

Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service CY2023 Annual Report



March 2024



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Executive Summary

Per Section IX.B.2 of the Federal Facility Agreement (FFA) for the Savannah River Site (SRS), the United States Department of Energy (DOE) is required to submit a report to the United States Environmental Protection Agency (EPA) – Region 4 and the South Carolina Department of Health and Environmental Control (SCDHEC) containing new or replacement waste tank system component assessments annually on or before March 9th of each year. Further, Section IX.E.3 of the SRS FFA requires that DOE submit to EPA and SCDHEC the status of the radioactive liquid waste tanks being removed from service. To fulfill these requirements, Calendar Year (CY) 2023 individual tank status reports and a list of FFA assessment reports are included in this report in Appendix A and Appendix B, respectively. Appendix L of the SRS FFA stipulates that, with respect to the F-Area and H-Area waste tanks, in connection with the annual report, DOE shall report on the status of bulk waste and heel removal activities, Performance Assessments (PA), General Closure Plans, operational closure of tanks, and implementation of Section 3116(a) of the *Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005* (NDAA). The information required by Appendix L is provided in Section 2 of this report.

As of the end of Calendar Year (CY) 2023, of the 24 old-style tanks, eight tanks have been operationally closed (also referred to as removed from service): Tanks 5F, 6F, 17F, 18F, 19F, and 20F in FTF and Tanks 12H and 16H in HTF. Heel Removal (HR) activities continued in Tank 15H. Saltcake dissolution activities resumed in Tanks 9H and 10H. In addition, five other old-style tanks had ongoing field activities in preparation for waste removal. The first Explanation of Significant Difference (ESD) for ancillary structures, F-Area Diversion Box 5 (FDB-5) and FDB-6, was approved and issued. Salt Waste Processing Facility (SWPF) operations continued in CY2023. Through CY2023 nine approximately one-million-gallon salt batches have been qualified for SWPF waste feed, one additional salt feed batch was qualified in Tank 42H in early CY2024 and another has been compiled and sampled in Tank 41H. SWPF treated over 2,600,000 gallons of salt solution during CY2023.

In July 2022, the decision was made to suspend Tank Closure Cesium Removal (TCCR) operations and layup TCCR Unit 1 to accelerate overall risk reduction (i.e., removal of waste) for Tanks 9H, 10H, and 11H which are submerged below the water table. In CY2023 the TCCR above ground transfer lines and flexible hoses were removed and the supplemental vent system was also isolated. All ion exchange columns have been removed from the TCCR Unit and it has been placed in a safe state.

The NRC did not perform any on-site monitoring visits related to FTF or HTF in CY2023. However, virtual meetings were held in CY2023 to discuss Waste Tank 12H/16H grouting and the new NRC PA review process. The NRC issued three Technical Review Reports related to FTF and HTF in CY2023:

1. *Technical Review of Grout Documentation for Tank 12H at SRS H-Tank Farm Facility (Revision)* (ML23250A025 and ML23251A046).
2. *Technical Review of Ancillary Equipment Inventory, Risk, Grout, F-Tank Savannah River Site* (ML23262B356 and ML23262B357).
3. *Technical Review of Environmental Monitoring Reports F and H Tank Farm Facilities at Savannah River* (ML23256A231 and ML23256A232).

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Abbreviations

A-P	Annulus to Primary	HVAC	Heating, Ventilation, and Air Conditioning
BA	Breathing Air	IA	Instrument Air
BW	Bearing Water	IW	Inhibited Water
CGCP	Consolidated General Closure Plan	LTAD	Low Temperature Aluminum Dissolution
CRW	Chromate Water	LDB	Leak Detection Box
CSMP	Commercial Submersible Mixer Pump	LVMJ	Low Volume Mixing Jet
CTS	Contingency Transfer System	MCC	Motor Control Center
CY	Calendar Year	MTS	Motor Transfer Switch
D&R	Disassembly and Removal	NEA	Nuclear Energy Agency
DCP	Design Change Package	NRC	United States Nuclear Regulatory Commission
DOE	United States Department of Energy	PA	Performance Assessment
DWPF:	Defense Waste Processing Facility	SA	Special Analysis
ECR	Electrical Control Room	SCDHEC	South Carolina Department of Health and Environmental Control
EOY	End of Year (2023-12-31 T 24:00)	SOW	Statement of Work
EPA	United States Environmental Protection Agency	SMP	Submersible Mixer Pump
ESD	Explanation of Significant Difference	SRMC	Savannah River Mission Completion
FDB	F-Area Diversion Box	SRS	Savannah River Site
FFA	Federal Facility Agreement	STP	Submersible Transfer Pump
FTF	F-Area Tank Farm	SWPF	Salt Waste Processing Facility
GRM	Gas Release Mode	TCCR	Tank Closure Cesium Removal
HDB	H-Area Diversion Box	UWMQE	Unreviewed Waste Management Question Evaluation
HEPA	High Efficiency Particulate Air	VFD	Variable Frequency Drive
HLLCP	High Liquid Level Conductivity Probe	WW	Well Water
HIH	Hose-in-Hose		
H&V	Heating and Ventilation		
HR	Heel Removal		
HTF	H-Area Tank Farm		

1.0 Introduction

Section IX.B.2 of the Federal Facility Agreement (FFA) for the Savannah River Site (SRS) requires the United States Department of Energy (DOE) to annually submit a report to the United States Environmental Protection Agency (EPA) – Region 4 and the South Carolina Department of Health and Environmental Control (SCDHEC):

“...for each F and H Area high-level waste tank system or component installed after the effective date of this Agreement, the DOE shall prepare a written assessment, certified by a registered professional engineer, that the waste tank system or component has sufficient structural integrity and is acceptable for the storing or treating of hazardous and/or radioactive substances.”

Section IX.B.3 further states:

“The assessment(s) shall demonstrate that the foundation, structural support, seams, connections, and pressure controls (if applicable) are adequately designed and that the waste tank system(s) have sufficient structural strength, compatibility with the hazardous/ radioactive substances to be stored or treated, and corrosion protection to ensure that the waste tank system(s) or component(s) will not collapse, rupture, or fail. At a minimum, the assessment(s) shall include the information contained in Subsection B of Appendix B herein, entitled, *Design/Installation Standards for New and Replacement Tank System(s) and Components.*”

These waste tank system component assessments are to be “submitted annually on or before March 9th of each year for all components installed during the previous year.”

In addition, Section IX.E.3 of the SRS FFA states:

“The DOE will submit to EPA and SCDHEC an annual report on the status of tanks being removed from service under Subsection E.1 herein. This report will include any requests, subject to review and approval, for changes to the existing plan(s) and schedule(s) approved under Subsection E.1. This annual report shall be submitted in conjunction with the assessments submitted under Subsection B.3 herein.”

With respect to the waste tanks in F-Area Tank Farm (FTF) and H-Area Tank Farm (HTF), Appendix L, Item 18, of the SRS FFA states:

“In connection with the annual report on the status of tanks being removed from service due by March 9th of each year in accordance with Section IX.E.3 of the FFA, DOE shall report on the status of bulk waste and heel removal activities for F Area and H Area tanks, F Area and H Area Tank Farm Performance Assessments, F Area and H Area Tank Farm General Closure Plans, operational closure of groups of tanks in F and H Areas, and implementation of Section 3116(a) of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 with respect to F Area and H Area tanks.”

The required assessments under Section IX.B are found in Appendix B of this report. The status of the old-style tanks being removed from service, as required in Section IX.E, are found in

Appendix A of this report. Section 2 of this report contains the additional information required by Appendix L of the SRS FFA.

2.0 Overview of CY2023 Activities and Accomplishments

As of the end of Calendar Year (CY) 2023, of the 24 old-style tanks, eight tanks have been operationally closed (also referred to as removed from service): Tanks 5F, 6F, 17F, 18F, 19F, and 20F in FTF and Tanks 12H and 16H in HTF. Heel Removal (HR) activities continued in Tank 15H. Saltcake dissolution activities resumed in Tanks 9H and 10H. In addition, five other old-style tanks had ongoing field activities in preparation for waste removal. The first Explanation of Significant Difference (ESD) for ancillary structures, F-Area Diversion Box 5 (FDB-5) and FDB-6, was approved and issued. Salt Waste Processing Facility (SWPF) Operations continued in CY2023. Through CY2023 nine approximately one-million-gallon salt batches have been qualified for SWPF waste feed, one additional salt feed batch was qualified in Tank 42H in early CY2024 and another has been compiled and sampled in Tank 41H. SWPF treated over 2,600,000 gallons of salt solution during CY2023.

2.1 Highlights of Waste Removal Efforts, Operational Closure, and Post Closure Activities for the F- and H-Area Tanks

Two FFA milestones were completed in CY2023 with the issuance of Revision 0 of the FDB-5 and FDB-6 ESD in February 2023, ahead of the FFA milestone completion date of November 30, 2023. Revision 1 of the ESD was issued on October 12, 2023, ahead of the FFA milestone date of March 1, 2024.

The Tank 1F Project Team completed the draft Scope of Work (SOW) and the design input in preparation for future salt dissolution activities in Tank 1F. The Tank 1F design scope includes Disassembly and Removal (D&R), tank top modifications, Heating and Ventilation (H&V) stack extension modifications, Submersible Transfer Pump (STP) installation, and installation of Commercial Submersible Mixer Pumps (CSMPs).

The Tank 2F Project Team completed the design development for the D&R of Risers 2 and 3, stack extension, and salt dissolution Design Change Packages (DCPs). These designs support mixing and transfer capabilities for waste removal. The Team installed a chemical/water addition downcomer in Riser 7 and completed the installation of supports and routed a supply hose from F-Catch Tank north of Tank 2F to a connection in Riser 7. The Team completed the fabrication of hydrolances, riser split plates, D&R of electrical commodities in Risers 1 and 6, and the fabrication of Risers 1 and 6 CSMP turntable Rotek assemblies. D&R of the Riser 1 spray chamber, D&R of Riser 6 spray water assembly, steel structures at Riser 6, Riser 3 Well Water (WW), and Instrument Air (IA) piping were also completed. The Team also initiated the D&R of Riser 1 Domestic Water (DW) and IA piping. Procurement of engineered equipment is in progress.

The Tank 3F Project Team continued making progress toward the execution of saltcake dissolution activities with the aid of CSMPs. The Project Team removed the Riser 5 STP/caisson (Figure 1) and dip tube assembly. A new STP was installed in Riser 5. CSMPs were installed in Risers 1 and 6 including the Rotek assemblies (Figure 2). Risers 1 and 6 steel modifications and electrical supports installation were completed, and the heel removal design was initiated.

Figure 1: Tank 3F Caisson D&R



Figure 2 – Tank 3F Riser 6 CSMP Installation



In CY2023 the Tank 4F Team completed the design input and initiated the D&R design for the accelerated dewatering of the tank.

In July 2022, the decision was made to suspend Tank Closure Cesium Removal (TCCR) operations and layup TCCR Unit 1 to accelerate overall risk reduction (i.e., removal of waste) for Tanks 9H, 10H, and 11H which are submerged below the water table. In CY2023 the TCCR above ground transfer lines and flexible hoses were removed and the supplemental vent system was also isolated. All ion exchange columns have been removed from the TCCR Unit and it has been placed in a safe state.

In CY2023 Tank 9H modifications continued to accelerate waste removal from the tank. D&R of the Tank 9H to Tank 10H Center Riser above ground Hose-in-Hose (HIH) transfer line, which previously supported TCCR operations, was completed. The Tank 9H to Tank 11H above ground HIH design was completed, issued, and installed. The Project Team removed the Riser 4 Low Volume Mixing Jet (LVMJ), riser obstructions, completed steel modifications and steel installations, and installed CSMPs with associated turntable equipment in Risers 1 and 4. The Project Team also installed a Gas Release Mode (GRM) and CSMP electrical contactor skid. A new STP was installed in the Center Riser. Chromate water modifications were also completed. D&R of Riser 6 spray chamber and hydrolancing of the riser was completed. The Riser 6 CSMP was assembled to the mast. Saltcake Dissolution activities in Tank 9H were resumed in CY2023 using the CSMPs installed in Risers 1 and 4. Two saltcake dissolution campaigns were completed in CY2023 with the resulting dissolved salt solution being transferred to Tank 11H. Figure 3 shows the removal of the Riser 4 LVMJ.

Figure 3: Tank 9H Riser 4 LVMJ Removal



On Tank 10H, the design, procurement, installation (including supports and shielding), and testing of a new HIH above grade transfer line from Tank 10H to Tank 11H was completed. The design and installation of a third CSMP in Riser 4 (with associated turntable) was completed which required piping D&R, mastic, and spray chamber removal from Riser 4. Electrical tie-ins for the CSMPs installed in CY 2022 in Risers 1 and 8 were completed. The Team also completed the design, installation, and testing of an Area Radiation Monitor. Tank 10H modification included modifications to the Chromate Water (CRW) system. The Project Team also installed an Annulus to Primary (A-P) transfer line for annulus dewatering/cleaning. Annulus cleaning components were also fabricated, and the Contingency Transfer System (CTS) was installed in the tank.

Salt dissolution in Tank 10H utilizing CSMPs started in August 2023 using the Riser 1 and Riser 8 CSMPs. The first Dissolution Campaign was completed in September 2023. The dissolved salt solution was transferred from Tank 10H to Tank 11H via an above grade HIH transfer line. A second Dissolution Campaign started with water addition in September 2023 and was completed in October 2023. The Riser 1 and Riser 8 CSMPs were lowered, and water was added in November 2023 to support Dissolution Campaign 3 which will be completed in CY2024. Figure 4 shows the installation of the Riser 4 CSMP and Figure 5 shows the STP being replaced in Tank 10H.

Figure 4: Tank 10 Riser 4 Commercial Submersible Mixer Pump



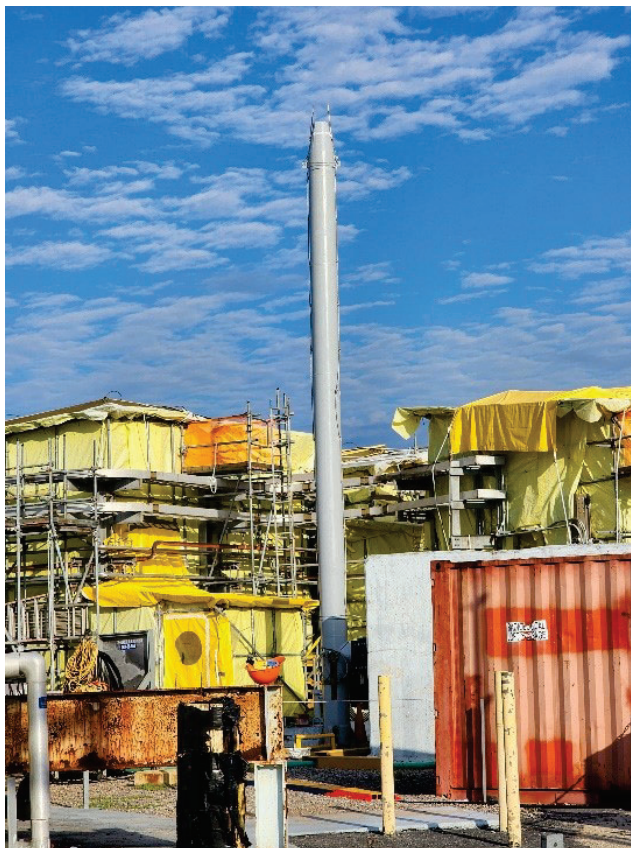
Figure 5: Tank 10 STP Replacement



For Tank 11H the Project Team restored the existing slurry pumps in Risers 1, 3, 5, and 8 for waste removal activities to be performed in CY 2024. Restoration of the slurry pumps included testing, repair/installation, verification of operability of the bearing water system to the slurry pumps and testing of the slurry pumps. Electrical modifications to restore power to the slurry pumps were also completed. As indicated above, the Team completed the design and installation for the CRW modifications in Tanks 9H, 10H, and 11H. The telescoping STP design and installation was completed. The HR designs were also completed. Tank 11H supported CY2023 salt dissolution activities in Tank 9H and tank 10H serving as the salt dissolution receipt tank. The dissolved salt solution is transferred from Tank 11H to Tank 35H to serve as feed material for SWPF.

In CY2023 the Tank 14H Project Team completed the procurement of long lead engineered equipment, the D&R of platform steel members at Riser 3, 5, and 8, completed the D&R of the A-P transfer line, installed the annulus stack extension, relocated the High Efficiency Particulate Air (HEPA) purge inlet from Riser 8 to Riser 7, completed D&R the H&V tank riser and installed a demister, completed the stack height analysis, procured and installed the new higher stack (Figure 6), fabricated and installed a chemical addition downcomer, and fabricated the radar level detector for the tank. The Project Team also completed the development of the waste removal equipment designs.

Figure 6: Tank 14H Annulus Stack Extension



Tank 15H HR activities continued in CY2023. In February 2023 the Submersible Mixing Pumps (SMPs) were operated to transfer the Tank 15H sludge slurry from HR Campaign 1 to Tank 13H. Approximately 393K gallons of sludge slurry were transferred into Tank 13H. In March 2023 approximately 385K gallons of supernate were transferred back from Tank 13H into Tank 15H for HR Campaign 2. The Riser 2 SMP faulted, and HR Campaign 2 mixing was completed using the remaining three SMPs in Risers 3, 4A, and 8. Mixing was completed in April 2023 but no transfer out to Tank 13H was made as part of HR Campaign 2. The STP and three operable SMPs were lowered. The Riser 2 SMP was removed and hydrolancing of Risers 1 and Riser 2 was completed in June 2023. The replacement Riser 2 SMP was installed and the SMPs were restarted in July 2023 for HR Campaign 3. In September 2023, the Riser 7 STP failed while attempting to perform the sludge slurry transfer. The STP was removed and a replacement STP was installed. In December 2023 approximately 458K gallons of sludge slurry were transferred from Tank 15H to Tank 13H.

Saltcake dissolution activities in Tank 27F were paused in November 2022 due to unavailable dissolved salt solution storage space in Tanks 25F and 26F. In CY2023, while saltcake dissolution activities were paused, tank top modifications continued. The Riser 4 LVMJ was removed and a CSMP and associated Rotek was installed. D&R and hydrolancing or mining was performed at Riser 2. Figure 7 shows the hydrolance used in Tank 27F. A CSMP and associated Rotek were

also installed in Riser 2. The Project Team also completed the removal of the CSMP electrical contactors which were transferred to Tank 9H to support accelerated waste removal activities on Tank 9H. The replacement wall-mounted contactor enclosures for Tank 27F were procured, received, inspected, and installed in CY2023.

Figure 7: Tank 27F Hydrolancing Tool



Tank 28F CY2023 modifications for saltcake dissolution activities included the installation of modifications and renovations to Building 241-18F Electrical Control Room (ECR), H&V modifications, and Tank Top D&R. The Tank Top D&R completed included removal of upper steel from Risers B3, B4, and H and the Riser H lower platform steel removal. D&R of Risers B4 and H spray chambers were also completed in CY2023. D&R of the Riser B4 Inhibited Water (IW) and Bearing Water (BW) lines was completed. LVMJs were installed in Riser B3, B4, and Riser H. The hydrogen monitor was also installed. Fabrication of the CSMP skids to support future CSMP installation and fabrication of the GRM skids were initiated in CY2023.

Renovations to 241-18F ECR were completed in CY2023. Excavations behind 241-18F were completed and concrete was poured. In CY2023 the Project Team installed new Motor Control Centers (MCCs) and Variable Frequency Drives (VFDs). Modifications to support the Motor Transfer Switches (MTSs) were completed. A new Heating, Ventilation, and Air Conditioning (HVAC) was installed for Building 241-18F ECR. The installation of the MTSs and installation of cables from 241-18F ECR to the MTSs cable trays were initiated. Figure 8 and Figure 9 shows modifications made to the ECR.

Figure 8: New Electrical Control Room Motor Control Centers and Variable Frequency Drives



Figure 9: 241-18F Installed HVAC



In CY2023 the Tank 31H Project Team completed the installation of LVMJs in Riser B10 (refer to Figure 10) and Riser E2. The Team completed the fabrication and tank top installation of the GRM skid. Reel tape and High Liquid Level Conductivity Probe (HLLCP) electrical modifications and relocations were completed. D&R of the Riser D1 hydrogen monitor was completed, and a new hydrogen monitor was installed. The abandoned Breathing Air (BA) piping was converted to WW piping along with piping heat trace and installation of insulation. The Team completed the tie-in stub up for the above ground transfer line from Riser C2 to H-Area Diversion Box (HDB)-6 and installed the transfer line supports (Figure 11); installation of the core and jacket lines and shielding is in progress. The installation of Leak Detection Box (LDB)- 6 was initiated.

Figure 10: Tank 31 Riser B10 Low Volume Mixing Jet Installation

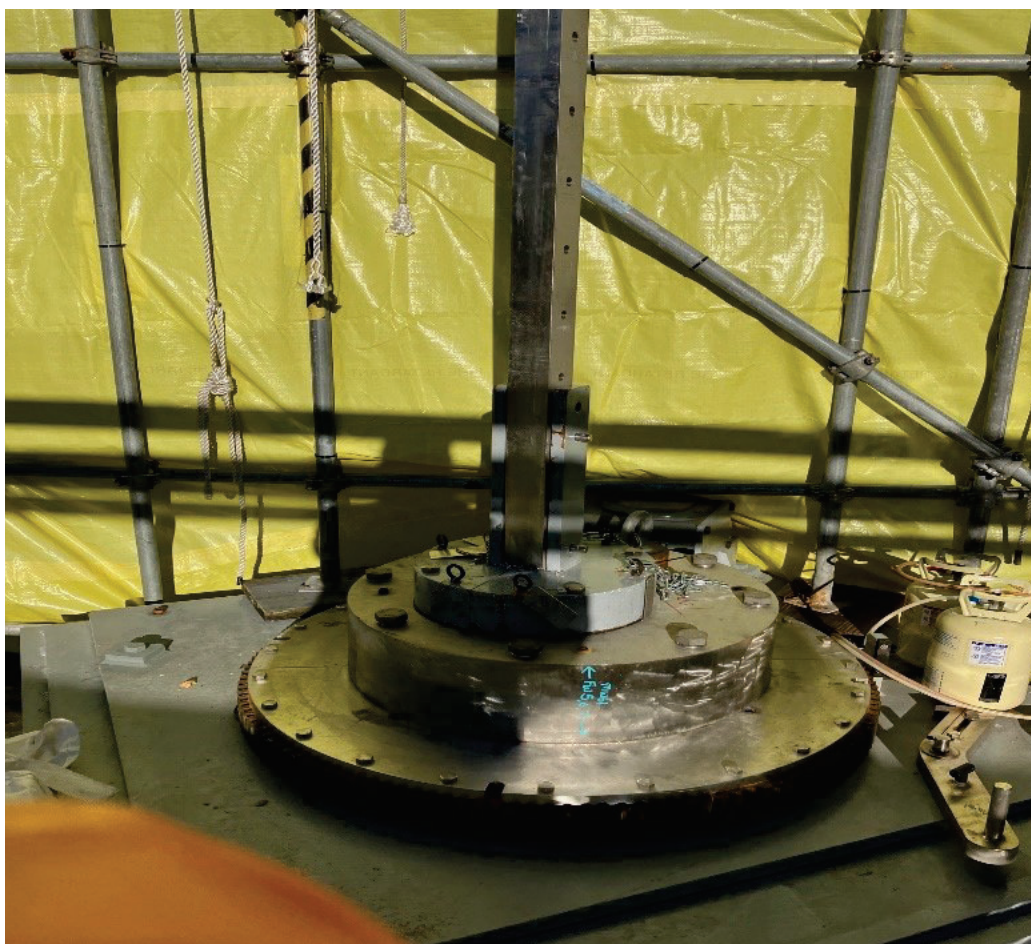
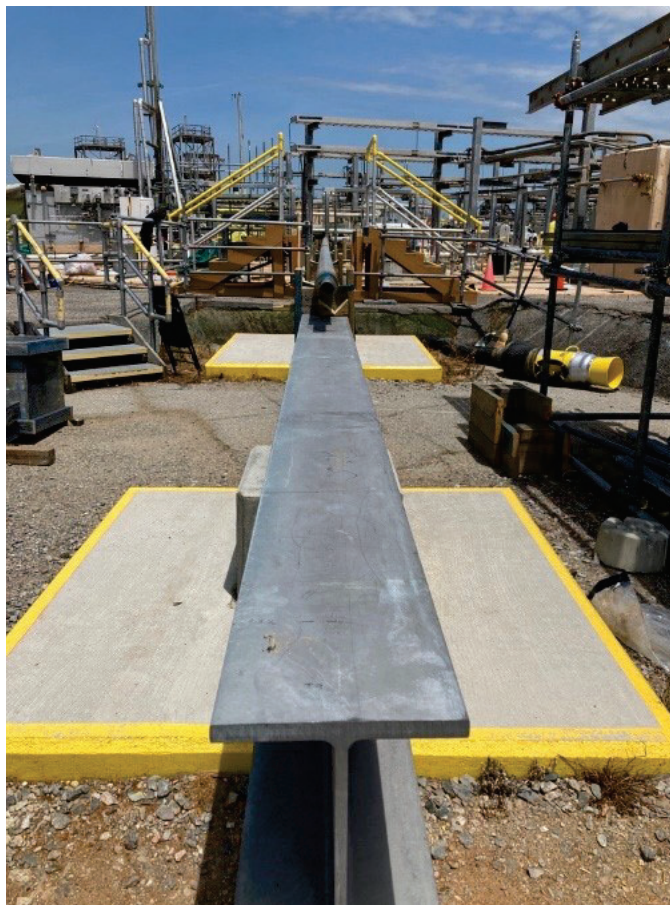


Figure 11: Installation of Tank 31H Above Ground Transfer Line



Tank 33F project activities completed in CY2023 include modifications to the H&V system. These modifications include the D&R, restoration, and filling of the chromate water piping, D&R of the old Continuous Air Monitor cabinet, re-routing the instrument air, D&R of the old purge exhaust ventilation stack, and fabrication and installation of the new stack and components. Additional modifications to the H&V system initiated in CY2023 include the D&R and re-route of the low-pressure steam piping and steam condensate drain line. The Project Team also completed the D&R of Riser C1 in preparation for installation of a transfer pump. Figure 12 shows the Tank 33F D&R of Riser C1 and Figure 13 shows the installation of the new chromate water piping.

Figure 12: Tank 33F Riser CI Nozzle Box D&R



Figure 13: Tank 33F Chromate Piping



In CY2023 the Tk 34F Project Team completed the design development for modifications to Riser C1 and C2, Tank Top D&R, D&R of Riser D4, D&R of the HLLCP, the design for the STP and transfer line, the design for modification of the H&V system, and the design for the installation of CSMPs. The Project Team completed the rollback and coatings of the Northwest and Southwest tank quadrants of the Contamination Area to support the modifications activities. Tank top drilling to support the transfer line modifications and fabrication of riser covers were also initiated in CY2023.

Tank 35H modifications to support Tank 35H sludge removal for Sludge Batch 11 feed preparation were completed in CY 2022. The Tank 35H Sludge Batch 11 sludge slurry transfer was performed in November 2023. Approximately 398K gallons of sludge slurry were transferred into Tank 51H in support of Sludge Batch 11 feed for the Defense Waste Processing Facility (DWPF).

In CY2023 the Tank 36F Project Team continue the procurement of engineered equipment expected to be complete in February 2024. The Team also continues the salt dissolution design development.

In CY2023 the Tank 39H Project Team completed D&R of Tank 39H Riser B1 and installed a permanent riser cover. The Project Team completed the installation of CSMPs at Risers B1 and B5. A downcomer was also installed in Riser B1. Repairs were done in CY2023 to a transfer line segment jacket from HDB-7 to Tank 39H. D&R of equipment and conduits was completed in 241-82H in support of electrical modifications for the CSMPs and VFDs. The electrical modifications and installation in 241-82H for the CSMPs and associated turntables and VFDs were completed in CY2023. The Project Team also installed a utility bridge between Tank 39H and Tank 42H. Tank 39H modifications support sludge removal for Sludge Batch 12 feed preparation. Figure 14 through Figure 16 show some of the Tank 39H modifications completed in CY2023.

Figure 14: Tank 39H Riser B3 CSMP



Figure 15: Tank 39H Turntables VFDs



Figure 16: Tank 39H CSMPs VFDs



The Tank 46F Project Team initiated the procurement of engineered equipment and the development of inputs for the modification design changes in support of bulk waste removal activities.

Salt dissolution planning activities for Tank 47F resumed in CY2023. The procurement of engineered equipment for salt dissolution utilizing CSMPs was completed, and fabrication of modification components initiated. A port plug and chemical addition downcomer were fabricated and installed in Riser E1 of Tank 47F. The Project Team initiated the development of the H&V stack modifications. The Team also initiated the fabrication of the hydrogen sample port and GRM skid. A small water addition was made into Tank 47F to adjust the tank chemistry to favor the flammability classification of the tank in support of upcoming saltcake dissolution activities.

2.2 F- and H-Area Tank Farm Consolidated General Closure Plan Activities

In CY2023, DOE issued Revision 4 of the *SRS Waste Removal Plan and Schedule for F-Area and H-Area Waste Tank Systems*, which is an attachment to the Consolidated General Closure Plan (CGCP). The document was updated to reflect the *2022 High Level Waste Tank Milestones Agreement* signed by DOE, SCDHEC and the EPA. As discussed previously, DOE completed the operational closure of FDB-5 and FDB-6 and subsequent issuance of the ESD supporting these two ancillary structures per the processes agreed upon by DOE, SCDHEC, and EPA within the CGCP.

2.3 Tank Farm Performance Assessments and Section 3116 Waste Determination Activities

As part of the ongoing performance assessment (PA) maintenance program consistent with DOE Manual 435.1-1, DOE has prepared an update to the current HTF PA. Draft A of SRMC-CWDA-2023-00073, *Performance Assessment for the H-Area Tank Farm at the Savannah River Site* was issued in November 2023 for DOE review. This updated HTF PA accomplishes multiple tasks: 1) Updates the HTF PA to current regulatory standards and guidance, 2) Incorporates current HTF Special Analyses (SAs) and Unreviewed Waste Management Question Evaluations (UWMQEs) into a single document, 3) Addresses ongoing U.S. Nuclear Regulatory Commission (NRC) monitoring factors and recommendations and incorporates results of the associated research and development activities, 4) Updates the HTF radiological and chemical inventories and explicitly addresses secondary containments as locations of inventory at closure to aid in future SA preparation, and 5) Improves the PA waste tank models and sub-models to provide greater defensibility and dose margin for reduced programmatic risk, delivering greater flexibility to support tank closure operations.

The NRC did not perform any on-site monitoring visits related to FTF or HTF in CY2023. However, virtual meetings were held in CY2023 to discuss Waste Tank 12H/16H grouting and the new NRC PA review process. The NRC issued three Technical Review Reports related to FTF and HTF in CY2023:

- *Technical Review of Grout Documentation for Tank 12H at SRS H-Tank Farm Facility (Revision)* (ML23250A025 and ML23251A046).
- *Technical Review of Ancillary Equipment Inventory, Risk, Grout, F-Tank Savannah River Site* (ML23262B356 and ML23262B357).
- *Technical Review of Environmental Monitoring Reports F and H Tank Farm Facilities at Savannah River* (ML23256A231 and ML23256A232).

DOE continued to provide documentation/information as requested by the NRC to support NRC and SCDHEC monitoring responsibilities under Section 3116(b) of the *Ronald w. Reagan National Defense Authorization Act for Fiscal Year 2005*.

Individual Tank Status Report

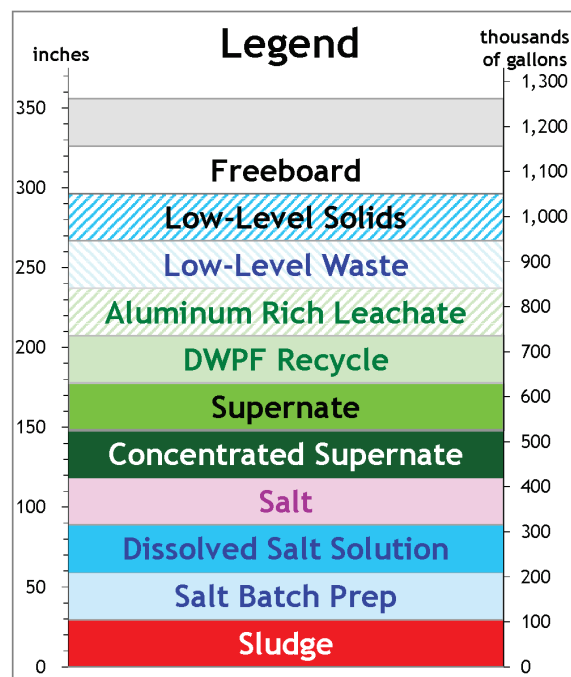
Introduction:

Appendix A provides information on the F-Area and H-Area Tank Farms' Waste Storage Tanks 1 through 24 being removed from service. Information in this appendix, including volumes of material in the tanks, is reported as of the end of CY2023.

Several of the tanks experienced leakage in the past. A dark green background in the tank diagram indicates a tank that has a leakage history; tank storage liquid levels are currently maintained below the lowest known leak site.

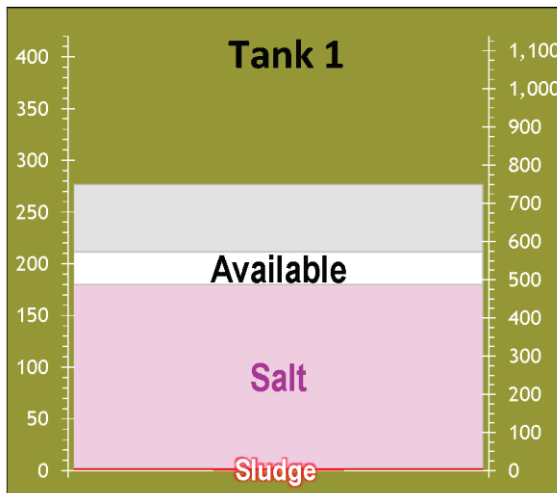
Eight of the tanks are operationally closed:

- Tank 5 closed December 2013
- Tank 6 closed December 2013
- Tank 12 closed April 2016
- Tank 16 closed September 2015
- Tank 17 closed December 1997
- Tank 18 closed September 2012
- Tank 19 closed September 2012
- Tank 20 closed July 1997



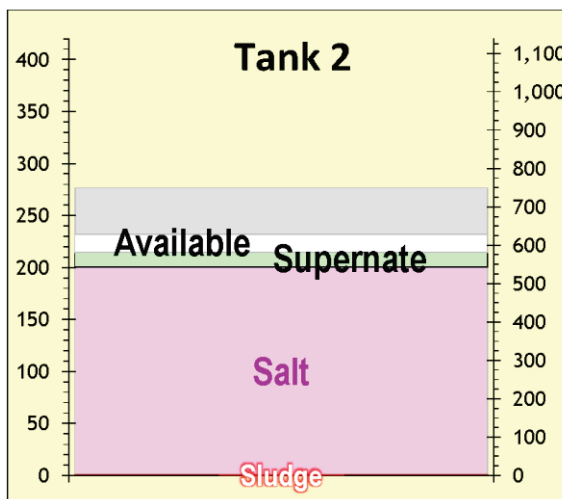
Tank 1:

Area: F-Area
 Service: Inactive Waste Storage Tank Under Active Surveillance. Design initiated for future waste removal equipment.
 Type: I
 End of Year (EOY): 486,990 gallons
 Status: There were no transfers in or out during 2023.



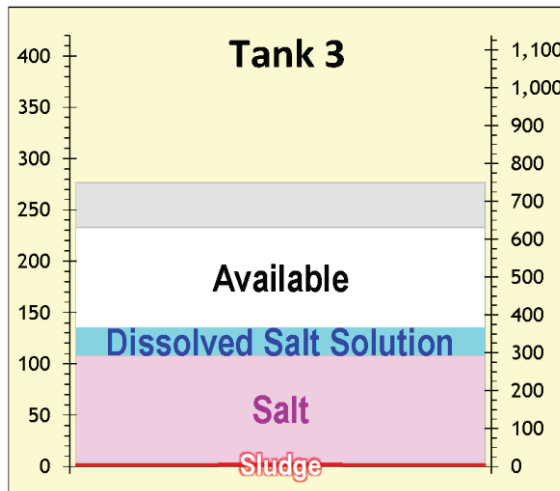
Tank 2:

Area: F-Area
 Service: Waste Storage Tank Under Active Surveillance. Field activities for future waste removal are ongoing.
 Type: I
 EOY Volume: 581,570 gallons
 Status: Tank 2 received 48,000 gallons from the catch tank in F-Tank Farm and 5,200 gallons of caustic for a chemistry adjustment.



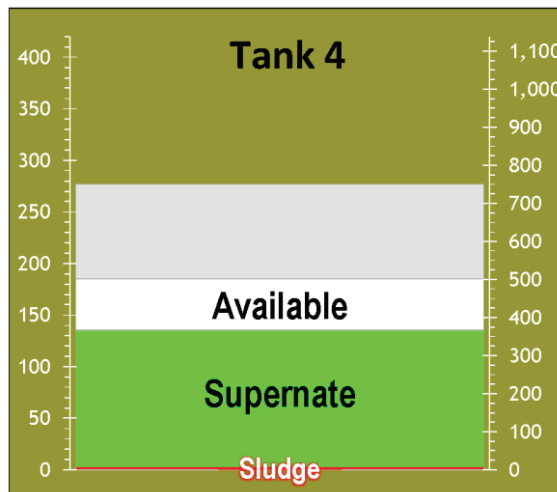
Tank 3:

Area: F-Area
 Service: Waste removal activities are ongoing.
 Type: I
 EOY Volume: 366,660 gallons
 Status: There were no transfers in or out during 2023.



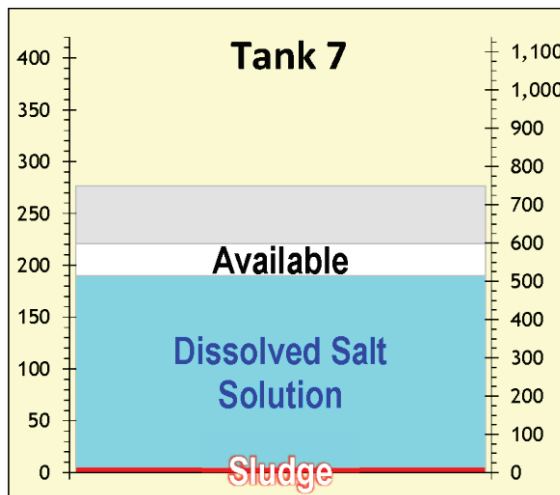
Tank 4:

Area: F-Area
 Service: Activities to prepare for removal of supernate are ongoing.
 Type: I
 EOY Volume: 367,480 gallons
 Status: There were no transfers in or out during 2023.



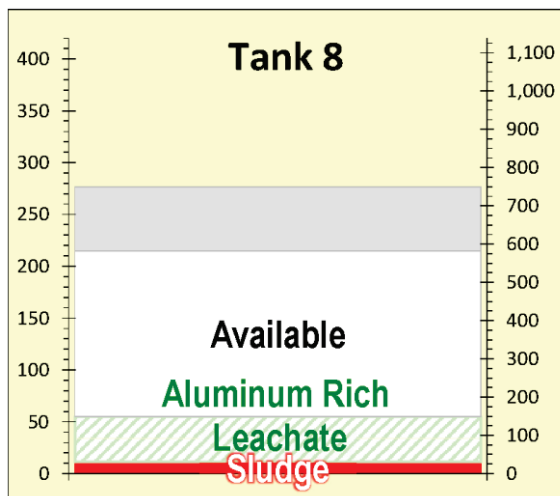
Tank 7:

Area: F-Area
 Service: Serving as a hub tank to receive Tank 3 dissolved salt solution.
 Tank Type: I
 EOY Volume: 514,900 gallons
 Status: There were no transfers in or out during 2023.



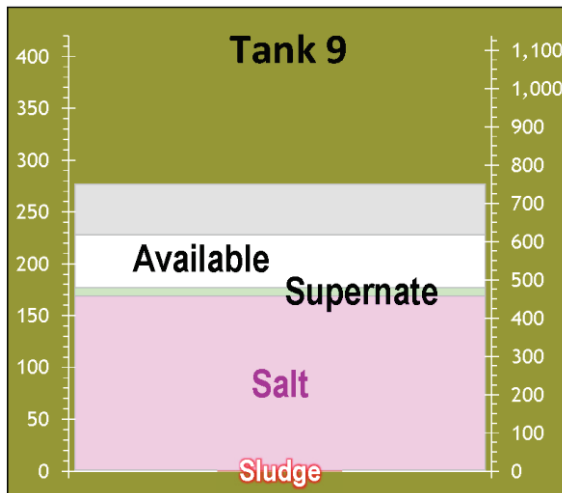
Tank 8:

Area: F-Area
 Service: Currently storing aluminum-rich leachate from Low Temperature Aluminum Dissolution (LTAD) in support of Sludge Batch 10 preparation.
 Type: I
 EOY Volume: 148,780 gallons
 Discussion: Tank 8 transferred approximately 79,000 gallons to Tank 21H for SWPF Batch 9 formation.



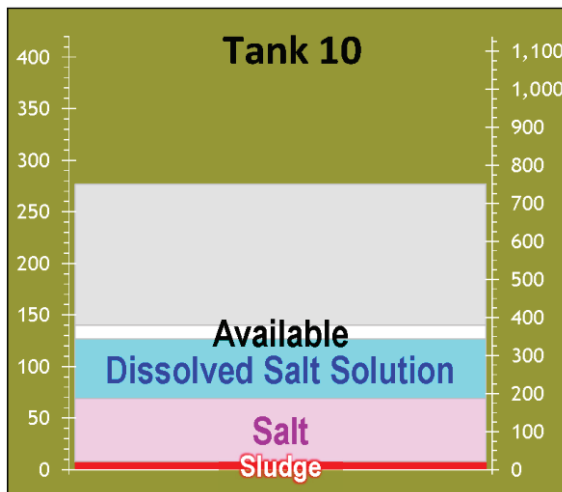
Tank 9:

Area: H-Area
 Service: Waste removal activities are ongoing.
 Type: I
 EOY Volume: 479,130 gallons
 Discussion: Tank 9 received 182,000 gallons of water to dissolve salt and transferred 299,000 gallons to Tank 11 for salt removal from Tank 9.



Tank 10:

Area: H-Area
 Service: Waste removal activities are ongoing.
 Type: I
 EOY Volume: 343,090 gallons
 Discussion: Tank 10 received 382,600 gallons of water to dissolve salt and transferred 470,700 gallons to Tank 11 for salt removal from Tank 10.



Tank 11:

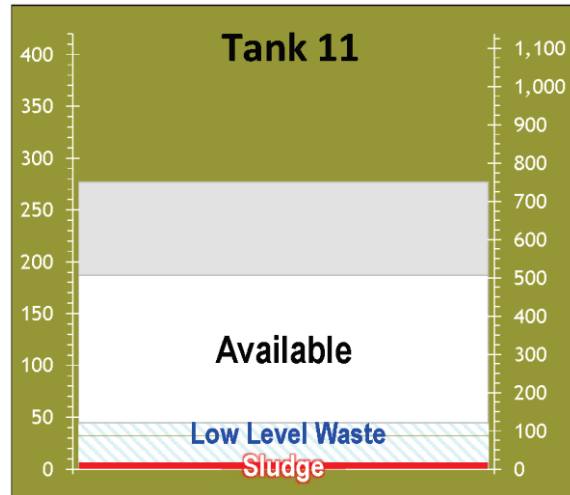
Area: H-Area

Service: Waste removal activities are ongoing.

Type: I

EOY Volume: 121,410 gallons

Status: Tank 11 received approximately 299,000 gallons from Tank 9 and 470,700 gallons from Tank 10 and transferred 679,200 gallons to Tank 35 to support salt removal from Tanks 9 and 10.



Tank 13:

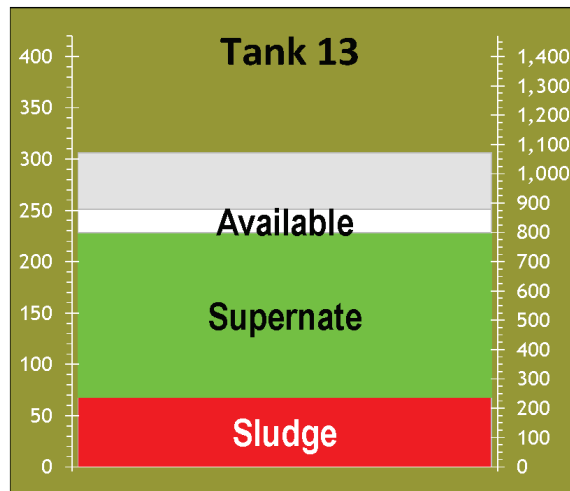
Area: H-Area

Service: Active Waste Tank used as a Hub Tank in support of future cleaning activities for Tanks 14 and 15.

Type: II

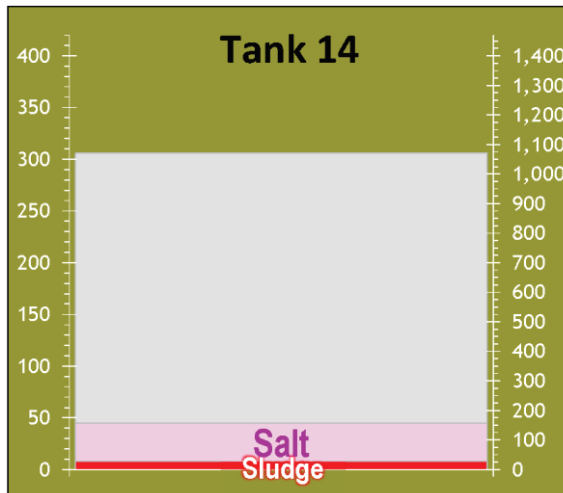
EOY Volume: 798,000 gallons

Status: Tank 13 transferred approximately 384,750 gallons to Tank 15 and received approximately 850,720 gallons from Tank 15 to support Tank 15 heel removal.



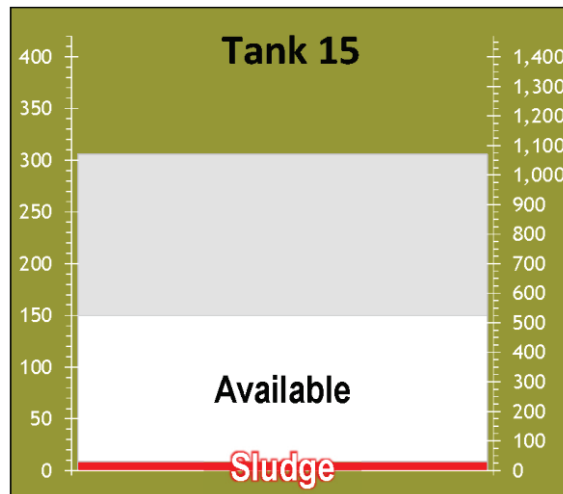
Tank 14:

Area: H-Area
 Service: Inactive Waste Storage Tank
 Under Active Surveillance. Field activities for future waste removal are ongoing.
 Type: II
 EOY Volume: 157,500 gallons
 Status: There were no transfers in or out during 2023.



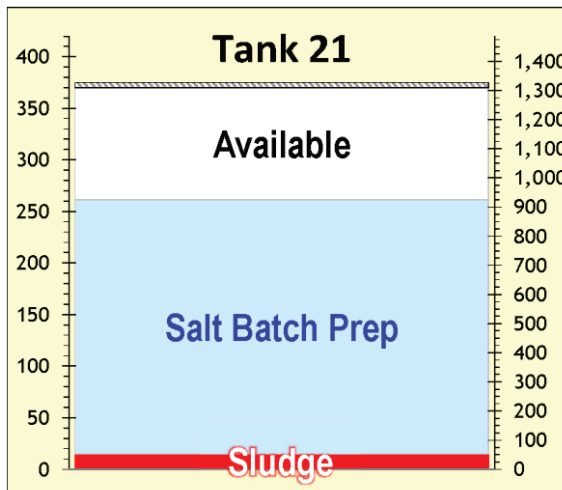
Tank 15:

Area: H-Area
 Service: Heel Removal in preparation for grouting and removal from service.
 Type: II
 EOY Volume: 30,800 gallons
 Status: Tank 15 transferred approximately 850,720 gallons to Tank 13 and received approximately 384,750 gallons from Tank 13 to support Tank 15 heel removal.



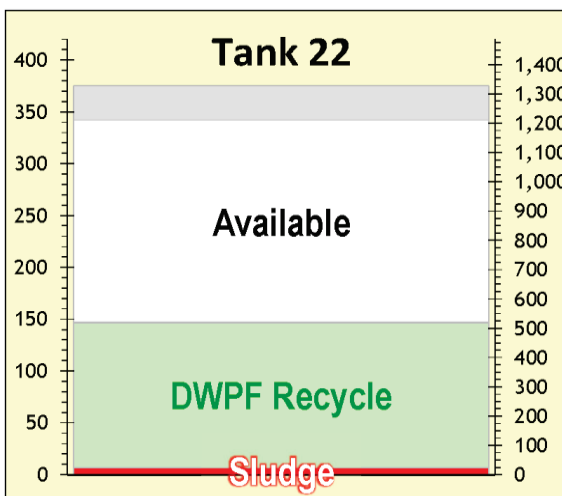
Tank 21:

Area: H-Area
 Service: Salt Batch Blend Tank
 Type: IV
 EOY Volume: 925,360 gallons
 Discussion: Tank 21 transferred 473,000 gallons of SWPF Batch 6 to Tank 49. Tank 21 then received approximately 955,000 gallons in SWPF Batch 9 formation transfers from Tanks 8, 24, 26, and 51 with 28,500 gallons of sodium hydroxide. The initial transfer of 343,000 gallons of SWPF Batch 9 was transferred to Tank 49 in 2023.



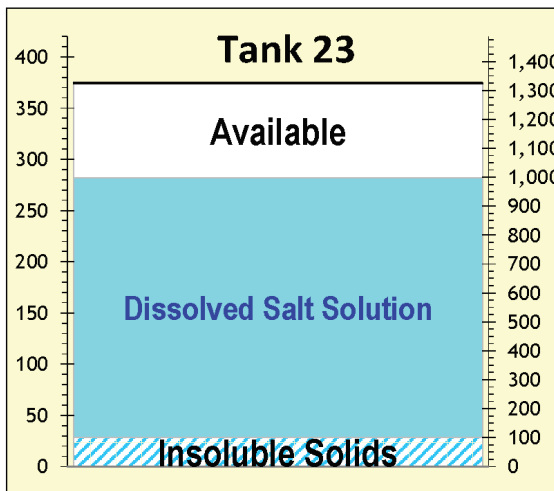
Tank 22:

Area: H-Area
 Service: Storage Tank for Defense Waste Processing Facility (DWPF) Recycle
 Type: IV
 EOY Volume: 519,320 gallons
 Discussion: In 2023, Tank 22 continued receiving and storing DWPF Recycle waste. Tank 22 transferred approximately 837,770 gallons to Tank 51 to remove sludge from Tank 22 for Sludge Batch 11 formation. Tank 51 returned a 158,500 decant to Tank 22. Additionally, 65,600 gallons was transferred to Tank 38 of the 16H Evaporator system at the first of the year and 279,000 gallons was transferred to Tank 41 for SWPF Batch 10 formation.



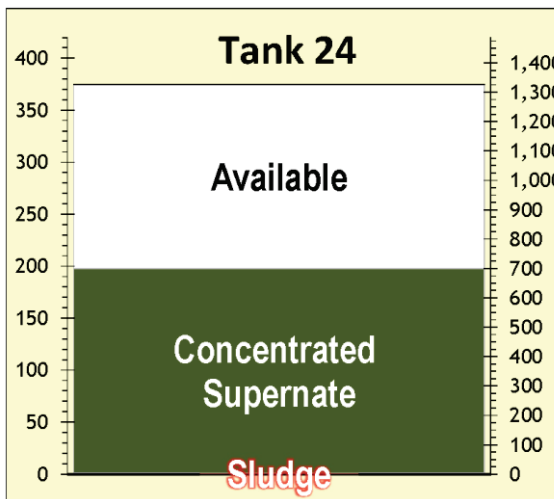
Tank 23:

Area: H-Area
 Service: Salt Solution Hold Tank
 Type: IV
 EOY Volume: 998,280 gallons
 Discussion: Tank 23 transferred approximately 58,700 gallons to Tank 42 for SWPF Batch 12 formation and 240,000 gallons to Tank 41 for SWPF Batch 10 formation.



Tank 24:

Area: H-Area
 Service: Waste Storage Tank
 Type: IV
 EOY Volume: 700,210 gallons
 Status: Tank 24 transferred approximately 225,000 gallons to Tank 21 SWPF Batch 9 formation, 200,000 gallons to Tank 42 SWPF Batch 12 formation, 177,000 gallons to Tank 41 SWPF Batch 10 formation. Tank 24 received 177,000 gallons from Tank 35 to make space in Tank 35 to receive Tank 9, 10, and 11 salt removal material.



APPENDIX B:
CY2023 Federal Facility Agreement System / Component Assessment
Reports

Report Number	Title
M-ESR-H-00624	Tank 31 Transfer Line Interim Extension

Savannah River Site

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT

FOR

TANK 31 TRANSFER LINE INTERIM EXTENSION

**M-ESR-H-00624
REVISION 0**

DISCLAIMER

This report was prepared by Savannah River Mission Completion (SRMC) for the United States Department of Energy under Contract No. 89303322DEM000068 and is an account of work performed under that contract. Neither the United States Department of Energy, nor SRMC, nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, or product or process disclosed herein or represents that its use will not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trademark, name, and manufacturer or otherwise does not necessarily constitute or imply endorsement, recommendations, or favoring of same by SRMC or by the United States Government or any agency thereof. The views and opinions of the authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

APPROVAL SIGNATURES / SUMMARY OF CHANGES**APPROVALS**

PREPARER	DATE
Nuri Sinha, Design Services Mechanical Engineer Project Management, Design and Construction Services	Nuri Sinha Digitally signed by Nuri Sinha Date: 2023.03.29 16:39:45 -04'00'
REVIEWER Harnish Makkar, Design Services Mechanical Engineer Project Management, Design and Construction Services	Harnish Makkar Digitally signed by Harnish Makkar Date: 2023.03.29 16:44:48 -04'00'
APPROVAL Benjamin Fryer, Tank 31 Design Authority Tank Farm Engineering	Benjamin Fryer Digitally signed by Benjamin Fryer Date: 2023.03.29 17:40:42 -04'00'
APPROVAL Chi Leung, Design Services Project Engineer, Project Management, Design and Construction Services	Chi Leung Digitally signed by Chi Leung Date: 2023.03.30 06:43:57 -04'00'

SUMMARY OF CHANGES

Rev. No	Reason for Change	Pages Affected	Issue Date
0	Initial Issue	All	

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1.0 Executive Summary

This Assessment Report is being submitted to satisfy requirements of Section IX and Appendix B of the Savannah River Site (SRS) Federal Facility Agreement (FFA, Ref. 2.4.1). Waste Tank 31, a salt tank located in H-Area Tank Farm (HTF), currently only has one waste transfer line to H-Diversion Box No. 4 (HDB-4). To restore transfer capabilities and prepare Tank 31 as a future hub tank, additional transfer capabilities are required.

The scope of this modification is to install a new above-ground transfer line (WTS-L-109) from Tank 31 Riser C2 to HDB-6 Nozzle 14. Installation of the transfer line will be conducted under Design Change Package M-DCP-H-19003 (Ref. 2.4.3). The transfer line will be installed in 2 phases: (1) tie-in to existing 3"-WTS-L-109 underground near HDB-6, reduce to 2", and extend to a stub-out located below grade; and (2) install waste transfer line 2"-WTS-L-109 between Tank 31 Riser C2 and the interim stub-out. Phase 1 will also isolate a length of existing transfer line (3"-WTS-L-109B) below grade. The phased approach is being implemented to allow resumption of transfer operations in HDB-6 after completion of the first phase.

This task is divided into two FFA reports:

- This FFA Assessment Report
- M-ESR-H-00562 FFA Assessment Report for the Tank 31 Transfer Line Installation

The FFA modification boundary for this FFA Assessment Report is shown in Attachment 9.

2.0 Design Information

2.1 The modification includes the following activities:

- 2.1.1 Cut and remove section of existing underground jacketed transfer line piping long enough to allow rerouting of jacketed transfer line.
- 2.1.2 Tie new bend into existing jacketed transfer line, extend transfer line vertically to below grade, and install non-corrosion evaluated interim cap.
- 2.1.3 Install new corrosion evaluated cap on open end of existing section of isolated transfer line.

2.2 Applicable National Codes & Standards:

- 2.2.1 ASME B31.3-2020 Edition, Process Piping

**FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
TANK 31 TRANSFER LINE INTERIM EXTENSION**M-ESR-H-00624
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- 2.3.1 SRS Engineering Standard 15060, Rev. 21, Additional Requirements for SRS Piping Systems
- 2.3.2 SRS Engineering Guide 15060-G, Rev. 8, Application of ASME B31.3
- 2.3.3 SRS Engineering Standard 05057, Rev. 7, Control of Welding

2.4 Reference Documents

- 2.4.1 WSRC-OS-94-42, Administrative Document Number 89-05-FF, Federal Facility Agreement for the Savannah River Site, August 16, 1993
- 2.4.2 M-TC-H-00090, Rev. 6, Task 31 Salt Dissolution Project
- 2.4.3 M-DCP-H-19003, Rev. 1, Tank 31 STP and Transfer Line Installation
- 2.4.4 WRSC-RP-93-00549, Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991
- 2.4.5 T-CLC-H-01375, Rev. 0, Tank 31 Transfer Line and STP Pump Manifold Stress Analysis
- 2.4.6 M-ML-H-07369, Rev. 2, Waste Tank 31 Modifications Piping Data Sheet Package
- 2.4.7 M-QIP-H-00415, Rev. 1, Tank 31 STP and Transfer Line Installation Quality Inspection Plan
- 2.4.8 M-ESR-H-00562, Rev. 0 Federal Facility Agreement Assessment Report for Tank 31 Transfer Line Installation
- 2.4.9 T-ECA-H-00135, Rev. 0, Tank 31 Transfer Line Interim Configuration Evaluation

3.0 Waste Compatibility

Waste characterization remains unchanged. The materials of construction used in the modifications are compatible with the waste stream. The modifications have not introduced any other materials that will invalidate the existing waste characterization.

4.0 Foundation Support

The integrity of the waste transfer line WTS-L-109 and associated pipe supports have been evaluated in T-ECA-H-00135 (Ref. 2.4.9) and found to be satisfactory.

5.0 Leak Detection and Past Leaks

The affected transfer line will continue to meet Section IX and Appendix B of the FFA. This line will still follow the design presented in Section 3.7.2 of the Phase II Assessment Report (Ref. 2.4.4) for Type II transfer lines and will be sloped toward HDB-6.

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TANK 31 TRANSFER LINE INTERIM EXTENSION

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As stated in the Phase II Assessment Report, there are no known past or present leaks involving the core pipe and secondary containment jacket associated with WTS-L-109 or WTS-L-109B.

6.0 Inspections

Piping material, fabrication, installation, inspection, examination, and testing shall be in accordance with References 2.2.1 and 2.3. These requirements are summarized in the Quality Inspection Plan (Ref. 2.4.7).

7.0 Determination of Secondary Containment

This modification will breach the primary containment (core piping) and secondary containment (jacket piping) of transfer lines WTS-L-109 and WTS-L-109B. Once restoration is achieved, the primary and secondary containment associated with the transfer and associated leak detection lines will meet all FFA requirements and the requirements stated in Section 2.1 of the Phase II Assessment Report (Ref. 2.4.4) as previously evaluated in Section 3.7.2.6 of this same report. Therefore, no further assessment of the primary and secondary containment of this modification is required.

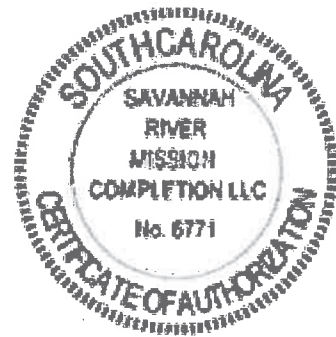
8.0 Professional Engineer Certifications (Design and Construction)

Design

This Assessment Report was prepared under my supervision and direction. I certify that the design for the modifications detailed in Design Change Package M-DCP-H-19003 and associated design documents comply with applicable engineering standards and the requirements in Appendix B of the Federal Facility Agreement. These standards have been generally accepted as adequate in demonstrating leak tightness.

Stamp

Name:
License Number:

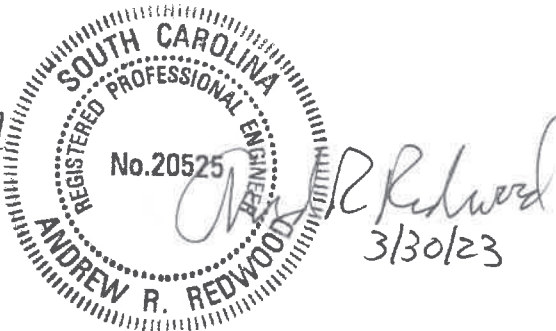


Construction and Installation

I have conducted an inspection, to the extent possible, of the completion of the rerouting of transfer line WTS-L-109 while the transfer line was still under construction. Based upon the inspection, I certify that, to the best of my knowledge, information, and belief, installation of transfer lines WTS-L-109 and WTS-L-109B were constructed in accordance with the approved design, per Design Change Package M-DCP-H-19003. I further certify that the modification was tested in accordance with requirements summarized in Section 6.0 of this Report. The tests conducted to demonstrate leak tightness and the results were found acceptable.

Stamp

Name: Andrew R. Redwood
License Number: 20525



FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
TANK 31 TRANSFER LINE INTERIM EXTENSION

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9.0 ATTACHMENT

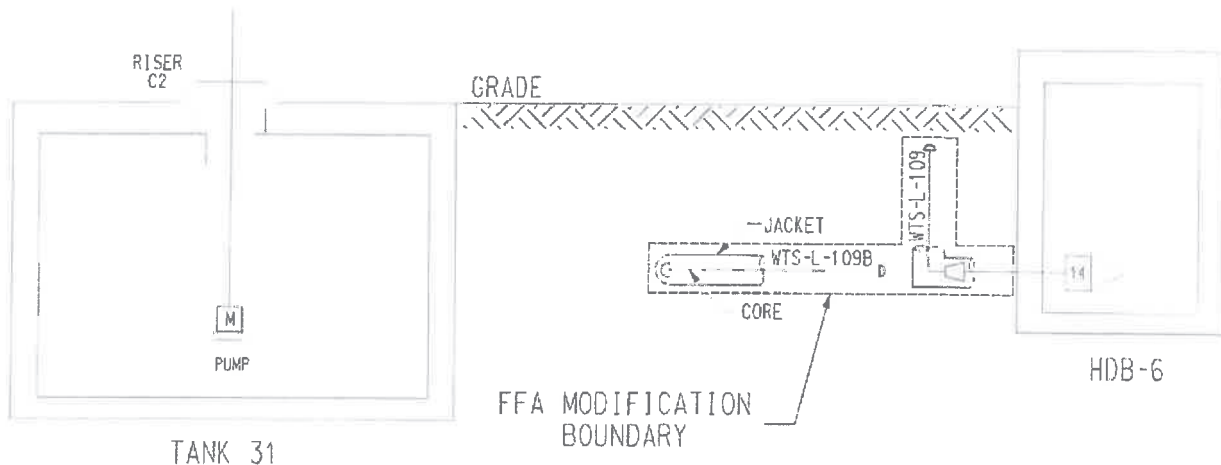


Figure 9-1 Tank 31 Transfer Line Interim Extension FFA Assessment Report Modification Boundary