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PROJECT SPECIFIC PLAN FOR AREA 4B POTENTIALLY CHARACTERISTIC AREA AND WEST OF PILOT PLANT PREDESIGN INVESTIGATION

SOIL AND DISPOSAL FACILITY PROJECT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

SEPTEMBER 14, 2001

U.S. DEPARTMENT OF ENERGY
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Revision A

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FERNALD ENVIRONMENTAL MONITORING PROJECT

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LIST OF ACRONYMS AND ABBREVIATIONS

ASL	analytical support level
ccpm	corrected counts per minute
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	constituents of concern
DQO	Data Quality Objective
FACTS	Fernald Analytical Computerized Tracking System
FRL	final remediation level
HWMU	hazardous waste management unit
ICP/AES	inductively coupled plasma/atomic emission spectroscopy
ICP/MS	inductively coupled plasma/mass spectrometry
KPA	Kinetic Phosphorescence Analysis
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligram per kilogram
mg/L	milligrams per liter
OSDF	On-Site Disposal Facility
pCi/g	picoCuries per gram
PID	photoionization detector
ppm	parts per million
PSP	Project Specific Plan
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
RWP	Radiological Work Permit
SCQ	Sitewide CERCLA Quality Assurance Project Plan
SED	Sitewide Environmental Database
SEP	Sitewide Excavation Plan
SPL	onsite Sample Processing Laboratory
TAL	Target Analyte List
TCLP	toxicity characteristic leachate procedure
V/FCN	Variance/Field Change Notice
VOC	volatile organic compound
WAC	waste acceptance criteria
WAO	Waste Acceptance Organization

1.0 INTRODUCTION

1.1 PURPOSE

This project specific plan (PSP) has been developed to investigate a potentially characteristic area and additional subsurface contamination in the area west of the Pilot Plant (Figure 1-1). The following four objectives will drive the work performed under this PSP:

- Vertically bound above-final remediation level (FRL) uranium contamination at one boring northwest of the abandoned sump area
- Determine if the area around an abandoned sump west of the Pilot Plant contains Resource Conservation and Recovery Act (RCRA) characteristic soil and bound (laterally and vertically) additional contamination in the area that is above established FRLs
- Bound (laterally and vertically) technetium-99 contamination that is above the On-Site Disposal Facility (OSDF) waste acceptance criteria (WAC) at one boring near the southwest corner of the Pilot Plant
- Analyze for volatile organic compounds (VOCs) when perched water zones are encountered to determine the level of wastewater treatment that may be required during excavation

The information collected under this PSP will be used in the Area 3B/4B remedial design to identify the extent of characteristic and/or above-WAC soil and to define the above-FRL excavation boundaries west of the Pilot Plant.

1.2 BACKGROUND

Pilot Plant operations began in October 1951 and continued for 36 years. Pilot Plant processes included aqueous/organic extractions of uranium and thorium, calcining, vacuum furnace casting, reduction of UF_6, reduction of UF_4, briquetting, heat treating, centrifugal casting, reject core reclamation, and various wet tank processes.

The abandoned sump in the potentially characteristic area is located approximately 15 feet west of the Pilot Plant. Used as a temporary sump, it was a collection point constructed and connected to the Pilot Plant floor drain system in 1969 and was used for a period of two months. During this time, the main sump was refurbished and the existing Pilot Plant floor drains and floor drain system were covered over

and replaced by a new collection system. The sump was a 9-foot long by 2-foot diameter stainless steel pipe, buried vertically in the ground, welded closed at the bottom, and left open at the top. It had a single entry line of stainless steel approximately 4 feet below grade connected to the original Pilot Plant floor drain. Floor-drain liquids flowed by gravity to the temporary sump where they accumulated until pumped to a processing system for uranium and thorium recovery. This abandoned sump was designated as Hazardous Waste Management Unit (HWMU) 22 in 1991.

Removal Action No. 24 was implemented in 1993 to remove the abandoned sump and its contents, cut and cap the drain line supplying the sump, remove contaminated soil immediately surrounding the sump and drain line, and inspect the drain line prior to backfilling the excavation. During excavation to uncover the drain line, it was discovered that concrete had been poured on the drain line in two separate places when the line was originally installed in 1969. The first concrete section was encountered where the stainless steel pipe from the sump connected with the outflow pipe from the Pilot Plant. The 1969 planning drawings indicated that the two lines were both 8 inches in diameter and were joined by a double hub. After removal of the concrete it was observed that the stainless steel pipe was 10 inches in diameter and the outflow pipe was 8 inches in diameter. The outflow pipe, being the smaller in diameter, had been inserted into the stainless steel line and then the two sections of pipe had been wrapped with tape. The concrete had apparently been poured around the tape to provide a type of seal. The second section of concrete was covering the outflow drain line approximately 6 to 8 inches beyond the first concrete section. Upon chipping away the concrete, the exposed pipe had a 3 to 4-inch crack in it. The line was plugged beyond the crack (i.e., towards the Pilot Plant) with an inflatable plug and an internal compression plug. Removal of the sump, excavation of soil, and backfilling the excavated area were performed without additional difficulties.

Soil samples were collected adjacent to (prior to removal) and under (after removal) the abandoned sump, as well as below the pipe connection, during this removal action. However, the sample points were not surveyed or illustrated on a scale drawing and the data were not entered into the Sitewide Environmental Database (SED). The data from this sampling were reviewed to ensure that the Sitewide Excavation Plan (SEP) and existing Remedial Investigation/Feasibility Study (RI/FS) data accurately identified the contaminants of concern for the area. Activities and data associated with this removal action are summarized in the project's final report (Final Report, Pilot Plant Sump, Removal Action No. 24 - Abandoned Sump West of Pilot Plant, December 1993).

1.3 CONSTITUENTS ASSOCIATED WITH THE POTENTIALLY CHARACTERISTIC AREA

Pursuant to the SEP, the abandoned sump west of the Pilot Plant was designated a potentially characteristic area for barium and lead (SEP, Table 2-1). Review of RI/FS analytical data for that area identified a nearby boring (1411) that was greater than 20 times the toxicity characteristic leachate procedure (TCLP) limit for barium. The "20 times rule" is an accepted method to screen for the presence of potentially RCRA characteristic soil and is applied by multiplying the TCLP regulatory level by 20 and then comparing this calculated value to the *in situ* soil concentration of the constituent. Further review of the RI/FS data determined that Boring 1411 also had a tetrachloroethene result that was greater than 20 times the TCLP limit. Based on this information, the constituents of concern (COCs) for the potentially characteristic area investigation are barium, lead, and tetrachloroethene.

1.4 CONSTITUENTS ASSOCIATED WITH HWMU 22

Per the SEP, the abandoned sump area is to be closed as a HWMU by demonstrating attainment of soil FRLs at the final excavation surface within the HWMU footprint. COCs associated with this HWMU (SEP, Table 2-1) are benzene, tetrachloroethene, chromium, barium, lead, and mercury. Because the potentially characteristic area being investigated encompasses this HWMU, those HWMU-specific analytes (benzene, tetrachloroethene, and chromium) that are measured using the analytical methods currently required for the potentially characteristic investigation will be included as COCs for this investigation. This additional analytical information will support future excavation of the HWMU. Because it requires an additional analytical method, mercury analysis will not be performed at this time. However, sampling for mercury, as well as the other HWMU-specific COCs, will be conducted at the time of HWMU closure.

1.5 CONSTITUENTS ABOVE THE OSDF WAC AND FRLs

A search of the SED was performed to identify constituents present in the area west of the Pilot Plant at concentrations that exceeded OSDF WAC or the Area 3B/4B FRLs. The only above-WAC result was technetium-99 at 1.5 to 2 feet deep in Boring 1258 [78.8 picoCuries per gram (pCi/g); Tc-99 WAC = 29.1 pCi/g] and this result is not bounded laterally or at depth. Non-uranium above-FRL results were investigated using the same approach implemented during the Area 3A/4A predesign investigation (PSP for Area 3A/4A Subsurface Predesign Investigation). Under this approach, non-uranium above-FRL results are compared to the current total uranium data [because this sampling effort is within a designated high leachability area the uranium FRL is 20 milligrams per kilogram (mg/kg)] used in the

three-dimensional computer model to identify areas where non-uranium FRL exceedances are located outside the soil volume that is currently planned to be excavated due to uranium contamination. Based on this comparison, all non-uranium above-FRL results were located within the uranium contamination. However, there were several unbounded thorium, radium, and VOC results in the area of the abandoned sump that were significantly above the FRLs (up to 10 times the FRL). Boring 1411 is unbounded at 10.5 feet for 1,2-dichloroethene and tetrachloroethene and at 11 feet for uranium and radium-228. Boring 1252 is unbounded at 6.5 feet for uranium, thorium, radium-226, and radium-228. Because of the high results and the depths at which these contaminants were found, these additional non-uranium constituents will also be investigated as part of this PSP.

Consistent with remedial design of Area 3A/4A, existing data will be used in a three-dimensional computer model to help determine the extent of uranium contamination in the soil; however, Borings 1246 and 1504 have unbounded above-FRL levels of uranium at depths that warrant further investigation. Boring 1246 has approximately 800 mg/kg of total uranium at a depth of 11 feet, while samples collected at 2.5 feet and 5.5 feet are non-detects. Boring 1504 is similar with a total uranium concentration of 900 mg/kg at a depth of 20 feet and below-FRL results from 6 feet through 19 feet. Consequently, all borings included in this investigation will include sample analysis for total uranium to a depth of 25 feet. The results associated with each of these borings are presented in Appendix A and their locations are illustrated on Figure 1-2.

1.6 SCOPE

Under this PSP, physical samples will be collected from the area west of the Pilot Plant to meet the objectives stated in Section 1.1. Following a review of initial sampling results, additional samples may be collected if the extent of characteristic, above-WAC, or above-FRL contamination has not been adequately bounded. These samples would be identified by a Variance/Field Change Notice (V/FCN) to this PSP. 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), the SEP, the WAC Attainment Plan for the OSDF, and Data Quality Objective (DQO) SL-048, Revision 5 (see Appendix B).

1.7 KEY PROJECT PERSONNEL

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

TABLE 1-1
KEY PERSONNEL

Title	Primary	Alternate
DOE Contact	Robert Janke	Kathi Nickel
Production Area Project Manager	Rich Abitz	Jyh-Dong Chiou
Production Area Characterization Lead	Frank Miller	Bill Westerman
Field Sampling Lead	Tom Buhrlage	Jim Hey
Surveying Lead	Jim Schwing	Andy Clinton
WAO Contact	Linda Barlow	Christa Walls
Laboratory Contact	Denise Arico	Brenda Collier
Data Management Lead	Bill Westerman	Frank Miller
Field Data Validation Contact	Dee Dee Early	Andy Sandfoss
Data Validation Contact	Jim Chambers	Jim Cross
FACTS/SED Database Contact	Cara Sue Schaefer	Anna Russell
Quality Assurance Contact	Reinhard Friske	Mary Eleton
Health and Safety Contact	Debra Grant	Jeff Middaugh

FACTS – Fernald Analytical Computerized Tracking System
WAO – Waste Acceptance Organization

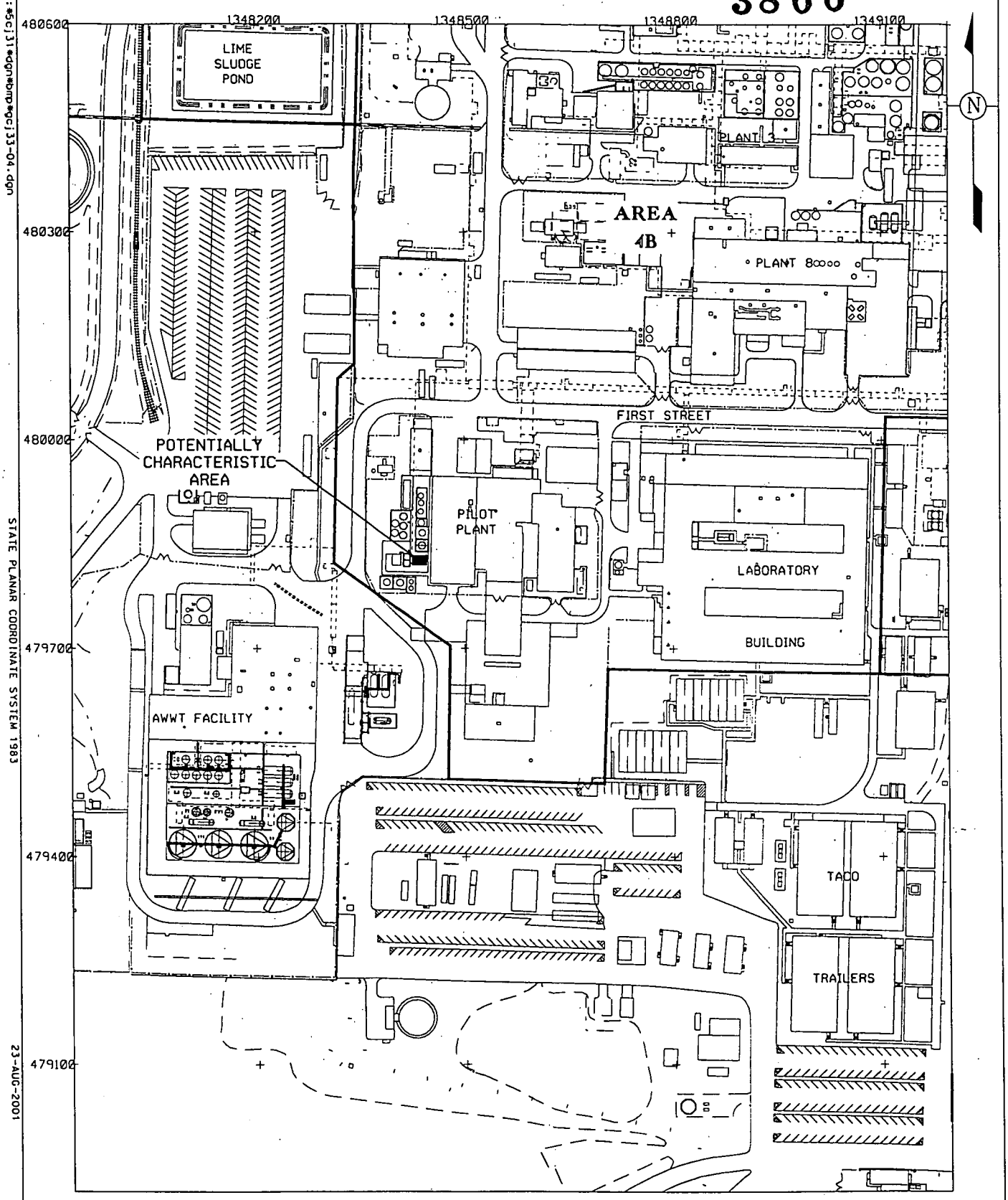

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FIGURE 1-1. LOCATION OF POTENTIALLY CHARACTERISTIC AREA

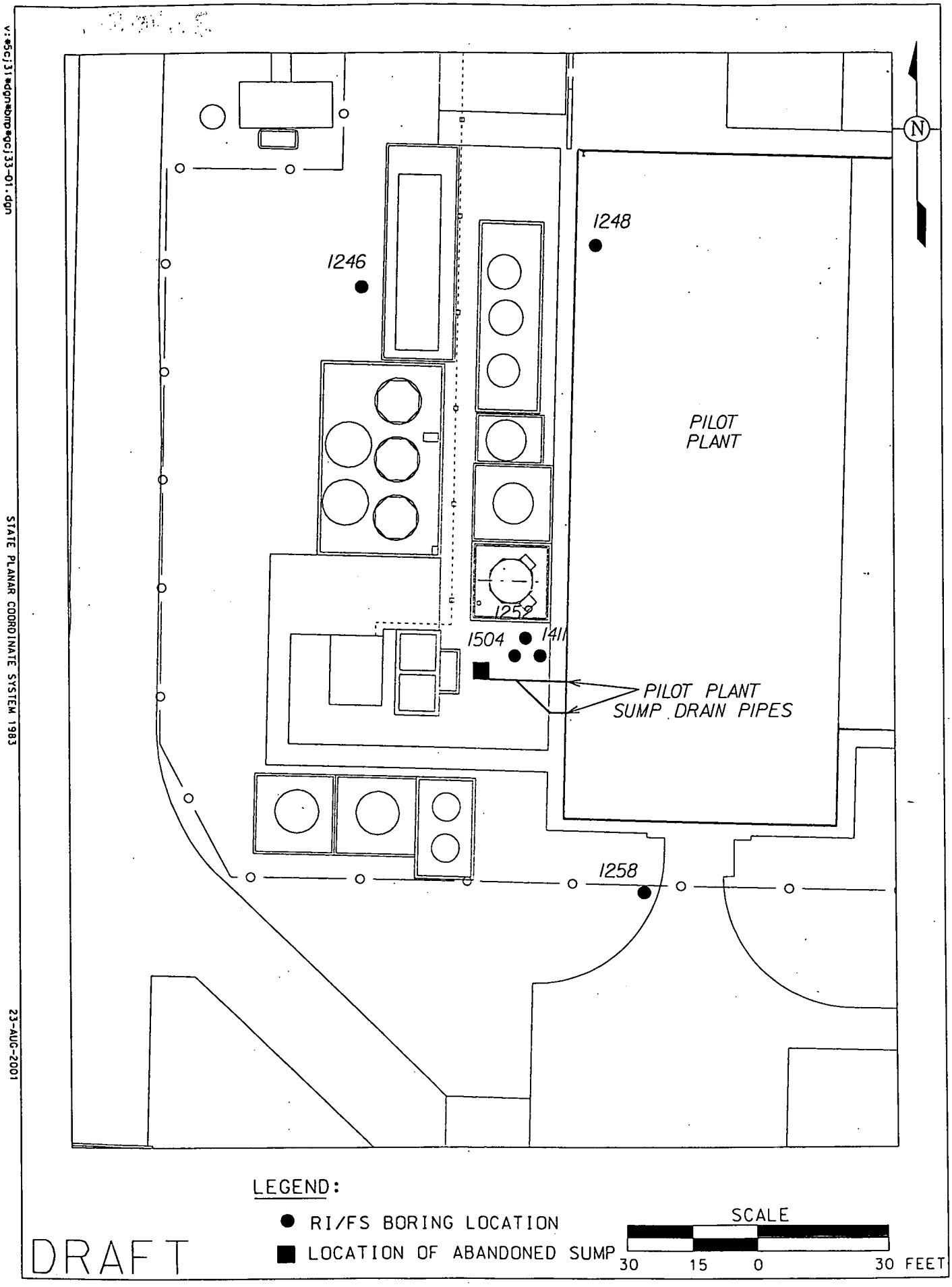

FIGURE 1-2. ABOVE-WAC, ABOVE- FRL, AND POTENTIALLY CHARACTERISTIC BORINGS IN THE AREA WEST OF THE PILOT PLANT

2.0 PHYSICAL SAMPLING STRATEGY

2.1 SELECTION OF SAMPLE LOCATIONS

Sample locations were chosen to meet the objectives presented in Section 1.1. The boring locations and sample depths identified to investigate the potentially characteristic area and to bound above-WAC and above-FRL areas were determined in accordance with the SEP.

The location of predesign borings proposed to delineate above-WAC, above-FRL, and potentially characteristic areas, are shown on Figure 2-1. Figure 2-1 also shows the location of RI/FS borings that detected above-WAC, above-FRL, or above RCRA toxicity characteristic levels, and the analytical data from these borings is in Appendix A. Fifteen investigative borings will be conducted in three general areas outside the Pilot Plant: 1) a single boring west of the northwest corner, 2) a group of nine borings west of the building around the location of a former temporary sump, and 3) a group of five borings south of the southwest corner. All borings will be to a depth of 25 feet, based on their close proximity to vertically unbounded uranium contamination (900 mg/kg) identified at a depth of 19.5 to 20 feet at RI/FS Boring 1504.

Predesign Boring 12860 will be positioned 1 foot north of RI/FS Boring 1246 to investigate unbounded above-FRL uranium at 10.5 to 11 feet (Figure 2-1). This boring will also be used to provide western bounding of shallow above-WAC technetium-99 identified within the Pilot Plant at RI/FS Boring 1248. This above-WAC technetium-99 area will be more closely bounded later, following removal of the above ground tanks that are currently preventing closer access to the Pilot Plant wall.

Predesign Borings 12861 through 12869 will be clustered in a pattern of three interior borings (12861 through 12863) encircled by six outer borings (12864 through 12969) to vertically and laterally bound a potentially characteristic area defined by barium and tetrachloroethene results from RI/FS Boring 1411 (Figure 2-1). Boring 12861 will be located in the center of RI/FS Borings 1504, 1252, and 1411. Boring 12862 will be located at the approximate location of the Pilot Plant abandoned sump removed in 1993, which is suspected to be a potential source of RCRA contamination. Boring 12863 will be located near the connection of the Pilot Plant sump outflow pipe and the abandoned sump inflow pipe. The area of the pipe connection was identified as a potential soil contamination source at the time of the sump excavation and removal. To confirm and bound potential RCRA contamination,

Borings 12861 through 12863 will be sampled their entire depth for total and TCLP VOCs and total metals. TCLP metals analysis will also be done at targeted depths based on RI/FS data. Analysis for total uranium/thorium, radium-226, and radium-228 will also be done to bound above-FRL levels of these constituents detected by RI/FS borings. Analysis for technetium-99 will also be done due to the proximity of above-WAC levels of this contaminant to the north and south. Additional sample material will be collected at locations where total metals samples will be collected for possible later TCLP metals analysis, if necessary. The additional material will be analyzed for TCLP metals at all locations where total barium exceeds the 20-times limit of 2,000 mg/kg.

The three "interior" predesign boring locations will be surrounded by an outer ring of borings (Borings 12864 through 12869) to provide additional vertical and lateral bounding data for the potentially characteristic area as well as for above-FRL contamination. Samples at these borings will be collected for the same analytes, with the exception of TCLP metals. However, additional sample material will also be collected from these borings for possible later TCLP metals analysis.

Predesign Borings 12870 through 12874 will be located around RI/FS Boring 1258 to vertically and laterally bound above-WAC technetium-99 and vertically bound above-FRL uranium detected at that location. Boring 12870 will be located 1 foot west of Boring 1258 and Borings 12871 through 12873 will be located around Boring 1258, based on existing building and overlying material considerations. Samples collected from these borings will be analyzed for total uranium/thorium and technetium-99.

To better determine treatment requirements for perched groundwater encountered at the time of excavation, groundwater samples will be collected for VOC analysis from any perched water zones identified in the borings. Once perched water samples are collected at any boring in the two areas of multiple borings (12861 through 12869 and 12870 through 12974), additional perched water samples will be collected from other borings in that area only if the perched water zone encountered is at a different depth than already sampled.

2.2 SAMPLE COLLECTION METHODS

All soil borings will be completed using the Geoprobe® Model 5400 with the dual tube or macro-core sampling system. The dual tube must be used for borings where perched water is expected, where significant surface soil contamination is known to exist, or where significant sidewall sloughing is

anticipated. Soil samples will be collected in accordance with Procedure SMPL-01, Solids Sampling. If refusal or resistance is encountered during sample collection, the location may be moved within a 3-foot radius of the identified sample location, unless precluded by the penetration permit. If the distance is greater than 3 feet from the originally planned sample point, the change must be documented on a V/FCN form, as described in Section 3.4.

Prior to collection of the soil cores, the field sampling technician will remove any surface vegetation within a 6-inch radius from the point to be sampled, using a clean-gloved hand and taking care to minimize removal of the surface soil. When sampling below gravel, asphalt, or concrete, the uppermost sampling interval will begin where the soil contains less than 50 percent gravel. Because sample intervals are recorded in even 6-inch increments and sample identification numbers include a depth designation that corresponds to each 6-inch interval, material overlying the uppermost sampling interval will be identified in 6-inch depth increments. Any overlying material interval of less than 3 inches will be included as part of the previous interval and any interval greater than 3 inches but less than 6 inches will be recorded as a separate interval and rounded to the next 6-inch interval measurement (e.g., 8 inches of overlying material would be recorded as a single 6-inch interval while 9 inches of overlying material would be recorded as two 6-inch intervals). Because the ultimate goal of this sampling effort is to define the excavation depth, the potential 3-inch discrepancy introduced by rounding the depth of overlying material will not be significant during excavation with heavy equipment.

Any debris (e.g., wood, concrete, metal) contained in the sample intervals will be removed. The Geoprobe® will be driven to the appropriate depth and, upon removal, cores will be laid out on clean plastic. The core liners will be opened and the entire length of each core will be screened using a photoionization detector (PID). Any sample interval with a sustained 5 parts per million (ppm) above-background reading on the PID will be subjected to a headspace analysis, in accordance with Procedure EQT-04, Photoionization Detector. Headspace analysis involves placing a small amount of soil into a sample container, covering the container opening with aluminum foil, placing the lid on the container, and placing it in an area where the temperature is greater than 60°F for five to ten minutes. The container lid is then removed, the PID tip inserted through the aluminum foil, and a PID measurement collected for ten seconds. The sample measurement will be recorded as part of the field documentation. If the result of the headspace analysis is above 10 ppm, the sample interval will be

submitted for total VOC analysis. If four or more consecutive 6-inch intervals have headspace analysis results above 10 ppm, the following samples will be sent to the lab:

- The shallowest and deepest samples that exceeded 10 ppm, in order to bound the area
- The sample in between the two bounding samples with the highest concentration
- If the samples in between the two bounding intervals have the same results, randomly choose an interval or, if there is a change in material types, choose an interval of sandy soil instead of clay soil

The entire length of each soil core will be surveyed with a beta/gamma (Geiger-Mueller) survey meter and all survey results will be recorded as part of the field documentation. Intervals with readings above 450 corrected counts per minute (ccpm) are considered potential above-WAC material and will be sampled and analyzed for total uranium/total thorium [Target Analyte List (TAL) A]. Samples for TAL A analysis will also be collected from the 6-inch intervals above and below any sample intervals that exceed 450 ccpm.

If the field screening results for the deepest sample interval scheduled for collection (Appendix C) exceed either the 10 ppm PID reading or the 450 ccpm beta/gamma reading, additional samples will be collected at consecutive 6-inch intervals until screening results do not exceed either threshold value.

Following PID and beta/gamma screening, the appropriate sample intervals, as identified in Appendix C, will be separated from each core. Sampling and analytical requirements are summarized in Table 2-1. Samples selected for analysis of radiological constituents or inorganics (total and TCLP metals) will be sent to the on-site laboratory for analysis. The total and TCLP VOC samples will be delivered to the on-site Sample Processing Laboratory (SPL), where they will be prepared for shipment to an approved off-site laboratory, in accordance with Procedure 9501, Shipping Samples to Off-Site Laboratories. Prior to shipping samples to an off-site laboratory, one alpha/beta-screening sample will be collected and analyzed on site for each boring that contains off-site soil samples. The alpha/beta sample will be collected from a depth of 0.5 to 1.0 feet, or a more appropriate interval (i.e., interval with highest beta/gamma results), as determined by the field sampling lead. All samples will be analyzed for the appropriate TAL, as identified in Appendix D.

If perched water is encountered, a sample will be collected from each boring area (i.e., Boring 12860 is one area, Borings 12861 through 12869 comprise the second area, and the third area consists of Borings 12870 through 12874). Multiple perched water samples will be collected within the same area only if from distinct perched water zones at different depths. When a perched groundwater zone is identified, collect a sample directly from the core sampling tube if possible, or utilize one of the following alternative collection methods: 1) a temporary screen point sampler (screen point 15), 2) a mill-slotted rod sampler, 3) a tubing bottom check valve assembly, or 4) a small-volume bailer. Because of the typically slow rate of perched water collection, perched water may be collected by placing one of the above devices in a boring adjacent to the original boring, allowing the required water sample volume to collect over time, so as not to delay other sampling activity. All water sampling will follow Procedure SMPL-02, Liquids and Sludge Sampling. Perched groundwater samples collected for VOC analysis are not to be filtered and will be analyzed at an off-site laboratory or with a portable gas chromatograph instrument, if available. A pH measurement (prior to acid preservation) will be done at the time of sample collection and recorded on the Sample Collection Log. Perched groundwater samples sent off site will require total uranium analysis (TAL H) for screening before shipment.

Each shipment of VOC samples for off-site analysis will require an accompanying trip blank for each day of VOC sample collection. Sample volumes, preservation requirements and analysis information are summarized in Table 2-1. If a 6-inch sample segment contains insufficient soil mass for the requested analyses at that interval, additional material will be collected from: 1) the top of the adjacent deeper 6-inch interval, 2) or, if further material is needed, the bottom of the adjacent shallower 6-inch interval.

Additional sample material collected for possible later TCLP metals analysis will be kept in refrigerated storage in SPL following removal of the aliquot required for total metals analysis. Samples containing additional material for possible later analysis are expected to require storage for no more than three months. Guidance for disposition of unused sample material will be provided by the characterization lead, based on analytical data results.

Full lithological characterization recorded on lithological logs will not be required. However, a visual description (e.g., type and color) of the material in each 6-inch interval will be recorded as part of the field documentation.

2.3 SAMPLE IDENTIFICATION

All physical samples collected for laboratory analysis or archiving will be assigned a unique sample identifier, as listed in Appendix D. This identifier will consist of the boring number, followed by a depth identification (1 = 0 to 0.5 feet below the surface, 2 = 0.5 to 1.0 feet below the surface, etc.) and a letter designating the type of sample ("R" for radionuclides, "L" for VOCs, "TL" for TCLP VOCs, "M" for metals, "TM" for TCLP metals, "RM" for radionuclides and metals in the same sample aliquot, "GWR" for groundwater radionuclides, "GWL" for groundwater VOCs, and "AB" for alpha/beta screening). For example, 12870-8-R is the sample collected from the 3.5 to 4.0-foot interval below the surface of Boring 12870 and is a sample for radionuclide analysis. A perched groundwater sample collected for VOC analysis from the 8.0 to 8.5-foot interval of Boring 12874 would be identified as 12874-17-GWL. Any archive samples collected will be assigned a "V" suffix (e.g., 12869-33-V) to designate an archive. If an archive sample is subsequently analyzed, the "V" will be replaced with the letter designation of the type of analysis. Trip blanks will be labeled with a project designation (PILOT) and the suffix "TB." For example, PILOT-TB3 would be the third trip blank collected under the Pilot Plant area investigation.

If a boring location requires multiple borings due to subsurface refusal, or if a boring is moved after attempting the original location, the boring identifier will be designated with an alphabetic suffix (e.g., 12869A, 12869B, etc.). Therefore, a radiological sample collected from the 4.0 to 4.5-foot interval of the third attempt at Boring 12869 would be 12869B-9-R. Unless refusal is experienced in the first push of the Geoprobe®, samples collected from a boring prior to experiencing refusal will be kept and sample collection will resume beyond the refusal depth at a subsequent successful boring.

Varying amounts of overlying materials may exist at the different boring locations. Because of this, the depth interval at which soil sample collection will begin cannot be determined before the actual boring activity. Since the sample identification methodology includes a depth (below surface) interval identifier, and because specific intervals in different borings are targeted for specific analyses based on RI/FS sampling results from the same depth below the surface, it is important that both the soil interval sampled and the sample identification number match the targeted sampling interval scheduled for each boring in Appendix C. To achieve this, sample depth interval variables (variables *a, b, c,* and *d* for Boring 12860; variables *a* and *b* for Borings 12861-12869; and variables *a*, *b*, and *c* for Borings 12870 through 12874) have been used in the sample identification tables in Appendix C. At the time of sample collection, these sample interval variables will be replaced by the actual depth interval sampled.

Included in Appendix C are instructions directing which samples are to be collected at each boring for varying depths of overlying material. If any uncertainty exists at the time of sampling about the correct sampling interval or any sampling contingencies that arise, the Field Sampling Lead should contact the Characterization Lead for direction.

2.4 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. Sampling equipment will be decontaminated prior to transport to the field site, between sample locations, and after sampling performed under this PSP is completed. Equipment that comes into contact with sample material will be decontaminated at Level II (Section K.11, SCQ). 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.

2.5 WASTE DISPOSITION

Excess soil from the borings will be managed as directed by WAO. Any water (used decontamination water, excess perched groundwater, etc.) generated during sampling can be evaluated for disposal purposes before the start of sampling, allowing the Wastewater Discharge Request Form (FS-F-4045) to be completed and approved prior to wastewater generation.

2.6 BOREHOLE ABANDONMENT

Each borehole will be plugged using bentonite pellets or a bentonite grout slurry immediately after sampling is completed. If pellets are used, they will be placed in the borehole in 2-foot intervals, then hydrated with potable water. The abandonment option will be determined as specified in the Plugging and Abandonment Procedure (DRL-01). Any concrete or asphalt that is removed will be replaced with an equal thickness of cement. A Borehole Abandonment Log will be completed for each borehole.

TABLE 2-1
SAMPLING AND ANALYTICAL REQUIREMENTS

Analyte	Sample Matrix	Lab	ASL	Preservation	Holding Time	Container	Sample Volume/ Mass
Total Uranium, Total Thorium (TAL A)	Solid	Onsite	B	None (soil)	12 months (soil)	glass or poly of appropriate size	50g
Technetium-99 (TAL B)	Solid	Onsite	B	None (soil)	12 months	glass or poly of appropriate size	20g[a]
Radium-226, Radium-228 (TAL C)	Solid	Onsite	B	None (soil)	12 months	glass or poly of appropriate size	250g[b]
Total Metals (TAL D)	Solid	Onsite	B	Cool 2°-6° C	6 months	glass or poly of appropriate size	150g minimum, prefer 250g (soil without rocks)[c]
TCLP Metals (TAL E)							
VOC (TAL F)	Solid or Water (perched water and trip blanks)	Offsite	B	Cool 2°-6° C (water and soil) H_2SO_4, pH<2 (water)	14 days	Soil: 60-mL glass w/ Teflon cap Water: 3 x 40-mL glass w/ Teflon septa cap	1 x 60-mL (soil without rocks) 5 x 40-mL (Water) Fill to no headspace
TCLP VOC (TAL G)	Solid	Offsite	B	Cool 2°-6° C	14 days	60-mL widemouth glass w/ Teflon cap	120g (soil without rocks) Fill to no headspace
Total Uranium screen for off-site shipment, (TAL H)	Water (perched water)	Onsite	B	HNO_3, pH<2	6 months	glass or poly of appropriate size	50 mL
Alpha/Beta screen[d]	Solid	Onsite	N/A	None	None	Any container	10g

ASL – analytical support level

[a] Sample can be included in same container when collected with TAL A.
[b] Sample can be included in same container when collected with TAL A or TAL B.
[c] Sample material for both TCLP and total metals analysis will be included in the same container although some TCLP analyses will be requested only after review of the totals data. Thus, SPL has been requested to hold the remaining sample, following removal of the material required for total metals analysis, in a refrigerator for possible later TCLP metals analysis.
[d] The alpha/beta screen is required only for borings from which soil samples will be shipped off site for analysis.

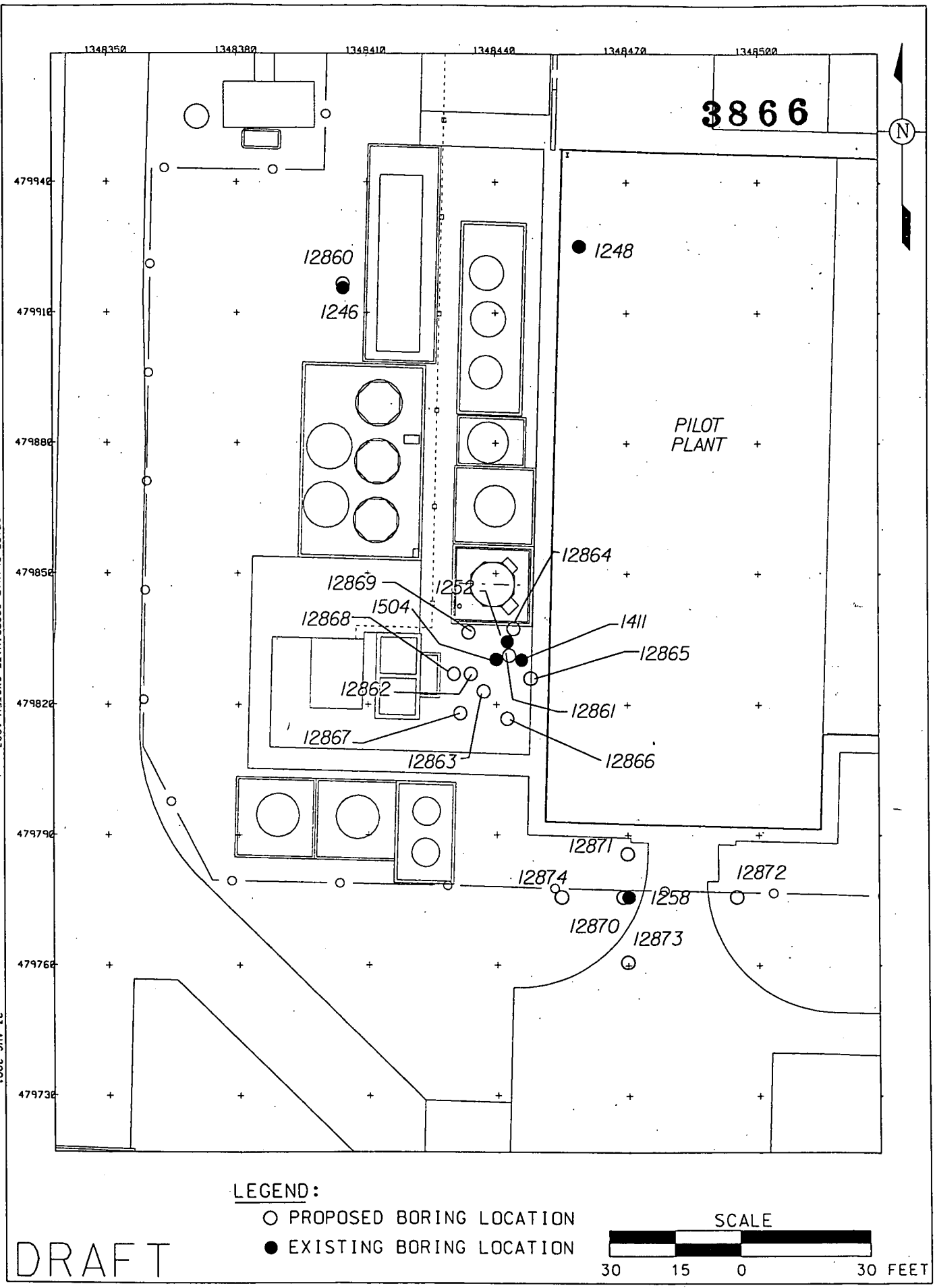

FIGURE 2-1. PROPOSED BORING LOCATIONS

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 B), 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).
- One trip blank will be taken each day that VOC samples are collected or one per 20 VOC samples that are collected, whichever is more frequent. In addition, a lab matrix spike and matrix spike duplicate will be designated on the Chain of Custody form for each organic release sent for off-site analysis. Equipment rinsate samples will not be required.
- All field data will be validated. All analytical data will require a certificate of analysis, and 10 percent of the area-wide analytical data will also require the associated quality assurance/quality control results and will be validated to ASL B. Analytical data requiring validation will be designated by the Characterization Lead.

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

- the PSP is varianced to include references confirming that the new method is sufficient to support data needs,
- variations from the SCQ methodology are documented in the PSP, or
- data validation of the affected samples is requested or qualifier codes of J (estimated) and R (rejected) be attached to detected and nondetected results, respectively.

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-05, Geodimeter® 4000 Survey System – Operation, Maintenance, and Calibration
- EQT-06, Geoprobe® Model 5400 Operation and Maintenance Manual
- EW-0002, Chain of Custody/Request for Analysis Record for Sample Control
- DRL-01, Plugging and Abandonment
- ALS 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
- RM-0021, Safety Performance Requirements Manual
- Pilot Plant Sump Report, Removal Action No. 24, Abandoned Sump West of Pilot Plant
- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- Sitewide Excavation Plan (SEP)
- WAC Attainment Plan for the OSDF.
- PSP for Area 3A/4A Subsurface Predesign Investigation

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 QA organization may conduct independent assessments of the work processes and operations to assure the quality of performance. Assessment 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 Characterization Lead must prepare a V/FCN. The completed V/FCN must contain the signatures of all affected organizations, which at a minimum includes the Project Manager, Characterization Lead, WAO, and Quality Assurance (QA) but may also include Real-Time Instrumentation Measurement Program, 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 Lead 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 Health and Safety Lead, Field Sampling Leads, and team members will assess the safety of performing sampling activities in Area 4B. This will include vehicle/equipment positioning limitations and fall hazards.

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

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

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

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 Characterization Lead.

All field measurements, observations, and sample collection information associated with physical sample collection will be recorded, as applicable, on the Sample Collection Log, the Field Activity Log, the Chain of Custody/Request for Analysis Form, and any necessary supplemental field logs, 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 2.3 and listed in Appendix C. 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 Environmental Management Project. 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. Analytical data from the on- and off-site laboratories will be reviewed by the Data Management Lead prior to transfer of the data to the SED from the FACTS database.

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

APPENDIX A

PREVIOUS PILOT PLANT AREA SAMPLING RESULTS

APPENDIX A
PREVIOUS PILOT PLANT AREA SAMPLING RESULTS

Boring	Sample ID	Sample Date	Top Depth	Bottom Depth	Parameter	Result	Units	Qualifier	Northing	Easting
ABOVE-WAC										
1248	18025	05-Dec-90	1	1.5	Technetium-99	55.3	pCi/g	J	479925.29	1348459.35
1258	18248	10-Sep-90	1.5	2	Technetium-99	78.8	pCi/g	-	479775.72	1348469.81
ABOVE-FRL										
1246	17981	06-Jun-89	0	0.5	Thorium-228	1.7	pCi/g	-	479915.64	1348404.44
1246	17981	06-Jun-89	0	0.5	Uranium, Total	570	mg/kg	J	479915.64	1348404.44
1246	17982	06-Jun-89	0.5	1	Uranium, Total	172.8	mg/kg	-	479915.65	1348404.45
1246	18002	06-Jun-89	10.5	11	Uranium, Total	802.69	mg/kg	-	479915.65	1348404.45
1252	18113	15-Jun-89	0	0.5	Radium-226	7.7	pCi/g	J	479834.40	1348442.50
1252	18113	15-Jun-89	0	0.5	Radium-228	49.8	pCi/g	J	479834.40	1348442.50
1252	18119	15-Jun-89	0	0.5	Thorium, Total*	9.11	pCi/g	NV	479834.40	1348442.50
1252	18113	15-Jun-89	0	0.5	Uranium, Total	126.08	mg/kg	-	479834.40	1348442.50
1252	18119	15-Jun-89	3	3.5	Uranium, Total	80	mg/kg	NV	479834.40	1348442.50
1252	18125	15-Jun-89	6	6.5	Radium-226	5.91	pCi/g	-	479834.40	1348442.50
1252	18125	15-Jun-89	6	6.5	Radium-228	17.6	pCi/g	-	479834.40	1348442.50
1252	18125	15-Jun-89	6	6.5	Thorium-228	14.6	pCi/g	J	479834.40	1348442.50
1252	18125	15-Jun-89	6	6.5	Thorium-232	8.07	pCi/g	J	479834.40	1348442.50
1252	18125	15-Jun-89	6	6.5	Thorium, Total*	7.99	pCi/g	J	479834.40	1348442.50
1252	18125	15-Jun-89	6	6.5	Uranium, Total	211.36	mg/kg	-	479834.40	1348442.50
1258	18247	10-Sep-90	1	1.5	Uranium, Total	21.1	mg/kg	-	479775.72	1348469.81
1258	18265	10-Sep-90	10	10.5	Uranium, Total	102.9	mg/kg	J	479775.73	1348469.82
1258	52863	10-Sep-90	15	15.5	Uranium, Total	102.9	mg/kg	J	479775.73	1348469.82
1411	54991	20-Jun-89	7.5	8	Thorium, Total*	31.84	pCi/g	NV	479830.34	1348445.91
1411	54991	20-Jun-89	7.5	8	Uranium, Total	41	mg/kg	NV	479830.34	1348445.91
1411	54996	20-Jun-89	10	10.5	1,2-Dichloroethene (Total)	1600	ug/kg	J	479830.34	1348445.91
1411	54997	20-Jun-89	10.5	11	Radium-228	2.03	pCi/g	-	479830.34	1348445.91
1411	54997	20-Jun-89	10.5	11	Uranium, Total	232.36	mg/kg	-	479830.34	1348445.91
1504	768	12-Sep-90	0	0.5	Uranium, Total	93.8	mg/kg	J	479830.34	1348439.91
1504	771	12-Sep-90	1.5	2	Uranium, Total	53	mg/kg	J	479830.34	1348439.91
1504	774	12-Sep-90	3	3.5	Radium-226	3.05	pCi/g	-	479830.34	1348439.91
1504	774	12-Sep-90	3	3.5	Radium-228	2.58	pCi/g	-	479830.34	1348439.91
1504	774	12-Sep-90	3	3.5	Thorium-228	3.5	pCi/g	-	479830.34	1348439.91
1504	774	12-Sep-90	3	3.5	Thorium-232	2.41	pCi/g	-	479830.34	1348439.91
1504	774	12-Sep-90	3	3.5	Thorium, Total*	2.39	pCi/g	-	479830.34	1348439.91
1504	777	12-Sep-90	4.5	5	Uranium, Total	32.8	mg/kg	J	479830.34	1348439.91
1504	783	12-Sep-90	7.5	8	Radium-226	3.37	pCi/g	-	479830.33	1348439.90
1504	783	12-Sep-90	7.5	8	Radium-228	3.02	pCi/g	-	479830.33	1348439.90
1504	783	12-Sep-90	7.5	8	Thorium-228	2.98	pCi/g	-	479830.33	1348439.90
1504	783	12-Sep-90	7.5	8	Thorium-232	2.52	pCi/g	-	479830.33	1348439.90
1504	783	12-Sep-90	7.5	8	Thorium, Total*	2.49	pCi/g	-	479830.33	1348439.90
1504	807	12-Sep-90	19.5	20	Uranium, Total	900	mg/kg	-	479830.33	1348439.90
ABOVE RCRA 20-TIMES RULE LIMITS										
1411	54996	20-Jun-89	10	10.5	Barium	3610	mg/kg	J	479830.34	1348445.91
1411	54996	20-Jun-89	10	10.5	Tetrachloroethene	17000	ug/kg	J	479830.34	1348445.91

*The Thorium, Total results have been converted from mg/kg to pCi/g and are compared to the Thorium-232 FRL.

APPENDIX B

DATA QUALITY OBJECTIVES SL-048, REV. 5

3866

Control Number _____

Fernald Environmental Management Project

Data Quality Objectives

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

Number: SL-048

Revision: 5

Effective Date: February 26, 1999

Contact Name: Eric Kroger

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

Approval: (signature on file) Date: 2/26/99
J.D. Chiou
SCEP Project Director

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

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

Members of Data Quality Objectives (DQO) Scoping Team

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

Conceptual Model of the Site

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

1.0 Statement of Problem

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

2.0 Identify the Decision

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

3.0 Inputs That Affect the Decision

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

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

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

4.0 The Boundaries of the Situation

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

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

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

5.0 Decision Rule

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

6.0 Limits on Decision Errors

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

Types of Decision Errors and Consequences

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

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

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

7.0 Optimizing Design for Useable Data

7.1 Sample Collection

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

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

7.2 COC Delineation

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

7.3 QC Considerations

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

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

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

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

- If samples are analyzed for WAC Attainment and/or RCRA Characteristic Areas Delineation, 100% of the data will be analyzed and reported to ASL B with 10% validated. The ASL B package will include a Certificate of Analysis along with all associated QA/QC results. Total uranium analyses using a higher detection limit than is required for ASL B (10 mg/kg) may be appropriate for WAC attainment purposes since the WAC limit for total uranium is 1,030 mg/kg. In this case, an ASL E designation will apply to the analysis and reporting to be performed under the following conditions:
  - all of the ASL B laboratory QA/QC methods and reporting criteria will apply with the exception of the total uranium detection limit
  - the detection limit will be ≤10% of the WAC limit (e.g., ≤103 mg/kg for total uranium).
- If delineation data are also to be used for certification, the data must meet the data quality objectives specified in the Certification DQO (SL-043).
- Validation will include field validation of field packages for ASL B or ASL D data.

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

7.4 Independent Assessment

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

7.5 Data Management

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

COC's.

7.6 Applicable Procedures

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

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

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

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

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

RI ☐ FS ☐ RD ☒ RA ☐ R_vA ☐ OTHER ☐

1.C. DQO No.: SL-048, Rev. 5 DQO Reference No.: _____

---

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

Air ☐ Biological ☐ Groundwater ☒ Sediment ☒ Soil ☒

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

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

Site Characterization A☐ B☒ C☐ D☒ E☒	Risk Assessment A☐ B☐ C☐ D☐ E☐
Evaluation of Alternatives A☐ B☐ C☐ D☐ E☐	Engineering Design A☐ B☒ C☐ D☒ E☒
Monitoring during remediation A☒ B☒ C☐ D☒ E☒	Other A☐ B☐ C☐ D☐ E☐

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

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

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5. Site Information (Description):

6.A. Data Types with appropriate Analytical Support Level Equipment Selection and SCQ Reference: (Place an "X" to the right of the appropriate box or boxes selecting the type of analysis or analyses required. Then select the type of equipment to perform the analysis if appropriate. Please include a reference to the SCQ Section.)

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

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

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

6.B. Equipment Selection and SCQ Reference:

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

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

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

DQO Number: SL-048, Rev. 5

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

Background samples: OU5 RI

7.C. Sample Collection Reference:

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

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

8.A. Field Quality Control Samples:

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

Other (specify)

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

8.B. Laboratory Quality Control Samples:

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

Other (specify) Per SCQ

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

APPENDIX C

SOIL SAMPLES TO BE COLLECTED FOR THE AREA 4B POTENTIALLY CHARACTERISTIC AREA AND WEST OF PILOT PLANT PREDESIGN INVESTIGATION

USING THE SAMPLE IDENTIFICATION TABLES

Varying amounts of overlying materials may exist at the different boring locations. Because of this, the depth interval at which soil sample collection will begin cannot be determined before the actual boring activity. Since the sample identification methodology includes a depth (below surface) interval identifier, and because specific intervals in different borings are targeted for specific analyses based on RI/FS sampling results from the same depth below the surface, it is important that both the soil interval sampled and the sample identification number match the targeted sampling interval scheduled for each boring in Appendix C. To achieve this, sample depth interval variables (variables *a, b, c* and *d* for Boring 12860; variables *a* and *b* for Borings 12861 through 12869; variables *a, b* and *c* for Borings 12870 through 12874) have been used in the sample identification tables in Appendix C. At the time of sample collection, these sample interval variables will be replaced by the actual depth interval sampled.

Following are three examples, based on the sample identification tables and accompanying notes in Appendix C:

1) At boring location 12860 the objective is to sample the first interval below overlying material. If boring location 12860 had 12 inches of overlying material, interval variable (*a*) (the first 6-inch interval below any overlying material) would be collected from Interval 3. Thus, the sample analytes scheduled in Appendix C for Interval 3 would be replaced by the analytes scheduled for Interval (*a*).

2) At boring locations 12861 through 12869 the objective is to sample the first and second intervals below overlying material. If boring location 12869 had 24 inches of overlying material, sampling interval variable (*a*) (the first 6-inch interval below any overlying material) would be collected at Interval 5 and sampling interval variable (*b*) (the second 6-inch interval below any overlying material) would be collected from Interval 6. Thus, the sample Identifiers and analytes scheduled in Appendix C for Intervals 5 and 6 would be replaced by the sample Identifiers and analytes scheduled for Intervals (*a*) and (*b*).

3) At boring locations 12870 through 12874 the objective is to sample the first three intervals below overlying material. If boring location 12870 had 18 inches of overlying material, interval variable (*a*) (the first interval under any underlying material) will be collected from sampling Interval 4 and Intervals 1, 2, and 3 will not require collection [unless collected as a biased sample (due to PID or beta/gamma field screening results) or as an alpha/beta screen for offsite sample shipment]. Interval variables (*b*) and (*c*) would now be collected from depth intervals 5 and 6.

APPENDIX C

SOIL SAMPLES TO BE COLLECTED FOR THE AREA 4B POTENTIALLY CHARACTERISTIC AREA AND WEST OF PILOT PLANT PREDESIGN INVESTIGATION

NORTHWEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12860	479916.6	1348404.44	Overlying Material	No Sample	N/A	N/A
			a	12860-(*a*)-R	TAL A,B	Total U/Total Thorium, Tc-99
			b	12860-(*b*)-AB	N/A	Gross A/B screen
			c	12860-(*c*)-R	TAL B	Technetium-99
			d	12860-(*d*)-R	TAL B	Technetium-99
			7	12860-7-R	TAL A,B	Total U/Total Thorium, Tc-99
			13	12860-13-R	TAL A	Total U/Total Thorium
			19	12860-19-R	TAL A,B	Total U/Total Thorium, Tc-99
			23	12860-23-R	TAL A	Total U/Total Thorium
			29	12860-29-R	TAL A	Total U/Total Thorium
			35	12860-35-R	TAL A	Total U/Total Thorium
			41	12860-41-R	TAL A	Total U/Total Thorium
			50	12860-50-R	TAL A	Total U/Total Thorium

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: The Gross alpha/beta screen will be required only if a sample for off-site analysis (i.e., volatiles analysis from PID hit) is collected. The soil for the alpha/beta screen will be selected from Interval 2 (below overlying material) or a more appropriate interval as determined by the field sampling lead.
c: Collect and record the third 6-inch interval below any overlying material.
d: Collect and record the fourth 6-inch interval below any overlying material.

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12861	479831.87	1348442.19	Overlying Material	No Sample	N/A	N/A
			a	12861-(*a*)-RM	TAL A,B,D	Total U/Total Th/ Tc-99/Total Mtls
			a	12861-(*a*)-V	Archive	
			b	12861-(*b*)-AB	N/A	Gross A/B screen
			b	12861-(*b*)-L	TAL F	Total Volatiles
			b	12861-(*b*)-TL	TAL G	TCLP Volatiles
			5	12861-5-M	TAL D	Total Metals
			5	12861-5-V	Archive	
			6	12861-6-L	TAL F	Total Volatiles
			6	12861-6-TL	TAL G	TCLP Volatiles
			9	12861-9-M	TAL D	Total Metals
			9	12861-9-V	Archive	
			10	12861-10-L	TAL F	Total Volatiles
			10	12861-10-TL	TAL G	TCLP Volatiles
			11	12861-11-R	TAL A	Total U/Total Th
			15	12861-15-M	TAL D	Total Metals
			15	12861-15-V	Archive	
			16	12861-16-L	TAL F	Total Volatiles
			16	12861-16-TL	TAL G	TCLP Volatiles
			19	12861-19-M	TAL D	Total Metals
			19	12861-19-TM	TAL E	TCLP Metals
			20	12861-20-L	TAL F	Total Volatiles
			20	12861-20-TL	TAL G	TCLP Volatiles
			21	12861-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12861-21-TM	TAL E	TCLP Metals
			22	12861-22-L	TAL F	Total Volatiles
			22	12861-22-TL	TAL G	TCLP Volatiles
			23	12861-23-M	TAL D	Total Metals
			23	12861-23-TM	TAL E	TCLP Metals
			24	12861-24-L	TAL F	Total Volatiles
			24	12861-24-TL	TAL G	TCLP Volatiles
			25	12861-25-R	TAL C	Ra-226, Ra-228
			27	12861-27-RM	TAL A,D	Total U/Th, Total Metals
			27	12861-27-V	Archive	
			28	12861-28-L	TAL F	Total Volatiles
			28	12861-28-TL	TAL G	TCLP Volatiles
			32	12861-32-M	TAL D	Total Metals
			32	12861-32-V	Archive	
			33	12861-33-R	TAL A	Total U/Th
			33	12861-33-L	TAL F	Total Volatiles
			33	12861-33-TL	TAL G	TCLP Volatiles
			34	12861-34-R	TAL C	Ra-226, Ra-228
			35	12861-35-M	TAL D	Total Metals
			35	12861-35-V	Archive	

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12861 (cont.)	479831.87	1348442.19	36	12861-36-L	TAL F	Total Volatiles
			36	12861-36-TL	TAL G	TCLP Volatiles
			39	12861-39-RM	TAL A,D	Total U/Th, Total Metals
			39	12861-39-V	Archive	
			40	12861-40-L	TAL F	Total Volatiles
			40	12861-40-TL	TAL G	TCLP Volatiles
			41	12861-41-R	TAL B,C	Tc-99, Ra-226, Ra-228
			43	12861-43-M	TAL D	Total Metals
			43	12861-43-V	Archive	
			39	12861-39-RM	TAL A,D	Total U/Th, Total Metals
			39	12861-39-V	Archive	
			40	12861-40-L	TAL F	Total Volatiles
			40	12861-40-TL	TAL G	TCLP Volatiles
			41	12861-41-R	TAL B,C	Tc-99, Ra-226, Ra-228
			43	12861-43-M	TAL D	Total Metals
			43	12861-43-V	Archive	
			44	12861-44-L	TAL F	Total Volatiles
			44	12861-44-TL	TAL G	TCLP Volatiles
			45	12861-45-R	TAL A	Total U/Th
			47	12861-47-M	TAL D	Total Metals
			47	12861-47-V	Archive	
			48	12861-48-L	TAL F	Total Volatiles
			48	12861-48-TL	TAL G	TCLP Volatiles
			49	12861-49-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12861-50-M	TAL D	Total Metals
			50	12861-50-V	Archive	

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12862	479827.0	1348434.0	Overlying Material	No Sample	N/A	N/A
			a	12862-(*a*)-RM	TAL A,B,D	Total U/Total Th/ Tc-99/Total Mtls
			a	12862-(*a*)-V	Archive	
			b	12862-(*b*)-AB	N/A	Gross A/B screen
			b	12862-(*b*)-L	TAL F	Total Volatiles
			b	12862-(*b*)-TL	TAL G	TCLP Volatiles
			5	12862-5-M	TAL D	Total Metals
			5	12862-5-V	Archive	
			6	12862-6-L	TAL F	Total Volatiles
			6	12862-6-TL	TAL G	TCLP Volatiles
			9	12862-9-M	TAL D	Total Metals
			9	12862-9-V	Archive	
			10	12862-10-L	TAL F	Total Volatiles
			10	12862-10-TL	TAL G	TCLP Volatiles
			11	12862-11-R	TAL A	Total U/Total Th
			15	12862-15-M	TAL D	Total Metals
			15	12862-15-V	Archive	
			16	12862-16-L	TAL F	Total Volatiles
			16	12862-16-TL	TAL G	TCLP Volatiles
			19	12862-19-M	TAL D	Total Metals
			19	12862-19-TM	TAL E	TCLP Metals
			20	12862-20-L	TAL F	Total Volatiles
			20	12862-20-TL	TAL G	TCLP Volatiles
			21	12862-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12862-21-TM	TAL E	TCLP Metals
			22	12862-22-L	TAL F	Total Volatiles
			22	12862-22-TL	TAL G	TCLP Volatiles
			23	12862-23-M	TAL D	Total Metals
			23	12862-23-TM	TAL E	TCLP Metals
			24	12862-24-L	TAL F	Total Volatiles
			24	12862-24-TL	TAL G	TCLP Volatiles
			25	12862-25-R	TAL C	Ra-226, Ra-228
			27	12862-27-RM	TAL A,D	Total U/Th, Total Metals
			27	12862-27-V	Archive	
			28	12862-28-L	TAL F	Total Volatiles
			28	12862-28-TL	TAL G	TCLP Volatiles
			32	12862-32-M	TAL D	Total Metals
			32	12862-32-V	Archive	
			33	12862-33-R	TAL A	Total U/Th
			33	12862-33-L	TAL F	Total Volatiles
			33	12862-33-TL	TAL G	TCLP Volatiles
			34	12862-34-R	TAL C	Ra-226, Ra-228
			35	12862-35-M	TAL D	Total Metals
			35	12862-35-V	Archive	

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12862 (cont.)	479827.0	1348434.0	36	12862-36-L	TAL F	Total Volatiles
			36	12862-36-TL	TAL G	TCLP Volatiles
			39	12862-39-RM	TAL A,D	Total U/Th, Total Metals
			39	12862-39-V	Archive	
			40	12862-40-L	TAL F	Total Volatiles
			40	12862-40-TL	TAL G	TCLP Volatiles
			41	12862-41-R	TAL B,C	Tc-99, Ra-226, Ra-228
			43	12862-43-M	TAL D	Total Metals
			43	12862-43-V	Archive	
			44	12862-44-L	TAL F	Total Volatiles
			44	12862-44-TL	TAL G	TCLP Volatiles
			45	12862-45-R	TAL A	Total U/Th
			47	12862-47-M	TAL D	Total Metals
			47	12862-47-V	Archive	
			48	12862-48-L	TAL F	Total Volatiles
			48	12862-48-TL	TAL G	TCLP Volatiles
			49	12862-49-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12862-50-M	TAL D	Total Metals
			50	12862-50-V	Archive	

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12863	479823.0	1348437.0	Overlying Material	No Sample	N/A	N/A
			a	12863-(*a*)-RM	TAL A,B,D	Total U/Total Th/ Tc-99/Total Mtls
			a	12863-(*a*)-V	Archive	
			b	12863-(*b*)-AB	N/A	Gross A/B screen
			b	12863-(*b*)-L	TAL F	Total Volatiles
			b	12863-(*b*)-TL	TAL G	TCLP Volatiles
			5	12863-5-M	TAL D	Total Metals
			5	12863-5-V	Archive	
			6	12863-6-L	TAL F	Total Volatiles
			6	12863-6-TL	TAL G	TCLP Volatiles
			9	12863-9-M	TAL D	Total Metals
			9	12863-9-V	Archive	
			10	12863-10-L	TAL F	Total Volatiles
			10	12863-10-TL	TAL G	TCLP Volatiles
			11	12863-11-R	TAL A	Total U/Total Th
			15	12863-15-M	TAL D	Total Metals
			15	12863-15-V	Archive	
			16	12863-16-L	TAL F	Total Volatiles
			16	12863-16-TL	TAL G	TCLP Volatiles
			19	12863-19-M	TAL D	Total Metals
			19	12863-19-TM	TAL E	TCLP Metals
			20	12863-20-L	TAL F	Total Volatiles
			20	12863-20-TL	TAL G	TCLP Volatiles
			21	12863-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12863-21-TM	TAL E	TCLP Metals
			22	12863-22-L	TAL F	Total Volatiles
			22	12863-22-TL	TAL G	TCLP Volatiles
			23	12863-23-M	TAL D	Total Metals
			23	12863-23-TM	TAL E	TCLP Metals
			24	12863-24-L	TAL F	Total Volatiles
			24	12863-24-TL	TAL G	TCLP Volatiles
			25	12863-25-R	TAL C	Ra-226, Ra-228
			27	12863-27-RM	TAL A,D	Total U/Th, Total Metals
			27	12863-27-V	Archive	
			28	12863-28-L	TAL F	Total Volatiles
			28	12863-28-TL	TAL G	TCLP Volatiles
			32	12863-32-M	TAL D	Total Metals
			32	12863-32-V	Archive	
			33	12863-33-R	TAL A	Total U/Th
			33	12863-33-L	TAL F	Total Volatiles
			33	12863-33-TL	TAL G	TCLP Volatiles
			34	12863-34-R	TAL C	Ra-226, Ra-228
			35	12863-35-M	TAL D	Total Metals
			35	12863-35-V	Archive	

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12863 (cont.)	479823.0	1348437.0	36	12863-36-L	TAL F	Total Volatiles
			36	12863-36-TL	TAL G	TCLP Volatiles
			39	12863-39-RM	TAL A,D	Total U/Th, Total Metals
			39	12863-39-V	Archive	
			40	12863-40-L	TAL F	Total Volatiles
			40	12863-40-TL	TAL G	TCLP Volatiles
			41	12863-41-R	TAL B,C	Tc-99, Ra-226, Ra-228
			43	12863-43-M	TAL D	Total Metals
			43	12863-43-V	Archive	
			44	12863-44-L	TAL F	Total Volatiles
			44	12863-44-TL	TAL G	TCLP Volatiles
			45	12863-45-R	TAL A	Total U/Th
			47	12863-47-M	TAL D	Total Metals
			47	12863-47-V	Archive	
			48	12863-48-L	TAL F	Total Volatiles
			48	12863-48-TL	TAL G	TCLP Volatiles
			49	12863-49-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12863-50-M	TAL D	Total Metals
			50	12863-50-V	Archive	

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

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WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12864	479837.33	1348444.0	Overlying Material	No Sample	N/A	N/A
			a	12864-(*a*)-RM	TAL A,B,D	Total U/Total Th/ Tc-99/Total Mtls
			a	12864-(*a*)-V	Archive	
			b	12864-(*b*)-AB	N/A	Gross A/B screen
			b	12864-(*b*)-L	TAL F	Total Volatiles
			5	12864-5-M	TAL D	Total Metals
			5	12864-5-V	Archive	
			6	12864-6-L	TAL F	Total Volatiles
			9	12864-9-M	TAL D	Total Metals
			9	12864-9-V	Archive	
			10	12864-10-L	TAL F	Total Volatiles
			11	12864-11-R	TAL A	Total U/Total Th
			13	12864-13-M	TAL D	Total Metals
			13	12864-13-V	Archive	
			14	12864-14-L	TAL F	Total Volatiles
			17	12864-17-M	TAL D	Total Metals
			17	12864-17-V	Archive	
			18	12864-18-L	TAL F	Total Volatiles
			21	12864-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12864-21-V	Archive	
			22	12864-22-L	TAL F	Total Volatiles
			24	12864-24-R	TAL C	Ra-226, Ra-228
			25	12864-25-M	TAL D	Total Metals
			25	12864-25-V	Archive	
			26	12864-26-L	TAL F	Total Volatiles
			27	12864-27-R	TAL A	Total U/Total Th
			29	12864-29-M	TAL D	Total Metals
			29	12864-29-V	Archive	
			30	12864-30-L	TAL F	Total Volatiles
			31	12864-31-R	TAL C	Ra-226, Ra-228
			33	12864-33-RM	TAL A,D	Total U/Th, Total Metals
			33	12864-33-V	Archive	
			34	12864-34-L	TAL F	Total Volatiles
			37	12864-37-M	TAL D	Total Metals
			37	12864-37-V	Archive	
			38	12864-38-L	TAL F	Total Volatiles
			39	12864-39-R	TAL A	Total U/Total Th
			41	12864-41-RM	TAL B,C,D	Tc-99, Ra-226, Ra-228, Total Mtls
			41	12864-41-V	Archive	
			42	12864-42-L	TAL F	Total Volatiles
			45	12864-45-RM	TAL A,D	Total U/Th, Total Metals
			45	12864-45-V	Archive	
			46	12864-46-L	TAL F	Total Volatiles

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12864 (cont.)	479837.33	1348444.0	49	12864-49-M	TAL D	Total Metals
			49	12864-49-V	Archive	
			50	12864-50-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12864-50-L	TAL F	Total Volatiles

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12865	479826.0	1348448.0	Overlying Material	No Sample	N/A	N/A
			a	12865-(*a*)-RM	TAL A,B,D	Total U/Total Th/ Tc-99/Total Mtls
			a	12865-(*a*)-V	Archive	
			b	12865-(*b*)-AB	N/A	Gross A/B screen
			b	12865-(*b*)-L	TAL F	Total Volatiles
			5	12865-5-M	TAL D	Total Metals
			5	12865-5-V	Archive	
			6	12865-6-L	TAL F	Total Volatiles
			9	12865-9-M	TAL D	Total Metals
			9	12865-9-V	Archive	
			10	12865-10-L	TAL F	Total Volatiles
			11	12865-11-R	TAL A	Total U/Total Th
			13	12865-13-M	TAL D	Total Metals
			13	12865-13-V	Archive	
			14	12865-14-L	TAL F	Total Volatiles
			17	12865-17-M	TAL D	Total Metals
			17	12865-17-V	Archive	
			18	12865-18-L	TAL F	Total Volatiles
			21	12865-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12865-21-V	Archive	
			22	12865-22-L	TAL F	Total Volatiles
			24	12865-24-R	TAL C	Ra-226, Ra-228
			25	12865-25-M	TAL D	Total Metals
			25	12865-25-V	Archive	
			26	12865-26-L	TAL F	Total Volatiles
			27	12865-27-R	TAL A	Total U/Total Th
			29	12865-29-M	TAL D	Total Metals
			29	12865-29-V	Archive	
			30	12865-30-L	TAL F	Total Volatiles
			31	12865-31-R	TAL C	Ra-226, Ra-228
			33	12865-33-RM	TAL A,D	Total U/Th, Total Metals
			33	12865-33-V	Archive	
			34	12865-34-L	TAL F	Total Volatiles
			37	12865-37-M	TAL D	Total Metals
			37	12865-37-V	Archive	
			38	12865-38-L	TAL F	Total Volatiles
			39	12865-39-R	TAL A	Total U/Total Th
			41	12865-41-RM	TAL B,C,D	Tc-99, Ra-226, Ra-228, Total Mtls
			41	12865-41-V	Archive	
			42	12865-42-L	TAL F	Total Volatiles
			45	12865-45-RM	TAL A,D	Total U/Th, Total Metals
			45	12865-45-V	Archive	
			46	12865-46-L	TAL F	Total Volatiles

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12865 (cont.)	479826.0	1348448.0	49	12865-49-M	TAL D	Total Metals
			49	12865-49-V	Archive	
			50	12865-50-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12865-50-L	TAL F	Total Volatiles

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12866	479816.76	1348442.45	Overlying Material	No Sample	N/A	N/A
			a	12866-(*a*)-RM	TAL A,B,D	Total U/Total Th/ Tc-99/Total Mtls
			a	12866-(*a*)-V	Archive	
			b	12866-(*b*)-AB	N/A	Gross A/B screen
			b	12866-(*b*)-L	TAL F	Total Volatiles
			5	12866-5-M	TAL D	Total Metals
			5	12866-5-V	Archive	
			6	12866-6-L	TAL F	Total Volatiles
			9	12866-9-M	TAL D	Total Metals
			9	12866-9-V	Archive	
			10	12866-10-L	TAL F	Total Volatiles
			11	12866-11-R	TAL A	Total U/Total Th
			13	12866-13-M	TAL D	Total Metals
			13	12866-13-V	Archive	
			14	12866-14-L	TAL F	Total Volatiles
			17	12866-17-M	TAL D	Total Metals
			17	12866-17-V	Archive	
			18	12866-18-L	TAL F	Total Volatiles
			21	12866-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12866-21-V	Archive	
			22	12866-22-L	TAL F	Total Volatiles
			24	12866-24-R	TAL C	Ra-226, Ra-228
			25	12866-25-M	TAL D	Total Metals
			25	12866-25-V	Archive	
			26	12866-26-L	TAL F	Total Volatiles
			27	12866-27-R	TAL A	Total U/Total Th
			29	12866-29-M	TAL D	Total Metals
			29	12866-29-V	Archive	
			30	12866-30-L	TAL F	Total Volatiles
			31	12866-31-R	TAL C	Ra-226, Ra-228
			33	12866-33-RM	TAL A,D	Total U/Th, Total Metals
			33	12866-33-V	Archive	
			34	12866-34-L	TAL F	Total Volatiles
			37	12866-37-M	TAL D	Total Metals
			37	12866-37-V	Archive	
			38	12866-38-L	TAL F	Total Volatiles
			39	12866-39-R	TAL A	Total U/Total Th
			41	12866-41-RM	TAL B,C,D	Tc-99, Ra-226, Ra-228, Total Metals
			41	12866-41-V	Archive	
			42	12866-42-L	TAL F	Total Volatiles
			45	12866-45-RM	TAL A,D	Total U/Th, Total Metals
			45	12866-45-V	Archive	
			46	12866-46-L	TAL F	Total Volatiles

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12866 (cont.)	479816.76	1348442.45	49	12866-49-M	TAL D	Total Metals
			49	12866-49-V	Archive	
			50	12866-50-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12866-50-L	TAL F	Total Volatiles

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12867	479818.0	1348431.5	Overlying Material	No Sample	N/A	N/A
			a	12867-(*a*)-RM	TAL A,B,D	Total U/Total Th/ Tc-99/Total Mtls
			a	12867-(*a*)-V	Archive	
			b	12867-(*b*)-AB	N/A	Gross A/B screen
			b	12867-(*b*)-L	TAL F	Total Volatiles
			5	12867-5-M	TAL D	Total Metals
			5	12867-5-V	Archive	
			6	12867-6-L	TAL F	Total Volatiles
			9	12867-9-M	TAL D	Total Metals
			9	12867-9-V	Archive	
			10	12867-10-L	TAL F	Total Volatiles
			11	12867-11-R	TAL A	Total U/Total Th
			13	12867-13-M	TAL D	Total Metals
			13	12867-13-V	Archive	
			14	12867-14-L	TAL F	Total Volatiles
			17	12867-17-M	TAL D	Total Metals
			17	12867-17-V	Archive	
			18	12867-18-L	TAL F	Total Volatiles
			21	12867-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12867-21-V	Archive	
			22	12867-22-L	TAL F	Total Volatiles
			24	12867-24-R	TAL C	Ra-226, Ra-228
			25	12867-25-M	TAL D	Total Metals
			25	12867-25-V	Archive	
			26	12867-26-L	TAL F	Total Volatiles
			27	12867-27-R	TAL A	Total U/Total Th
			29	12867-29-M	TAL D	Total Metals
			29	12867-29-V	Archive	
			30	12867-30-L	TAL F	Total Volatiles
			31	12867-31-R	TAL C	Ra-226, Ra-228
			33	12867-33-RM	TAL A,D	Total U/Th, Total Metals
			33	12867-33-V	Archive	
			34	12867-34-L	TAL F	Total Volatiles
			37	12867-37-M	TAL D	Total Metals
			37	12867-37-V	Archive	
			38	12867-38-L	TAL F	Total Volatiles
			39	12867-39-R	TAL A	Total U/Total Th
			41	12867-41-RM	TAL B,C,D	Tc-99, Ra-226, Ra-228, Total Mtls
			41	12867-41-V	Archive	
			42	12867-42-L	TAL F	Total Volatiles
			45	12867-45-RM	TAL A,D	Total U/Th, Total Metals
			45	12867-45-V	Archive	
			46	12867-46-L	TAL F	Total Volatiles

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12867 (cont.)	479818.0	1348431.5	49	12867-49-M	TAL D	Total Metals
			49	12867-49-V	Archive	
			50	12867-50-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12867-50-L	TAL F	Total Volatiles

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

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WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12868	479827.0	1348430.0	Overlying Material	No Sample	N/A	N/A
			a	12868-(*a*)-RM	TAL A,B,D	Total U/Total Th/ Tc-99/Total Mtls
			a	12868-(*a*)-V	Archive	
			b	12868-(*b*)-AB	N/A	Gross A/B screen
			b	12868-(*b*)-L	TAL F	Total Volatiles
			5	12868-5-M	TAL D	Total Metals
			5	12868-5-V	Archive	
			6	12868-6-L	TAL F	Total Volatiles
			9	12868-9-M	TAL D	Total Metals
			9	12868-9-V	Archive	
			10	12868-10-L	TAL F	Total Volatiles
			11	12868-11-R	TAL A	Total U/Total Th
			13	12868-13-M	TAL D	Total Metals
			13	12868-13-V	Archive	
			14	12868-14-L	TAL F	Total Volatiles
			17	12868-17-M	TAL D	Total Metals
			17	12868-17-V	Archive	
			18	12868-18-L	TAL F	Total Volatiles
			21	12868-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12868-21-V	Archive	
			22	12868-22-L	TAL F	Total Volatiles
			24	12868-24-R	TAL C	Ra-226, Ra-228
			25	12868-25-M	TAL D	Total Metals
			25	12868-25-V	Archive	
			26	12868-26-L	TAL F	Total Volatiles
			27	12868-27-R	TAL A	Total U/Total Th
			29	12868-29-M	TAL D	Total Metals
			29	12868-29-V	Archive	
			30	12868-30-L	TAL F	Total Volatiles
			31	12868-31-R	TAL C	Ra-226, Ra-228
			33	12868-33-RM	TAL A,D	Total U/Th, Total Metals
			33	12868-33-V	Archive	
			34	12868-34-L	TAL F	Total Volatiles
			37	12868-37-M	TAL D	Total Metals
			37	12868-37-V	Archive	
			38	12868-38-L	TAL F	Total Volatiles
			39	12868-39-R	TAL A	Total U/Total Th
			41	12868-41-RM	TAL B,C,D	Tc-99, Ra-226, Ra-228, Total Metals
			41	12868-41-V	Archive	
			42	12868-42-L	TAL F	Total Volatiles
			45	12868-45-RM	TAL A,D	Total U/Th, Total Metals
			45	12868-45-V	Archive	
			46	12868-46-L	TAL F	Total Volatiles

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12868 (cont.)	479827.0	1348430.0	49	12868-49-M	TAL D	Total Metals
			49	12868-49-V	Archive	
			50	12868-50-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12868-50-L	TAL F	Total Volatiles

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12869	479836.5	1348433.5	Overlying Material	No Sample	N/A	N/A
			a	12869-(*a*)-RM	TAL A,B,D	Total U/Total Th/Tc-99/Total Mtls
			a	12869-(*a*)-V	Archive	
			b	12869-(*b*)-AB	N/A	Gross A/B screen
			b	12869-(*b*)-L	TAL F	Total Volatiles
			5	12869-5-M	TAL D	Total Metals
			5	12869-5-V	Archive	
			6	12869-6-L	TAL F	Total Volatiles
			9	12869-9-M	TAL D	Total Metals
			9	12869-9-V	Archive	
			10	12869-10-L	TAL F	Total Volatiles
			11	12869-11-R	TAL A	Total U/Total Th
			13	12869-13-M	TAL D	Total Metals
			13	12869-13-V	Archive	
			14	12869-14-L	TAL F	Total Volatiles
			17	12869-17-M	TAL D	Total Metals
			17	12869-17-V	Archive	
			18	12869-18-L	TAL F	Total Volatiles
			21	12869-21-RM	TAL A,B,D	Total U/Th/Tc-99, Total Metals
			21	12869-21-V	Archive	
			22	12869-22-L	TAL F	Total Volatiles
			24	12869-24-R	TAL C	Ra-226, Ra-228
			25	12869-25-M	TAL D	Total Metals
			25	12869-25-V	Archive	
			26	12869-26-L	TAL F	Total Volatiles
			27	12869-27-R	TAL A	Total U/Total Th
			29	12869-29-M	TAL D	Total Metals
			29	12869-29-V	Archive	
			30	12869-30-L	TAL F	Total Volatiles
			31	12869-31-R	TAL C	Ra-226, Ra-228
			33	12869-33-RM	TAL A,D	Total U/Th, Total Metals
			33	12869-33-V	Archive	
			34	12869-34-L	TAL F	Total Volatiles
			37	12869-37-M	TAL D	Total Metals
			37	12869-37-V	Archive	
			38	12869-38-L	TAL F	Total Volatiles
			39	12869-39-R	TAL A	Total U/Total Th
			41	12869-41-RM	TAL B,C,D	Tc-99, Ra-226, Ra-228, Total Metals
			41	12869-41-V	Archive	
			42	12869-42-L	TAL F	Total Volatiles
			45	12869-45-RM	TAL A,D	Total U/Th, Total Metals
			45	12869-45-V	Archive	
			46	12869-46-L	TAL F	Total Volatiles

WEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below sfc**	**Sample ID**	**Analysis**	**Analyte**
12869 (cont.)	479836.5	1348433.5	49	12869-49-M	TAL D	Total Metals
			49	12869-49-V	Archive	
			50	12869-50-R	TAL A,C	Total U/Th, Ra-226, Ra-228
			50	12869-50-L	TAL F	Total Volatiles

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: Collect and record the second 6-inch interval below any overlying material. The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.

SOUTHWEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below surface**	**Sample ID**	**Analysis**	**Analyte**
12870	479775.72	1348468.81	Overlying Material	No Sample	N/A	N/A
			a	12870-(*a*)-R	TAL A,B	Total U/Total Th/Tc-99
			b	12870-(*b*)-AB	N/A	Gross A/B screen
			c	12870-(*c*)-R	TAL A,B	Total U/Total Th/Tc-99
			5	12870-5-R	TAL A,B	Total U/Total Th/Tc-99
			7	12870-7-R	TAL A,B	Total U/Total Th/Tc-99
			9	12870-9-R	TAL A,B	Total U/Total Th/Tc-99
			11	12870-11-R	TAL A,B	Total U/Total Th/Tc-99
			15	12870-15-R	TAL A,B	Total U/Total Th/Tc-99
			21	12870-21-R	TAL A,B	Total U/Total Th/Tc-99
			25	12870-25-R	TAL A,B	Total U/Total Th/Tc-99
			31	12870-31-R	TAL A,B	Total U/Total Th/Tc-99
			37	12870-37-R	TAL A,B	Total U/Total Th/Tc-99
			43	12870-43-R	TAL A,B	Total U/Total Th/Tc-99
			50	12870-50-R	TAL A,B	Total U/Total Th/Tc-99

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.
c: Collect and record the third 6-inch interval below any overlying material.

SOUTHWEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below surface**	**Sample ID**	**Analysis**	**Analyte**
12871	479785.72	1348469.81	Overlying Material	No Sample	N/A	N/A
			a	12871-(*a*)-R	TAL A,B	Total U/Total Th/Tc-99
			b	12871-(*b*)-AB	N/A	Gross A/B screen
			c	12871-(*c*)-R	TAL A,B	Total U/Total Th/Tc-99
			5	12871-5-R	TAL A,B	Total U/Total Th/Tc-99
			7	12871-7-R	TAL A,B	Total U/Total Th/Tc-99
			9	12871-9-R	TAL A,B	Total U/Total Th/Tc-99
			11	12871-11-R	TAL A,B	Total U/Total Th/Tc-99
			15	12871-15-R	TAL A,B	Total U/Total Th/Tc-99
			21	12871-21-R	TAL A,B	Total U/Total Th/Tc-99
			25	12871-25-R	TAL A,B	Total U/Total Th/Tc-99
			31	12871-31-R	TAL A,B	Total U/Total Th/Tc-99
			37	12871-37-R	TAL A,B	Total U/Total Th/Tc-99
			43	12871-43-R	TAL A,B	Total U/Total Th/Tc-99
			50	12871-50-R	TAL A,B	Total U/Total Th/Tc-99

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.
c: Collect and record the third 6-inch interval below any overlying material.

SOUTHWEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below surface**	**Sample ID**	**Analysis**	**Analyte**
12872	479775.72	1348494.81	Overlying Material	No Sample	N/A	N/A
			a	12872-(*a*)-R	TAL A,B	Total U/Total Th/Tc-99
			b	12872-(*b*)-AB	N/A	Gross A/B screen
			c	12872-(*c*)-R	TAL A,B	Total U/Total Th/Tc-99
			5	12872-5-R	TAL A,B	Total U/Total Th/Tc-99
			7	12872-7-R	TAL A,B	Total U/Total Th/Tc-99
			9	12872-9-R	TAL A,B	Total U/Total Th/Tc-99
			11	12872-11-R	TAL A,B	Total U/Total Th/Tc-99
			15	12872-15-R	TAL A,B	Total U/Total Th/Tc-99
			21	12872-21-R	TAL A,B	Total U/Total Th/Tc-99
			25	12872-25-R	TAL A,B	Total U/Total Th/Tc-99
			31	12872-31-R	TAL A,B	Total U/Total Th/Tc-99
			37	12872-37-R	TAL A,B	Total U/Total Th/Tc-99
			43	12872-43-R	TAL A,B	Total U/Total Th/Tc-99
			50	12872-50-R	TAL A,B	Total U/Total Th/Tc-99

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.
c: Collect and record the third 6-inch interval below any overlying material.

SOUTHWEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below surface**	**Sample ID**	**Analysis**	**Analyte**
12873	479760.72	1348469.81	Overlying Material	No Sample	N/A	N/A
			a	12873-(*a*)-R	TAL A,B	Total U/Total Th/Tc-99
			b	12873-(*b*)-AB	N/A	Gross A/B screen
			c	12873-(*c*)-R	TAL A,B	Total U/Total Th/Tc-99
			5	12873-5-R	TAL A,B	Total U/Total Th/Tc-99
			7	12873-7-R	TAL A,B	Total U/Total Th/Tc-99
			9	12873-9-R	TAL A,B	Total U/Total Th/Tc-99
			11	12873-11-R	TAL A,B	Total U/Total Th/Tc-99
			15	12873-15-R	TAL A,B	Total U/Total Th/Tc-99
			21	12873-21-R	TAL A,B	Total U/Total Th/Tc-99
			25	12873-25-R	TAL A,B	Total U/Total Th/Tc-99
			31	12873-31-R	TAL A,B	Total U/Total Th/Tc-99
			37	12873-37-R	TAL A,B	Total U/Total Th/Tc-99
			43	12873-43-R	TAL A,B	Total U/Total Th/Tc-99
			50	12873-50-R	TAL A,B	Total U/Total Th/Tc-99

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.
c: Collect and record the third 6-inch interval below any overlying material.

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SOUTHWEST OF PILOT PLANT						
Location	**Northing**	**Easting**	**6" Interval below surface**	**Sample ID**	**Analysis**	**Analyte**
12874	479775.72	1348454.81	Overlying Material	No Sample	N/A	N/A
			a	12874-(*a*)-R	TAL A,B	Total U/Total Th/Tc-99
			b	12874-(*b*)-AB	N/A	Gross A/B screen
			c	12874-(*c*)-R	TAL A,B	Total U/Total Th/Tc-99
			5	12874-5-R	TAL A,B	Total U/Total Th/Tc-99
			7	12874-7-R	TAL A,B	Total U/Total Th/Tc-99
			9	12874-9-R	TAL A,B	Total U/Total Th/Tc-99
			11	12874-11-R	TAL A,B	Total U/Total Th/Tc-99
			15	12874-15-R	TAL A,B	Total U/Total Th/Tc-99
			21	12874-21-R	TAL A,B	Total U/Total Th/Tc-99
			25	12874-25-R	TAL A,B	Total U/Total Th/Tc-99
			31	12874-31-R	TAL A,B	Total U/Total Th/Tc-99
			37	12874-37-R	TAL A,B	Total U/Total Th/Tc-99
			43	12874-43-R	TAL A,B	Total U/Total Th/Tc-99
			50	12874-50-R	TAL A,B	Total U/Total Th/Tc-99

a: Collect and record the first 6-inch interval below any overlying material (i.e., cement, sand, gravel, etc.).
b: The Gross alpha/beta screen will be collected from Interval 2 or a more appropriate interval as determined by the field sampling lead.
c: Collect and record the third 6-inch interval below any overlying material.

APPENDIX D

TARGET ANALYTE LISTS

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TAL 20200-PSP-0008-A

Soil Analysis, On-Site – ICP/MS (ASL B)

Analyte	FRL Limit	Requested Minimum Detection Limit
Total Uranium	20 mg/kg	2.0 mg/kg
Total Thorium	1.5 pCi/g*	.15 pCi/g*

* Reported in concentration units (mg/kg) by ICP/MS

TAL 20200-PSP-0008-B

Soil Analysis, On-Site – Gas Proportional Count (ASL B)

Analyte	WAC Limit	Requested Minimum Detection Limit
Technetium-99	29.1 pCi/g	2.9 pCi/g

TAL 20200-PSP-0008-C

Soil Analysis, On-Site (ASL B)

Analyte	FRL Limit	Requested Minimum Detection Limit
Radium-226	1.7 pCi/g	.17 pCi/g
Radium-228	1.8 pCi/g	.18 pCi/g

TAL 20200-PSP-0008-D

Soil Inorganics Analysis, On-Site - ICP/AES (ASL B)

Analyte	RCRA Limit*	Requested Minimum Detection Limit
Total Barium	2000 mg/kg	200 mg/kg
Total Lead	100 mg/kg	10 mg/kg
Total Chromium	100 mg/kg	10 mg/kg

* Based on "20-times" rule

TAL 20200-PSP-0008-E

Soil TCLP Inorganics Analysis, On-Site - ICP/AES (ASL B)

Analyte	RCRA Limit	Requested Minimum Detection Limit
TCLP Barium	100 mg/L	10 mg/L
TCLP Lead	5 mg/L	0.5 mg/L
TCLP Chromium	5 mg/L	0.5 mg/L

TAL 20200-PSP-0008-F

Soil and Water VOC Analysis, Off-Site (ASL B)

Analyte	FRL - Soil	Requested Minimum Detection Limit Waters - µg/L, Soils - µg/kg
Chloromethane	N/A	10
Bromomethane	8,200 mg/kg	10
Vinyl Chloride	0.13 mg/kg	10
Chloroethane	N/A	10
Methylene Chloride	37 mg/kg	10
Acetone	43,000 mg/kg	10
Carbon Disulfide	5,000 mg/kg	10
1,1-Dichloroethene	0.41 mg/kg	10
1,1-Dichloroethane	N/A	10
Total 1,2-Dichloroethene	0.16 mg/kg	10
Chloroform	45 mg/kg	10
1,2-Dichloroethane	N/A	10
2-Butanone	N/A	10
1,1,1-Trichloroethane	N/A	10
Carbon Tetrachloride	2.1 mg/kg	10
Bromodichloroemethane	4.0 mg/kg	10
1,2-Dichloropropane	N/A	10
Cis-1,3-Dichloropropene	N/A	10
Trichloroethene	25 mg/kg	10
Dibromochloromethane	N/A	10
1,1,2-Trichloroethane	4.3 mg/kg	10
Benzene	850 mg/kg	10
Trans-1,3-Dichloropropene	N/A	10
Bromoform	31 mg/kg	10
4-Methyl-2-pentanone	2,500 mg/kg	10
2-Hexanone	3.6 mg/kg	10
Tetrachloroethene	N/A	10
1,1,2,2-Tetrachloroethene	100,000 mg/kg	10
Toluene	340 mg/kg	10
Chlorobenzene	340 mg/kg	10
Ethylbenzene	5,100 mg/kg	10
Styrene	N/A	10
Xylenes (total)	920,000 mg/kg	10

TAL 20200-PSP-0008-G

Soil TCLP VOC Analysis, Off-Site (ASL B)

Analyte	RCRA Limit	Requested Minimum Detection Limit
TCLP Benzene	0.5 mg/L	.05 mg/L
TCLP Carbon Tetrachloride	0.5 mg/L	.05 mg/L
TCLP Chlorobenzene	100 mg/L	10 mg/L
TCLP Chloroform	6.0 mg/L	0.6 mg/L
TCLP 1,2-Dichloroethane	0.5 mg/L	.05 mg/L
TCLP 1,1-Dichloroethene	0.7 mg/L	.07 mg/L
TCLP 2-Butanone	200 mg/L	20 mg/L
TCLP Tetrachloroethene	0.7 mg/L	.07 mg/L
TCLP Trichloroethene	0.5 mg/L	.05 mg/L
TCLP Vinyl Chloride	0.2 mg/L	.02 mg/L

TAL 20200-PSP-0008-H

Water Analysis (screen for shipping categorization), On-Site – ICP/MS (ASL B)

Analyte	Requested Minimum Detection Limit
Total Uranium	1.0 µg/L