DRAFT

Department of Energy

STABILIZATION & PACKAGING PROJECT

UTILITY WASTEWATER MANAGEMENT STUDY

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Contract No. DE-AC02-99-CH10903
Project No. 79065.001
Document No. SRW-40.17-10-001
Revision P1
May 2010

Unclassified/ Non-UCNI

Reviewing Offfical C M Pascua / URS-PIC
(Name/Organization)

Date: 5-14-10

STUDY SIGN-OFF PAGE

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First Approved Issue: Revision N/A

Revision P1

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1.0 PURPOSE

The purpose of this study is to identify a path forward for the management of utility wastewater generated from the Stabilization & Packaging (S&P) Project. The study should assist in the identification of design requirements and unit operations required to develop design documents in support of the development of a cost estimate for the S&P project. This study will also attempt to identify risk associated with S&P path forward discussed.

2.0 INTRODUCTION

The Stabilization and Packaging (S&P) Project includes a Direct Metal Oxidation (DMO) line, the Stabilization glovebox with a muffle furnace for stabilization of oxides, a bagless transfer system for 3013 inner canning, a dropbox, three criticality pass through airlocks, and a transition glovebox with a hood and a bag-out port. The S&P Project also includes a 3013 outer canning system in a hardened area adjacent to the current K-Area Interim Surveillance area (KIS) and vault/pack/unpack area.

The S&P Project will combine the daughter products created in KIS back into a single item, stabilize it, then package into a 3013 compliant container. The S&P Project will also provide the capability to begin processing the 3.74 metric tons of Alternative Feed Stock-2 (AFS-2) materials. AFS-2 metals can be split, oxidized and stabilized in the DMO furnace, and subsequently canned in 3013 inner and outer containers, packaged in a 9975 container, and stored for future shipment to MFFF. It is anticipated that the startup of the S&P project operations would be begin in 2014.

3.0 WASTE TYPES

The only utility wastewater type to be encountered during S&P operations is:

Low Activity Waste (LAW) – Alpha contaminated radioactive liquid with an activity level less than 1,000 dpm per milliliter.

High activity waste (HAW) will not be generated from the S&P Project.

4.0 ASSUMPTIONS

1. Wastewater sources are from the S&P Project.

2. Deionized (DI) water is added manually in 1-gallon containers into the Limited Volume Cooling Water system for the S&P Project. Therefore, normal DI system wastewater contributions such as reverse osmosis blowdown, DI reject wastewater, and DI water blowdown contributions are not generated as part of S&P.

3. Any S&P utility wastewater collected will be sampled and sent to the F/H analytical lab for analysis prior to release to the Effluent Treatment Project (ETP) to determine if the wastewater meets the criteria required for treatment at the ETP. ETP Low-Level Liquid Waste Acceptance Criteria is defined in Reference 4 (WAC 3.17, Rev. 11, Page 45-52) and Reference 5. S&P utility wastewater is expected to meet ETP acceptance requirements without treatment. Otherwise a deviation will be obtained from ETP.

4. A truck provided by ETP will transport any collected S&P utility wastewater.

5. Non-routine sources of wastewater will not require routine management and therefore will not require any further review for this study.

6. Firewater as a source of utility wastewater is an off normal occurrence and is not covered in this study.

5.0 WASTE SOURCES

Potential sources of LAW wastewater related to the S&P Project includes: mop water, LVCW blow down, Process Cooling Water Blow Down, RCT Lab waste, and roof leaks.

1. Mop Water – Mop water will result from the floors in the S&P process area and hallways being cleaned. The area includes the DMO/Stabilization/Bagless Transfer System, Shuffler room, Outer Canning room, KIS Vaults, Pack/Unpack room, east and north Corridors, and the area from RCT Laboratory to Be Showers. Mop water is non-routine wastewater. If generated, absorbent pads will be used or an absorbent will be added to the mop water and disposed of as solid waste.

   Miscellaneous safety shower/eyewash use will generate personnel decontamination water. The wastewater collected from the safety showers/eyewashes is also considered mop water. Water generated from safety/eyewash use is non-routine wastewater. If generated, an absorbent will be added to the mop water and disposed of as solid waste.

   Normal testing of these showers/eyewashes is required. Wastewater generated from the testing of the safety showers/eyewashes is collected in bottles and will normally be placed into the process sewer upon successful testing as clean.

2. LVCW Blow Down – The Limited Volume Cooling Water (LVCW) system provides cooling to the DMO process and will occasionally be blown down. LVCW blow down water is non-routine wastewater. When wastewater from LVCW blow down is generated, an absorbent is added and disposed of as solid waste.

3. Process Cooling Water Blow Down – Process cooling water system provides cooling to the LVCW system, the muffle furnace, and the inert gas purification system. The system will be self-contained and installed within the S&P Project. Process cooling water blow down water is non-routine wastewater. When wastewater from process cooling water blow down is generated, an absorbent is added and disposed of as solid waste.

4. RCT Lab Waste – The RCT Lab will generate utility wastewater from the excess samples, instrument flush water and safety shower/eyewash use. Wastewater generated from excess samples and instrument flush water is non-routine wastewater, and will be mixed with absorbent and disposed of as solid waste. Wastewater generated from safety shower use/testing is non-routine wastewater. If generated, an absorbent will be added to the mop water and disposed of as solid waste. Wastewater generated from the testing of the safety showers is collected in bottles and will normally be placed into the process sewer upon successful testing as clean.

5. Wastewater may be generated from roof leaks and is non-routine wastewater. If a significant amount is generated, the wastewater will be mopped up, collected and transported to the ETP. If small amounts of wastewater are generated, an absorbent will be added and disposed of as solid waste.

6.0 WASTE ASSAY EQUIPMENT

NDA in the S&P Project area will not be required for collected utility wastewater. Utility wastewater will be sampled in a sample vial and analyzed to characterize the wastewater. in the F/H Analytical Lab.

Absorbed wasterwater will be packaged as LLW and will not require NDA in the S&P Project area. Characterization will occur from smear-to-curie and process knowledge.

7.0 S&P UTILITY WASTEWATER SYSTEM AREA DESCRIPTION

A specific area is not required for the S&P Utility Wastewater System.

8.0 INVENTORY CONTROL

Inventory control for inventory tracking purposes will not be required of utility wastewater.

9.0 CHARACTERIZATION OF WASTE

Any large amounts of utility wastewater collected will be shipped to ETP where the wastewater will be treated. A sample will be taken of the collected utility wastewater

before it leaves the MAA. The analysis of the sample will characterize the wastewater and confirm that the utility wastewater is LAW. The following analyses are performed on utility wastewater: alpha spectroscopy for total alpha activity, ICP-MS for uranium, liquid scintillation for tritium, pH, conductivity, gamma spectroscopy for fission products, and density.

An absorbent will be added to small amounts of utility wastewater and treated as solid waste. This waste will be LLW and characterization will be based on smear-to-curie and process knowledge.

10.0 UTILITY WASTEWATER MANAGEMENT ACTIVITIES DESCRIPTION

Potential sources of S&P utility wastewater includes: mop water, LVCW blow down, Process Cooling Water Blow Down, RCT Lab waste, and roof leaks. All occurrences of the generation of the S&P utility wastewater are either off normal or non-routine, and do not require normal or day-to-day utility wastewater management Figure 1 – Utility Wastewater Block Flow Diagram depicts a high level view of the flow of various utility wastewater sources and their disposition.

11.0 ISSUES REQUIRING FURTHER INVESTIGATION/SOLUTION

The following questions/issues require further investigation or require information not available yet.

1. The process is still maturing; therefore the layout of the S&P is still in progress.

2. The destination for treatment of utility wastewater has not been finalized. For this study, it was assumed that collected utility wastewater would be sent to the ETP.

3. It is assumed that a local process cooler is used for S&P. If process cooling water is available from other sources the utility wastewater contribution may change.

12.0 CONCLUSION

Potential sources of S&P utility wastewater includes: mop water, LVCW blow down, Process Cooling Water Blow Down, RCT Lab waste, and roof leaks. All occurrences of the generation of the S&P utility wastewater are either off normal or non-routine. The only utility wastewater type to be encountered during S&P operations is LAW. HAW will not be generated from the S&P Project.

Waste assay equipment in the S&P Project area will not be required for the S&P utility wastewater. Any large amounts of utility wastewater collected will be shipped to ETP where the wastewater will be treated. A sample will be taken of the collected utility wastewater before it leaves the MAA. The analysis of the sample will confirm that the utility wastewater is LAW and characterize the wastewater. An absorbent will be added

to small amounts of utility wastewater and treated as solid waste. This waste will be LLW and characterization will be based on smear-to-curie and process knowledge.

13.0 REFERENCES

1) Y-AES-K-00002, Rev. 0, NNSA, Refinement Study of the K-Area (KAC) Combination Project which provides Pit Disassembly and Conversion Capability and Plutonium Preparation Project Capability, 9/29/09 (UCNI)
2) SK-DA-WM-0007, Rev. A, Waste Management Strategy for the Plutonium Preparation Project in the K-Area Complex, 7/22/08
3) Q-PRP-F-00001, Rev. 1, Pit Disassembly and Conversion Facility, Waste Management Plan, 6/30/05
4) 1S, Savannah River Site Waste Acceptance Criteria Manual, Dated 6/30/09
5) X-SD-H-0009, Rev. 4, Effluent Treatment Project Engineering
6) Calc X-CLC-F-00276, Rev. 2., LAW Mass Balance
7) SK-PDC-15002-GA, Pit Disassembly & Conversion 0'-0" Level – plan General Arrangement, Rev. B.
8) Pit Disassembly And Conversion Facility System Design Description For Analytical Laboratory System (U), G-SYD-F-00018, Rev. F Draft

S&P Utility Wastewater Block Flow Diagram – Figure 1