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Revision 0

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

CY2019 Annual Report

March 2020

Savannah River Remediation
AMENTUM | BECHTEL | JACOBS | BWXT

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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) 2019 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.

In 2019, DOE continued to make progress regarding waste removal and closure. DOE operated Tank Closure Cesium Removal (TCCR) Unit 1 in the H-Tank Farm (HTF) to process dissolved salt solution fed from Tank 10H with the resultant decontaminated salt solution (DSS) being transferred to Tank 11H, prior to subsequent transfer of this DSS to Tank 50H for eventual disposal in the Saltstone Disposal Facility (SDF). Processing of the Tank 10H salt solution through TCCR Unit 1 was initiated on January 16, 2019 and completed on June 29, 2019. Subsequently, DOE notified SCDHEC and EPA via letter that Tank 10H Bulk Waste Removal Efforts (BWRE) were complete on October 31, 2019. Dissolution of Tank 3F saltcake, transfer and storage of the associated dissolved salt solution for future Salt Waste Processing Facility (SWPF) feed in Tank 7F was completed on June 25, 2019. Extensive balance of plant modifications and procurements were made, and assembly/installation of new equipment continued for two tanks, Tanks 9H and 27F, in preparation for salt waste removal and treatment. Salt dissolution scoping/design activities were performed for Tanks 31H and 44F, and sludge removal scoping/design activities were performed for Tanks 33F and 35H. The Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MCU) Facilities received the final transfer of salt waste from Tank 49 on May 19, 2019 and processing of that material was completed. Following the completion of ARP/MCU processing, these facilities were deinventoried, flushed and placed in a suspended operations condition. Extensive field work was performed to alter transfer lines and jumpers to tie-in SWPF. Additional equipment (e.g., new transfer pumps in Tank 49) was installed in preparation for transferring salt waste to SWPF when that facility initiates hot commissioning operations. Two one million-gallon salt batches are prepared, qualified, and ready as feed for SWPF; a third one million-gallon salt batch is currently being prepared.

On September 30, 2019 and October 2, 2019, respectively, EPA and SCDHEC approved a DOE request for continued usage of Tank 4 as needed to temporarily store dissolved salt solution from Tank 37 in order to return the 242-25H Evaporator System back to service. In April 2019, the *2019 Suspension Agreement Federal Facility Agreement (FFA) High Level Waste (HLW) Tank Milestones* was incorporated into the FFA via an approved minor modification. The agreement suspended the remaining Appendix L milestones for completion of BWRE and operational closure of waste tanks, except the BWRE milestone to complete Tank 10H BWRE by November 30, 2019.

DOE notified SCDHEC and EPA of the successful completion of BWRE activities in Tank 10H on October 31, 2019.

DOE hosted SCDHEC and the United States Nuclear Regulatory Commission (NRC) during an on-site monitoring visit in March 2019, consistent with their responsibilities under Section 3116(b) of the NDAA. The focus of the on-site visit was:

1) Tour the General Separations Area (GSA) surface water and other features important to developing mathematical models of contaminant fate and transport used in PAs for the Tank Farms and SDF; and
2) Continued discussions on hydrogeological and other technical issues from previous visits, technical review reports and teleconference calls.

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Acronyms

ARP/MCU	Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit
BWRE	Bulk Waste Removal Efforts
CGCP	Consolidated General Closure Plan for Waste Tank Systems
CY	Calendar Year
D&R	Disassembly and Removal
DO	Dissolved Oxygen
DOE	United States Department of Energy
DSS	Decontaminated Salt Solution
EPA	United States Environmental Protection Agency Region 4
FFA	Federal Facility Agreement for the Savannah River Site
FTF	F-Area Tank Farm
FY	Fiscal Year
GRM	Gas Release Mode
GSA	General Separations Area
H&V	Heating and Ventilation
HLW	High-Level Waste
HTF	H-Area Tank Farm
LVMJ	Low Volume Mixing Jet
NDAA	Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005
NRC	United States Nuclear Regulatory Commission
OOV	On-site Observation Visit
PA	Performance Assessment
SCDHEC	South Carolina Department of Health and Environmental Control
SDF	Saltstone Disposal Facility
SRS	Savannah River Site
SRR	Savannah River Remediation
STP	Submersible Transfer Pump
SWPF	Salt Waste Processing Facility
TCCR	Tank Closure Cesium Removal
TRR	Technical Review Report
WDA	Waste Disposal Authority
WRM	Waste Release Model
XRD	X-Ray Diffraction
XRF	X-Ray Fluorescence

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 Component*s."

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 CY2019 Activities and Accomplishments

As of the end of Calendar Year (CY) 2019, 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. Bulk Waste Removal Efforts (BWRE) have been declared complete on six additional old-style tanks: Tanks 4F, 7F, 8F, 10H, 11H and 15H. The Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (ARP/MCU) Facilities received the final transfer of salt waste from Tank 49 on May 19, 2019 and processing of that material was completed. Following the completion of ARP/MCU processing, these facilities were deinventoried, flushed and placed in a suspended operations condition. Extensive field work was performed to alter transfer lines and jumpers to tie-in SWPF and additional equipment (e.g., new transfer pumps in Tank 49) was installed in preparation for transferring salt waste to SWPF when that facility initiates hot commissioning efforts. On November 19, 2019, Savannah River Remediation LLC (SRR), the Liquid Waste contractor, declared readiness to ship and receive waste from SWPF. Two one million-gallon salt batches are prepared, qualified and ready as feed for SWPF; a third one million-gallon salt batch is currently being prepared.

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

DOE operated Tank Closure Cesium Removal (TCCR) Unit 1 to process dissolved salt solution fed from Tank 10H with the resultant decontaminated salt solution (DSS) being transferred to Tank 11H, prior to subsequent transfer of this DSS to Tank 50H for eventual disposal in the Saltstone Disposal Facility (SDF). Processing of the first batch ("Batch 1A") through TCCR Unit 1 was initiated on January 16, 2019, and approximately 152,000 gallons were processed. TCCR Unit 1 processing rates were sustained at five gallons per minute (gpm), pre-filters removed solids and performed backwash cleaning operations consistent with the design, and system pressures were within expected ranges. Treatment of Batch 1A was completed on February 15, 2019.

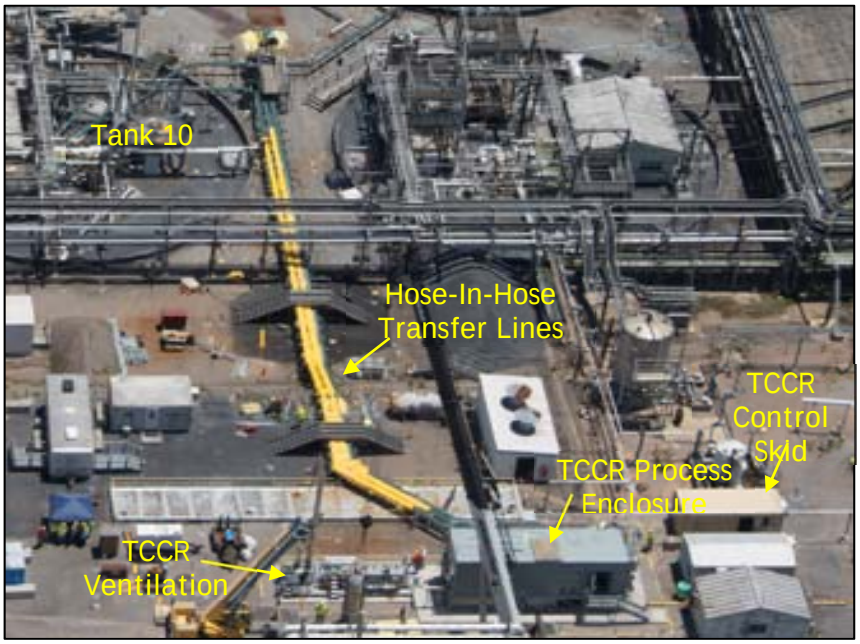
Less than expected saltcake dissolution occurred during this initial batch due to a relatively insoluble layer containing burkeite. To compensate for the burkeite, Batch 2 began with two small water additions (approximately 25,000 gallons each) and additional recirculation of the Tank 10H contents. The second batch ("Batch 2") consisted of approximately 58,000 gallons of dissolved salt solution, and this waste was processed through TCCR Unit 1 from June 21, 2019 through June 29, 2019. TCCR Unit 1 has processed a total of 210,000 gallons representing approximately 700 hours of operation. Tank 10H salt dissolution activities ended on August 8, 2019 with the failure of the submersible transfer pump (STP) and the determination that the current salt dissolution technique was no longer effective. Based on measured saltcake levels, the salt dissolution campaigns in Tank 10H during 2019 removed approximately five inches of saltcake which equates to approximately 13,500 gallons of tank space.

Based on the information obtained and evaluated during TCCR operations in 2019, DOE made the decision to process salt waste from at least one additional waste tank using TCCR Unit 1, Tank 9H. SRR-CWDA-2019-00089, *Evaluation of the Technical Feasibility and Economic Efficiency of Savannah River Site Tank Closure Cesium Removal Unit 1 to Process Salt Waste from at Least One Additional Tank*, Revision 0, was provided to SCDHEC on September 26, 2019. The submittal of this report met the October 31, 2016 Salt Waste Dispute Resolution Agreement

milestone to complete a technical feasibility and economic efficiency study of TCCR operations by September 30, 2019. SCDHEC and EPA provided comments on October 22, 2019 and November 4, 2019, respectively. Figures 1 and 2 show the TCCR Unit 1 Process Enclosure and Ventilation Equipment skids and the overall layout of the TCCR System, respectively.

Figure 1: TCCR Process Enclosure and Ventilation Equipment

Figure 2: TCCR Salt Treatment System



In August 2018, DOE, SCDHEC, and EPA agreed to modify FFA Appendix L, Item 5 to read "DOE shall complete bulk waste removal efforts for one tank (Tank 15H) by 10/31/17, restart BWRE activities (i.e., water addition) in Tank 10H by 1/31/19, and completed [sic] bulk waste removal efforts for Tank 10H by 11/30/19." DOE successfully completed the third and final piece

of Item 5, completion of BWRE activities in Tank 10H, via the saltcake dissolution and removal campaign in 2019. DOE provided the BWRE complete presentation on October 28, 2019 and notified SCDHEC and EPA of the tank status via letter on October 31, 2019. Agreement that Tank 10H BWRE was complete and that all commitments in FFA Appendix L, Item 5 have been met was received from SCHDEC on November 4, 2019 and EPA on November 8, 2019.

In 2019, DOE continued efforts to prepare Tank 9H to dissolve saltcake waste and process the resulting dissolved salt solution through TCCR Unit 1. Dissolved salt solution from Tank 9H will be transferred to Tank 10H where it will be batched and sampled to determine processability through the TCCR ion exchange columns. The existing equipment and transfer lines currently in use for Tank 10H dissolved salt solution processing will continue to be used to feed TCCR Unit 1. Additional ion exchange media, columns, and integral shield assemblies will be procured to support processing of Tank 9H dissolved salt solution through TCCR Unit 1.

Balance of plant modifications to support Tank 9H saltcake dissolution continued in CY2019. Hydrolancing and disassembly and removal (D&R) activities were completed on multiple risers to accommodate installation of a Low Volume Mixer Jet (LVMJ), downcomers and STP. The Riser 4 LVMJ is shown in Figure 3. Heating and ventilation (H&V) modifications were initiated for the tank primary and annulus. The upgraded annulus H&V system is shown in Figure 4.

Figure 3: Tank 9H Riser 4 LVMJ

Figure 4: Tank 9H Annulus H&V System

Dissolution of Tank 3F saltcake, transfer and storage of the associated dissolved salt solution for future SWPF feed in Tank 7F was completed in 2019. Dissolution in Tank 3 F was performed by adding water through three LVMJs. The first batch of dissolved salt solution was successfully transferred from Tank 3F to Tank 7F in January 2019. The sixth and final batch of dissolved salt solution was transferred from Tank 3F to Tank 7F on June 25, 2019. Tank 7F has been filled, receiving approximately 387,000 gallons of dissolved salt solution from Tank 3F in preparation for future feed to SWPF.

DOE continued to make progress on modifications to Tank 27F in preparation for saltcake dissolution and removal. Three LVMJs were installed and STP testing was completed. Transfer line modifications were completed (Figure 5) and the exhaust stack extension was installed (Figure 6). Also, the Gas Release Mode (GRM) skid containing hydrogen monitoring instrumentation and transfer controls was fabricated and installed.

Figure 5: Tank 27F Transfer Line Modifications

Figure 6: Tank 27F Exhaust Stack Extension

Design activities continued for future saltcake dissolution in Tanks 31H and 44F. Development of a design specification for procurement of an enhanced Commercial Submersible Mixing Pump (CSMP) was initiated to support future Tank 33F sludge removal activities, and project activities in preparation for Tank 35H sludge removal modifications resumed in May 2019.

The ARP/MCU Facilities received the final transfer of salt waste from Tank 49 on May 19, 2019 and processing of that material was completed. Following the completion of ARP/MCU processing, these facilities were deinventoried, flushed and placed in a suspended operations condition. Extensive field work was performed to alter transfer lines and jumpers to tie-in SWPF to the Liquid Waste facilities (i.e., HTF, Defense Waste Processing Facility and the Saltstone Production Facility). Additional equipment (e.g., new transfer pumps in Tank 49) was installed in preparation for transferring salt waste to SWPF when that facility initiates hot commissioning efforts in 2020. Two one million-gallon salt batches are prepared, qualified and ready as feed for SWPF; a third one million-gallon salt batch is currently being prepared.

In April 2019, the *2019 Suspension Agreement Federal Facility Agreement (FFA) High Level Waste (HLW) Tank Milestones* was incorporated into the FFA via an approved minor modification. The agreement suspended the remaining Appendix L milestones for completion of BWRE and operational closure of waste tanks, except one BWRE milestone to complete Tank 10H BWRE by November 30, 2019. As discussed above, the Tank 10H BWRE milestone was completed on October 31, 2019. As part of Suspension Agreement, the FTF Operable Unit Record of Decision date was changed to January 2040 and the FTF Remedial Action Start date was changed to April

2041. In addition, three new milestones associated with the Liquid Waste program were added to the FFA, Appendix L:

1. Issue a F-Tank Farm Deactivation Plan by June 30, 2020;
2. Water addition to Tank 9H to begin saltcake dissolution by September 30, 2020; and
3. Operational Closure of F-Diversion Box 5 and F-Diversion Box 6 by December 31, 2022.

BWRE complete was declared complete in Tank 4F in May 2011. Per the SRS FFA, both SCDHEC and EPA must approve the reuse of Tank 4F to store additional waste other than liquids added to the tank to support heel removal activities. Tank 4 is needed to temporarily store dissolved salt solution from Tank 37 in order to return the 242-25H Evaporator System back to service. DOE requested approval to reuse Tank 4F on September 30, 2019. Approval to reuse Tank 4F was granted by the EPA on September 30, 2019 and by SCDHEC on October 2, 2019.

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

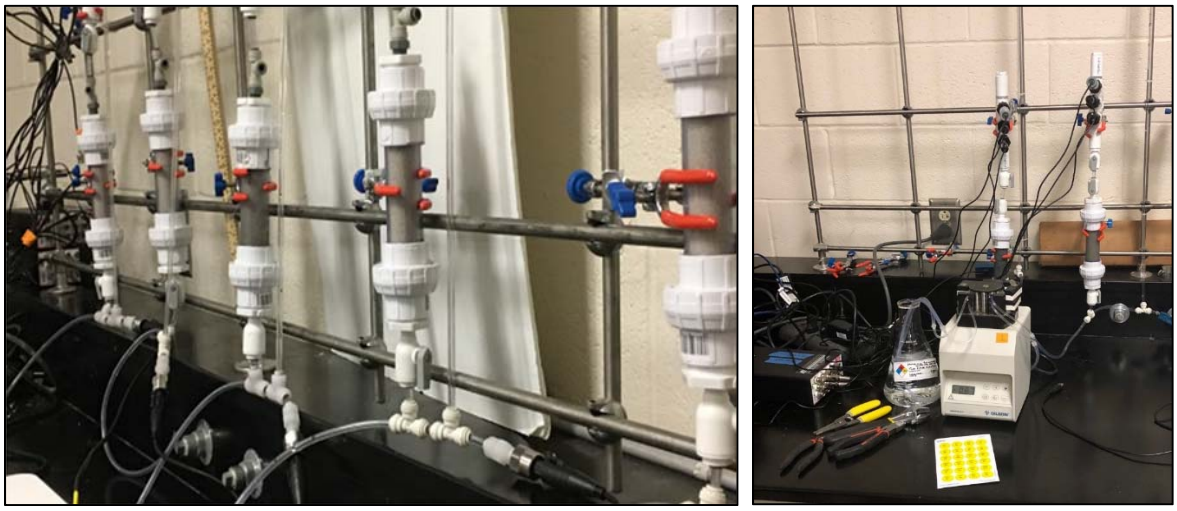
The update to the Consolidated General Closure Plan (CGCP) attachment SRR-CWDA-2017-00014, *SRS Waste Removal Plan and Schedule for F-Area and H-Area Waste Tank Systems,* Revision 3, incorporating changes identified in the *2019 Suspension Agreement for the Federal Facilities Agreement* reached in March 2019 between DOE-SR, SCDHEC, and the EPA was submitted to DOE-SR. The update was distributed to SCDHEC as required by the CGCP. SCDHEC deemed the revision was not needed at this time. After further negotiation, preparation of Revision 4 of the CGCP was initiated.

2.3 Tank Farm Performance Assessments and Section 3116 Waste Determinations Activities

As part of the ongoing performance assessment (PA) maintenance program consistent with DOE Manual 435.1-1, DOE initiated testing designed to reduce uncertainty and validate/refine underlying PA geochemical modeling assumptions regarding residual waste release.

The Tank Farm PAs use a conceptual Waste Release Model (WRM) to simulate stabilized contaminant release from the grouted waste tanks based on various chemical conditions in the waste tank which control solubility and thereby affect the timing and rate of release of contaminates from the residual waste layer. A waste release test plan was issued in 2019. Part 1 of the test plan work scope involves measuring the Eh and pH of eluate (open system, oxic conditions) and immersion (closed system, anoxic conditions) solutions associated with cementitious materials exposed to a simulant of SRS vadose zone liquid. This testing is intended to reduce uncertainty in the ranges of Eh and pH controlling radionuclide solubility. The cementitious materials selected for testing are candidates for waste tank bulk fill materials. The three grout formulations that will be used in batch and column tests completed a 90-day cure in 2019. Batch tests using open and closed containers to create oxic and anoxic exposure conditions were initiated. Mockups of additional column tests were performed to calibrate probes and troubleshoot the overall apparatus. The test setup is shown in Figure 7.

Figure 7: Test Set Up for Batch Testing of Waste Tank Bulk Fill Materials



Column tests using both oxic and anoxic infiltrates were started in October 2019, and pH and Eh will be monitored in the batch and column tests for at least 20 weeks. Following Eh/pH testing, Part 2 of the Scope of Work includes characterization of the solid phase composition of the cementitious materials using applicable analytical techniques (e.g., X-Ray Diffraction (XRD) and X-Ray Fluorescence (XRF) spectroscopy). This will guide validation and/or refinement of the geochemical modeling underlying PA radionuclide solubility assumptions. When testing is complete, a report will be issued describing these applied research experiments on waste release characteristics of residuals remaining in grouted waste tanks. This targeted research work was initiated to specifically address the NRC's primary recommendations in both the FTF and HTF Technical Evaluation Reports.

In 2019, DOE hosted NRC and SCDHEC for an on-site SRS Tank Farm Monitoring Onsite Observation Visit (OOV) on March 18-19, 2019. On March 18th, the NRC and SCDHEC completed a tour of the General Separations Area (GSA) surface water (i.e., Upper Three Runs and Four Mile Branch) and other features important to developing mathematical models of groundwater contaminant fate and transport used in the PAs for the Tank Farms. On March 19th, the participants (NRC, DOE, SRR and SCDHEC) held discussions on recently revised hydrogeological models, Tank 12 waste release testing and other technical issues from previous OOVs, NRC technical review reports (TRRs), and teleconference calls. Multiple documents requested during this OOV were transmitted by DOE to NRC and SCDHEC. The NRC issued the report on the OOV on August 13, 2019. They concluded that there was no change to the overall conclusions from either the HTF or the FTF NRC TER. In addition, during CY2019 NRC issued the following Technical Review Reports:

- ML19031B221, *Technical Review: Saltstone Waste Form Physical Degradation, (Docket No. PROJ0734)*, May 2019;
- ML19277H550, *Technical Review of the General Separations Area 2016 And 2018 PORFLOW Models and Associated Documentation Supporting The F-Area And H-Area Tank Farm Facility Performance Assessments at The Savannah River Site, Aiken, South Carolina (Docket No. PROJ0734)*, December 2019;

- ML19280A059, *Technical Review of Environmental Monitoring Reports For F-Area And H-Area Tank Farm Facility Facilities (Docket No. PROJ0734)*, December 2019; and
- ML19298A092, *Technical Review of Tank 12H Waste Release Reports and Associated Impact Analysis (Docket No. PROJ0734)*, December 2019.

APPENDIX A: CY2019 Individual Tank Status Reports for the F- and H-Area 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 CY2019.

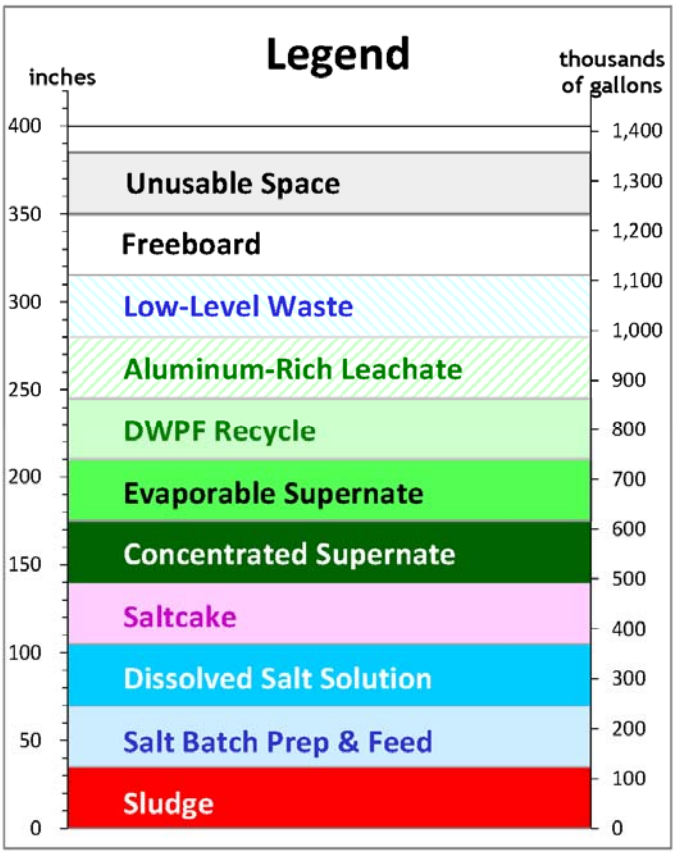
Several of the tanks experienced leakage in the past. A dark green background in the tank diagram indicates a tank that has a leakage history; tank storage liquid levels are currently maintained below the lowest known leak site.

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

Acronyms:

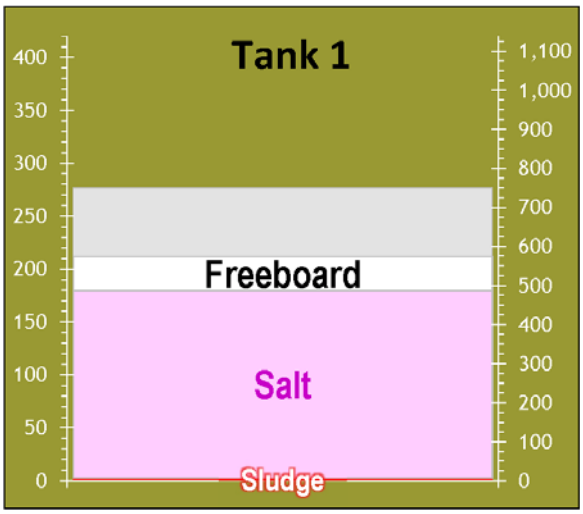
BWRE:	Bulk Waste Removal Efforts
DSS	Decontaminated Salt Solution
DWPF:	Defense Waste Processing Facility
EOY:	End of Year (December 31, 2019)
EPA:	Environmental Protection Agency
LTAD	Low Temperature Aluminum Dissolution
SCDHEC:	South Carolina Department of Health & Environmental Control
SWPF	Salt Waste Processing Facility
TCCR	Tank Closure Cesium Removal



Tank 1:

Area: F-Area
Service: Inactive Waste Storage Tank Under Active Surveillance
Type: I
EOY Volume: 486,990 gallons

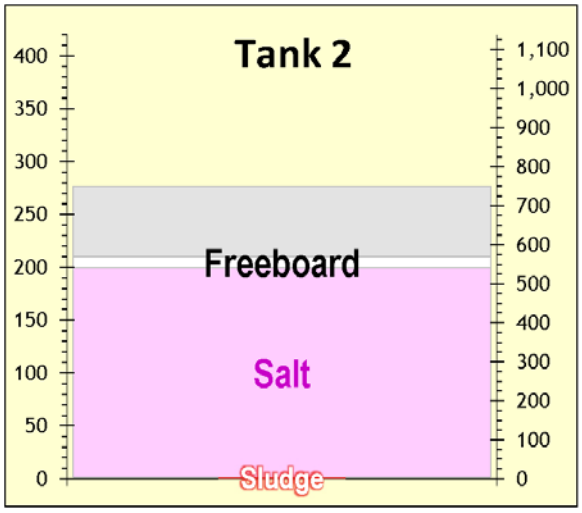
Status: There were no transfers in or out of Tank 1 during 2019. The saltcake in Tank 1 will eventually be dissolved and treated.



Tank 2:

Area: F-Area
Service: BWRE activities planning have been initiated
Type: I
EOY Volume: 540,100 gallons

Status: There were no transfers in or out of Tank 2 during 2019. Design activities have been initiated to begin BWRE in Tank 2 by dissolving the saltcake.



Tank 3:

Area: F-Area
Service: BWRE activities are ongoing
Type: I
EOY Volume: 368,560 gallons

Status: During 2019, approximately 160,000 gallons of liquid – well water, flush water, and rainwater collected in the F-Area Catch Tank – were added to Tank 3 to dissolve the saltcake. In a series of transfers from January thru July, dissolved salt solution was transferred to Tank 7 reducing the salt level to ~131″ from 198″.
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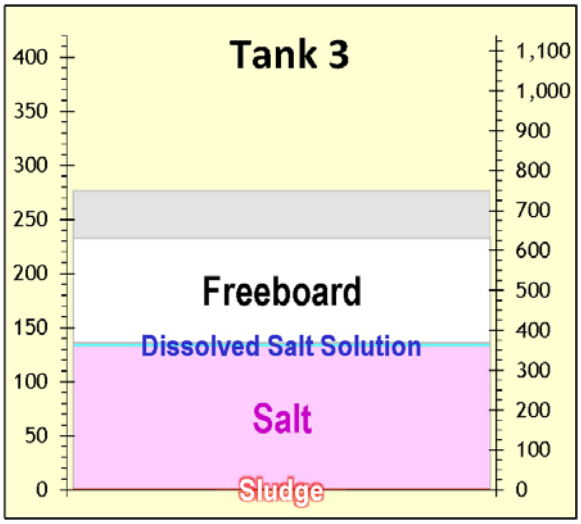
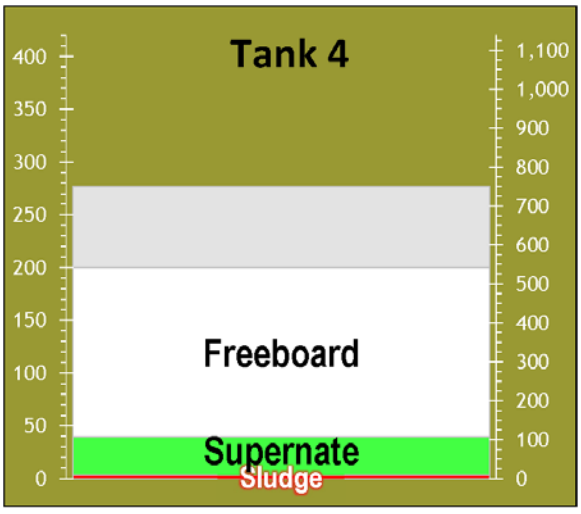


Tank 4:

Area: F-Area
Service: BWRE Complete – In 2011, SCDHEC and EPA approved the continued use of Tank 4 for storage of supernate for the purpose of keeping the remaining sludge hydrated to facilitate future tank cleaning activities.
Type: I
EOY Volume: 107,320 gallons

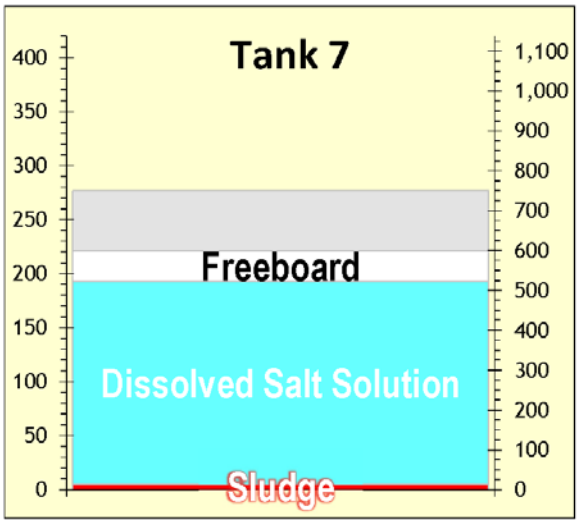
Status: There were no transfers in or out of Tank 4 during 2019.



Tank 7:

Area: F-Area
Service: BWRE Complete – Approved by SCDHEC and EPA in 2018 for use as hub tank to receive Tank 3 dissolved salt solution.
Tank Type: I
EOY Volume: 522,220 gallons

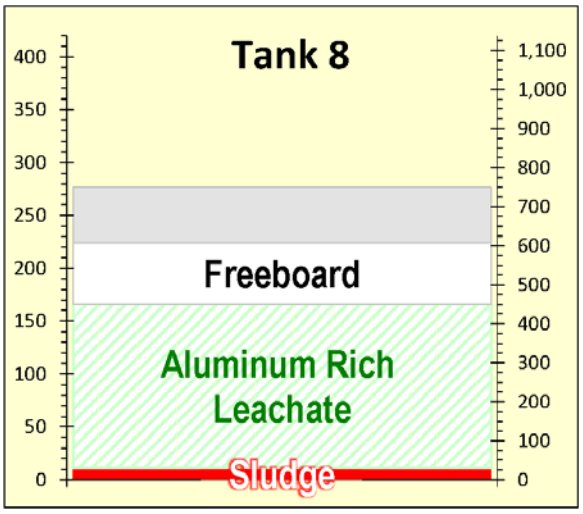
Status: Tank 7 received approximately 396,000 gallons of dissolved salt solution from Tank 3.



Tank 8:

Area: F-Area
Service: BWRE Complete – Approved by SCDHEC and EPA in 2018 for storage of aluminum-rich leachate from LTAD in support of Sludge Batch 10 preparation.
Type: I
EOY Volume: 450,940 gallons

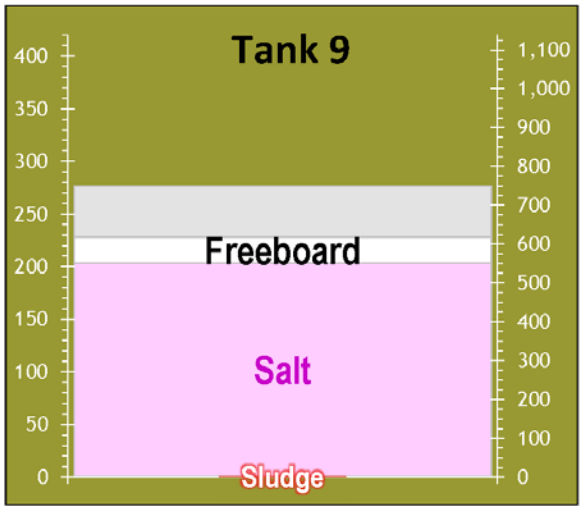
Status: There were no transfers in or out of Tank 8 during 2019.



Tank 9:

Area: H-Area
Service: BWRE planning activities have been initiated
Type: I
EOY Volume: 551,490 gallons

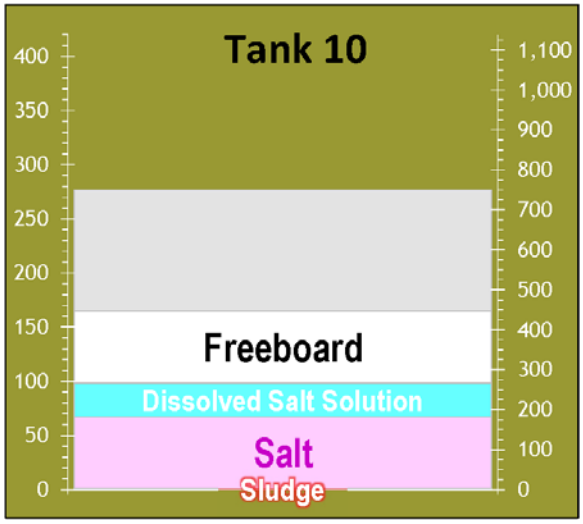
Status: Design activities and physical preparations have been initiated to dissolve saltcake in Tank 9 and to transfer it Tank 10 for eventual treatment via TCCR.



Tank 10:

Area: H-Area
Service: BWRE activities are complete
Type: I
EOY Volume: 265,850 gallons

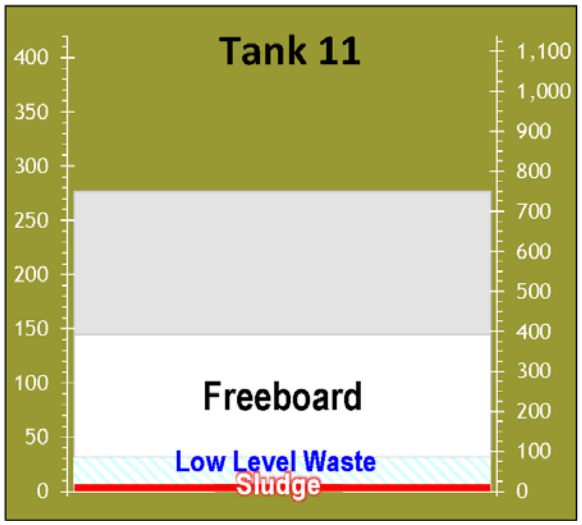
Status: Two batches of dissolved salt solution were fed to TCCR for treatment reducing the salt level in Tank 10 to 66″ from 71″. Approximately 101,000 gallons of water were added to continue dissolution of the saltcake.



Tank 11:

Area: H-Area
Service: BWRE Complete – Approved by SCDHEC and EPA in 2017 for receipt and storage of DSS from TCCR
Type: I
EOY Volume: 85,907 gallons

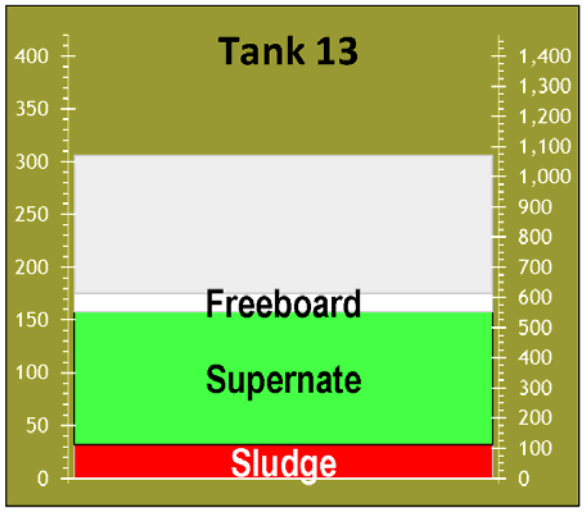
Status: Tank 11 received 210,000 gallons of DSS from TCCR operations. Tank 50 received 150,000 gallons of DSS from Tank 11 for disposition at Saltstone. To condition Tank 11 for the next TCCR DSS receipt, 110,000 gallons of water were added followed by a transfer of 107,000 gallons to Tank 51.



Tank 13:

Area: H-Area
Service: Active Waste Tank that will be used as a Hub Tank in the support of future cleaning activities for Tanks 9, 10, 11, 14, and 15
Type: II
EOY Volume: 550,900 gallons

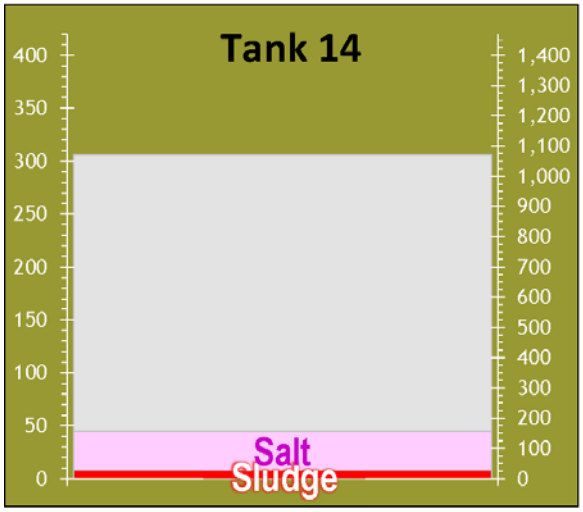
Status: There were no transfers in or out of Tank 13 during 2019.



Tank 14:

Area: H-Area
Service: Inactive Waste Storage Tank Under Active Surveillance
Type: II
EOY Volume: 157,500 gallons

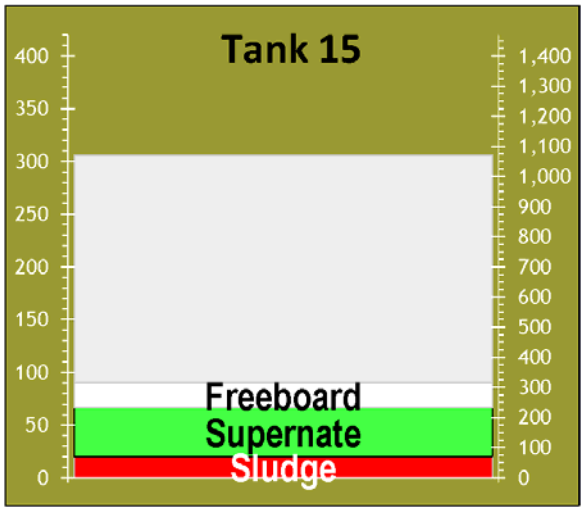
Status: There were no transfers in or out during 2019.



Tank 15:

Area: H-Area
Service: BWRE Complete; Heel Removal in preparation for grouting and removal from service is ongoing
Type: II
EOY Volume: 231,700 gallons

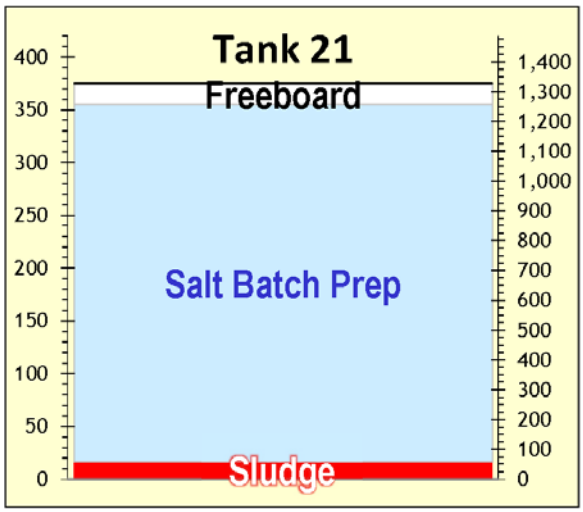
Status: There were no transfers in or out during 2019.



Tank 21:

Area: H-Area
Service: Salt Batch Blend Tank
Type: IV
EOY Volume: 1,256,300 gallons

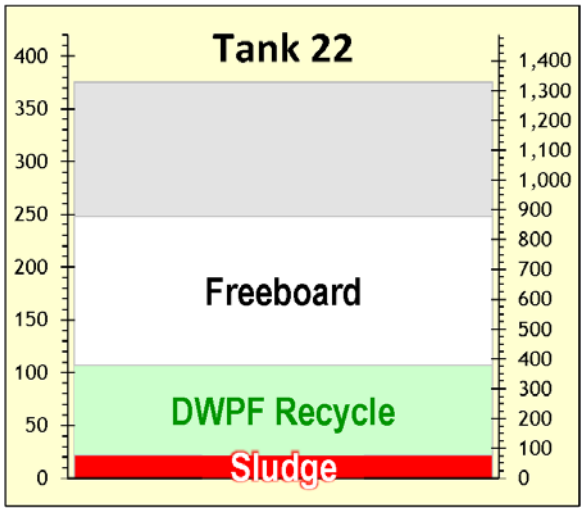
Status: In June, approximately 560,000 gallons of qualified material was transferred from Tank 21 to Tank 49 for SWPF Batch №1. Tank 21 then received 566,000 gallons from Tank 35, Tank 23, and Tank 39 to build SWPF Batch №2, which was qualified for SWPF in December.



Tank 22:

Area: H-Area
Service: Storage Tank for DWPF Recycle
Type: IV
EOY Volume: 379,490 gallons

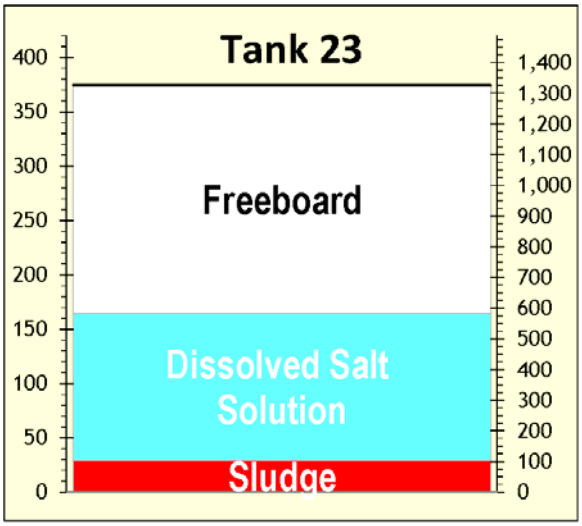
Status: In 2019, Tank 22 continued receiving and storing DWPF Recycle waste. This DWPF Recycle is volume reduced in the 2H Evaporator System.



Tank 23:

Area: H-Area
Service: Salt Solution Hold Tank
Type: IV
EOY Volume: 583,390 gallons

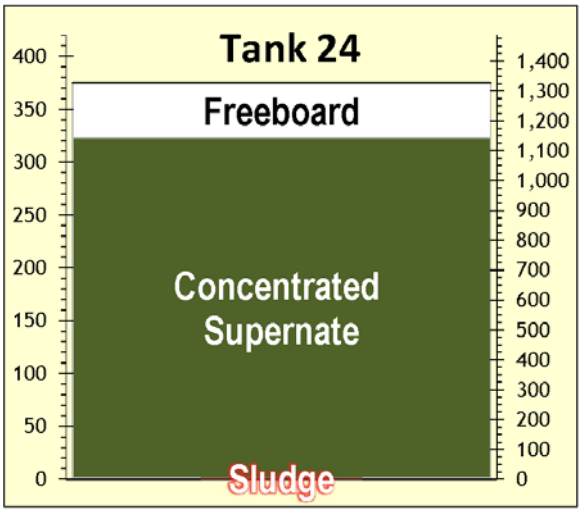
Status: In 2019, Tank 23 received additional dissolved salt solution from Tank 41. Some material was transferred back to Tank 41 supporting continued salt dissolution in Tank 41. In June, Tank 23 provided 60,000 gallons to Tank 21 for SWPF Batch №2.



Tank 24:

Area: H-Area
Service: Waste Storage Tank
Type: IV
EOY Volume: 1,143,100 gallons

Status: There were no transfers in or out of Tank 24 during 2019. The waste stored in Tank 24 is used in salt batch preparation and will ultimately be treated in SWPF.



APPENDIX B: CY2019 Federal Facility Agreement System / Component Assessment Reports

Report Number	Title
M-ESR-F-00288 / Rev. 0	The Replacement of Leak Detection Box LD-LDB-1
M-ESR-H-00501 / Rev. 0	TCCR Transfer Hose in Hose Between Tank 10, Tank 11 and TCCR
M-ESR-H-00509 / Rev. 0	SWPF Integration East Transfer Line to H-Z Inter-Area Transfer Line Tie-In
M-ESR-H-00527 / Rev. 0	The Final Transfer Line Tie-In of Waste Tank 49H to SWPF
M-ESR-H-00549 / Rev. 0	Leak Detection Line Modification to LD-LDB-4 at Tank 43H

Savannah River Site

FEDERAL FACILITY AGREEMENT
ASSESSMENT REPORT

FOR

THE REPLACEMENT OF LEAK DETECTION BOX LD-LDB-1

M-ESR-F-00288
REVISION 0

DISCLAIMER

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

	DATE
PREPARER D J Massey David Massey, Design Services Mechanical Engineer Project Management, Design and Construction Services	6.19.18
REVIEWER Oren Webb, Design Services Mechanical Engineer Project Management, Design and Construction Services	6/25/18
APPROVAL Scott Wallace Scott Wallace, Waste Transfer System Design Authority Tank Farm Engineering	6-25-18
APPROVAL CN Combs Neil Combs, Design Services Project Engineer, Project Management, Design and Construction Services	6/26/18

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 the requirements of Section IX and Appendix B of the Savannah River Site (SRS) Federal Facility Agreement (FFA, Ref. 2.4.1).

Waste transfer line FL-241907-WTS-L-211 (WTS-L-211) is constructed of a 3" stainless steel primary core piping located below grade. This primary transfer line is encapsulated by another 4" pipe (jacket) constructed of carbon steel. The jacket drains to Leak Detection Box (LDB) FL-241907-LD-LDB-1 (LD-LDB-1). After a failed periodic pressure test of the jacket piping, further investigation revealed that the leakage emanated from the LDB, drain line, and/or connected waste transfer lines FL-241903-WTS-L-211 (WTS-L-211) and FL-241907-WTS-L-216 (WTS-L-216) near the LDB. No degradation was identified in the waste transfer core piping.

The scope of this FFA is to install a new LDB, isolate unused lines and jackets, replace potentially affected jackets attached to the LDB and replace a small portion of waste transfer line WTS-L-211 to facilitate installation.

Remove the old LDB drain line from service by removing it back inside of the WTS-L-211 jacket behind the seal plate. The drain line is not necessary for the operability of the LDB. In the event leakage occurs, the contents of the LDB can be evacuated through the inspection port (see Attachment 9.1).

Waste transfer line WTS-L-216 was previously routed from Tank 7F, Riser 6 through the LDB to Tank 5. This line was isolated from Tank 5 in the 1980s and capped. Per this modification, line WTS-L-216 will be capped outside the LDB.

This modification will be conducted per Design Change Package (DCP) P-DCP-F-17003 (Ref. 2.4.2) and Design Change Form (DCF) P-DCF-F-00883 (Ref. 2.4.6). This task is not divided into two or more FFA reports.

2.0 Design Information

2.1 This modification includes the following activities:

- 2.1.1 Replace leak detection box LD-LDB-1 at waste transfer line WTS-L-211.
- 2.1.2 Cap waste transfer line WTS-L-216 from Waste Tank 7F, Riser 6.
- 2.1.3 Cut out of service leak detection box LD-LDB-1 drain line.

2.1.4 The LDB and capped waste transfer piping will be coated per SRS Engineering Guide 09903-G (Ref. 2.2.1), insulated per SRS Engineering Guide 15250-G (Ref. 2.2.2), and backfilled per SRS Engineering Guide 01110 (Ref. 2.2.3).

2.2 Applicable SRS Engineering Standards and Engineering Guides:

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

2.2.2 SRS Engineering Guide 15250-G, Rev. 2, Mechanical Insulation

2.2.3 SRS Engineering Standard 01110, Rev. 6, SRS Civil Site Design Criteria

2.2.4 SRS Engineering Standard 15060, Rev. 19, Additional Requirements for SRS Piping

2.2.5 SRS Engineering Standard 05057, Rev. 5, Control of Welding

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

2.3 Applicable National Codes & Standards:

2.3.1 ASME B31.3-2016 Edition, Process Piping

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 P-DCP-F-17003, Rev. 0, Leak Detector Box at Tank 7 Riser 6

2.4.3 M-ML-F-02657, Rev. 0, Tank 7 Riser 6 LDB Replacement

2.4.4 Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991

2.4.5 M-QIP-F-00105, Rev. 0, Leak Detection Box Replacement at Tank 7 Riser 6

2.4.6 P-DCF-F-00883, Rev. 0, Leak Detection Facilities Transfer Line Installation Plan and Details

3.0 Waste Compatibility

The modifications in the scope of this assessment and their waste characterization will remain unchanged. 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 structural integrity of LD-LDB-1 and associated waste transfer line WTS-L-211 are not impacted by the cutting of the drain line and capping of waste transfer line WTS-L-216. The drain line does not provide structural support for the waste transfer line and jacket. Support for the leak detection box and waste transfer lines is provided by the backfill per SRS Engineering Guide 01110 (Ref. 2.2.3) and insulation per SRS Engineering Guide 15250-G (Ref. 2.2.2). The Backfill material was evaluated and was found to be satisfactory to support LD-LDB-1 and waste transfer lines WTS-L-211, see P-DCP-F-17003 (Ref. 2.4.2) for backfill requirements.

5.0 Leak Detection and Past Leaks

The Leak Detection system (LD) for the affected transfer lines will be modified but continue to meet Section IX and Appendix B of the FFA. These lines will still follow the design presented in Section 3.7.2 of the Phase II Assessment Report, for Type II transfer lines and will still be sloped towards the existing leak detection boxes.

As stated in the Phase II Assessment Report, there are no known past or presents leaks involving the core pipes and secondary containment jackets associated with any of the Type II ITP waste transfer lines used in this modification.

6.0 Inspections

Piping/Leak Detection Box material, fabrication, installation, inspection, examination, and testing shall be in accordance with:

- ASME Code B31.3-2016 (Ref. 2.3.1)
- SRS Engineering Standard 15060 (Ref. 2.2.4)
- SRS Engineering Standard 05057 (Ref. 2.2.5)
- SRS Engineering Guide 15060-G (Ref. 2.2.6)
- Piping Data Sheet Package M-ML-F-02657 (Ref. 2.4.3)
- Quality Inspection Plan M-QIP-F-00105 (Ref. 2.4.5)

7.0 Determination of Secondary Containment

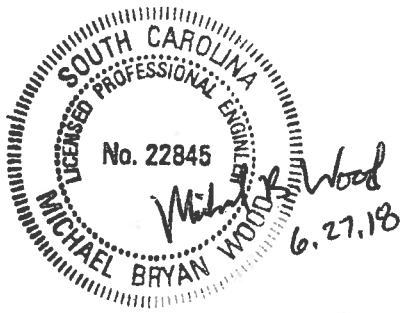
The primary and secondary containments associated with this modification will replicate the existing line arrangement which satisfies FFA requirements and the requirements stated in Section 2.1 of the Phase II Assessment Report (Ref. 2.4.8) as previously evaluated in Section 3.7.2 of this same report. 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 P-DCP-F-17003 and associated DCF complies 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



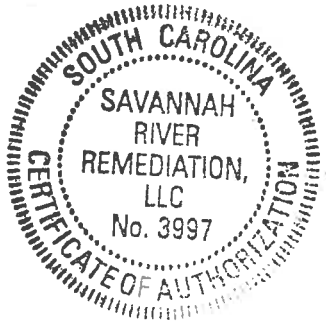
Name: MICHAEL B. WOOD
License Number: 22845

6.27.18

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 new waste transfer line was constructed in accordance with the approved design in Design Change Package P-DCP-F-17003 and associated DCF. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

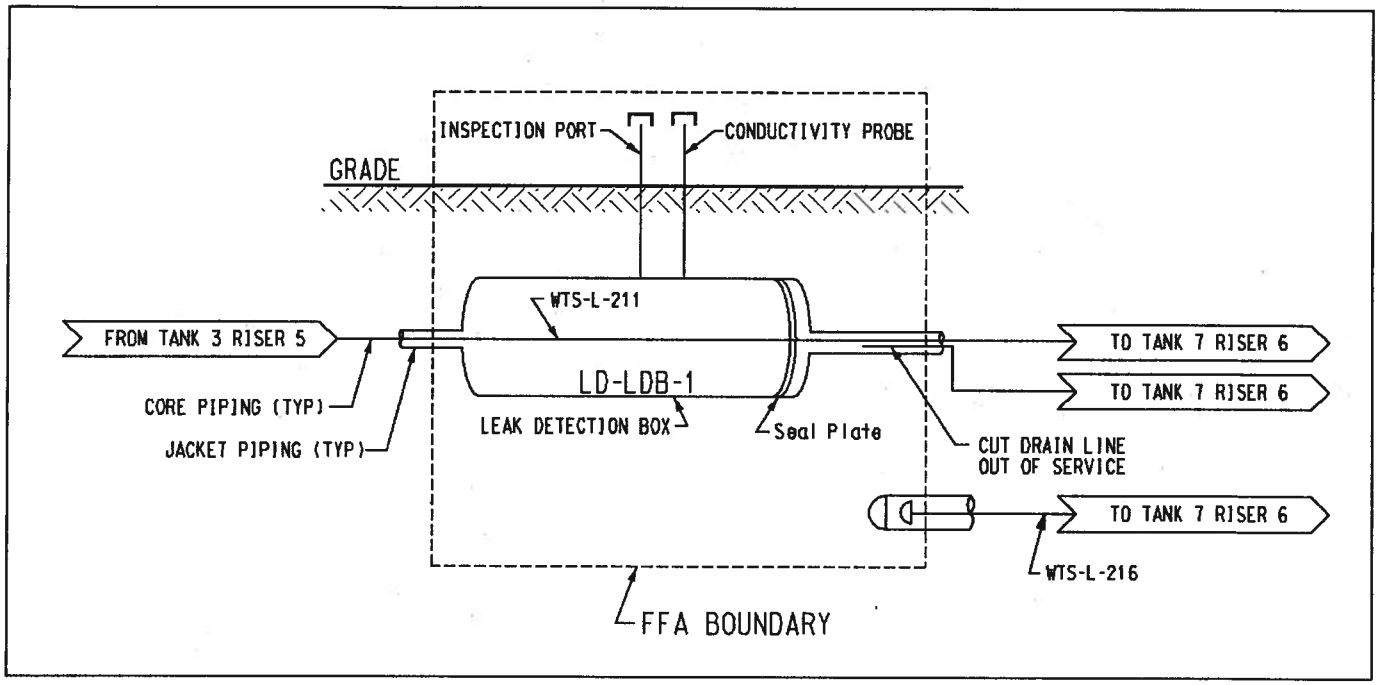


Name: Andrew R. Redwood
License Number: 20525

2/25/19

9.0 ATTACHMENT

9.1 Leak Detection Box and Capped Waste Transfer Lines



Savannah River Site

FEDERAL FACILITY AGREEMENT
ASSESSMENT REPORT

FOR

TCCR TRANSFER HOSE IN HOSE
BETWEEN TANK 10, TANK 11 AND TCCR

M-ESR-H-0501
REVISION 0

DISCLAIMER

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

	DATE
PREPARER Jeremy Brackman, Design Services Mechanical Engineer Project Management, Design and Construction Services	12-11-18
REVIEWER Oren Webb, Design Services Mechanical Engineer Project Management, Design and Construction Services	12/11/18
APPROVAL Robert Voegtlen, Waste Transfer System Design Authority Tank Farm Engineering	12/11/18
APPROVAL Michael B. Wood Michael B. Wood, Design Services Project Engineer, Project Management, Design and Construction Services	12.11.18

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 10 is a Type I, old style waste tank and has a planned operational closure date in accordance with the SRR Schedule. Because Tank 10 contains approximately 194,000 gallons of salt cake and approximately 15,000 gallons of supernatant liquid with an inventory of 100,000 curies of radioactive cesium-137, and no viable transfer path or an installed system which cesium extraction can be performed, the Tank Closure Cesium Removal (TCCR) system (Ref. 2.5.2) will be installed to facilitate removal of cesium-137. Waste Tank 11 will be the recipient of the processed dissolved salt solution (DSS).

Temporary Modification Package HTF-TMC-16-028 (Ref. 2.5.3) installs a system that will consist of Hose-In-Hose (HIH) transfer, recirculation/flushing, and processed DSS lines on the tank top (See Attachment 9.1). The transfer line provides the waste to the TCCR system, the recirculation/flushing line is from the TCCR system back to Tank 10, and all the processed DSS is delivered to Tank 11. The HIH lines consist of either 1 or 1½ inch hose core lines and 3 inch hose jacket lines and will be installed aboveground. The core hoses and jacket hoses of the HIH system are continuously aboveground with no hose fittings located outside of the tanks to prevent the possibility of leakage. The HIH system is supported between the tank risers and TCCR such that there is a continuous slope from the high-point of the HIH system back to the tank risers.

This task is not divided into two or more FFA reports.

2.0 Design Information

2.1 Temporary Modification Package HTF-TMC-16-028 (Ref. 2.5.3) installs:

2.1.1 One 1 inch core and 3 inch jacket HIH originating inside Tank 10 Center Riser and terminating at the TCCR housing for transferring of supernatant liquid (core hose terminating inside the TCCR housing and jacket hose terminating at the TCCR exterior wall penetration).

2.1.2 One 1½ inch core and 3 inch jacket HIH originating at the TCCR housing (core hose originating inside the TCCR housing and jacket hose originating at the TCCR exterior wall

penetration) and terminating inside the Tank 10 Riser 7 for recirculation and flushing of TCCR system and transfer hoses.

2.1.3 One 1 inch core and 3 inch jacket HIH originating at the TCCR housing (core hose originating inside the TCCR housing and jacket hose originating at the TCCR exterior wall penetration) and terminating inside the Tank 11 Riser 2 for processed dissolution salt solution (DSS).

2.2 The Temporary Modification includes the following activities:

2.2.1 The 1 inch (or 1½ inch) core hoses will be protected inside 3 inch jacket hoses to create the HIH piping system. Ensure the outer jacket hose is of sufficient length to extend into the vapor space of the tank risers as well as attach to the TCCR exterior wall penetration. Similar hoses have been used for aboveground waste transfers.

2.2.2 Install supports for the HIH as required per design to ensure continuous slope from HIH system high point to each riser.

2.2.3 The HIH and tank risers shall be shielded so that the dose rate is less than 5 mrem/hour at 30 cm during non-transfer conditions (Ref. 2.5.2).

2.3 Applicable SRS Engineering Standards and Engineering Guides:

2.3.1 SRS Engineering Standard 15060, Rev. 20, Additional Requirements for SRS Piping Systems

2.3.2 SRS Engineering Standard 01064, Rev. 8, Radiological Design Requirements

2.3.3 SRS Engineering Standard 01060, Rev. 12, Structural Design Criteria

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

2.3.5 SRS Engineering Guide 15062-G, Rev. 0, Qualification and Maintenance of Nonmetallic Flexible Hose

2.4 Applicable National Codes & Standards:

2.4.1 ASME B31.3-2016 Edition, Process Piping

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 N-TC-H-00001, Rev. 5, Tank 10: Salt Dissolution & Cesium Removal via TCCR

2.5.3 HTF-TMC-16-028, Rev. 4, TCCR Transfer Line Installation

2.5.4 Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991

2.5.5 M-CLC-G-00459, Rev. 1, Unlisted Component Evaluation for Waste Transfer Hose-In-Hose (HIH) Assemblies

2.5.6 T-CLC-H-01221, Rev. 0, TCCR BOP Flexible Hose Evaluation

2.5.7 M-QIP-H-00380, Rev. 1, Tank 10 Salt Dissolution Hose-In-Hose Transfer Installation

3.0 Waste Compatibility

Waste characterization will remain unchanged. Hoses used in the Temporary Modifications are constructed of materials that have been proven to be 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 hose components of the HIH system are selected according to SRS hose requirements (Ref. 2.3.5). In addition, M-CLC-G-00459 (Ref. 2.5.5) evaluates any ASME B31.3 Code unlisted components to determine adequate design per ASME B31.3 Code (Ref. 2.4.1). The HIH aboveground support system was evaluated by calculation T-CLC-H-01221 (Ref. 2.5.6) and was shown to be adequately designed to support hoses and shielding.

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.

6.0 Inspections

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

- ASME Code B31.3-2016 (Ref. 2.4.1)
- SRS Engineering Standard 15060 (Ref. 2.3.1)
- SRS Engineering Guide 15060-G (Ref. 2.3.4)
- SRS Engineering Guide 15062-G (Ref. 2.3.5)

Examination and leak testing inspections for the HIH assembly are contained in the M-QIP-H-00380 Quality Inspection Plan (Ref. 2.5.7).

7.0 Determination of Secondary Containment

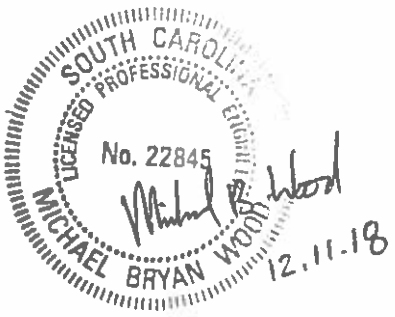
Once the operation of Temporary Modification is complete and the HIH transfer lines have been removed, the primary and secondary containments remain unchanged and satisfy FFA requirements and the requirements stated in Section 2.1 of the Phase II Assessment Report (Ref. 2.5.4) as previously evaluated in Section 3.6.6 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 Temporary Modification HTF-TMC-16-028 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



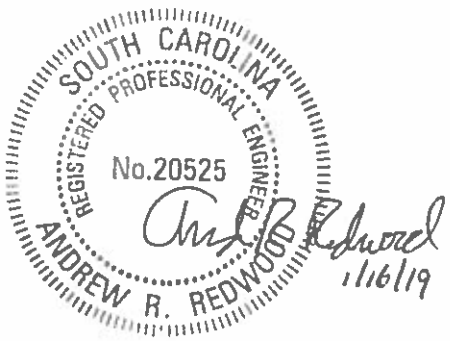
12.11.18

Name: MICHAEL B. WOOD
License Number: 22845

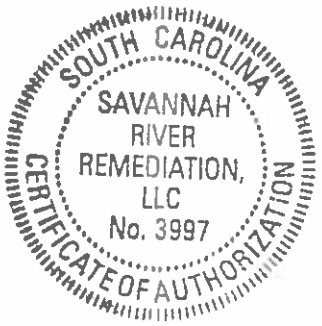
Construction and Installation

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 HIH transfer, recirculation/flushing, and processed DSS lines were constructed in accordance with the approved design in Temporary Modification HTF-TMC-16-028. 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 were found acceptable.

Stamp



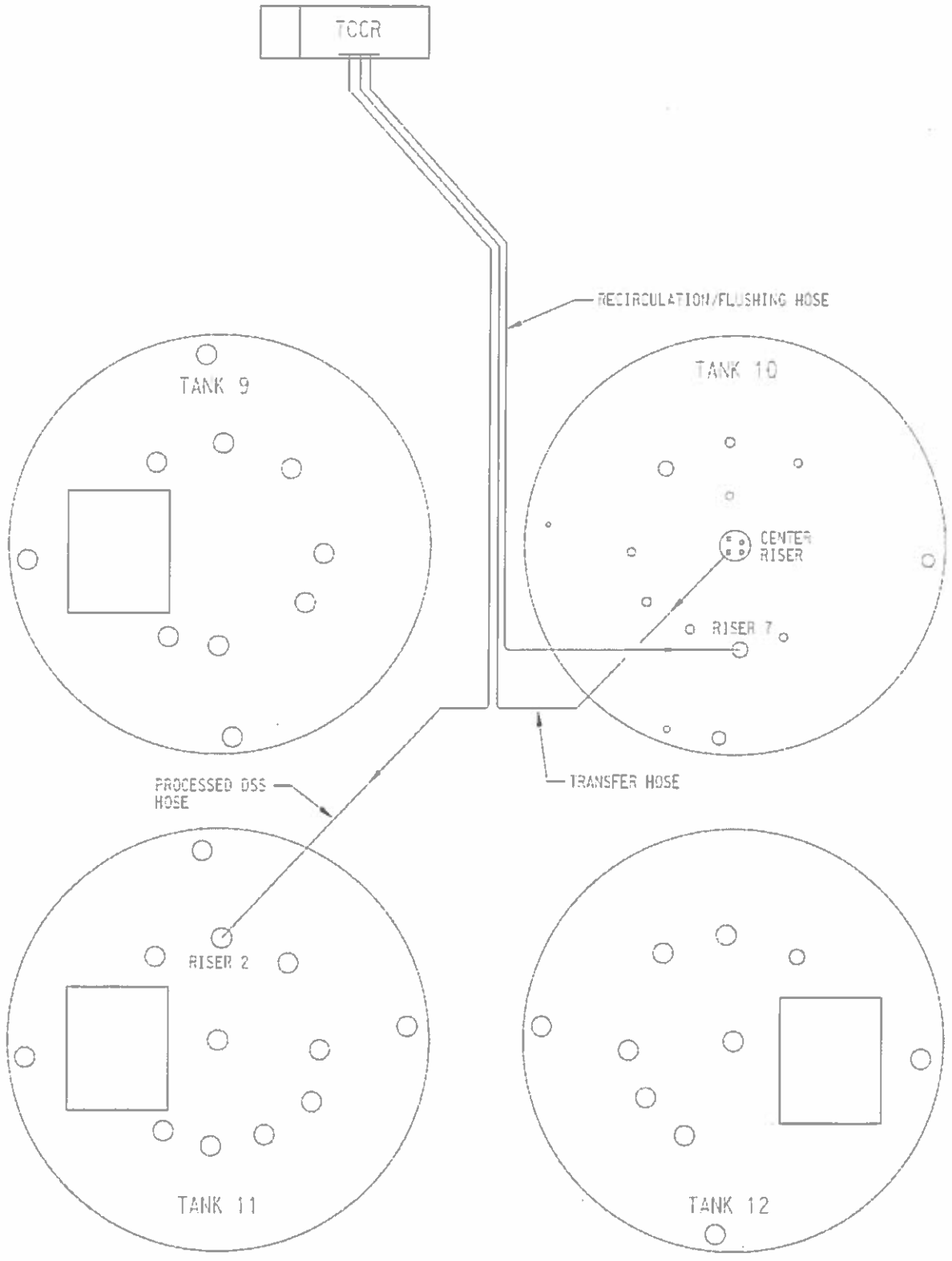
1/16/19



Name: Andrew R Redwood
License Number: 20525

9.0 ATTACHMENT

9.1 HIH Transfer Lines



Savannah River Site

FEDERAL FACILITY AGREEMENT
ASSESSMENT REPORT

FOR

SWPF INTEGRATION
EAST TRANSFER LINE TO
H-Z INTER-AREA TRANSFER LINE TIE-IN

M-ESR-H-00509
REVISION 0

DISCLAIMER

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

	DATE
PREPARER D J Massey David Massey, Design Services Mechanical Engineer Design and Construction Services	1.17.19
REVIEWER Jeremy Brackman, Design Services Mechanical Engineer Design and Construction Services	1-17-19
APPROVAL Scott M Wallace Scott Wallace, Design Authority SWPF Integration Project Engineering	1-22-19
APPROVAL Ashok Gupta, Project Engineer Design and Construction Services	1-22-19

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. 2.5.1).

The purpose of the East Transfer Line Extension to H-Z Interarea Transfer Line Tie-In portion of Salt Waste Processing Facility (SWPF) Integration Program is to allow SWPF to transfer Decontaminated Salt Solution (DSS) from its Alpha Finishing Facility (AFF) to either Salt Processing Facility (SPF) or Tank 50.

The scope of this FFA is the tie-in portion between the new east transfer line and existing H-Z inter-area transfer line. The new jacketed waste transfer piping (SSP077-DWPF-P224A-3) was installed and capped near the H-Z inter-area transfer line tie-in location per Design Change Package (DCP) P-DCP-H-11005 (Ref. 2.5.3) under FFA M-ESR-H-00479 (Ref. 2.5.4). The pipe cap will be removed and the jacketed waste transfer piping extended to connect the H-Z inter-area transfer line (4"-WTS-SSP4-P48). This modification will be conducted per Design Change Form (DCF) P-DCF-H-02163 (Ref. 2.5.5).

This task is not divided into two or more FFA Assessment Reports.

2.0 Design Information

2.1 This modification includes the following activity:

2.1.1 Installation of approximately 12 feet of new east transfer line (SSP077-DWPF-P224A-3) and approximately 4 feet of new H-Z inter-area transfer line (4"-WTS-SSP4-P48), all made of a stainless steel waste transfer line core and with a carbon steel jacket piping as a secondary containment. See Attachment 9 for FFA boundary.

2.2 Applicable SRS Engineering Standards, Engineering Guides and Specifications:

2.2.1 SRS Engineering Standard 15060, Rev. 20, ASME B31.3 Additional Requirements for SRS Piping Systems

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

2.2.3 T-ESR-S-00010, Rev. 8, Engineering Report Defense Waste Processing Facility Piping Specifications

2.3 SRS Supporting Calculations:

2.3.1 T-CLC-H-01008, Rev. 1, Seismic Evaluation of East Transfer Line

2.4 Applicable National Codes & Standards:

2.4.1 ASME B31.3-2006, 2016 Editions, Process Piping Code

2.5 Reference Documents

2.5.1 WSRC-OS-94-42 – ADN 89-05-FF, Federal Facility Agreement for the Savannah River Site

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

2.5.3 P-DCP-H-11005, Rev 1, East Transfer Line Tie In from SWPF to the H to Z Inter-area Transfer Line

2.5.4 M-ESR-H-00479, Rev 0, Federal Facility Agreement Assessment Report for SWPF Integration East Transfer Line Extension to H-Z- Interarea Transfer Line Tie-In

2.5.5 P-DCF-H-02163, Rev 2, As-built SWPF Tie-in drawings, remove "Holds" on piping core/jacket installation drawings

2.5.6 M-ML-S-00014, Rev. 2, SWPF Integration Transfer Line Tie-Ins

3.0 Waste Compatibility

The modifications in the scope of this assessment and their waste characterization will remain unchanged. 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 waste transfer lines SSP077-DWPF-P224A-3, SSP077-DWPF-P224A-4 and 4"-WTS-SSP4-P48 and all the pipe supports were evaluated and were found to be satisfactory in calculation T-CLC-H-01008 (Ref. 2.3.1).

5.0 Leak Detection System

As stated in the Phase II Assessment Report, there are no known past or present leaks involving the core pipes and secondary containment jackets associated with any of the Type II ITP waste transfer lines used in this modification.

6.0 Inspections

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

- ASME Code B31.3 -2006, 2016 (Ref. 2.4.1)
- SRS Engineering Standards 15060 (Ref. 2.2.1)
- SRS Engineering Guide 15060-G (Ref. 2.2.2)
- Piping Data Sheet Package M-ML-S-00014 (Ref. 2.5.6)
- DWPF Piping Specification T-ESR-S-00010 (Ref. 2.2.3)

Examination and leak testing inspections requirements for the transfer line are contained in the Quality Inspection Plan of P-DCF-H-02163 (Ref. 2.5.5).

7.0 Determination of Secondary Containment

The primary and secondary containments associated with this modification will replicate the existing arrangement which satisfies FFA requirements and the requirements stated in Section 2.1 of the Phase II Assessment Report (Ref. 2.5.2) as previously evaluated in Section 3.0 of this same report. Therefore, no further assessment is needed.

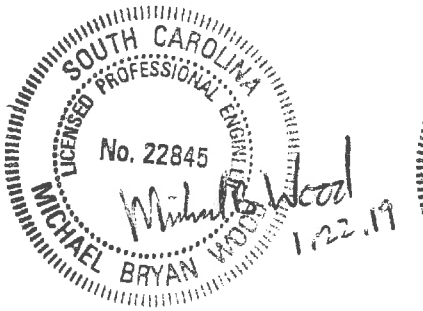
8.0 Professional Engineer Certifications (Design and Construction)

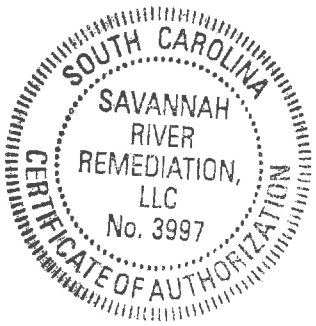
Design

This assessment report was prepared under my supervision and direction. I certify that the design for the modifications detailed in Design Change Form P-DCF-H-02163 complies with applicable engineering standards and the requirements of Appendix B of the Federal Facility Agreement. These standards have been accepted as adequate in demonstrating leak tightness.

Stamp

Name: MICHAEL B. WOOD
License Number: 22845



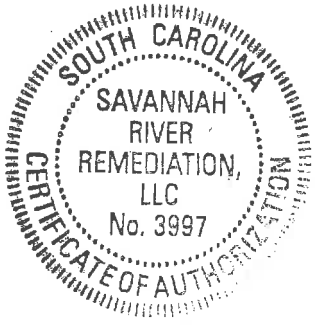


Construction and Installation

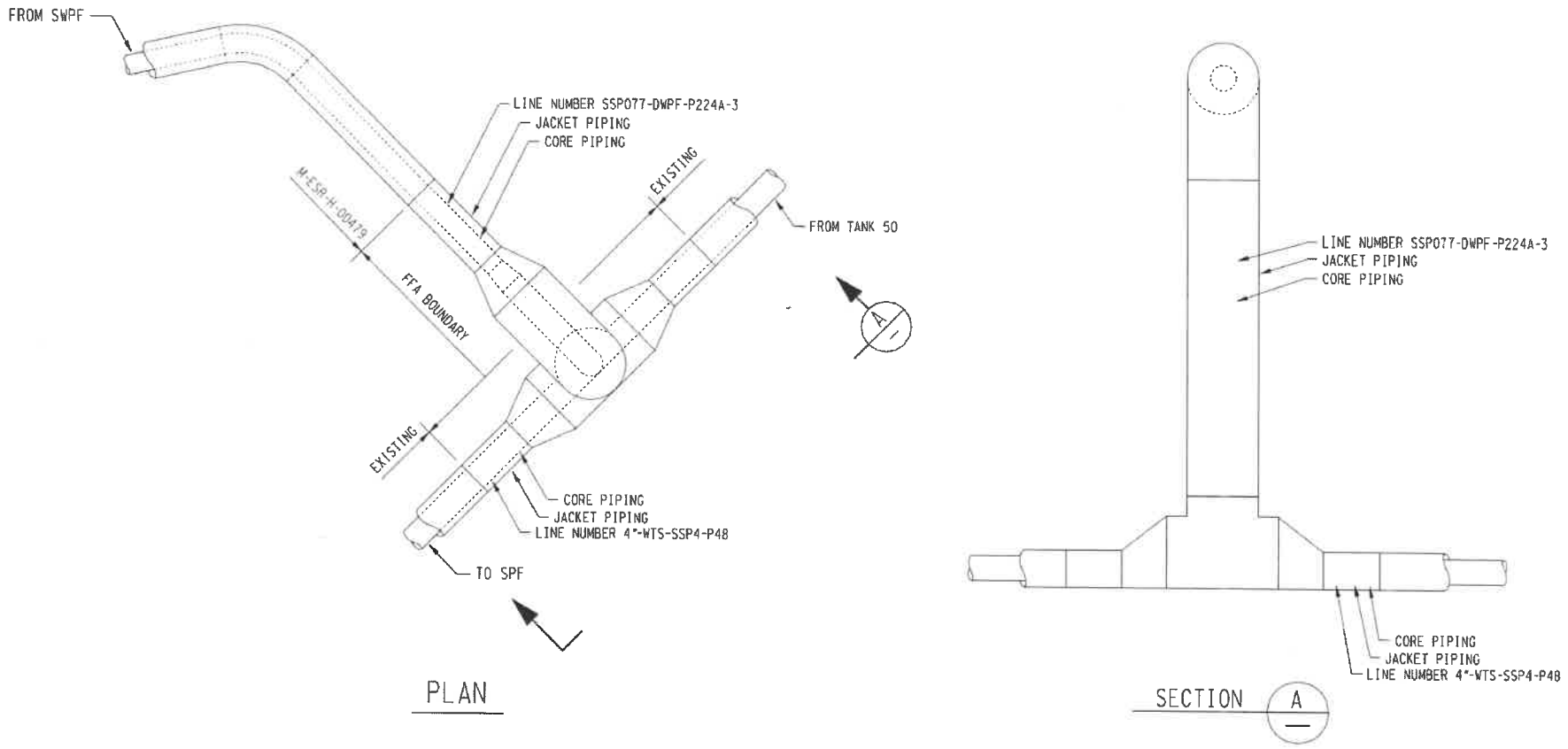
I have conducted an inspection, to the extent possible, of the completion of the modified system. Based upon the inspection, I certify that, to the best of my knowledge, information, and belief, the piping system was constructed and installed in accordance with the approved design in Design Change Form P-DCF-H-02163. I further certify that the modification was tested in accordance with requirements summarized in Section 6.0 of this Report.

Stamp

Name: Andrew R. Redwood
License Number: 20525



9.0 ATTACHMENT



ATTACHMENT 9.1

Savannah River Site

FEDERAL FACILITY AGREEMENT
ASSESSMENT REPORT

FOR

the Final Transfer Line Tie-in
of Waste Tank 49H to SWPF

M-ESR-H-00527
REVISION 0

DISCLAIMER

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

	DATE
PREPARER Jeremy Brackman, Design Services Mechanical Engineer Project Management, Design and Construction Services	9-30-19
REVIEWER David Massey, Design Services Mechanical Engineer Project Management, Design and Construction Services	9.30.19
APPROVAL Thomas Brooks, Design Authority Project Engineering	9/30/19
APPROVAL Richard Broomfield, Design Authority CPC & ARP System	10/1/19
APPROVAL Michael Wood, Design Services Project Engineer, Project Management, Design and Construction Services	DATE 10.1.19

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).

Prior to start-up operations at the Salt Waste Processing Facility (SWPF), modifications to and connections with the Liquid Waste transfer system at the H-Area Tank Farms will need to be completed. The current waste transfer path from the Modular Caustic Unit (MCU) to SWPF will be modified to facilitate the de-inventory and flushing of the MCU facility, and a new underground waste transfer line tie-in will be installed to allow raw salt solution transfers from Waste Tank 49H to SWPF.

The scope of this FFA is to reroute the current MCU to SWPF waste transfer line WTS-L-1755 to tee into existing MCU waste transfer line WTS-L-1657. Doing so requires a section of waste transfer line WTS-L-1459 to be removed and capped at both ends. Additionally, the tie-in to existing waste transfer line SDP-L-SDP1 will be completed, which provides a new waste transfer path to SWPF.

This modification will be conducted per Design Change Package (DCP) M-DCP-H-18003 (Ref. 2.4.2) and associated DCFs. This task is not divided into two or more FFA reports.

2.0 Design Information

2.1 This modification includes the following activities:

- 2.1.1 Complete final tie-in of waste transfer line SDP-L-SDP1 to connect Tank 49H to the SWPF.
- 2.1.2 Modify waste transfer line WTS-L-1755 and tie into existing MCU waste transfer line WTS-L-1657.
- 2.1.3 Remove section of existing waste transfer line WTS-L-1459 upstream of MCU and cap both ends.
- 2.1.4 Coat underground waste transfer piping per SRS Engineering Guide 09903-G (Ref. 2.2.1), insulate per SRS Engineering Guide 15250-G (Ref. 2.2.2), and backfill per SRS Engineering Guide 01110 (Ref. 2.2.3).

2.2 Applicable SRS Engineering Standards and Engineering Guides:

- 2.2.1 SRS Engineering Guide 09903-G, Rev. 3, Corrosion Protection – Underground Steel
- 2.2.2 SRS Engineering Guide 15250-G, Rev. 2, Mechanical Insulation
- 2.2.3 SRS Engineering Standard 01110, Rev. 6, SRS Civil Site Design Criteria

2.2.4 SRS Engineering Standard 15060, Rev. 20, Additional Requirements for SRS Piping

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

2.3 Applicable National Codes & Standards:

2.3.1 ASME B31.3-2016 Edition, Process Piping

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-DCP-H-18003, Rev. 1, Final Transfer Line Tie-in of Tank 49H to SWPF

2.4.3 M-ML-H-07285, Rev. 7, Waste Tank 49H Process Modifications Piping Data Sheet Package

2.4.4 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-01028, Rev. 9, Tank 49H Riser B5 STP Discharge to Waste Transfer Piping Analysis

2.4.6 M-QIP-H-00387, Rev. 1, Final Transfer Line Tie-in of Tank 49H to SWPF

2.4.7 T-CLC-H-00773, Rev. 3, Evaluation of MCU Transfer Lines

2.4.8 P-DCF-H-02287, Rev. 0, MCU Transfer Line Modifications Asbuilt

2.4.9 T-DCF-H-00012, Rev. 0, Correction of Functional Classification of CLSM Backfill Material

2.4.10 C-DCF-H-04529, Rev. 0, Clarification of Functional Classification for Pipe Support AM63

2.4.11 P-DCF-H-02268, Rev. 0, MCU Transfer Line Modifications

3.0 Waste Compatibility

The modifications in the scope of this assessment and their waste characterization will remain unchanged. 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 waste transfer line SDP-L-SDP1 and all the pipe supports were evaluated and were found to be satisfactory per T-CLC-H-01028 (Ref. 2.4.5). Waste transfer lines WTS-L-1755, WTS-L-1657 and WTS-L-1459 were evaluated and found to be satisfactory per T-CLC-H-00773 (Ref. 2.4.7)

Support for underground waste transfer lines is provided by the backfill per SRS Engineering Standard 01110 (Ref. 2.2.3) and insulation per SRS Engineering Guide 15250-G (Ref. 2.2.2).

5.0 Leak Detection and Past Leaks

The Leak Detection system (LD) for the affected transfer lines will continue to meet Section IX and Appendix B of the FFA. These lines 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.

6.0 Inspections

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

- ASME Code B31.3-2016 (Ref. 2.3.1)
- SRS Engineering Standard 15060 (Ref. 2.2.4)
- SRS Engineering Guide 15060-G (Ref. 2.2.5)
- Piping Data Sheet Package M-ML-H-07285 (Ref. 2.4.3)
- Quality Inspection Plan M-QIP-H-00387 (Ref. 2.4.6).

7.0 Determination of Secondary Containment

The primary and secondary containments associated with this modification will replicate the existing line arrangement which satisfies 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 of this same report. Therefore, no further assessment is needed.

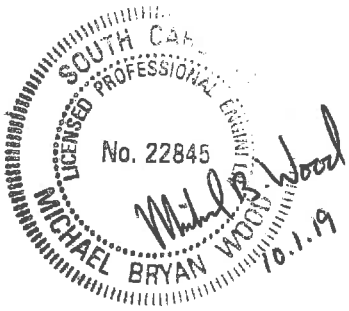
8.0 Professional Engineer Certifications (Design and Construction)

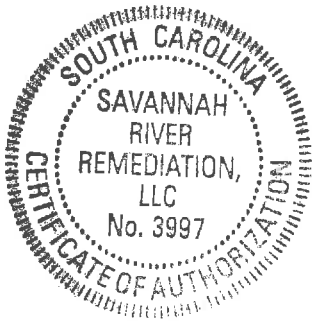
Design

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-18003 (Ref. 2.4.2) and associated DCFs 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: MICHAEL B. WOOD
License Number: 22845



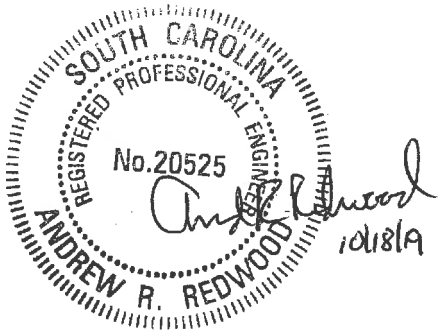


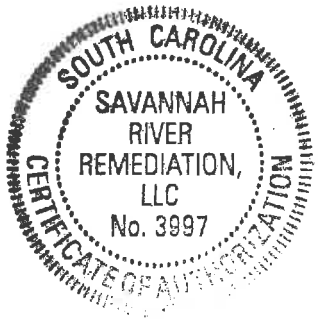
Construction and Installation

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 new waste transfer line was constructed in accordance with the approved design in Design Change Package M-DCP-H-18003 (Ref. 2.4.2) and associated DCFs. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

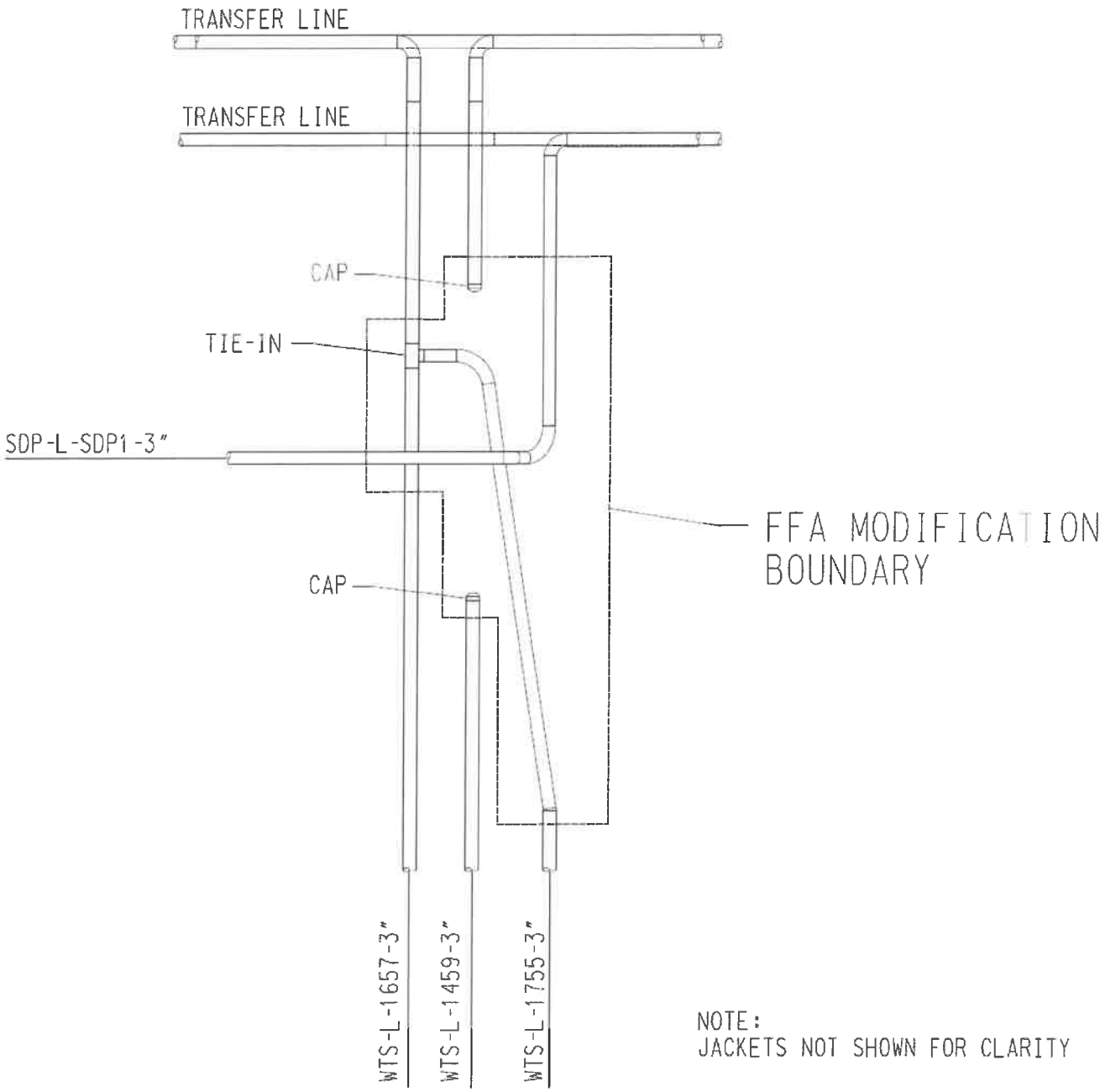
Name: Andrew R. Redwood
License Number: 20525





9.0 ATTACHMENT

9.1 Waste Tank 49H Waste Transfer Line Tie-in Sketch



Savannah River Site

FEDERAL FACILITY AGREEMENT
ASSESSMENT REPORT

FOR

LEAK DETECTION LINE MODIFICATION
to LD-LDB-4 at TANK 43H

M-ESR-H-00549

REVISION 0

DISCLAIMER

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

	DATE
PREPARER D J Massey David Massey, Design Services Mechanical Engineer Project Management, Design and Construction Services	5.28.19
REVIEWER Oren Webb, Design Services Mechanical Engineer Project Management, Design and Construction Services	5/28/19
APPROVAL Scott Wallace Scott Wallace, H-Tank Farm Engineering Tank Farm Engineering	5/28/19
APPROVAL Neil Combs Neil Combs, Design Services Project Engineer, Project Management, Design and Construction Services	5/28/19

SUMMARY OF CHANGES

Rev. No	Reason for Change	Pages Affected	Issue Date
0	Initial Issue	All	6/20/19

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 line, LD-1631, connecting Tank 41H (TK41) Bottoms Clean Out Port (COP) jacketed drain line and a Tank 43H (TK43) leak detection box (LDB), has failed a periodic line segment pressure test. The drain line from TK41 is no longer used and has been plugged/capped inside the COP. The section of LD-1631 from the TK41 COP will be cut and capped.

LD-1631, as stated above, also connects to TK43 LDB. Because TK43 LDB is still in use, the section of LD-1631 remains part of the pressure boundary and will be repaired and capped.

This modification will be conducted per Design Change Form (DCF) M-DCF-H-13582 (Ref. 2.4.2). This task is not divided into two or more FFA reports.

2.0 Design Information

2.1 This modification includes the following activities:

- 2.1.1 Cap LD drain line LD-1631 upstream of Leak Detection Box LD-LDB-4 (See Attachment 9.1).
- 2.1.2 Coat underground capped piping per SRS Engineering Guide 09903-G (Ref. 2.2.1). Per later design, the piping will be insulated per SRS Engineering Guide 15250-G (Ref. 2.2.2) and backfilled per SRS Engineering Guide 01110 (Ref. 2.2.3).

2.2 Applicable SRS Engineering Standards and Engineering Guides:

- 2.2.1 SRS Engineering Guide 09903-G, Rev. 3, Corrosion Protection – Underground Steel
- 2.2.2 SRS Engineering Guide 15250-G, Rev. 2, Mechanical Insulation
- 2.2.3 SRS Engineering Standard 01110, Rev. 6, SRS Civil Site Design Criteria
- 2.2.4 SRS Engineering Standard 15060, Rev. 20, Additional Requirements for SRS Piping
- 2.2.5 SRS Engineering Guide 15060-G, Rev. 8, Application of ASME B31.3

2.3 Applicable National Codes & Standards:

- 2.3.1 ASME B31.3-2016 Edition, Process Piping

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-DCF-H-13582, Rev. 0, Modify Jacket Drain Line LD-1631 to LD-LDB-4 at Tank 43

2.4.3 Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991

3.0 Waste Compatibility

The modifications in the scope of this assessment and their waste characterization will remain unchanged. 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 GDL, LD-1631, and Leak Detection Box LD-LDB-4 were not impacted by the cutting and capping of the failed leak detection drain line. The drain line did not provide structural support for the jacketed drain line. For structural supports, see DCF justification (Ref.2.4.2).

5.0 Leak Detection and Past Leaks

The Leak Detection system (LD) for the affected transfer lines will continue to meet Section IX and Appendix B of the FFA. These lines will still follow the design presented in Section 3.7.2 of the Phase II Assessment Report (Ref. 2.4.3), for Type II transfer lines.

6.0 Inspections

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

- ASME Code B31.3-2016 (Ref. 2.3.1)
- SRS Engineering Standard 15060 (Ref. 2.2.4)
- SRS Engineering Guide 15060-G (Ref. 2.2.6)
- Piping Data Sheets and Quality Inspection Plan (QIP) are within Ref. 2.4.2

7.0 Determination of Secondary Containment

The primary and secondary containments associated with this modification will replicate the existing line arrangement which satisfies FFA requirements and the requirements stated in Section 2.1 of the Phase II Assessment Report (Ref. 2.4.3) as previously evaluated in Section 3.7.2 of this same report. Therefore, no further assessment is needed.

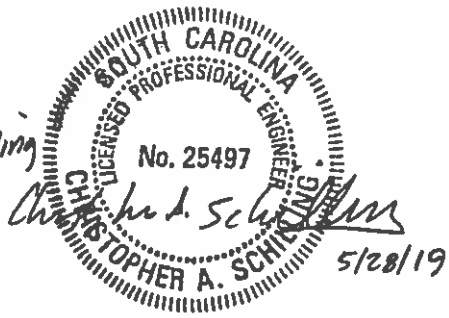
8.0 Professional Engineer Certifications (Design and Construction)

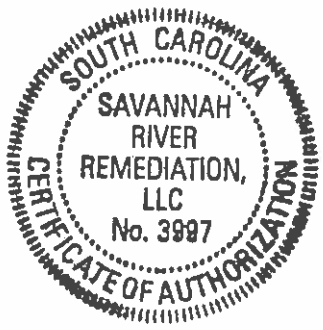
Design

This assessment report was prepared under my supervision and direction. I certify that the design for the modifications detailed in Design Change Form M-DCF-H-13582 (Ref. 2.4.2) complies 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: Christopher A. Schilling
License Number: 25497



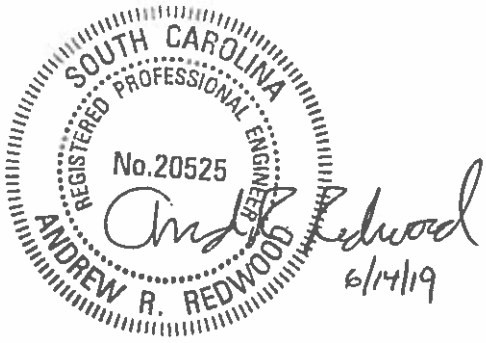


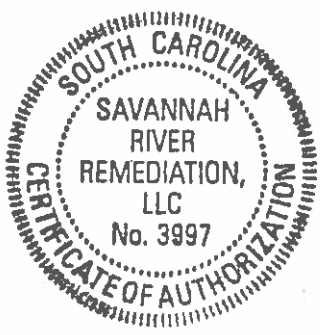
Construction and Installation

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 capping of the drain line was constructed in accordance with the approved design in Design Change Form M-DCF-H-13582 (Ref. 2.4.2). The tests conducted to demonstrate leak tightness and the results were found acceptable.

Stamp

Name: Andrew R. Redwood
License Number: 20525





9.0 ATTACHMENT

9.1 Waste Tank 43H Leak Detection Box Sketch