to disposition of the lift being monitored. Time limits to complete measurements are specified in the excavation subcontracts.

Practical Considerations: Weather, moisture, field conditions, and unforseen events affect the ability to perform excavation monitoring and meet the schedule. To maintain safe working conditions, excavation and construction activities will comply with all FEMP and project specific health and safety protocols.

5.0 Develop a Logic Statement

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Parameter(s) of Interest

The parameter of interest is the concentration of total uranium in soil or soil-like material designated for disposition in the OSDF.

Waste Acceptance Criteria Concentration

The OSDF WAC concentration is 1,030 ppm for total uranium in soil and soil-like materials. This concentration is considered a NTE level for OSDF WAC attainment, and no analytical data point or real-time measurement, as defined by the instrument-specific threshold values, can meet or exceed this level in material destined for the OSDF.

Decision Rules

If excavation monitoring results are below the total uranium WAC for a specified volume of soil, then that soil is considered acceptable for final disposition in the OSDF. If monitoring results reveal soil concentrations at or above the total uranium WAC, as indicated by exceeding the instrument-specific threshold level, then the unacceptable soil must be delineated, removed, and segregated pending off-site disposal.

6.0 Limits on Decision Errors

Range of Parameter Limits

The area-specific total uranium soil concentrations anticipated in excavation areas will range from background levels (naturally-occurring soil concentrations) to concentrations greater than the total uranium WAC levels.

Types of Decision Errors and Consequences

Decision Error 1: This decision error occurs when the decision makers decide a specified volume of soil is below the WAC for total uranium, when in fact the uranium concentration in that soil is at or above the WAC. This error would result in soil or soil like material with concentrations above the WAC for total uranium being placed into the OSDF. Since the WAC is a NTE level, this error is unacceptable.

Decision Error 2: This decision error occurs when a volume of soil or soil like material is identified as above WAC, excavated, and sent for off-site disposition when the material is actually below the WAC for total uranium. This error would result in added costs due to the unnecessary segregation and off-site disposition of material that is acceptable for disposal in the OSDF.

True State of Nature for the Decision Errors

The true state of nature for Decision Error 1 is that the actual concentration of total uranium in a volume of soil is greater than the WAC. The true state of nature for Decision Error 2 is that the actual concentration of total uranium in a volume of soil is below the WAC. Decision Error 1 is the more severe error.

7.0 Design for Obtaining Quality Data

7.1 WAC Attainment Excavation Monitoring

WAC decision-making will be based on real-time excavation monitoring using the RTRAK and HPGe systems. The sodium iodide system's threshold value (or trigger level) of 721 ppm for total uranium (70% of the 1,030 ppm WAC concentration for soil) is by agreement with the USEPA. Readings are obtained by RTRAK measurements using a spectral acquisition time of 4 seconds, and a detector speed of 1 mile per hour (mph) for each measurement. These parameters achieve the required sensitivity, and are the best compromise of practical considerations such as tractor speed and time in the field. (For more detailed information reference the *RTRAK Applicability Study, 20701-RP-0003, Revision 1, PCN1, May 15, 1998.*) Thorium can cause interferences with the total uranium. Uranium results associated with Thorium values greater than 500 net counts per second will be reevaluated.

The HPGe system confirmation and delineation threshold value of 928 ppm for total uranium with a spectral acquisition time of 5 minutes (300 seconds) and variable detector heights will be used in soil and soil-like material. Lower (more conservative) threshold values may be defined in the PSP. (For more detailed information reference the *User Guidelines, Measurement Strageties, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site, 20701-RP-0006, Revision A, May 8, 1998.*)

Real-time monitoring of each excavation lift will be accomplished using the RTRAK. In areas inaccessible to the RTRAK, HPGe detectors will be used. In the event the monitoring data exceeds either trigger level (see above), the entire vertical thickness (3 ± 1 foot) of the areal extent of above-WAC material will be removed and segregated pending off-site disposal. Confirmation measurements using HPGe detectors may be performed. If directed by the characterization lead, the HPGe detectors will be placed directly over the zone of maximum activity identified by the RTRAK and an additional 5 minute measurement will be taken. If the HPGe confirmation measurement exceeds 928 ppm for total uranium, then additional HPGe measurements may be required for further horizontal delineation (detector height may be adjusted to increase the field of view).

7.2 Interpretation of Results

The results obtained from real-time monitoring for purposes of WAC attainment will be compared to the published OSDF WAC concentration for total uranium. If results are equal to or greater than the WAC concentration (as defined by exceeding the specific threshold value level), the decision makers may take one of the following actions:

- Determine that the entire unit volume or "lift" subjected to excavation monitoring is at or above WAC and requires segregation pending off-site disposal.
- Based on adequacy of existing information (including visual inspection), excavate and segregate the portion of the lift material that is at or above WAC pending off-site disposition.
- Perform additional real-time monitoring to more accurately delineate the areal extent of above-WAC contamination. Using this information, define the extent of removal efforts to be conducted.

7.3 QC Considerations

The following data management requirements will be met prior to evaluation of acquired WAC attainment information:

1) An excavation monitoring form will be completed and reviewed in the field.

2) WAC data and decision-making information will be assigned to respective soil profiles, so characterization and tracking information can be maintained and retrieved.

3) The mobile sodium iodide systems will generate ASL level A data. The HPGe detectors can provide either ASL level A or B data. In order for real time data to be

ASL B, it must meet the 10% data validation criterion in the SEP. Excavation monitoring data will be collected according to the applicable site procedures for the respective instrumentation.

4) When using the HPGe detectors, duplicate measurements will be taken at a frequency of one in twenty measurements or one per excavation lift, whichever is greater.

7.4 Independent Assessment

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

7.5 Applicable Procedures

Real-time monitoring performed under the PSP shall follow the requirements outlined within the following procedures:

- ADM-16, In-Sutu Gamma Spectrometry Quality Control Measurements
- EQT-22, High Purity Germanium Detector In-Situ Efficiency Calibration
- EQT-23, Operation of ADCAM Series Analyzers with Gamma Sensitive Detectors
- EQT-30, Operation of Radiation Tracking Vehicle Sodium Iodide Detection System
- EQT-32, Troxler 3440 Series Surface Moisture/Density Gauge
- EQT-33, Real-Time Differential Global Positioning System Operation
- EQT-34, Radiation Scanning System
- 20300-PL-002, Real Time Instrumentation Measurement Program Quality Assurance Plan
- EW-1022, On-Site Tracking and Manifesting of Bulk Impacted Material

7.6 References

- Sitewide CERCLA Quality Assurance Project Plan (SCQ), FD-1000, May 10 1995

- Sitewide Excavation Plan, April 1998, 2500-WP-0028, Revision D Draft Final
- Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility, January 1998, 20100-PL-0014, Rev. C Draft Final]
- Impacted Materials Placement Plan for the On-Site Disposal Facility, January 1998, 20100-PL-007, Revision 0
- Area 2, Phase 1 Southern Waste Units Implementation Plan for Operational Unit 2, October 1997, 2502-WP-0029, Revision C Draft
- RTRAK Applicability Study, May 1998, 20701-RP-0003, Revision 1
- User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site, April 1998, 20701-RP-0006 Revision A

Data Quality Objectives
Excavation Monitoring for Total Uranium Waste Acceptance Criteria (WAC)

1A. Task/Description: Waste Acceptance Criteria Monitoring

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

RI ☐ FS ☐ RD ☐ RA ☒ R_vA ☐ OTHER

1.C. DQO No.: SL-051 DQO Reference No.: N/A

---

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

Air ☐ Biological ☐ Groundwater ☐ Sediment ☐

Soil and Soil Like Material ☒

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 Waste Acceptance Evaluation
A ☒ B ☒ C ☐ D ☐ E ☐

4.A. Drivers: Specific construction work plans, Applicable or Relevant and Appropriate Requirements (ARARs) and Operable Unit 2 and Operable Unit 5 Records of Decision (ROD).

4.B. Objective: To provide data for identification of soils for compliance with Waste Acceptance Criteria.

5. Site Information (Description):

The RODs specify that FEMP soils will be below the WAC for disposal in the OSDF. WAC determination will be necessary for site soils that are scheduled for excavation and potential OSDF disposition.

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 ☐
   Temperature ☐
   Specific Conductance ☐
   Dissolved Oxygen ☐
   Technetium-99 ☐

2. Uranium ☒
   Full Radiological ☐
   Metals ☐
   Cyanide ☐
   Silica ☐

3. BTX ☐
   TPH ☐
   Oil/Grease ☐

4. Cations ☐
   Anions ☐
   TOC ☐
   TCLP ☐
   CEC ☐
   COD ☐

5. VOA ☐
   BNA ☐
   Pesticides ☐
   PCB ☐

6. Other (specify) ☒
   Thorium, Moisture

6.B. Equipment Selection and SCQ Reference:

ASL A RTRAK, HPGe SCQ Section: Section 3

ASL B HPGe SCQ Section: Section 3

ASL C _____ SCQ Section: _____

ASL D _____ SCQ Section: _____

ASL E _____ SCQ Section: _____

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

Biased	☐	Composite	☐	Environmental	☐	Grab	☐	Grid	☐
Intrusive	☐	Non-Intrusive	☒	Phased	☐	Source	☐		

DQO Number: SL-051

7.B. Sample Work Plan Reference: The DQO is being established prior to completion of the PSP.

Background samples: SED

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

8.A. Field Quality Control Samples:

Trip Blanks	☐	Container Blanks	☐
Field Blanks	☐	Duplicate Measurements	☒*
Equipment Rinsate Samples	☐	Split Samples	☐
Preservative Blanks	☐	Performance Evaluation Samples	☐

Other (specify) _____

*For the HPGe detectors, duplicate measurements will be made every 1 in 20 or one per lift, whichever is greater.

8.B. Laboratory Quality Control Samples:

Method Blank	☐	Matrix Duplicate/Replicate	☐
Matrix Spike	☐	Surrogate Spikes	☐

Other (specify) Per method

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

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APPENDIX B

DATA QUALITY OBJECTIVES SL-048, Rev. 4

UNCONTROLLED

Control Number 1995 UNCONTROLLED

Fernald Environmental Management Project

Data Quality Objectives

Title: Delineating the Extent of Constituents of Concern in Pre-design Investigation and Remediation Sampling

Number: SL-048

Revision: 4

Effective Date: July 14, 1998

UNCONTROLLED

Contact Name: Eric Kroger

Approval: (Signature on File) Date: 7/14/98
William D. Kelley
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Approval: (Signature on File) Date: 7/14/98
J.D. Chiou
SCEP Project Director

UNCONTROLLED

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		

DATA QUALITY OBJECTIVES
Delineating the Extent of Constituents of Concern in Pre-design Investigation and 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.

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.

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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 accommodating sampling of wells that may go dry prior to completing purging of three 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. If collected, the frequency of field QC sampling is as follows:

Duplicate samples will be taken at a minimum of one per 20 samples. Rinsates will be performed at a minimum of one per 20 samples or one per 20 field sampling tools that are re-used. Trip blanks will be taken at a minimum of one per shipping container when analyzing for volatile organic compounds (VOCs). For VOCs, container blanks will be taken at a minimum of one per Area and Phase per container type (i.e. stainless steel core liner/plastic core liner/Geoprobe tube) when using uncertified containers. Field blanks are not necessary for soil metal analysis, as it is unlikely in ambient field conditions to have metals cross contamination. However, the potential of cross contamination with semi-volatile organic compounds (SVOCs) is higher, therefore soil samples being analyzed for SVOCs may also require associated field blanks to be collected and analyzed. If collected, field blanks will be taken at a minimum of one per 20 soil samples.

Per the Sitewide Excavation Plan, the ASL and data validation requirements for soil and field QC samples collected in association with this DQO are as follows:

- If physical samples are analyzed for Pre-design Investigations and/or Pre-certification delineations, 100% of the data will be analyzed per ASL B requirements. 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).

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.

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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. A minimum of ten percent (10%) of field data will be validated by the FEMP QA validation team. 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 in Pre-design Investigations and 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. 4 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. 4

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.