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# PROJECT SPECIFIC PLAN FOR SAMPLING THE WESTERN SECTION OF REMOVAL ACTION 17 STOCKPILE 1 FOR OSDF WAC ATTAINMENT

## SOIL AND DISPOSAL FACILITY PROJECT

**FERNALD ENVIRONMENTAL MANAGEMENT PROJECT**
**FERNALD, OHIO**

INFORMATION ONLY

**MARCH 10, 2000**

**U.S. DEPARTMENT OF ENERGY**
**FERNALD AREA OFFICE**

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**20200-PSP-0006**

**Revision B**
**Draft**

**March 10, 2000**

APPROVAL:

| | |
|---|---|
| Rich Abitz, Stockpile 1 Project Manager<br>Soil and Disposal Facility Project | Date |
| John Centers, SP-1 Characterization Lead<br>Soil and Disposal Facility Project | Date |
| Linda Barlow, Excavation Manager<br>Waste Acceptance Organization | Date |
| Frank Thompson, Quality Assurance<br>Soil and Water Projects | Date |

**FERNALD ENVIRONMENTAL MONITORING PROJECT**

**Fluor Daniel Fernald**
**P.O. Box 538704**
**Cincinnati, Ohio 45253-8704**

# TABLE OF CONTENTS

1.0 Introduction ..... 1-1
1.1 Purpose ..... 1-1
1.2 Stockpile History ..... 1-1
1.3 Determination of SP-1 WAC COCs ..... 1-2
1.3.1 Existing Data ..... 1-2
1.3.2 COCs ..... 1-2
1.4 Scope ..... 1-3
1.5 Key Project Personnel ..... 1-5

2.0 Sampling Strategy ..... 2-1
2.1 Determination of Number of Samples ..... 2-1
2.2 Selection of Sample Locations ..... 2-1
2.3 Sample Collection Methods ..... 2-2
2.3.1 Geoprobe® Methods ..... 2-3
2.3.2 Manual Sampling Methods ..... 2-3
2.3.3 Biased Sample Selection ..... 2-3
2.3.4 Soil Sample Processing and Analysis ..... 2-5
2.4 Sample Identification ..... 2-5
2.5 Equipment Decontamination ..... 2-6
2.6 Sample Handling and Shipping ..... 2-6

3.0 Real-Time Radiological Scanning ..... 3-1
3.1 Radiation Measurement System Scanning Coverage ..... 3-1
3.2 HPGe Detector Measurements ..... 3-2
3.3 Determining Need for Additional HPGe Measurements ..... 3-2
3.4 Real-Time Measurement Identification ..... 3-3
3.5 Data Mapping ..... 3-4
3.6 Sample Collection Based on RMS and HPGe Measurements ..... 3-4

4.0 Quality Assurance/Quality Control Requirements ..... 4-1
4.1 Field Quality Control Samples, Analytical Requirements, and Data Validation ..... 4-1
4.2 Applicable Procedures, Documents and Manuals ..... 4-2
4.3 Project Requirements for Independent Assessments ..... 4-3
4.4 Implementation of Field Changes ..... 4-3

5.0 Health and Safety ..... 5-1

6.0 Data Management ..... 6-1

Appendix A Data Quality Objectives SL-048, Rev. 5 and SL-055, Rev. 0
Appendix B Target Analyte Lists
Appendix C SP-1 Primary/Secondary/Confirmation Soil Samples
Appendix D Summary of Existing Data on SP-1

## LIST OF TABLES

Table 1-1 WAC COCs for SP-1
Table 1-2 Key Project Personnel
Table 2-1 Sampling and Analytical Requirements

## LIST OF FIGURES

Figure 1-1 Location of Stockpile SP-1
Figure 2-1 Topographical Map of SP-1
Figure 2-2 Sampling Locations for the Western Section of SP-1

## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ASL | analytical support level |
| ccpm | corrected counts per minute |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| COCs | constituents of concern |
| cy | cubic yards |
| DQO | Data Quality Objectives |
| FACTS | Fernald Analytical Customer Tracking System |
| GPC | Gas Proportional Count |
| GPS | Global Positioning System |
| HPGe | high-purity germanium |
| ICP/MS | Inductively Coupled Plasma/Mass Spectroscopy |
| LAN | Local Area Network |
| mg/kg | milligrams per kilogram |
| mL | milliliter |
| MTL | Material Tracking Location |
| NaI | sodium iodide |
| OSDF | On-Site Disposal Facility |
| pCi/g | picoCuries per gram |
| PID | photoionization detector |
| ppm | parts per million |
| PQL | practical quantitation limit |
| PSP | Project Specific Plan |
| QA | Quality Assurance |
| RCRA | Resource Conservation and Recovery Act |
| RI/FS | Remedial Investigation/Feasibility Study |
| RMS | Radiation Measurement System |
| RSS | Radiation Scanning System |
| RTRAK | Real Time Radiation Tracking System |
| RWP | Radiological Work Permit |
| SCQ | Sitewide CERCLA Quality Assurance Project Plan |
| SDFP | Soil and Disposal Facility Project |
| SED | Sitewide Environmental Database |
| SEP | Sitewide Excavation Plan |
| SP-1 | Removal Action 17 Stockpile 1 |
| SP-2 | Removal Action 17 Stockpile 2 |
| SP-4 | Removal Action 17 Stockpile 4 |
| SP-5 | Removal Action 17 Stockpile 5 |
| STP | Sewage Treatment Facility |
| SVOC | semi-volatile organic compound |
| TAL | Target Analyte List |
| TCLP | Toxicity Characteristic Leaching Procedure |
| µg/kg | micrograms per kilogram |
| 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 evaluate attainment of the On-Site Disposal Facility (OSDF) waste acceptance criteria (WAC) for soil contained in the western section of Removal Action 17 Stockpile 1 (SP-1), as required by the Sitewide Excavation Plan (SEP) and the WAC Attainment Plan for the OSDF. The stockpile location is shown on Figure 1-1. The sampling strategy presented in this PSP includes random and biased physical sampling throughout the stockpile and real-time gamma spectrometry measurements over the stockpile surfaces. This approach is identical to the WAC attainment sampling performed on the eastern section of SP-1.

This PSP fulfills the requirements of the SEP and the WAC Attainment Plan for the OSDF for developing predesign investigation plans and for documenting the justification for selection of stockpile-specific WAC constituents of concern (COCs). The data generated under this PSP will be used to 1) demonstrate that soil meeting the OSDF WAC may be bulk excavated and placed in the OSDF; 2) identify areas of soil which exceed the OSDF WAC, if any, and 3) apply the excavation approach to the stockpile.

## 1.2 STOCKPILE HISTORY

SP-1 [Material Tracking Location (MTL) W800051] is located in the northern portion of the Former Production Area, south of the OSDF Haul Road, west of the Decontamination Pad, and east of SP-4 (see Figure 1-1). In 1991, SP-1 was officially designated as part of Removal Action 17. SP-1 is divided into two distinct sections, the western section and the eastern section. The western section of SP-1 consists of approximately 2,160 cubic yards (cy) of soil and 80 cy of debris. The western section was created in 1997 by various projects, including:

- Soil generated during OSDF Haul Road construction,
- Soil from construction of the effluent line for the new Sewage Treatment Plant (STP),
- Soil from the removal of the old STP effluent line in the production area,
- Soil from the utility isolations at Plant 8,
- Soil from the new lab expansion project,
- Soil from the B Street water line repair project.

The eastern section of SP-1 was sampled in 1999 and met WAC. That sampling event was covered under a separate PSP (PSP for Sampling of Removal Action 17 Stockpiles 1, 2, and 4 for OSDF WAC Attainment).

The eastern and western sections of SP-1 are separated by construction fence, radiological control rope, and signs stating that entry to the eastern section is only allowed with an approved Radiological Work Permit (RWP). In addition, the entire stockpile is surrounded by a locked chainlink fence. In order to minimize potential cross-contamination between the two sides of the pile, a silt fence was installed at the top of the western slope (to the west of the north/south dividing line). Biased samples will be taken along this dividing line to confirm that no above-WAC soil from the western section has contaminated the eastern section of the stockpile. These samples will be located on the eastern side of the silt fence. Weekly inspections of the stockpile and silt fence have been performed in accordance with procedure EW-1023, Management of Stockpiles. The silt fence, combined with a vegetative cover over the western section, has helped minimize potential cross-contamination between the two sides of the stockpile.

## 1.3 DETERMINATION OF SP-1 WAC COCS

### 1.3.1 Existing Data

The existing data on the western section of SP-1 were collected in 1997 and 1998 on soil that was excavated during construction of the haul road north of the Vitrification Plant crossing and from soil excavated during removal of the old STP effluent line, including the Plant 8 General Sump effluent line. These data are presented in Appendix D and contain only the WAC COCs.

### 1.3.2 COCs

The OSDF WAC Attainment Plan requires that all 18 WAC COCs and Resource Conservation and Recovery Act (RCRA) toxicity characteristic COCs be considered when sampling is conducted on stockpiles. The following discussion evaluates these constituents and proposes the final list of WAC attainment COCs for SP-1, which are summarized in Table 1-1.

#### Radionuclides

Radionuclide WAC COCs for the OSDF are total uranium, technetium-99, neptunium-237, and strontium-90. Above-WAC concentrations of total uranium and technetium-99 have been detected in many areas of the site, and therefore are WAC COCs for SP-1. The OSDF WAC limits for

neptunium-237 and strontium-90, however, are much higher than detected concentrations at the site. The WAC for neptunium-237 is 3.12 x $10^9$ picoCuries per gram (pCi/g), while the highest soil activity measured on site for neptunium-237 is 37.2 pCi/g and the existing data for SP-1 had no values greater than minimum detectable concentration. Similarly, the WAC for strontium-90 is 5.67 x $10^{10}$ pCi/g, while the highest soil activity measured on site for strontium-90 is 47.6 pCi/g and the highest activity for the existing data for SP-1 was 2.7 pCi/g. Therefore, neptunium-237 and strontium-90 will not be WAC COCs for SP-1.

Organics

OSDF WAC are established for 12 organic compounds, including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and pesticides. One VOC (chloroethane) and one pesticide (toxaphene) have WAC limits that are significantly higher than the highest concentrations detected on site [2,600 milligrams per kilogram (mg/kg) maximum detected concentration versus a 3.92 x $10^5$ WAC limit for chloroethane and 10 mg/kg maximum detected concentration versus a 1.06 x $10^5$ WAC limit for toxaphene]. These compounds are not expected to be present in SP-1 at levels that approach the established WAC. However, because the origin of most of the material in the western section of SP-1 comes from the process area of the FEMP, all of the other organic compounds will be WAC COCs for the stockpile (see Table 1-1). Since analysis of chloroethane and toxaphene will not result in added laboratory costs, they will also be included as COCs.

Of the three SVOCs, carbazole has a WAC limit significantly higher than the highest concentrations detected on site. The highest on-site concentration of carbazole is 89 mg/kg, while the WAC limit is 7.27 x $10^4$ mg/kg. The other two SVOCs, bis(2-chloroisopropyl)ether and 4-nitroaniline, have no history of use during site operations. During previous laboratory analyses, the practical quantitation limit (PQL) for 4-nitroaniline (0.9 mg/kg) and bis(2-chloroisopropyl)ether (0.22 mg/kg ) was well above the WAC established for these two compounds. Therefore, 4-nitroaniline and bis(2-chloroisopropyl)ether will be retained as WAC COCs for SP-1 using the EPA Contract Laboratory Program Contract Required Detection Limits of 830 micrograms per kilogram (µg/kg) and 330 µg/kg, respectively, as default WAC attainment values since it is not feasible with current analytical methods to achieve detection limits at the WAC established for these two constituents. Because carbazole is not expected at levels that approach the established WAC and because the number of estimated detections reported for bis(2-chloroisopropyl)ether and 4-nitroaniline comprise less than 1 percent of the total number of

samples analyzed to date, the number of samples analyzed for these SVOCs under this PSP will be limited to 20 percent of the total number of random samples collected.

The following is the list of organic WAC COCs for the western section of SP-1:

- alpha-chlordane
- bromodichloromethane
- 1,1-dichloroethene
- tetrachloroethene
- vinyl chloride
- bis(2-chloroisopropyl)ether
- toxaphene
- chloroethane
- 1,2-dichloroethene
- trichloroethene
- carbazole
- 4-nitroaniline.

Metals

OSDF WAC are established for total boron and mercury; WAC were not established for any other non-radionuclide metals. Boron and mercury have not been detected on site at concentrations near the OSDF WAC limits. There were no existing boron data for SP-1; however, the highest detectable on-site concentration of total boron is 36 mg/kg, while the WAC is 1,040 mg/kg. The highest on-site concentration of total mercury is 130.9 mg/kg; however, the highest concentration of total mercury in the existing SP-1 data is only 4.6 mg/kg and the WAC for total mercury is 56,600 mg/kg. Because the highest site concentrations are significantly lower than the OSDF WAC limits, these metals will not be WAC COCs for SP-1.

Characteristic Hazardous Constituents

In the SEP, there are seven geographic areas around the site that have been identified as potential RCRA areas which require toxicity characteristic leaching procedure (TCLP) analysis of the waste stream prior to disposal. Outside the boundaries of these geographic areas, no additional analytical data will be required to screen for the presence of toxicity characteristic waste before placement in the OSDF. None of the soil that has been excavated and placed into the western section of SP-1 came from any of these seven RCRA areas; therefore, TCLP analysis will not be required for this soil.

## 1.4 SCOPE

Under this PSP, real-time measurements and physical sampling will be performed on SP-1 to identify and bound soil with contaminant concentrations above the OSDF WAC. Following review of the sample results, additional samples may be collected beyond those identified in this PSP if the extent of above-WAC material has not been adequately bound. In this situation, a variance to this PSP will be written. 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 Objectives (DQO) SL-048, Revision 5 (see Appendix A), and DQO SL-055, Revision 0 (see Appendix A).

Design of the excavation for SP-1 is not included in the scope of this PSP.

## 1.5 KEY PROJECT PERSONNEL

Team members responsible for coordination of work in accordance with this PSP are listed in Table 1-2.

**TABLE 1-1**
**WAC COCs FOR SP-1**

| SP-1 |
|---|
| Total Uranium |
| Technetium-99 |
| Alpha-chlordane |
| Toxaphene |
| Bromodichloromethane |
| Chloroethane |
| 1,1-dichloroethene |
| 1,2-dichloroethene |
| Tetrachloroethene |
| Trichloroethene |
| Vinyl Chloride |
| Carbazole |
| bis(2-chloroisopropyl)ether |
| 4-nitroaniline |

**TABLE 1-2**
**KEY PROJECT PERSONNEL**

| Title | Primary | Alternate |
|---|---|---|
| DOE Contact | Rob Janke | Kathi Nickel |
| SP-1 Project Manager | Rich Abitz | Jyh-Dong Chiou |
| SP-1 Characterization Lead | John Centers | Bill Westerman |
| Real-Time Characterization Lead | Brian McDaniel | Dave Allen |
| Field Sampling Lead | Tom Buhrlage | Jim Hey |
| Surveying Lead | Jim Schwing | Jim Capannari |
| Waste Acceptance Organization (WAO) Stockpile Contact | Linda Barlow | Christa Walls |
| FEMP Sample Management Office Contact | Audrey Hannum | Grace Ruesink |
| Data Management Lead | Bill Westerman | Christine Messerly |
| Field Data Validation Contact | Jenine Rogers | Jim Cross |
| Data Validation Contact | Jim Chambers | Jim Cross |
| Quality Assurance Contact | Reinhard Friske | Mary Eleton |
| Health and Safety Contact | Debbie Grant | Lewis Wiedeman |

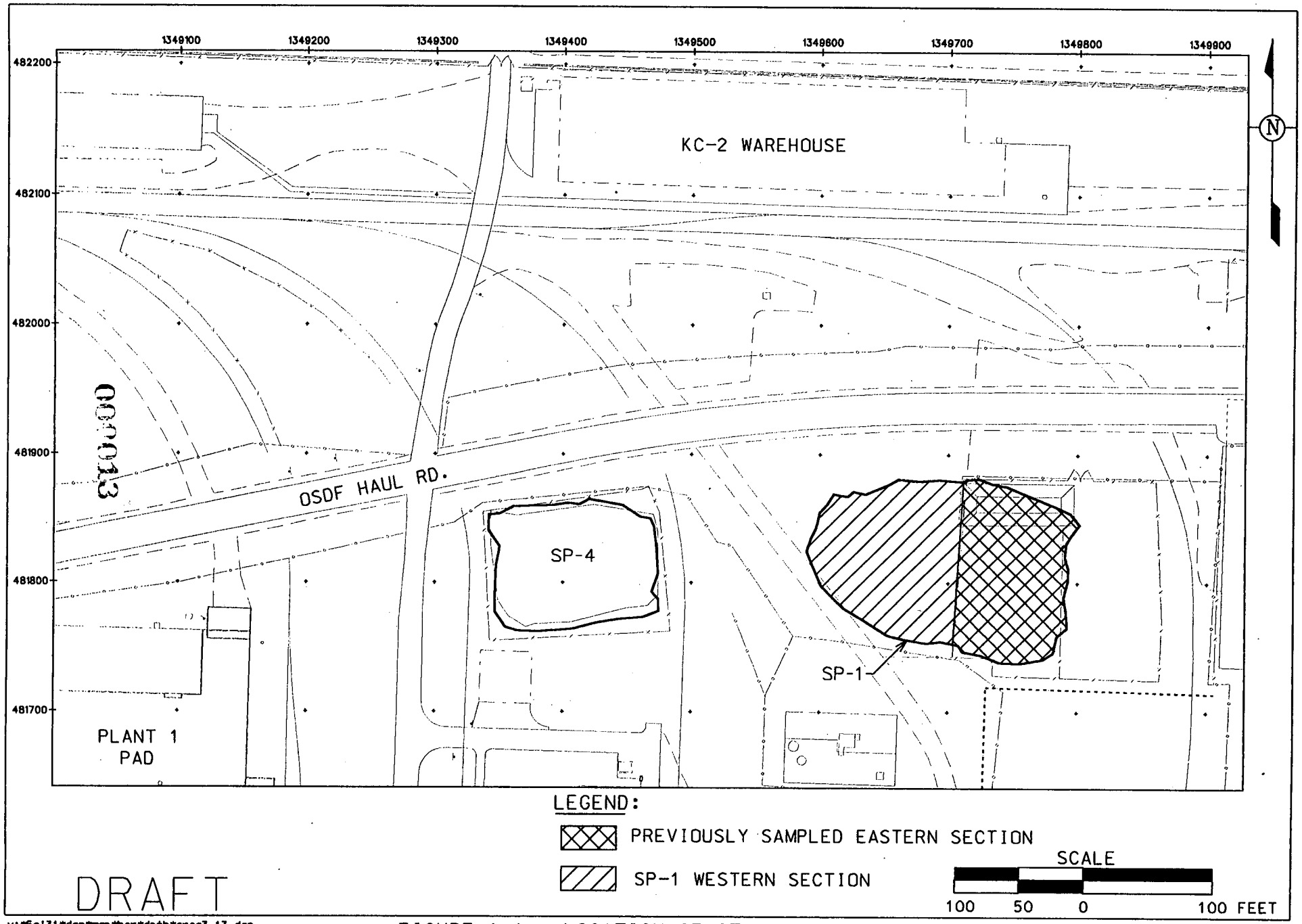


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FIGURE 1-1. LOCATION OF STOCKPILE SP-1

09-MAR-2000

# 2.0 SAMPLING STRATEGY

## 2.1 DETERMINATION OF NUMBER OF SAMPLES

In accordance with the SEP and OSDF WAC Attainment Plan, the number of samples determined to adequately characterize the western section of SP-1 is based on the current data set, the OU5 Remedial Investigation/Feasibility Study (RI/FS) sampling density in the Former Production Area, process knowledge of the stockpile, and sampling density in previous soil stockpile sampling projects. Based on these requirements, a minimum of 14 samples will be collected from this stockpile.

Based on previous sampling projects of Removal Action 17 Stockpiles 1, 2, and 4 (SP-1, SP-2, and SP-4), an analytical frequency has been established for the WAC COCs. All the random samples from SP-1 will be analyzed for total uranium and technetium-99. Fifty percent of the random samples from SP-1 (five) will be analyzed for VOCs and pesticides. Twenty percent of the random samples from SP-1 (two) will be analyzed for SVOCs.

The sample density for the western section of SP-1 translates to an average of one sample per 216 cy, which is a higher density relative to the WAC attainment sampling activities performed for other soil piles (i.e., SP-2, SP-4 and the eastern section of SP-1 had sample density of one sample per 230 cy, Area 1, Phase I West Impacted Soil Stockpile = one sample per 420 cubic yards, and Removal Action 17 Stockpile 5 (SP-5) = one sample per 350 cy).

## 2.2 SELECTION OF SAMPLE LOCATIONS

Sample locations and depths are based on both a combination of systematic grid/random approach and biased sampling at the random boring locations. A minimum of 14 samples will be collected through this integrated sampling strategy for this stockpile; other samples may be collected from the soil cores, depending on field beta/gamma and photoionization detector (PID) readings. Additional surface soil samples may be collected based on scans by the sodium iodide (NaI) and high-purity germanium (HPGe) detector systems (see Section 3.0).

A systematic approach was used to establish a sample grid over the stockpile surface. The grid pattern was based on surface area and consists of 10 grid blocks of approximately equal size. A primary random sample location (northing and easting coordinate) and depth interval was selected within each block as

shown on Figure 2-2. Secondary random sample locations and depths were also selected in the event that the primary sample cannot be taken. The primary and secondary random sample and depth intervals are presented in Appendix C. Sample locations will be surveyed (northing, easting, and elevation) and that information will be recorded.

In addition to the primary and secondary random samples chosen in the grids, there will also be four confirmation samples collected along the east side of the silt fence that runs the length of the dividing line between the eastern and western sections of SP-1. These samples will be taken to confirm that no above-WAC soil from the western section of SP-1 has contaminated the previously sampled eastern section. These four samples will be taken to a depth of 1 foot and analyzed for the TALs designated in Appendix C (Table C-3).

## 2.3 SAMPLE COLLECTION METHODS

Samples will be collected using the Geoprobe® Model 5400 in accordance with procedure EQT-06, Geoprobe® Model 5400 B Operation and Maintenance, where locations support the safe operation of the Geoprobe® vehicle. Otherwise, hand augering or direct-push liner sampling will be conducted, in accordance with procedure SMPL-01, Solids Sampling. At each sampling location, the surface vegetation within a 6-inch radius of the sample point will be removed using a stainless steel trowel or by hand with clean nitrile gloves while taking care to minimize the removal of any soil.

Soil samples will be collected from the 1-foot intervals identified in Appendix C. If additional volume is necessary, additional cores will be collected. The sample depth intervals will be recorded on the appropriate field documentation.

All borings will be taken completely through the soil pile, from the surface of the pile to a depth of one foot below the base of the pile, for field screening purposes. Estimated boring depths for each sample location are listed in Appendix C. If the primary random sample location cannot be collected, the secondary random sample location will be selected. If refusal or resistance is encountered during the secondary soil boring location, additional borings within a 3-foot radius will be attempted to collect the specified samples. If this is necessary, borings will not be moved across grid lines. All encounters with subsurface debris will be noted in the field log in order to characterize the pile for debris content. All

debris will be discarded from the sample volume. Disposition of excess soil and decontamination water will be determined by the Field Sampling Lead and the WAO stockpile contact.

### 2.3.1 Geoprobe® Methods

A Geoprobe® Macro-Core sampler will be advanced in approximately 12 to 48-inch increments to collect the target depth intervals for the soil samples specified in Appendix C. The Macro-Core collects a 1.5-inch diameter soil core. Multiple cores may be collected at each sampling location (not to exceed 1 foot apart) to obtain sufficient sample volume for analysis if complete sample recovery is not obtained. Borehole collapse will be monitored during core sampling to ensure minor sidewall slough is accounted for during coring and sample collection. If significant borehole collapse occurs, a closed-tube, piston-type core sampler (Macro-Core) will be employed which is closed during advancement to the sample interval, then opened to collect the discrete interval of interest. The Macro-Core sampling method will utilize a disposable plastic liner insert in which the soil core is recovered.

### 2.3.2 Manual Sampling Methods

If Geoprobe® accessibility is not possible, soil samples will be collected using a hand auger (typically 3-inch diameter) or other methods in specified in SMPL-01. The hand auger will be advanced in approximately one foot increments down to the target depth intervals for the soil samples specified in Appendix C. As with core sampling, multiple holes at one sampling location (not to exceed 1 foot apart) may have to be augered to obtain sufficient volume for laboratory analysis. Borehole collapse will be monitored during core sampling to ensure sidewall slough is accounted for during augering and sample collection. The borehole will be manually collapsed following sample collection to eliminate the possibility of injury to workers. For surface samples, a direct-push liner (1 foot length) may be used to collect the samples from the 0 to 1-foot interval. Surface samples may be required as a result of real-time radiological scanning, as discussed in Section 3.0.

### 2.3.3 Biased Sample Selection

Each boring location will be screened for VOCs using a PID and radiologically screened using a beta/gamma (Geiger-Mueller) survey meter. Any concrete and debris will be removed from the samples to the extent practical prior to screening.

The entire length of each boring will be screened using a PID. For hand auger borings, each one foot push will be placed in a clean tray prior to PID screening. For Geoprobe® cores, the core liners will be opened for PID screening. Any 1 foot sample interval with an above-background reading on the PID will be subjected to a headspace analysis in accordance with procedure EQT-04, Photoionization Detector. If the result of the headspace analysis is above 10 parts per million (ppm), the 1-foot sample interval will be submitted for total VOC analysis. If the entire boring is below background on the initial PID screening or if all headspace analysis results are less than 10 ppm, no biased sample will be collected from that boring for VOC analysis. If four or more consecutive 1-foot intervals have head-space analysis results above 10 ppm, the following samples will be sent to the lab:

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

If biased VOC samples are being collected from a boring and if the designated random sample interval is not above background on the PID scan or does not exceed 10 ppm head-space analysis, the biased sample interval will replace the random interval for total VOC analysis only. All other analytes will be collected from the designated random sample interval.

The entire length of the soil core, or the cuttings in the case of augering, will be surveyed to determine the intervals with beta/gamma readings above 400 corrected counts per minute (ccpm). The identified 1-foot intervals will be sampled and analyzed for total uranium only. If the entire soil core is found to be less than 400 ccpm, then no high-biased sample will be collected from that boring for total uranium analysis. Archive samples will be collected from the 1-foot intervals above and below any sample intervals that are above 400 ccpm. If the interval above or below is already designated for sampling, then no additional archive sample will be necessary in that direction. In the event that biased sample intervals are above the total uranium WAC, the archive samples may be submitted for analysis in an attempt to vertically bound the contamination. Excess sample material collected for analysis and archive

purposes will be returned to SP-1 prior to completion of the soil pile excavation. All biased samples and associated analysis will be documented in a Variance/Field Change Notice (V/FCN).

2.3.4 Soil Sample Processing and Analysis

The Geoprobe® soil cores will be laid out on clean plastic, and the appropriate sample intervals will be separated from the core to obtain the necessary samples. Any debris (e.g., wood, concrete, metal) contained in a sample interval will be removed from the sample in the field. For hand augering sampling locations, the soil cuttings collected from the target sample interval will be placed in a clean tray prior to transfer to a sample container so that the interval can be screened with a PID as described in Section 2.3.3. VOC samples from hand augering locations will be immediately placed in the sample container following screening. Sample volume and analysis information is summarized in Table 2-1.

Samples being analyzed for radiological constituents will be sent to the on-site laboratory for analysis. The VOC, SVOC, and pesticide samples will be sent to the Sample Processing Laboratory, where they will be prepared for shipment to an approved off-site laboratory. One alpha/beta screening sample will be collected and analyzed on site for any sample interval that exceeds the field screening beta/gamma trigger level of 400 ccpm. The laboratories will analyze the samples for the appropriate Target Analyte List (TAL), as identified in Appendix B.

## 2.4 SAMPLE IDENTIFICATION

All physical soil samples collected for laboratory analysis will be assigned a unique sample identifier, as listed in Appendix C. This identifier will consist of a prefix designating the area name (SP1), followed by the sample point number (11 through x), followed by a letter designating the type of sample ("R" for radionuclides, "L" for VOCs, "S" for SVOCs, "P" for pesticides, and "AB" for alpha/beta). [Note that sample numbers SP1-1 through SP1-10 were previously used on the sampling project for the eastern section of SP-1]. For example:

SP1-12-P is the sample collected at sample point 12 in SP-1 and is being analyzed for pesticides.

Biased samples collected as a result of PID and beta/gamma surveys will have a "B" followed by a sequential number 1 through x inserted after the sample point number. For example:

SP1-12-B-3-R is the third biased sample collected at sample point 12 in SP-1 and is being analyzed for radionuclides.

Any archive samples collected will be assigned a "V" suffix (e.g., SP1-12-B3-R-V) to designate an archive. Trip blanks will be labeled with the area name and the suffix "TB." For example, SP1-TB2 is the second trip blank from SP-1.

If a boring location requires multiple borings due to subsurface refusal, or if a boring is moved after attempting the original location, the boring grid identifier will be designated with an alphabetic suffix (e.g., 7A, 7B, etc.) Therefore, a random sample collected during the third attempt at sample point 12 at SP-1 would be SP1-12C-R.

The four confirmation samples that have been placed along the dividing line between the eastern and western sections of SP-1 will be labeled with the area name prefix (SP1) followed by the dividing line designator "CON" followed by a sequential number 1 through 4 (CON-1, CON-2, CON-3, CON-4). For example:

SP1- CON-1 is the first confirmation sample collected along the line dividing the eastern and western sections of SP-1.

## 2.5 EQUIPMENT DECONTAMINATION

Sampling equipment will be decontaminated before transporting to the sampling site. Additionally, equipment that comes into contact with sample media at the target sample interval must be decontaminated, including the core sampler cutting shoe, hand auger buckets, and other sample collection tools. All decontamination will be Level II decontamination as specified in SMPL-01. The core barrel portion of the core sampler will be wiped down between sample intervals and locations to remove visible soil or material. Decontamination of the core barrel will not be necessary because the core barrel will not come into contact with the sample when using a liner insert.

## 2.6 SAMPLE HANDLING AND SHIPPING

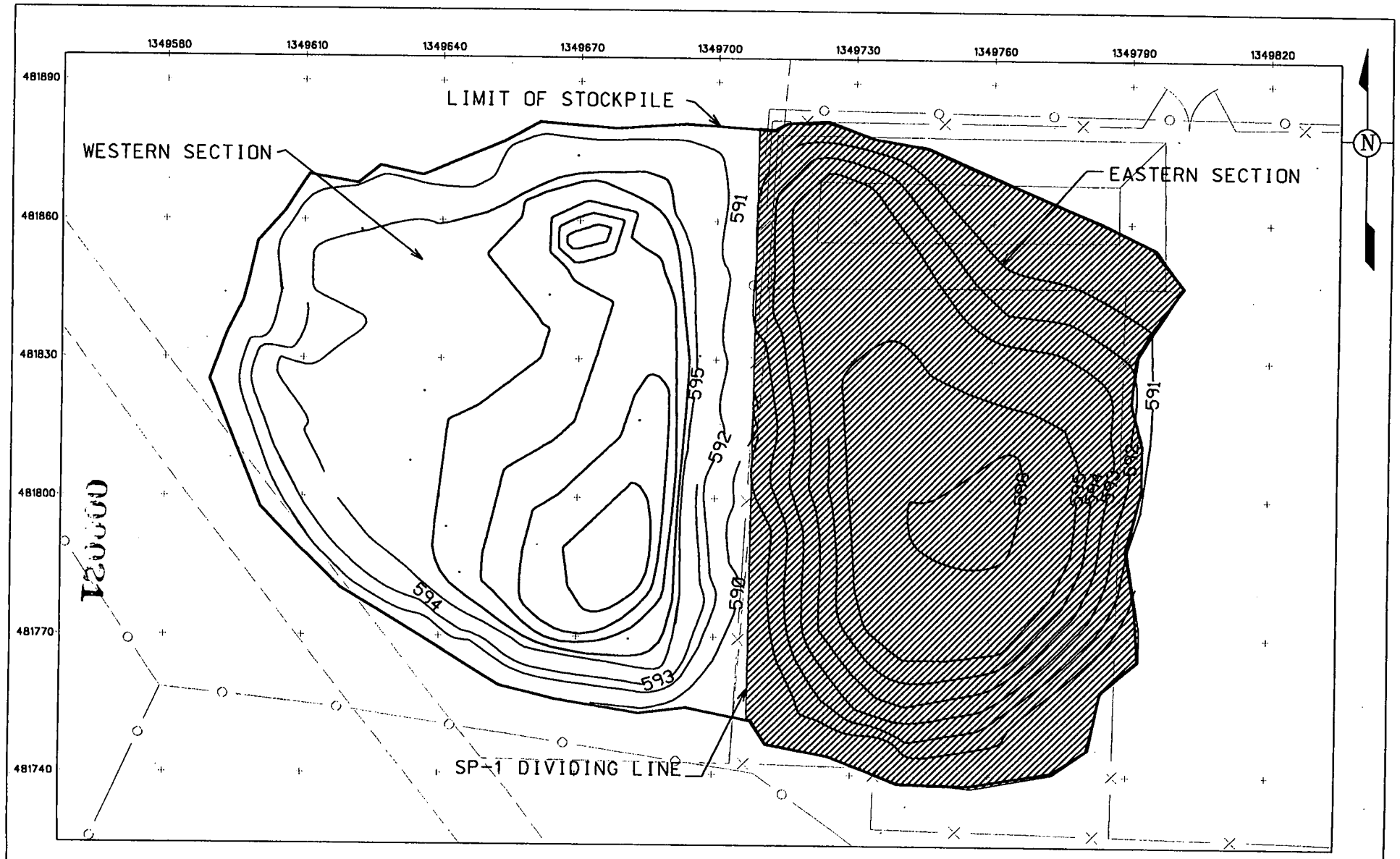
Samples will be processed in accordance with SMPL-01, to ensure that samples are documented properly and custody and sample integrity are maintained. All samples will be transported from the field to the on-site Sample Processing Laboratory.

**TABLE 2-1**
**SAMPLING AND ANALYTICAL REQUIREMENTS**

| Analyte | Sample Matrix | Lab | ASL | Preserve | Holding Time | Container | Minimum Sample Mass |
|---|---|---|---|---|---|---|---|
| Total Uranium Technetium-99 (TALs A and B) | Solid | On-site | B | None | 12 months | 250-mL widemouth glass | 40g |
| Total VOCs (TAL C) | Solid | Off-site | B | Cool to 2°-6°C | 14 days | 60-mL Septa widemouth glass with Teflon-lined lid | fill container to top (no head space) |
| Total SVOCs (TAL D) | Solid | Off-site | B | Cool to 2°-6°C | 14 days | 120-mL Septa widemouth glass with Teflon-lined lid | Fill container |
| Total Pesticides (TAL E) | Solid | Off-site | B | Cool to 2°-6°C | 14 days | 120-mL widemouth glass with Teflon-lined lid | 90g |
| Alpha/Beta Screen | Solid | On-site | N/A | None | None | Any container | 10g |
| Trip Blank | Liquid | Off-site | N/A | Cool to 2°-6°C; pH <2 by HCl or $H_2SO_4$ | 14 days | 3 x 40-mL glass with Teflon-lined lid | fill to top |
| Archive | Solid | N/A | N/A | None | 12 months | 250-mL widemouth glass | N/A |

Notes: The laboratory alpha/beta screen is only required for sample intervals that have been identified as having elevated beta/gamma activity (i.e., greater than 400 ccpm) and are destined for off-site laboratories (i.e., those undergoing TAL C through TAL E analysis).

Off-site samples will be recorded on a separate Chain of Custody form from the on-site samples.

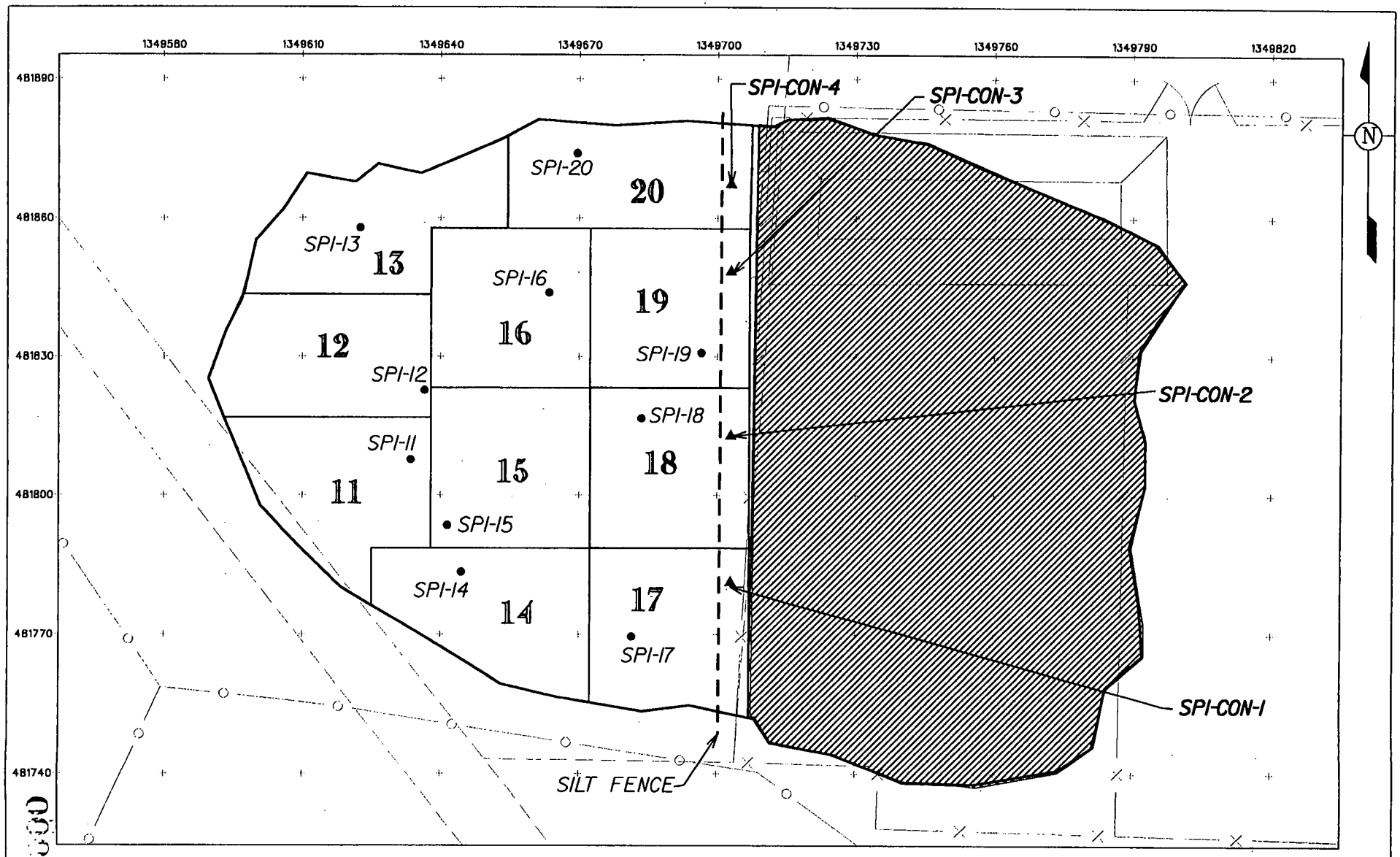



DRAFT

v:\5c/31\dgn\map\hor\dpth\area3-16.dgn
STATE PLANAR COORDINATE SYSTEM 1983

FIGURE 2-1. TOPOGRAPHICAL MAP OF SP-1

09-MAR-2000




LEGEND:

- ● SAMPLE LOCATIONS
- ▲ DIVIDING LINE CONFIRMATION SAMPLES
- 1 GRID NUMBERS
- —— GRID BOUNDARY

NOTE: SHADED AREA HAS PREVIOUSLY BEEN SAMPLED

SCALE

30 15 0 30 FEET

DRAFT

022000

v:#5cj31#dgn#map#hor#dpth#area3-16.dgn
STATE PLANAR COORDINATE SYSTEM 1983

09-MAR-2000

FIGURE 2-2. SAMPLING LOCATIONS FOR THE WESTERN SECTION OF SP-1

2851

# 3.0 REAL-TIME RADIOLOGICAL SCANNING

The real-time total uranium WAC investigation of surface soil in the western section of SP-1 will be performed to cover as much of the stockpile surface as practical using the HPGe portable detectors or a mobile NaI detector, referred to as the Radiation Measurement System (RMS). The RMS can be the Radiation Tracking System (RTRAK) or the Radiation Scanning System (RSS). The final aerial coverage will be documented and reported upon completion of the real-time measurement scanning.

Real-time data gathered during this activity will be reported on an IIMS Data Group Form (FS-F-5157). The Characterization Lead and WAO representatives or designees will complete this form for each real-time measurement. The original forms including color maps will be placed in the WAO files.

## 3.1 RADIATION MEASUREMENT SYSTEM SCANNING COVERAGE

Real-time NaI detector system coverage using the RMS will be limited to safely accessible surfaces and will be as extensive as possible without jeopardizing worker safety. The real-time field team, supervisor, and project health and safety representative will jointly determine which areas are accessible based on field conditions at the time of measurements.

The NaI detector spectral acquisition time will be set to 4 seconds and the data will be collected at a detector speed of 1 mile per hour. The onboard Global Positioning System (GPS) will be used to obtain positioning information with each detector measurement. The RMS scan data will be reviewed to determine if any single measurement exceeds 721 mg/kg total uranium, the trigger level established for NaI WAC measurements. If this trigger is exceeded, an HPGe measurement may be taken to confirm the RMS measurement, as discussed in Section 3.3.

A minimum of two Troxler® or Zeltex® Infrared Moisture Meter soil moisture measurements will be collected per acre in the area covered by the RMS. These moisture measurements are necessary because spectral data from HPGe and RMS detectors need to be adjusted to take into account the soil moisture. If a moisture measurement cannot be taken, a physical core sample will be collected for moisture analysis. If collected, the moisture core samples will follow the same sample identification system as outlined in Section 3.4.

## 3.2 HPGe DETECTOR MEASUREMENTS

The HPGe portable detector systems will be used to obtain gamma measurements in those areas that cannot be safely accessed by the RMS but are accessible to the HPGe detector (e.g., steep side slopes). The objective of the HPGe measurements is to cover the areas of the pile that were not scanned by RMS, with the goal of covering as much of the surface of the pile as possible using real-time methods.

The HPGe detector system spectral acquisition time will be set to 300 seconds (5 minutes). The detector height will be set at 1 meter above ground surface. All HPGe locations will be surveyed and marked. Each HPGe measurement will be identified as specified in Section 3.3. One Troxler® or Zeltex® Infrared Moisture Meter soil moisture measurement will be collected in each grid block covered by the HPGe measurements. If a moisture measurement cannot be taken, a physical core sample may be collected for moisture analysis or a default moisture value of 20 percent may be used. If collected, the moisture core samples will follow the same sample identification system as outlined in Section 3.4.

One duplicate measurement will be taken for every 20 HPGe measurements collected for this project. The duplicate measurement will immediately follow the original measurement and will be conducted using the same detector with the same height and spectral acquisition time.

The HPGe data will be reviewed to determine if any single measurement exceeds 400 mg/kg total uranium, the trigger level established for 5-minute HPGe WAC measurements at a 1-meter height. If this trigger is exceeded, an additional HPGe measurement at a lower detector height will be taken, as discussed in Section 3.3.

## 3.3 DETERMINING NEED FOR ADDITIONAL HPGe MEASUREMENTS

If RMS scans or 1-meter detector height HPGe measurements are greater than trigger level concentrations, confirmation and delineation will be required. This confirmation and delineation process is documented in Section 3.4 of the User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site (Users Manual). The circumscribed boundary of the RMS or 1-meter HPGe measurement above trigger limits will be located and marked (flags and/or stakes) on the surface of the stockpile by the Characterization and/or Survey Lead or designee. The location of the maximum activity will be identified in the field using a hand-held frisker or equivalent instrument. HPGe detectors will be used for all confirmation and delineation

measurements. Confirmation measurements shall be made using detector heights of 15 cm and/or 31 cm (depending on required field of view) and a spectral acquisition time of five minutes at the suspect above-WAC location to reliably determine above-WAC boundaries. If either confirmation measurement exceeds the trigger level of 928 ppm, then the area exceeding the trigger level (i.e., above-WAC) shall be further delineated with the HPGe. The boundary of confirmed above-WAC material area shall be refined (delineated) using a detector height of 15 cm with a spectral acquisition time of 5 minutes on a 2-meter triangular grid covering the entire area indicated by the detection and confirmation measurements. The limits of the above-WAC area will be defined by HPGe measurements that are lower than the HPGe WAC trigger levels.

Confirming and delineating the extent of contamination with 31-cm and 15-cm HPGe measurements is at the discretion of the Characterization Lead or designee. Conditions may arise which warrant a different decision process for defining the extent of contamination (i.e., cost effectiveness, need for timely response, obvious discoloration in the soil, or other suspect above-WAC material may require physical sampling). The decision process for the unusual condition will be documented in applicable field activity logs and, if determined to be appropriate by the Characterization Lead or designee, with a V/FCN as described in Section 4.4.

Duplicate measurements will be performed in the same manner described in Section 3.2, one per 20 measurements taken.

## 3.4 REAL-TIME MEASUREMENT IDENTIFICATION

The data from each run of the RMS will be uniquely identified. This identifier will consist of a prefix designating the area name (SP1) followed by the batch run number, which is assigned by the real-time scanning personnel. For example, SP1-265 would be batch run #265 on SP-1.

Each HPGe measurement will have a unique identifier. This identifier will consist of a prefix designating the area name (SP1), followed by the sample number within the area (1 through x), followed by a letter designating the type of sample ("G" for gamma). A "D" will be used to designate the duplicate measurements. For example:

SP1-1-G-D is the first HPGe reading taken in SP-1 and is a duplicate measurement.

## 3.5 DATA MAPPING

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

Surface Scan Coverage Map(s)

- RMS Location Map - showing field of view squares that are color-coded for total uranium concentration and denotes batch numbers in title.

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

  (Note: Both results can be shown on the same map.)

HPGe Confirmation/Delineation Map(s)

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

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

## 3.6 SAMPLE COLLECTION BASED ON RMS AND HPGe MEASUREMENTS

If RMS identifies an area of surface soil above the trigger level discussed in Section 3.1 and the stockpile slope prohibits the use of HPGe to confirm and delineate the potential above-WAC area, a surface soil sample (0 to 6 inches) will be collected from a location within that RMS measurement area that exhibits the highest gross beta/gamma reading based on a portable survey meter/probe. This surface soil sample

will be analyzed for total uranium (TAL B). If a surface sample is collected, it will be identified using the following identification scheme:

SP1-RMS-B1

where: SP1 = SP1 Stockpile location
RMS-B1 = consecutively numbered biased sample collected based on an elevated RMS measurement.

Note: The sample location (northing and easting) will be documented on a V/FCN.

# 4.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

## 4.1 FIELD QUALITY CONTROL SAMPLES, ANALYTICAL REQUIREMENTS, AND DATA VALIDATION

In accordance with the requirements of DQO SL-048, Revision 5 and DQO SL-055, Revision 0, the field quality control, analytical, and data validation requirements are as follows:

- All laboratory analyses will be performed at Analytical Support Level (ASL) B.
- One trip blank will be taken each day that VOC samples are collected, or one per 20 VOC samples that are collected, or one per sample transport cooler, whichever is more frequent. In addition, laboratory matrix spike and matrix spike duplicate sample volumes will be collected for each VOC release or one per 20 VOC samples that are collected, whichever is more frequent.
- All ASL B field data will be validated. All analytical data will require a certificate of analysis and 10 percent of the analytical data will also require the associated quality assurance/quality control results. A minimum of 10 percent of the analytical data from each laboratory will be validated to ASL B.
- Real-time measurements will be performed at ASL A.
- One in 20 HPGe measurements will require a duplicate.

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 revised 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.

## 4.2 APPLICABLE PROCEDURES, DOCUMENTS AND MANUALS

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

- SMPL-01, Solids Sampling
- SMPL-21, Collection of Field Quality Control Samples
- EQT-04, Photoionization Detector
- EQT-05, Geodimeter® 4000 Survey System B Operation, Maintenance, and Calibration
- EQT-06, Geoprobe® Model 5400 Operation and Maintenance Manual
- EQT-22, Characterization of Gamma Sensitive Detectors
- EQT-23, Operation of ADCAM Series Analyzers with Gamma Sensitive Detectors
- EQT-32, Troxler® 3440 Series Surface Moisture/Density Gauge -- Calibration, Operation, and Maintenance
- EQT-33, Real-Time Differential Global Positioning System Operation
- EQT-39, Zeltex® Infrared Moisture Meter
- EQT-41, Radiation Measurement Systems
- EW-1023, Management of Stockpiles
- S.P. 766-S-1000, Shipping Samples to Off-Site Laboratories
- Sitewide CERCLA Quality Assurance Project Plan (SCQ)
- Sitewide Excavation Plan
- WAC Attainment Plan for the OSDF
- User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site (Users Manual)

## 4.3 PROJECT REQUIREMENTS FOR INDEPENDENT ASSESSMENTS

Project management has ultimate responsibility for the quality of the work processes and the results of the sampling activities covered by this PSP. The Quality Assurance (QA) organization may conduct independent assessments of the work process and operations to assure the quality of performance. Assessment will encompass technical and procedural requirements of this PSP and the SCQ. Independent assessments will be performed by conducting a surveillance. Surveillances will be planned and documented according to Section 12.3 of the SCQ.

## 4.4 IMPLEMENTATION OF FIELD CHANGES

If field conditions require changes or variances, the Field Sampling Lead must obtain written or verbal approval (electronic mail is acceptable) from the Characterization Lead, QA, and WAO before the changes may be implemented. If the change involves real-time scanning, the Real-Time Lead must also give written or verbal approval before the change can be implemented. Changes to the PSP will be noted in the applicable Field Activity Logs and on a V/FCN. QA must receive the completed V/FCN, which includes the signatures of the Characterization Lead, Sampling Lead, Project Manager, WAO, QA, and Real-Time Lead (as necessary) within seven working days of implementation of the change.

# 5.0 HEALTH AND SAFETY

The Health and Safety Lead, Field Sampling Leads, and team members will assess the safety of performing sampling activities on the surface of SP-1. This will include vehicle positioning limitations, slips/trips/falls hazards, and vehicle stability if Geoprobe® or real-time scanning work is performed on the side slopes of the pile.

Technicians will conform to precautionary surveys performed by personnel representing the Radiological Control, Safety, and Industrial Hygiene organizations. 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 permits, and other applicable permits. Concurrence with applicable safety permits (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 sampling 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 the execution of sampling 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 at SP-1 during sampling activities.

A safety briefing will be conducted prior to the initiation of field activities. **All emergencies shall be reported immediately on extension 911, or to the Site Communications Center at 648-6511 (if using a cellular phone), or using a radio and contacting "CONTROL" on Channel 11.**

# 6.0 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 sufficiently detailed to allow 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.

Samples will be assigned a unique sample identifier, as explained in Sections 2.4 and 3.4 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 all data packages to the Data Validation Contact for final review. The field data package will be filed in the records of the Environmental Management Project. QA will perform validation on 10 percent of ASL B data packages.

All field measurements, observations, and sample collection information associated with physical sample collection will be recorded, as applicable, on the Sample Collection Log, the Field Activity Log, and the Chain of Custody/Request for Analysis Form as required. The method of sample collection will be specified in the Field Activity Log. Borehole Abandonment Logs will not be required. The PSP number will be on all documentation associated with these sampling activities.

The RTIMP group will provide hard copy maps and/or summary reports to the Characterization Lead and Data Management Contact or designees. All Real-Time data will be collected and reported at a minimum ASL A and require no data validation. All physical samples and RTIMP confirmation/delineation measurements will be collected and reported at ASL B and will require 10 percent data validation. All electronically recorded field data will have the RMS or HPGe Data Verification Checklist (Section 5.4 of the Users Manual), which will be completed after each data

collection event. Field documentation, such as the Nuclear Field Density/Moisture Worksheet, will undergo an internal review by the RTIMP.

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

Once the survey and real-time electronic data have been placed on the LAN and Sitewide Environmental Database (SED), the Data Management Contact will perform an evaluation prior to placement on the Soil and Disposal Facility Project (SDFP) website. The evaluation may involve a comparison check between the electronic data, hard copy maps and summary reports for accuracy and completeness. The evaluation will be documented on the Real-Time Electronic Data Quality Control checklist, dated, and signed.

The Data Management organization will perform data entry into the SED. Field logs will be maintained in loose-leaf form during the field recording activities. Analytical data from the off-site laboratory will be reviewed by the Project Lead prior to entry or transfer of the data to the SED from the Fernald Analytical Customer Tracking System (FACTS) database. The analytical data validation requirements are outlined in Section 4.1. After the analytical and real-time data are in the SED, the Data Group Form (FS-F-5157) will be completed by the Characterization Lead with concurrence from a WAO representative.



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# APPENDIX A

# DATA QUALITY OBJECTIVES
# SL-048, REV. 5 AND SL-055, REV. 0

2851

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) _____

---

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.

---

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

---

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.

2851

Control Number _____

# Fernald Environmental Management Project

## Data Quality Objectives

| | |
|---|---|
| Title: | Real-Time Excavation Monitoring For Total Uranium Waste Acceptance Criteria (WAC) |
| Number: | SL-055 |
| Revision: | 0 |
| Final Draft: | 6/8/99 |
| Contact Name: | Joan White |

Approval: _____ Date: 6/8/99
James E. Chambers
DQO Coordinator

Approval: _____ Date: 6/8/99
Joan White
Real-Time Instrumentation Measurement
Program Manager

| Rev. # | 0 | | | | | | |
|---|---|---|---|---|---|---|---|
| Effective Date: | 6/8/99 | | | | | | |

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

**Members of Data Quality Objectives (DQO) Scoping Team**

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

**Conceptual Model of the Site**

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

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

A sequential remediation plan has been presented which subdivides the FEMP into ten (10) independent remediation areas. Extensive historical sampling has demonstrated that in each of these 10 areas potentially above-WAC concentrations

may not be present, may be limited to one WAC COC, or consist of a subset of WAC COCs. According to the Sitewide Excavation Plan (SEP) only WAC COCs with a demonstrated or likely presence in an area will be evaluated during remedial design and implementation. This DQO will be used to define the WAC decision-making process using excavation monitoring instrumentation in areas where soil and soil-like material is being excavated and total uranium is a WAC COC.

## 1.0 Statement of Problem

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

### Available Resources

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

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

### Summary of the Problem

Excavated soil or soil-like material must be classified as either of the following:

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

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

## 2.0 Identify the Decision

### Decision

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

Possible Results

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

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

## 3.0 Identify Inputs That Affect the Decision

Required Information

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

Source of Informational Input

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

Non-invasive real-time excavation monitoring in areas where total uranium is a WAC concern will involve measurements collected with mobile and/or stationary in-situ gamma spectrometry equipment. These measurements will be collected from the surface of each excavation lift prior to excavation. Information compiled from this real-time monitoring will be assimilated and reviewed by decision makers to classify lifts or sections of lifts as either acceptable or unacceptable for placement in the OSDF. These measurements may also be collected on soils exposed after the removal of suspect above WAC material to verify its removal.

Action Levels

To ensure no above WAC soil or soil-like material is sent to the OSDF, threshold values (trigger levels) have been set for NaI and HPGe Phase 1 and II measurements. These values are significantly lower than the 1030 ppm total uranium OSDF not-to-exceed (NTE) level. The WAC Phase I (detection phase) threshold value is 721 ppm total uranium for NaI instruments (31 cm detector height), and 400 ppm total uranium for the HPGe (1 meter detector height). The WAC Phase II (confirmation and delineation phase) threshold value is 928 ppm total uranium for the HPGe (31 cm and 15 cm detector heights).

Methods of Data Collection

WAC Phase 1 measurements will be collected to obtain as close to complete coverage of the areas of concern as possible using either the NaI Radiation Measurement Systems (RMS) or HPGe equipment to identify potential above WAC total uranium locations. WAC Phase II measurements will be collected with strategically placed HPGe equipment to confirm and delineate Phase I potential above WAC measurements, as needed. The project may decide not to collect Phase II measurements if the potential above WAC area boundary is discernable by visual observation (such as presence of process residue or other OSDF prohibited items, discoloration of soil or soil-like material, or other information).

The project will use the real-time WAC Phase I and Phase II data as ASL A, and will perform no data validation (however the data will be collected with ASL B quality control criteria, for real-time project internal quality control. All measurements will be performed in compliance with operating procedures identified in Section 7.5 of this DQO, the Real-Time User's Manual, and the SEP.

## 4.0 The Boundaries of the Situation

Spatial Boundaries

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

Population of Soils:

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

Scale of Decision Making

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

Temporal Boundaries

Time Constraint: Real-time excavation monitoring information must be acquired and processed in time for review and use in decision making prior to excavation and disposition of excavated material. The scheduling of WAC excavation monitoring is directly tied to the excavation schedule. WAC excavation monitoring will be performed and a disposition decision made prior to excavation of each designated lift. Acquired information must be processed and reviewed by the project decision-makers prior to disposition of the lift being monitored. Time limits to complete measurements are specified in the excavation subcontracts.

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

## 5.0 Develop a Logic Statement

Parameter(s) of Interest

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

Waste Acceptance Criteria Concentration

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

Decision Rules

If excavation monitoring results are below the total uranium WAC for a specified

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

## 6.0 Limits on Decision Errors

### Range of Parameter Limits

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

### Types of Decision Errors and Consequences

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

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

### True State of Nature for the Decision Errors

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

## 7.0 Design for Obtaining Quality Data

### 7.1 WAC Attainment Excavation Monitoring

WAC attainment will be based on real-time excavation monitoring using the NaI and

HPGe measurement systems. Phase I (detection phase) measurements are collected with the NaI systems using a spectral acquisition time of 4 seconds, at a detector speed of 1 mile per hour (mph), and a detector height of 31 cm. These parameters achieve the required sensitivity, and are the best compromise of practical considerations such as detector speed and time in the field. In the NaI systems, the presence of thorium contamination can cause interferences which could affect total uranium concentration calculations. Uranium results associated with thorium values greater than 500 net counts per second will be reevaluated. The threshold value (trigger level) for Phase I NaI measurements is 721 ppm for total uranium (70% of the 1,030 ppm WAC concentration for soil, arrived at by agreement with the USEPA). Phase I measurements can also be collected with the HPGe systems using a spectral acquisition time of 5 minutes, and a detector height of 1 meter (the threshold value is lower than the NaI threshold value because of the larger field of view at the HPGe 1 meter detector height). (For more information reference the *RTRAK Applicability Study, 20701-RP-0003, Revision 1, May 1998).*

At the discretion of the characterization lead, Phase II confirmation and delineation measurements may be collected using the HPGe systems with a spectral acquisition time of 5 minutes at both the 31 cm and 15 cm detector heights. The HPGe detector will be placed directly over the zone of maximum activity identified by the Phase I measurements. The threshold value (trigger level) for Phase II measurements is 928 ppm for total uranium at either detector height. Lower (more conservative) threshold values may be defined in the PSP. (For more information reference the *User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site, 20701-RP-0006, Revision A, May 8, 1998.*)

In the event the monitoring data exceeds the trigger levels (see above), the entire vertical thickness (3 ± 1 foot) of the areal extent of above-WAC material will be removed and segregated pending off-site disposal.

7.2 Interpretation of Results

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

- Determine that the entire unit volume or "lift" subjected to excavation monitoring is at or above WAC and requires segregation pending off-site disposal.

- Based on adequacy of existing information (including visual inspection), excavate and

segregate the portion of the lift material that is at or above WAC pending off-site disposition.

- Perform additional real-time monitoring to more accurately delineate the areal extent of above-WAC contamination. Using this information, define the extent of removal efforts to be conducted.

7.3 QC Considerations

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

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

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

3) The mobile sodium iodide systems will generate ASL level A data, with no data validation. The HPGe detectors are capable of providing either ASL level A or B data, however for WAC determination only ASL A data will be generated.

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

7.4 Independent Assessment

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

7.5 Applicable Procedures

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

- ADM-16, In-Situ Gamma Spectrometry Quality Control Measurements
- EQT-22, High Purity Germanium Detector In-Situ Efficiency Calibration
- EQT-23, Operation of ADCAM Series Analyzers with Gamma Sensitive Detectors
- EQT-32, Troxler 3440 Series Surface Moisture/Density Gauge

- EQT-33, Real Time Differential Global Positioning System
- EQT-39, Zeltex Infrared Moisture Meter
- EQT-40, Satloc Real-time Differential Global PositioningSystem
- EQT-41, Radiation Measurement Systems
- 20300-PL-002, Real Time Instrumentation Measurement Program Quality Assurance Plan
- EW-1022, On-Site Tracking and Manifesting of Bulk Impacted Material

7.6 References

- Sitewide CERCLA Quality Assurance Project Plan (SCQ), May 1995, FD-1000
- Sitewide Excavation Plan, July 1998, 2500-WP-0028, Revision 0
- Waste Acceptance Criteria Attainment Plan for the On-Site Disposal Facility, June 1998, 20100-PL-0014, Revision 0
- Impacted Materials Placement Plan for the On-Site Disposal Facility, January 1998, 20100-PL-007, Revision 0
- Area 2, Phase 1 Southern Waste Units Implementation Plan for Operational Unit 2, July 1998, 2502-WP-0029, Revision 0
- RTRAK Applicability Study, May 1998, 20701-RP-0003, Revision 1
- User Guidelines, Measurement Strategies, and Operational Factors for Deployment of In-Situ Gamma Spectrometry at the Fernald Site, July 1998, 20701-RP-0006 Revision B

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

1A. Task/Description: Waste Acceptance Criteria Monitoring

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

RI ☐ FS ☐ RD ☐ RA ☒ $R_vA$ ☐ OTHER

1.C. DQO No.: SL-055 DQO Reference No.: N/A

---

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

Air ☐ Biological ☐ Groundwater ☐ Sediment ☐

Soil and Soil Like Material ☒

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

---

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

Site Characterization
A ☐ B ☐ C ☐ D ☐ E ☐

Risk Assessment
A ☐ B ☐ C ☐ D ☐ E ☐

Evaluation of Alternatives
A ☐ B ☐ C ☐ D ☐ E ☐

Engineering Design
A ☐ B ☐ C ☐ D ☐ E ☐

Monitoring during remediation activities
A ☐ B ☐ C ☐ D ☐ E ☐

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

---

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

4.B. Objective: To provide data for identification of soils and soil-like materials for compliance with Waste Acceptance Criteria.

---

5. Site Information (Description):

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

---

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

1. pH ☐
   Temperature ☐
   Specific Conductance ☐
   Dissolved Oxygen ☐
   Technetium-99 ☐

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

3. BTX ☐
   TPH ☐
   Oil/Grease ☐

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

5. VOA ☐
   BNA ☐
   Pesticides ☐
   PCB ☐

6. Other (specify) ☒
   Moisture

6.B. Equipment Selection and SCQ Reference:

ASL A Nal and HPGe SCQ Section: Appendix H

ASL B _____ SCQ Section: _____

ASL C _____ SCQ Section: _____

ASL D _____ SCQ Section: _____

ASL E _____ SCQ Section: _____

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

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

DQO Number: SL-055

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

Background samples: SED

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

8.A. Field Quality Control Samples:

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

Other (specify) _____

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

8.B. Laboratory Quality Control Samples:

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

Other (specify) Per method

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

# APPENDIX B

# TARGET ANALYTE LISTS

# APPENDIX B
# TARGET ANALYTE LISTS

## TAL 20200-PSP-0006-A

| Soil Analysis - ICP/MS and GPC | | |
|---|---|---|
| 1 | ASL B | Total Uranium |
| 2 | ASL B | Technetium-99 |

## TAL 20200-PSP-0006-B

| Soil Analysis - ICP/MS | | |
|---|---|---|
| 1 | ASL B | Total Uranium |

## TAL 20200-PSP-0006-C

| Soil Analysis - Total VOCs | | |
|---|---|---|
| 1 | ASL B | Bromodichloromethane |
| 2 | ASL B | Chloroethane |
| 3 | ASL B | 1,1-Dichloroethene |
| 4 | ASL B | 1,2-Dichloroethene |
| 5 | ASL B | Tetrachloroethene |
| 6 | ASL B | Trichloroethene |
| 7 | ASL B | Vinyl Chloride |

## TAL 20200-PSP-0006-D

| Soil Analysis - Total SVOCs | | |
|---|---|---|
| 1 | ASL B | Bis(2-chloroisopropyl)ether |
| 2 | ASL B | Carbazole |
| 3 | ASL B | 4-Nitroaniline |

1
2

## TAL 20200-PSP-0006-E

| Soil Analysis – Total Pesticides | | |
|---|---|---|
| 1 | ASL B | Alpha-chlordane |
| 2 | ASL B | Toxaphene |

000060

# APPENDIX C

# SP-1 PRIMARY/SECONDARY/CONFIRMATION SOIL SAMPLES

**TABLE C-1**
**SP-1 PRIMARY RANDOM SOIL SAMPLE LOCATIONS**

| Sample ID | Northing | Easting | Estimated Boring Depth (feet) | Sample Depth Interval (feet) | TAL |
|---|---|---|---|---|---|
| SP1-11-R | 481808 | 1349634 | 6.7' | 1.5-2.5' | A |
| SP1-11-S | 481808 | 1349634 | 6.7' | 1.5-2.5' | D |
| SP1-12-R | 481823 | 1349637 | 6.7' | 2.0-3.0' | A |
| SP1-12-L | 481823 | 1349637 | 6.7' | 2.0-3.0' | C |
| SP1-12-P | 481823 | 1349637 | 6.7' | 2.0-3.0' | E |
| SP1-13-R | 481858 | 1349623 | 5.9' | 3.0-4.0' | A |
| SP1-14-R | 481784 | 1349645 | 7.5' | 0.5-1.5' | A |
| SP1-14-L | 481784 | 1349645 | 7.5' | 0.5-1.5' | C |
| SP1-14-P | 481784 | 1349645 | 7.5' | 0.5-1.5' | E |
| SP1-15-R | 481794 | 1349642 | 7.2' | 1.5-2.5' | A |
| SP1-16-R | 481844 | 1349664 | 7.5' | 5.5-6.5' | A |
| SP1-16-L | 481844 | 1349664 | 7.5' | 5.5-6.5' | C |
| SP1-16-P | 481844 | 1349664 | 7.5' | 5.5-6.5' | E |
| SP1-17-R | 481770 | 1349682 | 7.7' | 4.5-5.5' | A |
| SP1-17-S | 481770 | 1349682 | 7.7' | 4.5-5.5' | D |
| SP1-18-R | 481817 | 1349684 | 9.0' | 5.0-6.0' | A |
| SP1-18-L | 481817 | 1349684 | 9.0' | 5.0-6.0' | C |
| SP1-18-P | 481817 | 1349684 | 9.0' | 5.0-6.0' | E |
| SP1-19-R | 481831 | 1349697 | 5.7' | 1.5-2.5' | A |
| SP1-19-L | 481831 | 1349697 | 5.7' | 1.5-2.5' | C |
| SP1-19-P | 481831 | 1349697 | 5.7' | 1.5-2.5' | E |
| SP1-20-R | 481874 | 1349670 | 4.5' | 2.5-3.5' | A |

**TABLE C-2**
**SP-1 SECONDARY RANDOM SOIL SAMPLE LOCATIONS**

| Sample ID | Northing | Easting | Estimated Boring Depth (feet) | Sample Depth Interval (feet) | TAL |
|---|---|---|---|---|---|
| SP1-11-R | 481793 | 1349615 | 4.0' | 0.0-1.0' | A |
| SP1-11-S | 481793 | 1349615 | 4.0' | 0.0-1.0' | D |
| SP1-12-R | 481833 | 1349605 | 3.8' | 2.0-3.0' | A |
| SP1-12-L | 481833 | 1349605 | 3.8' | 2.0-3.0' | C |
| SP1-12-P | 481833 | 1349605 | 3.8' | 2.0-3.0' | E |
| SP1-13-R | 481864 | 1349619 | 4.3' | 2.0-3.0' | A |
| SP1-14-R | 481786 | 1349647 | 7.7' | 2.5-3.5' | A |
| SP1-14-L | 481786 | 1349647 | 7.7' | 2.5-3.5' | C |
| SP1-14-P | 481786 | 1349647 | 7.7' | 2.5-3.5' | E |
| SP1-15-R | 481801 | 1349641 | 7.1' | 2.0-3.0' | A |
| SP1-16-R | 481841 | 1349650 | 6.9' | 2.0-3.0' | A |
| SP1-16-L | 481841 | 1349650 | 6.9' | 2.0-3.0' | C |
| SP1-16-P | 481841 | 1349650 | 6.9' | 2.0-3.0' | E |
| SP1-17-R | 481786 | 1349683 | 10.0' | 7.0-8.0' | A |
| SP1-17-S | 481786 | 1349683 | 10.0' | 7.0-8.0' | D |
| SP1-18-R | 481791 | 1349675 | 10.0' | 0.0-1.0' | A |
| SP1-18-L | 481791 | 1349675 | 10.0' | 0.0-1.0' | C |
| SP1-18-P | 481791 | 1349675 | 10.0' | 0.0-1.0' | E |
| SP1-19-R | 481841 | 1349685 | 8.0' | 5.5-6.5' | A |
| SP1-19-L | 481841 | 1349685 | 8.0' | 5.5-6.5' | C |
| SP1-19-P | 481841 | 1349685 | 8.0' | 5.5-6.5' | E |
| SP1-20-R | 481860 | 1349672 | 9.5' | 5.5-6.5' | A |

**TABLE C-3**
**SP-1 CONFIRMATION SAMPLE LOCATIONS**

| Sample ID | Northing | Easting | Top Depth (feet) | Bottom Depth (feet) | TAL |
|---|---|---|---|---|---|
| SP1-CON-1-R | 481781 | 1349703 | 0.0' | 1.0' | A |
| SP1-CON-1-L | 481781 | 1349703 | 0.0' | 1.0' | C |
| SP1-CON-1-S | 481781 | 1349703 | 0.0' | 1.0' | D |
| SP1-CON-1-P | 481781 | 1349703 | 0.0' | 1.0' | E |
| SP1-CON-2-R | 481813 | 1349703 | 0.0' | 1.0' | A |
| SP1-CON-2-L | 481813 | 1349703 | 0.0' | 1.0' | C |
| SP1-CON-2-S | 481813 | 1349703 | 0.0' | 1.0' | D |
| SP1-CON-2-P | 481813 | 1349703 | 0.0' | 1.0' | E |
| SP1-CON-3-R | 481848 | 1349703 | 0.0' | 1.0' | A |
| SP1-CON-3-L | 481848 | 1349703 | 0.0' | 1.0' | C |
| SP1-CON-3-S | 481848 | 1349703 | 0.0' | 1.0' | D |
| SP1-CON-3-P | 481848 | 1349703 | 0.0' | 1.0' | E |
| SP1-CON-4-R | 481867 | 1349703 | 0.0' | 1.0' | A |
| SP1-CON-4-L | 481867 | 1349703 | 0.0' | 1.0' | C |
| SP1-CON-4-S | 481867 | 1349703 | 0.0' | 1.0' | D |
| SP1-CON-4-P | 481867 | 1349703 | 0.0' | 1.0' | E |

# APPENDIX D

# SUMMARY OF EXISTING DATA ON SP-1

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-006 | 61385 | 1,1-Dichloroethene | 1.5 | 2.0 | 5 | UG/KG | U |
| HRD-008 | 61477 | 1,1-Dichloroethene | 1.5 | 2.0 | 5 | UG/KG | U |
| HRD-010 | SP1-4-TL | 1,1-Dichloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| HRD-010 | SP1-9-TL | 1,1-Dichloroethene | 0.0 | 0.7 | 5 | UG/L | U |
| HRD-010 | SP4-4-TL | 1,1-Dichloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| HRD-010 | SP4-9-TL | 1,1-Dichloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| STP-012 | 17719 | 1,1-Dichloroethene | 0.0 | 0.5 | 5 | UG/KG | U |
| STP-012 | 65511 | 1,1-Dichloroethene | | | 5 | UG/L | U |
| STP-011 | 98462 | 1,1-Dichloroethene | | | 5 | UG/L | U |
| STP-015 | 98462 | 1,1-Dichloroethene | | | 5 | UG/L | U |
| HRD-006 | 61364 | 1,1-Dichloroethene | 1.5 | 2.0 | 6 | UG/KG | U |
| HRD-006 | 61350 | 1,1-Dichloroethene | 0.0 | 0.5 | 6 | UG/KG | U |
| HRD-008 | 61484 | 1,1-Dichloroethene | 1.5 | 2.0 | 6 | UG/KG | U |
| STP-012 | 767 | 1,1-Dichloroethene | | | 6 | UG/KG | U |
| STP-011 | 98458 | 1,1-Dichloroethene | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-011 | 98461 | 1,1-Dichloroethene | 13.5 | 14.5 | 6 | UG/KG | U |
| STP-015 | 98458 | 1,1-Dichloroethene | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-015 | 98461 | 1,1-Dichloroethene | 13.5 | 14.5 | 6 | UG/KG | U |
| HRD-010 | 122398 | 1,1-Dichloroethene | 1.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-4-L | 1,1-Dichloroethene | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-9-L | 1,1-Dichloroethene | 0.0 | 0.7 | 10 | UG/KG | U |
| HRD-010 | SP4-10-B1-L | 1,1-Dichloroethene | 9.5 | 10.0 | 10 | UG/KG | U |
| HRD-010 | SP4-4-B1-L | 1,1-Dichloroethene | 1.5 | 1.9 | 10 | UG/KG | U |
| HRD-010 | SP4-4-L | 1,1-Dichloroethene | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B1-L | 1,1-Dichloroethene | 2.5 | 3.0 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B2-L | 1,1-Dichloroethene | 3.0 | 3.4 | 10 | UG/KG | U |
| HRD-006 | 121719 | 1,1-Dichloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 121715 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121717 | 1,1-Dichloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 40276 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40175 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 122394 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 121183 | 1,1-Dichloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| STP-012 | 122214 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-012 | 122216 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121718 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121714 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121716 | 1,1-Dichloroethene | 1.0 | 1.5 | 11 | UG/KG | UJ |



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## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-006 | 40347 | 1,1-Dichloroethene | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-001 | 99266 | 1,1-Dichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99267 | 1,1-Dichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99269 | 1,1-Dichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99268 | 1,1-Dichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-010 | 122409 | 1,1-Dichloroethene | 4.5 | 5.0 | 12 | UG/KG | U |
| HRD-010 | 121186 | 1,1-Dichloroethene | 2.5 | 3.0 | 12 | UG/KG | U |
| STP-012 | 122215 | 1,1-Dichloroethene | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-012 | 122217 | 1,1-Dichloroethene | 1.0 | 1.5 | 12 | UG/KG | U |
| HRD-006 | 40379 | 1,1-Dichloroethene | 0.0 | 0.5 | 12 | UG/KG | UJ |
| HRD-010 | 122403 | 1,1-Dichloroethene | 2.5 | 3.0 | 13 | UG/KG | U |
| HRD-010 | 121179 | 1,1-Dichloroethene | 0.0 | 0.5 | 13 | UG/KG | U |
| HRD-010 | 121192 | 1,1-Dichloroethene | 4.5 | 5.0 | 14 | UG/KG | U |
| HRD-006 | 61385 | 1,2-Dichloroethene (Total) | 1.5 | 2.0 | 5 | UG/KG | U |
| HRD-008 | 61477 | 1,2-Dichloroethene (Total) | 1.5 | 2.0 | 5 | UG/KG | U |
| STP-012 | 17719 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 5 | UG/KG | U |
| HRD-006 | 61364 | 1,2-Dichloroethene (Total) | 1.5 | 2.0 | 6 | UG/KG | U |
| HRD-006 | 61350 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 6 | UG/KG | U |
| HRD-008 | 61484 | 1,2-Dichloroethene (Total) | 1.5 | 2.0 | 6 | UG/KG | U |
| STP-011 | 98458 | 1,2-Dichloroethene (Total) | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-011 | 98461 | 1,2-Dichloroethene (Total) | 13.5 | 14.5 | 6 | UG/KG | U |
| STP-015 | 98458 | 1,2-Dichloroethene (Total) | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-015 | 98461 | 1,2-Dichloroethene (Total) | 13.5 | 14.5 | 6 | UG/KG | U |
| HRD-010 | 122398 | 1,2-Dichloroethene (Total) | 1.0 | 1.5 | 10 | UG/KG | U |
| HRD-006 | 121719 | 1,2-Dichloroethene (Total) | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 121715 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121717 | 1,2-Dichloroethene (Total) | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 40276 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40175 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40347 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 122394 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 121183 | 1,2-Dichloroethene (Total) | 1.0 | 1.5 | 11 | UG/KG | U |
| STP-012 | 122214 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-012 | 122216 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121718 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121714 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121716 | 1,2-Dichloroethene (Total) | 1.0 | 1.5 | 11 | UG/KG | UJ |
| HRD-001 | 99266 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 12 | UG/KG | U |

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-001 | 99267 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99269 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99268 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-006 | 40379 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-010 | 122409 | 1,2-Dichloroethene (Total) | 4.5 | 5.0 | 12 | UG/KG | U |
| HRD-010 | 121186 | 1,2-Dichloroethene (Total) | 2.5 | 3.0 | 12 | UG/KG | U |
| STP-012 | 122215 | 1,2-Dichloroethene (Total) | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-012 | 122217 | 1,2-Dichloroethene (Total) | 1.0 | 1.5 | 12 | UG/KG | U |
| HRD-010 | 122403 | 1,2-Dichloroethene (Total) | 2.5 | 3.0 | 13 | UG/KG | U |
| HRD-010 | 121179 | 1,2-Dichloroethene (Total) | 0.0 | 0.5 | 13 | UG/KG | U |
| HRD-010 | 121192 | 1,2-Dichloroethene (Total) | 4.5 | 5.0 | 14 | UG/KG | U |
| HRD-010 | SP1-5-S | 4-Nitroaniline | 0.0 | 1.5 | 820 | UG/KG | U |
| HRD-010 | 122398 | 4-Nitroaniline | 1.0 | 1.5 | 870 | UG/KG | UJ |
| HRD-006 | 40276 | 4-Nitroaniline | 0.0 | 0.5 | 890 | UG/KG | U |
| HRD-006 | 40347 | 4-Nitroaniline | 0.0 | 0.5 | 890 | UG/KG | UJ |
| STP-012 | 122214 | 4-Nitroaniline | 0.0 | 0.5 | 910 | UG/KG | UJ |
| HRD-006 | 121719 | 4-Nitroaniline | 1.0 | 1.5 | 920 | UG/KG | UJ |
| HRD-006 | 121717 | 4-Nitroaniline | 1.0 | 1.5 | 920 | UG/KG | UJ |
| HRD-010 | 122394 | 4-Nitroaniline | 0.0 | 0.5 | 920 | UG/KG | UJ |
| HRD-006 | 121715 | 4-Nitroaniline | 0.0 | 0.5 | 930 | UG/KG | U |
| HRD-006 | 40175 | 4-Nitroaniline | 0.0 | 0.5 | 930 | UG/KG | U |
| HRD-006 | 121716 | 4-Nitroaniline | 1.0 | 1.5 | 930 | UG/KG | UJ |
| STP-012 | 122216 | 4-Nitroaniline | 0.0 | 0.5 | 930 | UG/KG | UJ |
| HRD-010 | 121183 | 4-Nitroaniline | 1.0 | 1.5 | 940 | UG/KG | U |
| HRD-006 | 121718 | 4-Nitroaniline | 0.0 | 0.5 | 940 | UG/KG | UJ |
| HRD-006 | 40379 | 4-Nitroaniline | 0.0 | 0.5 | 940 | UG/KG | UJ |
| HRD-006 | 121714 | 4-Nitroaniline | 0.0 | 0.5 | 950 | UG/KG | U |
| STP-012 | 122217 | 4-Nitroaniline | 1.0 | 1.5 | 970 | UG/KG | UJ |
| STP-012 | 122215 | 4-Nitroaniline | 1.0 | 1.5 | 980 | UG/KG | UJ |
| HRD-010 | 121186 | 4-Nitroaniline | 2.5 | 3.0 | 990 | UG/KG | U |
| HRD-010 | 122409 | 4-Nitroaniline | 4.5 | 5.0 | 1000 | UG/KG | UJ |
| HRD-010 | 121179 | 4-Nitroaniline | 0.0 | 0.5 | 1100 | UG/KG | U |
| HRD-010 | 122403 | 4-Nitroaniline | 2.5 | 3.0 | 1100 | UG/KG | UJ |
| HRD-010 | 121192 | 4-Nitroaniline | 4.5 | 5.0 | 1100 | UG/KG | UJ |
| HRD-008 | 61477 | 4-Nitroaniline | 1.5 | 2.0 | 1700 | UG/KG | U |
| HRD-006 | 61364 | 4-Nitroaniline | 1.5 | 2.0 | 1800 | UG/KG | U |
| HRD-006 | 61385 | 4-Nitroaniline | 1.5 | 2.0 | 1800 | UG/KG | U |
| HRD-006 | 61350 | 4-Nitroaniline | 0.0 | 0.5 | 1800 | UG/KG | U |



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## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-001 | 99266 | 4-Nitroaniline | 0.0 | 0.5 | 1900 | UG/KG | U |
| HRD-001 | 99267 | 4-Nitroaniline | 0.0 | 0.5 | 1900 | UG/KG | U |
| HRD-001 | 99269 | 4-Nitroaniline | 0.0 | 0.5 | 1900 | UG/KG | U |
| HRD-001 | 99268 | 4-Nitroaniline | 0.0 | 0.5 | 2000 | UG/KG | U |
| HRD-008 | 61484 | 4-Nitroaniline | 1.5 | 2.0 | 2000 | UG/KG | U |
| STP-012 | 65511 | alpha-Chlordane | | | 0.5 | UG/L | U |
| STP-011 | 98462 | alpha-Chlordane | | | 0.5 | UG/L | U |
| STP-015 | 98462 | alpha-Chlordane | | | 0.5 | UG/L | U |
| HRD-010 | SP1-4-P | alpha-Chlordane | 0.0 | 1.5 | 1.7 | UG/KG | U |
| HRD-010 | SP1-9-P | alpha-Chlordane | 0.0 | 0.7 | 1.7 | UG/KG | U |
| HRD-010 | SP4-4-P | alpha-Chlordane | 0.0 | 1.5 | 1.7 | UG/KG | U |
| HRD-010 | SP4-9-P | alpha-Chlordane | 0.0 | 1.5 | 1.7 | UG/KG | U |
| HRD-010 | 122398 | alpha-Chlordane | 1.0 | 1.5 | 1.8 | UG/KG | UJ |
| HRD-006 | 121718 | alpha-Chlordane | 0.0 | 0.5 | 1.9 | UG/KG | U |
| HRD-006 | 121719 | alpha-Chlordane | 1.0 | 1.5 | 1.9 | UG/KG | U |
| HRD-006 | 121714 | alpha-Chlordane | 0.0 | 0.5 | 1.9 | UG/KG | U |
| HRD-006 | 121715 | alpha-Chlordane | 0.0 | 0.5 | 1.9 | UG/KG | U |
| HRD-006 | 121716 | alpha-Chlordane | 1.0 | 1.5 | 1.9 | UG/KG | U |
| HRD-006 | 121717 | alpha-Chlordane | 1.0 | 1.5 | 1.9 | UG/KG | U |
| HRD-006 | 40276 | alpha-Chlordane | 0.0 | 0.5 | 1.9 | UG/KG | U |
| HRD-006 | 40347 | alpha-Chlordane | 0.0 | 0.5 | 1.9 | UG/KG | U |
| HRD-010 | 122394 | alpha-Chlordane | 0.0 | 0.5 | 1.9 | UG/KG | U |
| HRD-010 | 121183 | alpha-Chlordane | 1.0 | 1.5 | 1.9 | UG/KG | U |
| STP-012 | 122214 | alpha-Chlordane | 0.0 | 0.5 | 1.9 | UG/KG | U |
| STP-012 | 122216 | alpha-Chlordane | 0.0 | 0.5 | 1.9 | UG/KG | U |
| HRD-006 | 40175 | alpha-Chlordane | 0.0 | 0.5 | 2 | UG/KG | U |
| HRD-006 | 40379 | alpha-Chlordane | 0.0 | 0.5 | 2 | UG/KG | U |
| HRD-010 | 121186 | alpha-Chlordane | 2.5 | 3.0 | 2 | UG/KG | U |
| STP-012 | 122215 | alpha-Chlordane | 1.0 | 1.5 | 2 | UG/KG | U |
| STP-012 | 122217 | alpha-Chlordane | 1.0 | 1.5 | 2 | UG/KG | U |
| HRD-010 | 122409 | alpha-Chlordane | 4.5 | 5.0 | 2.1 | UG/KG | U |
| HRD-010 | 122403 | alpha-Chlordane | 2.5 | 3.0 | 2.2 | UG/KG | U |
| HRD-010 | 121179 | alpha-Chlordane | 0.0 | 0.5 | 2.2 | UG/KG | U |
| HRD-010 | 121192 | alpha-Chlordane | 4.5 | 5.0 | 2.3 | UG/KG | U |
| HRD-006 | 61347 | alpha-Chlordane | 0.0 | 0.5 | 89 | UG/KG | U |
| HRD-006 | 61359 | alpha-Chlordane | 0.0 | 0.5 | 92 | UG/KG | U |
| HRD-008 | 61472 | alpha-Chlordane | 0.0 | 0.5 | 92 | UG/KG | U |
| HRD-008 | 61479 | alpha-Chlordane | 0.0 | 0.5 | 94 | UG/KG | U |

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-006 | 61380 | alpha-Chlordane | 0.0 | 0.5 | 95 | UG/KG | U |
| HRD-001 | 99266 | alpha-Chlordane | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-001 | 99267 | alpha-Chlordane | 0.0 | 0.5 | 280 | UG/KG | U |
| HRD-001 | 99167 | alpha-Chlordane | 0.0 | 0.5 | 490 | UG/KG | U |
| HRD-001 | 99269 | alpha-Chlordane | 0.0 | 0.5 | 680 | UG/KG | U |
| HRD-010 | SP1-5-S | bis(2-Chloroisopropyl) ether | 0.0 | 1.5 | 330 | UG/KG | U |
| HRD-008 | 61477 | bis(2-Chloroisopropyl) ether | 1.5 | 2.0 | 350 | UG/KG | U |
| HRD-010 | 122398 | bis(2-Chloroisopropyl) ether | 1.0 | 1.5 | 350 | UG/KG | UJ |
| STP-012 | 122214 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 360 | UG/KG | U |
| HRD-006 | 61385 | bis(2-Chloroisopropyl) ether | 1.5 | 2.0 | 370 | UG/KG | U |
| HRD-006 | 121718 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 370 | UG/KG | U |
| HRD-006 | 121719 | bis(2-Chloroisopropyl) ether | 1.0 | 1.5 | 370 | UG/KG | U |
| HRD-006 | 121715 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 370 | UG/KG | U |
| HRD-006 | 121716 | bis(2-Chloroisopropyl) ether | 1.0 | 1.5 | 370 | UG/KG | U |
| HRD-006 | 121717 | bis(2-Chloroisopropyl) ether | 1.0 | 1.5 | 370 | UG/KG | U |
| HRD-006 | 40276 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 370 | UG/KG | U |
| HRD-006 | 40347 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 370 | UG/KG | U |
| STP-012 | 122216 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 370 | UG/KG | U |
| HRD-010 | 122394 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 370 | UG/KG | UJ |
| HRD-006 | 61364 | bis(2-Chloroisopropyl) ether | 1.5 | 2.0 | 380 | UG/KG | U |
| HRD-006 | 61350 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 380 | UG/KG | U |
| HRD-006 | 121714 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 380 | UG/KG | U |
| HRD-006 | 40175 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 380 | UG/KG | U |
| HRD-010 | 121183 | bis(2-Chloroisopropyl) ether | 1.0 | 1.5 | 380 | UG/KG | U |
| HRD-006 | 40379 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 390 | UG/KG | U |
| STP-012 | 122215 | bis(2-Chloroisopropyl) ether | 1.0 | 1.5 | 390 | UG/KG | U |
| STP-012 | 122217 | bis(2-Chloroisopropyl) ether | 1.0 | 1.5 | 390 | UG/KG | U |
| HRD-001 | 99266 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 400 | UG/KG | U |
| HRD-001 | 99267 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 400 | UG/KG | U |
| HRD-001 | 99269 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 400 | UG/KG | U |
| HRD-001 | 99268 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 400 | UG/KG | U |
| HRD-010 | 121186 | bis(2-Chloroisopropyl) ether | 2.5 | 3.0 | 400 | UG/KG | U |
| HRD-008 | 61484 | bis(2-Chloroisopropyl) ether | 1.5 | 2.0 | 410 | UG/KG | U |
| HRD-010 | 122409 | bis(2-Chloroisopropyl) ether | 4.5 | 5.0 | 410 | UG/KG | UJ |
| HRD-010 | 122403 | bis(2-Chloroisopropyl) ether | 2.5 | 3.0 | 420 | UG/KG | UJ |
| HRD-010 | 121179 | bis(2-Chloroisopropyl) ether | 0.0 | 0.5 | 440 | UG/KG | U |
| HRD-010 | 121192 | bis(2-Chloroisopropyl) ether | 4.5 | 5.0 | 450 | UG/KG | U |
| HRD-008 | 61484 | bis(2-Ethylhexyl)phthalate | 1.5 | 2.0 | 75 | UG/KG | J |



00020
- 2851

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-008 | 61477 | bis(2-Ethylhexyl)phthalate | 1.5 | 2.0 | 530 | UG/KG | - |
| HRD-006 | 61385 | Bromodichloromethane | 1.5 | 2.0 | 5 | UG/KG | U |
| HRD-008 | 61477 | Bromodichloromethane | 1.5 | 2.0 | 5 | UG/KG | U |
| STP-012 | 17719 | Bromodichloromethane | 0.0 | 0.5 | 5 | UG/KG | U |
| HRD-006 | 61364 | Bromodichloromethane | 1.5 | 2.0 | 6 | UG/KG | U |
| HRD-006 | 61350 | Bromodichloromethane | 0.0 | 0.5 | 6 | UG/KG | U |
| HRD-008 | 61484 | Bromodichloromethane | 1.5 | 2.0 | 6 | UG/KG | U |
| STP-011 | 98458 | Bromodichloromethane | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-011 | 98461 | Bromodichloromethane | 13.5 | 14.5 | 6 | UG/KG | U |
| STP-015 | 98458 | Bromodichloromethane | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-015 | 98461 | Bromodichloromethane | 13.5 | 14.5 | 6 | UG/KG | U |
| HRD-010 | 122398 | Bromodichloromethane | 1.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-4-L | Bromodichloromethane | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-9-L | Bromodichloromethane | 0.0 | 0.7 | 10 | UG/KG | U |
| HRD-010 | SP4-10-B1-L | Bromodichloromethane | 9.5 | 10.0 | 10 | UG/KG | U |
| HRD-010 | SP4-4-B1-L | Bromodichloromethane | 1.5 | 1.9 | 10 | UG/KG | U |
| HRD-010 | SP4-4-L | Bromodichloromethane | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B1-L | Bromodichloromethane | 2.5 | 3.0 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B2-L | Bromodichloromethane | 3.0 | 3.4 | 10 | UG/KG | U |
| HRD-006 | 121719 | Bromodichloromethane | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 121715 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121716 | Bromodichloromethane | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 121717 | Bromodichloromethane | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 40276 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40175 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40347 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 122394 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 121183 | Bromodichloromethane | 1.0 | 1.5 | 11 | UG/KG | U |
| STP-012 | 122214 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-012 | 122216 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121718 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121714 | Bromodichloromethane | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-001 | 99266 | Bromodichloromethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99267 | Bromodichloromethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99269 | Bromodichloromethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99268 | Bromodichloromethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-006 | 40379 | Bromodichloromethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-010 | 122409 | Bromodichloromethane | 4.5 | 5.0 | 12 | UG/KG | U |

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-010 | 121186 | Bromodichloromethane | 2.5 | 3.0 | 12 | UG/KG | U |
| STP-012 | 122215 | Bromodichloromethane | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-012 | 122217 | Bromodichloromethane | 1.0 | 1.5 | 12 | UG/KG | U |
| HRD-010 | 122403 | Bromodichloromethane | 2.5 | 3.0 | 13 | UG/KG | U |
| HRD-010 | 121179 | Bromodichloromethane | 0.0 | 0.5 | 13 | UG/KG | U |
| HRD-010 | 121192 | Bromodichloromethane | 4.5 | 5.0 | 14 | UG/KG | U |
| HRD-010 | SP1-5-S | Carbazole | 0.0 | 1.5 | 330 | UG/KG | U |
| HRD-010 | 122398 | Carbazole | 1.0 | 1.5 | 350 | UG/KG | UJ |
| STP-012 | 122214 | Carbazole | 0.0 | 0.5 | 360 | UG/KG | U |
| HRD-006 | 121718 | Carbazole | 0.0 | 0.5 | 370 | UG/KG | U |
| HRD-006 | 121719 | Carbazole | 1.0 | 1.5 | 370 | UG/KG | U |
| HRD-006 | 121715 | Carbazole | 0.0 | 0.5 | 370 | UG/KG | U |
| HRD-006 | 121716 | Carbazole | 1.0 | 1.5 | 370 | UG/KG | U |
| HRD-006 | 121717 | Carbazole | 1.0 | 1.5 | 370 | UG/KG | U |
| HRD-006 | 40276 | Carbazole | 0.0 | 0.5 | 370 | UG/KG | U |
| STP-012 | 122216 | Carbazole | 0.0 | 0.5 | 370 | UG/KG | U |
| HRD-006 | 40347 | Carbazole | 0.0 | 0.5 | 370 | UG/KG | UJ |
| HRD-010 | 122394 | Carbazole | 0.0 | 0.5 | 370 | UG/KG | UJ |
| HRD-006 | 121714 | Carbazole | 0.0 | 0.5 | 380 | UG/KG | U |
| HRD-006 | 40175 | Carbazole | 0.0 | 0.5 | 380 | UG/KG | U |
| HRD-010 | 121183 | Carbazole | 1.0 | 1.5 | 380 | UG/KG | U |
| STP-012 | 122215 | Carbazole | 1.0 | 1.5 | 390 | UG/KG | U |
| STP-012 | 122217 | Carbazole | 1.0 | 1.5 | 390 | UG/KG | U |
| HRD-006 | 40379 | Carbazole | 0.0 | 0.5 | 390 | UG/KG | UJ |
| HRD-010 | 121186 | Carbazole | 2.5 | 3.0 | 400 | UG/KG | U |
| HRD-010 | 122409 | Carbazole | 4.5 | 5.0 | 410 | UG/KG | UJ |
| HRD-010 | 122403 | Carbazole | 2.5 | 3.0 | 420 | UG/KG | UJ |
| HRD-010 | 121179 | Carbazole | 0.0 | 0.5 | 440 | UG/KG | U |
| HRD-010 | 121192 | Carbazole | 4.5 | 5.0 | 450 | UG/KG | U |
| HRD-008 | 61477 | Chloroethane | 1.5 | 2.0 | 10 | UG/KG | U |
| HRD-010 | SP1-4-L | Chloroethane | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-9-L | Chloroethane | 0.0 | 0.7 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B1-L | Chloroethane | 2.5 | 3.0 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B2-L | Chloroethane | 3.0 | 3.4 | 10 | UG/KG | U |
| STP-012 | 17719 | Chloroethane | 0.0 | 0.5 | 10 | UG/KG | U |
| HRD-010 | 122398 | Chloroethane | 1.0 | 1.5 | 10 | UG/KG | UJ |
| HRD-010 | SP4-10-B1-L | Chloroethane | 9.5 | 10.0 | 10 | UG/KG | UJ |
| HRD-010 | SP4-4-B1-L | Chloroethane | 1.5 | 1.9 | 10 | UG/KG | UJ |



2851

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-010 | SP4-4-L | Chloroethane | 0.0 | 1.5 | 10 | UG/KG | UJ |
| HRD-006 | 61364 | Chloroethane | 1.5 | 2.0 | 11 | UG/KG | U |
| HRD-006 | 61385 | Chloroethane | 1.5 | 2.0 | 11 | UG/KG | U |
| HRD-006 | 61350 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121719 | Chloroethane | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 121715 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121717 | Chloroethane | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 40276 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40175 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40347 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 121183 | Chloroethane | 1.0 | 1.5 | 11 | UG/KG | U |
| STP-012 | 122214 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-012 | 122216 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-011 | 98461 | Chloroethane | 13.5 | 14.5 | 11 | UG/KG | U |
| STP-015 | 98461 | Chloroethane | 13.5 | 14.5 | 11 | UG/KG | U |
| HRD-006 | 121718 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121714 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121716 | Chloroethane | 1.0 | 1.5 | 11 | UG/KG | UJ |
| HRD-010 | 122394 | Chloroethane | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-001 | 99266 | Chloroethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99267 | Chloroethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99268 | Chloroethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-006 | 40379 | Chloroethane | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-008 | 61484 | Chloroethane | 1.5 | 2.0 | 12 | UG/KG | U |
| HRD-010 | 121186 | Chloroethane | 2.5 | 3.0 | 12 | UG/KG | U |
| STP-012 | 122215 | Chloroethane | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-012 | 122217 | Chloroethane | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-011 | 98458 | Chloroethane | 10.5 | 11.5 | 12 | UG/KG | U |
| STP-015 | 98458 | Chloroethane | 10.5 | 11.5 | 12 | UG/KG | U |
| HRD-001 | 99269 | Chloroethane | 0.0 | 0.5 | 12 | UG/KG | UJ |
| HRD-010 | 122409 | Chloroethane | 4.5 | 5.0 | 12 | UG/KG | UJ |
| HRD-010 | 121179 | Chloroethane | 0.0 | 0.5 | 13 | UG/KG | U |
| HRD-010 | 122403 | Chloroethane | 2.5 | 3.0 | 13 | UG/KG | UJ |
| HRD-010 | 121192 | Chloroethane | 4.5 | 5.0 | 14 | UG/KG | U |
| STP-012 | 65511 | Mercury | | | 0.0002 | MG/L | U |
| STP-011 | 98462 | Mercury | | | 0.0002 | MG/L | U |
| STP-015 | 98462 | Mercury | | | 0.0002 | MG/L | U |
| STP-012 | 767 | Mercury | | | 0.0002 | MG/L | UJ |



000073

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-010 | 122394 | Mercury | 0.0 | 0.5 | 0.05 | MG/KG | U |
| HRD-010 | 122398 | Mercury | 1.0 | 1.5 | 0.05 | MG/KG | U |
| STP-012 | 122214 | Mercury | 0.0 | 0.5 | 0.05 | MG/KG | U |
| HRD-006 | 121718 | Mercury | 0.0 | 0.5 | 0.06 | MG/KG | U |
| HRD-006 | 121719 | Mercury | 1.0 | 1.5 | 0.06 | MG/KG | U |
| HRD-006 | 121714 | Mercury | 0.0 | 0.5 | 0.06 | MG/KG | U |
| HRD-006 | 121715 | Mercury | 0.0 | 0.5 | 0.06 | MG/KG | U |
| HRD-006 | 121716 | Mercury | 1.0 | 1.5 | 0.06 | MG/KG | U |
| HRD-006 | 121717 | Mercury | 1.0 | 1.5 | 0.06 | MG/KG | U |
| HRD-010 | 122403 | Mercury | 2.5 | 3.0 | 0.06 | MG/KG | U |
| HRD-010 | 122409 | Mercury | 4.5 | 5.0 | 0.06 | MG/KG | U |
| HRD-010 | 121183 | Mercury | 1.0 | 1.5 | 0.06 | MG/KG | U |
| STP-012 | 122215 | Mercury | 1.0 | 1.5 | 0.06 | MG/KG | U |
| STP-012 | 122216 | Mercury | 0.0 | 0.5 | 0.06 | MG/KG | U |
| STP-012 | 122217 | Mercury | 1.0 | 1.5 | 0.06 | MG/KG | U |
| HRD-010 | 121179 | Mercury | 0.0 | 0.5 | 0.08 | MG/KG | U |
| HRD-010 | 121192 | Mercury | 4.5 | 5.0 | 0.08 | MG/KG | U |
| HRD-006 | 61347 | Mercury | 0.0 | 0.5 | 0.1 | MG/KG | U |
| HRD-010 | 121186 | Mercury | 2.5 | 3.0 | 0.1 | MG/KG | U |
| HRD-001 | 99266 | Mercury | 0.0 | 0.5 | 0.11 | MG/KG | U |
| HRD-006 | 61359 | Mercury | 0.0 | 0.5 | 0.11 | MG/KG | U |
| HRD-006 | 61380 | Mercury | 0.0 | 0.5 | 0.11 | MG/KG | U |
| HRD-006 | 40347 | Mercury | 0.0 | 0.5 | 0.11 | MG/KG | U |
| HRD-008 | 61479 | Mercury | 0.0 | 0.5 | 0.11 | MG/KG | U |
| HRD-001 | 99267 | Mercury | 0.0 | 0.5 | 0.12 | MG/KG | - |
| HRD-006 | 40276 | Mercury | 0.0 | 0.5 | 0.12 | MG/KG | U |
| HRD-006 | 40175 | Mercury | 0.0 | 0.5 | 0.12 | MG/KG | U |
| HRD-006 | 40379 | Mercury | 0.0 | 0.5 | 0.12 | MG/KG | U |
| HRD-001 | 99269 | Mercury | 0.0 | 0.5 | 0.19 | MG/KG | - |
| HRD-001 | 99268 | Mercury | 0.0 | 0.5 | 0.23 | MG/KG | - |
| HRD-008 | 61472 | Mercury | 0.0 | 0.5 | 4.6 | MG/KG | - |
| HRD-006 | SS-46-186 | Neptunium-237 | 0.0 | 0.5 | 0.1 | PCI/G | UJ |
| HRD-006 | SS-46-290 | Neptunium-237 | 0.0 | 0.2 | 0.1 | PCI/G | UJ |
| HRD-006 | SS-46-292 | Neptunium-237 | 0.0 | 0.2 | 0.1 | PCI/G | UJ |
| HRD-006 | SS-46-293 | Neptunium-237 | 0.0 | 0.2 | 0.1 | PCI/G | UJ |
| HRD-006 | SS-46-294 | Neptunium-237 | 0.0 | 0.2 | 0.1 | PCI/G | UJ |
| HRD-006 | SS-46-291 | Neptunium-237 | 0.0 | 0.2 | 0.2 | PCI/G | U |
| HRD-001 | 5992 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |



000074

2851

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-001 | 5993 | Neptunium-237 | 0.5 | 1.0 | 0.6 | PCI/G | U |
| HRD-001 | 5994 | Neptunium-237 | 1.0 | 1.5 | 0.6 | PCI/G | U |
| HRD-001 | 5995 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| HRD-001 | 5996 | Neptunium-237 | 0.5 | 1.0 | 0.6 | PCI/G | U |
| HRD-001 | 5997 | Neptunium-237 | 1.0 | 1.5 | 0.6 | PCI/G | U |
| HRD-001 | 5989 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| HRD-001 | 18751 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| HRD-001 | 18763 | Neptunium-237 | 6.0 | 6.5 | 0.6 | PCI/G | U |
| HRD-008 | 5970 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| HRD-008 | 5502 | Neptunium-237 | 0.0 | 0.2 | 0.6 | PCI/G | U |
| HRD-008 | 5503 | Neptunium-237 | 0.2 | 0.3 | 0.6 | PCI/G | U |
| HRD-008 | 5504 | Neptunium-237 | 0.3 | 0.5 | 0.6 | PCI/G | U |
| HRD-009 | 5390 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| HRD-009 | 5387 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| HRD-010 | 5967 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| STP-020 | 5543 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| STP-005 | 5505 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | U |
| HRD-001 | 18663 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | UJ |
| HRD-001 | 18729 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | UJ |
| HRD-006 | 8973 | Neptunium-237 | 105.0 | 106.5 | 0.6 | PCI/G | UJ |
| STP-012 | 52531 | Neptunium-237 | 1.0 | 1.5 | 0.6 | PCI/G | UJ |
| STP-012 | 52532 | Neptunium-237 | 1.5 | 2.0 | 0.6 | PCI/G | UJ |
| STP-012 | 17717 | Neptunium-237 | 0.0 | 0.5 | 0.6 | PCI/G | UJ |
| STP-012 | 17718 | Neptunium-237 | 0.5 | 1.0 | 0.6 | PCI/G | UJ |
| STP-011 | 98458 | Neptunium-237 | 10.5 | 11.5 | 0.6 | PCI/G | UJ |
| STP-011 | 98461 | Neptunium-237 | 13.5 | 14.5 | 0.6 | PCI/G | UJ |
| STP-015 | 98458 | Neptunium-237 | 10.5 | 11.5 | 0.6 | PCI/G | UJ |
| STP-015 | 98461 | Neptunium-237 | 13.5 | 14.5 | 0.6 | PCI/G | UJ |
| HRD-010 | 122404 | Strontium-90 | 2.5 | 3.0 | 0.3 | PCI/G | J |
| HRD-006 | SS-46-186 | Strontium-90 | 0.0 | 0.5 | 0.3 | PCI/G | UJ |
| HRD-006 | SS-46-292 | Strontium-90 | 0.0 | 0.2 | 0.3 | PCI/G | UJ |
| HRD-006 | SS-46-294 | Strontium-90 | 0.0 | 0.2 | 0.3 | PCI/G | UJ |
| HRD-006 | SS-46-291 | Strontium-90 | 0.0 | 0.2 | 0.4 | PCI/G | UJ |
| HRD-010 | 122399 | Strontium-90 | 1.0 | 1.5 | 0.4 | PCI/G | UJ |
| HRD-010 | 122410 | Strontium-90 | 4.5 | 5.0 | 0.4 | PCI/G | UJ |
| HRD-001 | 5992 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| HRD-001 | 5993 | Strontium-90 | 0.5 | 1.0 | 0.5 | PCI/G | U |
| HRD-001 | 5994 | Strontium-90 | 1.0 | 1.5 | 0.5 | PCI/G | U |

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-001 | 5996 | Strontium-90 | 0.5 | 1.0 | 0.5 | PCI/G | U |
| HRD-001 | 5997 | Strontium-90 | 1.0 | 1.5 | 0.5 | PCI/G | U |
| HRD-001 | 18663 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| HRD-001 | 18729 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| HRD-006 | 8973 | Strontium-90 | 105.0 | 106.5 | 0.5 | PCI/G | U |
| HRD-008 | 5970 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| HRD-008 | 5503 | Strontium-90 | 0.2 | 0.3 | 0.5 | PCI/G | U |
| HRD-008 | 5504 | Strontium-90 | 0.3 | 0.5 | 0.5 | PCI/G | U |
| HRD-009 | 5390 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| HRD-010 | 5967 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| STP-020 | 5543 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| STP-012 | 17717 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| STP-012 | 17718 | Strontium-90 | 0.5 | 1.0 | 0.5 | PCI/G | U |
| STP-011 | 98458 | Strontium-90 | 10.5 | 11.5 | 0.5 | PCI/G | U |
| STP-011 | 98461 | Strontium-90 | 13.5 | 14.5 | 0.5 | PCI/G | U |
| STP-015 | 98458 | Strontium-90 | 10.5 | 11.5 | 0.5 | PCI/G | U |
| STP-015 | 98461 | Strontium-90 | 13.5 | 14.5 | 0.5 | PCI/G | U |
| STP-005 | 5505 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | U |
| HRD-001 | 5995 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | UJ |
| HRD-001 | 18751 | Strontium-90 | 0.0 | 0.5 | 0.5 | PCI/G | UJ |
| HRD-008 | 5502 | Strontium-90 | 0.0 | 0.2 | 0.6 | PCI/G | - |
| HRD-006 | SS-46-293 | Strontium-90 | 0.0 | 0.2 | 0.6 | PCI/G | UJ |
| HRD-006 | SS-46-290 | Strontium-90 | 0.0 | 0.2 | 0.7 | PCI/G | UJ |
| HRD-001 | 5989 | Strontium-90 | 0.0 | 0.5 | 1.3 | PCI/G | - |
| HRD-009 | 5387 | Strontium-90 | 0.0 | 0.5 | 1.3 | PCI/G | - |
| HRD-001 | 18763 | Strontium-90 | 6.0 | 6.5 | 1.42 | PCI/G | J |
| STP-012 | 52532 | Strontium-90 | 1.5 | 2.0 | 2.1 | PCI/G | J |
| STP-012 | 52531 | Strontium-90 | 1.0 | 1.5 | 2.7 | PCI/G | J |
| HRD-010 | 122410 | Technetium-99 | 4.5 | 5.0 | 0.3 | PCI/G | UJ |
| HRD-008 | SP5-3-1-R | Technetium-99 | 0.1 | 0.6 | 0.556 | PCI/G | U |
| HRD-008 | SP5-3-2-R | Technetium-99 | 1.7 | 2.2 | 0.599 | PCI/G | U |
| HRD-010 | 122399 | Technetium-99 | 1.0 | 1.5 | 0.6 | PCI/G | J |
| HRD-006 | SS-46-294 | Technetium-99 | 0.0 | 0.2 | 0.6 | PCI/G | UJ |
| HRD-010 | 122395 | Technetium-99 | 0.0 | 0.5 | 0.7 | PCI/G | J |
| HRD-001 | 5995 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | - |
| HRD-001 | 5989 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | U |
| HRD-008 | 5502 | Technetium-99 | 0.0 | 0.2 | 0.9 | PCI/G | U |
| HRD-008 | 5503 | Technetium-99 | 0.2 | 0.3 | 0.9 | PCI/G | U |



92000 2851

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-008 | 5504 | Technetium-99 | 0.3 | 0.5 | 0.9 | PCI/G | U |
| HRD-009 | 5390 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | U |
| HRD-009 | 5387 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | U |
| STP-012 | 17717 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | U |
| STP-012 | 17718 | Technetium-99 | 0.5 | 1.0 | 0.9 | PCI/G | U |
| STP-005 | 5505 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | U |
| HRD-001 | 5993 | Technetium-99 | 0.5 | 1.0 | 0.9 | PCI/G | UJ |
| HRD-001 | 5994 | Technetium-99 | 1.0 | 1.5 | 0.9 | PCI/G | UJ |
| HRD-006 | 8973 | Technetium-99 | 105.0 | 106.5 | 0.9 | PCI/G | UJ |
| HRD-008 | 5970 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | UJ |
| HRD-010 | 5967 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | UJ |
| STP-020 | 5543 | Technetium-99 | 0.0 | 0.5 | 0.9 | PCI/G | UJ |
| STP-012 | 52531 | Technetium-99 | 1.0 | 1.5 | 0.9 | PCI/G | UJ |
| STP-012 | 52532 | Technetium-99 | 1.5 | 2.0 | 0.9 | PCI/G | UJ |
| STP-011 | 98458 | Technetium-99 | 10.5 | 11.5 | 0.9 | PCI/G | UJ |
| STP-011 | 98461 | Technetium-99 | 13.5 | 14.5 | 0.9 | PCI/G | UJ |
| STP-015 | 98458 | Technetium-99 | 10.5 | 11.5 | 0.9 | PCI/G | UJ |
| STP-015 | 98461 | Technetium-99 | 13.5 | 14.5 | 0.9 | PCI/G | UJ |
| HRD-010 | SP4-4-R | Technetium-99 | 0.0 | 1.5 | 0.956 | PCI/G | U |
| HRD-006 | SS-46-291 | Technetium-99 | 0.0 | 0.2 | 1 | PCI/G | UJ |
| HRD-006 | SS-46-293 | Technetium-99 | 0.0 | 0.2 | 1 | PCI/G | UJ |
| HRD-010 | SP4-9-R | Technetium-99 | 0.0 | 1.5 | 1.03 | PCI/G | U |
| HRD-010 | SP4-10-R | Technetium-99 | 9.0 | 10.4 | 1.04 | PCI/G | U |
| HRD-010 | SP4-8-R | Technetium-99 | 0.0 | 1.5 | 1.07 | PCI/G | U |
| HRD-001 | 5996 | Technetium-99 | 0.5 | 1.0 | 1.1 | PCI/G | J |
| HRD-001 | 5997 | Technetium-99 | 1.0 | 1.5 | 1.1 | PCI/G | J |
| HRD-008 | SP5-5-2-R | Technetium-99 | 2.7 | 3.2 | 1.3 | PCI/G | - |
| HRD-008 | SP5-5-3-R | Technetium-99 | 7.4 | 7.9 | 1.31 | PCI/G | - |
| HRD-010 | 122404 | Technetium-99 | 2.5 | 3.0 | 1.8 | PCI/G | J |
| HRD-001 | 5992 | Technetium-99 | 0.0 | 0.5 | 2.2 | PCI/G | - |
| HRD-008 | SP5-3-3-R | Technetium-99 | 3.0 | 3.5 | 2.42 | PCI/G | - |
| HRD-006 | SS-46-290 | Technetium-99 | 0.0 | 0.2 | 3 | PCI/G | UJ |
| HRD-006 | SS-46-292 | Technetium-99 | 0.0 | 0.2 | 3 | PCI/G | UJ |
| HRD-008 | SP5-5-1-R | Technetium-99 | 1.0 | 1.5 | 4.3 | PCI/G | - |
| HRD-001 | 18729 | Technetium-99 | 0.0 | 0.5 | 4.79 | PCI/G | J |
| HRD-001 | 18663 | Technetium-99 | 0.0 | 0.5 | 5.09 | PCI/G | J |
| HRD-006 | SS-46-186 | Technetium-99 | 0.0 | 0.5 | 5.1 | PCI/G | - |
| HRD-006 | 61385 | Tetrachloroethene | 1.5 | 2.0 | 5 | UG/KG | U |

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-008 | 61477 | Tetrachloroethene | 1.5 | 2.0 | 5 | UG/KG | U |
| HRD-010 | SP1-4-TL | Tetrachloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| HRD-010 | SP4-4-TL | Tetrachloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| HRD-010 | SP4-9-TL | Tetrachloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| STP-012 | 17719 | Tetrachloroethene | 0.0 | 0.5 | 5 | UG/KG | U |
| STP-012 | 65511 | Tetrachloroethene | | | 5 | UG/L | U |
| STP-011 | 98462 | Tetrachloroethene | | | 5 | UG/L | U |
| STP-015 | 98462 | Tetrachloroethene | | | 5 | UG/L | U |
| HRD-010 | SP1-9-TL | Tetrachloroethene | 0.0 | 0.7 | 5 | UG/L | UJ |
| HRD-006 | 61364 | Tetrachloroethene | 1.5 | 2.0 | 6 | UG/KG | U |
| HRD-006 | 61350 | Tetrachloroethene | 0.0 | 0.5 | 6 | UG/KG | U |
| HRD-008 | 61484 | Tetrachloroethene | 1.5 | 2.0 | 6 | UG/KG | U |
| STP-012 | 767 | Tetrachloroethene | | | 6 | UG/KG | U |
| STP-011 | 98458 | Tetrachloroethene | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-011 | 98461 | Tetrachloroethene | 13.5 | 14.5 | 6 | UG/KG | U |
| STP-015 | 98458 | Tetrachloroethene | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-015 | 98461 | Tetrachloroethene | 13.5 | 14.5 | 6 | UG/KG | U |
| HRD-010 | 122398 | Tetrachloroethene | 1.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-4-L | Tetrachloroethene | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP4-10-B1-L | Tetrachloroethene | 9.5 | 10.0 | 10 | UG/KG | U |
| HRD-010 | SP4-4-B1-L | Tetrachloroethene | 1.5 | 1.9 | 10 | UG/KG | U |
| HRD-010 | SP4-4-L | Tetrachloroethene | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B1-L | Tetrachloroethene | 2.5 | 3.0 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B2-L | Tetrachloroethene | 3.0 | 3.4 | 10 | UG/KG | U |
| HRD-010 | SP1-9-L | Tetrachloroethene | 0.0 | 0.7 | 10 | UG/KG | UJ |
| HRD-006 | 121717 | Tetrachloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 40276 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40175 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40347 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 122394 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 121183 | Tetrachloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| STP-012 | 122214 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-012 | 122216 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121718 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121719 | Tetrachloroethene | 1.0 | 1.5 | 11 | UG/KG | UJ |
| HRD-006 | 121714 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121715 | Tetrachloroethene | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121716 | Tetrachloroethene | 1.0 | 1.5 | 11 | UG/KG | UJ |



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2851

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-001 | 99267 | Tetrachloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99269 | Tetrachloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-006 | 40379 | Tetrachloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-010 | 122409 | Tetrachloroethene | 4.5 | 5.0 | 12 | UG/KG | U |
| HRD-010 | 121186 | Tetrachloroethene | 2.5 | 3.0 | 12 | UG/KG | U |
| STP-012 | 122215 | Tetrachloroethene | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-012 | 122217 | Tetrachloroethene | 1.0 | 1.5 | 12 | UG/KG | U |
| HRD-001 | 99266 | Tetrachloroethene | 0.0 | 0.5 | 12 | UG/KG | UJ |
| HRD-001 | 99268 | Tetrachloroethene | 0.0 | 0.5 | 12 | UG/KG | UJ |
| HRD-010 | 122403 | Tetrachloroethene | 2.5 | 3.0 | 13 | UG/KG | U |
| HRD-010 | 121179 | Tetrachloroethene | 0.0 | 0.5 | 13 | UG/KG | U |
| HRD-010 | 121192 | Tetrachloroethene | 4.5 | 5.0 | 14 | UG/KG | U |
| STP-012 | 65511 | Toxaphene | | | 1 | UG/L | U |
| STP-011 | 98462 | Toxaphene | | | 1 | UG/L | U |
| STP-015 | 98462 | Toxaphene | | | 1 | UG/L | U |
| STP-012 | 767 | Toxaphene | | | 1 | UG/L | UJ |
| HRD-010 | SP4-4-TS | Toxaphene | 0.0 | 1.5 | 10 | UG/L | U |
| HRD-010 | SP4-9-TS | Toxaphene | 0.0 | 1.5 | 10 | UG/L | U |
| HRD-010 | SP1-4-TS | Toxaphene | 0.0 | 1.5 | 20 | UG/L | U |
| HRD-010 | SP1-9-TS | Toxaphene | 0.0 | 0.7 | 20 | UG/L | U |
| HRD-010 | SP1-4-P | Toxaphene | 0.0 | 1.5 | 67 | UG/KG | U |
| HRD-010 | SP1-9-P | Toxaphene | 0.0 | 0.7 | 67 | UG/KG | U |
| HRD-010 | SP4-4-P | Toxaphene | 0.0 | 1.5 | 67 | UG/KG | U |
| HRD-010 | SP4-9-P | Toxaphene | 0.0 | 1.5 | 67 | UG/KG | U |
| HRD-006 | 61359 | Toxaphene | 0.0 | 0.5 | 180 | UG/KG | U |
| HRD-006 | 61347 | Toxaphene | 0.0 | 0.5 | 180 | UG/KG | U |
| HRD-008 | 61472 | Toxaphene | 0.0 | 0.5 | 180 | UG/KG | U |
| HRD-010 | 122398 | Toxaphene | 1.0 | 1.5 | 180 | UG/KG | UJ |
| HRD-006 | 61380 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-006 | 121718 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-006 | 121719 | Toxaphene | 1.0 | 1.5 | 190 | UG/KG | U |
| HRD-006 | 121714 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-006 | 121715 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-006 | 121716 | Toxaphene | 1.0 | 1.5 | 190 | UG/KG | U |
| HRD-006 | 121717 | Toxaphene | 1.0 | 1.5 | 190 | UG/KG | U |
| HRD-006 | 40276 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-006 | 40347 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-008 | 61479 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |



000029

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-010 | 122394 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-010 | 121183 | Toxaphene | 1.0 | 1.5 | 190 | UG/KG | U |
| STP-012 | 122214 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| STP-012 | 122216 | Toxaphene | 0.0 | 0.5 | 190 | UG/KG | U |
| HRD-006 | 40175 | Toxaphene | 0.0 | 0.5 | 200 | UG/KG | U |
| HRD-006 | 40379 | Toxaphene | 0.0 | 0.5 | 200 | UG/KG | U |
| HRD-010 | 121186 | Toxaphene | 2.5 | 3.0 | 200 | UG/KG | U |
| STP-012 | 122215 | Toxaphene | 1.0 | 1.5 | 200 | UG/KG | U |
| STP-012 | 122217 | Toxaphene | 1.0 | 1.5 | 200 | UG/KG | U |
| HRD-010 | 122409 | Toxaphene | 4.5 | 5.0 | 210 | UG/KG | U |
| HRD-010 | 122403 | Toxaphene | 2.5 | 3.0 | 220 | UG/KG | U |
| HRD-010 | 121179 | Toxaphene | 0.0 | 0.5 | 220 | UG/KG | U |
| HRD-010 | 121192 | Toxaphene | 4.5 | 5.0 | 230 | UG/KG | U |
| HRD-001 | 99266 | Toxaphene | 0.0 | 0.5 | 380 | UG/KG | U |
| HRD-001 | 99267 | Toxaphene | 0.0 | 0.5 | 560 | UG/KG | U |
| HRD-001 | 99268 | Toxaphene | 0.0 | 0.5 | 990 | UG/KG | U |
| HRD-001 | 99269 | Toxaphene | 0.0 | 0.5 | 1400 | UG/KG | U |
| HRD-006 | 61385 | Trichloroethene | 1.5 | 2.0 | 5 | UG/KG | U |
| HRD-008 | 61477 | Trichloroethene | 1.5 | 2.0 | 5 | UG/KG | U |
| HRD-010 | SP1-4-TL | Trichloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| HRD-010 | SP1-9-TL | Trichloroethene | 0.0 | 0.7 | 5 | UG/L | U |
| HRD-010 | SP4-4-TL | Trichloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| HRD-010 | SP4-9-TL | Trichloroethene | 0.0 | 1.5 | 5 | UG/L | U |
| STP-012 | 17719 | Trichloroethene | 0.0 | 0.5 | 5 | UG/KG | U |
| STP-012 | 65511 | Trichloroethene | | | 5 | UG/L | U |
| STP-011 | 98462 | Trichloroethene | | | 5 | UG/L | U |
| STP-015 | 98462 | Trichloroethene | | | 5 | UG/L | U |
| HRD-006 | 61364 | Trichloroethene | 1.5 | 2.0 | 6 | UG/KG | U |
| HRD-006 | 61350 | Trichloroethene | 0.0 | 0.5 | 6 | UG/KG | U |
| HRD-008 | 61484 | Trichloroethene | 1.5 | 2.0 | 6 | UG/KG | U |
| STP-012 | 767 | Trichloroethene | | | 6 | UG/KG | U |
| STP-011 | 98458 | Trichloroethene | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-011 | 98461 | Trichloroethene | 13.5 | 14.5 | 6 | UG/KG | U |
| STP-015 | 98458 | Trichloroethene | 10.5 | 11.5 | 6 | UG/KG | U |
| STP-015 | 98461 | Trichloroethene | 13.5 | 14.5 | 6 | UG/KG | U |
| HRD-010 | 122398 | Trichloroethene | 1.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-4-L | Trichloroethene | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-9-L | Trichloroethene | 0.0 | 0.7 | 10 | UG/KG | U |



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## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-010 | SP4-10-B1-L | Trichloroethene | 9.5 | 10.0 | 10 | UG/KG | U |
| HRD-010 | SP4-4-B1-L | Trichloroethene | 1.5 | 1.9 | 10 | UG/KG | U |
| HRD-010 | SP4-4-L | Trichloroethene | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B1-L | Trichloroethene | 2.5 | 3.0 | 10 | UG/KG | U |
| HRD-010 | SP4-9-B2-L | Trichloroethene | 3.0 | 3.4 | 10 | UG/KG | U |
| HRD-006 | 121719 | Trichloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 121715 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121716 | Trichloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 121717 | Trichloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 40276 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40175 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40347 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 122394 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 121183 | Trichloroethene | 1.0 | 1.5 | 11 | UG/KG | U |
| STP-012 | 122214 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-012 | 122216 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121718 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121714 | Trichloroethene | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-001 | 99266 | Trichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99267 | Trichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99269 | Trichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99268 | Trichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-006 | 40379 | Trichloroethene | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-010 | 122409 | Trichloroethene | 4.5 | 5.0 | 12 | UG/KG | U |
| HRD-010 | 121186 | Trichloroethene | 2.5 | 3.0 | 12 | UG/KG | U |
| STP-012 | 122215 | Trichloroethene | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-012 | 122217 | Trichloroethene | 1.0 | 1.5 | 12 | UG/KG | U |
| HRD-010 | 122403 | Trichloroethene | 2.5 | 3.0 | 13 | UG/KG | U |
| HRD-010 | 121179 | Trichloroethene | 0.0 | 0.5 | 13 | UG/KG | U |
| HRD-010 | 121192 | Trichloroethene | 4.5 | 5.0 | 14 | UG/KG | U |
| HRD-010 | 121187 | Uranium, Total | 2.5 | 3.0 | 2.1 | MG/KG | - |
| STP-012 | 122220 | Uranium, Total | 1.0 | 1.5 | 2.7 | MG/KG | - |
| HRD-010 | 121193 | Uranium, Total | 4.5 | 5.0 | 2.8 | MG/KG | - |
| STP-012 | 122219 | Uranium, Total | 0.0 | 0.5 | 3 | MG/KG | - |
| HRD-010 | 121197 | Uranium, Total | 1.0 | 1.5 | 3.4 | MG/KG | - |
| HRD-001 | 20035 | Uranium, Total | 2.0 | 3.0 | 4 | MG/KG | J |
| STP-011 | 98461 | Uranium, Total | 13.5 | 14.5 | 4.83 | MG/KG | J |
| STP-015 | 98461 | Uranium, Total | 13.5 | 14.5 | 4.83 | MG/KG | J |



000051

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-001 | 20008 | Uranium, Total | 2.0 | 3.0 | 5 | MG/KG | J |
| HRD-001 | 607 | Uranium, Total | 19.5 | 20.0 | 6 | MG/KG | - |
| HRD-001 | 12469-1-R | Uranium, Total | 0.0 | 0.5 | 6.66 | MG/KG | - |
| HRD-006 | 121726 | Uranium, Total | 1.0 | 1.5 | 7.4 | MG/KG | - |
| HRD-001 | 12468-1-R | Uranium, Total | 0.0 | 0.5 | 7.43 | MG/KG | - |
| HRD-006 | 121725 | Uranium, Total | 1.0 | 1.5 | 7.7 | MG/KG | - |
| HRD-006 | 121728 | Uranium, Total | 1.0 | 1.5 | 7.9 | MG/KG | - |
| HRD-001 | 12468-2-R | Uranium, Total | 0.5 | 1.0 | 7.97 | MG/KG | - |
| HRD-001 | 12467-1-R | Uranium, Total | 0.0 | 0.5 | 8.83 | MG/KG | - |
| HRD-001 | 12468-3-R | Uranium, Total | 1.0 | 1.5 | 8.94 | MG/KG | - |
| HRD-001 | 12467-2-R | Uranium, Total | 0.5 | 1.0 | 9.26 | MG/KG | - |
| HRD-010 | 122410 | Uranium, Total | 4.5 | 5.0 | 9.9 | MG/KG | - |
| STP-005 | 5505 | Uranium, Total | 0.0 | 0.5 | 10 | MG/KG | J |
| HRD-001 | 12469-3-R | Uranium, Total | 1.0 | 1.5 | 11.3 | UG/L | - |
| STP-011 | 98458 | Uranium, Total | 10.5 | 11.5 | 11.3 | MG/KG | J |
| STP-015 | 98458 | Uranium, Total | 10.5 | 11.5 | 11.3 | MG/KG | J |
| HRD-010 | 122399 | Uranium, Total | 1.0 | 1.5 | 12.4 | MG/KG | - |
| HRD-008 | SP5-5-3-R | Uranium, Total | 7.4 | 7.9 | 12.588 | MG/KG | J |
| HRD-001 | 572 | Uranium, Total | 2.0 | 2.5 | 13 | MG/KG | - |
| HRD-006 | 10611 | Uranium, Total | 131.5 | 133.5 | 13.8 | MG/KG | - |
| HRD-001 | 12470-3-R | Uranium, Total | 1.0 | 1.5 | 14.2 | MG/KG | - |
| STP-012 | 17671 | Uranium, Total | 11.0 | 11.5 | 16.2 | MG/KG | J |
| HRD-008 | SP5-3-2-R | Uranium, Total | 1.7 | 2.2 | 17.637 | MG/KG | J |
| HRD-001 | 571 | Uranium, Total | 1.5 | 2.0 | 19 | MG/KG | - |
| HRD-006 | 121723 | Uranium, Total | 0.0 | 0.5 | 19.3 | MG/KG | - |
| HRD-001 | 12469-2-R | Uranium, Total | 0.5 | 1.0 | 19.8 | MG/KG | - |
| HRD-006 | 121724 | Uranium, Total | 0.0 | 0.5 | 20 | MG/KG | - |
| HRD-010 | 121180 | Uranium, Total | 0.0 | 0.5 | 20.5 | MG/KG | - |
| STP-012 | 727 | Uranium, Total | 19.5 | 20.0 | 20.8 | MG/KG | J |
| HRD-010 | 122404 | Uranium, Total | 2.5 | 3.0 | 21.1 | MG/KG | - |
| HRD-008 | SP5-3-1-R | Uranium, Total | 0.1 | 0.6 | 23.714 | MG/KG | J |
| HRD-008 | 5970 | Uranium, Total | 0.0 | 0.5 | 25 | MG/KG | J |
| HRD-006 | SS-46-186 | Uranium, Total | 0.0 | 0.5 | 25.72097 | MG/KG | - |
| HRD-001 | 583 | Uranium, Total | 7.5 | 8.0 | 27 | MG/KG | - |
| STP-012 | 122222 | Uranium, Total | 1.0 | 1.5 | 27.3 | MG/KG | - |
| HRD-006 | 121727 | Uranium, Total | 0.0 | 0.5 | 28.2 | MG/KG | - |
| HRD-008 | SP5-5-2-R | Uranium, Total | 2.7 | 3.2 | 33.223 | MG/KG | J |
| STP-012 | 17655 | Uranium, Total | 3.0 | 3.5 | 33.6 | MG/KG | J |



000082

-2851

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-010 | 122395 | Uranium, Total | 0.0 | 0.5 | 36.3 | MG/KG | - |
| STP-012 | 17717 | Uranium, Total | 0.0 | 0.5 | 38 | MG/KG | - |
| HRD-001 | 12467-3-R | Uranium, Total | 1.0 | 1.5 | 39.8 | MG/KG | - |
| HRD-006 | SS-46-290 | Uranium, Total | 0.0 | 0.2 | 41.90696 | MG/KG | - |
| HRD-001 | 12470-2-R | Uranium, Total | 0.5 | 1.0 | 44.1 | MG/KG | - |
| HRD-008 | SP5-5-1-R | Uranium, Total | 1.0 | 1.5 | 44.825 | MG/KG | - |
| HRD-006 | SS-46-292 | Uranium, Total | 0.0 | 0.2 | 47.95972 | MG/KG | - |
| HRD-001 | 5996 | Uranium, Total | 0.5 | 1.0 | 51 | MG/KG | J |
| HRD-008 | 5503 | Uranium, Total | 0.2 | 0.3 | 54 | MG/KG | J |
| STP-012 | 717 | Uranium, Total | 14.5 | 15.0 | 54.8 | MG/KG | - |
| HRD-001 | 5994 | Uranium, Total | 1.0 | 1.5 | 57 | MG/KG | J |
| HRD-010 | 5967 | Uranium, Total | 0.0 | 0.5 | 59 | MG/KG | J |
| HRD-001 | 5997 | Uranium, Total | 1.0 | 1.5 | 60 | MG/KG | J |
| HRD-001 | 5993 | Uranium, Total | 0.5 | 1.0 | 62 | MG/KG | J |
| HRD-008 | SP5-3-3-R | Uranium, Total | 3.0 | 3.5 | 62.598 | MG/KG | - |
| HRD-006 | SS-46-294 | Uranium, Total | 0.0 | 0.2 | 65.74669 | MG/KG | - |
| STP-020 | 5543 | Uranium, Total | 0.0 | 0.5 | 71 | MG/KG | - |
| STP-012 | 17718 | Uranium, Total | 0.5 | 1.0 | 71 | MG/KG | - |
| HRD-006 | SS-46-293 | Uranium, Total | 0.0 | 0.2 | 77.85264 | MG/KG | - |
| HRD-006 | SS-46-291 | Uranium, Total | 0.0 | 0.2 | 77.8991 | MG/KG | - |
| HRD-001 | 12470-1-R | Uranium, Total | 0.0 | 0.5 | 79.3 | MG/KG | - |
| STP-012 | 697 | Uranium, Total | 4.5 | 5.0 | 86.4 | MG/KG | J |
| STP-012 | 52501 | Uranium, Total | 15.0 | 15.5 | 88.4 | MG/KG | J |
| HRD-001 | 5995 | Uranium, Total | 0.0 | 0.5 | 96 | MG/KG | J |
| STP-012 | 707 | Uranium, Total | 9.5 | 10.0 | 110 | MG/KG | - |
| STP-012 | 691 | Uranium, Total | 1.5 | 2.0 | 115 | MG/KG | - |
| STP-012 | 122221 | Uranium, Total | 0.0 | 0.5 | 116 | MG/KG | - |
| STP-012 | 694 | Uranium, Total | 3.0 | 3.5 | 128 | MG/KG | - |
| HRD-001 | 5992 | Uranium, Total | 0.0 | 0.5 | 132 | MG/KG | J |
| HRD-008 | 5502 | Uranium, Total | 0.0 | 0.2 | 140 | MG/KG | J |
| HRD-001 | 20006 | Uranium, Total | 0.0 | 1.0 | 156 | MG/KG | J |
| HRD-001 | 589 | Uranium, Total | 10.5 | 11.0 | 174 | MG/KG | - |
| HRD-008 | SP5-2-B1-R | Uranium, Total | 1.0 | 1.4 | 180.313 | MG/KG | - |
| HRD-001 | 575 | Uranium, Total | 3.5 | 4.0 | 190 | MG/KG | - |
| HRD-001 | 18729 | Uranium, Total | 0.0 | 0.5 | 393 | MG/KG | - |
| STP-012 | 700 | Uranium, Total | 6.0 | 6.5 | 711 | MG/KG | - |
| STP-012 | 688 | Uranium, Total | 0.0 | 0.5 | 913 | MG/KG | - |
| HRD-001 | 569 | Uranium, Total | 0.5 | 1.0 | 1474 | MG/KG | - |

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-001 | 568 | Uranium, Total | 0.0 | 0.5 | 1637 | MG/KG | - |
| HRD-010 | 122404 | Uranium-238 | 2.5 | 3.0 | 0.5 | PCI/G | J |
| HRD-006 | 8973 | Uranium-238 | 105.0 | 106.5 | 0.6 | PCI/G | U |
| HRD-010 | 121193 | Uranium-238 | 4.5 | 5.0 | 0.9 | PCI/G | J |
| STP-012 | 122220 | Uranium-238 | 1.0 | 1.5 | 0.9 | PCI/G | J |
| STP-012 | 122219 | Uranium-238 | 0.0 | 0.5 | 1.1 | PCI/G | J |
| HRD-010 | 122410 | Uranium-238 | 4.5 | 5.0 | 1.2 | PCI/G | J |
| HRD-010 | 121187 | Uranium-238 | 2.5 | 3.0 | 1.2 | PCI/G | J |
| STP-011 | 98461 | Uranium-238 | 13.5 | 14.5 | 1.38 | PCI/G | J |
| STP-015 | 98461 | Uranium-238 | 13.5 | 14.5 | 1.38 | PCI/G | J |
| STP-005 | 5505 | Uranium-238 | 0.0 | 0.5 | 3 | PCI/G | - |
| HRD-010 | 122399 | Uranium-238 | 1.0 | 1.5 | 3 | PCI/G | J |
| STP-012 | 52531 | Uranium-238 | 1.0 | 1.5 | 3.16 | PCI/G | - |
| STP-012 | 52532 | Uranium-238 | 1.5 | 2.0 | 3.34 | PCI/G | - |
| HRD-010 | 122395 | Uranium-238 | 0.0 | 0.5 | 3.5 | PCI/G | J |
| HRD-010 | 121180 | Uranium-238 | 0.0 | 0.5 | 7.7 | PCI/G | J |
| STP-011 | 98458 | Uranium-238 | 10.5 | 11.5 | 7.93 | PCI/G | J |
| STP-015 | 98458 | Uranium-238 | 10.5 | 11.5 | 7.93 | PCI/G | J |
| HRD-006 | SS-46-186 | Uranium-238 | 0.0 | 0.5 | 8.6 | PCI/G | - |
| HRD-008 | 5970 | Uranium-238 | 0.0 | 0.5 | 9.1 | PCI/G | - |
| STP-012 | 122222 | Uranium-238 | 1.0 | 1.5 | 12 | PCI/G | J |
| HRD-008 | 5504 | Uranium-238 | 0.3 | 0.5 | 12.5 | PCI/G | J |
| STP-012 | 17717 | Uranium-238 | 0.0 | 0.5 | 12.6 | PCI/G | - |
| HRD-006 | SS-46-290 | Uranium-238 | 0.0 | 0.2 | 14 | PCI/G | - |
| HRD-006 | SS-46-292 | Uranium-238 | 0.0 | 0.2 | 16 | PCI/G | - |
| HRD-008 | 5503 | Uranium-238 | 0.2 | 0.3 | 18.2 | PCI/G | J |
| HRD-010 | 5967 | Uranium-238 | 0.0 | 0.5 | 19.9 | PCI/G | - |
| HRD-001 | 5994 | Uranium-238 | 1.0 | 1.5 | 21.7 | PCI/G | J |
| HRD-006 | SS-46-294 | Uranium-238 | 0.0 | 0.2 | 22 | PCI/G | - |
| HRD-001 | 5993 | Uranium-238 | 0.5 | 1.0 | 23.3 | PCI/G | J |
| STP-012 | 17718 | Uranium-238 | 0.5 | 1.0 | 24.7 | PCI/G | - |
| HRD-006 | SS-46-291 | Uranium-238 | 0.0 | 0.2 | 26 | PCI/G | - |
| HRD-006 | SS-46-293 | Uranium-238 | 0.0 | 0.2 | 26 | PCI/G | - |
| STP-020 | 5543 | Uranium-238 | 0.0 | 0.5 | 26.1 | PCI/G | - |
| HRD-001 | 20027 | Uranium-238 | 0.0 | 1.0 | 31.8 | PCI/G | J |
| HRD-001 | 5989 | Uranium-238 | 0.0 | 0.5 | 37.1 | PCI/G | - |
| STP-012 | 122221 | Uranium-238 | 0.0 | 0.5 | 46 | PCI/G | J |
| HRD-001 | 5992 | Uranium-238 | 0.0 | 0.5 | 49.3 | PCI/G | - |



2851

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-001 | 5995 | Uranium-238 | 0.0 | 0.5 | 53.1 | PCI/G | - |
| HRD-008 | 5502 | Uranium-238 | 0.0 | 0.2 | 54.7 | PCI/G | - |
| HRD-001 | 18663 | Uranium-238 | 0.0 | 0.5 | 58.5 | PCI/G | - |
| HRD-001 | 18729 | Uranium-238 | 0.0 | 0.5 | 96.9 | PCI/G | - |
| HRD-001 | 99268 | Uranium-238 | 0.0 | 0.5 | 137 | PCI/G | J |
| HRD-001 | 20033 | Uranium-238 | 0.0 | 1.0 | 159.3 | PCI/G | J |
| HRD-001 | 20003 | Uranium-238 | 0.0 | 1.5 | 222.7 | PCI/G | J |
| HRD-001 | 99267 | Uranium-238 | 0.0 | 0.5 | 242 | PCI/G | J |
| HRD-009 | 5390 | Uranium-238 | 0.0 | 0.5 | 322 | PCI/G | - |
| HRD-009 | 5387 | Uranium-238 | 0.0 | 0.5 | 839 | PCI/G | J |
| HRD-008 | 61477 | Vinyl chloride | 1.5 | 2.0 | 10 | UG/KG | U |
| HRD-010 | 122398 | Vinyl chloride | 1.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-4-L | Vinyl chloride | 0.0 | 1.5 | 10 | UG/KG | U |
| HRD-010 | SP1-4-TL | Vinyl chloride | 0.0 | 1.5 | 10 | UG/L | U |
| STP-012 | 17719 | Vinyl chloride | 0.0 | 0.5 | 10 | UG/KG | U |
| STP-012 | 65511 | Vinyl chloride | | | 10 | UG/L | U |
| STP-011 | 98462 | Vinyl chloride | | | 10 | UG/L | U |
| STP-015 | 98462 | Vinyl chloride | | | 10 | UG/L | U |
| HRD-010 | SP1-9-L | Vinyl chloride | 0.0 | 0.7 | 10 | UG/KG | UJ |
| HRD-010 | SP1-9-TL | Vinyl chloride | 0.0 | 0.7 | 10 | UG/L | UJ |
| HRD-010 | SP4-10-B1-L | Vinyl chloride | 9.5 | 10.0 | 10 | UG/KG | UJ |
| HRD-010 | SP4-4-B1-L | Vinyl chloride | 1.5 | 1.9 | 10 | UG/KG | UJ |
| HRD-010 | SP4-4-B1-L | Vinyl chloride | 1.5 | 1.9 | 10 | UG/KG | UJ |
| HRD-010 | SP4-4-L | Vinyl chloride | 0.0 | 1.5 | 10 | UG/KG | UJ |
| HRD-010 | SP4-4-L | Vinyl chloride | 0.0 | 1.5 | 10 | UG/KG | UJ |
| HRD-010 | SP4-4-TL | Vinyl chloride | 0.0 | 1.5 | 10 | UG/L | UJ |
| HRD-010 | SP4-9-B1-L | Vinyl chloride | 2.5 | 3.0 | 10 | UG/KG | UJ |
| HRD-010 | SP4-9-B2-L | Vinyl chloride | 3.0 | 3.4 | 10 | UG/KG | UJ |
| HRD-010 | SP4-9-TL | Vinyl chloride | 0.0 | 1.5 | 10 | UG/L | UJ |
| HRD-006 | 61364 | Vinyl chloride | 1.5 | 2.0 | 11 | UG/KG | U |
| HRD-006 | 61385 | Vinyl chloride | 1.5 | 2.0 | 11 | UG/KG | U |
| HRD-006 | 61350 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121719 | Vinyl chloride | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 121715 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 121717 | Vinyl chloride | 1.0 | 1.5 | 11 | UG/KG | U |
| HRD-006 | 40276 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-006 | 40347 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | U |
| HRD-010 | 122394 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | U |

## TABLE D-1
## SUMMARY OF EXISTING DATA ON SP-1

| MTL | Sample ID | Parameter | Top Depth (feet) | Bottom Depth (feet) | Result | Units | Qualifier |
|---|---|---|---|---|---|---|---|
| HRD-010 | 121183 | Vinyl chloride | 1.0 | 1.5 | 11 | UG/KG | U |
| STP-012 | 767 | Vinyl chloride | | | 11 | UG/KG | U |
| STP-012 | 122214 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-012 | 122216 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | U |
| STP-011 | 98461 | Vinyl chloride | 13.5 | 14.5 | 11 | UG/KG | U |
| STP-015 | 98461 | Vinyl chloride | 13.5 | 14.5 | 11 | UG/KG | U |
| HRD-006 | 121718 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121714 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-006 | 121716 | Vinyl chloride | 1.0 | 1.5 | 11 | UG/KG | UJ |
| HRD-006 | 40175 | Vinyl chloride | 0.0 | 0.5 | 11 | UG/KG | UJ |
| HRD-001 | 99266 | Vinyl chloride | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99267 | Vinyl chloride | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99269 | Vinyl chloride | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-001 | 99268 | Vinyl chloride | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-006 | 40379 | Vinyl chloride | 0.0 | 0.5 | 12 | UG/KG | U |
| HRD-008 | 61484 | Vinyl chloride | 1.5 | 2.0 | 12 | UG/KG | U |
| HRD-010 | 122409 | Vinyl chloride | 4.5 | 5.0 | 12 | UG/KG | U |
| HRD-010 | 121186 | Vinyl chloride | 2.5 | 3.0 | 12 | UG/KG | U |
| STP-012 | 122215 | Vinyl chloride | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-012 | 122217 | Vinyl chloride | 1.0 | 1.5 | 12 | UG/KG | U |
| STP-011 | 98458 | Vinyl chloride | 10.5 | 11.5 | 12 | UG/KG | U |
| STP-015 | 98458 | Vinyl chloride | 10.5 | 11.5 | 12 | UG/KG | U |
| HRD-010 | 122403 | Vinyl chloride | 2.5 | 3.0 | 13 | UG/KG | U |
| HRD-010 | 121179 | Vinyl chloride | 0.0 | 0.5 | 13 | UG/KG | U |
| HRD-010 | 121192 | Vinyl chloride | 4.5 | 5.0 | 14 | UG/KG | U |

000086

2851