SRMC-ESH-2025-00012, Rev. 0

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

CY2024 Annual Report

March 2025

Approvals

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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 Environmental Services[1] (SCDES) 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 SCDES the status of the radioactive liquid waste tanks being removed from service. To fulfill these requirements, Calendar Year (CY) 2024 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) 2024, 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 and were initiated in Tank 11H. Waste removal activities completed in Tanks 4F, 9H, and 10H and all three tanks were declared Preliminary Cease Waste Removal (PCWR) Complete. In addition, four other old-style tanks had ongoing field activities in preparation for waste removal. Salt Waste Processing Facility (SWPF) operations continued in CY2024. Through CY2024 thirteen approximately one-million-gallon salt batches have been qualified for SWPF waste feed and another has been compiled and sampled in Tank 21H. SWPF treated over 3,200,000 gallons of salt solution during CY2024.

The NRC performed one on-site monitoring visit related to FTF and HTF in CY2024 and issued one document related to FTF and HTF in CY2024:

1. *Summary and Preliminary Comments on Documents Provided by the United States Department of Energy in Support of the F-Tank Farm and H-Tank Farm Facility Performance Assessments* (ML23361A032).

Footnote 1
South Carolina Department of Environmental Services (SCDES) was known as South Carolina Department of Health and Environmental Control (SCDHEC) prior to July 1, 2024.

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Abbreviations

A-P	Annulus to Primary
BW	Bearing Water
CGCP	Consolidated General Closure Plan
CSMP	Commercial Submersible Mixer Pump
CY	Calendar Year
D&R	Disassembly and Removal
DOE	United States Department of Energy
DWPF	Defense Waste Processing Facility
ECR	Electrical Control Room
ECSMP	Enhanced Commercial Submersible Mixer Pump
EOY	End of Year (2024-12-31)
EPA	United States Environmental Protection Agency
FFA	Federal Facility Agreement
FTF	F-Area Tank Farm
GRM	Gas Release Mode
H&V	Heating and Ventilation
HR	Heel Removal
HTF	H-Area Tank Farm
HVAC	Heating, Ventilation, and Air Conditioning
IA	Instrument Air
IW	Inhibited Water
LFRG	Low-Level Waste Disposal Facilities Federal Review Group
LTAD	Low Temperature Aluminum Dissolution
LDB	Leak Detection Box
LVMJ	Low Volume Mixing Jet
MCC	Motor Control Center
MTS	Motor Transfer Switch
NRC	United States Nuclear Regulatory Commission
PA	Performance Assessment
PCWR	Preliminary Cease Waste Removal
PO	Performance Objective
SA	Special Analysis
SCDHEC	South Carolina Department of Health and Environmental Control
SCDES	South Carolina Department of Environmental Services
SLP	Slurry Pump
SMP	Submersible Mixer Pump
SRMC	Savannah River Mission Completion
SRS	Savannah River Site
STP	Submersible Transfer Pump
SWPF	Salt Waste Processing Facility
UWMQE	Unreviewed Waste Management Question Evaluation
VFD	Variable Frequency Drive
WW	Well Water

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 Environmental Services (SCDES):

> "…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 CY2024 Activities and Accomplishments

As of the end of Calendar Year (CY) 2024, 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 and were initiated in Tank 11H. Waste removal activities completed in Tanks 4F, 9H, and 10H and all three tanks were declared Preliminary Cease Waste Removal (PCWR) Complete. In addition, four other old-style tanks had ongoing field activities in preparation for waste removal. Salt Waste Processing Facility (SWPF) operations continued in CY2024. Through CY2024 thirteen approximately one-million-gallon salt batches have been qualified for SWPF waste feed and another has been compiled and sampled in Tank 21H. SWPF treated over 3,200,000 gallons of salt solution during CY2024.

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

One FFA milestone was completed in CY2024 with the completion of PCWR in Tank 10H in May, ahead of the FFA milestone completion date of December 31, 2024. In addition, in October and December 2024, DOE received concurrence from SCDES and EPA to suspend waste removal activities in Tank 9H and Tank 4F, respectively, and move to the Residuals Sampling and Analysis step of the closure process. Completion of this PCWR step for these tanks represents the first two tanks credited towards completion of the FFA milestone to complete PCWR in three tanks by 12/31/2025.

In CY2024 the Tank 1F Project Team completed designs for the tank top modifications, thermocouples, and Submersible Transfer Pump (STP). The design of the Commercial Submersible Mixer Pumps (CSMPs) and the upgraded design of the Heating and Ventilation (H&V) system were also completed. The design input for HR modifications and field work installation activities of waste removal equipment was initiated. Fabrications of riser covers and thermowells were also initiated.

The Tank 2F Project Team completed hydrolancing, Disassembly and Removal (D&R) of riser plugs and spray chambers (including inhibited water [IW] and bearing water [BW] piping) of Risers 1 and 6, and completed the risers steel modifications to support the installation of CSMPs (refer to Figure 1). The Center riser radar level transmitter was installed. The H&V system component fabrications were completed, and field work installation activities were started. The Team also modified the Hydrogen monitor sample port, and the Hydrogen sampling assembly was installed. The Project Team assembled the Rotek assemblies for the CSMPs and installed the Riser 6 CSMP. Riser 3 instrument air (IA) and well water (WW) modifications were initiated, and the electrical D&R activities in the riser were initiated.

Figure 1 - Tank 2F Riser 1 Steel Modifications

The Tank 3F Project Team completed the design, and initiated installation, of the HR modifications. HR steel modifications were started at Riser 3 for installation of a third CSMP, two CSMP's were previously installed in Risers 1 and 6 in CY2023. D&R of electrical conduit was completed, and installation of new cable trays supporting electrical and fiber optic system were installed. Electrical modifications at Building 241-74F were also completed. The Project Team completed post-modification testing of previously installed equipment (Riser 1 and 6 CSMPs and associated Variable Frequency Drives [VFDs]).

Salt dissolution activities in Tank 3F utilizing the Risers 1 and 6 CSMPs were initiated in December 2024. The Risers 1 and 6 CSMPs were lowered to the extent possible prior to the start of the dissolution activities. Salt dissolution activities will continue into CY2025.

In CY2024 the Tank 4F Team completed the design and installation of a dewatering pump which was installed in Riser 6 after removal of the existing STP. Dewatering of Tank 4F into Tank 26F was done in August 2024 after replacing the originally installed dewatering pump which failed during initial use. Figure 2 shows the installation of the Tank 4F dewatering pump. A volume estimation (i.e., "mapping") and targeted sampling of the waste remaining in Tank 4F after dewatering were performed. A qualitative assessment indicated the residual waste volume was not expected to challenge the Consolidated General Closure Plan (CGCP) Performance Objectives (PO). DOE provided a PCWR presentation to SCDES and the EPA in December 2024. Both agencies concurred with DOE on a preliminary position to cease waste removal activities and proceed with the Sampling and Analysis phase of the tank closure process for Tank 4F. Design for the isolation and D&R of the chromate water system was initiated and is in progress.

Figure 2 - Tank 4F Dewatering Pump Installation

The HR design for Tank 7F was initiated in CY2024. The design input for the H&V system, tank top and CSMP installations modifications was completed.

In CY2024 Tank 9H saltcake dissolution activities using the CSMPs installed in Risers 1 and 4 continued. Three salt dissolution campaigns were performed from January through April 2024. The resulting dissolved salt solution was transferred to Tank 11H. D&R of the Riser 6 spray chamber was performed for the installation of a third CSMP. The Riser 6 CSMP was installed in February 2024 and turned over to Operations in April 2024. Three additional salt dissolutions campaigns utilizing the CSMPs installed in Risers 1, 4 and 6 were performed from April through August 2024. The STP faulted during salt dissolution Campaign 6 in June 2024, and a replacement STP was installed/operational by early July 2024. Annulus cleaning equipment was installed to include an Annulus to Primary (A-P) transfer line, a pump with a disconnect switch, and a water addition downcomer. Two annulus cleaning campaigns were performed in July 2024, followed by one last primary tank salt dissolution campaign (i.e., Campaign 7) completed in August 2024. A final primary tank inspection indicated the saltcake had been completely dissolved in Tank 9H. Figure 3 shows Tank 9H post Campaign 7.

Figure 3 - Tank 9H Primary Tank (Post-Waste Removal)

The Tank 9H annulus was 100% inspected utilizing a drone in September 2024. This was the first use of this technology within the tank closure process. Figure 4 shows the Tank 9H annulus inspection using a drone. The inspection indicated annulus cleaning was effective and consistent in all areas. The Project Team also completed the isolation of the chromate water system and initiated the D&R of the chromate water header and flushing of the cooling coils.

Figure 4 - Tank 9H Annulus Drone Inspection

DOE provided a PCWR presentation to SCDES and the EPA in October 2024. Both agencies concurred with DOE on a preliminary position to cease waste removal activities and proceed with the Sampling and Analysis phase of the tank closure process in Tank 9H.

On Tank 10H, salt dissolution Campaign 3 utilizing CSMPs which started in November 2023 was completed in January 2024. Visual inspection indicated there was no remaining saltcake in the primary tank (refer to Figure 5). Annulus cleaning equipment was installed to include an A-P transfer line, a pump with a disconnect switch, and a water addition downcomer. Two annulus cleaning campaigns were performed in February 2024 consisting of the addition of water with a six-day soak period, followed by an A-P transfer.

Figure 5 - Tank 10H Primary Tank (Post-Salt Dissolution)

A magnetic inspection crawler was deployed in March 2024 through the South annulus riser successfully traveling counterclockwise towards the dehumidification ductwork. The magnetic crawler dislodged from the primary tank wall after returning to the South annulus riser while traveling clockwise towards the West annulus riser. Attempts to recover the magnetic crawler were unsuccessful. Approximately 66% of the annulus was inspected with the aid of inspection cameras and the magnetic crawler. The primary wall conditions in the newly inspected areas with the magnetic crawler were consistent with previously inspected areas. Figure 6 and Figure 7 show the deployment of the magnetic crawler.

Figure 6 - Tank 10H Magnetic Crawler Deployment (South Annulus Riser)

Figure 7 - Tank 10H Magnetic Crawler Below South Annulus Riser

DOE provided a PCWR presentation to SCDES and the EPA in May 2024. Both agencies concurred with the DOE on a preliminary position to cease waste removal activities and proceed with the Sampling and Analysis phase of the tank closure process in Tank 10H.

The Project Team drained the chromate water header, flushed all cooling coils, removed their associated header lines, and fabricated and installed the primary tank dewatering pump. A Tank 10H to Tank 11H dewatering transfer was completed in December 2024. The Team initiated the fabrication of grouting lines to support the future closure of the tank. The Project Team also completed the D&R of the South annulus riser plug and jet.

Tank 11H supported CY2024 salt dissolution activities in Tank 9H and Tank 10H serving as the salt dissolution receipt tank. The dissolved salt solution was transferred from Tank 11H to Tank 35H to serve as feed material for SWPF. In CY2024 electrical modifications to restore power to the existing slurry pumps (SLPs) were completed. In-service leak tests of the BW system tie-ins to the slurry pumps and heat tracing of the BW stations were performed and repairs performed as needed.

Tank 11H waste removal activities were initiated in May 2024 operating Riser 3, 5, and 8 SLPs. The Riser 1 SLP was not operated due to high BW in-leakage. The first mixing Campaign was completed with the transfer of Tank 11H waste into Tank 35H after mixing with the SLPs. Based on the Tank 11H service history and the waste characteristics or chemistry, a decision was made to utilize the Low Temperature Aluminum Dissolution (LTAD) process for the removal of the remaining waste in Tank 11H. Sodium hydroxide additions to support the LTAD campaign were initiated in November and completed in December 2024.

In CY2024 the Tank 14H Project Team removed the Riser 1, Riser 3, and Riser 8 thermowells to support the installation of CSMPs. The Project Team installed the Riser 1, Riser 3, Riser 4A, and Riser 8 CSMPs with associated turntables. D&R of Riser 4 which comprised removal of the reel tape was completed, and a radar level detector was installed. The chemical addition downcomer was installed in Riser 5. The H&V Riser 7 purge system demister gauge, purge fan and the housing drain line installations were also completed. The Project Team installed the Tank 14H to Tank 13H transfer line support anchors and installation of the transfer line will continue in CY2025. An STP was installed in Riser 6 in CY2024. In CY2024 the Project Team also completed the H&V purge stack modifications shown in Figure 8.

Figure 8 - Tank 14H H&V Purge Stack Extension

Tank 15H HR activities continued in CY2024. After the HR Campaign 3 transfer in December 2023 from Tank 15H to Tank 13H, a supernate transfer was made from Tank 13H to Tank 15H in January 2024 to support HR Campaign 4. HR Campaign 4 started in February 2024 with all four (Risers 2, 3, 4A and 8) Submersible Mixing Pumps (SMPs) operating. The HR Campaign 4 transfer from Tank 15H into Tank 13H was completed in March 2024, but based on camera inspections very little sludge material was removed. The Riser 2 SMP failed during this Campaign.

Based on the HR Campaign 4 results an LTAD Campaign (Campaign 5) was started in April with the addition of sodium hydroxide. In May 2024 the Riser 2 SMP was removed and the area underneath the riser was hydrolanced to allow installation of a replacement SMP. Figure 9 shows a Tank 15H SMP. SMPs operation started in May 2024. After reaching the target LTAD temperature, the SMPs were operated for 39 days to dissolve the aluminum in the sludge. The Riser 3 and Riser 8 SMPs faulted during the campaign. LTAD activities were completed in July 2024. The failed Riser 8 SMP was removed and replaced in July 2024. The Campaign 5 transfer from Tank 15H to Tank 13H was performed in August 2024.

Figure 9 - Tank 15H Slurry Mixer Pump

Tank 15H annulus cleaning activities were performed in September 2024. The first water addition for annulus cleaning was allowed to soak for seven days followed by and A-P transfer. The second water addition was allowed to soak for three days, and the third water addition was allowed to soak

for 24 hours. A fourth annulus cleaning batch was performed with a 24-hour soak period. Annulus cleaning activities were completed with the A-P transfer.

A heel washing and mixing campaign (Campaign 6) was performed in October 2024, using WW. This was the first waste removal campaign performed in Tank 15H utilizing dilute material.

The Riser 7 STP was removed in November 2024 and replaced with a dewatering pump. A Tank 15H to Tank 13H dewatering transfer was also completed that month. At the completion of the dewatering transfer a camera inspection was performed to aid with residual waste mapping of the primary tank. A drone inspection, which was the first time the technology had been deployed within a primary tank, was also performed to support the residual waste mapping. Based on the inspections of the primary tank, along with sample results from process samples, it was determined that additional waste removal must be performed in Tank 15H. A Feed and Bleed Campaign (Campaign 7) consisting of water addition into Tank 15H, mixing and transfer into Tank 13H while transferring back into Tank 15H will be performed in CY2025. Figure 10 and Figure 11 show the Tank 15H residual waste at the end of Campaign 6. The photographs are still shots from the inspection performed using the drone.

Figure 10 - Tank 15H Post Campaign 6 (South of Center Column Looking East)

Figure 11 - Tank 15H Post Campaign 6 (Solids South of Riser 2A)

In CY2024 the Tank 28F Project Team installed a downcomer in Riser E1, a new H&V stack, a Low Volume Mixing Jet (LVMJ) in Riser B3 (refer to Figure 12), and the Gas Release Mode (GRM) skid on the tank top along with its associated electrical conduits and supports. D&R activities included the removal of the Riser B3 spray chamber. Modifications for the STP and transfer line were also initiated in CY2024. The installation of the LVMJs tank top valve manifolds was also initiated.

Figure 12 - Tank 28F Riser B3 Low Volume Mixing Jet

Building 241-18F Electrical Control Room (ECR) Heating, Ventilation, and Air Conditioning (HVAC) modifications completed in CY2024 including the installation of the Motor Transfer Switches (MTS) and running the electrical cables from the ECR to the MTS cable trays.

In CY2024 the Tank 31H Project Team continued installation of the modifications needed for salt dissolution activities. The Team completed the installation of Leak Detection Box (LDB)-6, and the GRM skid and disconnect (refer to Figure 13 and Figure 14). D&R of Riser H was completed, and a LVMJ was installed in the riser (refer to Figure 15). Activities related to the installation of the transfer line support beam, core and jacket lines, and shielding were put on hold in CY2024 in alignment with the Liquid Waste System Plan needs for Tank 31H.

Figure 13 - Tank 31H Gas Release Mode Skid Conduit

Figure 14 - Tank 31H Gas Release Mode Input Disconnect

Figure 15 - Tank 31H Riser H Low Volume Mixing Jet

Tank 33F project activities completed in CY2024 include the installation of heat trace and lighting protection, the restoration of chromate water, restoration of H&V purge ventilation for the Motor Control Center (MCC), and relocation of the reel tape assembly from Riser E2 to Riser B4. The Project Team also installed the foundations and contactor skids for the CSMP and Enhanced Commercial Submersible Mixer Pump (ECSMP). The Team started to pull the electrical cables from the Building 241-18F ECR to the contactor skids and started the layout and installation of the cable tray. The Riser E1 CSMP was installed in July 2024, and the Riser E2 CSMP and Riser B5 ECSMP were installed in October 2024. Figure 16 and Figure 17 show some of the CY2024 modifications completed in Tank 33F.

Figure 16 - Tank 33F Contactor Skid Foundation, Stack Extension Insulation, and Riser E1 CSMP Support Plate

Figure 17 - Tank 33F ECSMP Installation

In CY2024 the Tank 34F Project Team continue the modifications for the above ground transfer line. Drilling of the Tank Top to support the transfer line modifications as well as installation of the transfer line supports were completed (refer to Figure 18). Installation of the transfer line core jacket and piping was initiated and will continue in CY2025. The Team also completed the fabrications of riser covers. D&R of Riser D1 and Riser D4 thermowells, the Hydrogen monitor, and D&R of the A-P transfer line was completed in CY2024. The Riser E1 CSMP Rotek was installed. Figure 19 shows the work for the D&R of Riser E1. The Team also started the relocation of the reel tape from Riser E2 to Riser D1.

Figure 18 - Tank 34F Above Ground Transfer Line Supports

Figure 19 - Tank 34F D&R of Riser E1

The Tank 39H Project Team initiated and completed the D&R of the Riser C1 jet and installed an STP in the riser in April 2024. Electrical cables and electrical tie-ins to VFDs for CSMPs Risers B1, B3, B5 and H and for the STP Riser C1 VFD were initiated and completed. The CSMPs rotational checks were also completed. The H&V stack extension activities were also completed in CY2024. Integrated testing of the CSMPs was initiated and it is in progress.

The Tank 46F Project Team completed the design for the H&V system modifications. The Team completed the design and initiated the field work activities for the Tank Top modifications. The inputs for the modification design changes in support of bulk waste removal activities was completed, and the designs for the GRM equipment, CSMPs and STP were initiated and are in progress.

In CY2024 the Tank 47F Team completed the H&V system modifications which included installation of the hydrogen sample port fabricated in CY2023, installation of the H&V system pad for the stack and fan, and the H&V system stack (refer to Figure 20). Fabrications of the GRM skid were initiated in CY2024. The Project Team also completed the removal of the Snell House and its foundation.

Figure 20 - Tank 47F Heating and Ventilation

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

No revisions or updates to the CGCP occurred during CY2024.

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 initial review. In CY2024, DOE review was completed, and Draft B was transmitted to the DOE Low-Level Waste Disposal Facilities Federal Review Group (LFRG) for review. The LFRG review was ongoing as of the end of CY2024. 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 performed one on-site monitoring visit related to FTF and HTF in CY2024 and issued one document related to FTF and HTF in CY2024:

1. *Summary and Preliminary Comments on Documents Provided by the United States Department of Energy in Support of the F-Tank Farm and H-Tank Farm Facility Performance Assessments* (ML23361A032).

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

APPENDIX A: CY2024 Individual Tank Status Report for the F and HArea Radioactive Liquid Waste Tank Farms

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 CY2024.

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:

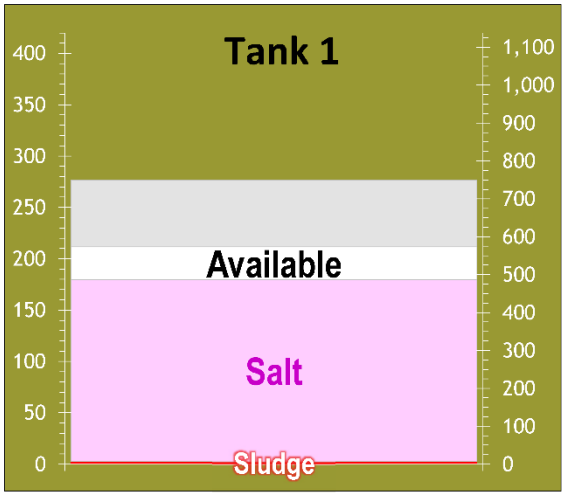
- Tank 5 closed December 2013
- Tank 6 closed December 2013
- Tank 12 closed April 2017
- Tank 16 closed September 2015
- Tank 17 closed December 1997
- Tank 18 closed September 2012
- Tank 19 closed September 2012
- Tank 20 closed July 1997

Three of the tanks received Preliminary Cease Waste Removal (PCWR) concurrence:

- Tank 10 PCWR concurrence in May 2024
- Tank 9 PCWR concurrence in October 2024
- Tank 4 PCWR concurrence in December 2024

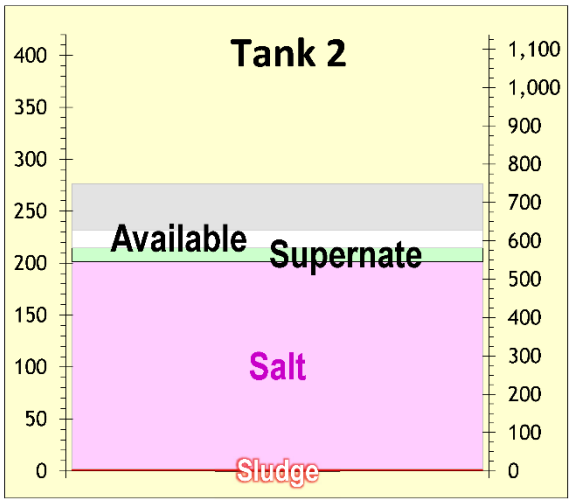
Tank 1:

Area: F-Area
Service: Waste Storage Tank
Under Active Surveillance
Type: I
End of Year (EOY) Volume: 486,990 gallons
Status: There were no transfers in or out during 2024.



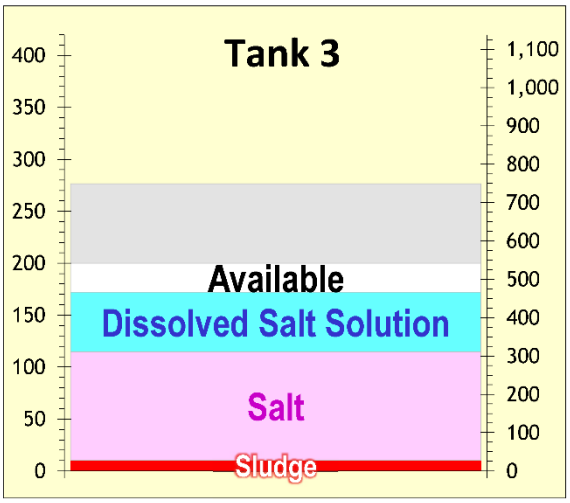
Tank 2:

Area: F-Area
Service: Waste Storage Tank
Under Active Surveillance
Type: I
EOY Volume: 581,570 gallons
Status: There were no transfers in or out during 2024.



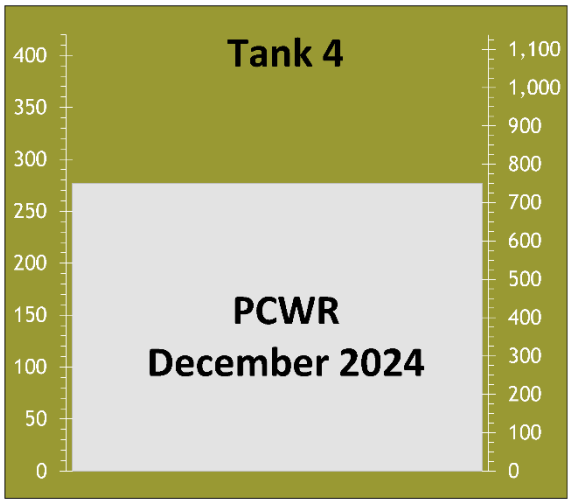
Tank 3:

Area: F-Area
Service: Waste removal activities are ongoing
Type: I
EOY Volume: 466,660 gallons
Status: Tank 3 received approximately 57,900 gallons from catch tank receipts and approximately 69,200 gallons of water for salt dissolution.



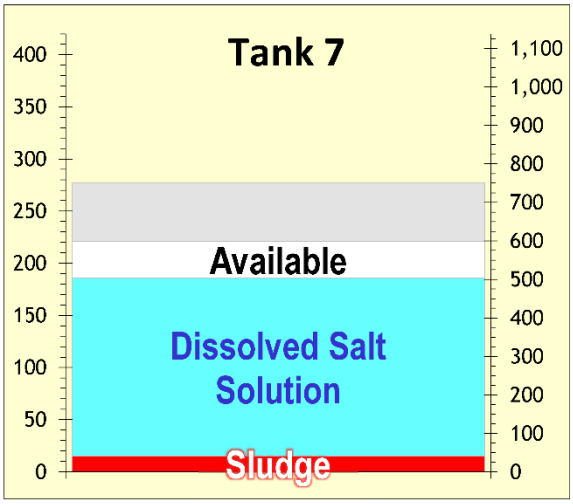
Tank 4:

Area: F-Area
Service: Tank closure.
Type: I
EOY Volume: 15,718 gallons
Status: Tank 4 transferred approximately 348,000 gallons to Tank 26 for salt removal. Tank 4 received Preliminary Cease Waste Removal concurrence.



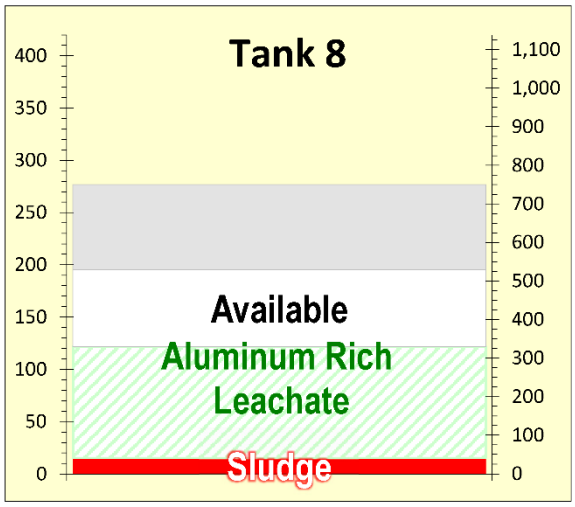
Tank 7:

Area: F-Area
Service: Approved by SCDES and EPA in 2018 for use as hub tank to receive Tank 3 dissolved salt solution.
Tank Type: I
EOY Volume: 503,790 gallons
Status: There were no transfers in or out during 2024.



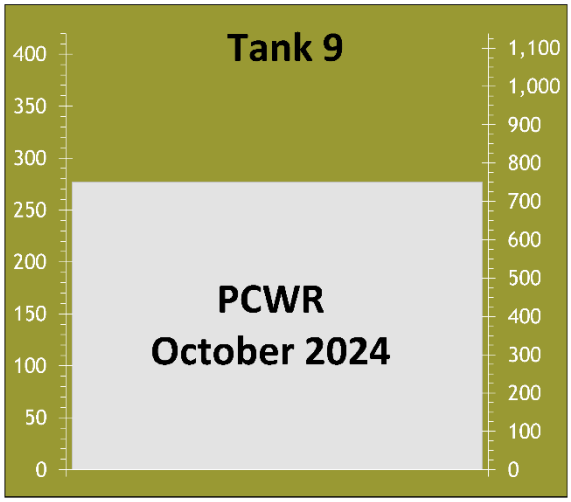
Tank 8:

Area: F-Area
Service: Approved by SCDES and EPA in 2018 for storage of aluminum-rich leachate from Low Temperature Aluminum Dissolution (LTAD).
Type: I
EOY Volume: 329,810 gallons
Discussion: Tank 8 received approximately 198,800 gallons of Tank 15 LTAD material from Tank 13.



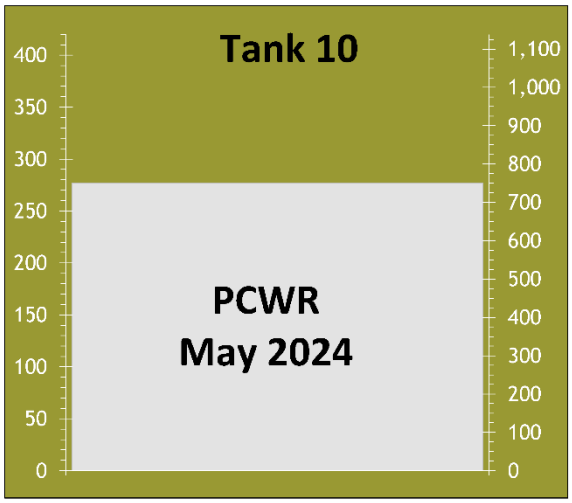
Tank 9:

Area: H-Area
Service: Tank closure.
Type: I
EOY Volume: 16,802 gallons
Discussion: Tank 9 transferred approximately 1,387,600 gallons to Tank 11 from salt removal activities. Tank 9 received Preliminary Cease Waste Removal concurrence.



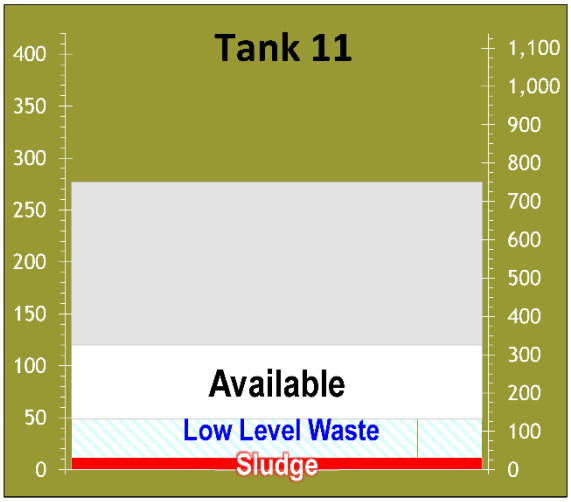
Tank 10:

Area: H-Area
Service: Tank closure.
Type: I
EOY Volume: 21,138 gallons
Discussion: Tank 10 transferred approximately 355,500 gallons to Tank 11 from salt removal activities. Tank 10 received Preliminary Cease Waste Removal concurrence.



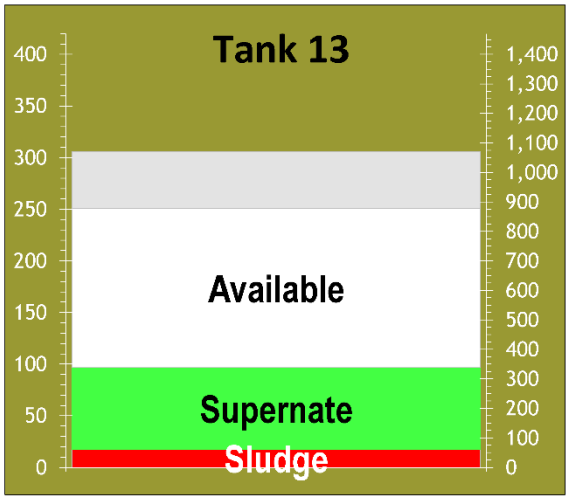
Tank 11:

Area: H-Area
Service: Waste removal activities are ongoing
Type: I
EOY Volume: 131,710 gallons
Status: Tank 11 received approximately 430,500 gallons from Tank 9 and 363,900 gallons from Tank 10 and transferred approximately 1,795,600 gallons to Tank 35 to support salt removal from Tanks 9 and 10.



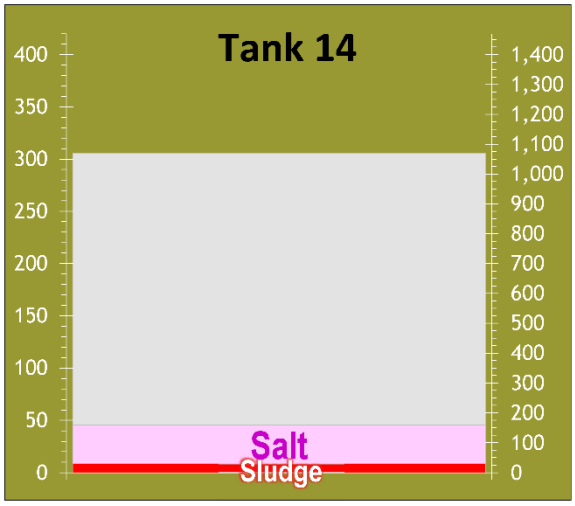
Tank 13:

Area: H-Area
Service: Active Waste Tank used as a Hub Tank in support of cleaning activities for Tanks 14 and 15
Type: II
EOY Volume: 338,100 gallons
Status: To support Tank 15 heel removal, approximately 847,700 gallons were received from Tank 15 including 189,350 gallons of LTAD material; approximately 486,200 gallons were transferred to Tank 15 and 311,200 gallons to Tank 27. The LTAD material was transferred to Tank 8 in a transfer of 198,800 gallons. Tank 13 also transferred almost 421,000 gallons to Tank 51 and received 121,000 gallons from Tank 51 to support Sludge Batch №11 preparation.



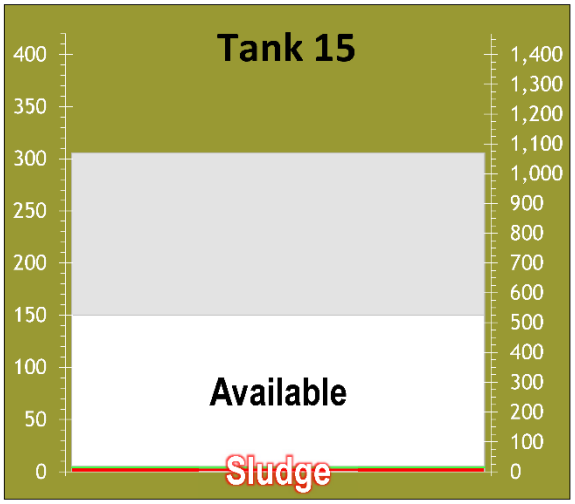
Tank 14:

Area: H-Area
Service: Heel Removal in preparation for grouting and removal from service
Type: II
EOY Volume: 153,300 gallons
Status: There were no transfers in or out during 2024.



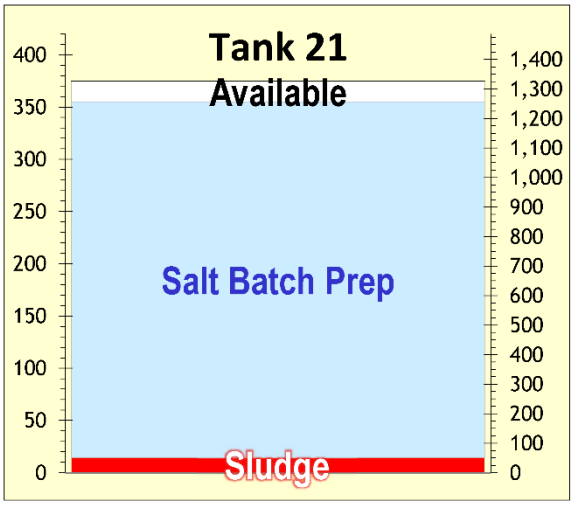
Tank 15:

Area: H-Area
Service: Heel Removal in preparation for grouting and removal from service
Type: II
EOY Volume: 18,900 gallons
Status: To support Tank 15 heel removal, approximately 855,300 gallons were transferred to Tank 13 including 186,900 gallons of LTAD material and 7,100 gallons to dewater Tank 15 approximately 515,600 gallons were received from Tank 13.



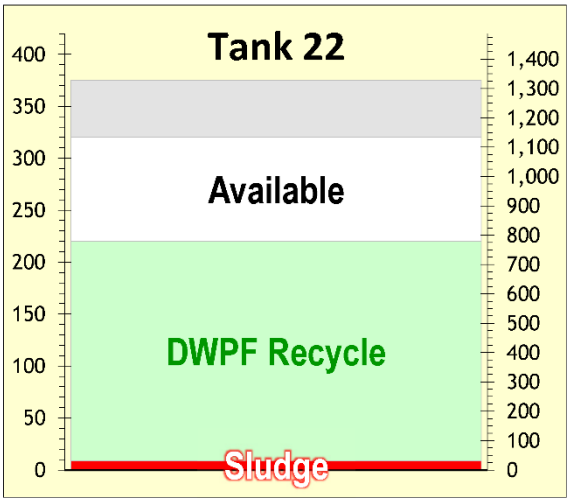
Tank 21:

Area: H-Area
Service: Salt Batch Blend Tank
Type: IV
EOY Volume: 1,256,700 gallons
Discussion: Tank 21 transferred 1,629,500 gallons of SWPF Batches to Tank 49. Tank 21 received approximately 594,800 gallons from Tank 22, 371,700 gallons from Tank 23 and 937,400 gallons from Tank 24 for salt batch formation.



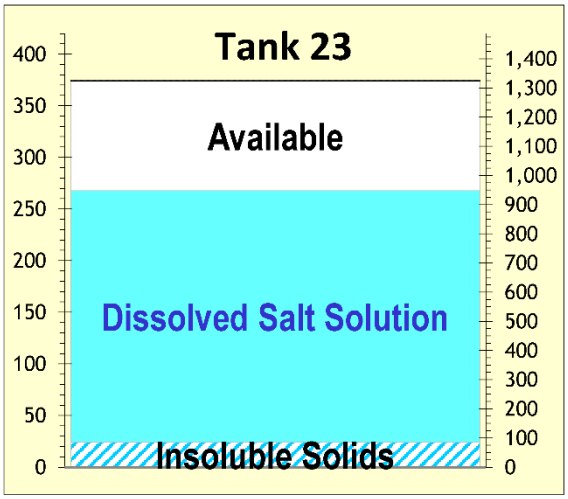
Tank 22:

Area: H-Area
Service: Storage Tank for Defense Waste Processing Facility (DWPF) Recycle
Type: IV
EOY Volume: 779,860 gallons
Discussion: In 2024, Tank 22 continued receiving and storing approximately 1,019,900 gallons of DWPF Recycle waste. Tank 22 transferred approximately 598,500 gallons to Tank 21 and 149,200 gallons to Tank 42 for Salt Batch formation.



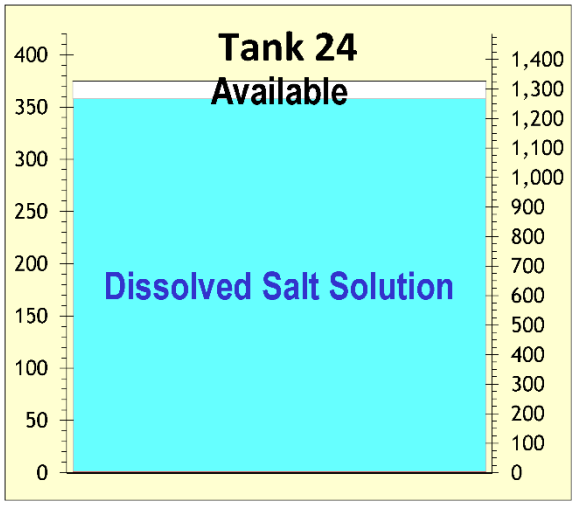
Tank 23:

Area: H-Area
Service: Salt Solution Hold Tank
Type: IV
EOY Volume: 947,300 gallons
Discussion: Tank 23 transferred approximately 349,200 gallons to Tank 42 for SWPF Batch 13 formation and 371,700 gallons to Tank 21 for SWPF Batch 14 formation. Tank 23 received approximately 539,700 gallons from Tank 30 to deliquor the 25H Evaporator. An additional 14,300 gallons was received from Tank 34 for volume relief.



Tank 24:

Area: H-Area
Service: Waste Storage Tank
Type: IV
EOY Volume: 1,266,600 gallons
Status: Tank 24 transferred approximately 948,100 gallons to Tank 21 and 369,400 gallons to Tank 42 for SWPF Batch formation. Tank 24 received 1,900,200 gallons from Tank 35 to make space in Tank 35 to receive Tanks 9 and 10 salt removal material.



APPENDIX B:
CY2024 Federal Facility Agreement System / Component Assessment Reports

Report Number	Title
M-ESR-H-00620	Tank 10 to Tank 11 Hose-in-Hose (HIH) Transfer Line Temp Mod
M-ESR-H-00625	Tank 9 to Tank 11 Hose-in-Hose (HIH) Transfer Line Temp Mod
M-ESR-H-00634	Modifications to Tank 39 WTS-L-3054 Secondary Containment and Leak Detection (LD) Liner

Savannah River Site

FEDERAL FACILITY AGREEMENT
ASSESSMENT REPORT

FOR

Tank 10 to Tank 11 Hose-in-Hose (HIH)
Transfer Line Temp Mod

M-ESR-H-00620
REVISION 0

DISCLAIMER

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

PREPARER/TITLE Jordan Bassett Jordan Bassett, Mechanical Design Engineer SRMC Design Services – Mechanical	Digitally signed by Jordan Bassett Date: 2023.08.07 13:16:01 -04'00'	DATE
REVIEWER/TITLE Lorrie Mobley Lorrie Mobley, Mechanical Design Services Engineering Lead Engineer SRMC Design Services – Mechanical	Digitally signed by Lorrie Mobley, P.E. Date: 2023.08.08 11:29:24 -04'00'	
APPROVAL/TITLE Bob Voegtlen Robert Voegtlen, DA Tank Farm and Closure Engineering	Digitally signed by Bob Voegtlen Date: 2023.08.09 05:16:52 -04'00'	
APPROVAL/TITLE CRAIG CAUGHMAN (Affiliate) Craig Caughman, Design Services Project Engineer, SRMC Design Services	Digitally signed by CRAIG CAUGHMAN (Affiliate) Date: 2023.08.09 13:55:17 -04'00'	

SUMMARY OF CHANGES

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

TABLE OF CONTENTS

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. 2.5.1).

Waste Tank 10H is a Type I, old style waste tank and has a planned operational closure date in accordance with the SRR Schedule. Currently Waste Tank 10H is connected to the TCCR system where Tank 10 waste was sent for Cesium Removal before being routed to Tank 11H as part of tank closure efforts. However, TCCR operations have been suspended and accelerated closure schedule is desired by the facility. In order to accomplish this, a hose-in-hose (HIH) transfer line will be routed directly from Tank 10H to Tank 11H. The HIH transfer line design is shown in a Temporary Modification Package M-TMOD-H-00010 (Ref. 2.5.3) The HIH transfer line consists of a 1.5" hose core line and a 3" hose jacket and will be installed aboveground between Waste Tank 10H, Center Riser and Waste Tank 11H, Riser 2. Both the waste core hose and jacket hose of the HIH system are continuous aboveground, i.e., no fittings are located outside of the tanks. The HIH system is supported between the tank risers such that there is a continuous slope from the high-point of the HIH system back to the tank risers.

The scope of this temporary modification is to allow for the transfer of the liquid waste from Waste Tank 10H to Waste Tank 11H. The use of the HIH as a transfer line and Tank 11 as a receipt tank are what are being evaluated. The Heel will be dissolved as part of efforts in separate DCPs and the resulting waste moved via the Hose-in-Hose transfer line. The goal of this modification is to expedite and facilitate the final operational closure of Waste Tank 10H.

This task is associated with M-ESR-H-00625, FFA Assessment Report Tank 9 to Tank 11 Hose-in-Hose Transfer Line Temp Mod.

2.0 Design Information

2.1 This modification installs a Hose-In-Hose HIH waste transfer system.

2.1.1 One inner core hose originates from the STP pump discharge line in Tank 10H Center Riser and terminates inside of Tank 11H Riser 2 (See sketch in Attachment). The outer Jacket hose will at minimum surround the core hose for the entire length not inside of one of the Tanks.

2.1.2 The HIH assembly will be a newly procured assembly that is a continuous run between tanks. It will be cut to length per the design described in the Temp Mod (Ref. 2.5.3).

2.2 This modification includes the following activities:

2.2.1 The 1.5" core hose will be protected inside the 3" jacket hose to create the HIH piping system. Ensure the outer jacket hose is of sufficient length to extend into the vapor space of both Waste Tanks. Similar hoses have been used for aboveground waste transfers.

2.2.2 Route the HIH system aboveground between Waste Tank 10H Center Riser and Waste Tank 11H Riser 2. Install supports for the HIH as required per design to ensure continuous slope from HIH system high point to each riser. Some existing supports from previous Tank 10H to TCCR Lines may be re-used if appropriate.

2.2.3 The HIH and Tank Risers shall be shielded with a goal to maintain the dose rate at less than 5 mrem/hour at 30 cm during non-transfer conditions (Ref. 2.5.5, DC.3.1.3.6).

2.3 Applicable SRS Engineering Standards and Engineering Guides:

2.3.1 SRS Engineering Standard 15060, Rev. 21, Additional Requirements for SRS Piping Systems

2.3.2 SRS Engineering Standard 01064, Rev. 9, Radiological Design Requirements

2.3.3 SRS Engineering Standard 01060, Rev. 13, SRS Structural Design Criteria

2.3.4 SRS Engineering Standard 15060-G, Rev. 8-ADD-2, Application of ASME B31.3

2.4 Applicable National Codes & Standards:

2.4.1 ASME B31.3-2018 Edition, Process Piping Code

2.5 Reference Documents

2.5.1 WSRC-OS-94-42, Administrative Document Number 89-05-FF, Federal Facility Agreement for the Savannah River Site, August 16, 1993

2.5.2 WSRC-RP-93-549, Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991

2.5.3 M-TMOD-H-00010, Rev. 3, Tank 10 to Tank 11 and Tank 9 to Tank 11 Transfer Line Temp Mod

2.5.4 M-QIP-H-00493, Rev. 0, Tank 10 to Tank 11 Hose-in-Hose Temp Mod Installation

2.5.5 M-TC-H-00095, Rev. 3, COMMERCIAL SUBMERSIBLE MIXER PUMP INSTALLATION ACTIVITIES FOR 241-910H (TANK 10H)

2.5.6 M-CLC-G-00459, Rev. 2, Unlisted Component Evaluation for Waste Transfer Hose-In-Hose (HIH) Assemblies

2.5.7 C-ECA-G-00013, Rev. 1, Evaluation of Supports for HIH Transfer Lines Tanks 10H to Tank 11H

2.5.8 M-ESR-H-00402, Rev. 4, Liquid Waste Transfer Hose-In Hose Systems Service Life Evaluation

2.5.9 WSRC-SA-2002-00007, CONCENTRATION, STORAGE, AND TRANSFER FACILITIES DOCUMENTED SAFETY ANALYSIS, Rev. 23

3.0 Waste Compatibility

Waste characterization remains unchanged. The HIH assembly used in the Temporary Modification are construction of materials that have been proven to be compatible with the waste stream as evaluated in M-ESR-H-00402 (Ref. 2.5.8) and its inputs. Use of Tank 11 for receipt of the Tank 10 waste was evaluated as part of inputs to the T&RC (Ref. 2.5.5). The modifications will not introduce any other materials that will invalidate the existing waste characterization.

4.0 Foundation Support

The hose components of the HIH system are evaluated in M-CLC-G-00459 (Ref. 2.5.6) as unlisted components in order to verify that they are of adequate design per ASME B31.3 Code Requirements (Ref. 2.4.1). The HIH aboveground support system was evaluated by calculation C-ECA-G-00013 (Ref. 2.5.7) and was shown to be adequately designed to support hoses and shielding. Tank 11 foundation support has been previously evaluated in WSRC-RP-93-549 (Ref.2.5.2), Section 3.1.2.

5.0 Leak Detection and Past Leaks

The HIH system will be installed such that it is continuously sloped from the high point of the waste transfer system back to the tanks. Leak detection for the HIH assembly will be by video inspections of the tank internals during transfer. Video inspections will detect leakage of the transfer line core into the HIH

jacket. No known past leaks exist for the HIH assembly. An ISLT will verify no leaks during installation activities for the HIH.

Tank 11 has leak detection devices as described in WSRC-SA-2002-00007 (Ref. 2.5.9) that meet FFA requirements. The Tank 11 primary tank has past leaks as described in WSRC-RP-93-549 and acknowledged in subsequent DOE/SCDHEC/SRS communications regarding its use. See section 7 below for more discussion.

6.0 Inspections

Hose material, assembly, installation, inspection, examination, and testing shall be in accordance with:

- ASME Code B31.3-2018 (Ref. 2.4.1)
- WSRC-TM-95-1, SRS Engineering Standards 15060 (Ref. 2.3.1)
- WSRC-IM-95-58, SRS Engineering Guide 15060-G (Ref. 2.3.4)
- M-ESR-H-00402, Liquid Waste Transfer Hose-In Hose Systems Service Life Evaluation, Rev. 3

Examination and leak testing inspections for the HIH assembly are contained in the Quality Inspection Plan (QIP) M-QIP-H-00493 (Ref. 2.5.4). The QIP verifies that the HIH assembly is sloped continuously towards Tank 10 or 11 as shown in the design documents.

There are no changes required to the Tank 11 inspections since they will be the same inspections required for its current role as a waste storage tank and receipt tank for TCCR output.

7.0 Determination of Secondary Containment

The HIH assembly meets the secondary containment requirements of the FFA (Ref. 2.5.1) as listed in Appendix B, subsection C. Discussion on how the assembly meets the Material, Foundation, Leak Detection, and Sloping requirements are included in the Sections 2 through 6 above.

Tank 11 is described in WSRC-RP-93-549 (Ref. 2.5.2) Section 3.1.6 as not meeting the secondary containment requirements of the FFA but was allowed for use for storing its current waste as stated in Section 4.1.5 of that same report. For using the Tank as a receipt tank for Tank 10 waste, the FFA (Ref. 2.5.1) makes an allowance for the use tanks with a leak in the primary tank in Appendix B, Section D.5.(b) subject to the approval of SCDHEC. Approval from DHEC has been previously granted for use of Tank 11 as a receipt tank for waste from Tank 10 as part of TCCR related activities. Approval for transferring

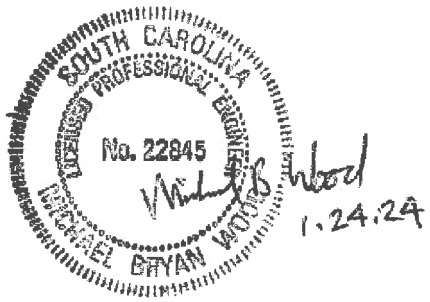
waste from Tank 10 to Tank 11 separate from TCCR will require approval from SCDHEC (either specifically for this task or as part of a standing approval for more general activities) prior to the transfer of waste from Tank 10 in order to comply with the FFA.

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 Temporary Modification Package M-TMOD-H-00010 and associated design documents, kept with applicable engineering standards and the requirements of 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

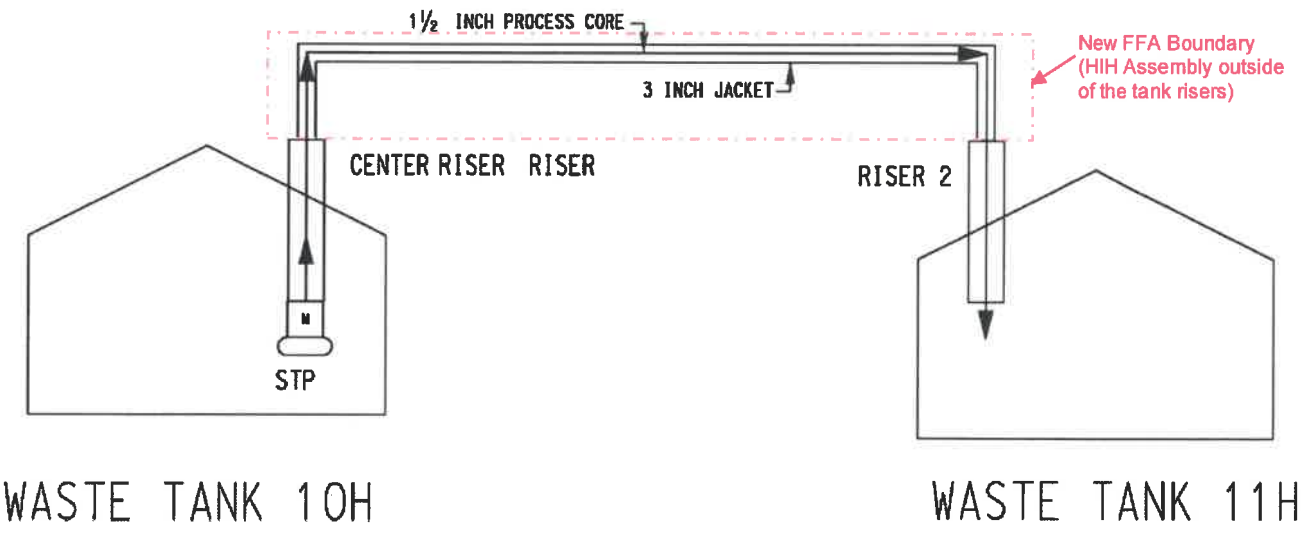
I have conducted an inspection, to the extent possible, of the completion of the modified system. Based upon the inspection, I certify that, to the best of my knowledge, information, and belief, the installation of the Tank 10H Center Riser to Tank 11H Riser 2 HIH above ground Transfer Line, was constructed in accordance with the approved design in Temporary Modification Package M-TMOD-H-00010. I further certify that the modification was tested and inspected in accordance with the requirements summarized in Section 6.0 of this Report and detailed in Temporary Modification Package M-TMOD-H-00010 and associated design documents. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

Name: Andrew R Redwood
License Number: 20525

9.0 ATTACHMENT

HIH From Waste Tank 10H Riser Center to Waste Tank 11H Riser 2



Savannah River Site

FEDERAL FACILITY AGREEMENT
ASSESSMENT REPORT

FOR

Tank 9 to Tank 11 Hose-in-Hose (HIH)
Transfer Line Temp Mod

M-ESR-H-00625
REVISION 0

DISCLAIMER

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

PREPARER/TITLE Jordan Bassett Jordan Bassett, Mechanical Design Engineer SRMC Design Services – Mechanical	Digitally signed by Jordan Bassett Date: 2023.08.07 13:17:50 -04'00'	DATE
REVIEWER/TITLE Lorrie Mobley Lorrie Mobley, Mechanical Design Services Engineering Lead Engineer SRMC Design Services – Mechanical	Digitally signed by Lorrie Mobley, P.E. Date: 2023.08.08 11:28:29 -04'00'	
APPROVAL/TITLE Bob Voegtlen Robert Voegtlen, DA Tank Farm and Closure Engineering	Digitally signed by Bob Voegtlen Date: 2023.08.09 05:18:39 -04'00'	
APPROVAL/TITLE CRAIG CAUGHMAN (Affiliate) Craig Caughman, Design Services Project Engineer, SRMC Design Services	Digitally signed by CRAIG CAUGHMAN (Affiliate) Date: 2023.08.09 13:54:24 -04'00'	

SUMMARY OF CHANGES

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

TABLE OF CONTENTS

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.2.5.1).

Waste Tank 9H is a Type I salt tank located in the H-Area Tank Farm Facility. Currently, Tank 9H is connected to Tank 10H via a Hose in Hose (HIH) transfer line. Current facility needs require the bulk of the waste in both Tanks 9 and 10 to be routed to Waste Tank 11. The scope of this FFA report consists of the installation of a new HIH transfer line between the Tank 9 Center Riser and the Tank 11 Riser 2.

Temporary Modification Package M-TMOD-H-00010 (Ref 2.5.3) installs an HIH transfer line from Tank 9H Center Riser to Tank 11H Riser 2 (see Attachment 9.1). The HIH line assembly consists of a 1½-inch hose core line and a 3-inch hose jacket line and will be installed above ground. The core hose and jacket hose of the HIH system are run continuously above ground with no hose fittings located outside of the tanks. The HIH system is supported between the tank risers such that there is a continuous slope from the high-point of the HIH system back to the tank risers.

This task is associated with M-ESR-H-00620, FFA Assessment Report Tank 10 to Tank 11 Hose-in-Hose Transfer Line Temp Mod.

2.0 Design Information

2.1 This modification installs a Hose-In-Hose HIH waste transfer system.

2.1.1 One inner core hose originates from the STP pump discharge line in Tank 9H Center Riser and terminates inside of Tank 11H Riser 2 (See sketch in Attachment 9.1). The outer Jacket hose will at minimum surround the core hose for the entire length not inside of one of the Tanks.

2.1.2 The HIH assembly will be a newly procured assembly that is a continuous run between tanks. It will be cut to length per the design described in the Temp Mod (Ref. 2.5.3).

2.2 This modification includes the following activities:

2.2.1 The 1.5" core hose will be protected inside the 3" jacket hose to create the HIH piping system. Ensure the outer jacket hose is of sufficient length to extend into the vapor space of both Waste Tanks. Similar hoses have been used for aboveground waste transfers.

2.2.2 Route the HIH system aboveground between Waste Tank 9H Center Riser and Waste Tank 11H Riser 2. Install supports for the HIH as required per design to ensure continuous slope from HIH system high point to each riser. Some existing supports from previous Tank 9H to TCCR Lines may be re-used if appropriate.

2.2.3 The HIH and Tank Risers shall be shielded with a goal to maintain the dose rate at less than 5 mrem/hour at 30 cm during non-transfer conditions (Ref. 2.5.5, DC.3.1.3.6).

2.3 Applicable SRS Engineering Standards and Engineering Guides:

2.3.1 SRS Engineering Standard 15060, Rev. 21, Additional Requirements for SRS Piping Systems

2.3.2 SRS Engineering Standard 01064, Rev. 9, Radiological Design Requirements

2.3.3 SRS Engineering Standard 01060, Rev. 13, SRS Structural Design Criteria

2.3.4 SRS Engineering Standard 15060-G, Rev. 8-ADD-2, Application of ASME B31.3

2.4 Applicable National Codes & Standards:

2.4.1 ASME B31.3-2020 Edition, Process Piping Code

2.5 Reference Documents

2.5.1 WSRC-OS-94-42, Administrative Document Number 89-05-FF, Federal Facility Agreement for the Savannah River Site, August 16, 1993

2.5.2 WSRC-RP-93-549, Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991

2.5.3 M-TMOD-H-00010, Rev. 3, Tank 10 to Tank 11 and Tank 9 to Tank 11 Transfer Lines Temp Mod

2.5.4 M-QIP-H-00498, Rev. 0, Tank 9 to Tank 11 Hose-in-Hose Temp Mod Installation

2.5.5 M-TC-H-00107, Rev. 1, COMMERCIAL SUBMERSIBLE MIXER PUMP INSTALLATION ACTIVITIES FOR 241-99H (TANK 9H)

2.5.6 M-CLC-G-00459, Rev. 2, Unlisted Component Evaluation for Waste Transfer Hose-In-Hose (HIH) Assemblies

2.5.7 C-ECA-G-00013, Rev. 1, Evaluation of Supports for HIH Transfer Lines Tanks 9H to Tank 11H

2.5.8 M-ESR-H-00402, Rev. 4, Liquid Waste Transfer Hose-In Hose Systems Service Life Evaluation

2.5.9 WSRC-SA-2002-00007, CONCENTRATION, STORAGE, AND TRANSFER FACILITIES DOCUMENTED SAFETY ANALYSIS, Rev. 23

3.0 Waste Compatibility

The waste characterization remains unchanged. The HIH assembly used in the Temporary Modification are constructed of materials that have been proven to be compatible with the waste stream as evaluated in M-ESR-H-00402 (Ref. 2.5.8) and its inputs. Use of Tank 11H for receipt of the Tank 9H waste was evaluated as part of inputs to the T&RC (Ref. 2.5.5). The modifications will not introduce any other materials that will invalidate the existing waste characterization.

4.0 Foundation Support

The hose components of the HIH system are evaluated in M-CLC-G-00459 (Ref. 2.5.6) as unlisted components to verify that they are of adequate design per ASME B31.3 Code Requirements (Ref. 2.4.1). The HIH aboveground support system was evaluated by calculation C-ECA-G-00013 (Ref. 2.5.7) and was shown to be adequately designed to support hoses and shielding. Tank 11 foundation support has been previously evaluated in WSRC-RP-93-549 (Ref. 2.5.2), Section 3.1.2.

5.0 Leak Detection and Past Leaks

The HIH system will be installed such that it is continuously sloped from the high point of the waste transfer system back to the tanks. Leak detection for the HIH assembly will be by video inspections of the tank internals during transfer. Video inspections will detect leakage of the transfer line core into the HIH

jacket. No known past leaks exist for the HIH assembly. An ISLT will verify no leaks during installation activities for the HIH.

Tank 11 has leak detection devices as described in WSRC-SA-2002-00007 (Ref. 2.5.9) that meet FFA requirements. The Tank 11 primary tank has past leaks as described in WSRC-RP-93-549 (Ref. 2.5.2) and acknowledged in subsequent DOE/SCDHEC/SRS communications regarding its use. See section 7 below for more discussion.

6.0 Inspections

Hose material, assembly, installation, inspection, examination, and testing shall be in accordance with:

- ASME Code B31.3-2018 (Ref. 2.4.1)
- WSRC-TM-95-1, SRS Engineering Standards 15060 (Ref. 2.3.1)
- WSRC-IM-95-58, SRS Engineering Guide 15060-G (Ref. 2.3.4)
- M-ESR-H-00402, Liquid Waste Transfer Hose-In Hose Systems Service Life Evaluation, Rev. 3 (Ref 2.5.8)

Examination and leak testing inspections for the HIH assembly are contained in the Quality Inspection Plan (QIP) M-QIP-H-00498 (Ref. 2.5.4). The QIP verifies that the HIH assembly is sloped continuously towards Tank 10 or 11 as shown in the design documents.

There are no changes required to the Tank 11 inspections since they will be the same inspections required for its current role as a waste storage tank and receipt tank for TCCR output.

7.0 Determination of Secondary Containment

The HIH assembly meets the secondary containment requirements of the FFA (Ref. 2.5.1) as listed in Appendix B, subsection C. Discussion on how the assembly meets the Material, Foundation, Leak Detection, and Sloping requirements are included in the Sections 2 through 6 above.

Tank 11 is described in WSRC-RP-93-549 (Ref. 2.5.2) Section 3.1.6 as not meeting the secondary containment requirements of the FFA but was allowed for use for storing its current waste as stated in Section 4.1.5 of that same report. For using Tank 11 as a receipt tank for Tank 9 waste, the FFA (Ref. 2.5.1) makes an allowance for using tanks with a leak in the primary tank in Appendix B, Section D.5.(b). This allowance permits known faulty systems to be returned to service with the approval of SCDHEC.

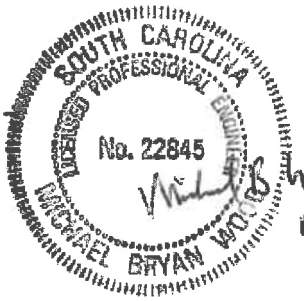
This approval from SCDHEC has been previously granted for use of Tank 11 as a receipt tank for waste as part of TCCR related activities. Approval for transferring waste from Tank 9 to Tank 11 separate from TCCR will require approval from SCDHEC (either specifically for this task or as part of a standing approval for more general activities) prior to the transfer of waste from Tank 9 in order to comply with the FFA.

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 Temporary Modification Package M-TMOD-H-00010, Rev 1 and associated design documents, kept with applicable engineering standards and the requirements of Appendix B of the Federal Facility Agreement. These standards have been generally accepted as adequate in demonstrating leak tightness.

Stamp

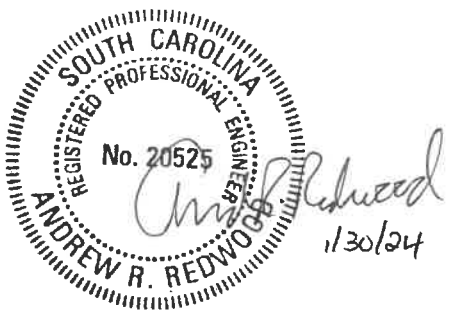


Name:
License Number:

Construction and Installation

I have conducted an inspection, to the extent possible, of the completion of the modified system. Based upon the inspection, I certify that, to the best of my knowledge, information, and belief, the installation of the Tank 9H Center Riser to Tank 11H Riser 2 HIH above ground Transfer Line, was constructed in accordance with the approved design in Temporary Modification Package M-TMOD-H-00010, Rev 1. I further certify that the modification was tested and inspected in accordance with the requirements summarized in Section 6.0 of this Report and detailed in Temporary Modification Package M-TMOD-H-00010, Rev 1 and associated design documents. The tests conducted to demonstrate leak tightness were found acceptable.

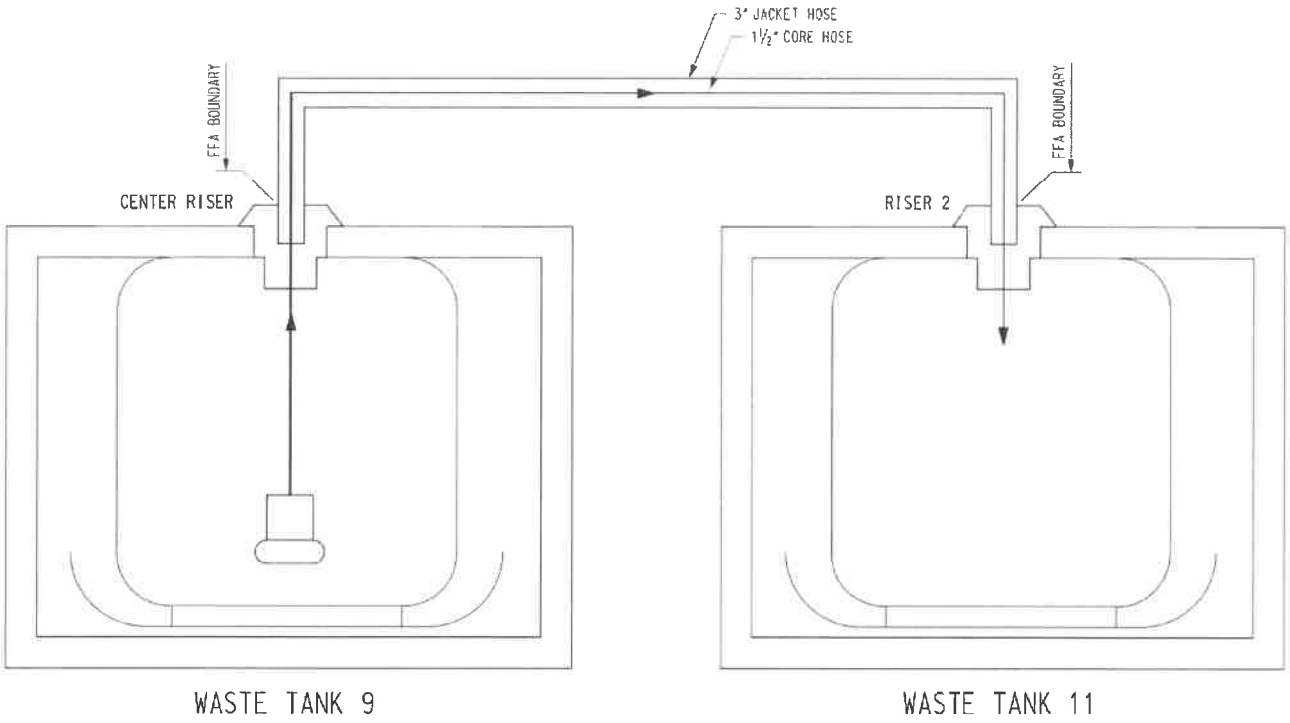
Stamp



Name: Andrew R Redwood
License Number: 20525

9.0 ATTACHMENT

HIH From Waste Tank 9H Riser Center to Waste Tank 11H Riser 2



Savannah River Site

FEDERAL FACILITY AGREEMENT
ASSESSMENT REPORT

FOR

Modifications to Tank 39 WTS-L-3054 Secondary Containment and Leak Detection (LD) Lines

M-ESR-H-00634
REVISION 0

DISCLAIMER

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

	DATE
PREPARER/TITLE Jaron Walker. Digitally signed by Jaron Walker. Date: 2023.05.25 15:38:10 -04'00' Jaron Walker, Mechanical Design Engineer SRMC Design Services – Mechanical	
REVIEWER/TITLE Jordan Bassett Digitally signed by Jordan Bassett Date: 2023.05.25 15:51:47 -04'00' Thomas Bassett, Mechanical Design Engineer SRMC Design Services – Mechanical	
APPROVAL/TITLE Scott M Wallace Digitally signed by Scott Wallace Date: 2023.05.25 16:00:02 -04'00' Scott Wallace, DA Tank Farm and Closure Engineering	
APPROVAL/TITLE C.N. Combs Digitally signed by C.N. Combs Date: 2023.05.25 16:10:20 -04'00' Neill Combs, Design Services Project Engineer, SRMC Design Services	

SUMMARY OF CHANGES

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

TABLE OF CONTENTS

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).

The H-Tank Farm Leak Detection (LD) drain lines, LD-L-1505 and LD-L-1547, connecting to the Tank 39H to Diversion Box 7 (HDB-7) transfer line jacket WTS-L-3054, have failed a periodic structural integrity inspection due to leak points found during line segment pressure tests. The lines will be disconnected from the jacket of WTS-L-3054 and capped on the ends connected to Tank 39's Leak Detection Box 1 (LDB-1). During this inspection, a hole was found in vent line LD-L-1546. This line will be cut and capped as close to the jacket of WTS-L-3054. Tank 39 LDB-1 will no longer be used for leak detection of this section of the transfer line but will not be placed completely out of commission at this time. A seal plate prevents this section of jacket (and a section of the jacket for line WTS-L-1501 that drains to this shared jacket location for leak detection) from draining to LDB-2 at HDB-7 for leak detection. A 1" bypass will be installed in the jacket around this seal plate so that the sections of the Jackets for WTS-L-3054 and WTS-L-1501 previously served by Tank 39 LDB-1 will be able to be served by LDB-2 at HDB-7. The bypass will be treated as the jacket piping it is attached to and conform to the relevant secondary containment requirements.

Since LDB-1 and the parts of LD-L-1505 and LD-L-1547 attached to LDB-1 are not being placed out of commission or otherwise permanently removed/grouted but remain connected to the LD system overall, they will continue to be treated as an FFA pressure boundary for the leak detection system in this assessment. The sections of LD-L-1547 that were cut completely free of both the WTS-L-3054 Jacket and LDB-1 were found to have no contamination and are completely isolated from any HLW system and will therefore no longer be considered part of an FFA pressure boundary.

The scope of this FFA is the modification to cut and cap LD-L-1505, LD-L-1546 and LD-L-1547 and the modification of leak detection for the jacket of WTS-L-3054 to bypass LDB-1 at Tank 39 and route to LDB-2 at HDB-7. This task is not divided into two or more FFA Assessment Reports.

2.0 Design Information

2.1 This modification includes the following activities:

2.1.1 Cut and Cap LD drain Line LD-L-1505 at the WTS-L-3054 Jacket as close as possible.

2.1.2 Cut LD drain Line LD-L-1547 at the WTS-L-3054 Jacket and use stub as part of the jacket bypass to be installed around the seal plate.

2.1.3 Cut and Cap LD vent line LD-L-1546 at the WTS-L-3054 Jacket as close as possible.

2.1.4 Install permanent caps at the location of the existing temporary cuts and caps on the Tank 39 LDB-1 side of lines LD-L-1505 and LD-L-1547 that were made on these lines per leak testing Work Order (WO) 2004284 that was part of the failed structural integrity inspection. Note: Portions of LD-L-1547 not connected to either WTS-L-3054 or LDB-1 are not part of the FFA boundary as discussed in section 1.0.

2.1.5 The FFA boundary caps will be insulated and-backfilled in accordance with M-ML-H-07435 (Ref. 2.4.5) and T-QIP-G-00002 (Ref. 2.4.9).

2.1.6 Install a bypass around the seal plate in the jacket of WTS-L-3054 at the location of the existing LD-L-1547 tie-in to the jacket of WTS-L-3054 to allow LDB-2 at HDB-7 to serve as leak detection for the sections of lines previously served by Tank 39 LDB-1.

2.2 Applicable SRS Engineering Standards and Engineering Guides:

2.2.1 SRS Engineering Standard 15060, Rev. 21-ADD-1, Additional Requirements for SRS Piping Systems

2.2.2 SRS Engineering Standard 01064, Rev. 9, Radiological Design Requirements

2.2.3 SRS Engineering Standard 01060, Rev. 13, SRS Structural Design Criteria

2.2.4 SRS Engineering Guide 15060-G, Rev. 8-ADD-3, Application of ASME B31.3

2.2.5 SRS Engineering Guide 09903-G, Rev. 3, Corrosion Protection - Underground Steel

2.2.6 SRS Engineering Guide 15250-G, Rev. 3, Mechanical Insulation

2.3 Applicable National Codes & Standards:

2.3.1 ASME B31.3-2020 Edition, Process Piping Code

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 WSRC-RP-93-549, Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991

2.4.3 M-DCP-H-23005, Rev. 0, Modifications to Tank 39 WTS-L-3054 Secondary Containment and Leak Detection (LD) Lines

2.4.4 M-QIP-H-00491, Rev. 1, Restoration of Tank Farm Waste Transfer Line Secondary Containments (Jackets, Drain Lines, LDBs, etc.)

2.4.5 M-ML-H-07435, Rev. 0, PDSP for Tank 39 Lead Detection (LD) Line Modifications

2.4.6 WSRC-SA-2002-00007, CONCENTRATION, STORAGE, AND TRANSFER FACILITIES DOCUMENTED SAFETY ANALYSIS, Rev. 22

2.4.7 MT-WPT-2023-00001, Rev. 0, Repair/Modify/Restore failed Transfer Line HM-241031-WTS-L-3054 (Tank 39 to/from HDB-7) Secondary Containment.

2.4.8 T-CLC-G-00092, Rev. 3, SEISMIC EVALUATION OF HLW UNDERGROUND TRANSFER LINES (U)

2.4.9 T-QIP-G-00002, Rev. 1, QUALITY INSPECTION PLAN FOR BACKFILLING REQUIREMENTS IN HTF/FTF TANK FARM AREA

2.4.10 P-DCF-H-02449, Rev. 0, Tank 39 Transfer Line Vent Line LD-L-1546 Isolation

3.0 Waste Compatibility

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

4.0 Foundation Support

The integrity of the WTS Jacket, the LD lines, and Tank 39 LDB-1 are not impacted by the cutting and capping of the failed leak detection lines or the installation of the seal-plate bypass. The drain lines did not provide structural support to the jacketed transfer line and do not require any additional structural support since they remain buried drain lines as before. See M-DCP-H-23005 (Ref. 2.4.3) and P-DCF-H-02449 (Ref. 2.4.10) for technical justification.

5.0 Leak Detection and Past Leaks

The leak detection system for WTS-L-3054 will continue to meet the requirements of Section IX and Appendix B of the FFA (Ref. 2.4.1) after the modification. The waste transfer line will still follow the design presented in Section 3.7.2 of the Phase II Assessment Report (Ref. 2.4.2), for Type II transfer lines.

6.0 Inspections

Piping material, fabrication, installation, inspection, examination, and testing shall be in accordance with:

- ASME Code B31.3-2020 (Ref. 2.3.1)
- WSRC-TM-95-1, SRS Engineering Standards 15060 (Ref. 2.2.1)
- WSRC-IM-95-58, SRS Engineering Guide 15060-G (Ref. 2.2.4)
- M-QIP-H-00491, Rev. 1, Restoration of Tank Farm Waste Transfer Line Secondary Containments (Jackets, Drain Lines, LDBs, etc.) (Ref. 2.4.4)
- M-ML-H-07435, Rev. 0, PDSP for Tank 39 Lead Detection (LD) Line Modifications (Ref 2.4.5)
- T-QIP-G-00002, Rev. 1, Quality Inspection Plan for Backfilling Requirements In HTF/FTF Tank Farm Area

7.0 Determination of Secondary Containment

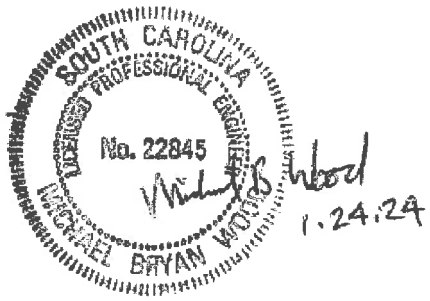
The primary and secondary containments of the transfer line associated with this modification will be based on the Type II design discussed in section 3.7.2 of the Phase II Assessment report (Ref. 2.4.2) which meet FFA requirements as discussed in that report. Therefore, no further assessment is needed.

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-23005, Design Change Form P-DCF-H-02449 and associated design documents comply with applicable engineering standards and the requirements of 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 modified system. Based upon the inspection, I certify that, to the best of my knowledge, information, and belief, the installation of the modifications for the Transfer Line WTS-L-3054, Tank 39 LDB-1, and Tank 39 Leak Detection Lines LD-L-1505, LD-L-1546 and LD-L-1547, were constructed in accordance with the approved design in Design Change Package M-DCP-H-23005, Design Change Form P-DCF-H-02449 and associated documents. I further certify that the modification was tested and inspected in accordance with the requirements summarized in Section 6.0 of this Report and detailed in Design Change Package M-DCP-H-23005, Design Change Form P-DCF-H-02449 and associated design documents. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

Name: Andrew R Redwood
License Number: 20525

9.0 ATTACHMENT

Tank 39 Jacket and Leak Detection Line Modifications