I-20338-0437

BJC/OR-3005

Environmental Management Waste Management Facility Waste Lot Profile 155.5 for the K-1015-A Laundry Pit, East Tennessee Technology Park, Oak Ridge, Tennessee

BECHTEL JACOBS
Bechtel Jacobs Company LLC

Interoffice Memorandum

To: G. J. Hampshire
Waste Management Project

From: J. M. Davenport
ETTP D&D Project
576-8049

Date: June 12, 2008

File: ETDD-08-0017

Subject: DE-AC05-98OR22700: Transmittal of Environmental Management Waste Management Facility Waste Lot Profile 155.5 for the K-1015-A Laundry Pit, East Tennessee Technology Park, Oak Ridge, Tennessee (BJC/OR-3005)

The purpose of this memorandum is to transmit three copies of the subject Environmental Management Waste Management Facility (EMWMF) Waste Lot profile to the EMWMF Waste Acceptance Criteria Attainment Team (WAT) for final review. This profile has been revised to address the comments submitted by the WAT on May 28, 2008. The Comment Response Table in Appendix B (Appendix B- Attachment 7) reflects responses to those comments. Please note that a variance request has been completed for the waste in this waste lot. Although it is not approved at this time, a draft has been included. EMWMF Operations expects to have it approved on Monday, June 23, 2008 and it will be submitted at that time for insertion into the profile. In order to facilitate the WAT review of this profile, the controlled data set and input to Waste Acceptance Criteria Forecasting Analysis Capability System are also being submitted to the WAT electronically.

The Project looks forward to approval of this profile. Please call if you have any questions.

JMD:sep

Enclosure:
EMWMF Waste Lot 155.5 Profile

c: L. A. Birk
D. W. Hanahan

c/enc: File–EMEF DMC–RC

Environmental Management Waste Management Facility Waste Lot Profile 155.5 for the K-1015-A Laundry Pit, East Tennessee Technology Park, Oak Ridge, Tennessee

This document is approved for public release per review by:

A. F. McBride/dw 6/13/2008

BJC ETTP Classification & Information Control Office — Date

USQD REVIEW DETERMINATION

Environmental Management Waste Management Facility Waste Lot Profile 155.5 for the K-1015-A Laundry Pit, East Tennessee Technology Park, Oak Ridge, Tennessee

BJC/OR-3005

☐ **USQD** ☐ **UCD** ☐ **CAT X** ☒ **N/A** **USQD/UCD/CAT X No:** _____

C. W. Caldwell — 6/12/08

Chris Caldwell
USQD Preparer
TC Program Solutions LLC

Date

Environmental Management Waste Management Facility Waste Lot Profile 155.5 for the K-1015-A Laundry Pit, East Tennessee Technology Park, Oak Ridge, Tennessee

BJC/OR-3005

Environmental Management Waste Management Facility Waste Lot Profile 155.5 for the K-1015-A Laundry Pit East Tennessee Technology Park, Oak Ridge, Tennessee

Date Issued—June 2008

Prepared for the
U.S. Department of Energy
Office of Environmental Management

BECHTEL JACOBS COMPANY LLC
managing the
Environmental Management Activities at the
East Tennessee Technology Park
Y-12 National Security Complex Oak Ridge National Laboratory
under contract DE-AC05-98OR22700
for the
U.S. DEPARTMENT OF ENERGY

FORWARD

Information provided in this profile is true and accurate to the best of my knowledge.

Preparer: J. E. Raymer 4/12/08

Generator Certification: D. W. Hanahan 6/12/2008

CONTENTS

TABLES v

ACRONYMS vii

1. INTRODUCTION AND BACKGROUND INFORMATION 1
   1.1 INTRODUCTION 1
   1.2 BACKGROUND 1

2. ADMINISTRATIVE WAC COMPLIANCE 3
   2.1 CERCLA ACTION 3
   2.2 PROHIBITED WASTE TYPES 3
   2.3 PROHIBITION OF FREE LIQUIDS 3
   2.4 RESOURCE CONSERVATION AND RECOVERY ACT LAND DISPOSAL RESTRICTIONS 3
      2.4.1 Characteristics of Ignitability 6
      2.4.2 Characteristics of Corrosivity 6
      2.4.3 Characteristics of Reactivity 6
   2.5 TOXIC SUBSTANCES CONTROL ACT LAND DISPOSAL REQUIREMENTS 6
   2.6 INFECTIOUS WASTE PROHIBITIONS 6
   2.7 PYROPHORIC MATERIALS PROHIBITION 6
   2.8 EXCLUSION OF WASTES CAPABLE OF DETONATION OR EXPLOSIVE DECOMPOSITION 6
   2.9 TOXIC GASES, VAPORS, OR FUMES PROHIBITION 7
   2.10 STRUCTURAL STABILITY DETERMINATION 7
   2.11 VOID SPACE REQUIREMENTS 7
   2.12 CONTAINER VOID SPACE REQUIREMENTS 7
   2.13 AVERAGE TOTAL URANIUM LIMITS 7
   2.14 CRITICALITY SAFETY EVALUATION 7
   2.15 TDEC WASTE CLASS 7

3. ANALYTIC WAC COMPLIANCE 9
   3.1 CARCINOGENIC WAC SRCS 11
   3.2 HAZARD INDEX WAC 11
   3.3 CARCINOGENIC WAC 3-YEAR VWSF COMPLIANCE 11
   3.4 HAZARD INDEX WAC 3-YEAR VWSF COMPLIANCE 11

4. ASA-DERIVED WAC COMPLIANCE 12
   4.1 AUDITABLE SAFETY ANALYSIS RADIOLOGICAL SUM OF FRACTIONS REQUIRMENTS 12
   4.2 AUDITABLE SAFETY ANALYSIS-DERIVED LIST OF CHEMICALS FOUND IN WASTE 13

5. PHYSICAL WAC COMPLIANCE 14
   5.1 CONTAINER REQUIREMENTS 14
   5.2 SIZE REQUIREMENTS 14
   5.3 WEIGHT REQUIREMENTS 14
   5.4 CONCRETE DEBRIS REQUIREMENTS 14

5.5 STEEL PLATE REQUIREMENTS 14
5.6 PIPE REQUIREMENTS 14
5.7 ASBESTOS AND BERYLLIUM DUST CONTAINING WASTE REQUIREMENTS 14
5.8 MISCELLANEOUS DEBRIS REQUIREMENTS 15
5.9 CONTAINERIZED COMPACTABLE WASTE 15
5.10 REBAR REQUIREMENTS 15
5.11 NONCRUSHABLE CONTAINER REQUIREMENTS 15
5.12 CONTAINER LINER REQUIREMENTS 15
5.13 DOSE RATE REQUIREMENTS 15

6. CERCLA DOCUMENTATION 16

7. REFERENCES 17

APPENDIX A: EMWMF ANOMALY DETECTION CHECKLIST
APPENDIX B: SUPPORT DOCUMENTATION (PROCESS KNOWLEDGE)
APPENDIX C: CERCLA DOCUMENTATION
APPENDIX D: EMWMF NUCLEAR CRITICALITY CHECKLIST
APPENDIX E: WASTE ACCEPTANCE CRITERIA FORECASTING ANALYSIS CAPABILITY SYSTEMS (WACFACS)
APPENDIX F: STATISTICAL SUMMARY
APPENDIX G: WASTE LOT CHARACTERIZATION DATA
APPENDIX H: VARIANCE REQUESTS

TABLES

1 Chemical concentrations in waste from characterization samples.....5
2 Tennessee LLW classification of long-lived radionuclides in waste.....8
3 Tennessee LLW classification of short-lived radionuclides 8
4 Summary of sample information.....9
5 Radiological ASA Sum of Fractions for waste.....12
6 Chemicals SRC concentrations in waste.....13

ACRONYMS

ACM	Asbestos containing material
ADP	Anomaly Detection Plan
ASA	Auditable Safety Analysis
BJC	Bechtel Jacobs Company, LLC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOE	U. S. Department of Energy
DOT	Department of Transportation
DVS	Dynamic Verification Strategy
EMWMF	Environmental Management Waste Management Facility
EPA	U.S. Environmental Protection Agency
ETTP	East Tennessee Technology Park
FFA	Federal Facility Agreement
HI	Hazard Index
LLW	low level waste
OREIS	Oak Ridge Environmental Information System
ORR	Oak Ridge Reservation
PCB	polychlorinated biphenyl
PEMS	Project Environmental Measurements System
ppm	parts per million
RA	Remedial Action
RCRA	Resource Conservation and Recovery Act
SOF	sum of fractions
SRC	site related contaminant
SVOC	semi-volatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
TDEC	Tennessee Department of Environment and Conservation
TSCA	Toxic Substance Control Act
TRU	Transuranic
UCL	upper confidence limit
VWSOF	volume-weighted sum of fraction
VOC	volatile organic compound
WAC	Waste Acceptance Criteria
WACFACS	Waste Acceptance Criteria Forecasting Analysis Capability System

1. INTRODUCTION AND BACKGROUND INFORMATION

1.1 INTRODUCTION

In 1989, the Oak Ridge Reservation (ORR), which includes the East Tennessee Technology Park (ETTP), was placed on the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) National Priorities List. The Federal Facility Agreement (FFA) (DOE 1992), effective January 1, 1992, now governs environmental restoration activities conducted under CERCLA at the ORR. Following signing of the FFA, U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and the state of Tennessee signed the Oak Ridge Accelerated Cleanup Plan Agreement on June 18, 2003. The purpose of this agreement is to define a streamlined decision-making process to facilitate the accelerated implementation of cleanup, to resolve ORR milestone issues, and to establish future actions necessary to complete the accelerated cleanup plan by the end of fiscal year 2008. While the FFA continues to serve as the overall regulatory framework for remediation, the Accelerated Cleanup Plan Agreement supplements existing requirements to streamline the decision-making process. The disposal of the K-1015 Laundry Pit waste will be executed in accordance with the *Record of Decision for Soil, Buried Waste, and Subsurface Structure Actions in Zone, 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2161&D2) and the *Waste Handling Plan for the Consolidated Soil and Waste Sites with Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2328&D1).

This waste lot consists of a total of approximately 50 cubic yards of waste that will be disposed at the Environmental Management Waste Management Facility (EMWMF) as non-containerized waste. This material will be sent to the EMWMF in dump trucks. This profile is for the K-1015-A Laundry Pit and includes debris (e.g., concrete, metal rebar, pipe), incidental soil, plastic and wood, and secondary waste (such as plastic sheeting, hay bales and other erosion control materials, wooden pallets, contaminated equipment, decontamination materials, etc.).

Supporting documentation for this EMWMF waste lot profile is included in the following appendices: Appendix A: EMWMF Anomaly Detection Checklist; Appendix B: Support Documentation (Process Knowledge); Appendix C: CERCLA Documentation; Appendix D: EMWMF Nuclear Criticality Checklist; Appendix E: Waste Acceptance Criteria Forecasting Analysis Capability Systems (WACFACS); Appendix F: Statistical Summary; Appendix G: Waste Lot Characterization Data; and Appendix H: Variance Request.

1.2 BACKGROUND

ETTP supplied enriched uranium for nuclear weapons production as a part of the Manhattan Project. Construction of the site started in 1943. In 1989, the ORR, which includes ETTP, was placed on the CERCLA National Priorities List. The FFA, effective January 1, 1992, now governs environmental restoration as well as remediation activities at the ORR.

This EMWMF Waste Lot profile is for the K-1015-A Laundry Pit debris, soil and secondary waste. The following paragraphs provide a brief description of the K-1015 facility, its operational history, and the K-1015-A Laundry Pit [from *Limited Characterization Report for the Laboratory Area Facilities, East Tennessee Technology Park, Oak Ridge, Tennessee* (BJC 2003)].

Building K-1015 and its associated laundry settling pit (K-1015-A) were constructed in the 1940s and served as the radiological laundry facility for both K-25 and Y-12 National Security Complex until approximately 1997, when contaminated laundry services were contracted with an off-site facility.

The total floor area of Building K-1015 was approximately 7200 ft^2. It is bordered by "D" Avenue on the east, "E" Avenue on the west, 6th Street on the north, and by a sidewalk separating it from Bldg. K-1004-D on the south. The main laundry area consisted of about 4790 ft^2 of floor area and contained industrial laundry equipment, including eight washers and ten dryers. About two-thirds of the main laundry area was posted as a Contamination Area. Most surfaces underneath laundry equipment were posted as Contaminated Areas or High Contaminated Areas.

Building K-1015 was a one-story, standard wood-frame construction with wood novelty siding overlaid with asbestos/concrete shingles and a built-up roof. Its dimensions were 130 ft x 85 ft with an average height of 13 ft. In the central portion of the roof was a framed area that is 103 ft x 17 ft x 6 ft that gives a high bay effect. The floor in the main laundry area was concrete, with ceramic tile in the office and change house areas. The entire exterior was covered with cement shingles, which contained 20 to 25 percent asbestos. This roof was a flat-tar type with a slight slope leading to roof gutters on two sides of the facility. There were two docks on the north side of the building, one for shipping and receiving radiologically contaminated goods and one for clean goods.

Building K-1015 was completed in 1946 and shut down in July 1996. The facility was used for the laundering of company-furnished washable goods used in radiologically regulated and non-regulated areas at both ETTP and the Y-12 Complex. Beryllium-contaminated clothing from the Y-12 Complex was also laundered at Bldg. K-1015 from 1983 to 1996. The clothing was brought to the facility wet to eliminate the airborne exposure to the laundry workers. Since 1979, it processed an average of 11,000 lbs of goods a day, of which 5000 lbs was radiologically contaminated. The wash water from the laundry facility flowed to the K-1015-A pit to allow the settling of particulates prior to discharge to the sewer system.

K-1015-A, located on the south side of Bldg. K-1015, is the settling pit (i.e., the K-1015-A Laundry Pit or Pit 229) constructed of reinforced concrete 14 ft deep with 1 ft above ground. The Laundry pit was sealed with a concrete lid. Sludge accumulated in the pit during routine operations. The sludge was removed from the pit on an average of every three years. The sludge was removed and sampled in 1994. PCBs, nickel, and several radionuclides were detected. From February 1995 to May 1996, the sludge was sampled routinely (monthly or quarterly) for beryllium and radionuclides. Beryllium and uranium were detected in the samples. Sampling was discontinued in 1996. The K-1015 Laundry pit may contain transuranic constituents (see reference BJC 2003).

The K-1015-A laundry pit was removed (i.e., excavated) in the fall of 2007 under the Zone 2 Record of Decision. Prior to removal, the pit was decontaminated using a pressure washer. The resulting water and soil/sludge/sediment was collected and shipped offsite for disposal. During the removal of the pit, efforts were made to minimize the soil content of the resulting waste. The Remedial Action (RA) project had originally anticipated soil around the pit to be included with the pit for disposal, however when sample data was collected, it revealed that no Remedial Action would be necessary due to the low or non-existent contaminant levels in the surrounding soils. Based on process knowledge collected from the RA project and interviews with RA project personnel, this was lot includes approximately 80% debris (i.e., concrete and metal rebar), ~19% soil, and less than 1% incidental wood and plastic.

2. ADMINISTRATIVE WAC COMPLIANCE

2.1 CERCLA ACTION

This waste will be generated as a CERCLA Removal Action under the *Record of Decision for Soil, Buried Waste, and Subsurface Actions in Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2161&D2). Additional CERCLA documentation related to the K-1015 Laundry Pit debris, soil and secondary waste includes:

- *Remedial Design Report/Remedial Action Work Plan for Zone 2 Soils, Slabs, and Subsurface East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2224&D3)
- *Waste Handling Plan for the Consolidated Soil and Waste Sites within Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2328&D1).

Summary information from these documents, as well as relevant approved concurrence forms, has also been included in Appendix C. The Waste Handling Plan for this waste has been submitted for review and approved by the DOE, EPA and Tennessee Department of Environment and Conservation (TDEC).

2.2 PROHIBITED WASTE TYPES

The characterization data and the data evaluation described later in this waste profile demonstrate that this Waste Lot is not transuranic (TRU) waste. The waste is not high-level radioactive waste, spent nuclear fuel, or 11e(2) byproduct wastes. Based on the samples collected to characterize this waste lot and process knowledge, only trace TRU are present in the waste. The maximum TRU concentration associated with this waste lot is 1.70E-04 nCi/g for N-237, and Pu-238 as the only other detected TRU isotope at 8.00E-05 nCi/g; therefore, the material included in this waste lot is considered low level waste (LLW).

2.3 PROHIBITION OF FREE LIQUIDS

This waste lot consists of the K-1015-A Laundry Pit debris, incidental soil, and associated secondary waste from the K-1015-A laundry pit remediation. This waste does not contain free liquids. In accordance with the EMWMF Waste Acceptance Criteria (WAC) all waste must contain less than 1% free liquid by volume. The waste will be dry when it is loaded into the conveyance. Additionally, a visual inspection will be performed on all waste containers prior to shipping to verify the absence of free liquids.

2.4 RESOURCE CONSERVATION AND RECOVERY ACT LAND DISPOSAL RESTRICTIONS

This waste lot does not contain Resource Conservation and Recovery Act (RCRA) listed or characteristic waste. The cumulative evaluation of waste characterization data, the laundry facility's function, process knowledge of the waste matrix, and historical administrative controls support the non-RCRA waste determination for this waste; therefore, no listed or characteristic codes apply. The

determination that no RCRA codes apply to this facility was performed in conjunction with ETTP Project Environmental Compliance and is based on no known records of Listed Waste spills and a review of the facility's historical function. The Listed Waste determination is included in Attachment B.

Waste included in this waste lot that is sent to the EMWMF will not exhibit any RCRA characteristics as defined under 40 *Code of Federal Regulations (CFR)* 261.10 – 261.33, and will have no underlying hazardous constituents; therefore, the Treatment Standards of 40 *CFR* 268 are not applicable. During waste characterization activities, laboratory analytical samples for the Toxicity Characteristic Leaching Procedure (TCLP) for semi-volatile organic compounds (SVOCs) and TCLP metals were collected from the debris pit, which consists of approximately 80% of the waste volume. Due to the waste process knowledge associated with the K-1015-A facility and the lack of any detection in historical Dynamic Verification Strategy (DVS) sample data around the K-1015-A facility, TCLP samples for volatile organic compounds (VOCs) were not collected. However, one (1) historical soil sample associated with the K-1015-A facility was discovered with Total VOC (i.e., mg/kg) results. The sample results were 100% non-detects for all VOCs and resulted in no VOC SRCs. Further, all Total SVOC sample results in the WL 155.5 controlled data set were 100% non-detects and resulted in no SVOC SRCs. Process knowledge indicates that pesticides and herbicides were not considered contaminants of concern for the material included in this waste lot profile, and were therefore eliminated from further evaluation. The RCRA characterization sample results are presented in Table 1.

The waste included in this profile is shown to be in compliance as no contaminants exceeded regulatory limits. Table 1 provides the maximum concentration for RCRA metals, semivolatiles, and volatiles and compares them to the regulatory limit. The maximum value was presented even if the chemical was non-detected. No maximums exceeded RCRA regulatory limits; therefore, the waste is not a RCRA characteristic waste and meets land disposal restrictions.

Table 1. Chemical concentrations in waste from characterization samples.

Contaminant	Units	Samples	Detects	Maximum Result[1]	Converted Maximum Result[2]	Regulatory limits (mg/L)	Exceeds TCLP Limit
Arsenic	mg/L	3	0	0.03	NA	5	N
Barium	mg/L	3	3	0.33	NA	100	N
Cadmium	mg/L	3	0	0.003	NA	1	N
Chromium	mg/L	3	0	0.01	NA	5	N
Lead	mg/L	3	0	0.02	NA	5	N
Mercury	mg/L	3	1	0.0001	NA	0.2	N
Selenium	mg/L	3	2	0.05	NA	1	N
Silver	mg/L	3	0	0.01	NA	5	N
1,1-Dichloroethene	mg/kg	1	0	0.01	0.0005	0.7	N
1,2-Dichloroethane	mg/kg	1	0	0.01	0.0005	0.5	N
2-Butanone	mg/kg	1	0	0.03	0.0015	200	N
Benzene	mg/kg	1	0	0.01	0.0005	0.5	N
Carbon tetrachloride	mg/kg	1	0	0.01	0.0005	0.5	N
Chlorobenzene	mg/kg	1	0	0.01	0.0005	100	N
Chloroform	mg/kg	1	0	0.01	0.0005	6	N
Tetrachloroethene	mg/kg	1	0	0.01	0.0005	0.7	N
Trichloroethene	mg/kg	1	0	0.01	0.0005	0.5	N
Vinyl chloride	mg/kg	1	0	0.01	0.0005	0.2	N
Chlordane[3]	NA	NA	NA	NA	NA	0.03	N
Endrin[3]	NA	NA	NA	NA	NA	0.02	N
Heptachlor[3]	NA	NA	NA	NA	NA	0.008	N
Heptachlor epoxide[3]	NA	NA	NA	NA	NA	0.008	N
Lindane[3]	NA	NA	NA	NA	NA	0.4	N
Methoxychlor[3]	NA	NA	NA	NA	NA	10.0	N
Toxaphene[3]	NA	NA	NA	NA	NA	0.5	N
1,4-Dichlorobenzene	mg/L	3	0	0.10	NA	7.5	N
2,4,5-Trichlorophenol	mg/L	3	0	0.10	NA	400	N
2,4,6-Trichlorophenol	mg/L	3	0	0.10	NA	2	N
2,4-Dinitrotoluene	mg/L	3	0	0.10	NA	0.13	N
2-Methylphenol	mg/L	3	0	0.10	NA	200	N
3-Methylphenol	mg/L	3	0	0.10	NA	200	N
Hexachlorobenzene	mg/L	3	0	0.10	NA	0.13	N
Hexachlorobutadiene	mg/L	3	0	0.10	NA	0.5	N
Hexachloroethane	mg/L	3	0	0.10	NA	3	N
Nitrobenzene	mg/L	3	0	0.10	NA	2	N
Pentachlorophenol	mg/L	3	0	0.20	NA	100	N
Pyridine	mg/L	3	0	0.10	NA	5	N

[1] Maximum value reported regardless of detect or non-detect.

[2] Maximum Totals (mg/kg) result divided by 20 to produce RCRA TCLP comparison.

[3] Pesticides/Herbicides were not analyzed for due to Process Knowledge of the facility.

NA = Not Available/Applicable

2.4.1 Characteristics of Ignitability

The material in this EMWMF waste lot does not exhibit the characteristic of ignitability as defined by 40 *Code of Federal Regulations (CFR)* 261.21. The waste is not a liquid or compressed gas and is not capable, under standard temperature and pressure, of causing fire through friction, adsorption of moisture, or spontaneous combustion.

2.4.2 Characteristics of Corrosivity

The material in this EMWMF waste lot does not exhibit the characteristic of corrosivity as defined by 40 *CFR* 261.22. The waste is not aqueous nor a liquid that corrodes steel at a rate greater that 6.35 mm/year.

2.4.3 Characteristics of Reactivity

The waste lot will not exhibit the characteristic of reactivity as defined by 40 *CFR* 261.23.

2.5 TOXIC SUBSTANCES CONTROL ACT LAND DISPOSAL REQUIREMENTS

Polychlorinated biphenyls (PCBs) were not detected in the debris or soil samples above 1 mg/kg, and the excavation of the K-1015-A laundry pit in the BOS Lab Area did not introduce any new PCBs into the soil. The TSCA waste determination was based upon those facts; therefore the Waste Lot 155.5 is not considered to be Toxic Substances Control Act (TSCA)- regulated. This waste lot will not be TSCA regulated when it is shipped to the EMWMF.

2.6 INFECTIOUS WASTE PROHIBITIONS

There is no historical knowledge or evidence that infectious wastes are present in the waste included in this profile. The handling of the material included in this waste lot will not contribute any infectious wastes therefore; the material included in this waste lot will not contain infectious waste.

2.7 PYROPHORIC MATERIALS PROHIBITION

The material (i.e., laundry pit debris, incidental soil and secondary waste) included in this waste profile does not contain pyrophoric compounds.

2.8 EXCLUSION OF WASTES CAPABLE OF DETONATION OR EXPLOSIVE DECOMPOSITION

The material (i.e., laundry pit debris, incidental soil and secondary waste) included in this waste profile is not capable of detonation or explosive decomposition.

2.9 TOXIC GASES, VAPORS, OR FUMES PROHIBITION

The material (i.e., laundry pit debris, incidental soil and secondary waste) included in this waste profile is not capable of generating toxic gases, vapors, or fumes.

2.10 STRUCTURAL STABILITY DETERMINATION

This waste lot consists of non-containerized waste. This non-containerized waste will be transported by unlined dump trucks and will consist of laundry pit debris, incidental soil and secondary waste (e.g., PPE, plastic, etc.) that will meet the EMWMF physical WAC. This material can be processed with heavy equipment (D7 bulldozer) to achieve stability.

2.11 VOID SPACE REQUIREMENTS

This waste lot consists of non-containerized waste. Non-containerized waste will be sent by unlined dump trucks and will consist of laundry pit debris, incidental soil and secondary waste (e.g., personal protective equipment, plastic, etc.) which will not contain significant void space when disposed at the EMWMF. The final waste form will meet the void space requirements listed in Table A.3 of the EMWMF Administrative WAC.

2.12 CONTAINER VOID SPACE REQUIREMENTS

The material in this waste lot consists of non-containerized waste. Non-containerized waste will be transported to EMWMF via dump trucks. No containerized waste (i.e., drums, B-25s, etc.) will be sent to the EMWMF.

2.13 AVERAGE TOTAL URANIUM LIMITS

The average uranium activity concentration present in the waste does not exceed the limit defined in Table A.3 of the EMWMF administrative WAC. The expected average uranium concentration among the volume of the waste is 12.68 ppm and 26.09 pCi/g average total uranium.

2.14 CRITICALITY SAFETY EVALUATION

Disposition activities for this waste lot involve very small quantities, enrichments, or concentrations of fissile materials. The waste meets the criteria for screening using the EMWMF Material Screen (Appendix D).

2.15 TDEC WASTE CLASS

The waste offered for disposal at the EMWMF under this waste lot are classified as TDEC Class A waste based on the Tennessee LLW regulations in TN1200-2-11-.17(6). The maximum concentration of the final waste form was compared to the regulatory limits in the above regulations for both long-lived

and short-lived radionuclides. The sum of fractions (SOF) is shown in Tables 2 and 3. For both long-lived radionuclides and short lived radionuclides, the waste classification would be Class A.

Table 2. Tennessee LLW classification of long-lived radionuclides in waste lot 155.5.

Radionuclide	Class A Limit (pCi/g)	Maximum concentration (pCi/g)	Fraction
Carbon-14	4.70E+06	N/A	N/A
Carbon-14 in activated metal	4.70E+07	N/A	N/A
Nickel-59 in activated metal	1.38E+08	N/A	N/A
Niobium-94 in activated metal	1.20E+05	N/A	N/A
Technetium-99	1.80E+06	N/D	N/A
Iodine-129	4.70E+04	N/A	N/A
Alpha emitting transuranic[1]	1.00E+05	0.25	2.47E-06
Plutonium-241	3.50E+06	N/A	N/A
Curium-242	2.00E+07	N/A	N/A
		Sum of Fractions	**2.47E-06**

LLW = low level waste
N/A = not applicable
N/D = not detected
[1] = Sum of Np-237 and Pu-238.

Table 3. Tennessee LLW classification of short-lived radionuclides in waste lot 155.5.

Radionuclide	Class A Limit (pCi/g)	Maximum concentration (pCi/g)	Fraction
Total all nuclides $T_{1/2}$<5 years[1]	4.50E+08	74.84	1.66E-07
Hydrogen-3	2.60E+07	N/A	N/A
Cobalt-60	4.50E+08	N/D	N/A
Nickel-63	2.20E+06	N/A	N/A
Nickel-63 in activated metal	4.10E+09	N/A	N/A
Strontium-90	4.10E+09	N/D	N/A
Cesium-137	2.70E+09	N/D	N/A
		Sum of Fractions	**1.66E-07**

LLW = low level waste
N/A = not applicable
N/D = not detected
[1] = Sum of Actinium-228, Bismuth-214, Lead-212, Lead-214, Protactinium-234m, Thorium-228, and Thorium-234.

3. ANALYTIC WAC COMPLIANCE

The K-1015-A Laundry pit debris and associated soil has been characterized following the *Attainment Plan for Risk/Toxicity Based Waste Acceptance Criteria at the Oak Ridge Reservation* (DOE/OR/01-1909&D3). The characterization consists of process knowledge of the K-1015-A facility, historical analytical data obtained from the *Dynamic Verification Strategy and Standard Operating Procedure* (DOE/OR/01-2063&D1), and waste characterization samples collected under the *Sample and Analyses Plan for Waste Disposition of Materials from the South Park Area.* This waste lot is primarily composed of the laundry pit concrete debris (Pit 229), incidental soil from the excavation, and secondary waste. A map showing the location of the laundry pit is provided in Appendix B (see grid location Z2-33).

Prior to sampling the laundry pit, the pit underwent decontamination which involved pressure washing after the pit contents was removed. The decontaminated pit was then brought above grade and size reduced. During the removal of the pit, efforts were made to minimize the soil content of the resulting waste Three (3) composite samples and one (1) duplicate sample were collected from the laundry pit. Each composite sample consisted of 3 subsamples collected from different locations. One of the composite samples was biased to an area exhibiting the highest surface radiological readings. Eight (8) historical DVS samples for the surrounding soil were utilized as supplemental characterization data due to the incidental soil attached to the excavated laundry pit. Some of these historical DVS samples were only for radiological analyses, while others provided metals, radiological, SVOCs, VOCs, and PCBs. Rejected historical data was removed (e.g., OREIS soil data had no rejected data, PEMS soil data had rejected data for radiological, metals, VOCs and SVOCs; and the Laundry Pit debris data had no rejected laboratory data). The data for the laundry pit debris and the soil areas were then combined to form the final controlled dataset for this EMWMF profile. All soil and debris data underwent 100% verification and 100% validation. Table 4 provides a summary of the sampling information.

Table 4. Summary of sample information.

Waste Material	Location ID	Sample IDs	Analysis
Laundry Pit 229 Debris	Z2-EU33B-WAC01	SPKAPIT-001 SPKAPIT-002 SPKAPIT-003 SPKAPIT-039 (duplicate)	Total metals (plus Hg), TCLP metals, SVOCs, TCLP SVOCs, Wet Chemistry (only Cyanide), PCBs, VOC (only propylene glycol), and Radiological.
Laundry Pit 229 Soil	KAH-SS-B12	KAH-SS-B12	Radiological
Laundry Pit 229 Soil	KAH-SS-B13	KAH-SS-B13	Radiological
Laundry Pit 229 Soil	Z2-EU33-2019	BOSLABS078	Metals & PCBs
Laundry Pit 229 Soil	Z2-EU33-2019	BOSLABS079	Radiological
Laundry Pit 229 Soil	Z2-EU33-2019	BOSLABS081	SVOCs, Metals & PCBs
Laundry Pit 229 Soil	Z2-EU33B-229	BOSLABS715	Metals & PCBs
Laundry Pit 229 Soil	Z2-EU33B-229	BOSLABS716	Radiological
Laundry Pit 229 Soil	Z2-EU33B-229	BOSLABS717	VOCs & SVOCs

Initially, EMWMF site related contaminants (SRCs) were eliminated based on historical information and process knowledge, these included the radiological isotopes C-14, H-3, and I-129. These isotopes are

not considered to be radiological contaminants of concern at ETTP or Y-12 and are not associated with the K-1015-A laundry.

Pesticides and herbicides were also eliminated based on process knowledge. These compounds were not associated with the K-1015-A laundry. In addition, if these compounds were applied in the general area of the pits and soils included in this waste lot, the material in the waste lot was located below grade and would not have been in contact with these compounds. Volatile organic compounds (VOCs) have not historically been contaminants of concern at the K-1015-A laundry pit. In interviews with BJC Remedial Action (RA) project employees, there had been no VOCs above (or even near) remediation levels were detected in the pit sludge, water, or surrounding soils. Therefore, when the Sampling and Analyses Plan was developed by BJC RA to collect additional debris data from the laundry pit for EMWMF disposal, VOCs were not considered potential EMWMF SRCs due to the absence of any detection in historical sampling campaigns. This process knowledge determination for VOCs is substantiated by the historical sample in the data set (i.e., BOSLABS717) that was 100% non-detected for Total (i.e., mg/kg) VOCs and all SVOCs in the data set were 100% non-detected resulting in no SVOC SRCs. The WACFACS output sheets located in Appendix E identify all chemicals and isotopes eliminated based solely on process knowledge.

Data to be utilized for the characterization of the waste included in this waste lot was compiled from historical sampling campaigns and downloaded from databases such as Project Environmental Measurements System (PEMS), Oak Ridge Environmental Information System (OREIS) and also from the Bechtel Jacobs Company (BJC) RA project files. All the historical data was evaluated, along with project sample summary tables and sample maps. The historical soil data from PEMS and OREIS, as well as the debris data were 100% validated. The historical samples from the K-1015-A pit contents (i.e., the sludge) were removed along with all historical samples that consisted of storm water, pit content waste water, or soil/sediment that was not in close proximity to the K-1015-A pit. All historical samples of depth greater than 14 feet were removed because the waste handling plan describes the pit as 13 feet underground and 1 foot above ground. For the duplicate sample and its co-located sample, the highest (i.e., the most conservative) result was utilized for statistical summaries and waste determinations. This process yielded historical samples from 3 separate databases (PEMS, OREIS, and DVS debris from RA project files). This data was compiled into a final controlled database; and waste determinations, statistics, etc. were concluded from the final controlled database.

The controlled data was normalized and converted to consistent units (mg/kg for chemical contaminants). The data was then assessed to identify potential data gaps. In addition, certain uranium data was combined in order to stream-line the controlled data set. Uranium-234 soil data was combined with Uranium-233/234 debris data and reported in the profile and WACFACS as Uranium-233/234. Second, Uranium-235/236 data by Alpha isotopic analyses was used in lieu of U-235 Gamma Spectroscopy analyses and was reported in the profile and WACFACS as Uranium-235/236. Radiological characterization throughout the profile was based upon Alpha Isotopic analyses when available, otherwise the Gamma Spectroscopy analyses was used. Gross Alpha/Beta analyses was reported for various radionuclides, however this data was not utilized for profile waste determinations and was considered anecdotal.

After the data set was normalized, contaminants displaying high non-detection rates or results below the reporting limits were eliminated. The WACFACS output sheet located in Appendix E identifies the EMWMF SRCs eliminated from this waste lot based on data interpretation guidelines.

Data for the remaining SRCs that were not eliminated was then evaluated statistically to determine concentrations (i.e., minimum, arithmetic mean, median, and maximum), probability distribution

functions (i.e., normal, log-normal, or PERT beta), and the 95% UCL concentration. The Shapiro-Wilk (S-W) Test, as described in Appendix C of the EMWMF WAC Attainment Plan, was used to evaluate all analytes since there were less than 50 data points to demonstrate analytic WAC compliance. The Environmental Protection Agency's Software (ProUCL v4.0) was used to evaluate data and determine the 95% Upper Confidence Limit (UCL) for normally and lognormally distributed data. In the case of pert beta distributed data, the Upper 95th Confidence Interval Calculations for a PERT Beta PDF worksheet © by Redus and Associates was used. Statistical summaries are provided in Appendix F.

Data for the waste lot were then loaded into the EMWMF WACFACS to determine the preliminary SOF for the waste lot. The WACFACS Output sheets located in Appendix E identifies the waste lot constituents identified as SRCs. The loaded WACFACS sheets and statistical summaries were then sent to EMWMF WAC Attainment for review and approval. The WACFACS Input sheets and completed WACFACS Output sheets are located in Appendix E.

3.1 CARCINOGENIC WAC SRCs

The WACFACS data input sheet is included in Appendix E. The preliminary carcinogenic SOF is XX.XX.

3.2 HAZARD INDEX WAC

The WACFACS data input sheet is included in Appendix E. The preliminary Hazard Index (HI) SOF is XX.XX.

3.3 CARCINOGENIC WAC 3-YEAR VWSF COMPLIANCE

The carcinogenic volume weighted sum of fractions (VWSF) has been calculated to be XX.XX.

3.4 HAZARD INDEX WAC 3-YEAR VWSF COMPLIANCE

The HI VWSF has been calculated to be XX.XX.

4. ASA-DERIVED WAC COMPLIANCE

4.1 AUDITABLE SAFETY ANALYSIS RADIOLOGICAL SUM OF FRACTIONS REQUIRMENTS

The Auditable Safety Analysis (ASA) SOF for this waste lot was calculated using the 95 percent UCL concentration of each SRC in the waste and divided by the ASA limits listed in Table A.2 of the EMWMF WAC. Table 5 summarizes the SOFs of each radionuclide SRC to their ASA-derived WAC. The calculated ASA SOF is 7.46E-03, and since the ASA SOF is less than 0.05, no further consideration is necessary.

Table 5. Radiological ASA Sum of Fractions for waste.

Isotope	ASA WAC (pCi/g)	95% UCL (pCi/g)	ASA SOF (pCi/g)
Europium-155*	2.30E+07	1.16	5.04E-08
Neptunium-237	1.00E+04	0.08	8.02E-06
Plutonium-238	1.50E+04	0.05	3.16E-06
Potassium-40	4.20E+06	15.79	3.76E-06
Radium-226	3.00E+05	0.61	2.03E-06
Thorium-228	2.50E+04	1.19	4.78E-05
Thorium-229	2.30E+03	13.60	5.91E-03
Thorium-230	1.50E+04	0.85	5.56E-05
Thorium-232	2.50E+03	1.01	4.06E-04
Uranium-232	2.00E+04	13.66	6.83E-04
Uranium-233/234	1.00E+05	25.76	2.58E-04
Uranium-235/236	1.00E+05	1.44	1.44E-05
Uranium-238	1.00E+05	6.95	6.95E-05
		Sum of Fractions	**7.46E-03**

**= Maximum value used because only one (1) sample available with this analyses.*

4.2 AUDITABLE SAFETY ANALYSIS-DERIVED LIST OF CHEMICALS FOUND IN WASTE

In addition to historical process knowledge information, sampling and analysis data were used to identify chemicals in material included in this waste lot. Chemicals eliminated as SRCs using analytical data and process knowledge were addressed in Chapter 3. Table 6 presents the waste lot SRCs with Reportable Quantities per 40 CFR 302.4, Appendix A and their respective UCL-95 mg/kg value.

Table 6. Chemicals SRC concentrations in waste.

Contaminant	95 % UCL Concentration (mg/kg)
Antimony	0.36
Arsenic	7.45
Barium	117.91
Beryllium	1.47
Cadmium	2.06
Chromium	20.32
Cobalt	32.82
Copper	46.79
Lead	27.78
Manganese	1876.00
Mercury	7.15
Nickel	135.46
Selenium	1.49
Silver	0.60
Sodium	56.21
Thallium	0.51
Zinc	72.16
PCB-1254	0.25
PCB-1260	0.16

5. PHYSICAL WAC COMPLIANCE

5.1 CONTAINER REQUIREMENTS

The material included in this waste lot will be sent as non-containerized debris in unlined dump trucks and/or intermodals that will be dumped for disposal. The EMWMF WAC container requirements will be met.

5.2 SIZE REQUIREMENTS

The material in this waste will be sent in compliance with the EMWMF WAC, which states that a single debris item will be size reduced to dimensions less than 4 ft x 4 ft x 6 ft and weigh less than 24,000 pounds.

5.3 WEIGHT REQUIREMENTS

In compliance with the EMWMF WAC, a single debris item will weigh less than 24,000 pounds.

5.4 CONCRETE DEBRIS REQUIREMENTS

Concrete debris will be sent in compliance with the EMWMF WAC which states that concrete debris will be reduced to rubble with a maximum dimension of 1 foot.

5.5 STEEL PLATE REQUIREMENTS

No steel plate debris is present in this waste lot; therefore the steel plate requirement is not applicable.

5.6 PIPE REQUIREMENTS

Only pipe of 8 inches in diameter is expected in this waste lot. Pipe will be handled and shipped in accordance the EMWMF WAC.

5.7 ASBESTOS AND BERYLLIUM DUST CONTAINING WASTE REQUIREMENTS

Although beryllium was detected in the samples collected to characterize this waste lot, the maximum beryllium concentration was 2.3 ppm and does not meet Bechtel Jacobs Company's definition of beryllium-contaminated waste. Asbestos Containing Material (ACM) is not expected in this waste lot. Additionally, no beryllium or asbestos containing waste is present in the material included in this waste lot; therefore the beryllium and asbestos requirements are not applicable.

5.8 MISCELLANEOUS DEBRIS REQUIREMENTS

Miscellaneous debris will not be bent over or folded. It will be strategically loaded such that it will easily dumped at the EWMWF. The debris will be sufficiently sized and/or compacted to allow for grading into an 18-inch layer, or will be able to be buried in the working face. The EMWMF miscellaneous debris requirement will be met.

5.9 CONTAINERIZED COMPACTABLE WASTE

No containerized compactable waste is present in this waste; therefore the EMWMF containerized compactable waste requirements are not applicable.

5.10 REBAR REQUIREMENTS

Rebar will be removed from concrete debris, cut to a maximum length of 4 ft and sent for bulk disposal in accordance with approved Variance Request EMWMF-VR-125. The approved variance is in Appendix H.

5.11 NONCRUSHABLE CONTAINER REQUIREMENTS

No noncrushable containerized waste is present in this waste lot; therefore the EMWMF noncrushable containerized waste requirements are not applicable.

5.12 CONTAINER LINER REQUIREMENTS

Waste will be sent to the EMWMF in lined intermodals or dump trucks in accordance with the WAC.

5.13 DOSE RATE REQUIREMENTS

All unshielded contact dose rates for this waste are below the EMWMF WAC limit dose rate of 200 mrem/hr on contact. Dose rates for all waste in this waste lot are expected to be < 5 mR/h on contact. The final Department of Transportation (DOT) survey will document that no container exceeds 10 mrem/hr at 2 m from any surface of the container. A final dose rate measurement prior to shipping from ETTP will be conducted to ensure compliance with DOT and the EMWMF WAC.

6. CERCLA DOCUMENTATION

This waste was generated as a part of a CERCLA removal action. The relevant CERCLA documentation for the material; included in this waste lot profile are listed below:

- *Record of Decision for Soil, Buried Waste, and Subsurface Structure Actions in Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR01-2161&D2);
- *Waste Handling Plan, for the Consolidated Soil and Waste Sites within Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2328&D1); and
- *Remedial Design Report/Remedial Action Work Plan for Zone 2 Soils, Slabs, and Subsurface East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2224&D4).

The waste handling plan for this remedial action waste has been submitted for review and approved by the DOE, EPA and TDEC. Relevant portions of the Record of Decision and waste handling plan are included in Appendix C.

7. REFERENCES

BJC 2003. *Limited Characterization Report for the Laboratory Area Facilities, East Tennessee Technology Park,* BJC/OR-1388, Bechtel Jacobs Company, LLC, Oak Ridge, TN.

BJC 2005. *Technical Information for Delivery of Waste to the Environmental Management Waste Management Facility,* 23900-SC-BC008U-A001, Rev. 1, Bechtel Jacobs Company LLC, Oak Ridge, TN.

DOE (U.S. Department of Energy) and EPA (U.S. Environmental Protection Agency) 1995. *Policy on Decommissioning of Department of Energy Facilities Under the Comprehensive, Environmental Response, Compensation, and Liability Act,* U.S. Department of Energy, Washington D.C.

DOE 2001. *Attainment Plan for Risk/Toxicity-Based Waste Acceptance Criteria at the Oak Ridge Reservation, Oak Ridge, Tennessee,* DOE/OR/01-1909&D3, U.S. Department of Energy, Oak Ridge, TN.

DOE 2003. *Dynamic Verification Strategy and Standard Operating Procedure,* DOE/OR/01-2063&D1, U.S. department of Energy, Office of Environmental Management, Oak Ridge, TN.

Sample and Analyses Plan for Waste Disposition of Materials from the South Park Area, East Tennessee Technology Park, Oak Ridge, Tennessee.

APPENDIX A: EMWMF ANOMALY DETECTION CHECKLIST

A.1 ANOMALY DETECTION PLAN (ADP) FOR WASTE LOT 155.5

A.1.1 INTRODUCTION

This plan identifies the actions that will be conducted in order to ensure that no anomalous waste is sent to the Environmental Management Waste Management Facility (EMWMF). That is, only waste identified and characterized as part of Waste Lot profile 155.5 will be packaged and shipped to the EMWMF. Any suspect, or identified, anomalous waste will be segregated from Waste Lot 155.5 for further evaluation by trained project personnel with consultation from the EMWMF waste acceptance criteria (WAC) Attainment Team, as needed.

The materials included in this profile are the debris and adjacent soil from the removal of the K-1015-A Laundry Pit in the BOS Labs area. Incidental amounts of secondary waste (i.e. personal protective equipment, plastic sheeting, hay bales and other erosion control materials, wooden pallets, contaminated equipment, decontamination materials, etc.) from sampling, excavation, and waste loading activities associated with this remediation are also included in this waste lot profile.

A.1.2 TRAINING

Prior to the disposal of the material included in Waste Lot 155.5, all field personnel will be trained to the anomaly detection checklist for this waste lot. This training will include: what the anomalies for this waste lot are, how to identify anomalous waste, and how to respond to the discovery of anomalous waste (e.g., segregate anomalies waste from remaining debris or suspend work until the potential anomaly can be addressed by qualified Waste Management project personnel in consultation with the WAC Attainment Team). Workers responsible for generating the material included in this waste lot will be trained to recognize anomalous waste using plan-of-the-day meetings, "tailgate briefings" and/or posted materials in break rooms and other areas to maximize recognition and awareness of anomalous waste issues and response actions.

The Waste Packaging Specialist will be required to read the EMWMF Waste Lot Profile 155.5 (BJC/OR-3005) and the WAC Attainment Plan (DOE/OR/01-1909&D3) prior to certifying the waste in this waste lot for disposal.

A.1.3 WASTE PACKAGING AND CERTIFICATION

Each container (i.e., dump truck) will be filled with waste under the supervision of a qualified Waste Packaging Specialist. The Waste Packaging Specialist will ensure that packaging requirements are met and that no anomalous waste is present in the container. If necessary, an absorbent material will be added to the load to prevent the buildup of free liquids during staging and/or transport to EMWMF.

In the event that an anomalous item is identified during loading of a conveyance to EMWMF, the item will be removed from the container, set aside, and project waste management notified. If the item is anomalous because of non-compliance with physical WAC criteria, the item will be size reduced to bring it into compliance with the physical WAC and profile description. An Anomaly Detection Checklist will

be completed for each shipment, certifying that all waste is in compliance with the EMWMF Waste Lot 155.5 profile. The Waste Packaging Specialist will sign the checklist prior to the waste leaving the site.

A.1.4 PROJECT ASSESSMENTS

An initial waste generation assessment will be conducted by the ETTP D&D/RA Project Waste Management Lead, or designee, prior to the initial shipments of the waste to the EMWMF. A representative from D&D/RA Project Quality Assurance may be invited to participate in this initial assessment, but because this is not considered a high-risk waste lot, this participation is not required. Prior to the initial shipment leaving the site, the Waste Management Lead or designee may hold discussions with the Waste Packaging Specialist and the Transportation Specialist to ensure they are confident that waste conforms to the EMWMF WAC, this profile, the shipping papers are in order, and any concerns they had have been satisfactorily addressed.

Additional assessments will be conducted if the Waste Management Lead determines that significant changes in the waste matrix have occurred or concerns are raised over the waste packaging process. It is expected that these assessments will be similar to the initial assessment described in this plan. In addition to the assessments stated above, the project expects to conduct assessments:

- Upon restart of waste loading activities that were terminated for a significant period of time (over one month);
- If it is determined, based on worker input (or other leading indicators), that the character of the waste lot has changed; or
- Of activities required by a corrective action plan, written in response to significant or repeated undetected anomalies discovered at the EMWMF.

These additional assessments are also expected to be similar to the initial assessment described in this plan with one additional evaluation. Waste Packaging Specialists will be interviewed regarding the types and numbers of items identified as anomalies that have been removed during the packaging of waste. At this time, documentation of anomalous waste (using the compilation of the BJCF-860 documentation of items removed) will also be reviewed. The results of this assessment will be evaluated to determine if this ADP needs to be revised, if the waste lot itself needs additional characterization, and/or more frequent assessments (focusing on anomalous waste) need to be conducted.

Process validation assessments will consist of two activities: examination of leading indicators and waste generation assessments. Leading indicators will be compiled as anomalous waste is detected and removed from packages. Documentation of items removed will be documented in project logbooks. As additional anomalous waste is identified, the Project Waste Management Lead (or designee) will examine the types and number of anomalous waste items removed, and the time intervals between items requiring removal. The results of these examinations determine if this ADP needs to be revised, if the waste lot itself needs additional characterization, and/or more frequent waste generation assessments to be conducted. The results of these examinations will also be provided to the Waste Packaging Specialists and other field personnel via updated training and/or plan of the day meetings.

EMWMF Anomalies Risk Scoring Checklist	
Waste Lot Number 155.5	**Date 4/13/08**
Risk Criteria	**Score (1 to 9)**
1. Likelihood of waste lot to have anomalies. 9 – Extremely likely -0.95 probability of anomalies in the waste lot 7 – Very likely – 0.75 probability 5 – Likely – 0.5 probability (50 – 50 chance) 3 – Unlikely – 0.25 probability 1 – Very unlikely – 0.05 probability (almost no probability of anomalous waste)	3-. The material in this waste lot consists of a discrete pit and soil area that was brought above grade and size reduced/staged.
2. Difficulty in detecting anomalies in the waste lot. The likelihood of a failure to detect an anomaly. Examples of factors that affect this are presence of soils or other conditions that minimize visual differences and the amount of different types of materials combined together. 9 – Extremely likely -0.95 probability of an anomaly could be undetected 7 – Very likely – 0.75 probability 5 – Likely – 0.5 probability (50 – 50 chance) 3 – Unlikely – 0.25 probability 1 – Very unlikely – 0.05 probability (almost no probability of detection failure)	3- If an anomaly is encountered it is likely that it will be detected because the material was brought above grade for size reduction and staging.
3. Potential hazards associated with likely anomalies. The likelihood of the potential hazards, if brought in contact with workers could cause significant harm to those workers. 9 – Extremely likely -0.95 probability to cause extreme worker harm 7 – Very likely – 0.75 probability 5 – Likely – 0.5 probability (50 – 50 chance) 3 – Unlikely – 0.25 probability 1 – Very unlikely – 0.05 probability (almost no probability of any harm to workers)	3- Due to the discrete nature of this waste lot it is unlikely that any anomalies are present. If they are present it is also unlikely that they will cause significant harm to the workers.
4. Potential impact of likely anomalies on cell performance and the environment. The likelihood that undetected anomalies, if found in EMWMF would require EMWMF shutdown for removal to minimize environmental insult and/or noncompliance with regulations. 9 – Extremely likely -0.95 probability 7 – Very likely – 0.75 probability 5 – Likely – 0.5 probability (50 – 50 chance) 3 – Unlikely – 0.25 probability 1 – Very unlikely – 0.05 probability	3- Due to the discrete nature of this waste lot it is unlikely that any anomalies are present. In addition, the material in this waste lot is primarily soil/concrete which is unlikely to result in shutdown of the EMWMF.
Total	**12**

Prepared by J.M. Davenport Date 4/21/2008

Quality Engineer Review Jim Moore Date 4/21/08

Waste Packaging Specialist Review Marie Jaycox Date 4/21/2008

Waste Lot Anomaly Detection Checklist

Waste Lot 155.5: K-1015-A Laundry Pit
Expected Waste Types: concrete, brick, rebar, soil, pipe, and secondary waste (e.g., personnel protective equipment, hay bales and other erosion control materials, plastic sheeting, wood sheets, wooden pallets, used disposable sampling equipment, etc.)
Physical Indicators of Potential Anomalies: • Waste from sources other than the K-1015-A Laundry Pit • Waste in unlined intermodals or dump trucks • Pipe that is commingled with the debris • Rebar exceeding approximately 4 ft in length or containing large or excessive pieces of concrete • Presence of yellow cake • Presence of free liquids • Unbagged personal protective equipment • Unbreached aerosol cans • Cylinders • Oversized debris (e.g., concrete debris exceeding approximately 1 ft in any dimension, piping exceeding 8 ft in length) • Pipe greater than 6 inches in diameter that has not been crushed to minimize voids • Any unusual staining or any unusual odors, such as sweet, organic, or acrid odors
Field Instrument Indicators of Potential Anomalies • Instrument readings deemed unusual by RadCon or field technicians • No PID readings required

Certification Statement (to be completed and sent with each waste shipment):

I certify that the wastes in this shipment conform to the descriptions found in the waste profile for Waste Lot _____. For question regarding the contents of this shipment, call _____.

_____	_____	_____
Printed name	Signature	Date

(Note: the phone number and printed name for this form may be electronically inserted. However, the waste lot number, signature, and date shall be handwritten in ink.

APPENDIX B: SUPPORTING DOCUMENTATION (PROCESS KNOWLEDGE)

The following Process Knowledge information is attached:

1. Environmental Compliance Listed Waste Determinations for the K-1015-A Laundry Pit.
2. Map showing Zone 2 EU33 location (i.e. K-1015-A).
3. South Park Area Sampling and Analyses Plan (SAP)
4. Building K-1015 Laundry Pit details (drawing)
5. Core Team Concurrence Log
6. Miscellaneous supporting e-mails, information, etc.
7. Comment Response Table addressing EMWMF WAT Comments on the Profile

Appendix B- Attachment 1

From: Creasey, Scott L (YCQ) [YCQ@bechteljacobs.org]
Sent: Tuesday, April 22, 2008 3:23 PM
To: Davenport, John M (MDN)
C Jamie Raymer; Poole, Tony (D6P)
Subject: Listed Waste Determination - K-1015-A Laundry Settling Pit (Waste Lot 155.5)

Marshall,

A listed waste determination review was conducted by Environmental Compliance for the K-1015-A Laundry Settling Pit on 07/27/07...and approved by BJC Legal on 08/15/07. This review focused on historical site disposal records, site operating records, and CERCLA investigation documentation associated with K-1015-A operations to determine if there were any RCRA-listed constitutents that would apply to the debris generated from the removal of the K-1015-A Laundry Settling Pit. Of particular concern, was: (1) The RCRA-Listed contaminated groundwater plume that extended from the K-1004-A,B,C, and D Laboratory footprint to the K-1004-L laboratory area, near the Laundry Pit; and (2) Operations that could have contaminated the pit with RCRA-listed constituents.

The listed waste determination review noted above indicated that the RCRA-listed groundwater could not have impacted the Laundry Pit and would not have contaminated the pit, nor its contents. It was determined that the top of the groundwater table was well below the bottom of the K-1015-A Laundry Settling Pit and did not have the potential to come into contact with the Laundry Pit...or infiltrate the pit. In addition, sampling results indicated that the contaminants detected in the K-1015-A Laundry Settling Pit were not the same as those in the groundwater plume of concern.

From an operational standpoint, historical documents indicated that there were no uses of chemicals that would carry a RCRA listed waste code that would have impacted this laundry pit. Also, there were no records of spills or releases of RCRA-Listed materials. Finally, no organics above (or even near) PRG levels were detected in the pit sludge, water, or surrounding soils.

In summary, the results of above noted RCRA-Listed Waste Determination indicated that there were no RCRA-listed constituents from the groundwater or any other source that would impact the debris generated from the removal of the K-1015-A Laundry Settling Pit. As such, no RCRA-listed waste codes will apply to this waste lot.

If you (or anyone else) should have any questions pertaining to this email or the noted listed waste determination, contact me at 241-5326 or Tony Poole at 241-3591.

Thanks,

Scott Creasey
Environmental Compliance Lead
ETTP D&D / RA Projects

From: Davenport, John M (MDN) [MDN@bechteljacobs.org]
Sent: Tuesday, April 15, 2008 9:39 AM
To: Jamie Raymer
Subject: FW: K-1015-A PCBs
Per your request.

From: Creasey, Scott L (YCQ)
Sent: Monday, April 14, 2008 4:06 PM
To: Davenport, John M (MDN)
Subject: RE: K-1015-A PCBs

I do concur. Not a PCB waste.

Scott

From: Davenport, John M (MDN)
Sent: Monday, April 14, 2008 1:29 PM
To: Creasey, Scott L (YCQ)
Cc: 'Jamie Raymer'; Hanahan, Douglas W. (HGG); Poole, Tony (D6P); Shipe, Lisa Gibson (LSG)
Subject: RE: K-1015-A PCBs

Do you concur with Lisa's opinion?

From: Shipe, Lisa Gibson (LSG)
Sent: Monday, April 14, 2008 12:26 PM
To: Davenport, John M (MDN)
Cc: 'Jamie Raymer'; Hanahan, Douglas W. (HGG); Creasey, Scott L (YCQ); Poole, Tony (D6P)
Subject: RE: K-1015-A PCBs

Marshall,

Call Jennifer Wellman or Scott Creasy. This is a "as is" concentration and not from a specific source - so I say no to your question.

Thanks,

Lisa

From: Davenport, John M (MDN)
Sent: Monday, April 14, 2008 12:07 PM
To: Shipe, Lisa Gibson (LSG)
Cc: 'Jamie Raymer'; Hanahan, Douglas W. (HGG)
Subject: FW: K-1015-A PCBs
Importance: High

Lisa- The e-mail below summarizes the PCB data for Waste Lot 155.5 (the BOS Labs Laundry Pit waste). It is

primarily debris with some adjacent soils from the removal of the K-1015-A Laundry Pit itself. As you can see, PCBs levels are below 1 ppm and would therefore indicate a non-PCB waste stream. From the EC point-of-view, is there additional information that would make this waste stream PCB Bulk Product or R ediation Waste. We need this for Section 2.5 of the EMWMF profile. Thank you.

From: Jamie Raymer [mailto:raymerj@alliantcorp.com]
Sent: Monday, April 14, 2008 9:50 AM
To: Davenport, John M (MDN)
Subject: K-1015-A PCBs
Importance: High

Marshall,
Here are the PCBs we have in the K-1015-A data set:

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7
PCB-1016_mg/kg	0.023	0.047	0.048	0.048	0.049	0.1	0.11
PCB-1221_mg/kg	0.023	0.047	0.048	0.048	0.049	0.1	0.11
PCB-1232_mg/kg	0.023	0.047	0.048	0.048	0.049	0.1	0.11
PCB-1242_mg/kg	0.023	0.047	0.048	0.048	0.049	0.1	0.11
PCB-1248_mg/kg	0.023	0.047	0.048	0.048	0.049	0.1	0.11
PCB-1254_mg/kg	0.023	0.047	0.048	0.048	0.1	0.11	0.42
PCB-1260_mg/kg	0.023	0.048	0.061	0.1	0.11	0.11	0.19
Total Polychlorinated biphenyl_mg/k	0.023	0.048	0.061	0.1	0.11	0.11	0.61

As you can see, nothing over 1 mg/kg for the debris or soil. Let me know what EC says we need to call this waste in the profile.

Thank you,

James E. Raymer
Alliant Corporation
(865) 251-5005 Office
(865) 661-0726 Mobile
(865) 769-0946 Fax
raymerj@alliantcorp.com

From: Shipe, Lisa Gibson (LSG) [LSG@bechteljacobs.org]
Sent: Wednesday, November 28, 2007 1:07 PM
To: Hanahan, Douglas W. (HGG); Creasey, Scott L (YCQ)
Cc: Wellman, Jennifer C (JBW)
Subject: K-1015 Laundry pit RCRA Listed Determination

Doug and Scott,

In case you need this for the Laundry Pit Debris.

Thanks,

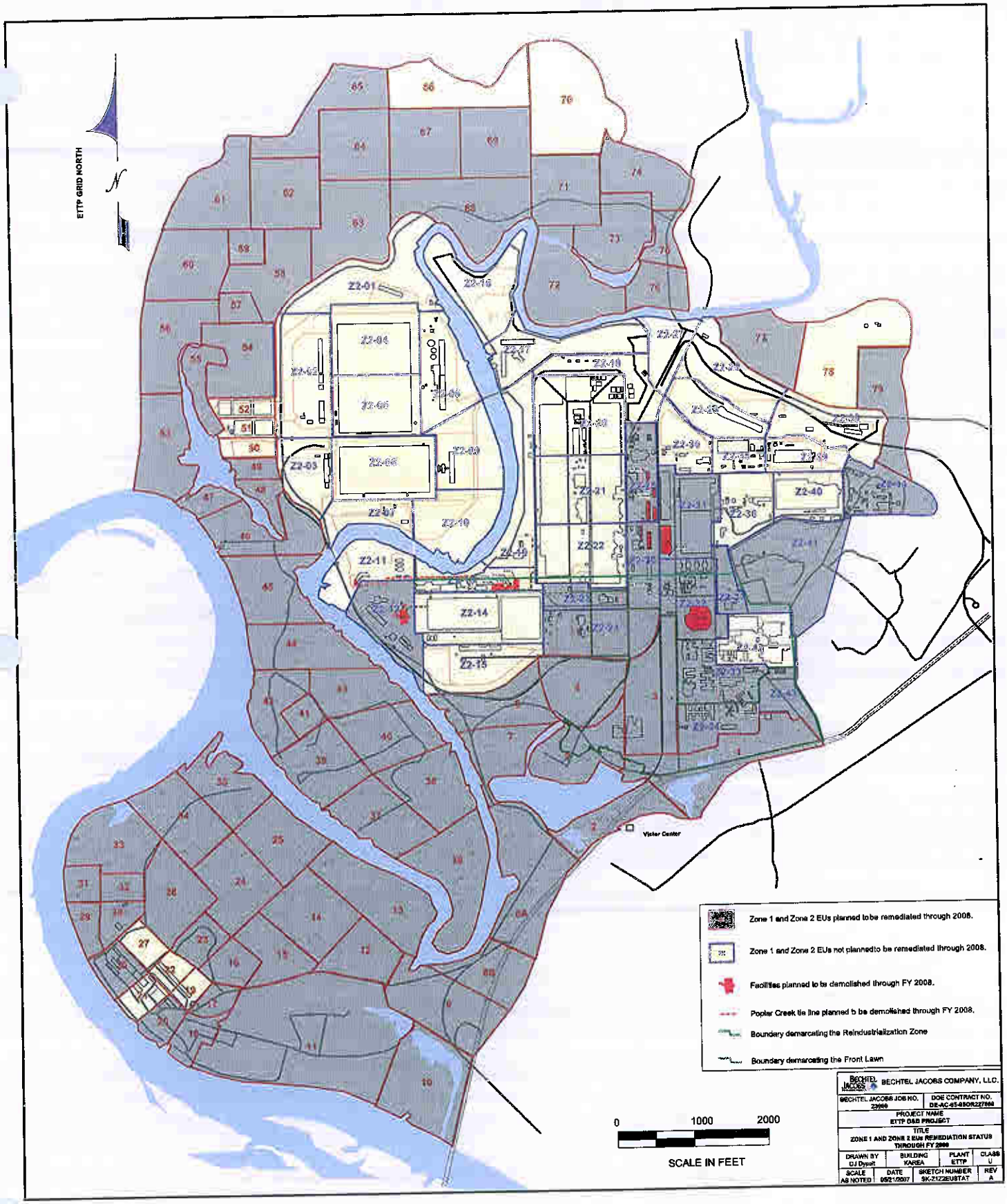
Lisa

Listed Waste Statement that includes Laundry Pit Debris

The contaminants detected in the K-1015-A Laundry Settling Pit are not the same as those in the groundwater plume known to exist to the south of the pit. Groundwater appears to occur at a greater depth than the bottom of the pit and no infiltration has occurred. No organics above or even near PRGs levels were detected in the pit sludge, water, or surrounding soils.

The results of this review indicate there were no uses of chemicals that would carry a RCRA listed waste code detected in the pit. There are no records of spills or releases of these materials from these activities.

Appendix B- Attachment 2


ETTP GRID NORTH
N
Z2-01
Z2-02
Z2-03
Z2-04
Z2-05
Z2-06
Z2-07
Z2-08
Z2-09
Z2-10
Z2-11
Z2-12
Z2-13
Z2-14
Z2-15
Z2-16
Z2-17
Z2-18
Z2-19
Z2-20
Z2-21
Z2-22
Z2-23
Z2-24
Z2-25
Z2-26
Z2-27
Z2-28
Z2-29
Z2-30
Z2-31
Z2-32
Z2-33
Z2-34
Z2-35
Z2-36
Z2-37
Z2-38
Z2-39
Z2-40
Z2-41
Visitor Center
Zone 1 and Zone 2 EUs planned to be remediated through 2008.
Zone 1 and Zone 2 EUs not planned to be remediated through 2008.
Facilities planned to be demolished through FY 2008.
Poplar Creek tie line planned to be demolished through FY 2008.
Boundary demarcating the Reindustrialization Zone
Boundary demarcating the Front Lawn
0
1000
2000
SCALE IN FEET
BECHTEL JACOBS COMPANY, LLC.
BECHTEL JACOBS JOB NO. 23900
DOE CONTRACT NO. DE-AC-05-98OR22700
PROJECT NAME ETTP D&D PROJECT
TITLE ZONE 1 AND ZONE 2 EUs REMEDIATION STATUS THROUGH FY 2008
DRAWN BY DJ Dysart
BUILDING K-1210
PLANT ETTP
CLASS U
SCALE AS NOTED
DATE 05/21/2007
SKETCH NUMBER SK-Z1Z2EUSTAT
REV A

Appendix B- Attachment 3

Sample and Analysis Plan for Waste Disposition of Materials from the South Park Area East Tennessee Technology Park, Oak Ridge, Tennessee

INTERNAL USE ONLY

CONTENTS

TABLES iv

ACRONYMS vi

1. INTRODUCTION 1

2. BACKGROUND INFORMATION 1

3. DATA QUALITY OBJECTIVES 3

4. SAMPLING REQUIREMENTS 5
   - 4.1 SAMPLE COLLECTION PROCESS 5
   - 4.2 SAMPLE CUSTODY AND DOCUMENTATION 6
   - 4.3 FIELD SAMPLING LOGS 7
   - 4.4 DECONTAMINATION OF FIELD SAMPLING EQUIPMENT 7
   - 4.5 SAMPLE IDENTIFICATION, LABELING, AND CHAIN OF CUSTODY 8
   - 4.6 SAMPLE STORAGE, PACKAGING, TRANSPORT, AND SAMPLE MANAGEMENT 8
   - 4.7 FIELD QUALITY ASSURANCE/QUALITY CONTROL SAMPLES 9
   - 4.8 DEVIATIONS AND EXCEPTIONS 9

5. ANALYTICAL REQUIREMENTS 10

6. DATA MANAGEMENT AND VALIDATION 15
   - 6.1 DATA DELIVERABLES 16
   - 6.2 DATA VERIFICATION AND VALIDATION 16
   - 6.3 DATA MANAGEMENT AND CONFIGURATION CONTROL 17
   - 6.4 USE OF DATA 17

7. REFERNCES 17

TABLES

1 Data quality objectives checklist 3
2 Analytic Requirements 6
3 Recommended sample containers, preservatives, and holding times 7
4 Analytical methods 11
5 Maximum allowable detection limits 13

ACRONYMS

AMSED	Analytical Master Specification Electronic Deliverable
BJC	Bechtel Jacobs Company, LLC
COC	chain of custody
DQO	data quality objective
DOT	U.S. Department of Transportation
DVS	Dynamic Verification Strategy
EMWMF	Environmental Management Waste Management Facility
EPA	U. S. Environmental Protection Agency
HDPE	high density polyethylene bottle
MS	matrix spike
MSD	matrix spike duplicate
NRC	U.S. Nuclear Regulatory Commission
PCB	polychlorinated biphenyls
PEMS	Project Environmental Measurement System
QC	quality control
RCRA	Resource Conservation and Recovery Act
RA	remedial action
SAP	Sampling and Analysis Plan
SMO	Sample Management Office
SVOA	semivolatile organic analysis
TBD	To Be Determined
TCLP	toxicity characteristic leaching procedure
VOA	volatile organic analysis
WAC	waste acceptance criteria
WMC	widemouth glass container

1. INTRODUCTION

The Zone 2 Record of Decision (ROD) requires waste to be characterized using prescribed testing methods and/or generator process knowledge. This Sampling and Analysis Plan (SAP) addresses the requirements for sampling and analysis to support the waste characterization and disposition of a variety of uncharacterized radiologically contaminated materials from the ongoing Remedial Action (RA) in the South Park Area. Characterization sampling and analysis will be conducted to provide data of known quantity that can be evaluated to determine the final disposition path of waste generated for the RA activities in this area.

The overall objective of this SAP is to provide a strategy to collect a sufficient number of representative samples to adequately characterize the waste from this RA activity for disposal. The plan will provide data of sufficient quality to supplement existing data and process knowledge to satisfy the waste acceptance criteria (WAC) at the appropriate disposal facility.

The anticipated disposal facility is the Environmental Management and Waste Management Facility (EMWMF); waste not meeting the requirements of this facility will be sent to an off-site commercial facility (e.g., Energy*Solution,* Onyx, Perma-fix, etc.). Since the anticipated disposal facility is the EMWMF and this facility has the most comprehensive analytical requirements; the analytical requirements of the EMWMF were incorporated into this SAP.

2. BACKGROUND INFORMATION

This SAP is to support the disposition of waste generated during the RA activities conducted in the South Park Area at East Tennessee Technology Park. The waste streams can be broken down into the following categories: K-1015-A laundry scum pit, K-1004 acid pits, K-1006 acid pit, contaminated soil from leaking acid pits, and contaminated soil from leaking inlet/outlet pipes associated with the acid pits. The following paragraphs provide a brief discussion of these categories and the contaminants of concern associated with them.

The K-1015-A Laundry Settling Pit (identified in this SAP as Pit 229), is a part of the K-1015 Laundry Facility. The drains in the K-1015 Facility went to the subsurface K-1015-A Settling Pit, which was used to remove particulates from the laundry wastewater before the water was discharged from the laundry complex. The Settling Pit is constructed of concrete, a porous material, and the contamination present in this waste (i.e., the actual pit) originated from contamination on the laundered clothing. While the Laundry was in operation the settling pit was periodically cleaned out. Based on the analytical data used to characterize the contents of this pit, radiological isotopes are the primary contaminants of concern for the pit, and more specifically uranium. Existing data also indicates that semi-volatiles and metals are also contaminants of concern for the pit contents, but not at concentration that would cause a Resource Conservation and Recovery Act (RCRA) concern. In addition, there are no RCRA listed F-codes associated with the laundry pit contents based on a documented RCRA listed waste determination. Since the contamination of the pit, originated from the pit contents the contaminants of concern are: radiological isotopes, metals, and semi-volatiles.

The drains from K-1006 and K-1004-A/B/C/D/L flowed into retention pits (identified in this SAP as Pit 310, Pit 312, Pit 313, Pit 314, Pit 316, Pit 335, and Pit 373) prior to discharge to the SD-

100 system. Until the implementation of Best Management Practices in 1985, chemicals used and wastes produced in the laboratories were discharged down the drains. Waste solutions entered one side of the pit and were temporarily retained and diluted by the contents of the pit prior to spilling over the baffle into the other side of the pit and being discharged to the SD-100 system. While in operation, the pits from K-1004-A/B/C/D received similar contaminants at similar concentrations. This is supported by the similarities in the physical nature of the materials inside the pit (i.e., liquid phase and thick sludge phase) and the similarity in contaminants of concern in the samples collected of the pit contents. The pit at K-1004-L received similar wastes but the chemicals were used for physical laboratory tests, not chemical. The difference in this pit and those from the other labs is that the waste from the K-1004-L pit was determined to not contain RCRA listed codes. The historical information and existing data from the actual pit contents indicate that the contaminants of concern for these pits are: radiological constituents, metals, semi-volatiles, volatiles, cyanide, and glycols.

During Dynamic Verification Strategy (DVS) sampling activities, it was determined that soil associated with the Pit 316 exceeded screening criteria and required excavation. The existing DVS data will be used to characterize this material for disposal along with data collected per this SAP to fill data gaps. Based on the existing DVS data, toxicity characteristic leaching procedure (TCLP) metals and volatiles are need to make a RCRA determination and cyanide is need to demonstrate EMWMF WAC compliance.

3. DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) for the project are summarized in Table 1. The process was used to determine potential problems that may be encountered during the sampling and analysis activities and to address these problems prior to initiating the field activities. Where applicable, the table refers to other locations in the SAP where the results from the process are located.

Table 1. Data quality objectives checklist.

1. The problem and the decision (DQO Steps 1 and 2)	
What is the description of the waste?	Waste is composed of the Laundry Settling Pit, South Park Acid Pits (7) and contaminated soil areas associated with the acid pits
Who needs information about the waste?	Waste Management and Environmental Compliance to ensure waste is properly containerized, marked, and stored. In addition, Waste Management requires defendable data to determine the appropriate waste outlet and ensure compliance with receiving facility WAC.
What are the contaminants or analytes of interest?	Process knowledge and existing samples indicate that the contaminants of concern are radionuclides (uranium isotopes, ^{99}Tc, and trace levels of transuranics); heavy metals (including mercury); PCBs; VOAs; SVOAs; cyanide; and glycols. A more detailed discussion by material type is provided in Section 2.
What decisions need to be made regarding the waste?	Wastes need to be characterized for radionuclides, PCBs, metals, VOAs, SVOA, cyanide and RCRA constituents for evaluation in relation to WAC, profiling requirements, and required transportation documentation.
2. Inputs to the decision (DQO Step 3)	
What historical data exist?	The contents of the acid pits, the inlet and outlet pipes from the pit, and soil adjacent to the pits have been sampled. These samples were analyzed for radiological constituents, PCBs, metals, VOAs, and SVOAs. The laundry pit contents have been sampled for radiological isotopes, SVOA and metals. No samples from the actual acid or laundry pit has been collected.
What process knowledge exists?	A thorough historical review has been conducted to make a RCRA determination on the pit contents. This process involved gathering records, historical documents, and conducting interviews with personnel who worked in the laboratory when it was in use.
What additional data must be collected?	Sampling must be collected for the pits themselves and adjacent soils that will be excavated and disposed of. A breakdown of the samples and analysis required is provided in Table 2.
3. Physical boundaries to be considered (DQO Step 4)	
What is the location of the potential contamination?	The source of the contamination is the pit contents and leaks that have occurred either from the pit or its associated piping. The contamination is located in pits themselves (Pit 229, Pit 310, Pit 312, Pit 313, Pit 314, Pit 316, Pit 335, and Pit 373) and contaminated soil adjacent to the pits.
What considerations affect the sample location choices?	Process Knowledge and DVS data are being used to determine the sample locations. Samples for waste management are being collected from materials that have to be excavated and disposed of due to failing risk.

Table 1. Data quality objectives checklist.

How is the waste containerized?	The waste has not been generated. Once the waste is generated it will be placed on plastic or in intermodals to be sampled.
Are there sampling problems?	Samples must be collected in a manner to ensure they are representative of the waste.
Are there other sampling constraints, such as temporal, schedule, seasonal concerns, regulatory requirements, etc.?	No
4. Decision statement and uncertainty (DQO Steps 5 and 6)	
What are the steps to be taken after the analytical results are received?	See Section 6.
5. Develop the data sampling design (DQO Step 7)	
State the type of data to be obtained.	Definitive (modified Level 3 data package)
State the approach to sample selection.	As required in the Record of Decision for Zone 2 a representative sample will be collected from each pit and contaminated soil area. The representative sample will be used to characterize a discrete population. The analysis requested for each sample is dependant on process knowledge and existing data from the contamination source.
Optimize the design and approach for efficiency and effectiveness.	One composite sample will be collected from each acid pit or soil excavation area and three composite samples will be collected from the Settling Pit. Each sample will represent a small discrete waste population. It is expected that contamination concentrations in these areas will be similar and the individual waste populations will be able to be combined into one waste stream.

DQO = data quality objective
DVS = Dynamic Verification Strategy
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act of 1976
SVOA = semivolatile organic analysis
TCLP = toxicity characteristic leaching procedure
VOA = volatile organic analysis
WAC = waste acceptance criteria

4. SAMPLING REQUIREMENTS

The proposed sample locations and sample numbers for pit/soil area are provided in Table 2. The Zone 2 Record of Decision (ROD) requires that detailed chemical and physical analysis be obtained on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 *CFR* 264 and 268. Since the goal is to obtain a representative sample, biased composite samples will be collected from each pit debris or soil pile. In the case of the pits being large pieces, core samples to depth will be collected. If one of the acid pits is not able to be "cleaned" per RCRA the samples for that pit may be cancelled and the pit debris sent to Energy*Solutions* using the pit contents data. In addition, if the Core Team concurs that Pit 373 can be left in place; the samples for this pit will be cancelled.

Decontamination of sampling equipment will be conducted prior to, during, and following characterization activities associated with the collection of samples from each location. At the completion of the sampling event, sampling equipment will be decontaminated by removing contaminants in accordance with approved standard operating procedures (SOPs). After the samples are collected, any unused portion of sample material will be returned to the appropriate debris pile.

4.1 SAMPLE COLLECTION PROCESS

Samples will consist or grab and composite samples. Concrete/brick/mortar samples will be a composite sample, with a subsample collected from each third of the debris pile or intermodal. Concrete/brick/mortar that is visibly stained will be sampled for chemical analysis. If no concrete/brick/mortar is visibly stained in a particular section of the debris pile or intermodal, the sub-sample in this section will be randomly collected. Concrete/brick/mortar with elevated radiological constituents, based on surveys, will be selected for radiological analysis. If no concrete has elevated rad in a particular section of the debris pile or intermodal, the sub-sample in this section will be randomly collected.

Grab soil samples will be collected. To ensure the soil samples are representative, each sample will be randomly collected to depth of the soil pile or intermodal. Due to the small volume of the soil requiring excavation, one soil sample will be collected from each debris pile or intermodal.

If necessary to collect or size reduce the sample the following equipment used could include, but is not limited to, a hammer, chisel, drill, and grinder.

Samples shall be collected following approved field sampling procedures. Sample transfer shall be documented via signatures on a chain-of-custody (COC) form. Samples shall be placed in a cooler and the cooler sealed with custody tape.

The number of sample containers needed for each sample will be based on the types of analyses required and the number of individual laboratories used to perform these analyses. For example, if one laboratory is chosen to perform all of the required analysis, then only one sufficiently sized sample may need to be collected. Recommended sample containers, sample preservation, and holding time requirements are provided in Table 3.

4.2 SAMPLE CUSTODY AND DOCUMENTATION

Sample custody and documentation are important elements of generating acceptable and defensible data. Each sample or field measurement must be properly documented to facilitate timely, correct, and complete analysis and to support use of field and laboratory data. The documentation system provides the means to identify, track, and monitor each sample from the point of collection through final data reporting.

Table 2. Analytic Requirements

Location	Sample	Matrix	Number of Samples	Analysis
Pit 229	Representative sample of the pit itself (ensure one sample is from the pit area where the contents had high rad)	Concrete/brick/mortar	3 – 3 pt composite	Total metals (plus Hg), TCLP metals, SVOAs, TCLP SVOA, cyanide, PCBs, glycol, and radiological constituents
Pit 310	Representative sample of the pit itself after it has been cleaned per RCRA	Concrete/brick (ensure the mortar is included in the sample)	1– 3 pt composite	Total metals (plus Hg), TCLP metals, SVOAs, TCLP SVOA, VOA, TCLP VOA, cyanide, PCBs, glycol, and radiological constituents
Pit 312	Representative sample of the pit itself after it has been cleaned per RCRA	Concrete/brick (ensure the mortar is included in the sample)	1– 3 pt composite	Total metals (plus Hg), TCLP metals, SVOAs, TCLP SVOA, VOA, TCLP VOA, cyanide, PCBs, glycol, and radiological constituents
Pit 313	Representative sample of the pit itself after it has been cleaned per RCRA	Concrete/brick (ensure the mortar is included in the sample)	1– 3 pt composite	Total metals (plus Hg), TCLP metals, SVOAs, TCLP SVOA, VOA, TCLP VOA, cyanide, PCBs, glycol, and radiological constituents
Pit 314	Representative sample of the pit itself after it has been cleaned per RCRA	Concrete/brick (ensure the mortar is included in the sample)	1– 3 pt composite	Total metals (plus Hg), TCLP metals, SVOAs, TCLP SVOA, VOA, TCLP VOA, cyanide, PCBs, glycol, and radiological constituents
Pit 316	Representative sample of the pit itself after it has been cleaned per RCRA	Concrete/brick (ensure the mortar is included in the sample)	1– 3 pt composite	Total metals (plus Hg), TCLP metals, SVOAs, TCLP SVOA, VOA, TCLP VOA, cyanide, PCBs, glycol, and radiological constituents
	Representative sample of excavated soil	Soil	1	TCLP metal, TCLP VOA, cyanide, and glycols
Pit 335	Representative sample of the pit itself after it has been cleaned per RCRA	Concrete/brick (ensure the mortar is included in the sample)	1– 3 pt composite	Total metals (plus Hg), TCLP metals, SVOAs, TCLP SVOA, VOA, TCLP VOA, cyanide, PCBs, glycol, and radiological constituents
Pit 373	Representative sample of the pit itself after it has been cleaned per RCRA	Concrete/brick (ensure the mortar is included in the sample)	1– 3 pt composite	Total metals (plus Hg), TCLP metals, SVOAs, TCLP SVOA, VOA, TCLP VOA, cyanide, PCBs, glycol, and radiological constituents

Hg- mercury
PCB – polychlorinated biphenyl
RCRA – Resource Conservation and Recovery Act
TCLP – toxicity characteristic leaching procedure
SVOA – semi-volatile organic analysis
VOA – volatile organic analysis

Table 3. Recommended sample containers, preservatives, and holding times

Analyte group	Recommended container (unless otherwise noted)	Preservative	Holding time
Soil Matrix			
Total/TCLP Volatile organic compounds	1 – 4-oz widemouth glass	Cool, 4°C	14 d
Total/TCLP Semivolatile organic compounds	1 – 8-oz widemouth glass	Cool, 4°C	14 d (extraction) 40 d (analysis)
Polychlorinated biphenyl	1 – 8-oz widemouth glass	Cool, 4°C	7 d (extraction) 40 d (analysis)
Total/TCLP metals	1 – 4-oz widemouth glass	None required	180 d, for Hg-28 d
Glycols	1 – 4-oz widemouth glass	Cool, 4°C	14 d (extraction) 40 d (analysis)
Cyanides	1- 8 oz widemouth glass	4°C	14 d
Radiochemical analyses	1 – 8-oz HDPE (widemouth)	None required	180 d
Concrete/Brick/Mortar Matrix			
Volatile/semivolatiles/metals/ TCLP volatiles/TCLP semivolatiles/ TCLP metals/glycols/cyanides/ radiological	3 - 8 oz jars widemouth glass	Cool, 4°C	14 d

4.3 FIELD SAMPLING LOGS

A controlled, pre-paginated, permanently bound logbook will be used to document field sampling activities. The logbook shall provide a daily record of all sampling activities in accordance with the Bechtel Jacobs Company, LLC (BJC) Technical Specifications for Field Equipment Calibration, Calibration Documentation, Field Logbook Preparation, COC Documentation and Field Quality Control (QC) Sample Planning for maintaining sampling documentation. Unique sample identifies shall be included in each daily logbook entry. All logs generated during the project will contain the following information, as appropriate:

- Unique sample identification number.
- Description of each sample collected, including the parameters to be analyzed.
- Any problems encountered during sampling and their resolution.
- Dates and times for the start and completion of the sample collection.
- Brief description of sample matrix (e.g., color, particle size, odor, etc.)

4.4 DECONTAMINATION OF FIELD SAMPLING EQUIPMENT

Non-disposable sampling equipment shall be decontaminated thoroughly before use in accordance with U.S. Environmental Protection Agency (EPA) Region 4 Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EPA 2001a) and shall be decontaminated and properly maintained each day upon the completion of sampling

activities. Disposable sampling equipment shall be kept sealed until just prior to sampling to prevent contamination. Disposable equipment will be used where practical to minimize the opportunity for cross-contamination.

Initial decontamination activities may take place near the sampling area (i.e., wiping down of equipment sufficiently to allow removal from contamination areas). Brushes and scrapers will be used as required to remove gross contamination. The equipment will be sprayed with water and wiped clean with paper towels. This method will avoid generating a separate waste stream for decontamination water. The water used to spray the equipment will be minimal and will be allowed to evaporate. Paper towels will be disposed with used personal protective equipment and disposable sampling equipment. Waste generated during sampling activities will be managed in accordance with the *Waste Management Plan for ETTP Characterization and Closure Documentation East Tennessee Technology Park Oak Ridge, Tennessee* (BJC/OR-2124/R1).

4.5 SAMPLE IDENTIFICATION, LABELING, AND CHAIN OF CUSTODY

Sample labels, generated by the Project Environmental Measurement System (PEMS), shall be affixed to each sample container at the time of sample collection. The tags shall be waterproof paper or plastic with gummed backs or waterproof tags, as appropriate. Labels shall be completed with black indelible ink and shall include, at a minimum, the following information:

- unique sample number;
- sample matrix;
- analysis to be performed;
- date and time of collection; and
- sampler's initials.

A COC form shall be completed in accordance with BJC Technical Specifications for Field Equipment Calibration, Calibration Documentation, Field Logbook Preparation, COC Documentation and Field QC Sample Planning for sample documentation. The COC shall be generated from PEMS, shall clearly reference the building number and sample matrix, and shall be completed with the sampler's initials, date, and time of sample collection. The COC shall be placed in the cooler with the samples, and the cooler shall be sealed with custody tape.

4.6 SAMPLE STORAGE, PACKAGING, TRANSPORT, AND SAMPLE MANAGEMENT

Sample containers will be filled with care taken to prevent contamination from coming in contact with the lid threads prior to closure to prevent potential cross-contamination. Sample containers will be closed as soon as they are filled and will be labeled to include (at a minimum) sample number, sample date, sample time, collector's name, and requested analyses. Volatile organic analysis (VOA), semivolatile organic analysis (SVOA), metals (including Hg), PCB, and glycol samples will be chilled to 4°C immediately upon collection. Trip blanks will be analyzed for VOAs only.

All samples submitted for laboratory analysis will have surface Geiger-Mueller pancake reading and surface microR meter (e.g., sodium iodide) radiological measurements documented on the sample label and in the field logbook. These measurements are required to ensure compliance

with the U.S. Department of Transportation (DOT) regulations regarding shipment of samples. The samples will also be tested for properties necessary to properly class, describe, package, mark, and label the material for shipment as required under 49 *CFR* Part 173, *General Requirements for Shipments and Packagings*.

Samples shall remain under control of the samplers until released for shipment to an off-site laboratory. Samples shall be packaged for shipment, labeled, and transported in accordance with all DOT regulations. Samples may require shipment as hazardous for other constituents or contaminants. Only a certified shipper shall ship samples.

The condition of samples (e.g., containers intact, sample container identifications cross-referenced to COC) shall be checked and documented on the COC form prior to transport or shipment to and upon receipt by the analytical laboratory.

Following submittal of samples to the laboratory, copies of the COCs shall be forwarded to the sampling and analysis requestor.

4.7 FIELD QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

QC samples and QC measures shall include (at a minimum) those listed below.

- Duplicates will be collected at a frequency of 1 in every 20 samples for each type of analysis (metals, chemical, PCB, and radiological). Additional sample volume will be collected at locations to provide sufficient sample volume for the laboratory to perform a matrix spike (MS) and matrix spike duplicate (MSD) analysis.

- One rinsate blank will be collected for each 20 locations sampled. If dedicated sampling equipment is used, no rinsate samples will be required.

- Trip blanks are expected for this project when VOAs are requested. If samples are collected for VOAs, a trip blank will be sent in each shipping container with those samples.

- Field QC samples will be numbered in a blind manner to the extent practical.

4.8 DEVIATIONS AND EXCEPTIONS

Any sampling exception or deviation to this plan requires authorization from a Waste Management Representative. Authorization can be via telephone, verbal, or written instructions; telephone and verbal changes shall be documented by Technical Support Personnel and documentation placed in the project file. If no authorization can be obtained while the samplers are in the field, the deviation will be noted in the logbook. The Waste Management Representative will be contacted the same day and the deviation reviewed. Upon review, if the deviation does not adhere to project goals, the sampling event will be discarded and an alternate modified event will be scheduled.

5. ANALYTICAL REQUIREMENTS

Samples collected for laboratory analyses will be submitted to a Sample Management Office (SMO)- approved laboratory for analyses in accordance with the analytical methods presented in Table 4. The approved laboratory will be selected from the U.S. Department of Energy (DOE) Consolidated Audit Program-audited, SMO-approved laboratories listed on the Oak Ridge SMO Web page. The approved laboratory shall (1) possess an appropriate license issued by the U.S. Nuclear Regulatory Commission (NRC), (2) possess a license issued by an NRC-approved agreement state, or (3) be a DOE facility. The maximum allowable detection limits for the radionuclide and chemical analytical parameters are presented in Table 5. Detection limits are based on limits identified in one these documents: administrative limit for the EMWMF analytic waste acceptance criterion (DOE 2001); EMWMF auditable safety analysis-derived waste acceptance criterion (DOE 2001); twenty times the maximum concentration for the toxicity characteristic in a TCLP extract (40 CFR 261.24); and definition of a beryllium-containing material (BJC 2000).

5. ANALYTICAL REQUIREMENTS

Samples collected for laboratory analyses will be submitted to a Sample Management Office (SMO)- approved laboratory for analyses in accordance with the analytical methods presented in Table 4. The approved laboratory will be selected from the U.S. Department of Energy (DOE) Consolidated Audit Program-audited, SMO-approved laboratories listed on the Oak Ridge SMO Web page. The approved laboratory shall (1) possess an appropriate license issued by the U.S. Nuclear Regulatory Commission (NRC), (2) possess a license issued by an NRC-approved agreement state, or (3) be a DOE facility. The maximum allowable detection limits for the radionuclide and chemical analytical parameters are presented in Table 5. Detection limits are based on limits identified in one these documents: administrative limit for the EMWMF analytic waste acceptance criterion (DOE 2001); EMWMF auditable safety analysis-derived waste acceptance criterion (DOE 2001); twenty times the maximum concentration for the toxicity characteristic in a TCLP extract (40 CFR 261.24); and definition of a beryllium-containing material (BJC 2000).

Table 4. Analytical methods

Analysis	Preparation method required	Method	Minimum Parameters Required to be Reported	
TAL metals	NS	EPA – 6010/7470/7471	Antimony Arsenic Barium Beryllium Boron Cadmium Chromium Lead Manganese Mercury	Molybdenum Nickel Selenium Silver Strontium Thallium Tin Vanadium Zinc
TCLP metals	EPA-1311	EPA – 6010/7470/7471A	Arsenic Barium Cadmium Chromium	Lead Mercury Selenium Silver
PCBs (Aroclors)	NS	EPA – 8082	PCB-1016 PCB-1221 PCB-1232 PCB-1242	PCB-1248 PCB-1254 PCB-1260
Glycols	NS	EPA - 8015M	Propylene glycol	
Cyanides	NS	EPA – 9010/9012		
SVOA - full list	NS	EPA – 8270C	Acenapthene Acenapthylene Acetophenone Acrolein Benzoic acid Benzyl Alcohol Carbazole o-cresol m-cresol; p-cresol; or m + p cresol di-n-butylphthalate 1,2-dichlorobenzene 1,3-dichlorobenzene 1,4-dichlorobenzene Diethylphthalate 2,4-dimethylphenol Dimethylphthalate 2,4-dinitrotoluene 2,6-dinitrotoluene Hexachlorobenzene	Hexachlorobutadiene Hexachlorothane Isophorone 2-methylnapthalene Naphthalene 4-nitrobenzenamine Nitrobenzene 2-nitrophenol 4-nitrophenol Pentachlorophenol Propylene glycol Pyridine Phenol 1,2,4-trichlorobenzene 2,4,5-trichlorophenol 2,4,6-trichlorophenol N-nitrosodiphenylamine n-nitroso-di-n-propylamine 2,3,4,6-tetrachlororphenol
TCLP SVOA	EPA-1311	EPA – 8270C	o-cresol m-cresol; p-cresol; or m + p cresol Cresol 1,4-dichlorobenzene Hexachlorobenzene Hexachlorobutadiene	Hexachloroethane Nitrobenzene Pentachlorophenol Pyridine 2,4,5-trichlorophenol 2,4,6-trichlorophenol

Table 4. (Continued)

Analysis	Preparation method required	Method	Minimum Parameters Required to be Reported	
VOA – full list	NS	EPA – 8260B	Acetone Acetonitrile Acrylonitrile Benzene Bromodichloromethane Bromoform Bromomethane Butylbenzene Carbon tetrachloride Carbon disulfide Chlorobenzene Chloroform Chloromethane o-chlorotoluene Cumene Dibromochloromethane 1,2-dichloroethane 1,1-dichloroethylene 1,2-cis-dichloroethylene 1,2-trans-dichloroethylene Dichlorodifluoromethane 1,2-dichloropropane 1,2-dimethylbenzene 2,4-dinitrotoluene Ethylbenzene Ethylchloride	n-hexane 2-hexanone Methanol Methyl chloride methylcyclohexane Methyl ethyl ketone Methyl isobutyl ketone Methyl methacrylate 1-methyl-4-(1-methylethyl)-benzene (1-methylpropyl)benzene Propylbenzene Styrene 1,1,1,2-tetrachloroethane 1,1,2,2-tetrachloroethane Tetrachloroethane Toluene Trichloroethene Trichlorofluoromethane 1,2,3-trichloropropane Trimethylbenzene 1,2,4-trimethylbenzene 1,3,5-trimethylbenzene Vinyl chloride Xylene
TCLP VOA	EPA-1311	EPA – 8260B	Benzene Carbon tetrachloride Chlorobenzene Chloroform 1,2-dichloroethane 1,1-dichloroethylene	2,4-dinitrotoluente Methyl ethyl ketone Tetrachloroethylene Trichloroethylene Vinyl chloride
Gamma Spectroscopy Scan	NS	Gamma Spectroscopy *(Report any detected above MDA)*	Cs-137, Co-60, Eu-152, Eu-154, Ra-226, and any other isotope above MDA	
Alpha Spec.	Total dissolution	Alpha Spectroscopy	Am-241, Np-237, Pu-238, Pu-239/240, Th-230, Th-232, Total U and isotopes (U-233/U-234, U-235/236, U-238) Alpha Activity	
Total radioactive Sr	Total dissolution	Beta counting - Laboratory-specific procedures, which are consistent with DOE Environmental Measurements Procedure Manual (HASL-300).	Sr-90	
Tc-99	Total dissolution	Liquid scintillation	Tc-99	

Table 5. Maximum allowable detection limits

Analyte	Totals Detection Limit / (TCLP limit)	Units / (TCLP unit)
Radiological Constituents		
^{90}Sr	3.0	pCi/g
^{99}Tc	4.0	pCi/g
^{137}Cs	1.0	pCi/g
^{152}Eu	0.5	pCi/g
^{154}Eu	0.5	pCi/g
^{226}Ra	0.3	pCi/g
^{230}Th	0.3	pCi/g
^{232}Th	0.3	pCi/g
^{234}U	3.5	pCi/g
^{235}U	3.5	pCi/g
^{236}U	3.5	pCi/g
^{238}U	3.5	pCi/g
^{237}Np	0.3	pCi/g
^{238}Pu	0.3	pCi/g
^{239}Pu	0.3	pCi/g
^{241}Am	0.3	pCi/g
Semi-volatiles		
Acenaphthene	39,000	ug/kg
Acenapthylene	93,200	ug/kg
Acetophenone	330	ug/kg
Acrolein	11	ug/kg
Benzoic acid	9,810	ug/kg
Benzyl Alcohol	16,500	ug/kg
Carbazole	11,000	µg/kg
o-Cresol	232 (20)	µg/kg (mg/L)
m-Cresol	170 (20)	µg/kg (mg/L)
p-Cresol	170 (20)	µg/kg (mg/L)
Cresol, total	2000 (20)	µg/kg (mg/L)
Di-n-butylphthalate	190	µg/kg
1,2-Dichlorobenzene	9400	µg/kg
1,3-Dichlorobenzene	58,000	µg/kg
1,4-Dichlorobenzene	24,000 (0.75)	µg/kg (mg/L)
Diethylphthalate	6180	µg/kg
2,4-dimethylphenol	2150	µg/kg
Dimethylphthalate	30,700	µg/kg
2,4-Dinitrotoluene	10	µg/kg
2,6-Dinitrotoluene	8	µg/kg
Hexachlorobenzene	397,000 (0.013)	µg/kg (mg/L)
Hexachlorobutadiene	1000 (0.05)	µg/kg (mg/L)
Hexachloroethane	500 (0.30)	µg/kg (mg/L)
Isophorone	6100	µg/kg
2-methylnapthalene	4000	µg/kg
Naphthalene	9900	µg/kg
4-nitobenzenamine	230,000	µg/kg
Nitrobenzene	20 (0.20)	µg/kg (mg/L)
N-nitrosodiphenylamine	1100	µg/kg
N-nitroso-di-n-propylamine	1	µg/kg

Table 5. (Continued)

Analyte	Detection Limit	Units
2-nitrophenol	160,000	µg/kg
4-nitrophenol	850	µg/kg
Pentachlorophenol	1000 (10)	µg/kg (mg/L)
Phenol	3200	µg/kg
Pyridine	22 (0.5)	µg/kg (mg/L)
1,2,4-Trichlorobenzene	5100	µg/kg
2,4,5-Trichlorophenol	1000 (40)	µg/kg (mg/L)
2,4,6-Trichlorophenol	22 (0.2)	µg/kg (mg/L)
2,3,4,6-tetrachlororphenol	10,800	µg/kg
Volatiles		
Acetone	135	µg/kg
Acetonitrile	13	µg/kg
Acrylonitrile	21	µg/kg
Benzene	200 (0.05)	µg/kg (mg/L)
Bromodichloromethane	10	µg/kg
Bromoform	16	µg/kg
Bromomethane	35	µg/kg
Butylbenzene	1510	µg/kg
Carbon tetrachloride	66 (0.05)	µg/kg (mg/L)
Carbon disulfide	710	µg/kg
Chlorobenzene	330 (10)	µg/kg (mg/L)
Chloroform	40 (0.6)	µg/kg (mg/L)
Chloromethane	44	µg/kg
o-chlorotoluene	450	µg/kg
Cumene	40,800	µg/kg
Dibromochloromethane	11	µg/kg
1,2-dichloroethane	660 (0.05)	µg/kg (mg/L)
1,1-dichloroethylene	660 (0.07)	µg/kg (mg/L)
1,2-cis-dichloroethylene	150	µg/kg
1,2-trans-dichloroethylene	62	µg/kg
Dichlorodifluoromethane	6,000	µg/kg
1,2-dichloropropane	11	µg/kg
1,2-dimethylbenzene	75,600	µg/kg
2,4-dinitrotoluene	2,150 (0.013)	µg/kg (mg/L)
Ethylbenzene	4,900	µg/kg
Ethylchloride	22	µg/kg
n-Hexane	53,000	µg/kg
2-Hexanone	21,000	µg/kg
Methanol	1,100	µg/kg
Methyl chloride	20	µg/kg
Methylcyclohexane	36,000	µg/kg
Methyl ethyl ketone	200 (10)	µg/kg (mg/L)
Methyl isobutyl ketone	170	µg/kg
Methyl methacrylate	3,300	µg/kg
1-methyl-4-(1-methylethyl)-benzene	15,100	µg/kg
(1-methylpropyl)benzene	15,100	µg/kg
Propylbenzene	15,100	µg/kg
Styrene	16,000	µg/kg
1,1,1,2-tetrachloroethane	7	µg/kg
1,1,2,2-tetrachloroethane	5	µg/kg

Table 5. (Continued)

Analyte	Detection Limit	Units
Tetrachloroethene	440 (0.07)	µg/kg (mg/L)
Toluene	49,000	µg/kg
Trichloroethene	780 (0.05)	µg/kg (mg/L)
Trichlorofluoromethane	2300	µg/kg
1,2,3-trichloropropane	1.6	µg/kg
Trimethylbenzene	22,000	µg/kg
1,2,4-trimethylbenzene	21,800	µg/kg
1,3,5-trimethylbenzene	26,000	µg/kg
Vinyl Chloride	2 (0.02)	µg/kg (mg/L)
Xylene (mixture of isomers)	35,000	µg/kg
Polychlorinated biphenyl		
PCB, total	1,000	µg/kg
Cyanides		
Cyanide	8,100	µg/kg
Glycols		
Propylene Glycol	1100	µg/kg
Metals		
Aluminum	3	mg/kg
Antimony	3	mg/kg
Arsenic	2 (0.5)	mg/kg (mg/L)
Barium	0.5 (10)	mg/kg (mg/L)
Beryllium	0.1	mg/kg
Boron	3	mg/kg
Cadmium	0.5 (0.1)	mg/kg (mg/L)
Chromium	2 (0.5)	mg/kg (mg/L)
Copper	3	mg/kg
Lead	2 (0.5)	mg/kg (mg/L)
Manganese	4	mg/kg
Molybedenum	2	mg/kg
Mercury	0.2 (0.02)	mg/kg (mg/L)
Nickel	3	mg/kg
Selenium	2 (0.1)	mg/kg (mg/L)
Silver	1 (0.5)	mg/kg (mg/L)
Strontium	3	mg/kg
Thallium	3	mg/kg
Tin	5	mg/kg
Vanadium	3	mg/kg
Zinc	3	mg/kg

Target detection limits are intended to be at or below regulatory levels or WAC. Actual detection limits can be sample-specific, especially in the case of samples having complex matrices, but the data measurement objective is to obtain data with detection limits adequate to satisfy these levels.

6. DATA MANAGEMENT AND VALIDATION

Data management practices will be consistent with the requirements of the Data Management Implementation Plan for the ETTP Closure Project (BJC 2003). The PEMS

database will be used for sample planning, generating COC records and sample labels, sample tracking, and as an interim repository for sample results. The laboratory will provide analytical results in electronic and hard-copy format. Analytical data will be subject to contract compliance verification and validation.

6.1 DATA DELIVERABLES

The laboratory will submit electronic data using the Analytical Master Specification Electronic Deliverable (AMSED) format. The laboratory will load the data directly into PEMS by internet connection. In addition to the AMSED deliverables, the laboratory will submit full hard-copy data packages (results, summary QC, and all raw data) for all analyses. The AMSED format and data package components are defined in the following documents:

- *AMSED EDD Format, BJC Site-Specific Requirements*, "Exhibit E: Technical Specifications."

- "Data Package Components," *DOE Integrated Contractor Procurement Team Requirements, Basic Order Agreement, Attachment 1: SOW for Analytical Services.*

These documents are available from the BJC SMO.

Analytical results shall be provided via fax and/or e-mail and complete data package provided within 14 calendar days of receipt of all samples submitted to the laboratory. Standard turnaround time for hard-copy and AMSED deliverables is 30 calendar days. Expedited turnaround time, as identified above, may be directed by the Laboratory Coordinator at the direction of the Project Manager. One hard-copy data package and one CD for each data deliverable shall be provided to the Data Manager and one CD to the SMO.

6.2 DATA VERIFICATION AND VALIDATION

To ensure the quality of analytical data, results will receive 100% verification and 100% validation. All data will be validated at Level 3 using QC forms. If QC failures indicate a systemic failure of the analytical process or severe matrix effects causing rejection of data, the level of validation will be increased to full validation. No rejected results will be used for any purpose, and the need for re-analysis shall be assessed. Deficiencies and deviations identified during review, verification, validation, and assessment shall be documented. All validation qualifiers will be entered into PEMS Verification and assessment shall include determination of the following:

- Were the DQOs and sampling design sufficient to provide enough information for the current decision?

- Are data complete as planned?

- Have comments and/or data qualifiers from field and laboratory technicians and supporting information been considered in determining usability of the data?

- Are duplicates and QC sample results acceptable?

- If applicable, does data validation indicate that data are useable?
- Have the impacts of holding time violations (if any) been evaluated?
- Are analytical detection limits below or at regulatory or action limits?
- Are data reasonable when compared to known or expected parameter levels?
- Based upon previous data reviews and results of the above questions, are data of adequate quality to be used?

Laboratory data validation will comply with *National Functional Guidelines for Organic Data Review* (EPA 1999), *National Functional Guidelines for Inorganic Data Review* (EPA 2004), and *Evaluation of Radiochemical Data Usability* (DOE 1997).

6.3 DATA MANAGEMENT AND CONFIGURATION CONTROL

Once the analytical data is received from the laboratory, it will be verified and validated. After data validation and resolution of issues with the laboratory, the new data will be evaluated to determine the representative average concentrations of analyte in the wastes. Resulting data sets will be evaluated to determine acceptability at the appropriate disposal facility.

Data reports along with all other records, including but not limited to checklists, Field Sampling Logbook, COCs, calculations, verification and validation reports, and any surveillance reports, shall be maintained as official project records and submitted to the project file station.

6.4 USE OF DATA

Upon acceptance of the sampling and analysis data, the results shall be compiled and utilized along with process knowledge to definitively classify waste for disposal.

Data reports along with all other records, including but not limited to checklists, Field Sampling Logbook, COCs, calculations, verification and validation reports, and any surveillance reports, shall be maintained as official project records and submitted to the project file station.

7. REFERNCES

BJC 2003. *Data Management Implementation Plan for the East Tennessee Technology Park Closure Project, Oak Ridge, Tennessee.* BJC/OR-1626, Oak Ridge, TN.

EPA 1999. *National Functional Guidelines for Organic Data Review,* EPA540/R-99/008, U.S. Environmental Protection Agency, Washington D.C.

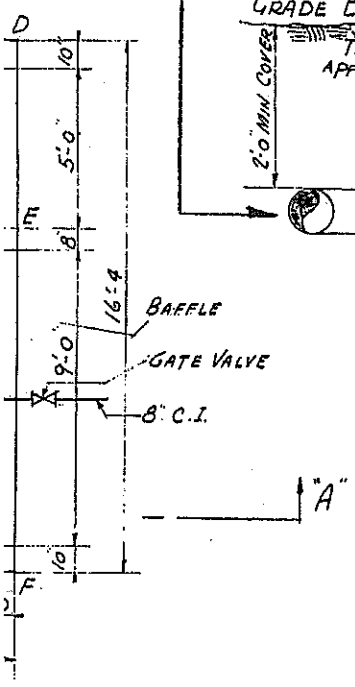
EPA 2001. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual,* U.S. Environmental Protection Agency, Athens, Georgia

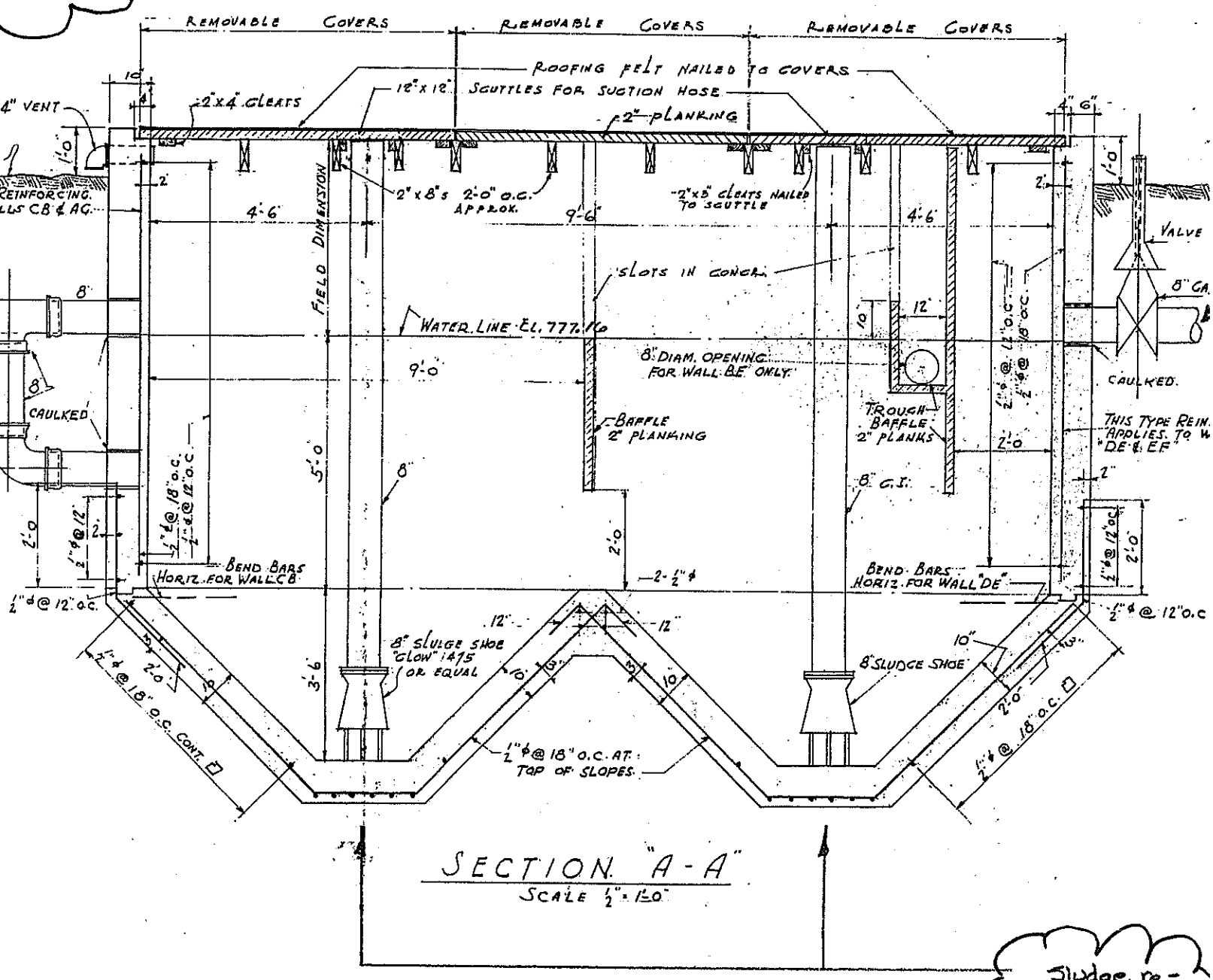
EPA 2004. *National Functional Guidelines for Inorganic Data Review*, EPA 540-R-04-004, U.S. Environmental Protection Agency, Washington D.C.

DOE 1997. *Evaluation of Radiochemical Data Usability,* es/er/ms-5, U.S. Department of Energy, Oak Ridge, Tennessee.

Appendix B- Attachment 4

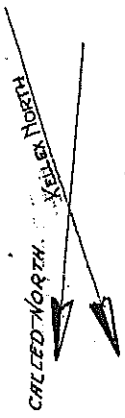
This piping is in the waste





SECTION "A-A"
SCALE 1/2" = 1'-0"

Sludge removal piping is not in waste

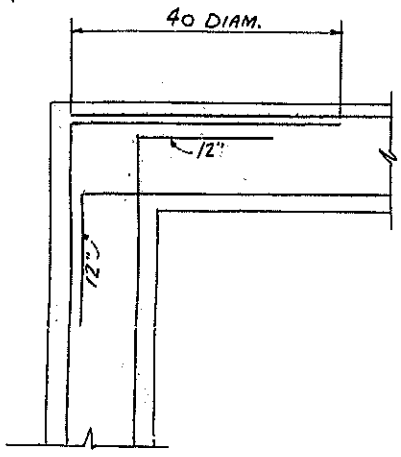


NOTES:

CONCRETE ULTIMATE STRENGTH AT 28 DAYS. 2500 #/SQ. IN.
ALL REINFORCING TO BE DEFORMED BARS AND LAPPED 40 DIAM. WHERE CONTINUOUS.
DIMENSIONS FROM FACE OF CONCRETE TO REINFORCING STEEL ARE CLEAR DISTANCES.
ALL PIPING SHOWN DIAGRAMMATICALLY ONLY: EXACT LOCATION TO BE DETERMINED IN THE FIELD

REFERENCE DRAWINGS:

1015-K-30-AA	FOUNDATION PLAN & DETAILS.
1015-K-30-BA	FLOOR PLAN & DETAILS.
1015-K-30-CA	ELEVATIONS & DETAILS.
1015-K-30-DA	SECTIONS & FRAMING PLAN.
1015-K-30-FA	MISCELLANEOUS DETAILS.
1015-K-30-GA	PLUMBING PLAN & SECTIONS.
1015-K-30-HA	HEATING PLAN.



TYPICAL CORNER REINFORCING
HORIZONTAL REINF.
- NO SCALE

PRG	VNDR CODE	TYPE	SUBJECT	PLT	BLDG/LOC	FLR
3N	2447	SCS		11	1015	0

LAUNDRY SCUM PIT DET
CODE FILE

CLASSIFICATION CHANGED TO UNCLASSIFIED
By authority of D. A. Napolitan, 2-3-71
By J. A. Brodey Date 2-10-71

[redacted] COPY NUMBER UNCLASSIFIED

NO.	DESCRIPTION	DATE	BY	CHECKED

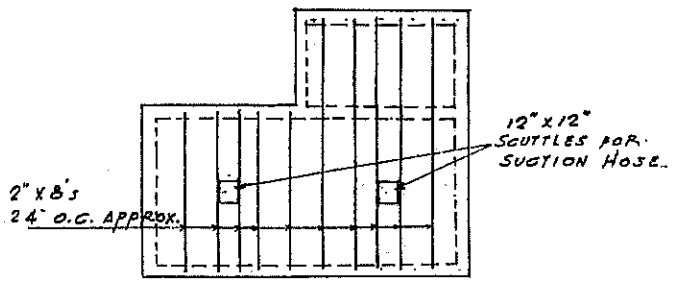
REVISIONS

THE KELLEX CORPORATION

FOR
LAUNDRY BUILDING K 1015
SCUM PIT - DETAILS

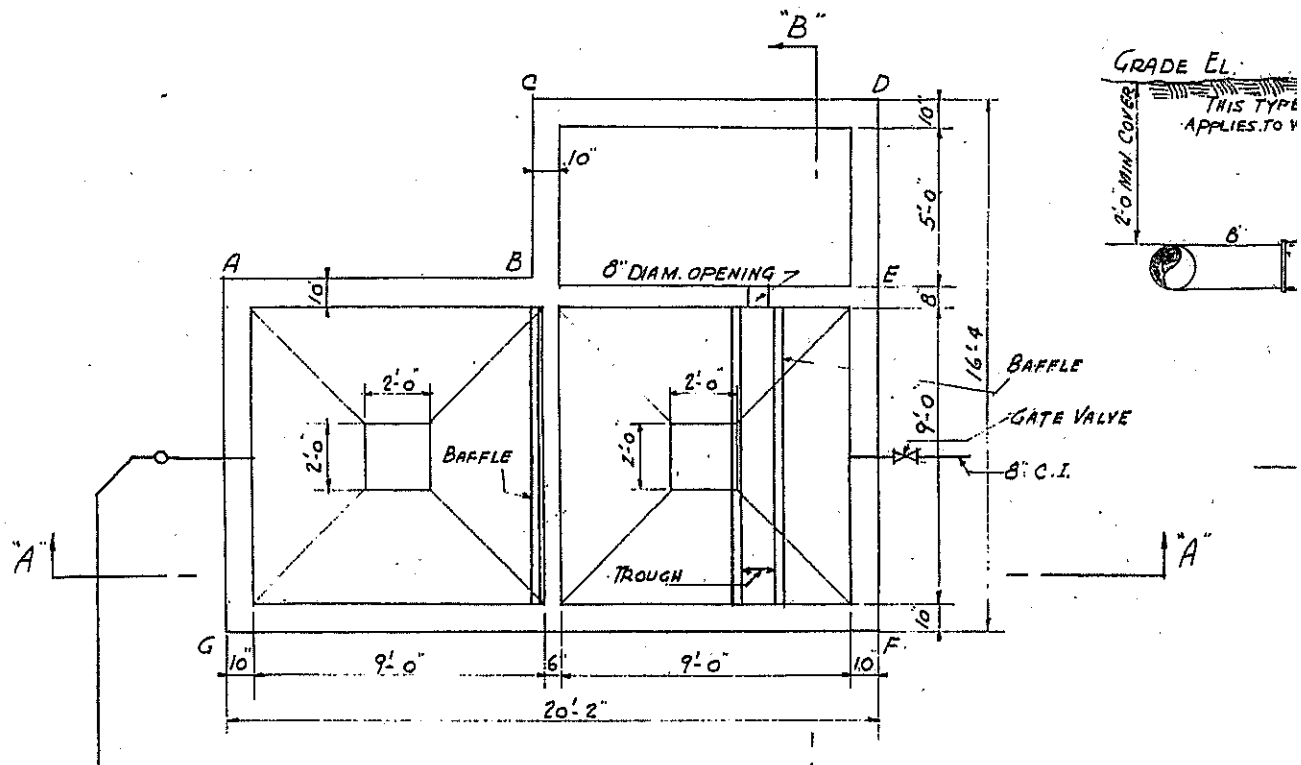
DRAWN A.S. MILLER JR. TRACED SCALE AS SHOWN DATE 12
CHECKED F.M. Turcel
APPROVED H.W. DEAN 12-1-45 NO. 1015-K-30 EA

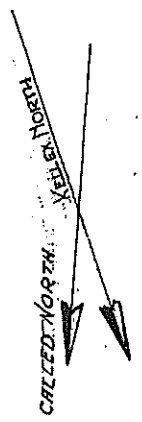
APPROVED

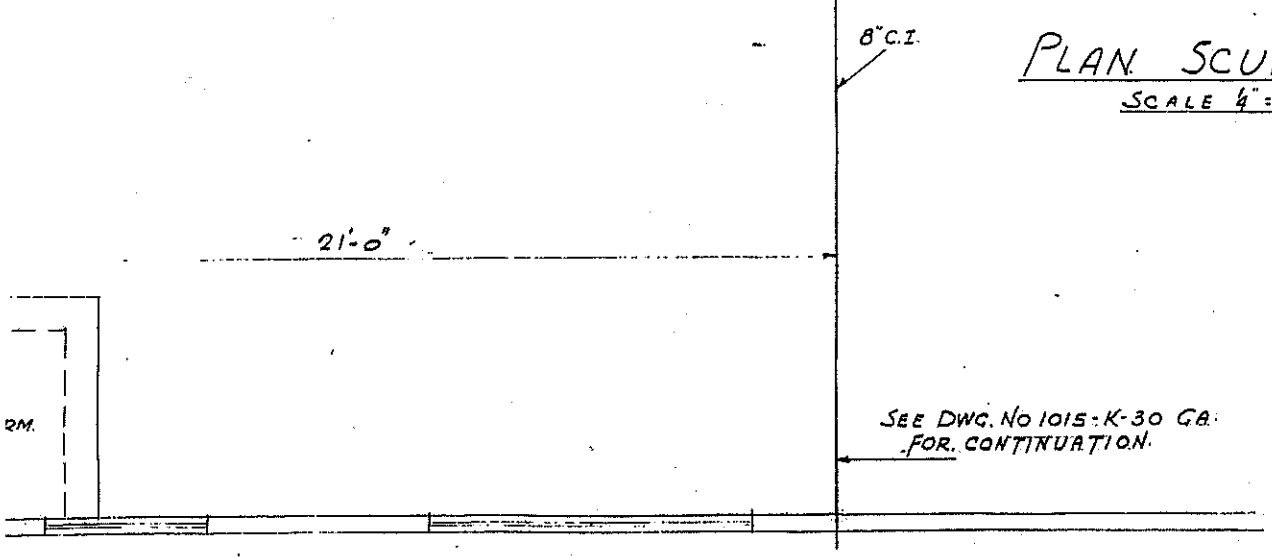


COVER FRAMING PLAN

1/8" = 1'-0"

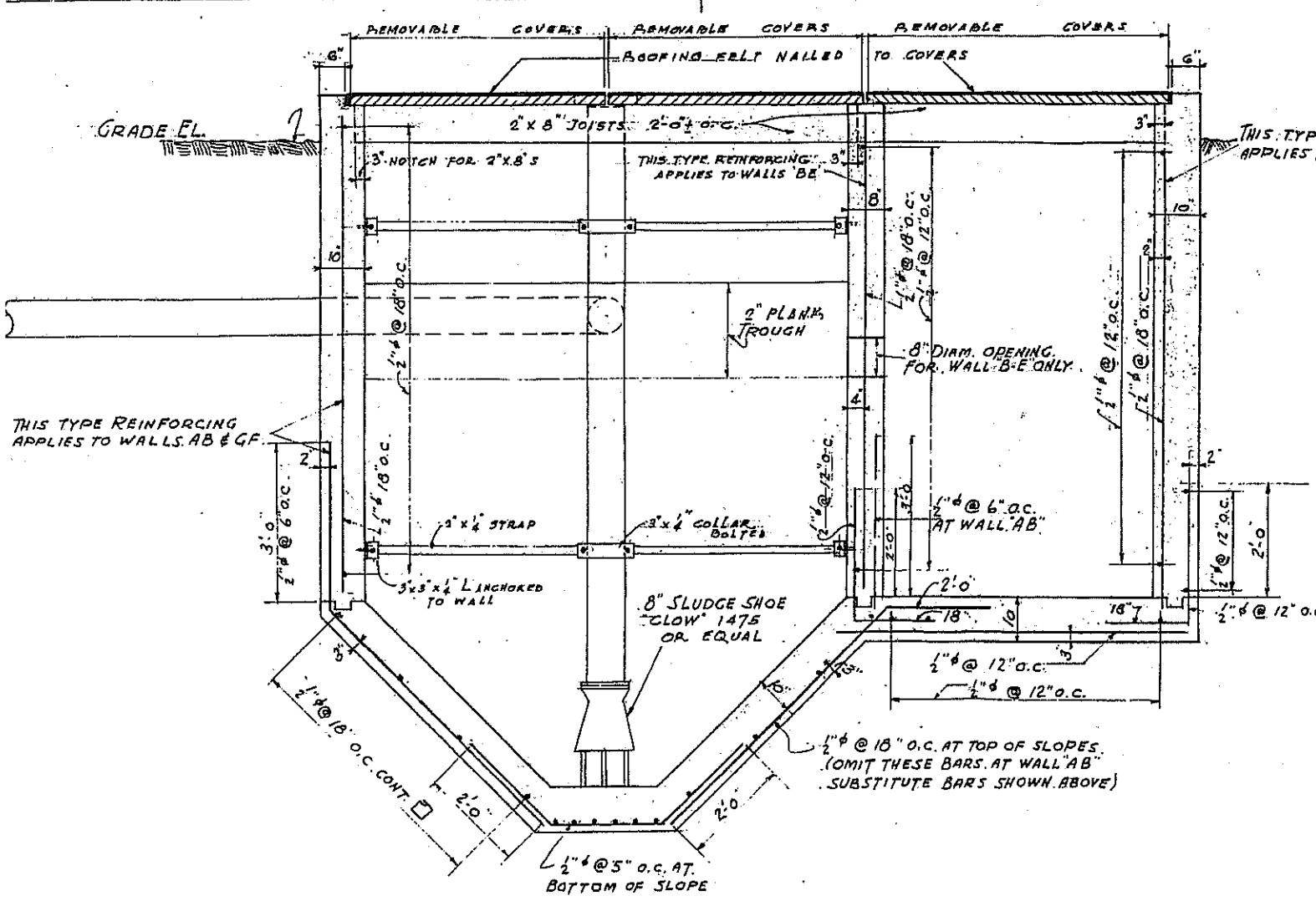






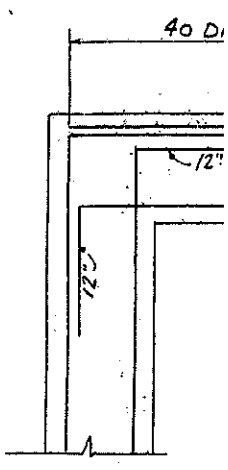
PLAN SCUM PIT

SCALE 4" = 1'-0"



SECTION "B-B"

1/2" = 1'-0"



TYPICAL COR

HORIZ
NO

C

Appendix B- Attachment 5

Core Team Agreement Log #: 197
Area: Zone 2 South Park DQO Scoping Package
EU Z1-33, Z1-34, and Z1-43
FCN-ETTP-Zone 2-063

Core Team Concurrence

The following is proposed for adding BOS Labs dilution pit wastes to the Zone 2 Waste Handling Plan (WHP).

Area: Zone 2 – South Park EU Z2-33 adding BOS Labs dilution pit waste to the Zone 2 WHP.

Change(s):

As discussed during the June 27, 2007 Remedial Action Core Team meeting, the *Waste Handling Plan, Part II, for the Consolidated Soil and Waste Sites within Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee* (DOE/OR/01-2328&D1) states a consolidated uniform waste profile would be prepared for the disposal of waste from multiple sites within Zone 2 at the East Tennessee Technology Park (ETTP).

The WHP estimated the remediation sites will generate a total of approximately 86,500 yd^3 of solid waste, and that the waste from the combined sites would be disposed as one waste lot at the Environmental Management Waste Management Facility (EMWMF). The WHP further stated that aqueous liquids would be removed and discharged to the ground surface or sent to the Central Neutralization Facility (CNF) or its replacement facility for disposal.

As presented during the June 27, 2007 Remedial Actions Core Team meeting, the consolidated waste lot concept is not working and the uniform waste profile will not be prepared. Each of the projects identified for inclusion in the uniform profile will be addressed under separate waste profiles. The Core Team agreed that that a concurrence form will be completed to document this Core Team discussion and revisions, and that an addendum to the WHP will be completed and approved at the completion of the Zone 2 work.

FCN-ETTP-Zone 2 -053 approves three waste profiles for:

- the K-1015 laundry pit and immediately surrounding inlet/outlet piping and soil;
- the remainder of the acid dilution pits and immediately surrounding inlet/outlet piping and soil; and
- the #106 location (near the K-1004-J lab) soils.

Solids wastes generated from the Remedial Action of the BOS Labs dilution pits includes the pits, associated inlet and outlet piping, and dilution pit #316 soil, and soil from near Building K-1004-J. The waste types, planned disposal method, and estimated volume for each type of waste expected to be generated during the BOS labs dilution pit and K-1004-J lab RA is identified in Table 1 below.

Core Team Agreement Log #: 197
Area: Zone 2 South Park DQO Scoping Package
EU Z1-33, Z1-34, and Z1-43
FCN-ETTP-Zone 1-063

Table 1. Summary of Waste from Zone 2 BOS Labs dilution pit and K-1004-J soil Remedial Actions

Waste Type	Disposal Location	Disposal Volume
Acid Dilution and K-1015 Laundry Pits (including inlet/out piping and secondary waste)	EMWMF	74 cu yd
Acid Dilution Pit #316	Energy Solutions of Utah	7 cu yd
Acid Dilution Pit contents (liquid, solids, and secondary waste)	Energy Solutions of Utah	23 cu yd
Laundry Pit Contents	Energy Solutions of Utah	69 cu yd
Soil (K-1004-J RA)	EMWMF	121 cu yd*
Soil (acid dilution pit #316)	Energy Solutions of Utah	33 cu yd

*24 cu yd are from the location in EU Z2-33, and 97 cu yd are from 2 similar locations across the road in EU Z2-42 previously approved for RA in the Zone 2 2006 PCCR.

Concurrence:

U.S. Department of Energy — Date: 9/5/07

Tennessee Department of Environment and Conservation — Date: 9/4/07

U.S. Environmental Protection Agency — Date: 8/29/2007

Appendix B- Attachment 6

Davenport, John M (MDN)

From: Hanahan, Douglas W. (HGG)
Sent: Wednesday, June 04, 2008 1:25 PM
To: Davenport, John M (MDN)
Subject: FW: EMWMF WAC Attainment Team Comments on the K-1015-A Laundry Pit Waste

---

From: Sanchez, Santiago (ZZS)
Sent: Wednesday, June 04, 2008 12:50 PM
To: Hanahan, Douglas W. (HGG)
Subject: RE: EMWMF WAC Attainment Team Comments on the K-1015-A Laundry Pit Waste

Doug;
There is no other material staged/mixed with the laundry pit material. There are some pipes (metal) included in the material.

Santi Sanchez
ETTP Field Services
Phone (865)241-8091
Fax (865)574-2717
Pager (865)417-1967

From: Hanahan, Douglas W. (HGG)
Sent: Wednesday, June 04, 2008 10:56 AM
To: Sanchez, Santiago (ZZS)
Subject: FW: EMWMF WAC Attainment Team Comments on the K-1015-A Laundry Pit Waste

Santi,
Really need this, something simple like the material from the laundry pit was staged as such and no other waste was introduced into the pile.

Thanks

From: Davenport, John M (MDN)
Sent: Thursday, May 29, 2008 7:38 AM
To: SANTIAGO, S. (2S6)
Cc: 'Jamie Raymer'; Hanahan, Douglas W. (HGG)
Subject: EMWMF WAC Attainment Team Comments on the K-1015-A Laundry Pit Waste

Santi-
We have received the following comment from the WAT during their review of the subject EMWMF profile. " What documentation exists that confirms that staged waste is only from the K-1015 Laundry Pit?" Can you please provide me an e-mail (or some other form of documentation) stating that the debris pile at the former K-1015 Facility location is only from the remediation of the K-1015-A Laundry Pit?

Also, three questions on the same waste. Does this debris pile contain any piping (such as from the inlet and the outlet from the Laundry Pit)? If so, what is it made of (metal, PVC, concrete, terra cotta)? If its metal, what diameter?

Thank you
Marshall Davenport (576-8049 or 310-8895)

Davenport, John M (MDN)

From: Devol, Bob (RD5)
Sent: Thursday, May 29, 2008 6:08 PM
To: Davenport, John M (MDN)
Subject: RE: WAC Attainment Team Comments on the K-1015-A Laundry Pit Waste

The quick and dirty reply is No. There is no reason to from the IH side.

Bob

From: Davenport, John M (MDN)
Sent: Thu 5/29/2008 3:00 PM
To: Devol, Bob (RD5)
Subject: RE: WAC Attainment Team Comments on the K-1015-A Laundry Pit Waste

One clarifying question to get your answer in the profile. Do you expect to monitor organics during the loading of this waste?

From: Devol, Bob (RD5)
Sent: Thursday, May 29, 2008 12:54 PM
To: Davenport, John M (MDN)
Subject: RE: WAC Attainment Team Comments on the K-1015-A Laundry Pit Waste

Marshall,

I don't know who is making the assertion that PID readings are required or routinely collected during the generation of waste. Unless there is a rationale for suspecting that organics are present in the waste in a sufficient concentration to pose a personal exposure issue, Industrial Hygiene would not necessarily collect PID readings. I am not aware of there ever being a requirement for IH to collect PID readings for anomaly detection on any project.

I was not assigned to the remediation work at K-1015-A when the Laundry Pit was remediated. However, I did find where PID readings were collected when the pit was opened. According to the IHAS reports, Quick Solid was poured into pit and mixed with the pit sludge. The sludge was then loaded into ST-90 boxes. The soil pile pile from this area, I assume is soil from the pit once the sludge was removed. If in fact this is the case, the pile as you mentioned in your e-mail has been out open to the environment for several months uncovered and based on that and the levels detected during the handling of the pit sludge, which were low (the highest reading being 2.5 mg/m3), I would not expect there to be any significant VOCs remaining in the soil pile. I am attaching the PID reading were where collected during the sludge removal operation.

<< File: PID Sample Results K-1015.doc >>

If you have questions or need further assistance, please contact me.

Bob Devol
BJC Industrial Hygiene

From: Davenport, John M (MDN)
Sent: Thursday, May 29, 2008 8:06 AM

To: Devol, Bob (RD5)

Cc: 'Jamie Raymer'; Hanahan, Douglas W. (HGG)

Subject: WAC Attainment Team Comments on the K-1015-A Laundry Pit Waste

Bob-
We have received the following comment on the subject waste lot profile. "It is unusual to state that PID readings are not required. Were PID readings taken during prior waste generation activities? If so, add that information to Appendix B and not whether any positive indications were seen on the instruments." This comment is referring to the use of PIDs during the waste loading activities to possibly indicate that anomalous levels of organics are in the waste.

My question is- are you expecting to use PIDs at the former K-1015-A Laundry Pit site during waste loading activities for IH purposes? If so, we can take credit for that usage in the profile's Anomaly Detection Plan. However, I suspect that you aren't. Here are the reasons: 1) there have never been any detections of organics in any data and organics were not identified as Site Related Contaminants in the profile, 2) the waste is not containerized- it is currently in a pile and although it is covered now, was left uncovered for several months before it was covered, and 3) PIDs were initially used on the on the BOS Labs Acid Pits waste when the intermodals were opened, but their use was discontinued because of lack of detections.

Are there any PID data for the Laundry Pit waste? Were PIDs in use when the Laundry Pit was remediated? That could be additional information to support your decision.

Although the comment states that it is unusual to not require PIDs for anomaly detection, the BOS Lab Acid Pits profile specifically stated that they were not required in its ADP.

Thank you,
Marshall

Appendix B- Attachment 7

OAK RIDGE PROGRAM DIVISION DOCUMENT REVIEW FORM

DOCUMENT TITLE: Environmental Management Waste Management Facility Waste Lot Profile 155.5 for the K-1015 Laundry Pit, East Tennessee Technology Park, Oak Ridge, Tennessee.	DATE COMMENTS ARE DUE: Received: May 2, 2008
DOCUMENT NUMBER: **BJC/OR-3005**	
NAME OF REVIEWER: WAC Attainment Team POC: John Hampshire, o57@bechteljacobs.org	DATE COMMENTS TRANSMITTED May 28, 2008
ORGANIZATION: BJC/EMWMF WAC Attainment Team	

COMMENT CODE

D = Deficiency of some type; cite applicable regulation(s)	C = Clarification or additional information needed; response may be in summary of comment responses and/or next version of document	E = Editorial comments will be noted and corrected, but dropped from the summary of comment responses

COMMENT NO.	SECT/ PAGE	COMMENT	RESPONSE	ACCEPT/REJECT
1	Pg. 4/ Section 2.4	C – In second paragraph discuss what media was sampled for RCRA characteristics. It does not appear that soil was analyzed for TCLP metals or SVOCs.	Four (4) TCLP metals and SVOCs samples were collected for debris. No soil TCLP samples are available. However, the pit is ~80% of the waste volume and the most likely source for any TCLP contamination. Further, there were zero detects for VOCs or SVOCs in this data set, which is additional evidence of the absence of these constituents. The referenced paragraph has been modified to include this clarification.	
2	Pg. 6/	C – Rewrite to clarify that the TSCA compliance determination was based on	The requested facts are in this section. This	

REVIEWED BY:	RESPONSE BY:

COMMENT NO.	SECT/ PAGE	COMMENT	RESPONSE	ACCEPT/REJECT
	Section 2.5	the wastes not being TCA regulated, which was determined based on two facts: PCBs < 1 ppm and no new PCBs introduced into the wastes.	comment and the requested revision were discussed with S. Creasey (Project EC) and it was determined that the third and fourth sentences in the section were not necessary and were deleted. S. Creasey is in agreement with the revised section and this response.	
3	Pg. 9/ Section 3	C – PK documents state that inlet and outlet piping is included with the pit? Does any piping exist in this waste lot?	The inlet and outlet piping is in the waste (expected diameter 8 inches). This piping is represented and indicated on drawings in Appendix B. It will be shipped in accordance with the PWAC (crushed and size-reduced, segregated, and shipped in a separate dump truck). Pipe has been added to the "Expected waste types" on the checklist. Appropriate potentially anomalous conditions covering the piping have been added to the checklist.	
4	Pgs 9 & 10/ Section 3	Sampling and Analysis questions: C – The attached SAP states that one grab soil sample would be collected from the soil surrounding the pit that was removed. Specifically, page 5, Sec. 4.1, 2nd par. – states that one soil sample will be collected from each debris pile or intermodal. Was this done? C - How are the 8 historical DVS soil samples representative? Provide/reference map that shows these sampling locations. E - In the analysis column of Table 4, indicate what analyses were obtained from each sample ID.	Sample BOSLABS717 was collected below the pit. See revised profile Table 4. The 8 historical DVS soil samples are representative because they are from soils directly around the K-1015-A Laundry Pit. These samples were collected via the DVS strategy under the BJC RA project and provide data for radiological, PCBs, metals, SVOCs and VOCs. Table 4 has been revised to indicate what analyses were obtained from each sample ID. Also, Appendix G is sorted by location ID and sample ID and the analyses per analyte are presented.	

REVIEWED BY:	RESPONSE BY:

COMMENT NO.	SECT/ PAGE	COMMENT	RESPONSE	ACCEPT/REJECT
		C - What level of V&V was performed on the soil data? C – Please verify and provide statements in profile that concrete samples collected and analyzed per ASTM standards (e.g., ASTM D 4547-06, *Standard Guide for Sampling Waste and Soils for Volatile Organic Compounds*).	The soil data were validated 100%. Reference added in Section 3, paragraph 5. Concrete samples were not analyzed for volatile organic compounds.	
5	Pg. 10/ Section 3	C – At the top of the page, the text states that, "No organics above (or even near) remediation levels were detected in pit sludge, water, or surrounding soils." While this may be important for excavation planning, there are numerous organics for which max RLs are greater than the nominal EMWMF analytic WAC. Were any organics detected at levels below max RLs? A later sentence seems to state so, but as-is the language is confusing.	The SAP Section 2, paragraph 2 states: "While the Laundry was in operation the settling pit was periodically cleaned out. Based on the analytical data used to characterize the contents of this pit, radiological isotopes are the primary contaminants of concern for the pit, and more specifically uranium. Existing data also indicates that semi-volatiles and metals are also contaminants of concern for the pit contents, but not at concentration that would cause a Resource Conservation and Recovery Act (RCRA) concern. In addition, there are no RCRA listed F-codes associated with the laundry pit contents based on a documented RCRA listed waste determination. Since the contamination of the pit, originated from the pit contents the contaminants of concern are: radiological isotopes, metals, and semi-volatiles." Interviews with previous BJC RA project employees stated that VOCs were not COCs because they were never detected or even near remediation levels. The absence of VOCs is substantiated by the 1 soil sample with VOC analyses (BOSLABS717), which was 100% non-detected for VOCs. The referenced paragraph has been modified to	

REVIEWED BY:	RESPONSE BY:

COMMENT NO.	SECT/ PAGE	COMMENT	RESPONSE	ACCEPT/REJECT
			more clearly state these facts.	
6	Pg. 12/ Section 4.1	C – In last sentence add…"since the ASA SOF is less than 0.05 no further consideration is necessary."	Text added.	
7	Pg. 12/ Table 5	E – What is purpose of the * for "*Eu-155"?	Maximum value for Eu-155 used because only 1 sample value available and cannot calculate a UCL-95. Clarification added.	
8	Pg. 15/ Sctn. 5.12	D – EMWMF-BV-13-01 (liner variance) does not apply to size-reduced concrete and soil. Please revise accordingly.	The referenced variance is included because it applies to the transport of the concrete debris (with some extruding rebar) to the EMWMF for direct placement and subsequent grouting by EMWMF Operations (a second variance has been approved covering the transport and disposal of the extruding rebar). This approach is consistent with the transport and disposal of similar debris in W.L. 155.4 and has been approved by EMWMF Operations. E-mail documentation of this approval can be provided upon request.	
9	App A	C – Knowing that the waste is currently staged in intermodals, describe the process that will be used to unload, inspect and repackage this waste into dump trucks for bulk disposal. Why does the Risk Scoring Checklist not address the fact that waste was generated by others and packaged into interim storage containers? C – What documentation exists that confirms that staged waste is only from the K-1015 Laundry Pit? C – Section A.1.4 – Why is "may be conducted" used instead of "will be conducted". Either an initial assessment must be performed and documented, or an explanation must be given as to why one is not required.	The waste is not packaged in intermodals. It is in a pile at the former location of the K-1015 facility. Loading of this material into dump trucks will be observed by a Project WPS. Any anomalous waste that is observed will be removed or size-reduced, crushed, etc. as necessary to meet the PWAC. An e-mail from S. Santiago (WSMS- the company that generated the waste) has been added to Appendix B stating that no other waste is staged/mixed with this waste. Text revised to "will."	

REVIEWED BY:	RESPONSE BY:

COMMENT NO.	SECT/ PAGE	COMMENT	RESPONSE	ACCEPT/REJECT
10	Checklist	C – Need to address rebar and how it should be expected and packaged. C – Add unbreached "containers" C – Suggest describing the concrete debris limitations of 1-foot in any dimension. C – It is unusual to state that PID readings are not required. Were PID readings taken during prior waste generation activities? If so, add that information to Appendix B and note whether any positive indications were seen on the instruments.	Rebar in this waste lot will be managed in the same manner as W.L. 155.4 (see response to Comment #8). Since it will all be sent for disposal under an approved variance, it does not need to be addressed in the ADP. Text not revised- waste is not containerized and will be shipped in bulk (not containerized). Oversized concrete debris is acceptable under the approved variance EMWMF-VR-12x. This is consistent with the W.L. 155.4 profile. PID readings were taken when the Laundry Pit was opened. Based on those readings and other relevant information such as: there have never been organics detected in any sampling data and were not identified as Site Related Contaminants in this profile, the waste is not containerized- it is currently in a pile and although it is covered now, was left uncovered for several months before it was covered, and PIDs were initially used on the BOS Labs Acid Pit wastes when the intermodals were opened, but their use was discontinued because of lack of detections upon opening, Project IH has determined that PIDs will not be required on-site during waste loading activities. Therefore, PIDs will not be installed to potentially identify anomalous conditions in the waste. The PID readings, plus e-mail correspondence with Project IH documenting this decision, have been added to Appendix B.	
11	App B	C – Since Lisa Shipe's email is being used for the listed waste determination, please add her name to the signature page for this profile.	The listed waste determination was made by Scott Creasey. There is an e-mail from him in Appendix B. In the past, this level of documentation has been adequate. S. Creasey has reviewed this	

REVIEWED BY:	RESPONSE BY:

COMMENT NO.	SECT/ PAGE	COMMENT	RESPONSE	ACCEPT/REJECT
			response and has determined it to be adequate.	
12	App B	E – The BOS Lab Acid Pits...map needs to highlight the sample(s) relevant to this profile and delete others. Based on this review, only one sample location appears to be relevant to this waste lot.	The map has been removed because it cannot show where the multiple samples of the pits were taken (it would only show a single sample location at the pits- which is obvious). The SAP required that samples be collected of any stained pieces of debris and at elevated areas of radiological contamination (or randomly if no staining was visible or no elevated rad areas were detected). Samples were collected after the pits were removed. Under these conditions, these sample locations cannot meaningfully be represented on a map.	
13	App B, SAP, Section 4.8	C – Were there any deviations noted from the V&V? Please provide statement of findings in the profile's discussions of data.	Historical OREIS soil data had no rejected data. Historical PEMS soil data had rejected data for RAD, METALS, VOC and SVOC (this rejected data was screened out during the data evaluation process). Debris data had no rejected laboratory data. This has been clarified in profile Section 3, paragraph 5.	
14	App B	D – Please provide signed Core Team Concurrence Log relevant to this profile.	Requested Concurrence Log added to Appendix B.	
15	App F	C – The sample numbers do not appear to match up to the number of sample locations presented in Table 4 presented in Section 3 of the profile. Please explain. C – Why are there no Sr-90 results per SAP?	Appendix F is the Stats Summary and does not have sample numbers. Appendix G has the characterization data with Location and Sample IDs. The Appendix G is sorted by Location ID and then Sample ID. The Location IDs and Sample IDs are 100% consistent with Table 4. Please specify what is not matching up? The revised profile contains results for Sr-90.	

REVIEWED BY:	RESPONSE BY:

COMMENT NO.	SECT/ PAGE	COMMENT	RESPONSE	ACCEPT/REJECT
		C- Section 3 stated that the debris samples were 100% validated; why are the DV codes not on the Controlled Dataset?	The data codes were inadvertently hidden. Appendix G revised to include the debris validation codes.	
16	General	D – Need WACFACS input sheets for profile. Insert the resultant SOF and VWSF results into Sections 3.1 through 3.4.	Text revised and WACFACS inserted into profile. (Need final VWSFs from Redus to insert into profile.)	

REVIEWED BY:	RESPONSE BY:

APPENDIX C: CERCLA DOCUMENTATION

DOE/OR/01-2328&D1

Waste Handling Plan for the Consolidated Soil and Waste Sites within Zone 2, East Tennessee Technology Park, Oak Ridge, Tennessee

This document is approved for public release per review by:

Signature on file	9/18/06
BJC ETTP Classification & Information Office	Date

DOE/OR/01-2224&D3

Remedial Design Report/Remedial Action Work Plan for Zone 2 Soils, Slabs, and Subsurface Structures East Tennessee Technology Park, Oak Ridge, Tennessee

This document is approved for public release per review by:

P. J. Kortmeyer/dlw 6/20/2007

BJC ETTP Classification & Information Control Office — Date

APPENDIX D: EMWMF NUCLEAR CRITICALITY CHECKLIST

BECHTEL JACOBS
Bechtel Jacobs Company LLC

EMWMF Material Screen Calculation Worksheet

Click here to view the EMWMF Material Screen Calculation Worksheet, Rev. 0.

Title: Waste Lot Profile 155.5 for the K-1015-A Laundry Pit	Revision No: ☒ 0 ☐ 1 ☐ 2 ☐ ___	
Date: 4/21/2008	Contact: Marshall Davenport	Phone No: 576-8049

WASTE DESCRIPTION

DESCRIPTION OF THE WASTE MATERIAL: (Include origin of waste, mass of waste, form and composition of waste, quantity of fissionable nuclides, types of containers, FEM calculations, etc. If information is attached, list attachments here.)

The materials included in this profile are the debris and adjacent soil from the removal of the K-1015-A Laundry Pit in the BOS Labs area. This is primarily concrete, brick, soil, and a plastic pipe. Incidental amounts of secondary waste (i.e. PPE, plastic sheeting, hay bales and other erosion control materials, wooden pallets, contaminated equipment, decontamination materials, etc.) from sampling, excavation, and waste loading activities associated with this remediation are also included in this waste lot profile. The total volume of waste in the profile is approximately 50 cubic yards. This waste will be transported to the EMWMF in dump trucks. It is estimated that a single dump truck will contain 38,000 lbs of waste.

Radiological summary data attached (Attachment 1)?	☒ YES ☐ NO
^{235}U FEM calculation attached (Attachment 2) and signed by preparer and reviewer?	☒ YES ☐ NO

If the shipment does not meet one of the three Exemption Criteria listed below, then an NCS evaluation shall be performed to determine acceptability of the waste at EMWMF.

NOTE: This form is not required if approved NCSD addresses the waste shipment.

Enrichment Exemption Criteria	
1. Is the uranium enrichment in the shipment less than 0.90 wt% ^{235}U?	☐ YES ☒ NO
2. Is the total activity of fissionable transuranic nuclides less than 1400 pCi/g waste?	☒ YES ☐ NO

If the answers to questions 1 and 2 are **BOTH YES**, then the shipment meets the requirements of Enrichment Exempt material and may be shipped to EMWMF with NCS concurrence noted below. Answers to questions 3 - 7 are not required.

Mass/Volume Exemption Criteria	
3. Does each waste package* contain less than 15 g ^{235}U FEM?	☐ YES ☒ NO

If the answer to question 3 is YES, then the material meets the requirements of Mass/Volume Exempt materials and may be shipped to EMWMF with NCS concurrence noted below. Answers to question 1, 2 and 4 through 7 are not required.

Concentration Exemption Criteria	
4. Is the fissile material concentration less than 2 g ^{235}U FEM / kg-waste? The concentration calculation shall use the highest sample value for fissile concentration and shall not include the mass of the waste container.	☒ YES ☐ NO
5. Does the waste primarily consist of soil and/or building debris?	☒ YES ☐ NO
6. Is the fissile material uniformly dispersed within the waste with NO concentrated deposits of fissile material?	☒ YES ☐ NO
7. Are there NO quantities of beryllium or reactor grade graphite in excess of 1% of the mass of waste?	☒ YES ☐ NO

If the answers to questions 4 through 7 are **ALL YES**, then the shipment meets the requirements of Concentration Exempt material and may be shipped to EMWMF with NCS concurrence noted below. Answers to questions 1, 2 and 3 are not required.

I certify all information on this form is accurate and correct to the best of my knowledge.

	Signature	Print	Date
Responsible Waste Management Lead:	J. M. Davenport	Marshall Davenport	4/21/2008

Concurrence that the information on this form meets the specified NCS exemption criterion.

	Signature	Print	Date
NCS Engineer:		Clyde Magill	4-21-08

Concurrence that the Waste Lot specified on this form meets the EMWMF administrative WAC for NCS.

	Signature	Print	Date
EMWMF Waste Generator Services Lead:		Steve Kucera	5/14/08

Concurrence that the Waste Lot specified on this form is acceptable for receipt at the EMWMF.

	Signature	Print	Date
EMWMF Facility Manager:		JEFFREY W. GRINDSTAFF	5-14-08

BECHTEL JACOBS
Bechtel Jacobs Company LLC

EMWMF Material Screen Calculation Worksheet

*A waste package is defined as a container together with its contents of waste in its final form for disposal, one or more of which may constitute a shipment. Examples are (1) a single box; (2) a single drum; (3) the entire contents of a single bulk shipment. For this form, a waste package may not be smaller than 30 gallons in volume.

Click here to view *Technical Information for Delivery of Waste to the Environmental Management Waste Management Facility.*

Chemical	Type	Units	Number of Samples	Number of Detects	Percent Detect	Maximum	Rad Error	2 Sigma (Rad Error x 2)	Value for NCS Checklist (max plus 2 sigma)
Actinium-228_EPA-901.1_pCi/g	Rad	pCi/g	1	1	100.00%	1.66	0.96	1.92	3.58
Alpha activity__pCi/g	Rad	pCi/g	2	2	100.00%	29.20	2.96	5.92	35.12
Beta activity__pCi/g	Rad	pCi/g	2	2	100.00%	15.80	1.8	3.6	19.40
Bismuth-214_EPA-901.1_pCi/g	Rad	pCi/g	1	1	100.00%	1.17	0.613	1.226	2.40
Europium-155_EPA-901.1_pCi/g	Rad	pCi/g	1	1	100.00%	1.16	0.645	1.29	2.45
Iron-59_EPA-901.1_pCi/g	Rad	pCi/g	1	1	100.00%	0.21	0.107	0.214	0.43
Lead-212_EPA-901.1_pCi/g	Rad	pCi/g	4	4	100.00%	1.14	0.315	0.63	1.77
Lead-214_EPA-901.1_pCi/g	Rad	pCi/g	4	4	100.00%	0.91	0.324	0.648	1.55
Neptunium-237_RAD-NP-237 BY ALPHA_pCi/g	Rad	pCi/g	5	1	20.00%	0.17	0.13	0.26	0.43
Plutonium-238_RAD-PU ISO BY ALPHA_pCi/g	Rad	pCi/g	3	1	33.33%	0.08	0.0629	0.1258	0.20
Potassium-40_EPA-901.1_pCi/g	Rad	pCi/g	5	5	100.00%	27.80	5.17	10.34	38.14
Protactinium-234m_EPA-901.1_pCi/g	Rad	pCi/g	1	1	100.00%	62.30	38.4	76.8	139.10
Radium-226_EPA-903.1_pCi/g	Rad	pCi/g	4	2	50.00%	0.73	0.252	0.504	1.24
Thallium-208_EPA-901.1_pCi/g	Rad	pCi/g	3	3	100.00%	0.47	0.232	0.464	0.93
Thorium-228_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	5	3	60.00%	1.78	0.377	0.754	2.53
Thorium-229_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	2	2	100.00%	13.90	0.941	1.882	15.78
Thorium-230_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	5	3	60.00%	1.19	0.366	0.732	1.92
Thorium-232_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	5	5	100.00%	1.49	0.315	0.63	2.12
Thorium-234_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	1	1	100.00%	47.60	5.01	10.02	57.62
Uranium-232_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	2	2	100.00%	14.10	0.978	1.956	16.06
Uranium-233/234_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	5	5	100.00%	42.90	1.86	3.72	46.62
Uranium-235/236_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	5	4	80.00%	2.20	0.458	0.916	3.12
Uranium-238_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	5	5	100.00%	13.30	1.04	2.08	15.38

NOTE 1: EPA Method 901.1 is Gamma Spectroscopy
NOTE 2: Radioisotopes that were 100% non-detected were not included.
NOTE 3: Alpha isotopic was preferred instead of Gamma Spec for radioisotopes with both analyses.

Waste Lot	155.5	see profile
Container Mass	38,000	Pounds
	17252000	Grams

Enrichment Exemption Criteria (Questions 1 & 2)

Uranium enrichment	3.06	wt% ^{235}U
Fissionable Transuranics	6.30E-01	pCi/g

FGE/FEM Calculations for Mass/Volume Exemption Criteria (Question 3)

Nuclide	Maximum Activity (pCi/g)	$T_{1/2}$[1,2] (years)	Atomic Weight	Specific Activity[3] (ci/g)	Total grams per container (g)	Curies (Ci)	Mass (g)	^{235}U FEM Mass Factor	^{235}U FEM (g)
^{233}U	46.62	1.592E+05	233	9.642E-03	1.725E+07	6.043E-04	6.341E+02	1	1.168E+01
^{234}U		2.450E+05	234	6.239E-03	1.725E+07	0.00E+00	0.00E+00	N/A	N/A
^{235}U	3.12	7.038E+08	235	2.163E-06	1.725E+07	6.36E-05	2.489E+01	1	2.49E+01
^{238}U	15.38	4.460E+09	238	3.370E-07	1.725E+07	2.66E-04	7.87E+02	N/A	N/A
^{236}Np		1.550E+05	236	9.778E-03	1.725E+07	0.00E+00	0.000E+00	140	0.00E+00
^{237}Np	0.43	2.140E+06	237	7.052E-04	1.725E+07	7.42E-06	1.052E+02	0.035	3.68E-04
^{238}Pu	0.2	8.774E+01	238	1.718E+01	1.725E+07	3.45E-06	2.014E+02	0.23	4.63E-06
^{239}Pu		2.440E+04	239	6.183E-02	1.725E+07	0.00E+00	0.000E+00	156	0.00E+00
^{240}Pu		6.570E+03	240	2.268E-01	1.725E+07	0.00E+00	0.000E+00	0.047	0.00E+00
^{241}Pu		1.440E+01	241	1.031E+02	1.725E+07	0.00E+00	0.000E+00	3.5	0.00E+00
^{242}Pu		3.760E+05	242	3.931E-03	1.725E+07	0.00E+00	0.000E+00	0.018	0.00E+00
^{241}Am		4.330E+02	241	3.426E+00	1.725E+07	0.00E+00	0.000E+00	0.044	0.00E+00
^{242m}Am		1.520E+02	242	3.724E+00	1.725E+07	0.00E+00	0.000E+00	54.0	0.00E+00
^{243}Am		7.370E+03	243	1.997E-01	1.725E+07	0.00E+00	0.000E+00	0.028	0.00E+00
^{243}Cm		2.910E+01	243	5.058E+01	1.725E+07	0.00E+00	0.000E+00	7.81	0.00E+00
^{244}Cm		1.810E+01	244	3.009E+01	1.725E+07	0.00E+00	0.000E+00	0.23	0.00E+00
^{245}Cm		8.500E+03	245	1.718E-01	1.725E+07	0.00E+00	0.000E+00	23.0	0.00E+00
^{247}Cm		1.560E+07	247	9.282E-05	1.725E+07	0.00E+00	0.000E+00	0.78	0.00E+00
^{249}Cf		3.510E+02	249	4.092E+00	1.725E+07	0.00E+00	0.000E+00	170.0	0.00E+00
^{251}Cf		9.000E+02	251	1.583E+00	1.725E+07	0.00E+00	0.000E+00	140.0	0.00E+00
									2.50E+01

g Total ^{233}U FEM

Concentration Exemption Criteria (Questions 4-7)

Nuclide	Maximum Activity (pCi/g)	Convert Ci/g	NA	Specific Activity[3] (ci/g)	g U/g-waste	^{235}U FEM Mass Factor	^{235}U FEM (g)	g ^{235}U FEM/ kg-waste
^{233}U	46.62	4.662E-11	NA	9.64E-03	4.83E-09	1	6.77E-09	6.77E-06
^{235}U	3.12	3.12E-12	NA	2.16E-06	1.44E-09	140	1.44E-06	1.44E-03
^{236}Np	0	0	NA	9.78E-03	0.00E+00	140.0	0.00E+00	0.00E+00
^{237}Np	0.43	4.3E-13	NA	7.05E-04	8.10E-10	0.035	2.51E-11	2.51E-08
^{238}Pu	0.2	2E-13	NA	1.71E+01	1.77E-14	0.23	2.69E-15	2.69E-12
^{239}Pu	0	0	NA	6.13E-02	0.00E+00	156	0.00E+00	0.00E+00
^{240}Pu	0	0	NA	2.27E-01	0.00E+00	0.047	0.00E+00	0.00E+00
^{241}Pu	0	0	NA	1.03E+02	0.00E+00	3.5	0.00E+00	0.00E+00
^{242}Pu	0	0	NA	3.93E-03	0.00E+00	0.018	0.00E+00	0.00E+00
^{241}Am	0	0	NA	3.43E+00	0.00E+00	0.044	0.00E+00	0.00E+00
^{242m}Am	0	0	NA	3.72E+00	0.00E+00	54.0	0.00E+00	0.00E+00
^{243}Am	0	0	NA	1.99E-01	0.00E+00	0.028	0.00E+00	0.00E+00
^{243}Cm	0	0	NA	5.06E+01	0.00E+00	7.8	0.00E+00	0.00E+00
^{244}Cm	0	0	NA	3.01E+01	0.00E+00	0.23	0.00E+00	0.00E+00
^{245}Cm	0	0	NA	1.72E-01	0.00E+00	23.0	0.00E+00	0.00E+00
^{247}Cm	0	0	NA	9.28E-05	0.00E+00	0.78	0.00E+00	0.00E+00
^{249}Cf	0	0	NA	4.09E+00	0.00E+00	170.0	0.00E+00	0.00E+00
^{251}Cf	0	0	NA	1.58E+00	0.00E+00	140.0	0.00E+00	0.00E+00
								1.45E-03

Total g ^{235}U FEM/kg-waste

[1] Isotope half-lives taken from LA-12846-MS except for ^{236}Np, ^{242}Cm, ^{244}Cm, ^{247}Cm, ^{249}Cf, and ^{251}Cf

[2] ^{236}Np, ^{242}Cm, ^{244}Cm, ^{247}Cm, ^{249}Cf, and ^{251}Cf half-lives taken from "Nuclides and Isotopes, Fourteenth Edition", GE Nuclear Energy

[3] Formula for specific activity taken from LA-12846-MS

Prepared By: J.M. Stevenson

Date: 04/21/08

Reviewed BY: Jan E Rymer

Waste Lot	155.5	see profile
Container Mass	38,000	Pounds
	17252000	Grams

Enrichment Exemption Criteria (Questions 1 & 2)

Uranium enrichment	3.06	wt% ^{235}U
Fissionable Transuranics	6.30E-01	pCi/g

FGE/FEM Calculations for Mass/Volume Exemption Criteria (Question 3)

Nuclide	Maximum Activity (pCi/g)	$T_{1/2}$[1,2] (years)	Atomic Weight	Specific Activity[3] (ci/g)	Total grams per container (g)	Curies (Ci)	Mass (g)	^{235}U FEM Mass Factor	^{235}U FEM (g)
^{233}U	46.62	1.592E+05	233	9.642E-03	1.725E+07	8.043E-04	8.341E-02	1.4	1.168E-01
^{234}U		2.450E+05	234	6.239E-03	1.725E+07	0.00E+00	0.00E+00	N/A	N/A
^{235}U	3.12	7.038E+08	235	2.163E-06	1.725E+07	5.38E-05	2.489E+01	1	2.49E+01
^{238}U	15.38	4.460E+09	238	3.370E-07	1.725E+07	2.65E-04	7.87E+02	N/A	N/A
^{236}Np		1.550E+05	236	9.778E-03	1.725E+07	0.00E+00	0.00E+00	140	0.00E+00
^{237}Np	0.43	2.140E+06	237	7.052E-04	1.725E+07	7.42E-06	1.052E-02	0.035	3.68E-04
^{238}Pu	0.2	8.774E+01	238	1.713E+01	1.725E+07	3.45E-06	2.014E-07	0.23	4.63E-08
^{239}Pu		2.440E+04	239	6.133E-02	1.725E+07	0.00E+00	0.00E+00	1.56	0.00E+00
^{240}Pu		6.570E+03	240	2.268E-01	1.725E+07	0.00E+00	0.00E+00	0.047	0.00E+00
^{241}Pu		1.440E+01	241	1.031E+02	1.725E+07	0.00E+00	0.00E+00	3.5	0.00E+00
^{242}Pu		3.760E+05	242	3.931E-03	1.725E+07	0.00E+00	0.00E+00	0.018	0.00E+00
^{241}Am		4.330E+02	241	3.428E+00	1.725E+07	0.00E+00	0.00E+00	0.044	0.00E+00
^{242m}Am		1.520E+02	242	9.724E+00	1.725E+07	0.00E+00	0.00E+00	54.0	0.00E+00
^{243}Am		7.370E+03	243	1.997E-01	1.725E+07	0.00E+00	0.00E+00	0.028	0.00E+00
^{243}Cm		2.910E+01	243	5.058E+01	1.725E+07	0.00E+00	0.00E+00	7.6	0.00E+00
^{244}Cm		1.810E+01	244	8.099E+01	1.725E+07	0.00E+00	0.00E+00	0.23	0.00E+00
^{245}Cm		8.500E+03	245	1.718E-01	1.725E+07	0.00E+00	0.00E+00	23.0	0.00E+00
^{247}Cm		1.560E+07	247	9.282E-05	1.725E+07	0.00E+00	0.00E+00	0.78	0.00E+00
^{249}Cf		3.510E+02	249	4.092E+00	1.725E+07	0.00E+00	0.00E+00	70.0	0.00E+00
^{251}Cf		9.000E+02	251	1.583E+00	1.725E+07	0.00E+00	0.00E+00	140.0	0.00E+00
									2.50E+01

g Total ^{235}U FEM

Concentration Exemption Criteria (Questions 4-7)

Nuclide	Maximum Activity (pCi/g)	Convert Ci/g	NA	Specific Activity[3] (ci/g)	g U/g-waste	^{235}U FEM Mass Factor	^{235}U FEM (g)	g ^{235}U FEM/ kg-waste
^{233}U	46.62	4.662E-11	NA	9.64E-03	4.83E-09	1.4	6.77E-09	6.77E-06
^{235}U	3.12	3.12E-12	NA	2.16E-06	1.44E-06	1.0	1.44E-06	1.44E-03
^{238}Np	0	0	NA	9.78E-03	0.00E+00	140.0	0.00E+00	0.00E+00
^{237}Np	0.43	4.3E-13	NA	7.05E-04	6.10E-10	0.035	2.13E-11	2.13E-08
^{238}Pu	0.2	2E-13	NA	1.71E+01	1.17E-14	0.23	2.69E-15	2.69E-12
^{239}Pu	0	0	NA	6.13E-02	0.00E+00	1.56	0.00E+00	0.00E+00
^{240}Pu	0	0	NA	2.27E-01	0.00E+00	0.047	0.00E+00	0.00E+00
^{241}Pu	0	0	NA	1.03E+02	0.00E+00	3.5	0.00E+00	0.00E+00
^{242}Pu	0	0	NA	3.93E-03	0.00E+00	0.018	0.00E+00	0.00E+00
^{241}Am	0	0	NA	3.43E+00	0.00E+00	0.044	0.00E+00	0.00E+00
^{242m}Am	0	0	NA	9.72E+00	0.00E+00	54.0	0.00E+00	0.00E+00
^{243}Am	0	0	NA	2.00E-01	0.00E+00	0.028	0.00E+00	0.00E+00
^{243}Cm	0	0	NA	5.06E+01	0.00E+00	7.6	0.00E+00	0.00E+00
^{244}Cm	0	0	NA	8.10E+01	0.00E+00	0.23	0.00E+00	0.00E+00
^{245}Cm	0	0	NA	1.72E-01	0.00E+00	23.0	0.00E+00	0.00E+00
^{247}Cm	0	0	NA	9.28E-05	0.00E+00	0.78	0.00E+00	0.00E+00
^{249}Cf	0	0	NA	4.09E+00	0.00E+00	70.0	0.00E+00	0.00E+00
^{251}Cf	0	0	NA	1.58E+00	0.00E+00	140.0	0.00E+00	0.00E+00
								1.45E-03

Total g ^{235}U FEM/kg-waste

[1] Isotope half-lives taken from LA-12846-MS except for ^{236}Np, ^{243}Cm, ^{244}Cm, ^{247}Cm, ^{249}Cf, and ^{251}Cf

[2] ^{236}Np, ^{243}Cm, ^{244}Cm, ^{247}Cm, ^{249}Cf, and ^{251}Cf half-lives taken from "Nuclides and Isotopes, Fourteenth Edition", GE Nuclear Energy

[3] Formula for specific activity taken from LA-12846-MS

Prepared By: J.M. Shuenpert

Date: 04/21/08

Reviewed BY: Jan E Rymer

APPENDIX E: WASTE ACCEPTANCE CRITERIA FORECASTING ANALYSIS CAPABILITY SYSTEMS (WACFACS)

WL L SSV BASIC INPUT

Rev 8-04 dated March 6, 2008

INPUT
OUTPUT
WACFACS

STEP 0 Enter WAC AT Configuration Management Information for Waste Lot 155.50 K-1015-A Laundry Pit

Worksheet	Prepared by	Date	Approved by	Date
WL L SSV BASIC INPUT	Jamie Raymer	4/28/2008	M. Davenport	5/28/2008
WL L SOF SUMMARY	*NO USER INPUTS ARE REQUIRED*			
WL L Volume INPUT	Jamie Raymer	4/28/2008	M. Davenport	5/28/2008
WL L SRC INPUT	Jamie Raymer	5/27/2008	M. Davenport	5/28/2008
WL L TABLE A.1 OUTPUT	*NO USER INPUTS ARE REQUIRED*			
WL L SRC ECHO	*NO USER INPUTS ARE REQUIRED*			
WL L SOF CALC	*NO USER INPUTS ARE REQUIRED*			

Password Protected. To edit INPUT cells for each tab, password = *waste*

Enter WACFACS ID, Waste Lot, and WBS Information

WACFACS ID	155.5
SUBPROJECT/WASTE LOT	K-1015-A Laundry Pit
WBS	WL WBS

Enter Current Qn FYnn
For example: Q1 FY10

Rev 8-04 dated March 6, 2008

STEP 1 Waste Lot 155.5 Volume Input

	Total CY	Units
No Fill Required (Soil Like)	15	CY
Fill Required (Debris Like)	35	CY
Total Volume CY	50	CY

Messages

ACTION: Update WGF — IMPORTANT

STEP 2 Waste Lot 155.5 Schedule Input

	Qtr or FY	
Qtr Start EMWMF (e.g., 1)	3	Q3
FY Start EMWMF (e.g., 10)	8	FY08
Qtr Complete EMWMF	3	Q3
FY Complete EMWMF	8	FY08

Messages

None

WL L SSV BASIC INPUT
Rev 8-04 dated March 6, 2008

INPUT
OUTPUT
WACFACS

Confirm you have most current Table A-1
EMWMF Table A-1

Follow WAC Attainment Plan for ALL Data Input
EMWMF WAC Attainment Plan

Use the Project Quick Look TAB to rapidly review your results

WL L Volume INPUT
Rev 8-04 dated March 6, 2008

INPUT
OUTPUT
WACFACS

WACFACS ID	155.5
SUBPROJECT/WASTE LOT	K-1015-A Laundry Pit
WBS	WL WBS

Use this table for CIVV INPUT			
DO NOT ALTER THESE FIXED VALUES			
Confidence in Volume Value (CIVV)	INPUT VALUE	MIN %	MAX %
The Confidence in the Volume value is LOW	L	-50%	100%
The Confidence in the Volume value is MODERATE	M	-25%	50%
The Confidence in the Volume value is HIGH	H	-10%	15%
The Volume value is really VERY LOW	VL	-5%	100%
The Volume value is really VERY HIGH	VH	-50%	5%

STEP 1	Enter CIVV Information	*** *ANNUAL* VOLUME DATA MUST MATCH MOST CURRENT WGF ***							
	Volume Input	Total CY	Units	CIVV	MIN %	MAX %	Expected CY	Error Messages
	No Fill Required (Soil Like)	15	CY	L	-50%	100%	16	None
	Fill Required (Debris Like)	35	CY	L	-50%	100%	38	
	Total Volume CY	50	CY				54	

WACFACS	WL L Volume INPUT
	Rev 8-04 dated March 6, 2008
STEP 2	Enter Volume Information
	Disposition Schedule
	Start: Q3 FY08
	Complete: Q3 FY08

INPUT
OUTPUT
WACFACS

Error Messages
None

*** *QUARTERLY* VOLUME DATA MUST MATCH MOST CURRENT WGF ***

EMWMF Quarter	Waste Lot Disposition Schedule	15 Volume No Fill Required (Soil Like) CY	35 Volume Fill Required (Debris Like) CY	50 Total Volume	By when?	Q FY	Qtr	FY
1				0		Q3 FY02	3	2
2				0		Q4 FY02	4	2
3				0		Q1 FY03	1	3
4				0		Q2 FY03	2	3
5				0		Q3 FY03	3	3
6				0		Q4 FY03	4	3
7				0		Q1 FY04	1	4
8				0		Q2 FY04	2	4
9				0		Q3 FY04	3	4
10				0		Q4 FY04	4	4
11				0		Q1 FY05	1	5
12				0		Q2 FY05	2	5
13				0		Q3 FY05	3	5
14				0		Q4 FY05	4	5
15				0		Q1 FY06	1	6
16				0		Q2 FY06	2	6
17				0		Q3 FY06	3	6
18				0		Q4 FY06	4	6
19				0		Q1 FY07	1	7
20				0		Q2 FY07	2	7
21				0		Q3 FY07	3	7
22				0		Q4 FY07	4	7
23				0		Q1 FY08	1	8
24				0		Q2 FY08	2	8
25	START/COMPLETE	15	35	50		Q3 FY08	3	8
26				0		Q4 FY08	4	8
27				0		Q1 FY09	1	9
28				0		Q2 FY09	2	9
29				0		Q3 FY09	3	9
30				0		Q4 FY09	4	9
31				0		Q1 FY10	1	10
32				0		Q2 FY10	2	10
33				0		Q3 FY10	3	10
34				0		Q4 FY10	4	10
35				0		Q1 FY11	1	11
36				0		Q2 FY11	2	11

	WL L Volume INPUT					INPUT		
WACFACS	Rev 8-04 dated March 6, 2008					OUTPUT		
						WACFACS		
37				0		Q3 FY11	3	11
38				0		Q4 FY11	4	11
39				0		Q1 FY12	1	12
40				0		Q2 FY12	2	12
41				0		Q3 FY12	3	12
42				0		Q4 FY12	4	12
43				0		Q1 FY13	1	13
44				0		Q2 FY13	2	13
45				0		Q3 FY13	3	13
46				0		Q4 FY13	4	13
47				0		Q1 FY14	1	14
48				0		Q2 FY14	2	14
49				0		Q3 FY14	3	14
50				0		Q4 FY14	4	14
51				0		Q1 FY15	1	15
52				0		Q2 FY15	2	15
53				0		Q3 FY15	3	15
54				0		Q4 FY15	4	15
55				0		Q1 FY16	1	16
56				0		Q2 FY16	2	16
57				0		Q3 FY16	3	16
58				0		Q4 FY16	4	16
59				0		Q1 FY17	1	17
60				0		Q2 FY17	2	17
61				0		Q3 FY17	3	17
62				0		Q4 FY17	4	17
63				0		Q1 FY18	1	18
64				0		Q2 FY18	2	18
65				0		Q3 FY18	3	18
66				0		Q4 FY18	4	18

WL 155.5 , K-1015-A Laundry Pit

WACFACS Input Worksheet Rev 8-04 dated March 6, 2008

ID	EMWMF SRC FOR WL 155.5 K-1015-A Laundry Pit	Units	Analytical Data Available (Y, N, or X)	Process Knowledge Eliminates as SRC (Y or N)	Is this an SRC (Y, N)	Detects / Samples	N for Statistics	Rationale	WACFACS Function	Minimum Value	Median Value	Maximum Value	Expected SRC Concentration	UCL-95 (SRC Concentration)	Expected HI SOF Value	Expected Carcinogenic SOF Value	SRC SOF % of HI SOF	SRC SOF % of Carcinogenic SOF
1	Am-241	pCi/g	Y	N	N			Note 1										
2	C-14	pCi/g	N	Y	N			Note 2										
3	H-3	pCi/g	N	Y	N			Note 2										
4	I-129	pCi/g	N	Y	N			Note 2										
5	Np-237	pCi/g	Y	N	Y	1 / 5	5		PERT Beta	-8.80E-03	0.00E+00	1.70E-01	2.69E-02	8.02E-02		#NAME?		#NAME?
6	Pu-239	pCi/g	X	X	N													
7	Pu-240	pCi/g	X	X	N													
67	Pu-239/240	pCi/g	Y	N	N			Note 1										
8	Tc-99	pCi/g	Y	N	N			Note 1										
9	U-233	pCi/g	X	X	N													
10	U-234	pCi/g	X	X	N													
910	U-233/234	pCi/g	Y	N	Y	5 / 5	5		Normal	7.54E-01	7.64E+00	4.29E+01	1.59E+01	2.58E+01	#NAME?	#NAME?	#NAME?	#NAME?
11	U-235	pCi/g	Y	N	Y	4 / 5	5		Normal	7.74E-02	5.63E-01	2.20E+00	8.71E-01	1.44E+00	#NAME?	#NAME?	#NAME?	#NAME?
12	U-236	pCi/g	X	X	N													
13	U-238	pCi/g	Y	N	Y	5 / 5	5		Lognormal	9.66E-01	1.41E+00	1.33E+01	4.37E+00	6.95E+00	#NAME?	#NAME?	#NAME?	#NAME?
14	Antimony	mg/kg	Y	N	Y	3 / 6	6		Normal	2.60E-03	2.80E-01	3.90E-01	2.37E-01	3.55E-01	#NAME?		#NAME?	
15	Barium	mg/kg	Y	N	Y	6 / 6	6		Normal	2.00E+01	5.65E+01	1.70E+02	7.60E+01	1.18E+02	#NAME?		#NAME?	
N84	Boron	mg/kg	Y	N	Y	6 / 6	6		Normal	1.40E+00	4.10E+00	7.10E+00	4.10E+00	5.94E+00	#NAME?		#NAME?	
16	Chromium [total]	mg/kg	Y	N	Y	6 / 6	6		Normal	9.40E+00	1.60E+01	2.30E+01	1.59E+01	2.03E+01	#NAME?		#NAME?	
17	Lead	mg/kg	Y	N	Y	6 / 6	6		Normal	7.40E+00	1.95E+01	3.30E+01	2.02E+01	2.78E+01	#NAME?		#NAME?	
N72	Manganese	mg/kg	Y	N	Y	6 / 6	6		Lognormal	1.30E+02	2.50E+02	2.00E+03	6.63E+02	1.88E+03	#NAME?		#NAME?	
N73	Molybdenum	mg/kg	Y	N	Y	5 / 6	6		Normal	1.70E-01	8.10E-01	1.70E+00	8.28E-01	1.34E+00	#NAME?		#NAME?	
18	Selenium	mg/kg	Y	N	N			Note 1										
19	Strontium	mg/kg	Y	N	Y	3 / 3	3		PERT Beta	1.10E+02	1.60E+02	1.70E+02	1.53E+02	1.67E+02	#NAME?		#NAME?	
20	Tin	mg/kg	Y	N	Y	3 / 3	3		PERT Beta	4.20E+00	4.30E+00	4.40E+00	4.30E+00	4.36E+00	#NAME?		#NAME?	
21	Vanadium	mg/kg	Y	N	Y	6 / 6	6		Normal	5.10E+00	1.62E+01	2.90E+01	1.59E+01	2.40E+01	#NAME?		#NAME?	
N33	2,4-D	mg/kg	N	Y	N			Note 2										
N34	2,4,5-T (Silvex)	mg/kg	N	Y	N			Note 2										
22	Acenaphthene	mg/kg	Y	N	N			Note 1										
N59	Acenaphthylene	mg/kg	Y	N	N			Note 1										
23	Acetone	mg/kg	Y	N	N			Note 1										
N99	Acetonitrile	mg/kg	N	Y	N			Note 3										
N74	Acetophenone	mg/kg	N	Y	N			Note 3										
N100	Acrolein	mg/kg	N	Y	N			Note 3										
N101	Acrylonitrile	mg/kg	N	Y	N			Note 3										
N45	Aldrin	mg/kg	N	Y	N			Note 2										
N47	Aroclor-1221	mg/kg	Y	N	N			Note 1										
N48	Aroclor-1232	mg/kg	Y	N	N			Note 1										
24	Benzene	mg/kg	Y	N	N			Note 1										
N120	Benzidine	mg/kg	N	Y	N			Note 2										
N80	Benzoic Acid	mg/kg	Y	N	N			Note 1										
N67	Benzyl Alcohol	mg/kg	N	Y	N			Note 2										
N52	alpha-BHC	mg/kg	N	Y	N			Note 2										
N53	beta-BHC	mg/kg	N	Y	N			Note 2										
N54	delta-BHC	mg/kg	N	Y	N			Note 2										
N102	Bromodichloromethane	mg/kg	Y	N	N			Note 1										
N103	Bromoform	mg/kg	Y	N	N			Note 1										
N104	Bromomethane	mg/kg	Y	N	N			Note 1										
N105	Butylbenzene	mg/kg	Y	N	N			Note 1										
25	Carbazole	mg/kg	Y	N	N			Note 1										
26	Carbon tetrachloride	mg/kg	Y	N	N			Note 1										
N75	Carbon Disulfide	mg/kg	Y	N	N			Note 1										
N35	Chlordane	mg/kg	N	Y	N			Note 2										
N01	Chlorobenzene	mg/kg	Y	N	N			Note 1										
27	Chloroform	mg/kg	Y	N	N			Note 1										
N106	Chloromethane (Methyl Chloride)	mg/kg	Y	N	N			Note 1										
N112	o-Chlorotoluene	mg/kg	Y	N	N			Note 1										
N27	m-Cresol	mg/kg	Y	N	N			Note 1										
N26	o-Cresol	mg/kg	Y	N	N			Note 1										
N28	p-Cresol	mg/kg	N	Y	N			Note 3										
N76	Cumene (Isopropylbenzene)	mg/kg	Y	N	N			Note 1										
N09	Cyanide	mg/kg	Y	N	N			Note 1										
N49	DDD	mg/kg	N	Y	N			Note 2										
N50	DDE	mg/kg	N	Y	N			Note 2										
29	Di-n-butylphthalate	mg/kg	Y	N	N			Note 1										
N107	Dibromochloromethane	mg/kg	Y	N	N			Note 1										
N02	1,2-Dichlorobenzene	mg/kg	Y	N	N			Note 1										
N03	1,3-Dichlorobenzene	mg/kg	Y	N	N			Note 1										
N04	1,4-Dichlorobenzene	mg/kg	Y	N	N			Note 1										
N93	1,2,-cis-Dichloroethylene	mg/kg	Y	N	N			Note 1										
N96	1,2-trans-Dichloroethylene	mg/kg	Y	N	N			Note 1										
N109	Dichlorodifluoromethane	mg/kg	Y	N	N			Note 1										
N94	1,2-Dichloropropane	mg/kg	Y	N	N			Note 1										
28	Dieldrin	mg/kg	N	Y	N			Note 2										
N62	Diethylphthalate	mg/kg	Y	N	N			Note 1										
N95	1,2-Dimethylbenzene	mg/kg	Y	N	N			Note 1										
N63	2,4-Dimethylphenol	mg/kg	Y	N	N			Note 1										
N64	Dimethylphthalate	mg/kg	Y	N	N			Note 1										
N86	2,4 Dinitrotoluene	mg/kg	Y	N	N			Note 1										
N87	2,6 Dinitrotoluene	mg/kg	Y	N	N			Note 1										

WL 155.5 , K-1015-A Laundry Pit

WACFACS Input Worksheet Rev 8-04 dated March 6, 2008

ID	EMWMF SRC FOR WL 155.5 K-1015-A Laundry Pit	Units	Analytical Data Available (Y, N, or X)	Process Knowledge Eliminates as SRC (Y or N)	Is this an SRC (Y, N)	Detects / Samples	N for Statistics	Rationale	WACFACS Function	Minimum Value	Median Value	Maximum Value	Expected SRC Concentation	UCL-95 (SRC Concentration)	Expected HI SOF Value	Expected Carcinogenic SOF Value	SRC SOF % of HI SOF	SRC SOF % of Carcinogenic SOF
N69	Endosulfan II + Endosulfan I	mg/kg	N	Y	N			Note 2										
N36	Endrin	mg/kg	N	Y	N			Note 2										
N70	Endrin Aldehyde	mg/kg	N	Y	N			Note 2										
N71	Endrin Ketone	mg/kg	N	Y	N			Note 2										
N77	Ethylbenzene	mg/kg	Y	N	N			Note 1										
N78	Ethylchloride	mg/kg	Y	N	N			Note 1										
N37	Heptachlor	mg/kg	N	Y	N			Note 2										
N38	Heptachlor Epoxide	mg/kg	N	Y	N			Note 2										
N42	Hexachlorobenzene	mg/kg	Y	N	N			Note 1										
N30	Hexachloroethane	mg/kg	Y	N	N			Note 1										
N111	n-Hexane	mg/kg	N	Y	N			Note 2										
N118	1-Hexanol	mg/kg	N	Y	N			Note 2										
N79	2-Hexanone	mg/kg	Y	N	N			Note 1										
30	Isophorone	mg/kg	Y	N	N			Note 1										
N44	Lindane	mg/kg	N	Y	N			Note 2										
N109	Methanol	mg/kg	N	Y	N			Note 2										
N110	Methylene Chloride	mg/kg	Y	N	N			Note 1										
N05	Methylcyclohexane	mg/kg	N	Y	N			Note 2										
N80	Methyl Isobutyl Ketone	mg/kg	Y	N	N			Note 1										
N85	Methyl Methacrylate	mg/kg	N	Y	N			Note 2										
N98	1-Methyl-4-(1-methylethyl)-benzene	mg/kg	Y	N	N			Note 1										
N57	2-Methylnapthalene	mg/kg	Y	N	N			Note 1										
N88	(1-Methylpropyl)benzene	mg/kg	N	Y	N			Note 2										
31	Naphthalene	mg/kg	Y	N	N			Note 1										
N83	4-Nitrobenzenamine (4-Nitroaniline)	mg/kg	Y	N	N			Note 1										
N31	Nitrobenzene	mg/kg	Y	N	N			Note 1										
N58	2-Nitrophenol	mg/kg	Y	N	N			Note 1										
N82	4-Nitrophenol	mg/kg	Y	N	N			Note 1										
32	N□nitroso□di(n□propylamine	mg/kg	Y	N	N			Note 1										
N14	N-Nitrosodiphenylamine	mg/kg	Y	N	N			Note 1										
33	Phenol	mg/kg	Y	N	N			Note 1										
N113	Propylbenzene	mg/kg	Y	N	N			Note 1										
N114	Propylene Glycol	mg/kg	Y	N	N			Note 1										
N43	Pyridine	mg/kg	Y	N	N			Note 1										
N115	Styrene	mg/kg	Y	N	N			Note 1										
N89	1,1,1,2-Tetrachloroethane	mg/kg	Y	N	N			Note 1										
N90	1,1,2,2-Tetrachloroethane	mg/kg	Y	N	N			Note 1										
34	Tetrachloroethene	mg/kg	Y	N	N			Note 1										
N66	2,3,4,6-Tetrachlorophenol	mg/kg	Y	N	N			Note 1										
35	Toluene	mg/kg	Y	N	N			Note 1										
N06	1,2,4-Trichlorobenzene	mg/kg	Y	N	N			Note 1										
36	Trichloroethene	mg/kg	Y	N	N			Note 1										
N116	Trichlorofluoromethane	mg/kg	Y	N	N			Note 1										
N32	2,4,6-Trichlorophenol	mg/kg	Y	N	N			Note 1										
N91	1,2,3-Trichloropropane	mg/kg	Y	N	N			Note 1										
N117	Trimethylbenzene (mixed isomers)	mg/kg	N	Y	N			Note 3										
N92	1,2,4-Trimethylbenzene	mg/kg	Y	N	N			Note 1										
N97	1,3,5-Trimethylbenzene	mg/kg	Y	N	N			Note 1										
N25	Vinyl Chloride	mg/kg	Y	N	N			Note 1										
N15	Xylene (mixture of isomers)	mg/kg	Y	N	N			Note 1										

WACFACS CM: 0	Rev 8-04 dated March 6, 2008	WGF Volume (CY)		CIVV	WACFACS Calculated	Expected	LCL-95	UCL-95
WACFACS ID	155.5	SOIL	15	L	No Fill Required	#NAME?	10	24
SUBPROJECT/WASTE LOT	K-1015-A Laundry Pit	DEBRIS	35	L	Fill is Required	#NAME?	23	55
WBS	WL WBS	TOTAL	50		Total	#NAME?	33	78
		START	Q3 FY08					
		FINISH	Q3 FY08					

0.0				
Expected SOF	0.00	0.00	100%	100%
UCL-95 SOF	0.00	0.00		
Comment:	None			

NOTES

Note 1: Eliminated as a potential SRC based on guidance from Appendix C of the EMWMF WAC Attainment guide.

Note 2: Based on site process knowledge, not considered a potential SRC.

WL 155.5 , K-1015-A Laundry Pit

WACFACS Input Worksheet Rev 8-04 dated March 6, 2008

ID	EMWMF SRC FOR WL 155.5 K-1015-A Laundry Pit	Units	Analytical Data Available (Y, N, or X)	Process Knowledge Eliminates as SRC (Y or N)	Is this an SRC (Y, N)	Detects / Samples	N for Statistics	Rationale	WACFACS Function	Minimum Value	Median Value	Maximum Value	Expected SRC Concentration	UCL-95 (SRC Concentration)	Expected HI SOF Value	Expected Carcinogenic SOF Value	SRC SOF % of HI SOF	SRC SOF % of Carcinogenic SOF
Note 3: Analytical data not available, but not considered a potential SRC due to similar chemicals eliminated as SRCs, as well as not expected due to site process knowledge.																		

APPENDIX F: STATISTICAL SUMMARY

Appendix F ; Summary

Chemical	Type	Units	Samples	Non-Detects	Detects	Percent Detect	Minimum	Maximum	Average	Median	UCL95
Aluminum_mg/kg	Metal	mg/kg	6	0	6	100%	3200	22000	10933.33	9550	16663.03
Antimony_mg/kg	Metal	mg/kg	6	3	3	50%	0.0026	0.39	0.237433	0.28	0.36
Arsenic_mg/kg	Metal	mg/kg	6	0	6	100%	2.3	11	4.666667	3.7	7.45
Barium_mg/kg	Metal	mg/kg	6	0	6	100%	20	170	76	56.5	117.91
Beryllium_mg/kg	Metal	mg/kg	6	0	6	100%	0.3	2.3	0.993333	0.61	1.47
Boron_mg/kg	Metal	mg/kg	6	0	6	100%	1.4	7.1	4.1	4.1	5.94
Cadmium_mg/kg	Metal	mg/kg	6	0	6	100%	0.19	3.1	1.361667	0.85	2.06
Calcium_mg/kg	Metal	mg/kg	3	0	3	100%	2000	14000	6800	4400	9455.32
Chromium_mg/kg	Metal	mg/kg	6	0	6	100%	9.4	23	15.9	16	20.32
Cobalt_mg/kg	Metal	mg/kg	3	0	3	100%	12	52	26.33333	15	32.82
Copper_mg/kg	Metal	mg/kg	6	0	6	100%	24	50	39.16667	40.5	46.79
Iron_mg/kg	Metal	mg/kg	3	0	3	100%	24000	57000	44666.67	53000	55830.66
Lead_mg/kg	Metal	mg/kg	6	0	6	100%	7.4	33	20.23333	19.5	27.78
Lithium_mg/kg	Metal	mg/kg	3	0	3	100%	4.6	20	11.86667	11	16.36
Magnesium_mg/kg	Metal	mg/kg	3	0	3	100%	850	3200	1716.667	1100	2136.50
Manganese_mg/kg	Metal	mg/kg	6	0	6	100%	130	2000	615	250	1876.00
Mercury_mg/kg	Metal	mg/kg	6	0	6	100%	0.08	14	2.97	0.92	7.15
Molybdenum_mg/kg	Metal	mg/kg	6	1	5	83%	0.17	1.7	0.828333	0.81	1.34
Nickel_mg/kg	Metal	mg/kg	6	0	6	100%	15	250	83.83333	30.5	135.46
Potassium_mg/kg	Metal	mg/kg	3	0	3	100%	740	1700	1313.333	1500	1640.71
Selenium_mg/kg	Metal	mg/kg	6	5	1	17%	0.24	2.3	0.885	0.615	1.49
Silver_mg/kg	Metal	mg/kg	6	2	4	67%	0.062	0.62	0.427	0.57	0.60
Sodium_mg/kg	Metal	mg/kg	3	1	2	67%	39	73	51	41	56.21
Strontium_mg/kg	Metal	mg/kg	3	0	3	100%	110	170	146.6667	160	167.10
Thallium_mg/kg	Metal	mg/kg	6	3	3	50%	0.21	0.55	0.396667	0.42	0.51
Tin_mg/kg	Metal	mg/kg	3	0	3	100%	4.2	4.4	4.3	4.3	4.36
Uranium_mg/kg	Metal	mg/kg	3	0	3	100%	0.4	25	8.693333	0.68	11.76
Vanadium_mg/kg	Metal	mg/kg	6	0	6	100%	5.1	29	15.93333	16.15	23.99
Zinc_mg/kg	Metal	mg/kg	6	0	6	100%	53	78	64.16667	63.5	72.16
PCB-1016_mg/kg	PCB	mg/kg	6	6	0	0%	0.023	0.11	0.063	0.0485	0.08
PCB-1221_mg/kg	PCB	mg/kg	6	6	0	0%	0.023	0.11	0.063	0.0485	0.08
PCB-1232_mg/kg	PCB	mg/kg	6	6	0	0%	0.023	0.11	0.063	0.0485	0.08
PCB-1242_mg/kg	PCB	mg/kg	6	6	0	0%	0.023	0.11	0.063	0.0485	0.08
PCB-1248_mg/kg	PCB	mg/kg	6	6	0	0%	0.023	0.11	0.063	0.0485	0.08
PCB-1254_mg/kg	PCB	mg/kg	6	5	1	17%	0.023	0.42	0.124833	0.074	0.25
PCB-1260_mg/kg	PCB	mg/kg	6	3	3	50%	0.023	0.19	0.096833	0.105	0.16
Polychlorinated biphenyl_mg/kg	PCB	mg/kg	6	3	3	50%	0.023	0.61	0.166833	0.105	0.36
Actinium-228_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	0.7346	1.946	1.3403	1.3403	1.72
Actinium-228_EPA-901.1_pCi/g	Rad	pCi/g	1	0	1	100%	1.66	1.66	1.66	1.66	NA
Alpha activity__pCi/g	Rad	pCi/g	2	0	2	100%	4.52	29.2	16.86	16.86	24.53
Americium-241_EPA-900_pCi/g	Rad	pCi/g	1	0	1	100%	5.133	5.133	5.133	5.133	NA
Americium-241_RAD-AM ISO BY ALPHA_pCi/g	Rad	pCi/g	3	3	0	0%	-0.00441	0.0557	0.022397	0.0159	0.04
Beta activity__pCi/g	Rad	pCi/g	2	0	2	100%	4.53	15.8	10.165	10.165	13.67
Bismuth-214_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	0.4772	1.5	0.9886	0.9886	1.31
Bismuth-214_EPA-901.1_pCi/g	Rad	pCi/g	1	0	1	100%	1.17	1.17	1.17	1.17	NA
Cesium-137_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	0.166	0.3745	0.27025	0.27025	0.34
Cesium-137_EPA-901.1_pCi/g	Rad	pCi/g	5	5	0	0%	-0.054	0.128	0.019986	-0.00297	0.07
Cobalt-60_EPA-900_pCi/g	Rad	pCi/g	2	2	0	0%	-0.0016	0.093	0.0457	0.0457	0.08
Cobalt-60_EPA-901.1_pCi/g	Rad	pCi/g	5	5	0	0%	-0.0119	0.052	0.012126	0.00673	0.03
Europium-152_EPA-901.1_pCi/g	Rad	pCi/g	3	3	0	0%	-0.167	0.207	0.075667	0.187	0.20

Chemical	Type	Units	Samples	Non-Detects	Detects	Percent Detect	Minimum	Maximum	Average	Median	UCL95
Europium-154_EPA-901.1_pCi/g	Rad	pCi/g	3	3	0	0%	0.063	0.195	0.115933	0.0898	0.15
Europium-155_EPA-901.1_pCi/g	Rad	pCi/g	1	0	1	100%	1.16	1.16	1.16	1.16	NA
Lead-212_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	1.097	4.571	2.834	2.834	3.91
Lead-212_EPA-901.1_pCi/g	Rad	pCi/g	4	0	4	100%	0.169	1.14	0.66825	0.682	0.97
Lead-214_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	0.5288	1.166	0.8474	0.8474	1.05
Lead-214_EPA-901.1_pCi/g	Rad	pCi/g	4	0	4	100%	0.191	0.906	0.49025	0.432	0.70
Neptunium-237_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	6.82	19.73	13.275	13.275	17.29
Neptunium-237_RAD-NP-237 BY ALPHA_pCi/g	Rad	pCi/g	5	4	1	20%	-0.0088	0.17	0.034558	0	0.08
Plutonium-238_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	0.2323	0.6858	0.45905	0.45905	0.60
Plutonium-238_RAD-PU ISO BY ALPHA_pCi/g	Rad	pCi/g	3	2	1	33%	-0.00339	0.077	0.02917	0.0139	0.05
Plutonium-239/240_EPA-900_pCi/g	Rad	pCi/g	1	0	1	100%	0.3279	0.3279	0.3279	0.3279	NA
Plutonium-239/240_RAD-PU ISO BY ALPHA_pCi/g	Rad	pCi/g	3	3	0	0%	0.0113	0.0308	0.021933	0.0237	0.03
Plutonium-239_EPA-900_pCi/g	Rad	pCi/g	1	0	1	100%	0.1659	0.1659	0.1659	0.1659	NA
Potassium-40_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	9.193	10.87	10.0315	10.0315	10.55
Potassium-40_EPA-901.1_pCi/g	Rad	pCi/g	5	0	5	100%	2.14	27.8	8.436	4.4	15.79
Protactinium-234m_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	155.4	626.7	391.05	391.05	537.50
Protactinium-234m_EPA-901.1_pCi/g	Rad	pCi/g	1	0	1	100%	62.3	62.3	62.3	62.3	NA
Radium-226_EPA-903.1_pCi/g	Rad	pCi/g	4	2	2	50%	-0.0444	0.731	0.36615	0.389	0.61
Strontium-90_RAD-SR-90 BY BETA GPC_pCi/g	Rad	pCi/g	3	3	0	0%	0.18	0.258	0.212667	0.2	0.23
Technetium-99_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	3.1127	11.8901	7.5014	7.5014	10.23
Technetium-99_RAD-TC-99 BY BETA LSC_pCi/g	Rad	pCi/g	5	5	0	0%	-0.822	6.61	1.4436	0.381	3.58
Thallium-208_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	0.9612	3.365	2.1631	2.1631	2.91
Thallium-208_EPA-901.1_pCi/g	Rad	pCi/g	3	0	3	100%	0.0938	0.466	0.320267	0.401	0.45
Thorium-228_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	2.073	3.135	2.604	2.604	2.93
Thorium-228_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	5	1	4	80%	0.115	1.78	0.8042	0.507	1.19
Thorium-229_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	2	0	2	100%	12.3	13.9	13.1	13.1	13.60
Thorium-230_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	2.327	3.419	2.873	2.873	3.21
Thorium-230_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	5	2	3	60%	0.121	1.19	0.6296	0.433	0.85
Thorium-232_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	1.19	1.651	1.4205	1.4205	1.56
Thorium-232_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	5	0	5	100%	0.0868	1.49	0.65836	0.444	1.01
Thorium-234_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	116.7	652.7	384.7	384.7	551.26
Thorium-234_EPA-901.1_pCi/g	Rad	pCi/g	3	0	3	100%	3.4	5.88	4.293333	3.6	4.70
Thorium-234_RAD-TH ISO BY ALPHA_pCi/g	Rad	pCi/g	1	1	0	0%	0.394	0.394	0.394	0.394	NA
Thorium-234_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	1	0	1	100%	47.6	47.6	47.6	47.6	NA
Uranium_RAD-TOTAL U BY ALPHA_pCi/g	Rad	pCi/g	3	0	3	100%	5.8	28.9	14.77	9.61	19.54
Uranium-232_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	2	0	2	100%	11.8	14.1	12.95	12.95	13.66
Uranium-233/234_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	5	0	5	100%	0.754	42.9	15.9108	7.64	25.76
Uranium-234_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	784.7	1538	1161.35	1161.35	1395.43
Uranium-235/236_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	5	1	4	80%	0.0774	2.2	0.87108	0.563	1.44
Uranium-235_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	94.45	148.8	121.625	121.625	138.51
Uranium-235_EPA-901.1_pCi/g	Rad	pCi/g	4	0	4	100%	0.672	8.75	2.772	0.833	4.47
Uranium-238_EPA-900_pCi/g	Rad	pCi/g	2	0	2	100%	143.1	401.7	272.4	272.4	352.76
Uranium-238_RAD-U ISO BY ALPHA_pCi/g	Rad	pCi/g	5	0	5	100%	0.966	13.3	4.1272	1.41	6.95
1,2,4-Trichlorobenzene_mg/kg	SVOA	mg/kg	5	5	0	0%	0.0071	9.8	5.88942	9.4	9.63
1,2-Dichlorobenzene_mg/kg	SVOA	mg/kg	5	5	0	0%	0.0071	9.8	5.88942	9.4	9.63
1,3-Dichlorobenzene_mg/kg	SVOA	mg/kg	5	5	0	0%	0.0071	9.8	5.88942	9.4	9.63
1,4-Dichlorobenzene_mg/kg	SVOA	mg/kg	5	5	0	0%	0.0071	9.8	5.88942	9.4	9.63
2,3,4,6-Tetrachlorophenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
2,4,5-Trichlorophenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
2,4,6-Trichlorophenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67

Appendix F s Summary

Chemical	Type	Units	Samples	Non-Detects	Detects	Percent Detect	Minimum	Maximum	Average	Median	UCL95
2,4-Dichlorophenol_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
2,4-Dimethylphenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
2,4-Dinitrophenol_mg/kg	SVOA	mg/kg	1	1	0	0%	0.88	0.88	0.88	0.88	NA
2,4-Dinitrotoluene_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
2,6-Dinitrotoluene_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
2-Chloronaphthalene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
2-Chlorophenol_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
2-Methyl-4,6-dinitrophenol_mg/kg	SVOA	mg/kg	1	1	0	0%	0.88	0.88	0.88	0.88	NA
2-Methylnaphthalene_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
2-Methylphenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
2-Nitrobenzenamine_mg/kg	SVOA	mg/kg	1	1	0	0%	0.88	0.88	0.88	0.88	NA
2-Nitrophenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
3,3'-Dichlorobenzidine_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
3-Methylphenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
3-Nitrobenzenamine_mg/kg	SVOA	mg/kg	1	1	0	0%	0.88	0.88	0.88	0.88	NA
4-Bromophenyl phenyl ether_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
4-Chloro-3-methylphenol_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
4-Chlorobenzenamine_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
4-Chlorophenyl phenyl ether_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
4-Nitrobenzenamine_mg/kg	SVOA	mg/kg	4	4	0	0%	0.88	20	14.97	19.5	19.72
4-Nitrophenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.88	9.8	7.47	9.6	9.68
Acenaphthene_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Acenaphthylene_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Aniline_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Anthracene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Benz(a)anthracene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Benzenemethanol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Benzo(a)pyrene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Benzo(b)fluoranthene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Benzo(ghi)perylene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Benzo(k)fluoranthene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Benzoic acid_mg/kg	SVOA	mg/kg	4	4	0	0%	2.2	49	36.8	48	48.36
Bis(2-chloroethoxy)methane_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Bis(2-chloroethyl) ether_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Bis(2-chloroisopropyl) ether_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Bis(2-ethylhexyl)phthalate_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Butyl benzyl phthalate_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Carbazole_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Chrysene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Dibenz(a,h)anthracene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Dibenzofuran_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Diethyl phthalate_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Dimethyl phthalate_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Di-n-butyl phthalate_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Di-n-octylphthalate_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Diphenyldiazene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Fluoranthene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Fluorene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Hexachlorobenzene_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Hexachlorobutadiene_mg/kg	SVOA	mg/kg	5	5	0	0%	0.0071	9.8	5.88942	9.4	9.63

Appendix F s Summary

Chemical	Type	Units	Samples	Non-Detects	Detects	Percent Detect	Minimum	Maximum	Average	Median	UCL95
Hexachlorocyclopentadiene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Hexachloroethane_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Indeno(1,2,3-cd)pyrene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Isophorone_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Naphthalene_mg/kg	SVOA	mg/kg	5	5	0	0%	0.0071	9.8	5.88942	9.4	9.63
Nitrobenzene_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
N-Nitrosodimethylamine_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
N-Nitroso-di-n-propylamine_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
N-Nitrosodiphenylamine_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Pentachlorophenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.88	20	14.97	19.5	19.72
Phenanthrene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Phenol_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
Pyrene_mg/kg	SVOA	mg/kg	1	1	0	0%	0.44	0.44	0.44	0.44	NA
Pyridine_mg/kg	SVOA	mg/kg	4	4	0	0%	0.44	9.8	7.36	9.6	9.67
1,4-Dichlorobenzene_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
2,4,5-Trichlorophenol_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
2,4,6-Trichlorophenol_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
2,4-Dinitrotoluene_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
2-Methylphenol_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
3-Methylphenol_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
Arsenic_mg/L	TCLP	mg/L	3	3	0	0%	0.027	0.027	0.027	0.027	NA
Barium_mg/L	TCLP	mg/L	3	3	0	0%	0.21	0.33	0.253333	0.22	0.27
Cadmium_mg/L	TCLP	mg/L	3	3	0	0%	0.0025	0.0025	0.0025	0.0025	NA
Chromium_mg/L	TCLP	mg/L	3	3	0	0%	0.0075	0.0075	0.0075	0.0075	NA
Hexachlorobenzene_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
Hexachlorobutadiene_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
Hexachloroethane_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
Lead_mg/L	TCLP	mg/L	3	3	0	0%	0.016	0.016	0.016	0.016	NA
Mercury_mg/L	TCLP	mg/L	3	2	1	33%	0.00012	0.00012	0.00012	0.00012	NA
Nitrobenzene_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
Pentachlorophenol_mg/L	TCLP	mg/L	3	3	0	0%	0.2	0.2	0.2	0.2	NA
Pyridine_mg/L	TCLP	mg/L	3	3	0	0%	0.1	0.1	0.1	0.1	NA
Selenium_mg/L	TCLP	mg/L	3	1	2	67%	0.024	0.045	0.033	0.03	0.04
Silver_mg/L	TCLP	mg/L	3	3	0	0%	0.014	0.014	0.014	0.014	NA
(1,1-Dimethylethyl)benzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
(1-Methylpropyl)benzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,1,1,2-Tetrachloroethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,1,1-Trichloroethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,1,2,2-Tetrachloroethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,1,2-Trichloro-1,2,2-trifluoroethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,1,2-Trichloroethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,1-Dichloroethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,1-Dichloroethene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,1-Dichloropropene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,2,3-Trichlorobenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,2,3-Trichloropropane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,2,4-Trimethylbenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,2-Dibromo-3-chloropropane_mg/kg	VOA	mg/kg	1	1	0	0%	0.014	0.014	0.014	0.014	NA
1,2-Dibromoethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,2-Dichloroethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA

Appendix F s Summary

Chemical	Type	Units	Samples	Non-Detects	Detects	Percent Detect	Minimum	Maximum	Average	Median	UCL95
1,2-Dichloropropane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,2-Dimethylbenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,3,5-Trimethylbenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1,3-Dichloropropane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1-Chloro-4-methylbenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1-chlorohexane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
1-Methyl-4-(1-methylethyl)benzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
2,2-Dichloropropane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
2-Butanone_mg/kg	VOA	mg/kg	1	1	0	0%	0.028	0.028	0.028	0.028	NA
2-Hexanone_mg/kg	VOA	mg/kg	1	1	0	0%	0.028	0.028	0.028	0.028	NA
2-Methoxy-2-methylpropane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
4-Methyl-2-pentanone_mg/kg	VOA	mg/kg	1	1	0	0%	0.028	0.028	0.028	0.028	NA
Acetone_mg/kg	VOA	mg/kg	1	1	0	0%	0.028	0.028	0.028	0.028	NA
Benzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Bromobenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Bromochloromethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Bromodichloromethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Bromoform_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Bromomethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Butylbenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Carbon disulfide_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Carbon tetrachloride_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Chlorobenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Chloroethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Chloroform_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Chloromethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
cis-1,2-Dichloroethene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
cis-1,3-Dichloropropene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Cumene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Dibromochloromethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Dibromomethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Dichlorodifluoromethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Ethylbenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Iodomethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
M + P Xylene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Methylene chloride_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
o-Chlorotoluene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Propylbenzene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Propylene glycol_mg/kg	VOA	mg/kg	3	3	0	0%	30	30	30	30	NA
Styrene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Tetrachloroethene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Toluene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
trans-1,2-Dichloroethene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
trans-1,3-Dichloropropene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Trichloroethene_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Trichlorofluoromethane_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Vinyl acetate_mg/kg	VOA	mg/kg	1	1	0	0%	0.028	0.028	0.028	0.028	NA
Vinyl chloride_mg/kg	VOA	mg/kg	1	1	0	0%	0.0071	0.0071	0.0071	0.0071	NA
Cyanide_mg/kg	Wet Chem	mg/kg	3	3	0	0%	0.5	0.5	0.5	0.5	NA

APPENDIX G: WASTE LOT CHARACTERIZATION DATA

Appendix G: Waste haracterization Data

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
KAH-SS-B12	KAH-SS-B12	Actinium-228	pCi/g	0.7346		=	0.32	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Bismuth-214	pCi/g	0.4772		=	0.1803	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Cesium-137	pCi/g	0.166		=	0.0847	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Cobalt-60	pCi/g	-0.0016	U	U	0.0972	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Lead-212	pCi/g	1.097		=	0.1238	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Lead-214	pCi/g	0.5288		=	0.1511	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Neptunium-237	pCi/g	6.82		=	0.0902	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Plutonium-238	pCi/g	0.2323	J	J	0.2321	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Plutonium-239	pCi/g	0.1659	J	J	0.0899	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Potassium-40	pCi/g	10.87		=	0.7555	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Protactinium-234m	pCi/g	155.4		=	9.671	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Technetium-99	pCi/g	11.8901		=	0.0719	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Thallium-208	pCi/g	0.9612		=	0.2616	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Thorium-228	pCi/g	2.073		=	0.1495	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Thorium-230	pCi/g	2.327		=	0.0521	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Thorium-232	pCi/g	1.19		=	0.052	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Thorium-234	pCi/g	116.7		=	8.187	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Uranium-234	pCi/g	784.7		=	13.99	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Uranium-235	pCi/g	94.45		=	29.47	RADS	EPA-900	SOIL
KAH-SS-B12	KAH-SS-B12	Uranium-238	pCi/g	143.1		=	23.79	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Actinium-228	pCi/g	1.946		=	0.6483	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Americium-241	pCi/g	5.133		=	1.439	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Bismuth-214	pCi/g	1.5		=	0.4754	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Cesium-137	pCi/g	0.3745	J	J	0.2499	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Cobalt-60	pCi/g	0.093	U	U	0.213	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Lead-212	pCi/g	4.571		=	0.4497	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Lead-214	pCi/g	1.166	J	J	0.5221	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Neptunium-237	pCi/g	19.73		=	0.24	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Plutonium-238	pCi/g	0.6858		=	0.1616	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Plutonium-239/240	pCi/g	0.3279	J	J	0.1379	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Potassium-40	pCi/g	9.193		=	1.454	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Protactinium-234m	pCi/g	626.7		=	19.91	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Technetium-99	pCi/g	3.1127		=	0.3823	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Thallium-208	pCi/g	3.365		=	0.7451	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Thorium-228	pCi/g	3.135		=	0.192	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Thorium-230	pCi/g	3.419		=	0.0594	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Thorium-232	pCi/g	1.651		=	0.1319	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Thorium-234	pCi/g	652.7		=	13.3	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Uranium-234	pCi/g	1538		=	11.67	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Uranium-235	pCi/g	148.8		=	14.4	RADS	EPA-900	SOIL
KAH-SS-B13	KAH-SS-B13	Uranium-238	pCi/g	401.7		=	23.25	RADS	EPA-900	SOIL
Z2-EU33-2019	BOSLABS078	Aluminum	mg/kg	14000		=	0.5	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Antimony	mg/kg	0.18		=	0.0024	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Arsenic	mg/kg	11		=	0.33	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Barium	mg/kg	130		=	0.02	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Beryllium	mg/kg	0.85		=	0.0032	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Boron	mg/kg	1.4	B	J	0.12	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Cadmium	mg/kg	3.1		=	0.004	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Calcium	mg/kg	14000		=	0.43	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Chromium	mg/kg	23		=	0.074	METAL		SOIL

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33-2019	BOSLABS078	Cobalt	mg/kg	15		=	0.065	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Copper	mg/kg	47		=	0.075	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Iron	mg/kg	24000		=	1.9	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Lead	mg/kg	31		=	0.33	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Lithium	mg/kg	4.6		=	0.22	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Magnesium	mg/kg	1100		=	0.89	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Manganese	mg/kg	2000		=	0.024	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Mercury	mg/kg	0.24		=	0.0012	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Molybdenum	mg/kg	1.2	B	J	0.15	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Nickel	mg/kg	150		=	0.11	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Potassium	mg/kg	740		=	8.4	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Selenium	mg/kg	0.99	B	J	0.78	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Silver	mg/kg	0.56	B	J	0.12	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Sodium	mg/kg	39	B	J	0.71	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Thallium	mg/kg	0.21		=	0.0018	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Uranium	mg/kg	25		=	0.0029	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Vanadium	mg/kg	24		=	0.087	METAL		SOIL
Z2-EU33-2019	BOSLABS078	Zinc	mg/kg	58		=	0.081	METAL		SOIL
Z2-EU33-2019	BOSLABS078	PCB-1016	mg/kg	0.1	U	U	17	PPCB		SOIL
Z2-EU33-2019	BOSLABS078	PCB-1221	mg/kg	0.1	U	U	15	PPCB		SOIL
Z2-EU33-2019	BOSLABS078	PCB-1232	mg/kg	0.1	U	U	19	PPCB		SOIL
Z2-EU33-2019	BOSLABS078	PCB-1242	mg/kg	0.1	U	U	8.5	PPCB		SOIL
Z2-EU33-2019	BOSLABS078	PCB-1248	mg/kg	0.1	U	U	17	PPCB		SOIL
Z2-EU33-2019	BOSLABS078	PCB-1254	mg/kg	0.1	U	U	18	PPCB		SOIL
Z2-EU33-2019	BOSLABS078	PCB-1260	mg/kg	0.1	U	U	24	PPCB		SOIL
Z2-EU33-2019	BOSLABS078	Polychlorinated biphenyl	mg/kg	0.1	U	U	8.5	PPCB		SOIL
Z2-EU33-2019	BOSLABS079	Actinium-228	pCi/g	1.66	J	J	1.32	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Alpha activity	pCi/g	29.2		J	0.798	RADS		SOIL
Z2-EU33-2019	BOSLABS079	Beta activity	pCi/g	15.8		J	1.98	RADS		SOIL
Z2-EU33-2019	BOSLABS079	Bismuth-214	pCi/g	1.17	J	J	0.902	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Cesium-137	pCi/g	0.128	U	U	0.296	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Cobalt-60	pCi/g	2.28E-08	U	U	0.437	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Europium-155	pCi/g	1.16	J	J	0.985	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Lead-212	pCi/g	1.04		=	0.412	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Lead-214	pCi/g	0.906	J	J	0.463	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Neptunium-237	pCi/g	0.17		J	0.14	RADS	RAD-NP-237 BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Potassium-40	pCi/g	4.4		=	3.16	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Protactinium-234m	pCi/g	62.3	J	J	51.9	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Radium-226	pCi/g	0.731		=	0.317	RADS	EPA-903.1	SOIL
Z2-EU33-2019	BOSLABS079	Technetium-99	pCi/g	6.61		UJ	4.38	RADS	RAD-TC-99 BY BETA LSC	SOIL
Z2-EU33-2019	BOSLABS079	Thallium-208	pCi/g	0.401		=	0.316	RADS	EPA-901.1	SOIL
Z2-EU33-2019	BOSLABS079	Thorium-228	pCi/g	1.31		=	0.381	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Thorium-229	pCi/g	13.9		XV	0.132	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Thorium-230	pCi/g	1.19		=	0.48	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Thorium-232	pCi/g	1.15		=	0.109	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Thorium-234	pCi/g	47.6		=	5.95	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Uranium-232	pCi/g	14.1		XV	0.254	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Uranium-233/234	pCi/g	42.9		=	0.124	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Uranium-235/236	pCi/g	2.2		J	0.131	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS079	Uranium-235	pCi/g	8.75		J	1.45	RADS	EPA-901.1	SOIL

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33-2019	BOSLABS079	Uranium-238	pCi/g	13.3		=	0.0946	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33-2019	BOSLABS081	Aluminum	mg/kg	22000		=	0.54	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Antimony	mg/kg	0.0026	U	U	0.0026	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Arsenic	mg/kg	4.4		=	0.36	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Barium	mg/kg	80		=	0.021	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Beryllium	mg/kg	1.8		=	0.0034	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Boron	mg/kg	2.6	B	J	0.13	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Cadmium	mg/kg	2.7		=	0.0043	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Calcium	mg/kg	2000		=	0.46	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Chromium	mg/kg	20		=	0.08	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Cobalt	mg/kg	52		=	0.07	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Copper	mg/kg	24		=	0.081	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Iron	mg/kg	53000		=	3.1	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Lead	mg/kg	33		=	0.53	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Lithium	mg/kg	11		=	0.24	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Magnesium	mg/kg	850		=	0.95	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Manganese	mg/kg	920		=	0.013	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Mercury	mg/kg	0.1		=	0.0013	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Molybdenum	mg/kg	0.17	U	U	0.17	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Nickel	mg/kg	27		=	0.12	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Potassium	mg/kg	1500		=	9.1	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Selenium	mg/kg	1.3	U	U	1.3	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Silver	mg/kg	0.13	U	U	0.13	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Sodium	mg/kg	41	B	J	0.77	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Thallium	mg/kg	0.29		=	0.002	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Uranium	mg/kg	0.68		=	0.00063	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Vanadium	mg/kg	29		=	0.094	METAL		SOIL
Z2-EU33-2019	BOSLABS081	Zinc	mg/kg	69		=	0.087	METAL		SOIL
Z2-EU33-2019	BOSLABS081	PCB-1016	mg/kg	0.11	U	U	18	PPCB		SOIL
Z2-EU33-2019	BOSLABS081	PCB-1221	mg/kg	0.11	U	U	16	PPCB		SOIL
Z2-EU33-2019	BOSLABS081	PCB-1232	mg/kg	0.11	U	U	20	PPCB		SOIL
Z2-EU33-2019	BOSLABS081	PCB-1242	mg/kg	0.11	U	U	9.1	PPCB		SOIL
Z2-EU33-2019	BOSLABS081	PCB-1248	mg/kg	0.11	U	U	18	PPCB		SOIL
Z2-EU33-2019	BOSLABS081	PCB-1254	mg/kg	0.11	U	U	19	PPCB		SOIL
Z2-EU33-2019	BOSLABS081	PCB-1260	mg/kg	0.11	U	U	26	PPCB		SOIL
Z2-EU33-2019	BOSLABS081	Polychlorinated biphenyl	mg/kg	0.11	U	U	9.1	PPCB		SOIL
Z2-EU33-2019	BOSLABS081	1,2,4-Trichlorobenzene	mg/kg	0.44	U	U	16	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	1,2-Dichlorobenzene	mg/kg	0.44	U	U	19	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	1,3-Dichlorobenzene	mg/kg	0.44	U	U	20	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	1,4-Dichlorobenzene	mg/kg	0.44	U	U	17	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2,3,4,6-Tetrachlorophenol	mg/kg	0.44	U	U	29	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2,4,5-Trichlorophenol	mg/kg	0.44	U	U	20	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2,4,6-Trichlorophenol	mg/kg	0.44	U	U	20	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2,4-Dichlorophenol	mg/kg	0.44	U	U	16	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2,4-Dimethylphenol	mg/kg	0.44	U	U	10	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2,4-Dinitrophenol	mg/kg	0.88	U	U	500	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2,4-Dinitrotoluene	mg/kg	0.44	U	U	42	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2,6-Dinitrotoluene	mg/kg	0.44	U	U	41	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2-Chloronaphthalene	mg/kg	0.44	U	U	22	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2-Chlorophenol	mg/kg	0.44	U	U	18	SVOA		SOIL

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33-2019	BOSLABS081	2-Methyl-4,6-dinitrophenol	mg/kg	0.88	U	U	33	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2-Methylnaphthalene	mg/kg	0.44	U	U	22	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2-Methylphenol	mg/kg	0.44	U	U	15	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2-Nitrobenzenamine	mg/kg	0.88	U	U	24	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	2-Nitrophenol	mg/kg	0.44	U	U	24	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	3,3'-Dichlorobenzidine	mg/kg	0.44	U	U	42	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	3-Methylphenol	mg/kg	0.44	U	U	25	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	3-Nitrobenzenamine	mg/kg	0.88	U	U	34	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	4-Bromophenyl phenyl ether	mg/kg	0.44	U	U	20	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	4-Chloro-3-methylphenol	mg/kg	0.44	U	U	24	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	4-Chlorobenzenamine	mg/kg	0.44	U	U	22	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	4-Chlorophenyl phenyl ether	mg/kg	0.44	U	U	25	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	4-Nitrobenzenamine	mg/kg	0.88	U	U	44	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	4-Nitrophenol	mg/kg	0.88	U	U	40	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Acenaphthene	mg/kg	0.44	U	U	19	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Acenaphthylene	mg/kg	0.44	U	U	24	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Aniline	mg/kg	0.44	U	U	18	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Anthracene	mg/kg	0.44	U	U	20	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Benz(a)anthracene	mg/kg	0.44	U	U	27	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Benzenemethanol	mg/kg	0.44	U	U	22	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Benzo(a)pyrene	mg/kg	0.44	U	U	21	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Benzo(b)fluoranthene	mg/kg	0.44	U	U	32	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Benzo(ghi)perylene	mg/kg	0.44	U	U	39	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Benzo(k)fluoranthene	mg/kg	0.44	U	U	31	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Benzoic acid	mg/kg	2.2	U	U	1100	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Bis(2-chloroethoxy)methane	mg/kg	0.44	U	U	22	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Bis(2-chloroethyl) ether	mg/kg	0.44	U	U	30	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Bis(2-chloroisopropyl) ether	mg/kg	0.44	U	U	38	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Bis(2-ethylhexyl)phthalate	mg/kg	0.44	U	U	32	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Butyl benzyl phthalate	mg/kg	0.44	U	U	31	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Carbazole	mg/kg	0.44	U	U	31	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Chrysene	mg/kg	0.44	U	U	38	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Dibenz(a,h)anthracene	mg/kg	0.44	U	U	140	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Dibenzofuran	mg/kg	0.44	U	U	22	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Diethyl phthalate	mg/kg	0.44	U	U	23	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Dimethyl phthalate	mg/kg	0.44	U	U	21	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Di-n-butyl phthalate	mg/kg	0.44	BJ	U	27	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Di-n-octylphthalate	mg/kg	0.44	U	U	29	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Diphenyldiazene	mg/kg	0.44	U	U	31	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Fluoranthene	mg/kg	0.44	U	U	34	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Fluorene	mg/kg	0.44	U	U	20	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Hexachlorobenzene	mg/kg	0.44	U	U	30	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Hexachlorobutadiene	mg/kg	0.44	U	U	25	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Hexachlorocyclopentadiene	mg/kg	0.44	U	U	250	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Hexachloroethane	mg/kg	0.44	U	U	20	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Indeno(1,2,3-cd)pyrene	mg/kg	0.44	U	U	47	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Isophorone	mg/kg	0.44	U	U	21	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Naphthalene	mg/kg	0.44	U	U	19	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Nitrobenzene	mg/kg	0.44	U	U	26	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	N-Nitrosodimethylamine	mg/kg	0.44	U	U	49	SVOA		SOIL

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33-2019	BOSLABS081	N-Nitroso-di-n-propylamine	mg/kg	0.44	U	U	36	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	N-Nitrosodiphenylamine	mg/kg	0.44	U	U	17	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Pentachlorophenol	mg/kg	0.88	U	U	270	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Phenanthrene	mg/kg	0.44	U	U	26	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Phenol	mg/kg	0.44	U	U	21	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Pyrene	mg/kg	0.44	U	U	28	SVOA		SOIL
Z2-EU33-2019	BOSLABS081	Pyridine	mg/kg	0.44	U	U	60	SVOA		SOIL
Z2-EU33B-229	BOSLABS715	Aluminum	mg/kg	18000		=	0.8	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Antimony	mg/kg	0.092		J	0.0048	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Arsenic	mg/kg	4.8		=	0.73	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Barium	mg/kg	170		J	0.014	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Beryllium	mg/kg	2.3		=	0.011	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Boron	mg/kg	3.2	B	J	0.36	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Cadmium	mg/kg	0.19		=	0.0054	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Calcium	mg/kg	4400		=	0.7	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Chromium	mg/kg	20		=	0.078	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Cobalt	mg/kg	12		=	0.093	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Copper	mg/kg	33		J	0.046	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Iron	mg/kg	57000		J	2.5	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Lead	mg/kg	22		=	0.94	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Lithium	mg/kg	20		J	0.011	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Magnesium	mg/kg	3200		=	0.64	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Manganese	mg/kg	320		J	0.011	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Mercury	mg/kg	0.08		=	0.00084	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Molybdenum	mg/kg	0.28	B	J	0.17	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Nickel	mg/kg	27		=	0.12	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Potassium	mg/kg	1700		=	3.3	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Selenium	mg/kg	2.3	U	U	2.3	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Silver	mg/kg	0.062	U	U	0.062	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Sodium	mg/kg	73	B	U	0.24	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Thallium	mg/kg	0.23		J	0.0059	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Uranium	mg/kg	0.4		=	0.00062	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Vanadium	mg/kg	24		J	0.34	METAL		SOIL
Z2-EU33B-229	BOSLABS715	Zinc	mg/kg	78		=	0.13	METAL		SOIL
Z2-EU33B-229	BOSLABS715	PCB-1016	mg/kg	0.023	U	U	5.3	PPCB		SOIL
Z2-EU33B-229	BOSLABS715	PCB-1221	mg/kg	0.023	U	U	7.3	PPCB		SOIL
Z2-EU33B-229	BOSLABS715	PCB-1232	mg/kg	0.023	U	U	7.1	PPCB		SOIL
Z2-EU33B-229	BOSLABS715	PCB-1242	mg/kg	0.023	U	U	6.8	PPCB		SOIL
Z2-EU33B-229	BOSLABS715	PCB-1248	mg/kg	0.023	U	U	3.1	PPCB		SOIL
Z2-EU33B-229	BOSLABS715	PCB-1254	mg/kg	0.023	U	U	5.5	PPCB		SOIL
Z2-EU33B-229	BOSLABS715	PCB-1260	mg/kg	0.023	U	U	3.4	PPCB		SOIL
Z2-EU33B-229	BOSLABS715	Polychlorinated biphenyl	mg/kg	0.023	U	U	3.1	PPCB		SOIL
Z2-EU33B-229	BOSLABS716	Alpha activity	pCi/g	4.52		=	0.77	RADS		SOIL
Z2-EU33B-229	BOSLABS716	Beta activity	pCi/g	4.53		=	1.19	RADS		SOIL
Z2-EU33B-229	BOSLABS716	Cesium-137	pCi/g	0.0419	U	U	0.281	RADS	EPA-901.1	SOIL
Z2-EU33B-229	BOSLABS716	Cobalt-60	pCi/g	0.052	U	U	0.255	RADS	EPA-901.1	SOIL
Z2-EU33B-229	BOSLABS716	Lead-212	pCi/g	1.14		=	0.394	RADS	EPA-901.1	SOIL
Z2-EU33B-229	BOSLABS716	Lead-214	pCi/g	0.541	J	J	0.457	RADS	EPA-901.1	SOIL
Z2-EU33B-229	BOSLABS716	Neptunium-237	pCi/g	0	U	U	0.0969	RADS	RAD-NP-237 BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Potassium-40	pCi/g	27.8		=	3.34	RADS	EPA-901.1	SOIL

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-229	BOSLABS716	Technetium-99	pCi/g	0.381	U	U	2.85	RADS	RAD-TC-99 BY BETA LSC	SOIL
Z2-EU33B-229	BOSLABS716	Thallium-208	pCi/g	0.466		J	0.322	RADS	EPA-901.1	SOIL
Z2-EU33B-229	BOSLABS716	Thorium-228	pCi/g	1.78		=	0.367	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Thorium-229	pCi/g	12.3		XV	0.0796	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Thorium-230	pCi/g	1.15		=	0.415	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Thorium-232	pCi/g	1.49		=	0.11	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Thorium-234	pCi/g	0.394	U	U	2.6	RADS	RAD-TH ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Uranium-232	pCi/g	11.8		XV	0.194	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Uranium-233/234	pCi/g	0.754		=	0.108	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Uranium-235/236	pCi/g	0.0774	U	UJ	0.139	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS716	Uranium-238	pCi/g	0.966		=	0.142	RADS	RAD-U ISO BY ALPHA	SOIL
Z2-EU33B-229	BOSLABS717	1,2,4-Trichlorobenzene	mg/kg	0.0071	U	U	2.4	SVOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2-Dichlorobenzene	mg/kg	0.0071	U	U	2.4	SVOA		SOIL
Z2-EU33B-229	BOSLABS717	1,3-Dichlorobenzene	mg/kg	0.0071	U	U	2.4	SVOA		SOIL
Z2-EU33B-229	BOSLABS717	1,4-Dichlorobenzene	mg/kg	0.0071	U	U	2.4	SVOA		SOIL
Z2-EU33B-229	BOSLABS717	Hexachlorobutadiene	mg/kg	0.0071	U	U	2.4	SVOA		SOIL
Z2-EU33B-229	BOSLABS717	Naphthalene	mg/kg	0.0071	U	U	2.4	SVOA		SOIL
Z2-EU33B-229	BOSLABS717	(1,1-Dimethylethyl)benzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	(1-Methylpropyl)benzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,1,1,2-Tetrachloroethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,1,1-Trichloroethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,1,2,2-Tetrachloroethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,1,2-Trichloro-1,2,2-trifluoroethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,1,2-Trichloroethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,1-Dichloroethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,1-Dichloroethene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,1-Dichloropropene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2,3-Trichlorobenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2,3-Trichloropropane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2,4-Trimethylbenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2-Dibromo-3-chloropropane	mg/kg	0.014	U	U	4.7	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2-Dibromoethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2-Dichloroethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2-Dichloropropane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,2-Dimethylbenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,3,5-Trimethylbenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1,3-Dichloropropane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1-Chloro-4-methylbenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1-chlorohexane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	1-Methyl-4-(1-methylethyl)benzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	2,2-Dichloropropane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	2-Butanone	mg/kg	0.028	U	U	9.5	VOA		SOIL
Z2-EU33B-229	BOSLABS717	2-Hexanone	mg/kg	0.028	U	U	9.5	VOA		SOIL
Z2-EU33B-229	BOSLABS717	2-Methoxy-2-methylpropane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	4-Methyl-2-pentanone	mg/kg	0.028	U	U	9.5	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Acetone	mg/kg	0.028	U	U	9.5	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Benzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Bromobenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Bromochloromethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Bromodichloromethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL

Appendix G: Waste Characterization Data

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-229	BOSLABS717	Bromoform	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Bromomethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Butylbenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Carbon disulfide	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Carbon tetrachloride	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Chlorobenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Chloroethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Chloroform	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Chloromethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	cis-1,2-Dichloroethene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	cis-1,3-Dichloropropene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Cumene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Dibromochloromethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Dibromomethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Dichlorodifluoromethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Ethylbenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Iodomethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	M + P Xylene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Methylene chloride	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	o-Chlorotoluene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Propylbenzene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Styrene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Tetrachloroethene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Toluene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	trans-1,2-Dichloroethene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	trans-1,3-Dichloropropene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Trichloroethene	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Trichlorofluoromethane	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Vinyl acetate	mg/kg	0.028	U	U	4.7	VOA		SOIL
Z2-EU33B-229	BOSLABS717	Vinyl chloride	mg/kg	0.0071	U	U	2.4	VOA		SOIL
Z2-EU33B-WAC01	SPKAPIT-001	Aluminum	mg/kg	3300		=	0.97	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Antimony	mg/kg	0.37	NU	UJ	0.37	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Arsenic	mg/kg	2.5		=	0.26	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Barium	mg/kg	20	E	J	0.01	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Beryllium	mg/kg	0.34	E	J	0.0031	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Boron	mg/kg	5.1		=	0.1	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Cadmium	mg/kg	0.33	B	J	0.024	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Chromium	mg/kg	9.1	EN	J	0.074	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Copper	mg/kg	29	N	J	0.091	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Lead	mg/kg	7.4		=	0.16	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Manganese	mg/kg	120	E	J	0.0099	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Mercury	mg/kg	0.13		=	0.0019	METAL	SW846-7471A	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Molybdenum	mg/kg	0.49	B	J	0.097	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Nickel	mg/kg	13	E	J	0.1	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Selenium	mg/kg	0.24	U	U	0.24	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Silver	mg/kg	0.22	B	J	0.13	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Strontium	mg/kg	160	EN	J	0.0058	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Thallium	mg/kg	0.54	U	U	0.54	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Tin	mg/kg	3.6	B	J	0.22	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Vanadium	mg/kg	5.2	E	J	0.085	METAL	SW846-6010B	SOLID

Appendix G: Waste Characterization Data

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-001	Zinc	mg/kg	37	E	J	0.12	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Arsenic	mg/L	0.027	U	U	0.027	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Barium	mg/L	0.23	B	U	0.0011	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Cadmium	mg/L	0.0025	U	U	0.0025	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Chromium	mg/L	0.0075	U	U	0.0075	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Lead	mg/L	0.016	U	U	0.016	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Mercury	mg/L	0.00012	B	J	0.00012	METAL	SW846-7470A	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Selenium	mg/L	0.045	B	J	0.024	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Silver	mg/L	0.014	U	U	0.014	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Uranium	pCi/g	5.82		=	0.249	METAL	RAD-TOTAL U BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	PCB-1016	mg/kg	0.047	U	U	11	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	PCB-1221	mg/kg	0.047	U	U	15	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	PCB-1232	mg/kg	0.047	U	U	15	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	PCB-1242	mg/kg	0.047	U	U	14	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	PCB-1248	mg/kg	0.047	U	U	6.3	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	PCB-1254	mg/kg	0.047	U	U	11	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	PCB-1260	mg/kg	0.061		J	7.1	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Polychlorinated biphenyl	mg/kg	0.061		J	6.3	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Americium-241	pCi/g	0.0159	U	U	0.0432	RADS	RAD-AM ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Cesium-137	pCi/g	-0.00323	U	U	0.0729	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Cobalt-60	pCi/g	-0.0164	U	U	0.0863	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Europium-152	pCi/g	-0.184	U	U	0.485	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Europium-154	pCi/g	0.0484	U	U	0.439	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Lead-212	pCi/g	0.169		=	0.139	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Lead-214	pCi/g	0.191	J	J	0.156	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Neptunium-237	pCi/g	-0.0171	U	U	0.158	RADS	RAD-NP-237 BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Plutonium-238	pCi/g	0	U	U	0.0407	RADS	RAD-PU ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Plutonium-239/240	pCi/g	0.0105	U	U	0.0789	RADS	RAD-PU ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Potassium-40	pCi/g	2.85		=	1.15	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Radium-226	pCi/g	0.0932	U	U	0.616	RADS	EPA-903.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Strontium-90	pCi/g	0.258	U	U	0.701	RADS	RAD-SR-90 BY BETA GPC	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Technetium-99	pCi/g	-0.217	U	U	1.5	RADS	RAD-TC-99 BY BETA LSC	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Thorium-228	pCi/g	0.0998		=	0.076	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Thorium-230	pCi/g	0.269		=	0.242	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Thorium-232	pCi/g	0.0948		=	0.0522	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Thorium-234	pCi/g	3.09		=	1.3	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Uranium-233/234	pCi/g	4.75		=	0.19	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Uranium-235/236	pCi/g	0.338		=	0.16	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Uranium-235	pCi/g	0.395		=	0.337	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Uranium-238	pCi/g	0.724		=	0.151	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	1,2,4-Trichlorobenzene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	1,2-Dichlorobenzene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	1,3-Dichlorobenzene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	1,4-Dichlorobenzene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,3,4,6-Tetrachlorophenol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,4,5-Trichlorophenol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,4,6-Trichlorophenol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,4-Dimethylphenol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,4-Dinitrotoluene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,6-Dinitrotoluene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-001	2-Methylnaphthalene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2-Methylphenol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2-Nitrophenol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	3-Methylphenol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	4-Nitrobenzenamine	mg/kg	19	U	U	4700	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	4-Nitrophenol	mg/kg	9.3	U	U	4000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Acenaphthene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Acenaphthylene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Benzenemethanol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Benzoic acid	mg/kg	46	U	U	16000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Carbazole	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Diethyl phthalate	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Dimethyl phthalate	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Di-n-butyl phthalate	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Hexachlorobenzene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Hexachlorobutadiene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Hexachloroethane	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Isophorone	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Naphthalene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Nitrobenzene	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	N-Nitroso-di-n-propylamine	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	N-Nitrosodiphenylamine	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Pentachlorophenol	mg/kg	19	U	U	3700	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Phenol	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Pyridine	mg/kg	9.3	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	1,4-Dichlorobenzene	mg/L	0.1	U	U	0.022	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,4,5-Trichlorophenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,4,6-Trichlorophenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2,4-Dinitrotoluene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	2-Methylphenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	3-Methylphenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Hexachlorobenzene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Hexachlorobutadiene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Hexachloroethane	mg/L	0.1	U	U	0.022	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Nitrobenzene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Pentachlorophenol	mg/L	0.2	U	U	0.04	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Pyridine	mg/L	0.1	U	U	0.031	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Propylene glycol	mg/kg	30	U	U	3600	VOA	SW846-8015M	SOLID
Z2-EU33B-WAC01	SPKAPIT-001	Cyanide	mg/kg	0.5	NU	U		WETCHEM	SW846-9014	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Aluminum	mg/kg	3200		=	0.98	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Antimony	mg/kg	0.38	U	UJ	0.38	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Arsenic	mg/kg	2.3		=	0.26	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Barium	mg/kg	23		J	0.011	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Beryllium	mg/kg	0.3		J	0.0031	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Boron	mg/kg	5		=	0.1	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Cadmium	mg/kg	1.2		=	0.025	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Chromium	mg/kg	9.4		J	0.074	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Copper	mg/kg	50		J	0.092	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Lead	mg/kg	17		=	0.16	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Manganese	mg/kg	130		J	0.01	METAL	SW846-6010B	SOLID

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-002	Mercury	mg/kg	1.6		=	0.019	METAL	SW846-7471A	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Molybdenum	mg/kg	0.71	B	J	0.098	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Nickel	mg/kg	250		J	0.1	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Selenium	mg/kg	0.24	U	U	0.24	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Silver	mg/kg	0.61	B	J	0.13	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Strontium	mg/kg	160		J	0.0058	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Thallium	mg/kg	0.55	U	U	0.55	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Tin	mg/kg	4.3	B	J	0.22	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Vanadium	mg/kg	5.1		J	0.086	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Zinc	mg/kg	53		J	0.12	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Arsenic	mg/L	0.027	U	U	0.027	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Barium	mg/L	0.21	B	U	0.0011	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Cadmium	mg/L	0.0025	U	U	0.0025	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Chromium	mg/L	0.0075	U	U	0.0075	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Lead	mg/L	0.016	U	U	0.016	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Mercury	mg/L	0.00012	U	U	0.00012	METAL	SW846-7470A	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Selenium	mg/L	0.024	U	U	0.024	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Silver	mg/L	0.014	U	U	0.014	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Uranium	pCi/g	9.61		=	0.2	METAL	RAD-TOTAL U BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	PCB-1016	mg/kg	0.048	U	U	11	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	PCB-1221	mg/kg	0.048	U	U	15	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	PCB-1232	mg/kg	0.048	U	U	15	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	PCB-1242	mg/kg	0.048	U	U	14	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	PCB-1248	mg/kg	0.048	U	U	6.4	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	PCB-1254	mg/kg	0.048	U	U	12	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	PCB-1260	mg/kg	0.048		J	7.2	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Polychlorinated biphenyl	mg/kg	0.048		J	6.4	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Americium-241	pCi/g	-0.00441	U	U	0.0772	RADS	RAD-AM ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Cesium-137	pCi/g	-0.054	U	U	0.0941	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Cobalt-60	pCi/g	-0.0119	U	U	0.107	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Europium-152	pCi/g	0.187	U	U	0.354	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Europium-154	pCi/g	0.195	U	U	0.459	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Neptunium-237	pCi/g	-0.00791	U	U	0.121	RADS	RAD-NP-237 BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Plutonium-238	pCi/g	-0.00339	U	U	0.0593	RADS	RAD-PU ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Plutonium-239/240	pCi/g	0.0113	U	U	0.0306	RADS	RAD-PU ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Potassium-40	pCi/g	2.14		=	1.27	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Radium-226	pCi/g	0.307	U	U	0.428	RADS	EPA-903.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Strontium-90	pCi/g	0.18	U	U	0.634	RADS	RAD-SR-90 BY BETA GPC	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Technetium-99	pCi/g	-0.822	U	U	1.72	RADS	RAD-TC-99 BY BETA LSC	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Thorium-228	pCi/g	0.309		J	0.263	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Thorium-230	pCi/g	0.121	U	UJ	0.215	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Thorium-232	pCi/g	0.121		J	0.0564	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Thorium-234	pCi/g	3.4	J	J	1.57	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Uranium-233/234	pCi/g	7.64		=	0.166	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Uranium-235/236	pCi/g	0.563		=	0.0983	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Uranium-235	pCi/g	0.672		=	0.426	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Uranium-238	pCi/g	1.41		=	0.14	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	1,2,4-Trichlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	1,2-Dichlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	1,3-Dichlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-002	1,4-Dichlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,3,4,6-Tetrachlorophenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,4,5-Trichlorophenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,4,6-Trichlorophenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,4-Dimethylphenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,4-Dinitrotoluene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,6-Dinitrotoluene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2-Methylnaphthalene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2-Methylphenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2-Nitrophenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	3-Methylphenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	4-Nitrobenzenamine	mg/kg	20	U	U	5000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	4-Nitrophenol	mg/kg	9.8	U	U	4200	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Acenaphthene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Acenaphthylene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Benzenemethanol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Benzoic acid	mg/kg	49	U	U	17000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Carbazole	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Diethyl phthalate	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Dimethyl phthalate	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Di-n-butyl phthalate	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Hexachlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Hexachlorobutadiene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Hexachloroethane	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Isophorone	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Naphthalene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Nitrobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	N-Nitroso-di-n-propylamine	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	N-Nitrosodiphenylamine	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Pentachlorophenol	mg/kg	20	U	U	3900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Phenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Pyridine	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	1,4-Dichlorobenzene	mg/L	0.1	U	U	0.022	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,4,5-Trichlorophenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,4,6-Trichlorophenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2,4-Dinitrotoluene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	2-Methylphenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	3-Methylphenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Hexachlorobenzene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Hexachlorobutadiene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Hexachloroethane	mg/L	0.1	U	U	0.022	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Nitrobenzene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Pentachlorophenol	mg/L	0.2	U	U	0.04	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Pyridine	mg/L	0.1	U	U	0.031	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Propylene glycol	mg/kg	30	U	U	3600	VOA	SW846-8015M	SOLID
Z2-EU33B-WAC01	SPKAPIT-002	Cyanide	mg/kg	0.5	U	U		WETCHEM	SW846-9014	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Aluminum	mg/kg	5100		=	0.99	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Antimony	mg/kg	0.39	B	J	0.38	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Arsenic	mg/kg	3		=	0.27	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Barium	mg/kg	33		J	0.011	METAL	SW846-6010B	SOLID

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-003	Beryllium	mg/kg	0.37		J	0.0031	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Boron	mg/kg	7.1		=	0.1	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Cadmium	mg/kg	0.5	B	J	0.025	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Chromium	mg/kg	12		J	0.075	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Copper	mg/kg	39		J	0.093	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Lead	mg/kg	11		=	0.16	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Manganese	mg/kg	180		J	0.01	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Mercury	mg/kg	1.8		=	0.019	METAL	SW846-7471A	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Molybdenum	mg/kg	1.7		=	0.099	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Nickel	mg/kg	34		J	0.1	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Selenium	mg/kg	0.24	U	U	0.24	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Silver	mg/kg	0.62	B	J	0.14	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Strontium	mg/kg	110		J	0.0059	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Thallium	mg/kg	0.55	U	U	0.55	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Tin	mg/kg	4.2	B	J	0.22	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Vanadium	mg/kg	8.3		J	0.086	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Zinc	mg/kg	73		J	0.12	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Arsenic	mg/L	0.027	U	U	0.027	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Barium	mg/L	0.22	B	U	0.0011	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Cadmium	mg/L	0.0025	U	U	0.0025	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Chromium	mg/L	0.0075	U	U	0.0075	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Lead	mg/L	0.016	U	U	0.016	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Mercury	mg/L	0.00012	B	J	0.00012	METAL	SW846-7470A	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Selenium	mg/L	0.03	B	J	0.024	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Silver	mg/L	0.014	U	U	0.014	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Uranium	pCi/g	5.8		=	0.132	METAL	RAD-TOTAL U BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	PCB-1016	mg/kg	0.048	U	U	11	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	PCB-1221	mg/kg	0.048	U	U	15	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	PCB-1232	mg/kg	0.048	U	U	15	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	PCB-1242	mg/kg	0.048	U	U	14	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	PCB-1248	mg/kg	0.048	U	U	6.5	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	PCB-1254	mg/kg	0.048	U	U	12	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	PCB-1260	mg/kg	0.11		=	7.3	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Polychlorinated biphenyl	mg/kg	0.11		=	6.5	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Americium-241	pCi/g	0.0557	U	U	0.0792	RADS	RAD-AM ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Cesium-137	pCi/g	-0.00297	U	U	0.0709	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Cobalt-60	pCi/g	0.00673	U	U	0.0696	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Europium-152	pCi/g	-0.167	U	U	0.342	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Europium-154	pCi/g	0.063	U	U	0.417	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Lead-212	pCi/g	0.324		=	0.118	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Lead-214	pCi/g	0.323	J	J	0.174	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Neptunium-237	pCi/g	-0.0088	U	U	0.134	RADS	RAD-NP-237 BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Plutonium-238	pCi/g	0.0139	U	U	0.0377	RADS	RAD-PU ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Plutonium-239/240	pCi/g	0.0237	U	U	0.0732	RADS	RAD-PU ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Potassium-40	pCi/g	4.99		=	1.35	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Radium-226	pCi/g	-0.0444	U	U	0.418	RADS	EPA-903.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Strontium-90	pCi/g	0.2	U	U	0.535	RADS	RAD-SR-90 BY BETA GPC	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Technetium-99	pCi/g	-0.211	U	U	1.57	RADS	RAD-TC-99 BY BETA LSC	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Thallium-208	pCi/g	0.0938		=	0.0814	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Thorium-228	pCi/g	0.115	U	U	0.204	RADS	RAD-TH ISO BY ALPHA	SOLID

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-003	Thorium-230	pCi/g	0.254	U	U	0.278	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Thorium-232	pCi/g	0.0868		=	0.0755	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Thorium-234	pCi/g	5.88		=	1.58	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Uranium-233/234	pCi/g	4.36		=	0.101	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Uranium-235/236	pCi/g	0.315		=	0.118	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Uranium-235	pCi/g	0.779		=	0.269	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Uranium-238	pCi/g	1.12		=	0.0583	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	1,2,4-Trichlorobenzene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	1,2-Dichlorobenzene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	1,3-Dichlorobenzene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	1,4-Dichlorobenzene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,3,4,6-Tetrachlorophenol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,4,5-Trichlorophenol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,4,6-Trichlorophenol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,4-Dimethylphenol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,4-Dinitrotoluene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,6-Dinitrotoluene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2-Methylnaphthalene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2-Methylphenol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2-Nitrophenol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	3-Methylphenol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	4-Nitrobenzenamine	mg/kg	19	U	U	4800	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	4-Nitrophenol	mg/kg	9.4	U	U	4000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Acenaphthene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Acenaphthylene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Benzenemethanol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Benzoic acid	mg/kg	47	U	U	16000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Carbazole	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Diethyl phthalate	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Dimethyl phthalate	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Di-n-butyl phthalate	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Hexachlorobenzene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Hexachlorobutadiene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Hexachloroethane	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Isophorone	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Naphthalene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Nitrobenzene	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	N-Nitroso-di-n-propylamine	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	N-Nitrosodiphenylamine	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Pentachlorophenol	mg/kg	19	U	U	3800	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Phenol	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Pyridine	mg/kg	9.4	U	U	1900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	1,4-Dichlorobenzene	mg/L	0.1	U	U	0.022	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,4,5-Trichlorophenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,4,6-Trichlorophenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2,4-Dinitrotoluene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	2-Methylphenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	3-Methylphenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Hexachlorobenzene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Hexachlorobutadiene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID

Appendix G: Waste Characterization Data

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-003	Hexachloroethane	mg/L	0.1	U	U	0.022	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Nitrobenzene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Pentachlorophenol	mg/L	0.2	U	U	0.04	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Pyridine	mg/L	0.1	U	U	0.031	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Propylene glycol	mg/kg	30	U	U	3600	VOA	SW846-8015M	SOLID
Z2-EU33B-WAC01	SPKAPIT-003	Cyanide	mg/kg	0.5	U	U		WETCHEM	SW846-9014	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Aluminum	mg/kg	3300		=	0.98	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Antimony	mg/kg	0.38	U	UJ	0.38	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Arsenic	mg/kg	2.4		=	0.26	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Barium	mg/kg	20		J	0.011	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Beryllium	mg/kg	0.31		J	0.0031	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Boron	mg/kg	5.3		=	0.1	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Cadmium	mg/kg	0.48	B	J	0.025	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Chromium	mg/kg	11		J	0.074	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Copper	mg/kg	42		J	0.092	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Lead	mg/kg	6.4		=	0.16	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Manganese	mg/kg	140		J	0.01	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Mercury	mg/kg	14		=	0.039	METAL	SW846-7471A	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Molybdenum	mg/kg	0.91	B	J	0.098	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Nickel	mg/kg	15		J	0.1	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Selenium	mg/kg	0.24	U	U	0.24	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Silver	mg/kg	0.58	B	J	0.13	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Strontium	mg/kg	170		J	0.0058	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Thallium	mg/kg	0.55	U	U	0.55	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Tin	mg/kg	4.4	B	J	0.22	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Vanadium	mg/kg	5.2		J	0.086	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Zinc	mg/kg	54		J	0.12	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Arsenic	mg/L	0.027	U	U	0.027	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Barium	mg/L	0.33	B	U	0.0011	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Cadmium	mg/L	0.0025	U	U	0.0025	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Chromium	mg/L	0.0075	U	U	0.0075	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Lead	mg/L	0.016	U	U	0.016	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Mercury	mg/L	0.00012	U	U	0.00012	METAL	SW846-7470A	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Selenium	mg/L	0.024	U	U	0.024	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Silver	mg/L	0.014	U	U	0.014	METAL	SW846-6010B	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Uranium	pCi/g	28.9		=	0.238	METAL	RAD-TOTAL U BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	PCB-1016	mg/kg	0.049	U	U	11	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	PCB-1221	mg/kg	0.049	U	U	16	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	PCB-1232	mg/kg	0.049	U	U	15	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	PCB-1242	mg/kg	0.049	U	U	15	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	PCB-1248	mg/kg	0.049	U	U	6.6	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	PCB-1254	mg/kg	0.42		J	12	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	PCB-1260	mg/kg	0.19		J	7.4	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Polychlorinated biphenyl	mg/kg	0.61		J	6.6	PPCB	SW846-8082	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Americium-241	pCi/g	0	U	U	0.0428	RADS	RAD-AM ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Cesium-137	pCi/g	-0.013	U	U	0.0862	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Cobalt-60	pCi/g	0.0138	U	U	0.0865	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Europium-152	pCi/g	0.207	U	U	0.414	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Europium-154	pCi/g	0.0898	U	U	0.481	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Neptunium-237	pCi/g	0.0195	U	U	0.112	RADS	RAD-NP-237 BY ALPHA	SOLID

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-039	Plutonium-238	pCi/g	0.077		=	0.0348	RADS	RAD-PU ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Plutonium-239/240	pCi/g	0.0308	U	U	0.081	RADS	RAD-PU ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Radium-226	pCi/g	0.471		=	0.349	RADS	EPA-903.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Strontium-90	pCi/g	0.0138	U	U	0.429	RADS	RAD-SR-90 BY BETA GPC	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Technetium-99	pCi/g	1.26	U	U	1.39	RADS	RAD-TC-99 BY BETA LSC	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Thorium-228	pCi/g	0.507		=	0.249	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Thorium-230	pCi/g	0.433		=	0.264	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Thorium-232	pCi/g	0.444		=	0.0585	RADS	RAD-TH ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Thorium-234	pCi/g	3.6		=	0.874	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Uranium-233/234	pCi/g	23.9		=	0.174	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Uranium-235/236	pCi/g	1.2		=	0.148	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Uranium-235	pCi/g	0.887		=	0.351	RADS	EPA-901.1	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Uranium-238	pCi/g	3.84		=	0.194	RADS	RAD-U ISO BY ALPHA	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	1,2,4-Trichlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	1,2-Dichlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	1,3-Dichlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	1,4-Dichlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2,3,4,6-Tetrachlorophenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2,4,5-Trichlorophenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2,4,6-Trichlorophenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2,4-Dimethylphenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2,4-Dinitrotoluene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2,6-Dinitrotoluene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2-Methylnaphthalene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2-Methylphenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2-Nitrophenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	3-Methylphenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	4-Nitrobenzenamine	mg/kg	20	U	U	5000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	4-Nitrophenol	mg/kg	9.8	U	U	4200	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Acenaphthene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Acenaphthylene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Benzenemethanol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Benzoic acid	mg/kg	49	U	U	17000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Carbazole	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Diethyl phthalate	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Dimethyl phthalate	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Di-n-butyl phthalate	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Hexachlorobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Hexachlorobutadiene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Hexachloroethane	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Isophorone	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Naphthalene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Nitrobenzene	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	N-Nitroso-di-n-propylamine	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	N-Nitrosodiphenylamine	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Pentachlorophenol	mg/kg	20	U	U	3900	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Phenol	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Pyridine	mg/kg	9.8	U	U	2000	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	1,4-Dichlorobenzene	mg/L	0.1	U	U	0.022	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2,4,5-Trichlorophenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID

Location ID	Sample Id	Chemical Name	Units	Result	Lab Qual	Validation Qual	Detection Limit	Analysis Type	Analysis Method	Matrix Type
Z2-EU33B-WAC01	SPKAPIT-039	2,4,6-Trichlorophenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2,4-Dinitrotoluene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	2-Methylphenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	3-Methylphenol	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Hexachlorobenzene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Hexachlorobutadiene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Hexachloroethane	mg/L	0.1	U	U	0.022	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Nitrobenzene	mg/L	0.1	U	U	0.02	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Pentachlorophenol	mg/L	0.2	U	U	0.04	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Pyridine	mg/L	0.1	U	U	0.031	SVOA	SW846-8270D	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Propylene glycol	mg/kg	30	U	U	3600	VOA	SW846-8015M	SOLID
Z2-EU33B-WAC01	SPKAPIT-039	Cyanide	mg/kg	0.5	U	U		WETCHEM	SW846-9014	SOLID

APPENDIX H: VARIANCE REQUEST

Davenport, John M (MDN)

From: Davenport, John M (MDN)
Sent: Wednesday, June 11, 2008 8:32 AM
To: Hopper Jr, James Guy (HPZ)
Cc: Hanahan, Douglas W. (HGG); Kucera, Stephen P (O4O); Grindstaff, Jeffrey W (ZJF); Thompson, Ken {C K } (OF3)
Subject: RE: Rebar variance for W.L. 155.5

That's good news. Thanks for the coordination.

From: Hopper Jr, James Guy (HPZ)
Sent: Wednesday, June 11, 2008 8:30 AM
To: Davenport, John M (MDN)
Cc: Hanahan, Douglas W. (HGG); Kucera, Stephen P (O4O); Grindstaff, Jeffrey W (ZJF); Thompson, Ken {C K } (OF3)
Subject: RE: Rebar variance for W.L. 155.5

No problems anticipated for this variance. With a total WL volume of an approx. 50 CY it appears that the total amount of rebar is 5 CY that will be distributed amongst rubbleized concrete and soil. I will initiate the review today and should have approval no later than next Monday.

Thanks!
Guy

From: Davenport, John M (MDN)
Sent: Tuesday, June 10, 2008 3:51 PM
To: Hopper Jr, James Guy (HPZ)
Cc: Hanahan, Douglas W. (HGG)
Subject: Rebar variance for W.L. 155.5

uy-
I talked with our field ops people and they will not be managing the concrete debris with rebar in W.L. 155.5 like we did in W.L. 155.4. We will be managing the waste in accordance with the attached variance (we will retract the previous variance request and replace it with the attached). The new variance should be consistent with our earlier conversation. Please take a quick look at it and let me know if you anticipate any problems or not. We are going to start the concrete crushing tomorrow. Although the variance does not state specifically, we will be packaging the waste in intermodals (by not stating that we still have some flexibility in case we need to use dump trucks). Thanks for your help on this.

<< File: Rebar Variance Request.doc >>

Request for Approval of Variance from Physical Waste Acceptance Criteria (WAC) for the Environmental Management Waste Management Facility (EMWMF)

Instructions: The Waste Generator shall:

(1) Communicate with the EMWMF Waste Generator Services Lead to discuss the proposed variance request prior to the submittal of this form.
(2) Complete Section 1 and prepare any necessary support information.
(3) Electronically transmit the completed form and support information to the EMWMF WAC Manager.

BJC EMWMF Operations will coordinate the review of the variance request and transmit the results of the review to the Waste Generator.

Section 1---To be Completed by Waste Generator	
1. Waste Lot Nos. 155.5	2. Date: June 10, 2008
3. Waste Lot Names: BOS Lab K-1015-A Laundry Pit	
4. Name of Project: ETTP D&D/RA	
5. Name of Requestor: Marshall Davenport	6. Telephone No.: 576-8049
7. Alternate contact: Doug Hanahan	8. Telephone No.: 241-9573
9. Company Affiliation: BJC	10. Fax No.: 241-5178
11. Describe the physical WAC parameter(s) for which a variance is being requested: The EMWMF physical WAC states that rebar shall be cut to a maximum 4-ft length and shall be in rolls or bundles that can be placed and graded in an 18-in lift.	
12. Describe the proposed variance The Project is requesting that a variance be granted to allow rebar to be sheared to lengths of 4-ft or less and comingled with the remainder of the waste lot for bulk disposal at the EMWMF. Rebar will be removed from concrete by crushing the concrete. Most rebar is expected to be free of concrete. However, some may contain incidental, small pieces of concrete. Bulk containers used for this waste would be lined in accordance with the PWAC. The Project will attempt to distribute the rebar evenly between the loads of waste.	
13. Describe why the physical WAC parameter(s) cannot be met and provide justification for the proposed variance: Based on the configuration of the rebar present in this waste lot, it would be difficult (and unsafe) to cut into 4-ft lengths and reconfigure into rolls or bundles. By removing rebar from the concrete and further size-reducing the rebar to 4-ft lengths or less the debris should be suitable for placement and grading into an 18-in lift.	
14. Describe and identify if the variance is requested for the entire waste lot or for a specific portion of the waste lot: This variance request is for the rebar in the entire waste lot. It is estimated that the rebar comprises less than 10% of the waste lot and it should be distributed approximately evenly between the loads of waste.	
15. Describe the potential impacts of implementing the variance request and the suggested mitigation actions by the waste generator and EMWMF Operations: No impacts are expected.	
16. Other support information: This variance is similar to the approved Variance Request EMWMF-VR-122. Concrete debris will meet PWAC size restrictions and all waste in this waste lot will be shipped in lined containers.	
Section 2---To be Completed by EMWMF Operations	

Request for Approval of Variance from Physical Waste Acceptance Criteria (WAC) for the Environmental Management Waste Management Facility (EMWMF)

17. Was a field walkdown performed to review the waste? Yes ☐ No ☐ If so, state notes from the field walkdown that are pertinent to the variance review:
18. Provide brief justification for concurring with or rejecting the variance request:
19. Will the requested variance impact the design basis for EMWMF? Yes ☐ No ☐ If so, describe the potential impact and mitigation measures. 20. Are other reviews (i.e., Procurement, Engineering, RADCON) required? Yes ☐ No ☐
21. If other reviews are required, do the reviews support approval of the requested variance? Yes ☐ No ☐
22. State variance request approval conditions:

Approval / Disapproval by BJC EMWMF Operations		
23. Approved ☐	Approved with conditions ☐	Disapproved ☐
Printed Name:	Signature:	Date:

BJC/OR-3005

RECORD COPY DISTRIBUTION

File–EMEF DMC–RC