5201

PROJECT-SPECIFIC PLAN FOR INVESTIGATING SUBSURFACE MATERIAL FROM THE NORTHWESTERN PORTION OF WASTE PIT 3

FERNALD CLOSURE PROJECT
FERNALD, OHIO

DECEMBER 2003

U.S. DEPARTMENT OF ENERGY

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PROJECT-SPECIFIC PLAN FOR INVESTIGATING THE NORTHEWESTERN PORTION OF WASTE PIT 3 SUBSURFACE MATERIAL

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LIST OF ACRONYMS AND ABBREVIATIONS

ASL	analytical support level
BTV	benchmark toxicity value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Constituent of Concern
DOE	U.S. Department of Energy
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
FACTS	Fernald Analytical Computerized Tracking System
FCP	Fernald Closure Project
FF	Fluor Fernald
FRL	final remediation level
IEMP	Integrated Environmental Monitoring Plan
mCi/g	milliCuries per gram
mg/kg	milligram per kilogram
OEPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
pCi	picoCuries
pCi/g	picoCuries per gram
PID	photoionization detector
ppb	parts per billion
PSP	project-specific plan
QA	Quality Assurance
RI/FS	Remedial Investigation/Feasibility Study
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
SPL	Sample Processing Laboratory
SVOC	semi-volatile organic compound
TAL	target analyte list
TEF	Toxicity Equivalence Factor
µg/kg	micrograms per kilogram
V/FCN	Variance/Field Change Notice
VOC	volatile organic compound
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization
WPP	Waste Pits Project

1.0 INTRODUCTION

1.1 PURPOSE

This project-specific plan (PSP) has been developed to gather information pertaining to the material underlying the northwestern portion of Waste Pit 3 in the Fernald Closure Project (FCP) Waste Storage Area. The resulting data from the Waste Pit 3 subsurface material (i.e., liner and/or native material) investigation will assist in:

- Verifying the general assumptions supporting overall schedule and management decisions associated with the remediation of the subsurface materials underlying the waste pits
- Updating/refining volume estimates and schedule for on-site disposal facility (OSDF) waste placement and Envirocare railcar shipments
- Obtaining field experience and identifying general statistical parameters necessary to support the development of a future pre-design PSP for sampling subsurface material underlying all waste pits in the Waste Storage Area.

It is anticipated that waste pit subsurface sampling will be conducted in multiple phases as excavation of the waste pits progresses. Sampling under this PSP specifically addresses the northwestern portion of Waste Pit 3 where waste excavation has been completed to the extent that safe access to the pit floor is possible. Sampling under this PSP will also be conducted in a manner that will prevent impact to the Great Miami Aquifer.

1.2 BACKGROUND

The Waste Storage Area at the FCP covers approximately 38 acres and is located west of the former production area (Figure 1-1). Designated as Operable Unit (OU) 1 during the Remedial Investigation/Feasibility Study (RI/FS), this area consists of Waste Pits 1 through 6, the Burn Pit, and the Clearwell. The various components of OU1 were constructed from 1952 (Waste Pit 1) through 1979 (Waste Pit 6) and were used to store waste products generated by the FCP uranium refinement process.

The waste product sources were numerous production byproducts from chemical feed material extraction and precipitation, filtering and settling operations, drying operations, chemical conversion, and heat treatment. The waste pits were also used to dispose of other wastes generated in the refinement process and site support activities, including pollution control products, flyash from the boiler plant, residues from the process water treatment plant, construction debris, and discarded equipment, vessels, and containers. These wastes were contaminated with numerous radiological and chemical constituents, including uranium isotopes and their decay products, thorium isotopes and their decay products, fission products such as technetium-99, potentially hazardous metals (such as arsenic, chromium, nickel, and lead) extracted as impurities from the uranium-bearing feedstock, and organic chemical constituents used in various plant processes and maintenance operations.

Characterization of the physical, chemical, and radiological profiles of the contents of each waste pit, supplemented by treatability studies, were completed in 1992 to meet the objectives of the OU1 RI/FS. No analytical information on the nature and extent of contaminants in the native clay material used to line some of the waste pits, as well as the soils beneath the pits is available.

Because of the concern about maintaining the integrity of the waste pit liners to prevent environmental migration of pit contaminants into the underlying Great Miami Aquifer, waste pit content characterization borings were carefully conducted so as not to breach the pit lining material. The informational needs of the RI/FS were satisfied through the use of computer modeling that simulated the migration of contaminants from the waste pits to the underlying soils.

Lining material used in the waste pits includes native clay (either from an existing in-situ clay lens, or dug from the Burn Pit) used for Waste Pits 1, 2, 3, 4, and the Clearwell. A 60-mil thick ethylene propylene diene monomer elastomeric membrane underlain with native soil was used for Waste Pits 5 and 6, and native soil is beneath the Burn Pit (which was created as the result of removal of clay for lining other pits).

Figure 1-2 presents the OU1 RI/FS sample locations associated with Waste Pit 3. The figure additionally delineates the area where current excavation in Waste Pit 3 has reached the waste pit floor, which is indicated by the 550 foot above mean sea level contour from the July 2003 topographical survey.

1.3 SCOPE

Under this PSP, physical samples will be collected from the northwestern portion of Waste Pit 3 where excavation has progressed to the pit floor (Figure 1-2), to meet the objectives stated in Section 1.1. The analytical results of this investigation will be compiled to support overall schedule and management decisions associated with remediation of the subsurface materials underlying the waste pits. All sampling activities carried out under this PSP will be performed in accordance with the Sitewide Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Project Plan (SCQ), and Data Quality Objective (DQO) SL-048, Revision 5 (Appendix A). Further sampling of Waste Pit 3 subsurface material along with the remaining waste pits' subsurface material will be addressed in a separate PSP.

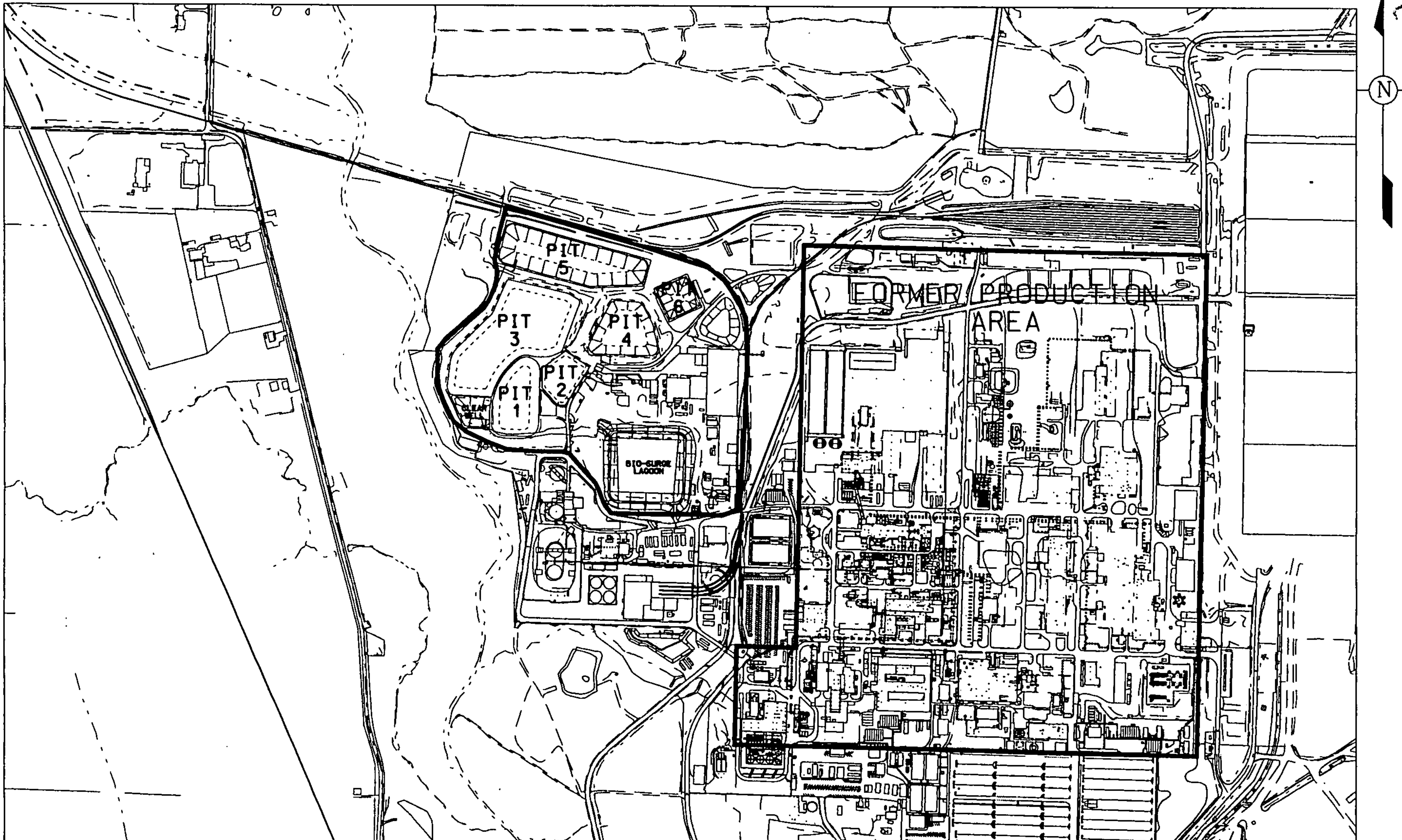
1.4 KEY PROJECT PERSONNEL

The key project personnel are listed in Table 1-1:

TABLE 1-1
KEY PERSONNEL

Title	Primary	Alternate
DOE Contact	Dave Lojek	Johnny Reising
Soil and Disposal Facility Project (SDFP) - Project Manager	Jyh-Dong Chiou	Rich Abitz
Waste Pits Project (WPP) - Project Manager	Mike Kopp (Acting)	Dennis Dalga
Characterization Lead	Cindy Tabor	Bill Westerman
Field Sampling Lead	Tom Buhrlage	Jim Hey
Project Geologist[a]	Hank Becker	Jonathon Walters
Surveying Lead	Jim Schwing	Andy Clinton
Waste Acceptance Organization (WAO) Contact	Joe Jacoboski	Bob Bischoff
Laboratory Contact	Heather Medley	Keith Tomlinson
Data Management Lead	Bill Westerman	Cindy Tabor
Field Data Validation Contact	Demetria Edwards	Andy Sandfoss
Data Validation Contact	Jim Chambers	Andy Sandfoss
Fernald Analytical Computerized Tracking System (FACTS)/Sitewide Environmental Database (SED) Contact	Kym Lockard	Laurie Kahill
Quality Assurance Contact	Leslie Williams	Mike Malone
Radiological Control	Robert Holley	Russ Hall
WPP Excavation Manager	Marshall Linton	Jerry Boeckman
Health and Safety Contact	Charlie Lineberry	Todd Valli

[a]Bill Hertel (primary project geologist) and Karen Voisard will provide additional support, as necessary.



LEGEND:

—·—·— FCP BOUNDARY

SCALE

800 400 0 800 FEET

V:/5FGP1/DGN/WESTERMAN04.DGN
STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 1-1. LOCATION OF OU1 WASTE PITS AT FCP

02/04/02

000008

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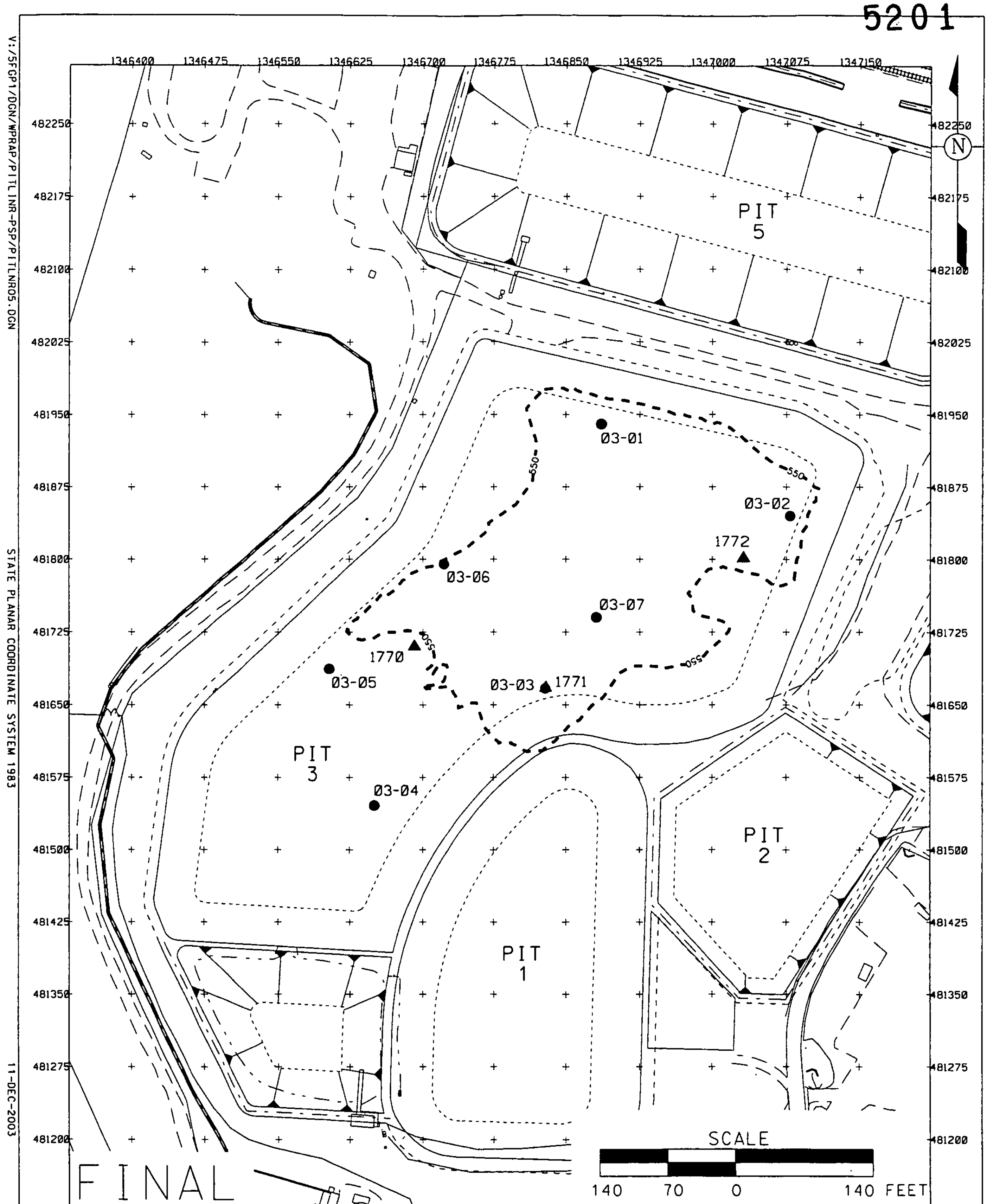

LEGEND:

- - - - - JULY 2003 550′ (amsl) LIDAR CONTOUR (i.e., EXCAVATED AREA)

▲ RI/FS BORING LOCATION

● CIS BORING LOCATION

FIGURE 1-2. PREVIOUS BORING LOCATIONS AND CURRENTLY EXCAVATED AREA IN WASTE PIT 3

2.0 PHYSICAL SAMPLING STRATEGY

2.1 SELECTION OF CONSTITUENTS

In order to determine the appropriate list of constituents to monitor in the northwestern portion of Waste Pit 3, those constituents of concern (COCs) in the Sitewide Excavation Plan (SEP) for Remediation Area 6 (i.e., Waste Storage Area) were reviewed. These COCs are listed below.

SEP Remediation Area 6 COC List

Primary COCs	Secondary COCs	Ecological COCs
Radium-226	Fluoride	Antimony
Radium-228		Cadmium
Thorium-228	Arsenic	Silver
Thorium-232	Beryllium	
Total Uranium		Benzo(a)anthracene
	Aroclor-1254	Benzo(k)fluoranthene
	Aroclor-1260	Chrysene
	Dieldrin	Benzo(g,h,i)perylene[a]
		Fluoranthene[a]
	Benzo(a)pyrene	Phenanthrene[a]
	Benzo(b)fluoranthene	Pyrene[a]
	Dibenzo(a,h)anthracene	
	Indeno(1,2,3-cd)pyrene	
	Bromodichloromethane	
	1,1-Dichloroethene	
	Tetrachloroethene	
	Heptachloradibenzo-p-dioxin	
	Octochlorodibenzo-p-dioxin	
	Cesium-137	
	Technetium-99	
	Thorium-230	

[a]Constituent has no associated final remediation level (FRL) or OSDF waste acceptance criteria (WAC) level.

Specifically, Remediation Area 6 COCs from Waste Pit 3 OU1 RI/FS data (refer to Figure 1-2 for monitoring locations) were evaluated against on-property FRLs and OSDF WAC levels. Table 2-1 lists these COCs and identifies those constituents that have exceeded FRLs and/or OSDF WAC levels in Waste Pit 3. For each COC, this table additionally identifies the following information from Waste Pit 3 data:

- Minimum and maximum concentrations
- Number of locations and samples with exceedances
- Total number of samples and locations.

Of the 29 constituents identified in Table 2-1, 13 had concentrations that exceeded a FRL and/or OSDF WAC level. Note that benzo(g,h,i)perylene, fluoranthene, phenanthrene, and pyrene are not included in Table 2-1. This is because these constituents have no associated FRL or OSDF WAC level.

For this investigation, samples will be collected for the 13 constituents that have had FRL or OSDF WAC exceedances in Waste Pit 3. Additionally, the following constituent selection process was used to ensure the appropriate target analyte lists (TALs) were defined for the northwestern portion of Waste Pit 3 subsurface sampling:

1) Determine if any Remediation Area 6 COCs have not been analyzed from Waste Pit 3 and evaluate the necessity for sampling.

2) Determine if FRL or OSDF WAC constituent exceedances in Waste Pit 3 have been widespread or isolated based on number of samples/locations and evaluate if/where sampling should occur.

3) Determine if additional site information exists that might lead to the elimination or addition of constituents for Waste Pit 3 subsurface sampling.

4) Determine if the presence of volatile organic exceedances necessitates photoionization detector (PID) screening.

After analysis of the data presented in Table 2-1, the following statements can be made in response to the four constituent selection criteria above:

1) All Remediation Area 6 COCs have been analyzed with respect to Waste Pit 3; therefore, no constituents will be added to the TALs based on this step.

2) 1,1-Dichloroethene was not detected in any samples; however, one sample had a non detected value slightly above the associated FRL (420 μg/kg versus 410 μg/kg). This constituent will not be add to the Waste Pit 3 TAL based on all results being non detects; however, will be added based on step 3)c below.

3) a) The latest guidance for evaluating the health-based risk of dioxins, in short, is to determine the concentration of each individual congener, multiply each concentration by the appropriate Toxicity Equivalence Factors (TEF), sum the corrected concentrations, and compare the total contribution of all dioxin and furan congeners to an established limit of 1 part per billion (ppb). Appendix B presents these calculations for all samples of dioxins and furans for Waste Pit 3. Based on the results of these calculations, it is concluded that dioxins and furans are well within the acceptable risk level per U.S. Environmental Protection Agency (EPA) Guidelines. Therefore, the two dioxins listed in the SEP as Remediation Area 6 COCs, heptachlorodibenzo-p-dioxin and octochlorodibenzo-p-dioxin, do not require further evaluation and will not be included in the TALs associated with this PSP.

b) Although benzo(g,h,i)perlyene, fluoranthene, phenanthrene, and pyrene do not have associated FRLs or OSDF WAC levels, they have been identified as COCs for Remediation Area 6. These constituents will be added to the Waste Pit 3 TALs in order to collect information to support overall schedule and management decisions associated with remediation of the subsurface materials underlying the waste pits.

c) Volatile organic compounds (VOCs) sampling will be conducted to support the selection of future certification COCs. Analysis will include those typical solvents found in quantities around the site, based on process knowledge: 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Trichloroethene, Tetrachlorethene, and Vinyl Chloride.

4) Because there are volatile organics among the COCs for Waste Pit 3, PID screening will be necessary.

Through application of the constituent selection process, it was determined that 17 constituents, 13 with FRL and/or OSDF WAC exceedances and four polynuclear aromatic hydrocarbons [step 3)b], will be sampled in the northwestern portion of Waste Pit 3 subsurface investigation. Additionally, samples will be collected for VOC analysis as identified in step 3)c above. The constituents to be sampled are listed below and provided in Appendix C in five TALs (TAL A, TAL B, TAL C, TAL D, TAL E, and TAL F). Division of the constituents into the different TALs is based on the various analytical methods used and whether particular constituents will be analyzed on-site or at an off-site laboratory.

Waste Pit 3 Sampling List

Primary COCs	Secondary COCs	Ecological COCs
Radium-226	Arsenic	*Benzo(g,h,I)perylene*
Radium-228	Beryllium	*Fluoranthene*
Thorium-228		*Phenanthrene*
Thorium-232	Aroclor-1254	*Pyrene*
Total Uranium	Aroclor-1260	
	Dieldrin	
	Cesium-137	
	Technetium-99	
	Thorium-230	

Highlighting Constituent concentrations from Waste Pit 3 OU1 RI/FS data have exceeded OSDF WAC levels.
Italicized Although there are no associated FRLs, samples will be collected to support overall schedule and management decisions associated with the remediation of waste pits subsurface material.
Note: VOC samples to support future remediation certification efforts will be collected for 1,1,1-Trichloroethane, 1,1,2-Trichloroethane, 1,1-Dichloroethene, cis-1,2-Dichloroethene, trans-1,2-Dichloroethene, Trichloroethene, Tetrachlorethene, and Vinyl Chloride.

2.2 SELECTION OF SAMPLE LOCATIONS

Sample locations will be placed to meet the objectives presented in Section 1.1, while taking into consideration efforts to minimize cross-contamination. Because of the dynamic nature of excavation activities in the various waste pits, final placement of borings will be determined during an area walk-down completed shortly before commencement of boring activities. Selection of locations will be based on a variety of factors, including:

- Accessibility of pit bottom (i.e., area that waste has been removed)
- Safety factors (e.g., sidewall setbacks, on-going excavation operation areas)
- Proximity to areas of special interest (e.g., Great Miami Aquifer, sump area)
- Waste pit floor conditions (e.g., pooled water, areas susceptible to damage from tracked equipment).

Final confirmed locations will be surveyed, marked with flags, mapped, and reported as a variance to this PSP.

Borings for the initial sampling are located in the currently excavated northwestern portion of Waste Pit 3 (Figure 2-1). In general, the proposed locations were selected by overlaying a 75-foot square grid pattern across the excavated area. Each boring is located at the center of each grid unless moved due to any of the previously cited factors. For instance, care was taken to ensure that boring locations will not be in the vicinity of the sump area, located in the northeastern portion of Waste Pit 3 (refer to Figure 2-1). Projected coordinates for the 10 borings of the initial phase of sampling are provided in Appendix D. If any location is moved more than three feet as a result of the boring location walk-down or during contingencies experienced at the time of sampling, the revised coordinates will be reported as a variance to this PSP.

Based on OU5 and OU1 RI/FS information, it is projected that there is approximately 4 to 6 feet of clay material (i.e., liner and native material) above the unsaturated portion of the Great Miami Aquifer sand and gravel in the area where sampling will occur. Additionally, it is at least 30 feet to the saturated portion of the Great Miami Aquifer based on data from the Integrated Environmental Management Plan (IEMP) summary reports.

Note that in support of excavation (e.g., to maintain adequate control of excavation water), it was necessary to excavate a portion of the pit liner (6 inches) in some areas of Waste Pit 3. Four boring locations within the area where this material has been removed are identified with an asterisk (*) on Figure 2-1.

Sampling within each boring core will be conducted at 6 six-inch intervals as shown on Figure 2-2. The first six-inch interval of non-waste material (i.e., liner) will be included as part of the general pit excavation effort, with the material presumed to be contaminated and shipped offsite for disposal. Sampling for the targeted constituents will begin after the first six-inch interval of non-waste material is removed (except for the four asterisked locations) and will be conducted at six-inch intervals to a depth of 3.5 feet (refer to Section 2.3). The six sample intervals collected from each of the 10 locations are identified in Appendix D.

2.3 SAMPLE COLLECTION METHODS

Soil borings will be completed using the Geoprobe® core sampling assembly, in accordance with procedure EQT-06, Geoprobe® Model 5400 and Model 6600 Operation and Maintenance Manual. Soil samples will be collected in accordance with procedure SMPL-01, Solids Sampling. If refusal or resistance is encountered during sample collection, the boring location may be relocated up to three feet away. Any movement of the boring location by more than three feet will be documented on a variance/field change notice (V/FCN) form, as described in Section 3.4. Changes of less than three feet from the scheduled location will be documented (distance and direction) in the Field Activity Log associated with that boring. These activities will be coordinated with and authorized by the Characterization Lead and the WPP Excavation Manager.

Prior to collection of the sample cores, any pit waste material overlying the pit floor within a 12-inch radius from the point to be sampled will be removed. The Geoprobe® will then be driven to the appropriate depth and, upon removal, each core will be laid out on clean plastic. The entire length of each boring will be PID screened for volatile organics. The Geoprobe core liners will be opened for the PID screening and the measurement for each six-inch interval will be recorded in the field documentation, along with the PID background reading. Additionally, the entire length of each soil core will be surveyed with a beta/gamma (Geiger-Mueller) survey meter. Following beta/gamma screening, the appropriate six-inch sample intervals, as designated for each of the 10 boring locations, will be collected. Note that a sample will be collected from the interval with the highest beta/gamma reading in each boring and submitted to the on-site laboratory for alpha/beta analysis results for off-site shipping purposes. If all intervals from a boring indicate no contamination above background, the alpha/beta sample will be collected from the first six-inch interval of non-waste material.

Lithological descriptions of the cores will be completed by the project geologist. The project geologist will attempt to identify the interface between the constructed clay pit liner material and the material below the constructed liner by evaluation of certain lithological characteristics. These characteristics will be recorded on a lithological log and will include, at minimum, material stratification; particle size; color; moisture content; density; and related geotechnical properties. Additionally, any debris (e.g., wood not part of undisturbed native till material, glass, metal) contained in the sample intervals will be removed and identified in a visual description of the sample core material.

Because of the propensity for contaminants to collect at interfaces of differing material, it has been determined that at conditions where there is a clear/major interface between material types (e.g., clay versus sand), the six-inch sample interval will be adjusted such that one six-inch interval will be collected immediately above the material interface and one six-inch interval will be collected immediately below the interface. The six-inch interval spacing will proceed in both directions (up and down the core) starting from the interface. If there is less than six inches remaining that can't provide the sufficient amount of soil volume at the uppermost interval of the boring, that interval will only be analyzed for total uranium and technetium-99. Any such interval adjustments must be noted in the Field Activity Log.

During this investigation, it is critical to prevent cross-contamination within the boreholes due to the proximity of the Great Miami Aquifer to the bottom of the waste pit liner. Therefore, a project geologist from Aquifer Restoration/Water Management group will monitor all boring activities associated with this investigation to ensure that every effort is taken to protect the Great Miami Aquifer. No borehole will be placed within ten feet of any liquid pooled on the waste pit floor. Weather forecasts will be monitored to prevent sampling during precipitation events. A containment barrier will be closely available to place around a borehole in process in the case of unexpected rain. Boreholes in the pit liner will be plugged (as specified in Section 2.8) immediately upon completion and any partially completed borehole shall not be left unplugged overnight or left unattended during the day of sampling.

Additionally, if the sand and gravel of the Great Miami Aquifer is encountered prior to the 3.5 foot depth in a borehole, then adjacent borehole depths will be altered to a depth six inches below the depth from which the sand and gravel was encountered (e.g., encounter sand and gravel at 2.0 feet, then adjacent borehole depths would be 2.5 feet). If in adjacent boreholes, sand and gravel is not encountered, then sample interval depths will proceed. Changes will be documented in the Field Activity Log associated for borings of interest and activities will be coordinated with and authorized by the Characterization Lead and the WPP Excavation Manager. Note that monitoring of the Great Miami Aquifer will continue as part of the groundwater remedy performance monitoring specified in the IEMP and Geoprobe activities in the

Waste Storage Area are being planned for 2004 to ensure that there is no adverse impact to the aquifer and/or to determine if groundwater remedy design changes are necessary.

2.4 SAMPLE IDENTIFICATION

All physical samples collected for laboratory analysis will be assigned a unique sample identification number as A6WP3-Location^Depth-Analysis, where:

A6WP3	=	Sample collected from Remediation Area 6 Waste Pit 3
Location	=	Sample Location number (1 through 10)
Depth Interval	=	"1"= 0 to 0.5 feet below the pit floor (i.e., where the overlying waste material ends and the pit liner material begins) "2"= 0.5 to 1 feet below the pit floor, etc. (where depth interval indicator equals two times the bottom depth for the respective interval and is measured in feet, i.e., "1"= 2 x 0.5', "2" = 2 x 1', etc.)
Analysis	=	"RA" for radiological (total uranium and technetium-99), "RB" for all other radiological parameters, "M" for metals, "P" for pesticide/polychlorinated biphenyls (PCBs), "S" for polynuclear aromatic hydrocarbons, "L" for VOCs, and "AB" for alpha/beta screening

For example:

- Sample identifier A6WP3-1^3-RA is a sample collected from boring location A6WP3-1, at the 1 to 1.5 foot boring interval, for total uranium and technetium-99 radiological analysis.
- Sample identifier A6WP3-7^4-RBMPS is a sample collected from boring location A6WP3-7, at the 1.5 to 2 foot boring interval, for radiological, metals, pesticide/PCB, and polynuclear aromatic hydrocarbon analysis.

Refer to Appendix D for a listing of sample identifiers for all samples from each boring location.

2.5 SAMPLE ANALYSIS

Sample volume, container, and preservation requirements for samples collected for the various TALs are listed in Table 2-2. All samples will be delivered to the on-site Sample Processing Laboratory (SPL), where samples to be analyzed offsite will be prepared for shipment to an approved off-site laboratory, in accordance with procedure 9501, Shipping Samples to Off-Site Laboratories. The alpha/beta screening samples will be analyzed onsite to provide radiological activity information for the off-site shipment. Those samples to be analyzed onsite will be delivered to the appropriate on-site laboratory by SPL.

The following identifies the location for analyses:

- All technetium-99 and total uranium analyses are expected to be performed onsite (TAL A); however, as capacity permits, these analyses may also be performed offsite.
- All other samples will be sent offsite for analyses (TALs B, C, D, E, and F).

A vertical profile will be created for each boring location to efficiently provide information to support the objectives of the investigation. Vertical profiles will identify analytical results (e.g., above WAC concentrations) and will be created by having analyses performed in a step-by-step process (refer to Figure 2-3):

- First, the laboratory will analyze the top six inches from each location to determine whether constituents are above or below the OSDF WAC levels (TAL A - technetium-99 and total uranium)
  - If the interval is above WAC levels then the next lower six-inch interval will be analyzed for WAC constituents (TAL A)
  - If the interval is below WAC levels then the sample interval will be analyzed by the offsite laboratory for remaining COCs (TALs B, C, D, and E)
- As soon as an interval is below WAC levels, the subsequent lower six-inch intervals will be analyzed for all COCs (TALs A, B, C, D, and E).

Note: TAL F (VOC analysis) will be performed at the uppermost interval that demonstrates below WAC levels for both total uranium and technetium-99 (TAL A).

In general, this analyses approach along with the development of vertical profiles will allow for the optimal amount of data to:

- Verify the general assumptions supporting overall schedule and management decisions associated with the remediation of the subsurface materials underlying the waste pits
- Update/refine volume estimates and schedule for on-site disposal facility (OSDF) waste placement and Envirocare railcar shipments

2.6 EQUIPMENT DECONTAMINATION

Decontamination is performed on the sampling equipment to protect worker health and safety and to prevent the introduction of contaminants into subsequent soil samples. Equipment that comes into contact with sample material (i.e., cutting shoes, etc.) will be decontaminated at Level II (Section K.11, SCQ) prior to transport to the field site, between sample locations, and after sampling performed under this PSP is completed. Other equipment that does not contact sample media may be decontaminated at Level I, or wiped down using disposable towels. Clean disposable wipes may be used to replace air drying of the equipment.

Based on the Waste Pits isotope of concern (thorium-230) and due to the nature and extent of work to be performed within the waste pit areas it may be necessary to incorporate additional radiological controls on equipment or supplies to prevent or mitigate the potential spread of radiological contamination. Thus, in an effort to reduce the decontamination effort prior to release from radiological areas, members of the sampling team may be required to use plastic, herculite or other non-permeable materials on items that come or are likely to come into direct contact with sample material.

2.7 SAMPLING WASTE DISPOSITION

Excess soil from the borings will be disposed of in the waste pit from which it was collected. Any water (used decontamination water, flushed groundwater, etc.) generated during sampling will be disposed at the wastewater discharge sump located in each waste pit.

2.8 BOREHOLE ABANDONMENT

Each borehole will be plugged using a bentonite grout slurry injected immediately after sampling is completed. The bentonite grout slurry will have a density of at least 9.4 pounds per gallon. A Borehole Abandonment Log will be completed for each borehole. Each plugged borehole will be checked 24 hours after placement of the bentonite grout slurry and additional sealing material will be added if settling has occurred.

TABLE 2-1

OU1 RI/FS DATA FOR WASTE PIT 3 AND ASSOCIATED REMEDIATION AREA 6 FRL AND OSDF WAC INFORMATION

Constituent	WAC/FRL[a]	Minimum[a,b,c]	Maximum[a,b,c]	Number of Samples Above WAC/FRL[a,c,d]	Number of Samples[a,c]	Number of Locations Above WAC/FRL[a,c,d]	Number of Locations Sampled
General Chemistry:	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**				
Fluoride	- - /78,000	0.4 U	2,350 -	- - /0	5	- - /0	3
Inorganics:	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**				
Antimony	- - /96	2.6 U	63.5 -	- - /0	10	- - /0	7
Arsenic	- - /12	6.9 J	37,200 J	- - /9	10	- - /7	7
Beryllium	- - /1.5	1 J	24 J	- - /8	10	- - /6	7
Cadmium	- - /82	2.2 -	38.6 J	- - /0	10	- - /0	7
Silver	- - /29,000	2 U	41.8 -	- - /0	10	- - /0	7
Pesticides/PCBs:	**(μg/kg)**	**(μg/kg)**	**(μg/kg)**				
Aroclor-1254	- - /130	210 U	1,500 J	- - /4	7	- - /4	7
Aroclor-1260	- - /130	210 U	1,600 U	- - /10	10	- - /7	7
Dieldrin	- - /15	21 U	160 U	- - /10	10	- - /7	7
Semi-Volatile Organics:	**(μg/kg)**	**(μg/kg)**	**(μg/kg)**				
Benzo(a)anthracene	- - /20,000	510 U	60 J[e]	- - /0	5	- - /0	5
Benzo(a)pyrene	- - /2,000	510 U	960 U	- - /0	5	- - /0	5
Benzo(b)fluoranthene	- - /20,000	510 U	110 J[e]	- - /0	5	- - /0	5
Benzo(k)fluoranthene	- - /200,000	510 U	960 U	- - /0	5	- - /0	5
Chrysene	- - /2,000,000	510 U	75 J[e]	- - /0	5	- - /0	5
Dibenzo(a,h)anthracene	- - /2,000	510 U	960 UJ	- - /0	5	- - /0	5
Indeno(1,2,3-cd)pyrene	- - /20,000	510 U	960 U	- - /0	5	- - /0	5
Volatile Organics:	**(μg/kg)**	**(μg/kg)**	**(μg/kg)**				
Bromodichloromethane	903 /4,000	6 U	420 U	- - /0	14	0/ 0	7
1,1-Dichloroethene[f]	11,400 /410	6 U	420 U	0 /1[f]	14	- - /1[f]	7
Tetrachloroethene	1.28E+5 /3,600	220 U	420 U	0 /0	4	0/ 0	4
Dioxins:	**(μg/kg)**	**(μg/kg)**	**(μg/kg)**				
Heptachlorodibenzo-p-dioxin[g]	- - /0.88	0.11 U	3.2 J	- - /3[g]	6	- - /2[g]	3
Octachlorodibenzo-p-dioxin[g]	- - /8.8	3.7 J	19.4 J	- - /1[g]	6	- - /1[g]	3

FCP-WPP PIT LINER INVEST FINAL
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TABLE 2-1

(Continued)

Radionuclides:	(pCi/g)	(pCi/g)	(pCi/g)				
Cesium-137	- - /1.4	0.2 UJ	5 UJ	- - /1	10	- - /1	7
Radium-226	- - /1.7	1.41 J	451 J	- - /5	6	- - /3	3
Radium-228	- - /1.8	1.5 J	241 J	- - /5	6	- - /3	3
Technetium-99	29.1 /30	1.2 UJ	1,110 -	4 /4	10	4 /4	7
Thorium-228	- - /1.7	3.7 U	554 -	- - /4	9	- - /4	7
Thorium-230	- - /280	3.28 J	11,370 J	- - /6	10	- - /4	7
Thorium-232	- - /1.5	1.5 U	396 -	- - /4	9	- - /4	7
Total Uranium (mg/kg)	1,030 /50	399[h] J	5,190[h] -	8 /10	10	5 /7	7

Note: Highlighting indicates constituent exceeded FRL.
Note: Outbox indicates constituent exceeded OSDF WAC.

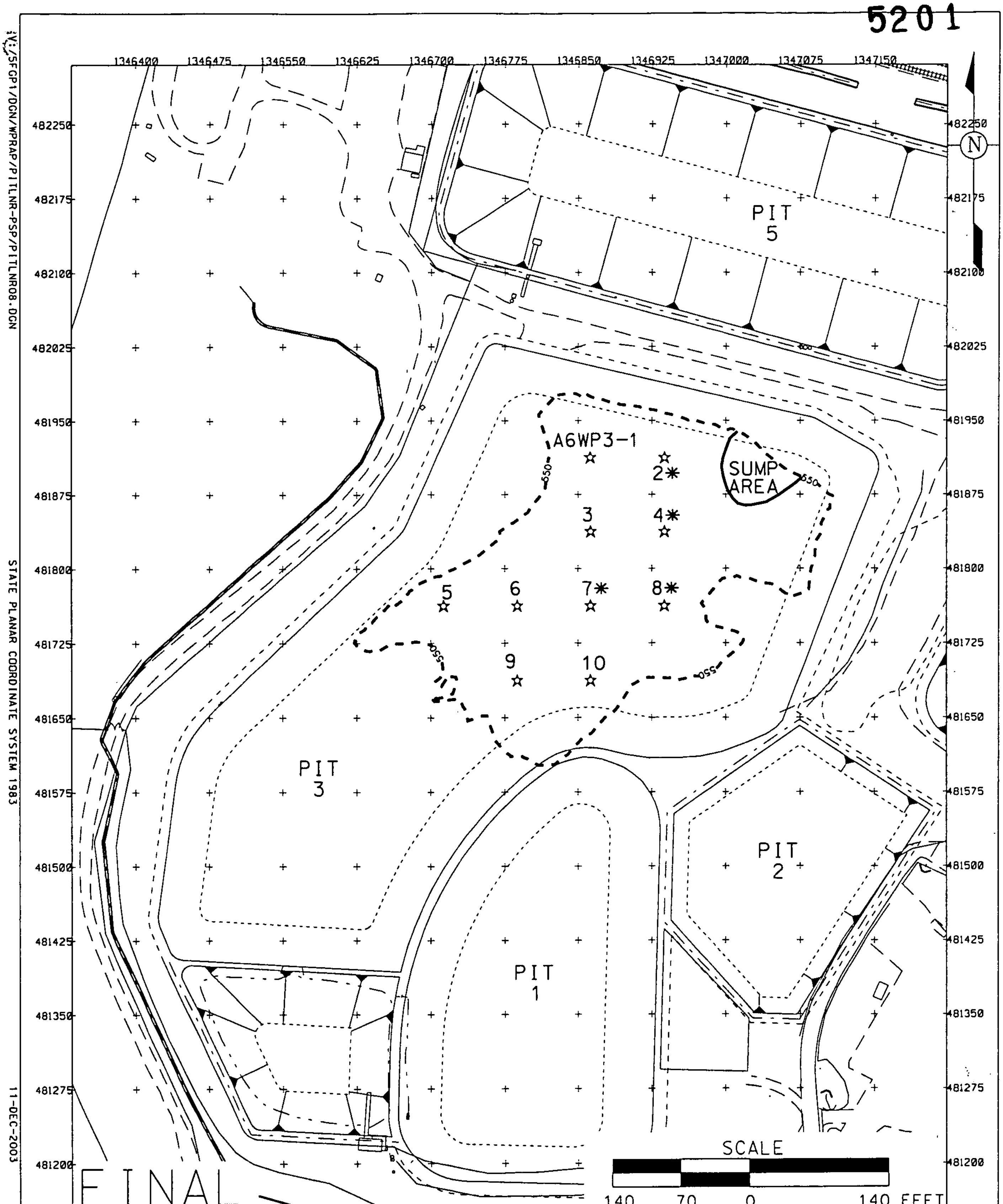
[a]"- -" indicates there is no defined WAC or FRL for that constituent.
[b]"U" indicates non-detected results, "-" indicates detected results, and "J" indicates estimated detected results.
[c]Rejected data qualified with either a R or Z were not included in the minimum, maximum, or counts.
[d]The column is intended to focus on detected results. However, in the case where all the results are non-detects, the number in the column reflects the number of non-detected results above the WAC/FRL or number of locations above the WAC/FRL.
[e]This result represents the highest detected result. There were several non-detected results, with detection limits above the result.
[f]Minimal non detected level above FRL (420 µg/kg versus 410 µg/kg) and only one occurrence indicates that it is not necessary to sample for this constituent.
[g]Exceedances are not considered to be warranted based on the commonly accepted practice of multiplying the highest conger concentration by the appropriate TEF, which indicates that the sum of the adjusted dioxin values are significantly less than the current limit of 1 µg/kg and the proposed federal limit of 0.1 µg/kg.
[h]Total uranium results were calculated from uranium-238 results with a conversion factor of 2.98 µg total uranium per pCi of uranium-238.

TABLE 2-2

SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte	Method	Sample Matrix	Lab	ASL	Preservation	Holding Time	Container	Sample Mass
Total U/Tc-99 (TAL A)	ICP-MS, GFPC, Gamma Spectroscopy	Solid	On-site[a]	B	none	one year	Glass or Plastic	20 grams
Radiological (TAL B)	Gamma Spectroscopy	Solid	Off-site	B	none	one year	Glass or Plastic	250 grams
Total Inorganics (TAL C)	ICP-AES, ICP-MS, or GFAA	Solid	Off-site	B	Cool 2°-6° C	6 months	Glass or Plastic	30 grams
Pesticide/PCBs (TAL D)	GC	Solid	Off-site	B	Cool 2°-6° C	14 days	Glass w/ Teflon cap	30 grams[b]
PAHs (TAL E)	GC/MS	Solid	Offsite	B	Cool 2°-6° C	14 days	Glass w/ Teflon cap	30 grams[b]
VOCs[c] (TAL F)	GC/MS	Solid	Offsite	B	Cool 2°-6° C	14 days	Glass w/ Teflon cap	30 grams[b]
VOCs[d] (TAL F)	GC/MS	Water	Offsite	B	H_2SO_4, pH < 2 Cool 2°-6° C	14 days	Glass w/ Teflon cap	3-40 ml
Alpha/Beta Screen[e]	NA[f]	Solid	On-site	B	none	NA[f]	any	10 grams

[a]As capacity permits, TAL A analyses may be performed at an approved offsite laboratory.
[b]One sample from each off-site sample shipment (which will be chosen by the field sampling lead) must have at least three times the mass specified, for laboratory QC.
[c]VOC analysis will be conducted at the uppermost interval that demonstrates below WAC concentrations for both total uranium and technetium-99.
[d]This VOC is for the trip blank, which will be taken at a rate of 1 per team per day.
[e]If all intervals indicate no contamination above background, the alpha/beta sample will be collected from the first 6-inch interval of non-waste material.
[f]NA = not applicable



NOTE:
ALL BORING LOCATIONS WILL BE PRECEDED BY "A6WP3-"

LEGEND:

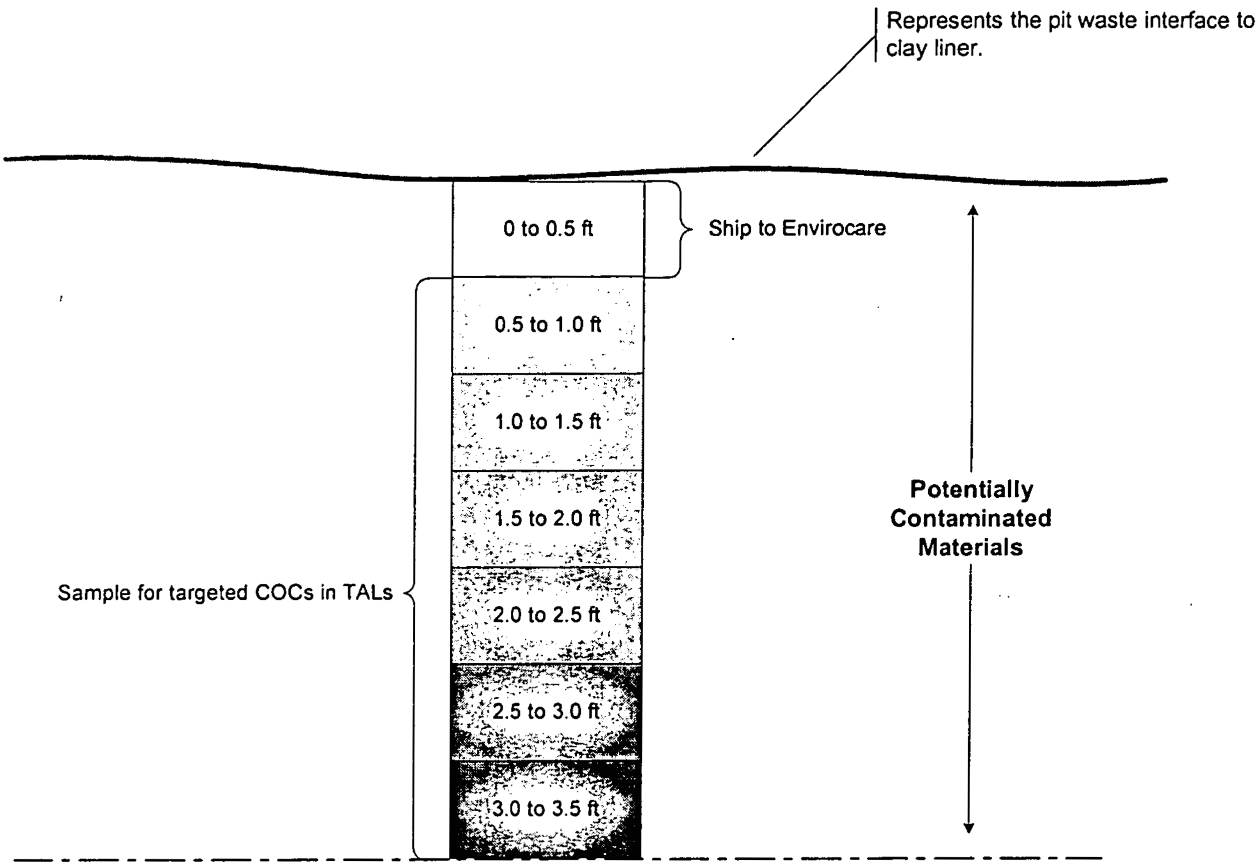
JULY 2003 550' (amsl) LIDAR CONTOUR (i.e., EXCAVATED AREA)

☆ PROPOSED LINER/SUBSURFACE MATERIAL BORINGS

✳ AT THESE PROPOSED LOCATIONS SIX INCHES OF LINER MATERIAL HAS BEEN EXCAVATED AND SHIPPED TO ENVIROCARE

FIGURE 2-1. PROPOSED SAMPLE LOCATIONS FOR THE NORTHWESTERN PORTION OF WASTE PIT 3

FIGURE 2-2. SAMPLE INTERVALS FOR WASTE PIT 3 SUBSURFACE INVESTIGATION

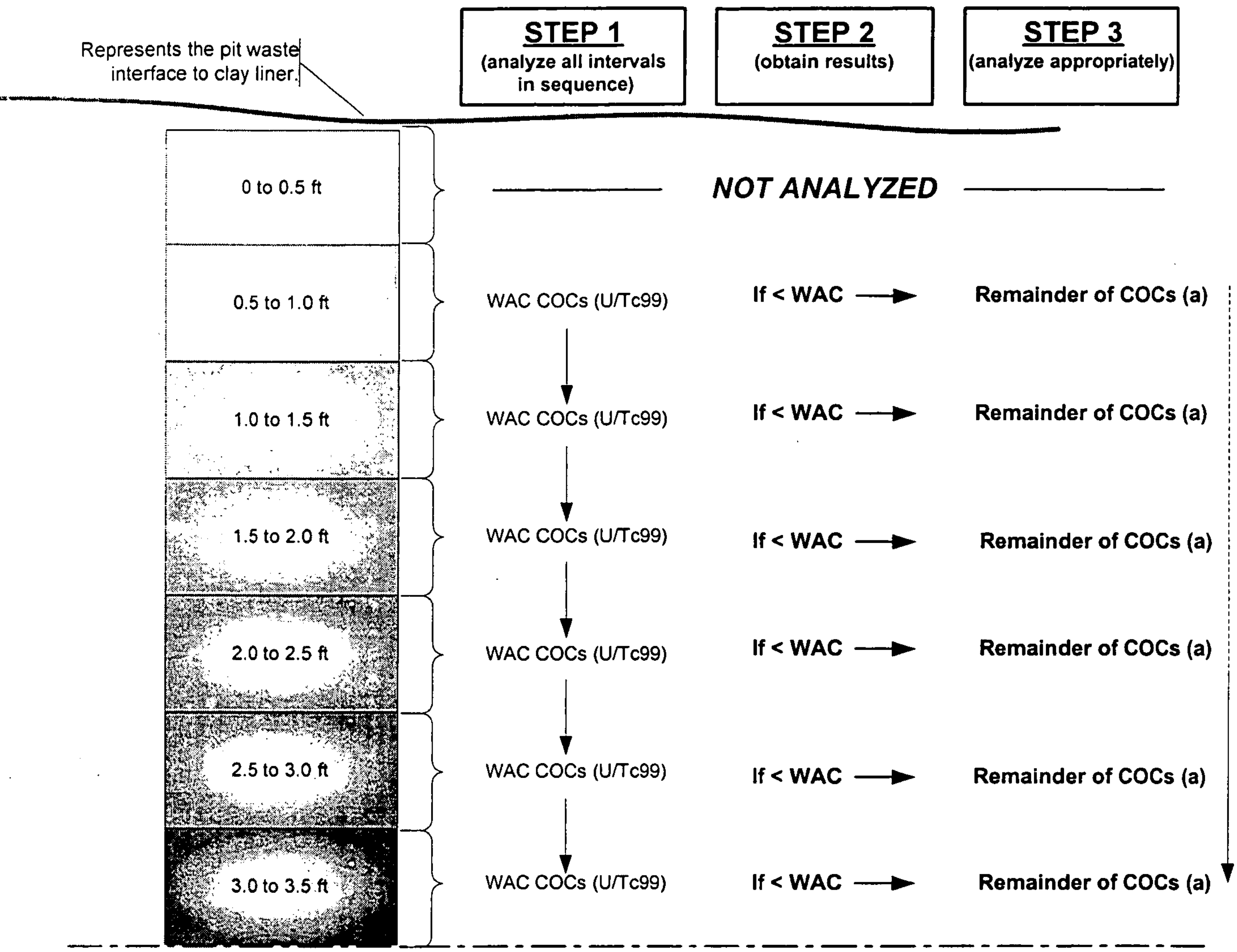


Note 1: Where there is a clear/major interface between material types (e.g., clay versus sand), the six-inch sample interval will be adjusted such that one six-inch interval will be collected immediately above the material interface and one six-inch interval will be collected immediately below the surface. The six-inch interval spacing will proceed in both directions (up and down the core) starting from the interface.

Note 2: For those * locations on Figure 2-1, the top interval (0 to 0.5 feet) has already been removed.

Note 3: If the sand and gravel of the Great Miami Aquifer is encountered prior to the 3.5 foot depth in the borehole, then adjacent borehole depths will be altered to a depth six inches below the depth from which the sand and gravel was encountered (e.g., encounter sand and gravel at 2.0 feet, then adjacent borehole depths would be 2.5 feet). If in adjacent boreholes, sand and gravel is not encountered, then sample interval depths will proceed.

FIGURE 2-3. ANALYSIS SEQUENCE FOR WASTE PIT 3 SUBSURFACE INVESTIGATION



(a) VOCs (TAL F) will be analyzed at the uppermost interval that demonstrates below WAC concentrations of both total uranium and technetium-99.

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 (see Appendix A), the field quality control, analytical, and data validation requirements are as follows:

- All laboratory analyses will be performed at ASL B (ASLs are defined in the SCQ).
- A sample selected for lab matrix spike and matrix spike duplicate analysis (requires additional sample mass per Table 2-2) will be designated by the Sampling Lead on the Chain of Custody form for each shipment of samples sent for off-site analysis.
- A trip blank water sample for VOCs (TAL F) analysis will be collected by each sample team for each day of sampling.
- All field data will be validated. Ten per cent of the analytical data will be validated to validation support level B and require a certificate of analysis and associated laboratory quality assurance/quality control results.

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, manuals, and documents include:

- SMPL-01, Solids Sampling
- SMPL-02, Liquids and Sludge Sampling
- SMPL-21, Collection of Field Quality Control Samples
- EQT-04, Photoionization Detector
- EQT-06, Geoprobe® Model 5400 and Model 6600 Operation and Maintenance Manual
- EW-0002, Chain of Custody/Request for Analysis Record for Sample Control
- 5507, Drying and Grinding Solid Samples in Preparation for Laboratory Analysis
- 9503, Processing Samples through the Sample Processing Laboratory
- 9505, Using the FACTS Database to Process Samples
- 7532, Analytical Laboratory Services Internal Chain of Custody
- 9501, Shipping Samples to Off-Site Laboratories
- RM-0020, Radiological Control Requirements Manual
- 10500-H1, Shaw Environmental and Infrastructure, Incorporated (Shaw) Health and Safety Program
- 10500-017, Shaw WPRAP Excavation Plan
- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- Sitewide Excavation Plan (SEP)

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. The Quality Assurance (QA) organization may conduct independent assessments of the work processes and operations to assure the quality of performance. Assessments will encompass technical and procedural requirements of this PSP and the SCQ.

3.4 IMPLEMENTATION OF FIELD CHANGES

If field conditions require changes or variances, the project manager 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, and QA but may also include Field Sampling, or Sample Management Office, 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 (electronic mail is acceptable) must be received from the Characterization Manager and from QA 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.

4.0 HEALTH AND SAFETY

The Fluor Fernald (FF) and Shaw Excavation Managers, Shaw Health and Safety Lead, Field Sampling Leads, and team members will assess the safety of performing sampling activities in the Waste Storage Area. This will include vehicle/equipment positioning limitations and fall hazards.

Sample 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), Shaw Health and Safety Plan, FF 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.

Sampling technicians will also comply with any specific requirements for activity conducted within the waste pits area, including the Excavation Plan, the non-typical waste procedure, access restrictions, respiratory requirements, and health and safety briefings that may be required by Shaw procedures. Any access to the waste pits area must be authorized by a competent (i.e., certified in excavation activity) excavation manager. Members of the sampling team are also required to be on the beryllium monitoring list. Because waste pit excavation activities using heavy equipment may be ongoing during this sampling activity, the sampling team and support personnel must pay special attention to such activities and maintain a safe distance from the heavy equipment work zones, as well as, ensuring that the heavy equipment operators are aware of their presence.

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 daily safety briefing will be conducted prior to the initiation of field activities. All emergencies will be reported immediately to the Shaw control room at 648-4496, the site communication center at 648-6511 by cell phone, 911 on-site phone, or by contacting "control" on the radio.

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 at a later date 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 field sampling event. At least weekly, a copy of all field logs will be sent to the Data Management 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, the Lithological 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. Borehole Abandonment Logs are required. 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 2.4. This unique sample identifier will appear on the Sample Collection Log and Chain of Custody/Request for Analysis 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 Sample and Data Management Group. Analytical data that is designated for data validation will be forwarded to the Data Validation Group. The PSP requirements for analytical data validation are outlined in Section 3.1.

APPENDIX A

DATA QUALITY OBJECTIVES SL-048, REVISION 5

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 Predesign 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 ☐ RvA ☐ 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) ____

---

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] *
   Temperature [X] *
   Specific Conductance [X] *
   Dissolved Oxygen [X] *
   Technetium-99 [X] *

2. Uranium [X] *
   Full Radiological [X] *
   Metals [X] *
   Cyanide [ ]
   Silica [ ]

3. BTX [ ]
   TPH [ ]
   Oil/Grease [ ]

4. Cations [ ]
   Anions [ ]
   TOC [ ]
   TCLP [X] *
   CEC [ ]

5. VOA [X] *
   BNA [X] *
   Pesticides [X] *
   PCB [X] *
   COD [ ]

6. Other (specify)

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

6.B. Equipment Selection and SCQ Reference;

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

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

Biased [X] Composite [ ] Environmental [X] Grab [X] Grid [X]

Intrusive [X] Non-Intrusive [ ] Phased [ ] Source [ ]

DQO Number: SL-048, Rev. 5

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

Background samples: OU5 RI

7.C. Sample Collection Reference:

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

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

8.A. Field Quality Control Samples:

Trip Blanks	[X]*	Container Blanks	[X]++
Field Blanks	[X]+	Duplicate Samples	[X]***
Equipment Rinsate Samples	[X]***	Split Samples	[X]**
Preservative Blanks	[ ]	Performance Evaluation Samples	[ ]
Other (specify)			

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

8.B. Laboratory Quality Control Samples:

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

Other (specify) Per SCQ

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

APPENDIX B

WASTE PIT 3 DIOXIN AND FURAN INFORMATION

APPENDIX B

Table B-1 provides the results for the evaluation of the health-based risk of dioxins and furans at Waste Pit 3. Specifically, Table B-1 provides the analytical results of each dioxin and furan congener at each location and depth within a location. The table also provides:

- The Toxicity Equivalence Factor (TEF) for each constituent (dioxin and furan congener)
- The result used for the calculation (i.e., for non-detected results, the result used for the calculation is set at half the detection limit).
- The corrected concentration found by multiplying each dioxin and furan congener result by its applicable TEF
- The sum of the corrected concentrations at each of the six locations/depths.

All six TEF calculations are below the limit of 1 µg/kg as demonstrated by the last column of Table B-1. The highest corrected calculation, at location 1770 and a depth of 24 to 39 inches, is less than 0.34 µg/kg.

TABLE B-1
DIOXIN AND FURAN TOXICITY EQUIVALENCE FACTORS CALCULATIONS FROM SOIL DATA

Location	SAMPLE_ID	Constituent	Validated Result (µg/kg)	Validation Qualifier	Top Depth (inches)	Bottom Depth (inches)	TEF	Result for Calculation (µg/kg)	Corrected Concentration (µg/kg)	Sum of Corrected Concentrations (µg/kg)
1770	063390	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.19	U	12	24	0.1	0.095	0.0095	
1770	063390	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.15	U	12	24	0.1	0.075	0.0075	
1770	063390	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.16	U	12	24	0.1	0.08	0.008	
1770	063390	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.15	U	12	24	0.5	0.075	0.0375	
1770	063390	Hexachlorodibenzo-p-dioxin	0.16	U	12	24	0.1	0.08	0.008	
1770	063390	Octachlorodibenzo-p-dioxin	5.3	J	12	24	0.001	5.3	0.0053	
1770	063390	Pentachlorodibenzo-p-dioxin	0.15	U	12	24	0.5	0.075	0.0375	
1770	063390	Tetrachlorodibenzo-p-dioxin	0.037	U	12	24	1	0.0185	0.0185	
1770	063390	Heptachlorodibenzo-p-dioxins	0.75	-	12	24	0.01	0.75	0.0075	
1770	063390	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.23	UJ	12	24	0.01	0.115	0.00115	
1770	063390	1,2,3,4,7,8-Hexachlorodibenzofuran	0.22	UJ	12	24	0.1	0.11	0.011	0.23885
1770	063390	1,2,3,6,7,8-Hexachlorodibenzofuran	0.2	UJ	12	24	0.1	0.1	0.01	
1770	063390	1,2,3,7,8,9-Hexachlorodibenzofuran	0.26	UJ	12	24	0.1	0.13	0.013	
1770	063390	1,2,3,7,8-Pentachlorodibenzofuran	0.06	U	12	24	0.05	0.03	0.0015	
1770	063390	2,3,4,6,7,8-Hexachlorodibenzofuran	0.23	UJ	12	24	0.1	0.115	0.0115	
1770	063390	2,3,4,7,8-Pentachlorodibenzofuran	0.065	U	12	24	0.5	0.0325	0.01625	
1770	063390	Heptachlorodibenzofuran	0.22	J	12	24	0.01	0.22	0.0022	
1770	063390	Hexachlorodibenzofuran	0.27	U	12	24	0.1	0.135	0.0135	
1770	063390	Octachlorodibenzofuran	0.2	J	12	24	0.001	0.2	0.0002	
1770	063390	Pentachlorodibenzofuran	0.065	U	12	24	0.5	0.0325	0.01625	
1770	063390	Tetrachlorodibenzofuran	0.06	U	12	24	0.1	0.03	0.003	
1770	063392	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.32	UJ	24	39	0.1	0.16	0.016	
1770	063392	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.26	UJ	24	39	0.1	0.13	0.013	
1770	063392	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.27	UJ	24	39	0.1	0.135	0.0135	
1770	063392	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.15	U	24	39	0.5	0.075	0.0375	
1770	063392	Hexachlorodibenzo-p-dioxin	0.28	UJ	24	39	0.1	0.14	0.014	
1770	063392	Octachlorodibenzo-p-dioxin	19.4	J	24	39	0.001	19.4	0.0194	
1770	063392	Pentachlorodibenzo-p-dioxin	0.15	U	24	39	0.5	0.075	0.0375	
1770	063392	Tetrachlorodibenzo-p-dioxin	0.042	U	24	39	1	0.021	0.021	
1770	063392	Heptachlorodibenzo-p-dioxins	3.2	J	24	39	0.01	3.2	0.032	
1770	063392	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.22	UJ	24	39	0.01	0.11	0.0011	
1770	063392	1,2,3,4,7,8-Hexachlorodibenzofuran	0.13	UJ	24	39	0.1	0.065	0.0065	0.334475
1770	063392	1,2,3,6,7,8-Hexachlorodibenzofuran	0.11	UJ	24	39	0.1	0.055	0.0055	
1770	063392	1,2,3,7,8,9-Hexachlorodibenzofuran	0.15	UJ	24	39	0.1	0.075	0.0075	
1770	063392	1,2,3,7,8-Pentachlorodibenzofuran	0.095	U	24	39	0.05	0.0475	0.002375	
1770	063392	2,3,4,6,7,8-Hexachlorodibenzofuran	0.13	UJ	24	39	0.1	0.065	0.0065	
1770	063392	2,3,4,7,8-Pentachlorodibenzofuran	0.11	U	24	39	0.5	0.055	0.0275	
1770	063392	Heptachlorodibenzofuran	0.95	J	24	39	0.01	0.95	0.0095	
1770	063392	Hexachlorodibenzofuran	0.35	J	24	39	0.1	0.35	0.035	
1770	063392	Octachlorodibenzofuran	1.1	J	24	39	0.001	1.1	0.0011	
1770	063392	Pentachlorodibenzofuran	0.1	U	24	39	0.5	0.05	0.025	
1770	063392	Tetrachlorodibenzofuran	0.06	U	24	39	0.1	0.03	0.003	

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TABLE B-1
DIOXIN AND FURAN TOXICITY EQUIVALENCE FACTORS CALCULATIONS FROM SOIL DATA

Location	SAMPLE_ID	Constituent	Validated Result (µg/kg)	Validation Qualifier	Top Depth (inches)	Bottom Depth (inches)	TEF	Result for Calculation (µg/kg)	Corrected Concentration (µg/kg)	Sum of Corrected Concentrations (µg/kg)
1771	063474	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.085	U	14	28	0.1	0.0425	0.00425	
1771	063474	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.048	J	14	28	0.1	0.048	0.0048	
1771	063474	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.07	U	14	28	0.1	0.035	0.0035	
1771	063474	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.14	UJ	14	28	0.5	0.07	0.035	
1771	063474	Hexachlorodibenzo-p-dioxin	0.26	J	14	28	0.1	0.26	0.026	
1771	063474	Octachlorodibenzo-p-dioxin	8	-	14	28	0.001	8	0.008	
1771	063474	Pentachlorodibenzo-p-dioxin	0.14	UJ	14	28	0.5	0.07	0.035	
1771	063474	Tetrachlorodibenzo-p-dioxin	0.038	U	14	28	1	0.019	0.019	
1771	063474	Heptachlorodibenzo-p-dioxins	1.4	-	14	28	0.01	1.4	0.014	
1771	063474	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.028	U	14	28	0.01	0.014	0.00014	
1771	063474	1,2,3,4,7,8-Hexachlorodibenzofuran	0.13	U	14	28	0.1	0.065	0.0065	0.264115
1771	063474	1,2,3,6,7,8-Hexachlorodibenzofuran	0.12	U	14	28	0.1	0.06	0.006	
1771	063474	1,2,3,7,8,9-Hexachlorodibenzofuran	0.15	U	14	28	0.1	0.075	0.0075	
1771	063474	1,2,3,7,8-Pentachlorodibenzofuran	0.085	UJ	14	28	0.05	0.0425	0.002125	
1771	063474	2,3,4,6,7,8-Hexachlorodibenzofuran	0.14	U	14	28	0.1	0.07	0.007	
1771	063474	2,3,4,7,8-Pentachlorodibenzofuran	0.095	UJ	14	28	0.5	0.0475	0.02375	
1771	063474	Heptachlorodibenzofuran	0.55	-	14	28	0.01	0.55	0.0055	
1771	063474	Hexachlorodibenzofuran	0.13	J	14	28	0.1	0.13	0.013	
1771	063474	Octachlorodibenzofuran	0.55	-	14	28	0.001	0.55	0.00055	
1771	063474	Pentachlorodibenzofuran	0.09	UJ	14	28	0.5	0.045	0.0225	
1771	063474	Tetrachlorodibenzofuran	0.2	J	14	28	0.1	0.2	0.02	
1771	063476	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.11	U	28	41	0.1	0.055	0.0055	
1771	063476	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.85	U	28	41	0.1	0.425	0.0425	
1771	063476	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.09	U	28	41	0.1	0.045	0.0045	
1771	063476	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.11	UJ	28	41	0.5	0.055	0.0275	
1771	063476	Hexachlorodibenzo-p-dioxin	0.085	U	28	41	0.1	0.0425	0.00425	
1771	063476	Octachlorodibenzo-p-dioxin	6.3	-	28	41	0.001	6.3	0.0063	
1771	063476	Pentachlorodibenzo-p-dioxin	0.11	UJ	28	41	0.5	0.055	0.0275	
1771	063476	Tetrachlorodibenzo-p-dioxin	0.043	U	28	41	1	0.0215	0.0215	
1771	063476	Heptachlorodibenzo-p-dioxins	1.3	-	28	41	0.01	1.3	0.013	
1771	063476	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.15	U	28	41	0.01	0.075	0.00075	
1771	063476	1,2,3,4,7,8-Hexachlorodibenzofuran	0.08	U	28	41	0.1	0.04	0.004	0.236905
1771	063476	1,2,3,6,7,8-Hexachlorodibenzofuran	0.075	U	28	41	0.1	0.0375	0.00375	
1771	063476	1,2,3,7,8,9-Hexachlorodibenzofuran	0.095	U	28	41	0.1	0.0475	0.00475	
1771	063476	1,2,3,7,8-Pentachlorodibenzofuran	0.055	UJ	28	41	0.05	0.0275	0.001375	
1771	063476	2,3,4,6,7,8-Hexachlorodibenzofuran	0.085	U	28	41	0.1	0.0425	0.00425	
1771	063476	2,3,4,7,8-Pentachlorodibenzofuran	0.06	UJ	28	41	0.5	0.03	0.015	
1771	063476	Heptachlorodibenzofuran	0.55	J	28	41	0.01	0.55	0.0055	
1771	063476	Hexachlorodibenzofuran	0.28	-	28	41	0.1	0.28	0.028	
1771	063476	Octachlorodibenzofuran	0.48	J	28	41	0.001	0.48	0.00048	
1771	063476	Pentachlorodibenzofuran	0.055	UJ	28	41	0.5	0.0275	0.01375	
1771	063476	Tetrachlorodibenzofuran	0.055	UJ	28	41	0.1	0.0275	0.00275	

TABLE B-1
DIOXIN AND FURAN TOXICITY EQUIVALENCE FACTORS CALCULATIONS FROM SOIL DATA

Location	SAMPLE_ID	Constituent	Validated Result (µg/kg)	Validation Qualifier	Top Depth (inches)	Bottom Depth (inches)	TEF	Result for Calculation (µg/kg)	Corrected Concentration (µg/kg)	Sum of Corrected Concentrations (µg/kg)
1772	063308	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.051	U	9	18	0.1	0.0255	0.00255	
1772	063308	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.04	U	9	18	0.1	0.02	0.002	
1772	063308	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.042	U	9	18	0.1	0.021	0.0021	
1772	063308	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.014	UJ	9	18	0.5	0.007	0.0035	
1772	063308	Hexachlorodibenzo-p-dioxin	0.044	U	9	18	0.1	0.022	0.0022	
1772	063308	Octachlorodibenzo-p-dioxin	4.8	J	9	18	0.001	4.8	0.0048	
1772	063308	Pentachlorodibenzo-p-dioxin	0.014	UJ	9	18	0.5	0.007	0.0035	
1772	063308	Tetrachlorodibenzo-p-dioxin	0.029	U	9	18	1	0.0145	0.0145	
1772	063308	Heptachlorodibenzo-p-dioxins	0.11	U	9	18	0.01	0.055	0.00055	
1772	063308	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.035	U	9	18	0.01	0.0175	0.000175	
1772	063308	1,2,3,4,7,8-Hexachlorodibenzofuran	0.014	U	9	18	0.1	0.007	0.0007	0.0507455
1772	063308	1,2,3,6,7,8-Hexachlorodibenzofuran	0.013	U	9	18	0.1	0.0065	0.00065	
1772	063308	1,2,3,7,8,9-Hexachlorodibenzofuran	0.016	U	9	18	0.1	0.008	0.0008	
1772	063308	1,2,3,7,8-Pentachlorodibenzofuran	0.018	UJ	9	18	0.05	0.009	0.00045	
1772	063308	2,3,4,6,7,8-Hexachlorodibenzofuran	0.016	U	9	18	0.1	0.008	0.0008	
1772	063308	2,3,4,7,8-Pentachlorodibenzofuran	0.018	UJ	9	18	0.5	0.009	0.0045	
1772	063308	Heptachlorodibenzofuran	0.03	UJ	9	18	0.01	0.015	0.00015	
1772	063308	Hexachlorodibenzofuran	0.015	UJ	9	18	0.1	0.0075	0.00075	
1772	063308	Octachlorodibenzofuran	0.041	UJ	9	18	0.001	0.0205	0.0000205	
1772	063308	Pentachlorodibenzofuran	0.018	UJ	9	18	0.5	0.009	0.0045	
1772	063308	Tetrachlorodibenzofuran	0.031	U	9	18	0.1	0.0155	0.00155	
1772	063310	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	0.26	U	18	36.5	0.1	0.13	0.013	
1772	063310	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	0.21	U	18	36.5	0.1	0.105	0.0105	
1772	063310	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	0.22	U	18	36.5	0.1	0.11	0.011	
1772	063310	1,2,3,7,8-Pentachlorodibenzo-p-dioxin	0.32	UJ	18	36.5	0.5	0.16	0.08	
1772	063310	Hexachlorodibenzo-p-dioxin	0.23	U	18	36.5	0.1	0.115	0.0115	
1772	063310	Octachlorodibenzo-p-dioxin	3.7	J	18	36.5	0.001	3.7	0.0037	
1772	063310	Pentachlorodibenzo-p-dioxin	0.32	UJ	18	36.5	0.5	0.16	0.08	
1772	063310	Tetrachlorodibenzo-p-dioxin	0.024	UJ	18	36.5	1	0.012	0.012	
1772	063310	Heptachlorodibenzo-p-dioxins	0.44	-	18	36.5	0.01	0.44	0.0044	
1772	063310	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.12	U	18	36.5	0.01	0.06	0.0006	
1772	063310	1,2,3,4,7,8-Hexachlorodibenzofuran	0.01	U	18	36.5	0.1	0.005	0.0005	0.254875
1772	063310	1,2,3,6,7,8-Hexachlorodibenzofuran	0.01	U	18	36.5	0.1	0.005	0.0005	
1772	063310	1,2,3,7,8,9-Hexachlorodibenzofuran	0.012	U	18	36.5	0.1	0.006	0.0006	
1772	063310	1,2,3,7,8-Pentachlorodibenzofuran	0.031	UJ	18	36.5	0.05	0.0155	0.000775	
1772	063310	2,3,4,6,7,8-Hexachlorodibenzofuran	0.012	U	18	36.5	0.1	0.006	0.0006	
1772	063310	2,3,4,7,8-Pentachlorodibenzofuran	0.03	UJ	18	36.5	0.5	0.015	0.0075	
1772	063310	Heptachlorodibenzofuran	0.11	-	18	36.5	0.01	0.11	0.0011	
1772	063310	Hexachlorodibenzofuran	0.031	J	18	36.5	0.1	0.031	0.0031	
1772	063310	Octachlorodibenzofuran	0.25	J	18	36.5	0.001	0.25	0.00025	
1772	063310	Pentachlorodibenzofuran	0.031	UJ	18	36.5	0.5	0.0155	0.00775	
1772	063310	Tetrachlorodibenzofuran	0.11	UJ	18	36.5	0.1	0.055	0.0055	

APPENDIX C

TARGET ANALYTE LISTS

TAL A		
Soil Radiological Analysis, On-site, ASL B	**On-Property FRL (WAC[a])**	**MDL**
Total Uranium	82 mg/kg	8.2 mg/kg
Technetium-99	29.1 pCi/g	29 pCi/g
TAL B		
Soil Radiological Gamma Spectroscopy Analysis, Off-site, ASL B	**On-Property FRL**	**MDL**
Radium-226	1.7 pCi/g	0.17 pCi/g
Radium-228	1.8 pCi/g	0.18 pCi/g
Thorium-228	1.7 pCi/g	0.17 pCi/g
Thorium-230	280 pCi/g	28 pCi/g
Thorium-232	1.5 pCi/g	0.15 pCi/g
Cesium-137	1.4 pCi/g	0.14 pCi/g
TAL C		
Soil Total Inorganics Analysis, Off-site, ASL B	**On-Property FRL**	**MDL**
Arsenic	12 mg/kg	1.2 mg/kg
Beryllium	1.5 mg/kg	0.15 mg/kg
TAL D		
Soil Pesticide/PCB Analysis, Off-site, ASL B	**On-Property FRL**	**MDL**
Aroclor-1254	130 µg/kg	13 µg/kg
Aroclor-1260	130 µg/kg	13 µg/kg
Dieldrin	15 µg/kg	1.5 µg/kg
TAL E		
Soil PAHs, Off site, ASL B	**BTV[b]**	**MDL**
Benzo(g,h,i)perylene	1,000 µg/kg	100 µg/kg
Fluoranthene	10,000 µg/kg	1,000 µg/kg
Phenanthrene	5,000 µg/kg	500 µg/kg
Pyrene	10,000 µg/kg	1,000 µg/kg
TAL F		
Soil Volatile Organic Constituents, Off-site, ASL B	**On-Property FRL**	**MDL[c]**
1,1,1-Trichloroethane	4.3 mg/kg[d]	0.43 mg/kg
1,1,2-Trichloroethane	4.3 mg/kg	0.43 mg/kg
1,1-Dichloroethene	0.41 mg/kg	0.041 mg/kg
cis-1,2-Dichloroethene	0.16 mg/kg	0.01 mg/kg
trans-1,2-Dichloroethene	0.16 mg/kg	0.01 mg/kg
Trichloroethene	25 mg/kg	2.5 mg/kg
Tetrachloroethene	3.6 mg/kg	0.36 mg/kg
Vinyl Chloride	0.13 mg/kg	0.013 mg/kg

[a]If the WAC is lower than the established FRL, the MDL will be set at 10 percent of the OSDF WAC.
[b]There is no FRL; therefore, the MDL will be set at 10 percent of the OSDF WAC.
[c]For the trip blank, the MDL is 0.010 mg/L for all constituents.
[d]There is no FRL for 1,1,1-Trichloroethane. It will be evaluated using the FRL for 1,1,2-Trichloroethane.
WAC – waste acceptance criteria
MDL – minimum detection level
BTV – benchmark toxicity value
mg/kg – milligrams per kilogram
pCi/g – picoCuries per gram
µg/kg – micrograms per kilogram

APPENDIX D

SAMPLE LOCATIONS AND IDENTIFIERS

TABLE D-1

WASTE PIT 3 SAMPLE LOCATION AND IDENTIFIERS

LOCATION	DEPTH	SAMPLE ID	ANALYSIS	EAST-83	NORTH-83
A6WP3-1	0' - 0.5'	No sample; will be shipped to E-care		1346862.5	481912.5
	0.5' - 1.0'	A6WP3-1^2-RA	TAL A	1346862.5	481912.5
	0.5' - 1.0'	A6WP3-1^2-RB	TAL B	1346862.5	481912.5
	0.5' - 1.0'	A6WP3-1^2-MPS	TAL C,D,E	1346862.5	481912.5
	0.5' - 1.0'	A6WP3-1^2-L	TAL F	1346862.5	481912.5
	1.0' - 1.5'	A6WP3-1^3-RA	TAL A	1346862.5	481912.5
	1.0' - 1.5'	A6WP3-1^3-RB	TAL B	1346862.5	481912.5
	1.0' - 1.5'	A6WP3-1^3-MPS	TAL C,D,E	1346862.5	481912.5
	1.0' - 1.5'	A6WP3-1^3-L	TAL F	1346862.5	481912.5
	1.5' - 2.0'	A6WP3-1^4-RA	TAL A	1346862.5	481912.5
	1.5' - 2.0'	A6WP3-1^4-RB	TAL B	1346862.5	481912.5
	1.5' - 2.0'	A6WP3-1^4-MPS	TAL C,D,E	1346862.5	481912.5
	1.5' - 2.0'	A6WP3-1^4-L	TAL F	1346862.5	481912.5
	2.0' - 2.5'	A6WP3-1^5-RA	TAL A	1346862.5	481912.5
	2.0' - 2.5'	A6WP3-1^5-RB	TAL B	1346862.5	481912.5
	2.0' - 2.5'	A6WP3-1^5-MPS	TAL C,D,E	1346862.5	481912.5
	2.0' - 2.5'	A6WP3-1^5-L	TAL F	1346862.5	481912.5
	2.5' - 3.0	A6WP3-1^6-RA	TAL A	1346862.5	481912.5
	2.5' - 3.0	A6WP3-1^6-RB	TAL B	1346862.5	481912.5
	2.5' - 3.0	A6WP3-1^6-MPS	TAL C,D,E	1346862.5	481912.5
	2.5' - 3.0	A6WP3-1^6-L	TAL F	1346862.5	481912.5
	3.0' - 3.5'	A6WP3-1^7-RA	TAL A	1346862.5	481912.5
	3.0' - 3.5'	A6WP3-1^7-RB	TAL B	1346862.5	481912.5
	3.0' - 3.5'	A6WP3-1^7-MPS	TAL C,D,E	1346862.5	481912.5
	3.0' - 3.5'	A6WP3-1^7-L	TAL F	1346862.5	481912.5
LOCATION	**DEPTH**	**SAMPLE ID**	**ANALYSIS**	**EAST-83**	**NORTH-83**
A6WP3-2	0' - 0.5'	Removed previously; shipped to E-care		1346937.5	481912.5
	0.5' - 1.0'	A6WP3-2^2-RA	TAL A	1346937.5	481912.5
	0.5' - 1.0'	A6WP3-2^2-RB	TAL B	1346937.5	481912.5
	0.5' - 1.0'	A6WP3-2^2-MPS	TAL C,D,E	1346937.5	481912.5
	0.5' - 1.0'	A6WP3-2^2-L	TAL F	1346937.5	481912.5
	1.0' - 1.5'	A6WP3-2^3-RA	TAL A	1346937.5	481912.5
	1.0' - 1.5'	A6WP3-2^3-RB	TAL B	1346937.5	481912.5
	1.0' - 1.5'	A6WP3-2^3-MPS	TAL C,D,E	1346937.5	481912.5
	1.0' - 1.5'	A6WP3-2^3-L	TAL F	1346937.5	481912.5
	1.5' - 2.0'	A6WP3-2^4-RA	TAL A	1346937.5	481912.5
	1.5' - 2.0'	A6WP3-2^4-RB	TAL B	1346937.5	481912.5
	1.5' - 2.0'	A6WP3-2^4-MPS	TAL C,D,E	1346937.5	481912.5
	1.5' - 2.0'	A6WP3-2^4-L	TAL F	1346937.5	481912.5
	2.0' - 2.5'	A6WP3-2^5-RA	TAL A	1346937.5	481912.5
	2.0' - 2.5'	A6WP3-2^5-RB	TAL B	1346937.5	481912.5
	2.0' - 2.5'	A6WP3-2^5-MPS	TAL C,D,E	1346937.5	481912.5
	2.0' - 2.5'	A6WP3-2^5-L	TAL F	1346937.5	481912.5
	2.5' - 3.0	A6WP3-2^6-RA	TAL A	1346937.5	481912.5
	2.5' - 3.0	A6WP3-2^6-RB	TAL B	1346937.5	481912.5
	2.5' - 3.0	A6WP3-2^6-MPS	TAL C,D,E	1346937.5	481912.5
	2.5' - 3.0	A6WP3-2^6-L	TAL F	1346937.5	481912.5
	3.0' - 3.5'	A6WP3-2^7-RA	TAL A	1346937.5	481912.5
	3.0' - 3.5'	A6WP3-2^7-RB	TAL B	1346937.5	481912.5
	3.0' - 3.5'	A6WP3-2^7-MPS	TAL C,D,E	1346937.5	481912.5
	3.0' - 3.5'	A6WP3-2^7-L	TAL F	1346937.5	481912.5

TABLE D-1
(Continued)

LOCATION	DEPTH	SAMPLE ID	ANALYSIS	EAST-83	NORTH-83
A6WP3-3	0' - 0.5'	No sample; to be shipped to E-care		1346862.5	481837.5
	0.5' - 1.0'	A6WP3-3^2-RA	TAL A	1346862.5	481837.5
	0.5' - 1.0'	A6WP3-3^2-RB	TAL B	1346862.5	481837.5
	0.5' - 1.0'	A6WP3-3^2-MPS	TAL C,D,E	1346862.5	481837.5
	0.5' - 1.0'	A6WP3-3^2-L	TAL F	1346862.5	481837.5
	1.0' - 1.5'	A6WP3-3^3-RA	TAL A	1346862.5	481837.5
	1.0' - 1.5'	A6WP3-3^3-RB	TAL B	1346862.5	481837.5
	1.0' - 1.5'	A6WP3-3^3-MPS	TAL C,D,E	1346862.5	481837.5
	1.0' - 1.5'	A6WP3-3^3-L	TAL F	1346862.5	481837.5
	1.5' - 2.0'	A6WP3-3^4-RA	TAL A	1346862.5	481837.5
	1.5' - 2.0'	A6WP3-3^4-RB	TAL B	1346862.5	481837.5
	1.5' - 2.0'	A6WP3-3^4-MPS	TAL C,D,E	1346862.5	481837.5
	1.5' - 2.0'	A6WP3-3^4-L	TAL F	1346862.5	481837.5
	2.0' - 2.5'	A6WP3-3^5-RA	TAL A	1346862.5	481837.5
	2.0' - 2.5'	A6WP3-3^5-RB	TAL B	1346862.5	481837.5
	2.0' - 2.5'	A6WP3-3^5-MPS	TAL C,D,E	1346862.5	481837.5
	2.0' - 2.5'	A6WP3-3^5-L	TAL F	1346862.5	481837.5
	2.5' - 3.0	A6WP3-3^6-RA	TAL A	1346862.5	481837.5
	2.5' - 3.0	A6WP3-3^6-RB	TAL B	1346862.5	481837.5
	2.5' - 3.0	A6WP3-3^6-MPS	TAL C,D,E	1346862.5	481837.5
	2.5' - 3.0	A6WP3-3^6-L	TAL F	1346862.5	481837.5
	3.0' - 3.5'	A6WP3-3^7-RA	TAL A	1346862.5	481837.5
	3.0' - 3.5'	A6WP3-3^7-RB	TAL B	1346862.5	481837.5
	3.0' - 3.5'	A6WP3-3^7-MPS	TAL C,D,E	1346862.5	481837.5
	3.0' - 3.5'	A6WP3-3^7-L	TAL F	1346862.5	481837.5
LOCATION	**DEPTH**	**SAMPLE ID**	**ANALYSIS**	**EAST-83**	**NORTH-83**
A6WP3-4	0-0.5	Removed previously; shipped to E-care		1346937.5	481837.5
	0.5' - 1.0'	A6WP3-4^2-RA	TAL A	1346937.5	481837.5
	0.5' - 1.0'	A6WP3-4^2-RB	TAL B	1346937.5	481837.5
	0.5' - 1.0'	A6WP3-4^2-MPS	TAL C,D,E	1346937.5	481837.5
	0.5' - 1.0'	A6WP3-4^2-L	TAL F	1346937.5	481837.5
	1.0' - 1.5'	A6WP3-4^3-RA	TAL A	1346937.5	481837.5
	1.0' - 1.5'	A6WP3-4^3-RB	TAL B	1346937.5	481837.5
	1.0' - 1.5'	A6WP3-4^3-MPS	TAL C,D,E	1346937.5	481837.5
	1.0' - 1.5'	A6WP3-4^3-L	TAL F	1346937.5	481837.5
	1.5' - 2.0'	A6WP3-4^4-RA	TAL A	1346937.5	481837.5
	1.5' - 2.0'	A6WP3-4^4-RB	TAL B	1346937.5	481837.5
	1.5' - 2.0'	A6WP3-4^4-MPS	TAL C,D,E	1346937.5	481837.5
	1.5' - 2.0'	A6WP3-4^4-L	TAL F	1346937.5	481837.5
	2.0' - 2.5'	A6WP3-4^5-RA	TAL A	1346937.5	481837.5
	2.0' - 2.5'	A6WP3-4^5-RB	TAL B	1346937.5	481837.5
	2.0' - 2.5'	A6WP3-4^5-MPS	TAL C,D,E	1346937.5	481837.5
	2.0' - 2.5'	A6WP3-4^5-L	TAL F	1346937.5	481837.5
	2.5' - 3.0	A6WP3-4^6-RA	TAL A	1346937.5	481837.5
	2.5' - 3.0	A6WP3-4^6-RB	TAL B	1346937.5	481837.5
	2.5' - 3.0	A6WP3-4^6-MPS	TAL C,D,E	1346937.5	481837.5
	2.5' - 3.0	A6WP3-4^6-L	TAL F	1346937.5	481837.5
	3.0' - 3.5'	A6WP3-4^7-RA	TAL A	1346937.5	481837.5
	3.0' - 3.5'	A6WP3-4^7-RB	TAL B	1346937.5	481837.5
	3.0' - 3.5'	A6WP3-4^7-MPS	TAL C,D,E	1346937.5	481837.5
	3.0' - 3.5'	A6WP3-4^7-L	TAL F	1346937.5	481837.5

TABLE D-1
(Continued)

LOCATION	DEPTH	SAMPLE ID	ANALYSIS	EAST-83	NORTH-83
A6WP3-5	0' - 0.5'	No sample; to be shipped to E-care		1346712.5	481762.5
	0.5' - 1.0'	A6WP3-5^2-RA	TAL A	1346712.5	481762.5
	0.5' - 1.0'	A6WP3-5^2-RB	TAL B	1346712.5	481762.5
	0.5' - 1.0'	A6WP3-5^2-MPS	TAL C,D,E	1346712.5	481762.5
	0.5' - 1.0'	A6WP3-5^2-L	TAL F	1346712.5	481762.5
	1.0' - 1.5'	A6WP3-5^3-RA	TAL A	1346712.5	481762.5
	1.0' - 1.5'	A6WP3-5^3-RB	TAL B	1346712.5	481762.5
	1.0' - 1.5'	A6WP3-5^3-MPS	TAL C,D,E	1346712.5	481762.5
	1.0' - 1.5'	A6WP3-5^3-L	TAL F	1346712.5	481762.5
	1.5' - 2.0'	A6WP3-5^4-RA	TAL A	1346712.5	481762.5
	1.5' - 2.0'	A6WP3-5^4-RB	TAL B	1346712.5	481762.5
	1.5' - 2.0'	A6WP3-5^4-MPS	TAL C,D,E	1346712.5	481762.5
	1.5' - 2.0'	A6WP3-5^4-L	TAL F	1346712.5	481762.5
	2.0' - 2.5'	A6WP3-5^5-RA	TAL A	1346712.5	481762.5
	2.0' - 2.5'	A6WP3-5^5-RB	TAL B	1346712.5	481762.5
	2.0' - 2.5'	A6WP3-5^5-MPS	TAL C,D,E	1346712.5	481762.5
	2.0' - 2.5'	A6WP3-5^5-L	TAL F	1346712.5	481762.5
	2.5' - 3.0	A6WP3-5^6-RA	TAL A	1346712.5	481762.5
	2.5' - 3.0	A6WP3-5^6-RB	TAL B	1346712.5	481762.5
	2.5' - 3.0	A6WP3-5^6-MPS	TAL C,D,E	1346712.5	481762.5
	2.5' - 3.0	A6WP3-5^6-L	TAL F	1346712.5	481762.5
	3.0' - 3.5'	A6WP3-5^7-RA	TAL A	1346712.5	481762.5
	3.0' - 3.5'	A6WP3-5^7-RB	TAL B	1346712.5	481762.5
	3.0' - 3.5'	A6WP3-5^7-MPS	TAL C,D,E	1346712.5	481762.5
	3.0' - 3.5'	A6WP3-5^7-L	TAL F	1346712.5	481762.5
LOCATION	DEPTH	SAMPLE ID	ANALYSIS	EAST-83	NORTH-83
A6WP3-6	0' - 0.5'	No sample; to be shipped to E-care		1346787.5	481762.5
	0.5' - 1.0'	A6WP3-6^2-RA	TAL A	1346787.5	481762.5
	0.5' - 1.0'	A6WP3-6^2-RB	TAL B	1346787.5	481762.5
	0.5' - 1.0'	A6WP3-6^2-MPS	TAL C,D,E	1346787.5	481762.5
	0.5' - 1.0'	A6WP3-6^2-L	TAL F	1346787.5	481762.5
	1.0' - 1.5'	A6WP3-6^3-RA	TAL A	1346787.5	481762.5
	1.0' - 1.5'	A6WP3-6^3-RB	TAL B	1346787.5	481762.5
	1.0' - 1.5'	A6WP3-6^3-MPS	TAL C,D,E	1346787.5	481762.5
	1.0' - 1.5'	A6WP3-6^3-L	TAL F	1346787.5	481762.5
	1.5' - 2.0'	A6WP3-6^4-RA	TAL A	1346787.5	481762.5
	1.5' - 2.0'	A6WP3-6^4-RB	TAL B	1346787.5	481762.5
	1.5' - 2.0'	A6WP3-6^4-MPS	TAL C,D,E	1346787.5	481762.5
	1.5' - 2.0'	A6WP3-6^4-L	TAL F	1346787.5	481762.5
	2.0' - 2.5'	A6WP3-6^5-RA	TAL A	1346787.5	481762.5
	2.0' - 2.5'	A6WP3-6^5-RB	TAL B	1346787.5	481762.5
	2.0' - 2.5'	A6WP3-6^5-MPS	TAL C,D,E	1346787.5	481762.5
	2.0' - 2.5'	A6WP3-6^5-L	TAL F	1346787.5	481762.5
	2.5' - 3.0	A6WP3-6^6-RA	TAL A	1346787.5	481762.5
	2.5' - 3.0	A6WP3-6^6-RB	TAL B	1346787.5	481762.5
	2.5' - 3.0	A6WP3-6^6-MPS	TAL C,D,E	1346787.5	481762.5
	2.5' - 3.0	A6WP3-6^6-L	TAL F	1346787.5	481762.5
	3.0' - 3.5'	A6WP3-6^7-RA	TAL A	1346787.5	481762.5
	3.0' - 3.5'	A6WP3-6^7-RB	TAL B	1346787.5	481762.5
	3.0' - 3.5'	A6WP3-6^7-MPS	TAL C,D,E	1346787.5	481762.5
	3.0' - 3.5'	A6WP3-6^7-L	TAL F	1346787.5	481762.5

5201

TABLE D-1
(Continued)

LOCATION	DEPTH	SAMPLE ID	ANALYSIS	EAST-83	NORTH-83
A6WP3-7	0' - 0.5'	Removed previously; shipped to E-care		1346862.5	481762.5
	0.5' - 1.0'	A6WP3-7^2-RA	TAL A	1346862.5	481762.5
	0.5' - 1.0'	A6WP3-7^2-RB	TAL B	1346862.5	481762.5
	0.5' - 1.0'	A6WP3-7^2-MPS	TAL C,D,E	1346862.5	481762.5
	0.5' - 1.0'	A6WP3-7^2-L	TAL F	1346862.5	481762.5
	1.0' - 1.5'	A6WP3-7^3-RA	TAL A	1346862.5	481762.5
	1.0' - 1.5'	A6WP3-7^3-RB	TAL B	1346862.5	481762.5
	1.0' - 1.5'	A6WP3-7^3-MPS	TAL C,D,E	1346862.5	481762.5
	1.0' - 1.5'	A6WP3-7^3-L	TAL F	1346862.5	481762.5
	1.5' - 2.0'	A6WP3-7^4-RA	TAL A	1346862.5	481762.5
	1.5' - 2.0'	A6WP3-7^4-RB	TAL B	1346862.5	481762.5
	1.5' - 2.0'	A6WP3-7^4-MPS	TAL C,D,E	1346862.5	481762.5
	1.5' - 2.0'	A6WP3-7^4-L	TAL F	1346862.5	481762.5
	2.0' - 2.5'	A6WP3-7^5-RA	TAL A	1346862.5	481762.5
	2.0' - 2.5'	A6WP3-7^5-RB	TAL B	1346862.5	481762.5
	2.0' - 2.5'	A6WP3-7^5-MPS	TAL C,D,E	1346862.5	481762.5
	2.0' - 2.5'	A6WP3-7^5-L	TAL F	1346862.5	481762.5
	2.5' - 3.0	A6WP3-7^6-RA	TAL A	1346862.5	481762.5
	2.5' - 3.0	A6WP3-7^6-RB	TAL B	1346862.5	481762.5
	2.5' - 3.0	A6WP3-7^6-MPS	TAL C,D,E	1346862.5	481762.5
	2.5' - 3.0	A6WP3-7^6-L	TAL F	1346862.5	481762.5
	3.0' - 3.5'	A6WP3-7^7-RA	TAL A	1346862.5	481762.5
	3.0' - 3.5'	A6WP3-7^7-RB	TAL B	1346862.5	481762.5
	3.0' - 3.5'	A6WP3-7^7-MPS	TAL C,D,E	1346862.5	481762.5
	3.0' - 3.5'	A6WP3-7^7-L	TAL F	1346862.5	481762.5
LOCATION	DEPTH	SAMPLE ID	ANALYSIS	EAST-83	NORTH-83
A6WP3-8	0' - 0.5'	Removed previously; shipped to E-care		1346937.5	481762.5
	0.5' - 1.0'	A6WP3-8^2-RA	TAL A	1346937.5	481762.5
	0.5' - 1.0'	A6WP3-8^2-RB	TAL B	1346937.5	481762.5
	0.5' - 1.0'	A6WP3-8^2-MPS	TAL C,D,E	1346937.5	481762.5
	0.5' - 1.0'	A6WP3-8^2-L	TAL F	1346937.5	481762.5
	1.0' - 1.5'	A6WP3-8^3-RA	TAL A	1346937.5	481762.5
	1.0' - 1.5'	A6WP3-8^3-RB	TAL B	1346937.5	481762.5
	1.0' - 1.5'	A6WP3-8^3-MPS	TAL C,D,E	1346937.5	481762.5
	1.0' - 1.5'	A6WP3-8^3-L	TAL F	1346937.5	481762.5
	1.5' - 2.0'	A6WP3-8^4-RA	TAL A	1346937.5	481762.5
	1.5' - 2.0'	A6WP3-8^4-RB	TAL B	1346937.5	481762.5
	1.5' - 2.0'	A6WP3-8^4-MPS	TAL C,D,E	1346937.5	481762.5
	1.5' - 2.0'	A6WP3-8^4-L	TAL F	1346937.5	481762.5
	2.0' - 2.5'	A6WP3-8^5-RA	TAL A	1346937.5	481762.5
	2.0' - 2.5'	A6WP3-8^5-RB	TAL B	1346937.5	481762.5
	2.0' - 2.5'	A6WP3-8^5-MPS	TAL C,D,E	1346937.5	481762.5
	2.0' - 2.5'	A6WP3-8^5-L	TAL F	1346937.5	481762.5
	2.5' - 3.0	A6WP3-8^6-RA	TAL A	1346937.5	481762.5
	2.5' - 3.0	A6WP3-8^6-RB	TAL B	1346937.5	481762.5
	2.5' - 3.0	A6WP3-8^6-MPS	TAL C,D,E	1346937.5	481762.5
	2.5' - 3.0	A6WP3-8^6-L	TAL F	1346937.5	481762.5
	3.0' - 3.5'	A6WP3-8^7-RA	TAL A	1346937.5	481762.5
	3.0' - 3.5'	A6WP3-8^7-RB	TAL B	1346937.5	481762.5
	3.0' - 3.5'	A6WP3-8^7-MPS	TAL C,D,E	1346937.5	481762.5
	3.0' - 3.5'	A6WP3-8^7-L	TAL F	1346937.5	481762.5

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TABLE D-1
(Continued)

LOCATION	DEPTH	SAMPLE ID	ANALYSIS	EAST-83	NORTH-83
A6WP3-9	0' - 0.5'	No sample; to be shipped to E-care		1346787.5	481687.5
	0.5' - 1.0'	A6WP3-9^2-RA	TAL A	1346787.5	481687.5
	0.5' - 1.0'	A6WP3-9^2-RB	TAL B	1346787.5	481687.5
	0.5' - 1.0'	A6WP3-9^2-MPS	TAL C,D,E	1346787.5	481687.5
	0.5' - 1.0'	A6WP3-9^2-L	TAL F	1346787.5	481687.5
	1.0' - 1.5'	A6WP3-9^3-RA	TAL A	1346787.5	481687.5
	1.0' - 1.5'	A6WP3-9^3-RB	TAL B	1346787.5	481687.5
	1.0' - 1.5'	A6WP3-9^3-MPS	TAL C,D,E	1346787.5	481687.5
	1.0' - 1.5'	A6WP3-9^3-L	TAL F	1346787.5	481687.5
	1.5' - 2.0'	A6WP3-9^4-RA	TAL A	1346787.5	481687.5
	1.5' - 2.0'	A6WP3-9^4-RB	TAL B	1346787.5	481687.5
	1.5' - 2.0'	A6WP3-9^4-MPS	TAL C,D,E	1346787.5	481687.5
	1.5' - 2.0'	A6WP3-9^4-L	TAL F	1346787.5	481687.5
	2.0' - 2.5'	A6WP3-9^5-RA	TAL A	1346787.5	481687.5
	2.0' - 2.5'	A6WP3-9^5-RB	TAL B	1346787.5	481687.5
	2.0' - 2.5'	A6WP3-9^5-MPS	TAL C,D,E	1346787.5	481687.5
	2.0' - 2.5'	A6WP3-9^5-L	TAL F	1346787.5	481687.5
	2.5' - 3.0	A6WP3-9^6-RA	TAL A	1346787.5	481687.5
	2.5' - 3.0	A6WP3-9^6-RB	TAL B	1346787.5	481687.5
	2.5' - 3.0	A6WP3-9^6-MPS	TAL C,D,E	1346787.5	481687.5
	2.5' - 3.0	A6WP3-9^6-L	TAL F	1346787.5	481687.5
	3.0' - 3.5'	A6WP3-9^7-RA	TAL A	1346787.5	481687.5
	3.0' - 3.5'	A6WP3-9^7-RB	TAL B	1346787.5	481687.5
	3.0' - 3.5'	A6WP3-9^7-MPS	TAL C,D,E	1346787.5	481687.5
	3.0' - 3.5'	A6WP3-9^7-L	TAL F	1346787.5	481687.5
LOCATION	**DEPTH**	**SAMPLE ID**	**ANALYSIS**	**EAST-83**	**NORTH-83**
A6WP3-10	0' – 0.5'	No sample; to be shipped to E-care		1346862.5	481687.5
	0.5' - 1.0'	A6WP3-10^2-RA	TAL A	1346862.5	481687.5
	0.5' - 1.0'	A6WP3-10^2-RB	TAL B	1346862.5	481687.5
	0.5' - 1.0'	A6WP3-10^2-MPS	TAL C,D,E	1346862.5	481687.5
	0.5' - 1.0'	A6WP3-10^2-L	TAL F	1346862.5	481687.5
	1.0' - 1.5'	A6WP3-10^3-RA	TAL A	1346862.5	481687.5
	1.0' - 1.5'	A6WP3-10^3-RB	TAL B	1346862.5	481687.5
	1.0' - 1.5'	A6WP3-10^3-MPS	TAL C,D,E	1346862.5	481687.5
	1.0' - 1.5'	A6WP3-10^3-L	TAL F	1346862.5	481687.5
	1.5' - 2.0'	A6WP3-10^4-RA	TAL A	1346862.5	481687.5
	1.5' - 2.0'	A6WP3-10^4-RB	TAL B	1346862.5	481687.5
	1.5' - 2.0'	A6WP3-10^4-MPS	TAL C,D,E	1346862.5	481687.5
	1.5' - 2.0'	A6WP3-10^4-L	TAL F	1346862.5	481687.5
	2.0' - 2.5'	A6WP3-10^5-RA	TAL A	1346862.5	481687.5
	2.0' - 2.5'	A6WP3-10^5-RB	TAL B	1346862.5	481687.5
	2.0' - 2.5'	A6WP3-10^5-MPS	TAL C,D,E	1346862.5	481687.5
	2.0' - 2.5'	A6WP3-10^5-L	TAL F	1346862.5	481687.5
	2.5' - 3.0	A6WP3-10^6-RA	TAL A	1346862.5	481687.5
	2.5' - 3.0	A6WP3-10^6-RB	TAL B	1346862.5	481687.5
	2.5' - 3.0	A6WP3-10^6-MPS	TAL C,D,E	1346862.5	481687.5
	2.5' - 3.0	A6WP3-10^6-L	TAL F	1346862.5	481687.5
	3.0' - 3.5'	A6WP3-10^7-RA	TAL A	1346862.5	481687.5
	3.0' - 3.5'	A6WP3-10^7-RB	TAL B	1346862.5	481687.5
	3.0' - 3.5'	A6WP3-10^7-MPS	TAL C,D,E	1346862.5	481687.5
	3.0' - 3.5'	A6WP3-10^7-L	TAL F	1346862.5	481687.5

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TABLE D-1
(Continued)

Note 1: A sample for alpha/beta screening required for off-site shipment will be collected from the boring core interval with the highest measurement during a field beta/gamma screen. For borings that have no interval exceeding the beta/gamma background level, the alpha/beta shipping screen sample will be collected from the shallowest sample interval. Thus, if all field beta/gamma screening results are background for Boring A6WP3-1, the alpha/beta shipping screen sample would be collected from the first interval and identified as A6WP3-1^1-AB.

Note 2: The entire length of each boring will be PID screened for volatile organics. The Geoprobe core liners will be opened for the PID screening and the measurement for each six-inch interval will be recorded in the field documentation, along with the PID background reading.

Note 3: Because of the propensity for contaminants to collect at interfaces of differing material, it has been determined that at conditions where there is a clear/major interface between material types (e.g., clay versus sand), the six-inch sample interval will be adjusted such that one six-inch interval will be collected immediately above the material interface and one six-inch interval will be collected immediately below the interface. The six-inch interval spacing will proceed in both directions (up and down the core) starting from the interface. If there is less than six inches remaining that can't provide the sufficient amount of soil volume at the uppermost interval of the boring, that interval will only be analyzed for total uranium and technetium-99. Any such interval adjustments must be noted in the Field Activity Log.

Note 4: If the sand and gravel of the Great Miami Aquifer is encountered prior to the 3.5 foot depth in the borehole, then adjacent borehole depths will be altered to a depth six inches below the depth from which the sand and gravel was encountered (e.g., encounter sand and gravel at 2.0 feet, then adjacent borehole depths would be 2.5 feet). If in adjacent boreholes, sand and gravel is not encountered, then sample interval depths will proceed.