



Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29802

Ms. Susan B. Fulmer, P. G., Manager APR - 3 2018
Federal Remediation Section
Division of Site Assessment, Remediation and Revitalization
Bureau of Land and Waste Management
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Mr. Jon Richards
Acting Savannah River Site Remedial Project Manager
Superfund Division
U. S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Dear Ms. Fulmer and Mr. Richards:

SUBJECT: Continued Usage of High-Level Waste Tank 7F, SEMS Number: 23

In accordance with the Federal Facility Agreement, this letter is to request your approval for continued usage of Type I Tank 7F for which the Bulk Waste Removal Efforts milestone was previously completed. Enclosed is a technical justification that provides a summary of Tank 7F operational and waste removal history, current status, and planned usage to support Tank 3F salt dissolution. Our immediate proposed usage is for transfers of dissolved salt solution with fines (i.e., contaminated liquids without any appreciable solids) resulting from the dissolution of the saltcake material currently in Tank 3F. Beneath the saltcake is a sludge heel which was left behind upon completion of sludge waste removal performed in 1968 when Tank 3F was converted for storage of salt waste.

As documented in the October 31, 2016, South Carolina Department of Health and Environmental Control (SCDHEC) and U.S. Department of Energy (DOE) signed *Dispute Resolution Agreement for Alleged Violations of Class 3 Industrial Solid Waste Landfill Permit Facility Paragraph 17* provides SCDHEC approval for reuse of Tank 7F to facilitate the implementation of that Agreement which includes our commitments for salt waste processing.

DOE requests your approval, as soon as possible, only for continued usage of Tank 7F to support Tank 3F saltcake dissolution and transfer of dissolved salt solution to support preparation of future salt batches for waste treatment.

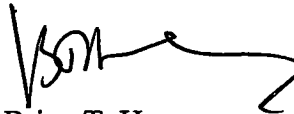
Ms. Fulmer
Mr. Richards

2

APR - 3 2018

The effort and time that the SCDHEC and the U.S. Environmental Protection Agency have given on the subject are greatly appreciated. DOE will keep you informed of the transfers and use of Tank 7F during our quarterly Liquid Waste regulatory meetings. Questions from you or your staff may be directed to me at (803) 952-8365, Mr. Jeff Bentley at (803) 208-7513, or Ms. Jolene Seitz at (803) 208-6234.

Sincerely,



Brian T. Hennessey
SRS Remedial Project Manager
Infrastructure and Area Completion Project

WDPD-18-21

Enclosure:

Technical Justification for
Continued Use of Tank 7F

cc w/encl:

H. H. Cathcart, SCDHEC – Columbia
B. S. Mullinax, SCDHEC-Columbia
J. Dawson, TechLaw, Inc

cc w/o encl:

G. N. O'Quinn, SCDHEC – Aiken Environmental Affairs Office
M. D. Wilson, SCDHEC-Columbia
J. P. deBessonnet, SCDHEC-Columbia
G. K. Taylor, SCDHEC-Columbia
D. Scaturo, SCDHEC-Columbia
S. French, SCDHEC-Columbia
R. H. Pope, EPA-Atlanta

Enclosure
Technical Justification for Continued Use of Tank 7F

Facts:

- Type I tanks – nominal capacity 750,000 gallons
- Tank groups designed for infrastructure efficiency and avoidance of redundancy
- Waste transfers out of tanks restricted by infrastructure, transfer route limitations
- Tank 7F
 - Designed and serves as hub tank associated with F-Area Tank Farm (FTF) Type I tanks
 - No known leak sites
 - Bulk Waste Removal Efforts (BWRE) initiated in 2002 -2003; resumed in 2008
 - BWRE completed in June 2011 and declared in August 2011
 - Sludge heel (solids) volume of approximately 13,600 gallons at time of BWRE; determined by visual mapping
 - Added supernate to keep sludge heel hydrated
- Tank 3F
 - No known leak sites
 - Bulk sludge removal completed in 1968, tank converted to salt storage
 - Currently storing approximately 540,000 gallons of saltcake over a sludge heel
 - No transfers into or out of tank since 2003 when interstitial fluid was removed
 - Bulk salt waste retrieval planning, design and installation phase initiated in Fiscal Year 2016

Operational and Waste Removal History

The twelve Type I tanks in both tank farms (Tanks 1F to 8F and 9H to 12H) were the first high-level waste (HLW) storage tanks built and commissioned for use at Savannah River Site. As designed and constructed, there are eight underground Type I HLW storage tanks in the FTF in two parallel rows of four tanks. The stainless-steel waste transfer line piping lies underground between the two rows of tanks. This transfer line piping is in a covered, reinforced, trench-like concrete encasement. Tanks 1F to 6F and 8F were designed with transfer jets that discharge to transfer lines connecting to Tank 7F. To serve as the hub tank, Tank 7F was designed as the only Type I tank with underground transfer line connections to diversion boxes. The piping is sloped such that it lies deepest near Tanks 7F and 8F and shallowest near Tanks 1F and 2F.

Tanks 1F to 6F and 8F began receiving high heat waste resulting from Plutonium Recovery and Extraction (PUREX) processing at F Canyon in the mid 1950's and early 1960's. However, when Tank 7F was initially placed into service in 1954, it received only the low heat waste stream from F Canyon. The FTF operated without an evaporator system for six years, until 1960, when the 1F (242-F) Evaporator System was placed into service. In 1961, Type IV Tank 18F was placed into service and the low heat waste stored in Tank 7F was intermittently transferred over to Tank 18F. Tank 18F served as the 1F Evaporator feed tank. Subsequently, Tank 7F became available to receive high heat waste and initially received the aged high heat waste (slurried sludge and supernate) from Tanks 1F to 3F, when those were converted from sludge waste storage to salt waste storage during bulk sludge removal campaigns conducted in the late 1960's. During bulk waste removal activities conducted from 2001 to 2009, Tank

Enclosure
Technical Justification for Continued Use of Tank 7F

7F received the slurried sludge and supernate from Tanks 4F, 5F, 6F, and 8F. Over the operational history of Tank 7F, it has received many transfers from the other tanks such as Tank 18F which was associated with waste removal and cleaning of Type IV Tanks 17F to 20F. After BWRE was completed in Tank 7F in June 2011, mapping of the sludge heel (solids) waste was performed and the volume determined to be approximately 13,600 gallons.

Two out of the eight FTF Type I tanks have been operationally closed (Tanks 5F and 6F). Tanks 1F, 2F, and 3F are each currently storing roughly a half million gallons of saltcake. Tanks 4F, 7F, and 8F have completed BWRE and are subject to the definition of BWRE that was included as a modification to Appendix L of the Federal Facility Agreement (FFA) in September 2010. It should be noted that Tanks 3F and 7F have no history of leak sites. Previously, limited use of Tanks 4F, 7F, and 11H after completion of BWRE has been given by South Carolina Department of Health and Environmental Control (SCDHEC) and U.S. Environmental Protection Agency (EPA).

Need for Continued Usage of Tank 7F Post-BWRE:

After declaring BWRE complete, Tank 7F was beneficially reused to receive and store liquid waste associated with the flushing of both Tanks 5F and 6F cooling coils performed in 2013.

As previously discussed with SCDHEC and EPA, the future use of hub tanks that have been declared BWRE completed is needed to support waste removal from other tanks. This requires reuse of Tank 7F to support eventual waste removal from other tanks. Current planning requires reuse of Tank 7F to support eventual waste removal (i.e., salt dissolution) in Tanks 1F, 2F, and 3F.

Tank 3F Salt Dissolution and Removal

Treatment of sludge and salt waste leading to disposition serves to reduce the environmental risk of the liquid radioactive waste by immobilizing the waste into solid waste forms of glass and saltstone, resulting in the ability to empty, clean, and close the older style tanks. The Planning, Design and Installation Phase for the dissolution and removal of the saltcake stored in Tank 3F began in late FY2016. The Execution Phase is anticipated to begin in September 2018.

Due to numerous changes in tank farm operating conditions since previous sludge waste removal campaigns were performed back in the late 1960's, upgrades to balance of plant systems are necessary to ensure safe operations during the upcoming salt dissolution and removal in Tank 3F. For example, the primary heating and ventilation exhaust stack must be extended due to anticipated mercury levels during bulk salt dissolution and retrieval which will be performed using three low-volume mixing jets (LVMJ) to provide necessary agitation. A new submersible transfer pump system needs to be installed in Riser 5 once the dismantlement and removal of the old transfer pump system, which was used during 2003 to perform interstitial draining at a very low flow rate, is completed. Additionally, the existing Tank 3F to Tank 7F Transfer Line Leak Detection Box failed leak testing and will be replaced. A new Leak Detection Box is being fabricated and readied for installation.

Enclosure
Technical Justification for Continued Use of Tank 7F

Tank 3F contains roughly 540,000 gallons of saltcake that is not uniformly distributed. As shown in the photo taken inside the primary tank space, there are numerous dried, massive nodules of saltcake adhered to the cooling coils and suspended above the top layer of the saltcake.



Inside of Tank 3F – Photo taken June 17, 2016.

The likely dissolution approach to be chosen for Tank 3F will be Add, Sit, Remove (ASR) for the first waste transfer followed by Semi-Continuous Dissolution (SCD) for subsequent waste transfers. The sources for the dissolution liquid will be the contaminated rainwater stored in the FTF Catch Tank and “fresh” well water fed from the 10,000-gallon tank. An evaluation will be completed to determine whether the well water needs to be “inhibited” for corrosion control.

Upwards of 80,000 gallons of dissolution water may be added to Tank 3F to sufficiently submerge the dried saltcake. The dissolved salt material in Tank 3F must be transferred out and received into the hub tank (Tank 7F) due to the design limitation of the transfer lines for the FTF Type I tanks that were implemented for infrastructure efficiency and avoidance of redundancy.

In addition to preparing Tank 3F for saltcake dissolution and removal, Tank 7F must be ready to receive the incoming dissolved salt material. Some of the supernate stored in Tank 7F, to keep the sludge heel hydrated since 2011, was removed to create sufficient space to receive the Tank 3F dissolved salt material.

Current planning is that Tank 3F saltcake dissolution will begin in October 2018 with the first transfer into the Tank 7F expected in November 2018. This process will continue for 2 to 3 years and consist of numerous waste transfer campaigns. The subsequent treatment path of the dissolved salt will be to transfer the material from Tank 7F for use in preparation of future salt batches.

The submersible transfer pump in Tank 3F will be located at approximately 9 inches above the tank floor. In addition to the roughly 540,000 gallons of saltcake, Tank 3F contains an estimated 1.5 inches

Enclosure**Technical Justification for Continued Use of Tank 7F**

(approximately 4000 gallons) of compacted settled sludge on the bottom of the tank, beneath the saltcake. The settled sludge has been there for approximately fifty years and is not expected to be easily removed without mechanical agitation. Because the submersible transfer pump suction will be within 24 inches of the tank floor, sludge fines will be in the dissolved salt solution sent into Tank 7F. The total amount of sludge estimated to be potentially transferred to Tank 7F is less than 150 gallons during the entire Tank 3F salt dissolution campaign.

Request for Reuse

Although the Salt Dispute Resolution Agreement provided DOE with SCDHEC's approval to reuse Tank 7F to facilitate implementation of that agreement to achieve the waste processing amounts, DOE is submitting this request for reuse of Tank 7F to comply with the bulk waste removal definition included in Appendix L of the FFA, and seeks written concurrence from the SCDHEC and EPA FFA Managers based on the technical justification provided herein. DOE will continue to provide the status as well as any additional information regarding Tank 3F salt dissolution and removal, and the use of Tank 7F, during our Liquid Waste Program quarterly regulatory meetings.