



Department of Energy
Savannah River Operations Office
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JAN 27 2020

Ms. Susan B. Fulmer, P. G., Manager
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
United States 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 Tanks 10H and 11H, SEMS Number 89

In accordance with the Savannah River Site Federal Facility Agreement (FFA), this letter is to request your approval for continued use of Type I Tanks 10H and 11H to support operations of Tank Closure Cesium Removal (TCCR) Unit 1. The Complete Bulk Waste Removal Efforts milestone for Tank 10H was achieved in October 2019 and for Tank 11H in May 2011. Enclosed are technical justifications that provide a summary of Tanks 10H and 11H operational and waste removal history, current status, and planned usage to support TCCR Unit 1 operations. Tank 9H is a Type I waste tank that currently contains an estimated 550,000 gallons of saltcake waste. Efforts are in progress to prepare Tank 9H to dissolve this saltcake waste and process the resulting dissolved salt solution through TCCR Unit 1. Dissolved salt solution from Tank 9H will be transferred to Tank 10H where it will be batched and sampled to determine processability through the TCCR ion exchange columns. The existing equipment and transfer lines currently in use for Tank 10H dissolved salt solution processing will continue to be used to feed TCCR Unit 1. The decontaminated salt solution discharged from TCCR Unit 1 will be transferred and collected in Tank 11H, the Type I H-Tank Farm hub tank. It will subsequently be transferred from Tank 11H to the Saltstone Feed Tank, Tank 50H. As part of the TCCR process, the dissolved salt solution is filtered prior to passing through the ion exchange columns. Therefore, the decontaminated salt solution discharged from TCCR Unit 1 will not result in the addition of appreciable solids in Tank 11H.

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 11H to facilitate the implementation of that

Ms. Fulmer
Mr. Richards

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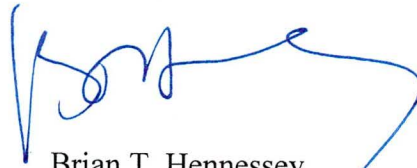
JAN 27 2020

Agreement which includes our commitment for TCCR Unit 1. However, the U.S. Environmental Protection Agency approval is also required by the FFA.

Therefore, DOE requests your approval for the reuse of Tanks 10H and 11H to support the processing of Tank 9H dissolved salt solution through TCCR Unit 1. We will continue to keep your agencies informed on the transfers and use of Tanks 10H and 11H during our quarterly Liquid Waste regulatory meetings and future revisions to the Tank Closure Cesium Removal Unit 1 Demonstration Progress Tracker.

If you or your staff have questions, please direct them to me at (803) 952-8365 or Mr. Aaron White at (803) 208-7248.

Sincerely,



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

WDPD-20-11

Enclosures:

- Technical Justification for
Continued Use of Tank 10H
- Technical Justification for
Continued Use of 11H

cc w/enclosures:

R. H. Pope, EPA-Atlanta
J. Dawson, TechLaw, Inc
H. H. Cathcart, SCDHEC – Columbia
B. S. Mullinax, SCDHEC – Columbia
S. French, SCDHEC - Columbia
C. Rippy, SCDHEC – Columbia
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Enclosure
Technical Justification for Continued Use of Tank 10H

Tank 10H Facts:

- Type I tank – nominal capacity 750,000 gallons
- At least one known leak site
 - 19% of the primary tank wall has been inspected
 - Leak site(s) location unknown
 - Liquid level is maintained below 165 inches
 - 2-3 inches of salt waste in annulus
 - Lack of change in salt waste in annulus indicates leak site(s) are inactive
- Bulk Waste Removal Efforts (BWRE) declared complete on October 31, 2019
- Salt/burkeite heel volume estimated to be 180,000 gallons at time of BWRE Complete declaration
- Sludge heel (solids) volume estimated to be 2,700 gallons at time of BWRE Complete declaration
- Current liquid level at approximately 98 inches

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 four underground Type I HLW storage tanks in the H-Area Tank Farm (HTF) in two parallel rows of two tanks. Tanks 9H, 10H, and 12H have transfer lines that connect to Tank 11H. Tank 11H is the only HTF Type I tank with underground transfer line connections to diversion boxes. Therefore, waste from Tanks 9H and 10H must pass through Tank 11H.

Tank 10H was commissioned for use and received waste from H-Canyon from 1955 through 1959. The historical maximum waste volume attained was 726,000 gallons in 1959. Waste removal was performed in 1967 to remove approximately 63,000 gallons of sludge. Tank 10H then accumulated approximately 500,000 gallons of saltcake while it served as a 242-H (1H) Evaporate concentrate receipt tank from 1967 through 1974. Salt removal campaigns were performed from 1979 to 1982, again in 2013, and finally in 2019. The 2019 campaign provided salt solution feed to the Tank Closure Cesium Removal (TCCR) Unit 1 system. These salt removal campaigns removed approximately 320,000 gallons of saltcake, leaving approximately 180,000 gallons of saltcake.

In October 2019, the U.S. Department of Energy (DOE) declared BWRE complete in Tank 10H and received concurrence from South Carolina Department of Health and Environmental Control (SCDHEC) and U. S. Environmental Protection Agency (EPA).

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Technical Justification for Continued Use of Tank 10H

Need for Continued Usage Post-BWRE:

On October 31, 2016, SCDHEC and DOE signed the *Dispute Resolution Agreement for Alleged Violations of Class 3 Industrial Solid Waste Landfill Permit Facility* (hereinafter referred to as “the Salt Waste Dispute Resolution Agreement”) for the purposes of reaching agreement concerning Special Conditions A.1.d.i-iii of the Class 3 Industrial Solid Waste Landfill Permit (Facility ID# 025500-1603) in effect for the Z-Area Saltstone Disposal Facility. Paragraph 18(a) states that for Tank Closure Cesium Removal Unit 1 (TCCR Unit 1) DOE will “Design, construct, install and operate a demonstration unit (TCCR Unit 1) for the removal of cesium from liquid tank waste. TCCR Unit 1 is expected to process approximately 750,000 gallons of liquid waste resulting from the dissolution of saltcake from one of the H-Tank Farm tanks towards achieving DOE’s liquid waste processing obligations specified in paragraph 22 of this Agreement.”

DOE selected Tank 10H to serve as the initial TCCR demonstration tank for processing liquid waste resulting from the dissolution of Tank 10H saltcake. The TCCR Unit 1 demonstration began in January 2019 and between January 2019 and July 2019 approximately 210,000 gallons of dissolved salt solution was processed through TCCR Unit 1. The decontaminated salt solution discharged from TCCR Unit 1 was transferred and collected in Tank 11H, the Type I HTF hub tank. In August 2019, the Tank 10H Submersible Transfer Pump (STP), which serves as both the transfer and recirculation pump, failed and additional processing of Tank 10H dissolved salt solution through TCCR Unit 1 is on hold until the STP can be replaced.

The Salt Waste Dispute Resolution Agreement paragraph 18(c) required DOE to complete an evaluation of the technical feasibility and economic efficiency of TCCR Unit 1 to support a decision to further utilize the system to process waste from at least one additional waste tank. The *Evaluation of the Technical Feasibility and Economic Efficiency of Savannah River Site Tank Closure Cesium Removal Unit 1 to Process Salt Waste From At Least One Additional Tank* (SRR-CWDA-2019-00089) was submitted to SCDHEC in September 2019. This evaluation determined that continued operation of TCCR Unit 1 to treat the saltcake waste currently stored in Tank 9H is considered technically feasible and economically efficient and therefore, as agreed to in paragraph 18(d) of the Salt Waste Dispute Resolution Agreement, DOE intends to “Utilize TCCR Unit 1 to process waste from at least one additional waste tank...” (i.e., Tank 9H).

Processing of Tank 9H dissolved salt solution through TCCR Unit 1 requires reuse of Tank 10H. The infrastructure to support TCCR operations remains in place in Tank 10H making it the optimal tank to receive dissolved salt solution from Tank 9H for qualification and batch feed to TCCR Unit 1. The use of Tank 10H as a batch feed tank for TCCR Unit 1 significantly optimizes the overall salt waste processing capabilities of the TCCR process by allowing large batches of Tank 9H dissolved salt solution to be collected, qualified, and fed to TCCR Unit 1. Feed batch qualification for the TCCR process takes approximately one month to complete. For effective dissolution, the dissolution batches in Tank 9H are anticipated to be relatively small (e.g., less than 100,000 gallons). Without the use of Tank 10H, each of the individual dissolution batches would need to be qualified in Tank 9H and processed through the TCCR unit prior to starting the next dissolution batch. The use of Tank 10H to collect several dissolution batches from Tank 9H prior to qualifying and processing the dissolved salt solution will reduce the overall timeframe required to complete waste removal in Tank 9H by reducing the number of batch qualifications

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Technical Justification for Continued Use of Tank 10H

that must occur. In addition, the use of Tank 10H will allow the dissolution process in Tank 9H to continue while qualification and processing of the material in Tank 10H is occurring.

Current Status and Path Forward:

Tank 10H contains approximately 84,000 gallons of dissolved salt solution, 180,000 gallons of saltcake/burkeite, and 2,700 gallons of sludge. Replacement of the failed Tank 10H STP is in progress. Once the STP is replaced, the current liquid contents will be recirculated and subsequently qualified and processed through TCCR Unit 1. In parallel, Tank 9H is being prepared to begin salt waste removal within that tank. When salt dissolution begins in Tank 9H, the resulting dissolved salt solution will be batched and qualified in Tank 10H and subsequently fed to TCCR Unit 1 from Tank 10H. In addition, design and procurement activities have been initiated to support the installation of two Commercial Submersible Mixing Pumps (CSMPs) in Tank 10H to support heel removal activities within the tank. Heel removal in Tank 10H utilizing the CSMPs will be closely coordinated with Tank 9H waste removal activities to ensure the most efficient processing of salt waste through TCCR Unit 1 and the earliest completion of all waste removal activities in both Tank 9H and Tank 10H.

Request for Concurrence:

DOE is submitting this request for reuse of Tank 10H consistent with Appendix L of the Federal Facility Agreement and seeks written concurrence from the SCDHEC and EPA based on the technical justification provided herein. DOE will continue to provide the status of these operational activities during the Liquid Waste Program Quarterly Regulatory Conference Calls.

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Technical Justification for Continued Use of Tank 11H

Tank 11H Facts:

- Tank 11H
 - Type I tank – nominal capacity 750,000 gallons
 - Serves as hub tank associated with H-Area Tank Farm (HTF) Type I tanks
 - Two known leak sites
 - 25% of the primary tank wall has been inspected
 - Leak sites located at 189 inches and 235 inches above tank floor
 - Both leak sites are dry and stable (i.e., inactive)
 - Liquid level is maintained below 189 inches
 - Trace amounts of salt waste in annulus
 - Bulk Waste Removal Efforts (BWRE) declared complete in May 2011
 - Sludge heel (insoluble solids) volume of approximately 18,000 gallons at time BWRE Complete declared
 - Added aluminum-rich supernate to keep sludge heel hydrated
 - Previously supported waste removal efforts from other tanks
 - Tank 12H heel removal and closure preparations
 - Tank 10H bulk salt waste removal (dissolved salt solution)
 - Served as receipt tank for decontaminated salt solution from Tank Closure Cesium Removal (TCCR) Unit 1 processing of Tank 10H dissolved salt solution beginning January 2019
 - Liquid level currently at approximately 32 inches

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 four underground Type I HLW storage tanks in the HTF in two parallel rows of two tanks. Tanks 9H, 10H, and 12H have transfer lines that connect to Tank 11H. Tank 11H is the only HTF Type I tank with underground transfer line connections to diversion boxes. Therefore, waste from Tanks 9H and 10H must pass through Tank 11H.

Tank 11H was commissioned for use and received waste from H-Canyon from 1955 until 1982. The historical maximum waste volume attained was 734,000 gallons. Waste removal performed in 1969 resulted in the removal of approximately 176,000 gallons of sludge. The tank was removed from active service in 1989 until BWRE resumed in 2004. Waste removal activities during 2004 and 2005 removed approximately 120,000 gallons of sludge, leaving approximately 18,000 gallons of sludge.

In May 2011, the U.S. Department of Energy (DOE) declared BWRE complete in Tank 11H and received concurrence from South Carolina Department of Health and Environmental Control (SCDHEC) and U. S. Environmental Protection Agency (EPA).

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Technical Justification for Continued Use of Tank 11H

Need for Continued Usage Post-BWRE:

After declaring BWRE complete, Tank 11H has continued to be beneficially reused to receive and store liquid waste. Previously, to support waste removal in other tanks, Tank 11H received approximately:

- 25,000 gallons from Tank 12H during May to June 2012
- 100,000 gallons of dissolved salt solution from Tank 10H bulk salt waste removal efforts during May 2013
- 31,000 gallons from Tank 12H waste removal activities during July 2013
- 210,000 gallons of decontaminated salt solution from processing of Tank 10H dissolved salt solution through TCCR Unit 1 during January to July 2019

On October 31, 2016, SCDHEC and DOE signed the *Dispute Resolution Agreement for Alleged Violations of Class 3 Industrial Solid Waste Landfill Permit Facility* (hereinafter referred to as “the Salt Waste Dispute Resolution Agreement”) for the purposes of reaching agreement concerning Special Conditions A.1.d.i-iii of the Class 3 Industrial Solid Waste Landfill Permit (Facility ID# 025500-1603) in effect for the Z-Area Saltstone Disposal Facility. Per paragraph 16 of the Salt Waste Dispute Resolution Agreement, DOE agreed to implement several described Supplemental Tank Closure Activities and achieve waste processing amounts as specified. Of particular note are paragraphs 17 and 18. The Salt Waste Dispute Resolution Agreement states in paragraph 17 “Tanks 4, 7, and 11 will be used to facilitate the implementation of this Agreement”. Paragraph 18(a) states that for Tank Closure Cesium Removal Unit 1 (TCCR Unit 1) DOE will “Design, construct, install and operate a demonstration unit (TCCR Unit 1) for the removal of cesium from liquid tank waste. TCCR Unit 1 is expected to process approximately 750,000 gallons of liquid waste resulting from the dissolution of saltcake from one of the H-Tank Farm tanks towards achieving DOE’s liquid waste processing obligations specified in paragraph 22 of this Agreement.”

DOE selected Tank 10H to serve as the initial TCCR demonstration tank for processing liquid waste resulting from the dissolution of Tank 10H saltcake. The TCCR Unit 1 demonstration began in January 2019, and between January 2019 and July 2019 approximately 210,000 gallons of dissolved salt solution was processed through TCCR Unit 1. The processing was completed in two batches: the first batch was approximately 152,000 gallons and the second approximately 58,000 gallons. The decontaminated salt solution discharged from TCCR Unit 1 was transferred and collected in Tank 11H, the Type I HTF hub tank. Following completion of the first TCCR processing batch, approximately 150,000 gallons of decontaminated salt solution was transferred from Tank 11H to the Saltstone Feed Tank, Tank 50H. The remaining decontaminated salt solution is currently being stored in Tank 11H. In August 2019, the Tank 10H Submersible Transfer Pump (STP), which serves as both the transfer and recirculation pump, failed and additional processing of Tank 10H dissolved salt solution through TCCR Unit 1 is on hold until the STP can be replaced.

The Salt Waste Dispute Resolution Agreement paragraph 18(c) required DOE to complete an evaluation of the technical feasibility and economic efficiency of TCCR Unit 1 to support a decision to further utilize the system to process waste from at least one additional waste Tank. The *Evaluation of the Technical*

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Technical Justification for Continued Use of Tank 11H

Feasibility and Economic Efficiency of Savannah River Site Tank Closure Cesium Removal Unit 1 to Process Salt Waste From At Least One Additional Tank (SRR-CWDA-2019-00089) was submitted to SCDHEC in September 2019. This evaluation determined that continued operation of TCCR Unit 1 to treat the saltcake waste currently stored in Tank 9H is considered technically feasible and economically efficient and therefore, as agreed to in paragraph 18(d) of the Salt Dispute Agreement, DOE intends to “Utilize TCCR Unit 1 to process waste from at least one additional waste tank...” (i.e., Tank 9H). Processing of Tank 9H dissolved salt solution through TCCR Unit 1 requires reuse of Tank 11H to receive the decontaminated salt solution discharged from the TCCR process.

Current Status and Path Forward:

Tank 11H contains approximately 88,000 gallons of decontaminated salt solution and 19,000 gallons of sludge. During refilling of Tank 11H with the TCCR discharge, the conductivity probe will be maintained at 145 inches above the tank floor and the liquid level in the tank will be kept below the lowest leak site. Replacement of the failed Tank 10H STP is in progress. Once the STP is replaced, it is anticipated that the current liquid contents will be recirculated and subsequently qualified and processed through TCCR Unit 1 and received in Tank 11H. In parallel, Tank 9H is being prepared to begin salt waste removal within that tank. When salt dissolution begins in Tank 9H, the resulting dissolved salt solution will be batched and qualified in Tank 10H and subsequently fed to TCCR Unit 1 from Tank 10H and received in Tank 11H. In addition, design and procurement activities have been initiated to support the installation of two Commercial Submersible Mixing Pumps (CSMPs) in Tank 10H to support heel removal activities within the tank. Heel removal in Tank 10H utilizing the CSMPs will be closely coordinated with Tank 9H waste removal activities to ensure the most efficient processing of salt waste through TCCR Unit 1 and the earliest completion of all waste removal activities in both Tank 9H and Tank 10H.

Request for Concurrence:

Although the Salt Waste Dispute Resolution Agreement provided DOE with SCDHEC’s approval to reuse Tank 11H to facilitate implementation of that agreement to achieve the waste processing amounts, DOE is submitting this request for reuse of Tank 11H consistent with Appendix L of the Federal Facility Agreement and seeks written concurrence from the SCDHEC and EPA based on the technical justification provided herein. DOE will continue to provide the status of these operational activities during the Liquid Waste Program Quarterly Regulatory Conference Calls.