

CY2017 Annual Report
Status of F/H Area Radioactive Liquid Waste Tanks
Being Removed From Service

As required by the
Federal Facility Agreement
For the Savannah River Site
(Admin. Docket No.: 89-05-FF, Effective August 16, 1993)

March 2018

Disclaimer

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Table of Contents

Acronyms	4
I. Introduction	5
II. Overview of CY2017 Accomplishments.....	5
Status of Bulk Waste Removal Efforts, Operational Closure, and Post Closure Activities for the F- and H-Area Tanks.	5
Status of F- and H-Area Tank Farm Performance Assessments.	7
Status of F- and H-Area Tank Farm Closure Plans.	7
Status of Operational Closure of Groups of Tanks in the F- and H-Areas.....	7
Implementation of Section 3116(a) of the Ronald W. Reagan National Defense Authorization Act for FY2005 with respect to the F- and H-Area Tanks.....	10
 Appendices:	
A. 2017 Individual Tank Status Report.....	12
B. Federal Facility Agreement System/Component Assessment Reports.....	22

Acronyms

<u>Acronym:</u>	<u>Description:</u>
BWR	Bulk Waste Removal
BWRE	Bulk Waste Removal Efforts
CY	Calendar Year
DOE-SR	United States Department of Energy – Savannah River Field Office
DRC	Dispute Resolution Committee
DWPF	Defense Waste Processing Facility
EOY	End of Year
EPA	United States Environmental Protection Agency Region 4
FFA	Federal Facility Agreement for the Savannah River Site
FTF	F-Area Tank Farm
FTF PA	F-Area Tank Farm Performance Assessment
GCP	Industrial Wastewater General Closure Plan for Waste Tank Systems
HTF	H-Area Tank Farm
HTF PA	H-Area Tank Farm Performance Assessment
LWTR-QAPP	Liquid Waste Tank Residuals – Quality Assurance Program Plan
LWTRSAPP	Liquid Waste Tank Residuals Sampling and Analysis Program Plan
NDAA	Ronald W. Reagan National Defense Authorization Act for FY2005 (Pub. L. 108-375)
NRC	Nuclear Regulatory Commission
PA	Performance Assessment
SCDHEC	South Carolina Department of Health and Environmental Control
SEC	Senior Executive Committee
SRS	Savannah River Site
TCCR	Tank Closure Cesium Removal

I. Introduction

The Federal Facility Agreement (FFA) for the Savannah River Site (SRS) requires the United States Department of Energy – Savannah River Operations Office (DOE-SR) to annually submit a report to the United States Environmental Protection Agency – Region 4 (EPA) and the South Carolina Department of Health and Environmental Control (SCDHEC) on the status of the radioactive liquid waste tanks being removed from service (FFA IX.E.3). This report includes discussions on the following activities which occurred during CY2017:

- CY2017 accomplishments related to tank farm and waste disposition facilities;
- Bulk Waste Removal Efforts (BWRE) for the F- and H-Area Tanks, F- and H-Area Tank Farm (FTF and HTF) Performance Assessments, and F- and H-Area Tank Farm General Closure Plans;
- Removal from service (operational closure) of groups of tanks in the F- and H-Areas;
- Implementation of Section 3116 of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 with respect to the F- and H-Area tanks; and
- Appendix A, which provides the CY2017 status for each of the 24 radioactive liquid waste tanks being removed from service.

Also, the FFA Section IX.B.2 requires new or replacement waste tank system component assessments to be submitted annually on or before March 9 of each year, which is attached as Appendix B.

II. Overview of CY2017 Accomplishments and Activities

Status of BWRE, Operational Closure, and Post Closure Activities for the F- and H-Area Tanks

- Received regulatory approval and issued the *Liquid Waste Tank Residuals Sampling and Analysis Program Plan*, Revision 4, and *Liquid Waste Tank Residuals Sampling – Quality Assurance Program Plan*, Revision 3.

- Received letter from SCDHEC documenting removal of Tank 16H from *Construction Permit No. 17,424-IW: F and H-Area High-Level Radioactive Waste Tank Farms*.
- Received regulatory approval and issued the *Explanation of Significant Difference (ESD) for Incorporating Tank 12 into the Revision 1 Interim Record of Decision Remedial Alternative Selection for the H-Area Tank Farm, Waste Tank 16, Revision 0*.
- Received SCDHEC approval and issued the *Tank 12 Final Configuration Report for H-Tank Farm at the Savannah River Site*.
- Issued notification of *Interim Remedial Action Start for H-Area Tank Farm, Waste Tank 12*.
- Issued notification of *Interim Remedial Action Completion for Waste Tanks 16 and 12, CERCLIS Number 89*.
- Received notification that the RCRA Hazardous Waste Permit was revised to include the remedy selection for Tank 12H.
- Received letter from SCDHEC documenting removal of Tank 12H from *Construction Permit No. 17,424-IW: F and H-Area High-Level Radioactive Waste Tank Farms*.
- Received regulatory approval that FFA milestone associated with Bulk Waste Removal Efforts was completed for Tank 15H and completed Heel Removal – first Mound Reduction effort reducing height of mound from 60 inches to 33 inches above the tank floor.
- Completed installation of three Low Volume Mixer Jets in Tank 3 to support future Bulk Waste Removal.
- The Tank 12 Closure Project was awarded the 2017 Project Management Institute Award for Project Excellence - one of only two awarded in North America.
- Deployed equipment and completed field activities for demonstration of tank solids SONAR mapping technology in Tank 7F.
- The fabrication of the Tank Closure Cesium Removal (TCCR) Unit 1 was completed and factory acceptance testing was initiated at the vendor's facility.

Status of F- and H-Area Tank Farm Performance Assessments

The F-Tank Farm Performance Assessment (FTF PA) [SRS-REG-2007-00002, Revision 1] was issued in March 2010 and implemented in 2012. The H-Tank Farm Performance Assessment (HTF PA) [SRR-CWDA-2010-00128, Revision 1] was issued in November 2012 and implemented in 2015. DOE-SR formally approved *Type I and II Tanks Special Analysis for the Performance Assessment for the H-Area Tank Farm at the Savannah River Site*, Revision 0, authorizing use of this Special Analysis to make risk informed decisions to optimize waste removal efforts. No new activities were performed related to these performance assessments during 2017.

Status of F- and H-Area Tank Farm Closure Plans

Received SCDHEC approval in May 2017 and issued the *Consolidated General Closure Plan For F-Area and H-Area Waste Tank Systems* (CGCP), Revision 1. The CGCP incorporates lessons learned from tank closure activities performed to date and covers both the F-Area and H-Area Tank Farms.

Status of Operational Closure of Groups of Tanks in the F- and H-Areas

Progress continued as highlighted above regarding waste removal and closure. There are two closed tanks in HTF (Tanks 12H and 16H) and six closed tanks in the FTF (Tanks 5F, 6F, 17F, 18F, 19F and 20F).

The December 2016 extension associated with FFA milestones for completion of BWRE for Tanks 10H and 15H required two meetings be held between April 1 and August 31, 2017, to discuss plans for the 2017 FFA milestones. DOE held FFA milestone discussion meetings with SCDHEC and EPA on May 16 and August 15, 2017.

On October 2, 2017, SCDHEC and EPA approved a DOE request for a 45-day extension to FFA Appendix L items #6 and #12. Specifically, the completion of BWRE for 3 tanks by 9/30/17 and completion of operational closure of two tanks by 9/30/2017 was extended to 11/14/2017.

Based on a three-party (DOE, SCDHEC and EPA) discussion on November 1, 2017, the three agencies agreed to and subsequently signed on November 8, 2017, a *Suspension Agreement – Federal Facility Agreement (FFA) High-Level Waste (HLW) Tank Milestones* suspending Appendix L Items #6, #7, and #12 associated with completion of BWRE and Operational Closure of HLW tanks until May 2019. This suspension was entered to allow time to negotiate a comprehensively revised set of HLW Program milestones.

CY2017 Status:

Tank 15H: The execution phase of removal of bulk waste from Tank 15H continued in 2017. DOE provided monthly progress reports to SCDHEC and EPA documenting the progress toward completing BWRE in Tank 15H. Each report provided the status, risks, and issues experienced during execution. BWRE campaigns in Tank 15H consisted of mixing the sludge solids using submersible mixer pumps (SMPs), transferring the associated sludge slurry from Tank 15H to 13H, and then a subsequent supernate (liquid) recycle transfer from Tank 13H back to Tank 15H following adequate settling of the solids in Tank 13H. Four SMPs had been installed in Tank 15H to mix the tank contents to form the sludge slurry. Three BWRE campaigns were performed in Tank 15H between October 24, 2016 and July 15, 2017. Over the three campaigns, 116,000 gallons of the original 187,000 gallons of sludge solids were removed from Tank 15H. After the third slurry transfer from Tank 15H to Tank 13H, it was determined that removal had reached the point of diminishing effectiveness.

Following a briefing to SCHEC and EPA on September 6, 2017 describing completion of BWRE in Tank 15H, DOE issued *Completion of Bulk Waste Removal Efforts in Waste Tank 15, CERCLIS Number 89* on September 21, 2017 informing both regulatory agencies that SRS had completed BWRE in Tank 15H. This satisfied one of the commitments for Item #5 listed in Appendix L of the FFA to complete BWRE in Tank 15H by October 31, 2017. SCDHEC issued a letter on September 28, 2017 and EPA issued a letter on October 4, 2017 agreeing that BWRE for Tank 15H were completed.

The first indexed SMP operations for mound dispersion in preparation for Heel Removal were completed on September 28, 2017. This mound dispersion effort successfully reduced the height of the sludge mound under Riser 1 from approximately 60 inches to approximately 33 inches above the tank floor.

Tank 10H/TCCR: DOE procured an at-tank cesium removal system for the treatment of salt waste from commercial sources to accelerate salt waste treatment and expedite tank closure. Design of the ion-exchange system, called Tank Closure Cesium Removal (TCCR), was completed in June 2017. The vendor completed TCCR fabrication in October 2017 and initiated factory acceptance testing. Testing of the TCCR unit utilizing a simulated salt solution (which mimics liquid waste salt solution) and simulated resin (mimicking the very expensive crystalline silicotitanate (CST) resin) resulted in fouling of the TCCR unit pre-filters at a frequency that will not support field operations for treating Tank 10H dissolved salt solution. Investigation and analysis/troubleshooting of the technical issue with the TCCR unit pre-filter system is in-progress at the vendor's facility.

SRR continues to develop the Documented Safety Analysis for TCCR while completing balance of plant activities including Tank 10H transfer pump and the Tank 10H-to-TCCR above grade transfer line installation.

Tank 3F: Preparation for salt dissolution and Bulk Salt Waste Removal in Tank 3F continued in 2017. Installation of three Low Volume Mixer Jets (LVMJ) was completed in October 2017. In 2003, Tank 3F underwent a waste removal campaign which removed a portion of the interstitial liquid from the saltcake. Waste removal activities were then suspended in 2004 due to a shift in Liquid Waste Program priorities. In 2017, the previously used interstitial liquid transfer pump/hose were removed from the tank to allow for installation of a new transfer pump. Integrity testing of the underground waste transfer line connecting Tank 3F to the FTF Type I hub tank (Tank 7F) indicated a possible failure of the transfer line piping. Based on additional testing, it was determined that replacement of the Leak Detection Box at Tank 7, which is connected to the transfer line jacket for the Tank 3F to Tank 7F transfer line, is required. Ongoing activities include

installation of the new transfer pump in Tank 3F and replacement of the Leak Detection Box at Tank 7F.

Tank 7/SONAR: In accordance with the *Dispute Resolution Agreement for Alleged Violations of Class 3 Industrial Solid Waste Landfill Permit Facility, Facility ID #025500-1603, United States Department of Energy Savannah River Site*, the supplemental tank closure activity for demonstration of SONAR mapping technology was performed in Tank 7F in December 2017. Data was collected on the configuration of the residual solids on the tank floor to support the development of a solids map and volume determination.

Tank 9H: Design activities for salt dissolution and Bulk Salt Waste Removal in Tank 9H were initiated in 2017. The Balance of Plant design was approved. Ongoing design activities include the installation of the transfer pump, low volume mixer jets (LVMJ), and Gas Release Modifications (GRM).

Implementation of Section 3116 of the Ronald W. Reagan National Defense Authorization Act for FY2005 with respect to the F- and H-Area Tanks

The Secretary of Energy issued the *Section 3116 Determination for Closure of F-Tank Farm at the Savannah River Site*, DOE-WD-2012-001, on March 27, 2012. In the F-Tank Farm Waste Determination the Secretary of Energy determined, based on the reasons set forth in the *Basis for Section 3116 Determination for Closure of F-Tank Farm at the Savannah River Site*, DOE/SRS-WD-2012-001, that the stabilized residuals, tanks and ancillary structures in the F-Tank Farm at closure are not high-level radioactive waste and may be disposed of in place at the Savannah River Site.

On December 19, 2014, the Secretary of Energy issued the *Section 3116 Determination for Closure of H-Tank Farm at the Savannah River Site*, DOE-WD-2014-001. In the H-Tank Farm Waste Determination the Secretary of Energy determined, based on the reasons set forth in the *Basis for Section 3116 Determination for Closure of H-Tank Farm at the Savannah River Site*, DOE/SRS-WD-2014-001, that the stabilized residuals, tanks and ancillary structures in the H-Tank

Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)	CY2017
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Farm at closure are not high-level radioactive waste and may be disposed of in place at the Savannah River Site.

In CY2017, DOE supported the NRC in NRC's F and H-Tank Farm monitoring role under Section 3116 of the NDAA by providing routine documentation (e.g., groundwater monitoring reports, PA maintenance plan) as requested by NRC. There were no on-site observation visits for F and H-Tank Farm monitoring in CY2017.

APPENDIX A

CY2017 Individual Tank Status Report 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 CY2017.

Several of the tanks experienced leakage in the past. An olive-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:

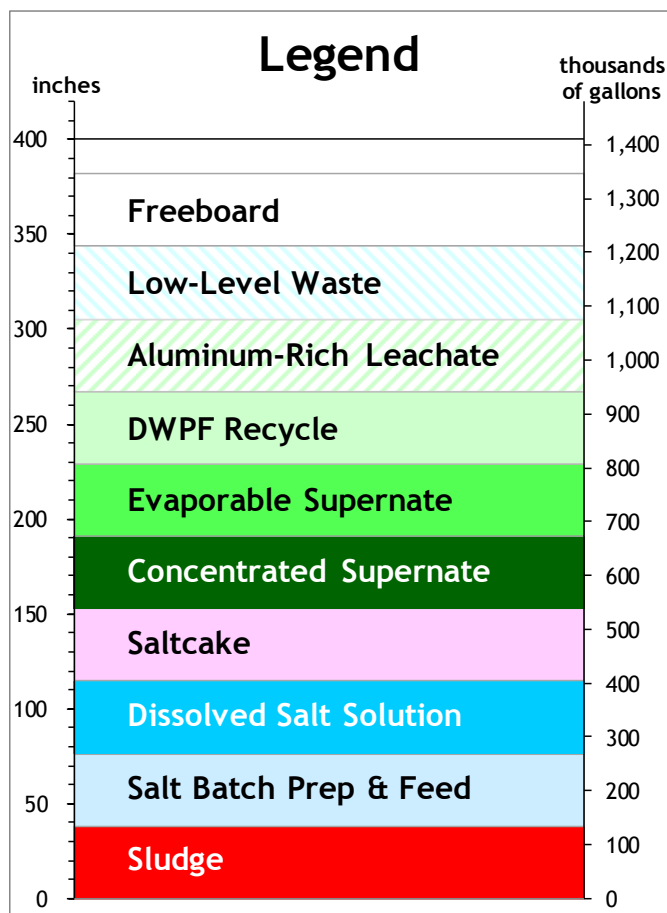
BWRE: Bulk Waste Removal Efforts

DWPF: Defense Waste Processing Facility

EOY: End of Year (December 31, 2017)

EPA: Environmental Protection Agency

SCDHEC: South Carolina Department of Health & Environmental Control



Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)

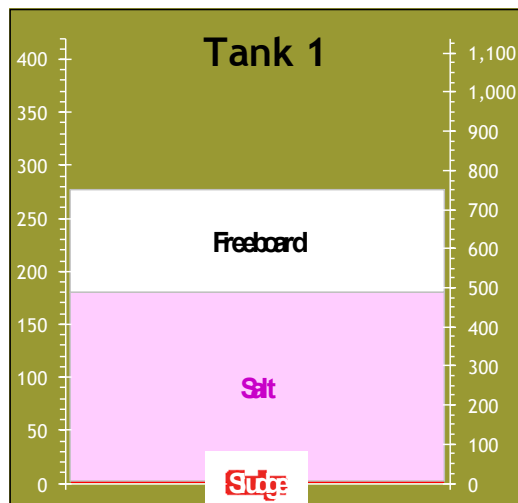
CY2017

Tank 1:

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

Discussion: There were no transfers in or out during 2017.

Comment: Tank 1 is planned to be a future salt removal tank.

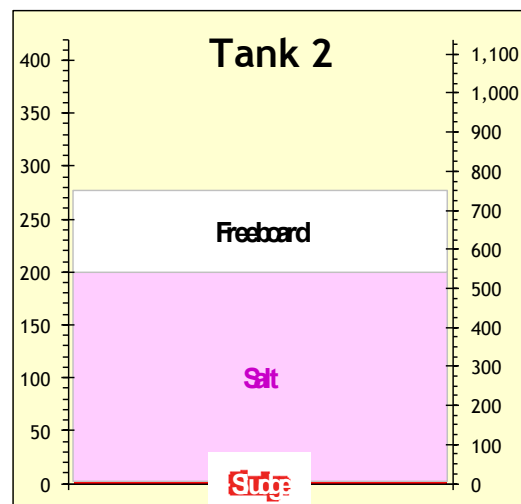


Tank 2:

Area: F-Area
 Service: Inactive Waste Storage Tank
 Under Active Surveillance
 Type: I
 EOY Volume: 540,100 gallons

Discussion: There were no transfers in or out during 2017.

Comment: Tank 2 is planned to be a future salt removal tank.



Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)

CY2017

Tank 3:

Area: F-Area

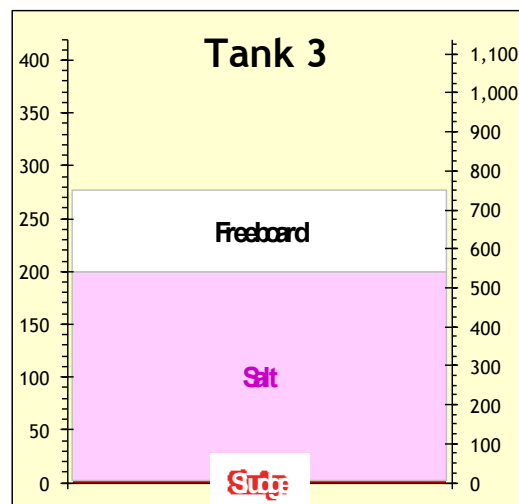
Service: Inactive Waste Storage Tank
Under Active Surveillance

Type: I

EOY Volume: 540,100 gallons

Discussion: There were no transfers in or out during 2017.

Comment: Installed three Low Volume Mixing Jets to prepare Tank 3 for upcoming salt dissolution and bulk salt waste removal and provide feed to the Salt Waste Processing Facility.



Tank 4:

Area: F-Area

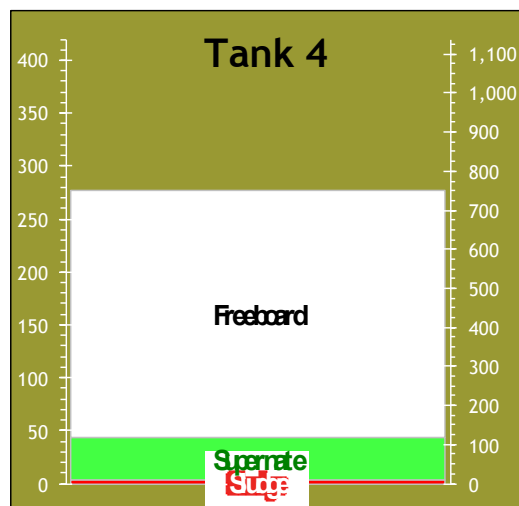
Service: Tank Closure

Type: I

EOY Volume: 118,700 gallons

Discussion: There were no transfers in or out during 2017.

Comment: SCDHEC and EPA concurred that BWRE were complete and that additional supernate may be added to keep the sludge material hydrated.



Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)

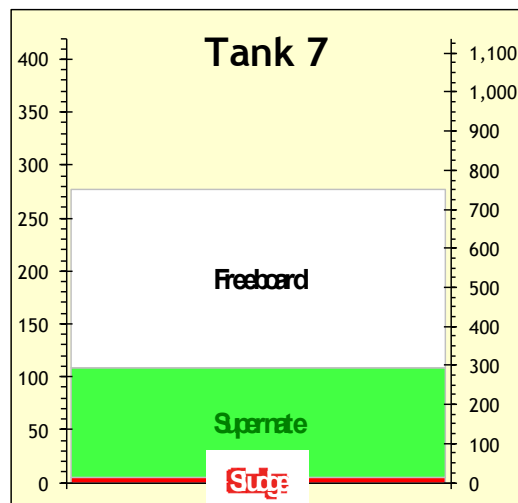
CY2017

Tank 7:

Area: F-Area
 Service: Waste storage tank – Hub tank
 Tank Type: I
 EOY Volume: 293,760 gallons

Discussion: In April, supernate was transferred to Tank 38 to provide feed for the 2H Evaporator. In December, domestic water and corrosion control chemicals were added to support the SONAR mapping technology demonstration.

Comments: SCDHEC and EPA concurred that BWRE were complete and that additional supernate may be added to keep the sludge material hydrated. Serves as hub tank for the FTF Type I tanks.

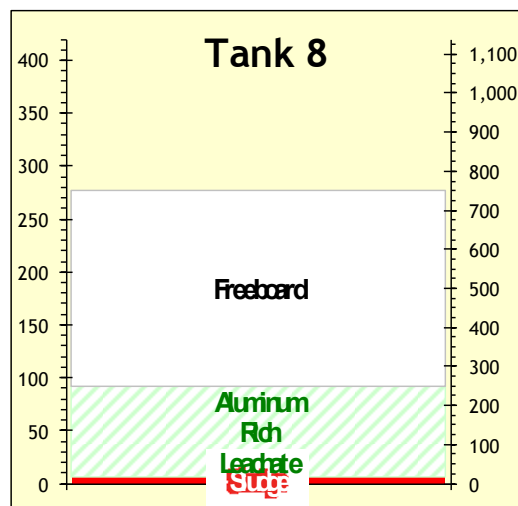


Tank 8:

Area: F-Area
 Service: Aluminum-rich leachate storage tank
 Type: I
 EOY Volume: 247,150 gallons

Discussion: A portion of the aluminum-rich supernate was transferred to Tank 21 for Salt Batch 11 preparation.

Comment: SCDHEC and EPA concurred that BWRE were complete and that Tank 8 could continue to store aluminum-rich leachate.



Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)

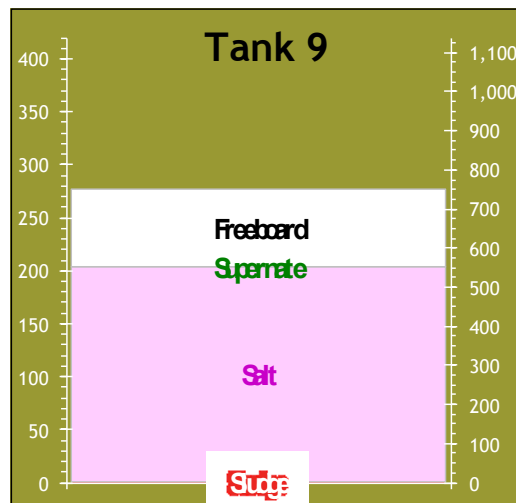
CY2017

Tank 9:

Area: H-Area
Service: Inactive Waste Storage Tank
Under Active Surveillance
Type: I
EOY Volume: 551,490 gallons

Discussion: There were no transfers in or out during 2017.

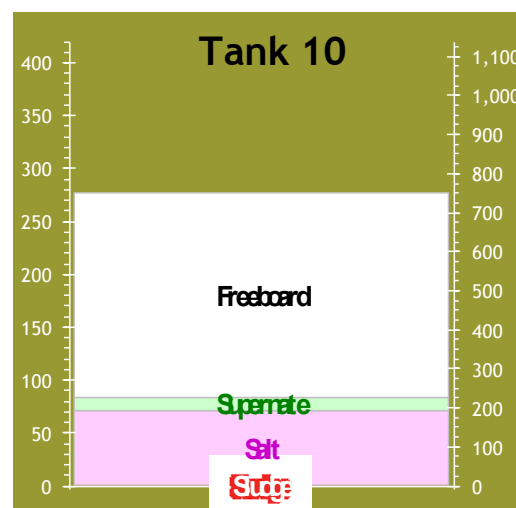
Comment: Tank 9 is planned to be a future salt removal tank.



Tank 10:

Area: H-Area
Service: Inactive Waste Storage Tank
Under Active Surveillance
Type: I
EOY Volume: 228,180 gallons

Discussion: There were no transfers in or out during 2017. Dissolved salt from this tank is planned to be the source of feed for the Tank Closure Cesium Removal (TCCR) Unit #1 demonstration.



Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)

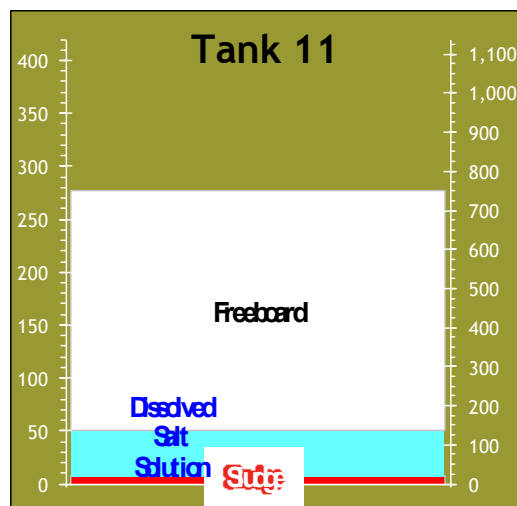
CY2017

Tank 11:

Area: H-Area
 Service: Salt solution hold tank – Hub tank
 Type: I
 EOY Volume: 126,560 gallons

Discussion: There were no transfers in or out during 2017.

Comments: SCDHEC and EPA concurred that BWRE were complete. Tank 11 is planned to be used for future receipt of the decontaminated salt solution from the TCCR #1 demonstration.

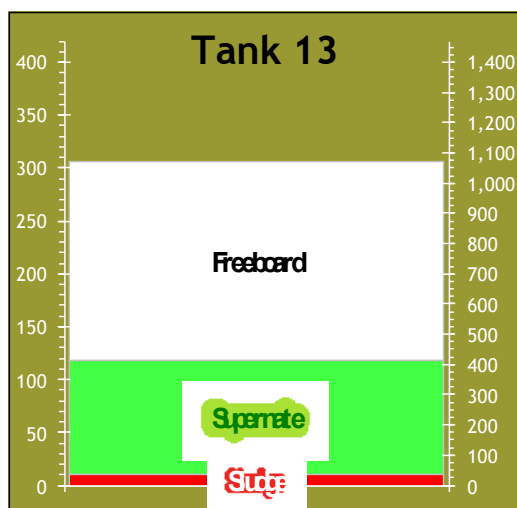


Tank 13:

Area: H-Area
 Service: Active Waste Tank – Hub tank
 Type: II
 EOY Volume: 343,000 gallons

Discussion: Thirteen transfers between Tank 13 and Tanks 15 and 51 supported Tank 15 BWRE activities in 2017.

Comment: Tank 13 is a sludge removal and sludge staging tank for future sludge batches. Serves as sludge hub tank for the HTF Type I and II tanks.



Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)

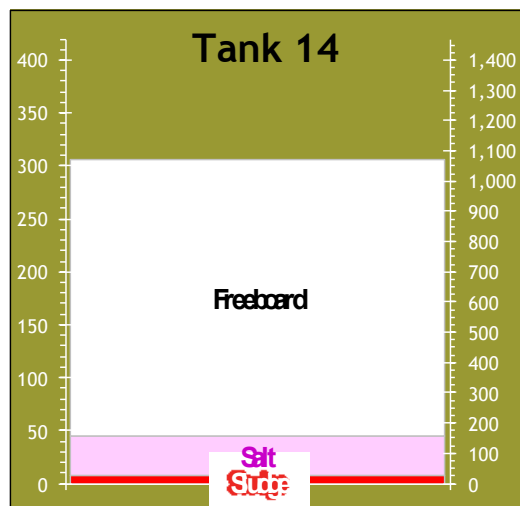
CY2017

Tank 14:

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

Discussion: There were no transfers in or out during 2017.

Comment: Tank 14 is planned to be a sludge removal tank for future sludge batches.

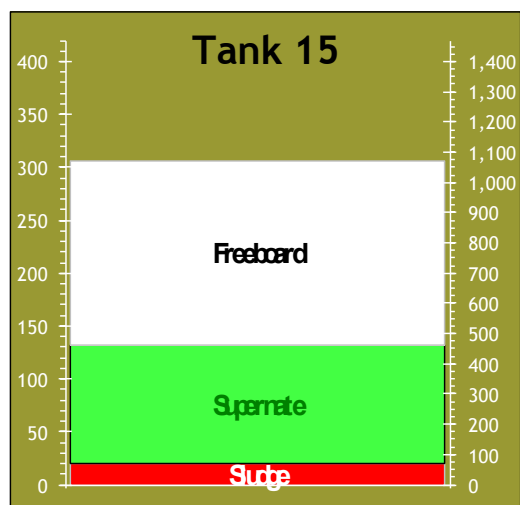


Tank 15:

Area: H-Area
Service: Inactive Waste Storage Tank
Under Active Surveillance
Type: II
EOY Volume: 463,050 gallons

Discussion: SCDHEC and EPA concurred in October that BWRE were complete. Six transfers between Tank 15 and Tank 13 supported BWRE in 2017.

Comment: Tank 15 is planned to undergo heel removal in preparation for removal from service.



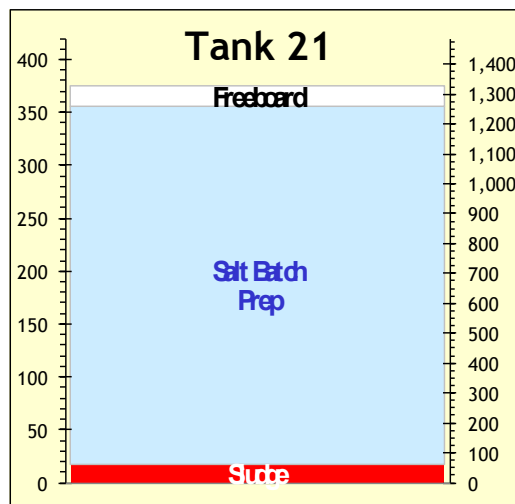
Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)

CY2017

Tank 21:

Area: H-Area
Service: Salt Batch Blend Tank
Type: IV
EOY Volume: 1,257,100 gallons

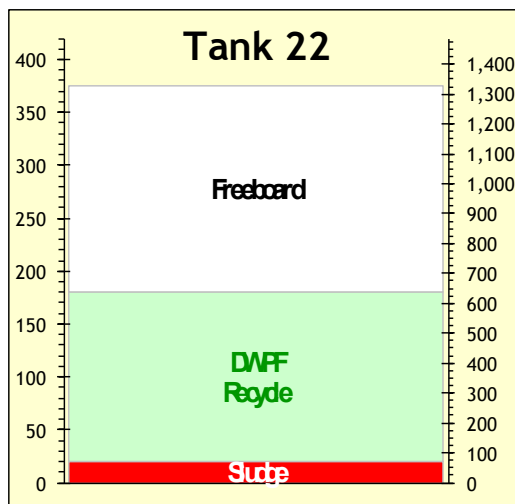
Discussion: In 2017, Salt Batch 10 material was transferred to Tank 49 for processing. Tank 21 received material from Tanks 8, 35, 41, and 43 to prepare Salt Batch 11.



Tank 22:

Area: H-Area
Service: Storage Tank for DWPF
Recycle
Type: IV
EOY Volume: 636,490 gallons

Discussion: In 2017, Tank 22 continued receiving and storing DWPF recycle and supplying feed for the 2H Evaporator.



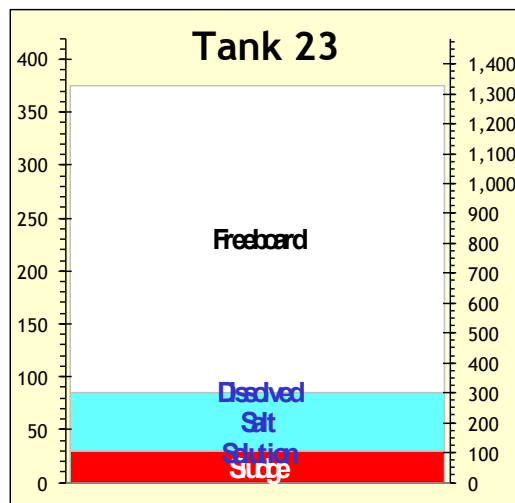
Annual Report Status of F/H Area Radioactive Liquid Waste Tanks Being Removed from Service (SRR-ESH-2018-00007)

CY2017

Tank 23:

Area: H-Area
 Service: Salt Solution Hold Tank
 Type: IV
 EOY Volume: 302,670 gallons

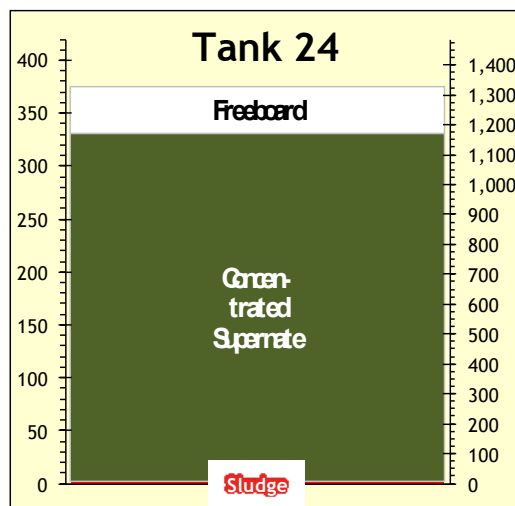
Discussion: In 2017, Tank 23 received dissolved salt from Tank 41. Dissolve salt was transferred to Tank 21 for Salt Batch 11 preparation.



Tank 24:

Area: H-Area
 Service: Salt Solution Storage Tank
 Type: IV
 EOY Volume: 1,172,100 gallons

Discussion: There were no transfers in or out during 2017.



APPENDIX B

Federal Facility Agreement System/Component Assessment Reports

Report Number	Title
M-ESR-H-00404 / Rev. 1	Waste Removal Hose in Hose Transfer from Waste Tank 15H Riser 7 To Tank 13H Riser 6
M-ESR-H-00462 / Rev. 0	Waste Tank 49H New Transfer Line Installation
M-ESR-F-00474 / Rev. 0	Waste Tank 49H New Transfer Line Installation
M-ESR-H-00521 / Rev. 0	Waste Tank 49H Transfer Line Backfill
M-ESR-H-00519 / Rev. 0	242-25H Evaporator Vessel Modification Conical Cap Installation

Savannah River Site

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT

FOR

**WASTE REMOVAL HOSE IN HOSE TRANSFER FROM
WASTE TANK 15H RISER 7 TO TANK 13H RISER 6**

**M-ESR-H-00404
REVISION 1**

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
For Waste Removal Hose In Hose Transfer from Waste Tank 15H Riser 7
To Tank 13H Riser 6

M-ESR-H-00404
Revision 1
Page 2 of 11

DISCLAIMER

This report was prepared by Savannah River Remediation LLC (SRR) for the United States Department of Energy under Contract No. DE-AC09-09SR22505 and is an account of work performed under that contract. Neither the United States Department of Energy, nor SRR, nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, or product or process disclosed herein or represents that its use will not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trademark, name, manufacturer or otherwise does not necessarily constitute or imply endorsement, recommendations, or favoring of same by SRR or by the United States Government or any agency thereof. The views and opinions of the authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
 For Waste Removal Hose In Hose Transfer from Waste Tank 15H Riser 7
 To Tank 13H Riser 6

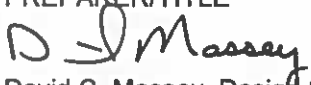
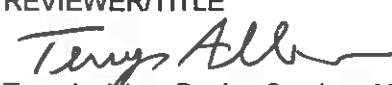
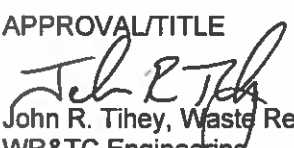
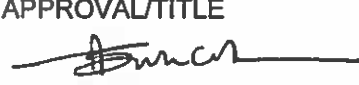
M-ESR-H-00404

Revision 1

Page 3 of 11

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

PREPARER/TITLE  David C. Massey, Design Services Mechanical Engineer Project Management, Design and Construction Services	DATE 9.13.16
REVIEWER/TITLE  Terry L. Allen, Design Services Mechanical Engineer Project Management, Design and Construction Services	9.13.16
APPROVAL/TITLE  John R. Tihey, Waste Retrieval Engineering Manager WR&TC Engineering	9-13-16
APPROVAL/TITLE  Ashok Gupta, Design Services Project Engineer, Project Management, Design and Construction Services	9/13/16

SUMMARY OF CHANGES

Rev. No	Reason for Change	Pages Affected	Issue Date
0	Initial Issue	DCM All	9.13.16
1	Revised to document Revision 1 of HTF-TMC-14-004. Affirm approval signatures/dates succeed date of design document issuance - DCM	None	

9-13-16

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	5
2.0	DESIGN INFORMATION	6
3.0	WASTE COMPATIBILITY	8
4.0	FOUNDATION SUPPORT	8
5.0	LEAK DETECTION AND PAST LEAKS	8
6.0	INSPECTIONS	9
7.0	DETERMINATION OF SECONDARY CONTAINMENT	9
8.0	PROFESSIONAL ENGINEER CERTIFICATIONS (DESIGN AND CONSTRUCTION).....	10
9.0	ATTACHMENT	11

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. 2.6.3).

Waste Tank 15H is a Type II, old style waste tank and has a planned operational closure date in accordance with the SRR Schedule. Because Waste Tank 15H contains approximately 175,000 gallons of sludge and no supernate, a transfer system will be installed between Waste Tank 15H and Waste Tank 13H to facilitate Bulk Waste Removal (BWR) efforts. The transfer system will consist of the installation of transfer pumps connected by Hose-in-Hose (HIH) transfer lines on the tank top. The HIH transfer line design that connects to these two pumps is shown in Temporary Modification Package HTF-TMC-14-004 (Ref. 2.6.5). A Submersible Transfer Pump (STP) will be installed in Waste Tank 15H Riser 7 and a Recirculation Transfer Pump (RTP) will be installed in Waste Tank 13H Riser 6 per Design Change Package (DCP) M-DCP-H-11028 (Ref. 2.6.8).

The HIH transfer lines consists of two 1½ inch hose core lines and two 3 inch hose jacket lines and will be installed aboveground between Waste Tank 15H Riser 7 and Tank 13H Riser 6. Both the waste core hoses and jacket hoses of the HIH system are continuously aboveground and no hose fittings are located outside of the tanks to prevent the possibility of leakage. 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 the temporary modification is that when the transfer hoses are connected to the transfer pumps, supernate from Tank 13H Riser 6 will be recycled to Tank 15H Riser 7 in a feed-and-bleed operation (i.e., continuous addition of liquid to the waste tank while simultaneously pumping out the waste tank). This will result in the transfer of the sludge from Tank 15H to Tank 13H to facilitate the final operational closure of Waste Tank 15H. The transfer hoses and associated shielding will be supported by a stand-alone support structure designed for a seismic event (Ref. 2.4.10). The transfer line core hose is designed to prevent transfer line leaks and spills. In the event of high wind and tornados, the transfer system will be isolated.

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 15H Riser 7 and terminates at the Tank 13H Riser 6 downcomer (See sketch in Attachment). The other inner core hose originates from the RTP pump discharge line in Tank 13H Riser 6 and terminates at the Tank 15H Riser 7 downcomer.
- 2.1.2 The outer jacket hoses are open-ended. The STP transfer hose will begin inside Tank 15H Riser 7 and terminate at Tank 13H Riser 6. The RTP transfer hose will begin inside Tank 13H Riser 6 and will terminate in Tank 15H Riser 7.

2.2 This modification includes the following activities:

- 2.2.1 Cover the 1½-inch transfer core hoses with 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 both Waste Tanks. Similar hoses have been used for aboveground waste transfers.
- 2.2.2 Route the HIH system aboveground between Waste Tank 15H Riser 7 and Waste Tank 13H Riser 6. 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 transfer lines will be shielded so that the hoses have a dose of no more than 50 millirem/hour at 30 centimeters on the sides and top (Ref. 2.6.7). Tank risers shall be shielded so that the dose rate is less than 5 millirem/hour at 30 centimeters during non-transfer conditions or less when the tank contains 150 inches of 1.4 Ci/gal material (Ref. 2.6.7).

2.3 Applicable SRS Engineering Standards and Engineering Guides:

- 2.3.1 SRS Engineering Standards Manual, WSRC-TM-95-1, Rev. 79:
 - 2.3.1.1 15060, Rev. 18, ASME B31.3 Additional Requirements for SRS Piping Systems
 - 2.3.1.2 05057, Rev. 4, Control of Welding
 - 2.3.1.3 01064, Rev. 7, Radiological Design Requirements
 - 2.3.1.4 01060, Rev. 10, Structural Design Criteria

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
For Waste Removal Hose In Hose Transfer from Waste Tank 15H Riser 7
To Tank 13H Riser 6

M-ESR-H-00404
Revision 1
Page 7 of 11

2.3.2 SRS Engineering Practices Manual, WSRC-IM-95-58, Rev. 11:

2.3.2.1 15060-G, Rev. 7, Application of ASME B31.3

2.3.2.2 15062-G, Rev. 0, Qualification and Maintenance of Nonmetallic Flexible Hose

2.3.2.3 15140-G, Rev. 0, Field Fabrication and Installation of Pipe Supports

2.4 SRS Supporting Calculations:

2.4.1 N-CLC-H-00865, Rev. 0, Tank 15 to Tank 13 Hose-in-Hose (HIH) Transfer Line Shielding Across Tank Top

2.4.2 M-CLC-H-03078, Rev. 1, Waste Tank 15H Waste Removal Project

2.4.3 M-CLC-H-03079, Rev.1, Waste Tank 15H to Waste Tank 13H Submersible Transfer Pump Selection

2.4.4 M-CLC-H-02869, Rev. 3, Tank 13H Riser 6 and Tank 15H Risers 7, 2, 3, 4A and 8 Drainage Evaluation

2.4.5 T-CLC-H-01069, Rev. 0, Evaluation of Tank 15 STP and Manifold Piping

2.4.6 M-CLC-H-03229, Rev. 0, Tank 15H to Tank 13H Siphon and Water Hammer Analysis

2.4.7 T-CLC-H-00577, Rev. 7, Type II Tank 15H, Tank Top Vertical Loading Evaluation (U)

2.4.8 M-CLC-G-00434, Rev. 0, ASME B31.3 Unlisted Component Calculation for Hoses and Fittings.

2.4.9 C-CLC-H-01537, Rev. 0, Bulk Waste Removal Pump Supports for Tanks 13H & 15H

2.4.10 C-CLC-H-01535, Rev. 0, Tank 15 to Tank 13 Hose in Hose Transfer Line Supports

2.5 Applicable National Codes & Standards:

2.5.1 ASME B31.3-2008 Edition, Process Piping Code

2.6 Reference Documents

2.6.1 SRNL-TR-2009-00187, Rev. 0, HLW Flexible Jumper Materials Compatibility Evaluation

2.6.2 SRNL-L1300-2008-00041, Rev. 0, Structural Testing of Hose and Fittings for HLW Flexible Jumper

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

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

2.6.5 HTF-TMC-14-004, Rev. 1, Tank 15H and Tank 13H Hose-in-Hose Transfer System

2.6.6 M-QIP-H-00335, Rev. 0, Tank 15 to 13 Recirculation System Hose-in-Hose Transfer Line

2.6.7 M-TC-H-00080, Rev. 4, Task Requirements and Criteria closure activities for 241-915H
(Tank 15)

2.6.8 M-DCP-H-11028, Rev. 0, Waste Tanks 15H and 13H Waste Transfer Modifications

3.0 Waste Compatibility

The modifications contained in HTF-TMC-14-004, Rev. 1 and other associated design documents are consistent with the FFA documents (Ref. 2.6.3 and 2.6.4). Hoses used in the Temporary Modification 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. Therefore, the modifications in the scope of this assessment and their waste characterization will remain unchanged.

4.0 Foundation Support

The piping components of the HIH system are selected according to SRS piping requirements (Ref. 2.3.1.1 and 2.3.2.1). In addition, M-CLC-G-00434 (Ref. 2.4.8) evaluates any ASME B31.3 Code unlisted components to determine that they are adequately designed per ASME B31.3 Code (Ref. 2.5.1). The HIH aboveground support system was evaluated by calculation C-CLC-H-01535 (Ref. 2.4.10) 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

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

- ASME Code B31.3-2008
- WSRC-TM-95-1, SRS Engineering Standards 15060 and 05057
- WSRC-IM-95-58, SRS Engineering Guide 15060-G
- WSRC-IM-95-58, SRS Engineering Guide 15062-G

Examination and leak testing inspections for the HIH assembly are contained in the Quality Inspection Plan (QIP) M-QIP-H-00335 (Ref. 2.6.6).

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. 2.6.4) 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.

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
For Waste Removal Hose In Hose Transfer from Waste Tank 15H Riser 7
To Tank 13H Riser 6

M-ESR-H-00404
Revision 1
Page 10 of 11

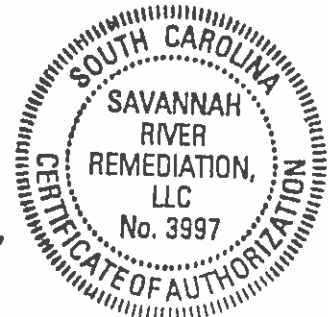
8.0 Professional Engineer Certifications (Design and Construction)

Design

This assessment report was prepared under my supervision and direction. I certify that the design for the modifications detailed in Temporary Modification Package HTF-TMC-14-004 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: MICHAEL B. WOOD
License Number: 22845

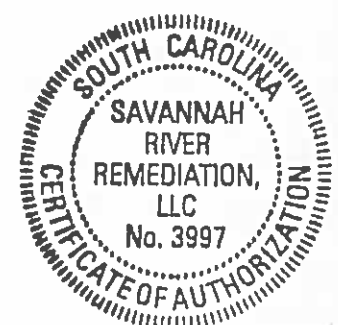
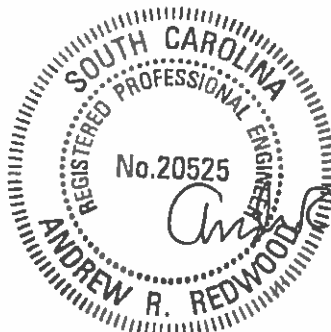


Construction and Installation

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 aboveground transfer lines between Waste Tank 15H Riser 7 and Tank 13H Riser 6, was constructed in accordance with the approved design in Temporary Modification Package HTF-TMC-14-004. 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 HTF-TMC-14-004 and associated design documents. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

Name: Andrew R. Redwood
License Number: 20525

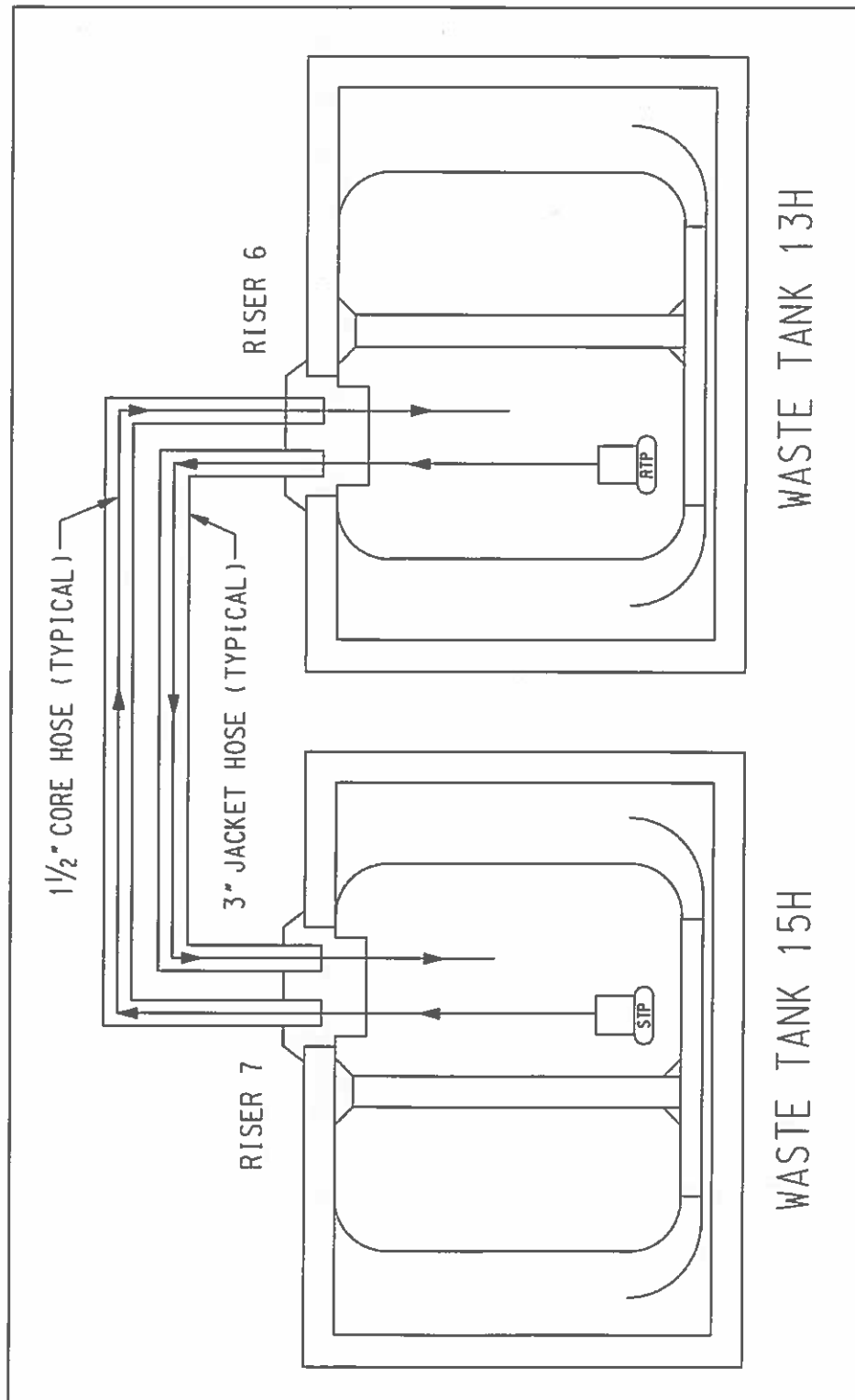


FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
For Waste Removal Hose In Hose Transfer from Waste Tank 15H Riser 7
To Tank 13H Riser 6

M-ESR-H-00404
Revision 1
Page 11 of 11

9.0 ATTACHMENT

HIH between Waste Tank 15H Riser 7 and Waste Tank 13H Riser 6



Savannah River Site

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT

FOR

WASTE TANK 49H NEW TRANSFER LINE INSTALLATION

**M-ESR-H-00462
REVISION 0**

DISCLAIMER

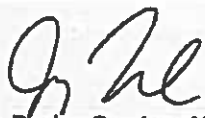

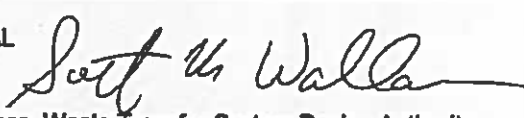
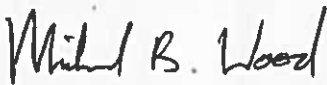
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FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
Waste Tank 49H New Transfer Line Installation

M-ESR-H-00462
Revision 0
Page 3 of 9

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

PREPARER  Jeremy Brackman, Design Services Mechanical Engineer Project Management, Design and Construction Services	DATE 4-27-17
REVIEWER  Oren Webb, Design Services Mechanical Engineer Project Management, Design and Construction Services	4-27-17
APPROVAL  Scott Wallace, Waste Transfer System Design Authority Tank Farm Engineering	5-1-17
APPROVAL  Michael B. Wood, Design Services Project Engineer, Project Management, Design and Construction Services	5.2.17

SUMMARY OF CHANGES

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

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	5
2.0	DESIGN INFORMATION.....	5
3.0	WASTE COMPATIBILITY	6
4.0	FOUNDATION SUPPORT	7
5.0	LEAK DETECTION AND PAST LEAKS	7
6.0	INSPECTIONS	7
7.0	DETERMINATION OF SECONDARY CONTAINMENT	7
8.0	PROFESSIONAL ENGINEER CERTIFICATIONS (DESIGN AND CONSTRUCTION).....	8
9.0	ATTACHMENT	9
9.1	WASTE TANK 49H NEW WASTE TRANSFER LINE.....	9

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 purpose of the Blend and Feed portion of the Salt Disposition Integration (SDI) Program is to modify the H-Area Tank Farm (HTF) tanks to blend salt waste and feed the waste to the Salt Waste Processing Facility (SWPF). Tank 49H will receive waste from tanks designated as Blend Tanks and feed the salt waste to the SWPF. A new waste transfer path from Tank 49H Riser B5 to SWPF will be required.

This task is divided into four FFA reports. The scope of this FFA is for a portion of the new waste transfer line. To accomplish this, jacketed waste transfer piping (WTS-L-1665) will be installed east of Tank 49H from the top of the gabion stone bank to just west of the concrete culvert. This modification will be conducted per Design Change Package (DCP) M-DCP-H-15004 (Ref. 2.4.2) and associated DCFs, C-DCF-H-04429 (Ref. 2.4.12), P-DCF-H-02102 (Ref. 2.4.9), P-DCF-H-02126 (Ref. 2.4.13), and P-DCF-H-02129 (Ref. 2.4.14).

The remainder of the Tank 49H waste transfer line tie-ins will be installed per M-DCP-H-09017 (Ref. 2.4.3) and FFA Assessment Report M-ESR-H-00388 (Ref. 2.4.5), M-DCP-H-09017 (Ref. 2.4.3) and FFA Assessment Report M-ESR-H-00465 (Ref. 2.4.10), and M-DCP-H-15016 (Ref. 2.4.4) and FFA Assessment Report M-ESR-H-00474 (Ref. 2.4.11).

2.0 Design Information

2.1 This modification includes the following activity:

2.1.1 Installation of approximately 58 feet of new stainless steel waste transfer line core (WTS-L-1665) with a carbon steel jacket piping as a secondary containment along the rock bank east of Tank 49H.

2.2 Applicable SRS Engineering Standards and Engineering Guides:

2.2.1 SRS Engineering Standard 15060, Rev. 18, ASME B31.3 Additional Requirements for SRS Piping Systems

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

2.2.3 SRS Engineering Guides 15060-G, Rev. 7, Application of ASME B31.3

2.3 Applicable National Codes & Standards:

2.3.1 ASME B31.3-2010 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 M-DCP-H-15004, Rev. 0, Tank 49 Jacketed Transfer Line Installation
- 2.4.3 M-DCP-H-09017, Rev. 3, Waste Tank 49H Process Modifications
- 2.4.4 M-DCP-H-15016, Rev. 1, Tank 49 Jacketed Transfer Line Installation
- 2.4.5 M-ESR-H-00388, Rev. 1, Federal Facility Agreement Assessment Report for Waste Tank 49H Transfer Line Modifications
- 2.4.6 M-ML-H-07285, Rev. 5, Piping Data Sheet Package for Waste Tank 49H Process Modification
- 2.4.7 Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991
- 2.4.8 T-CLC-H-01028, Rev. 6, Tank 49H Riser B5 STP Discharge to Waste Transfer Piping Analysis
- 2.4.9 P-DCF-H-02102, Rev. 1, Revise Slope Requirements for Tank 49 Waste Transfer Line Core and Jacket (3"-WTS-1665)
- 2.4.10 M-ESR-H-00465, Rev. 0, Federal Facility Agreement Assessment Report for Waste Tank 49H New Transfer Line and Tie-In to Rock Bank
- 2.4.11 M-ESR-H-00474, Rev. 0, Federal Facility Agreement Assessment Report for Waste Tank 49H New Transfer Line Modification
- 2.4.12 C-DCF-H-04429, Rev. 0, Support Coating Exemption at Gilsulate Boundary
- 2.4.13 P-DCF-H-02126, Rev. 0, Tank 49 Transfer Line Installation
- 2.4.14 P-DCF-H-02129, Rev. 0, Backfill Modifications in Rock Bank Area for Tank 49 Transfer Line

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 line WTS-L-1665 and all the pipe supports were evaluated and were found to be satisfactory, see T-CLC-H-01028 (Ref. 2.4.8).

5.0 Leak Detection and Past Leaks

The Leak Detection for the new 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. 2.4.7), for Type II transfer lines.

6.0 Inspections

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

- ASME Code B31.3-2010 (Ref. 2.3.1)
- SRS Engineering Standard 15060 (Ref. 2.2.1)
- SRS Engineering Standard 05057 (Ref. 2.2.2)
- SRS Engineering Guide 15060-G (Ref. 2.2.3)
- Piping Data Sheet Package M-ML-H-07285 (Ref. 2.4.6)

Examination and leak testing inspections requirements for the transfer line are contained in the Quality Inspection Plan of M-DCP-H-15004 (Ref. 2.4.2).

7.0 Determination of Secondary Containment

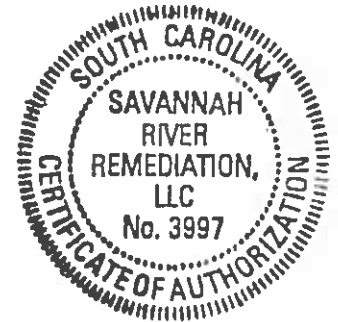
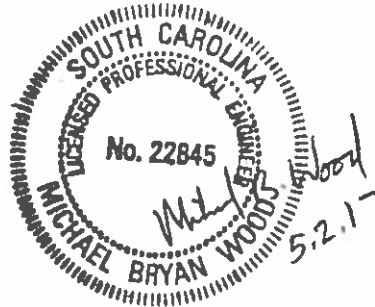
The primary and secondary containments associated with this modification will replicate the existing line arrangement which satisfies FFA requirements and the requirements stated in Section 2.1 of the Phase II Assessment Report (Ref. 2.4.7) as previously evaluated in Section 3.6.6 of this same report. 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-15004 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

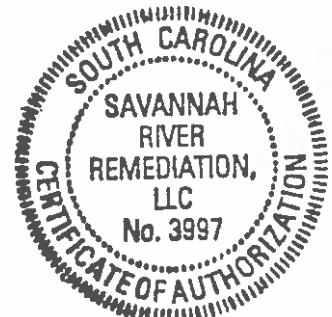
Name: MICHAEL B. WOOD
License Number: 22845

**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-15004 and associated DCFs. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

Name: Andrew R. Redwood
License Number: 20525

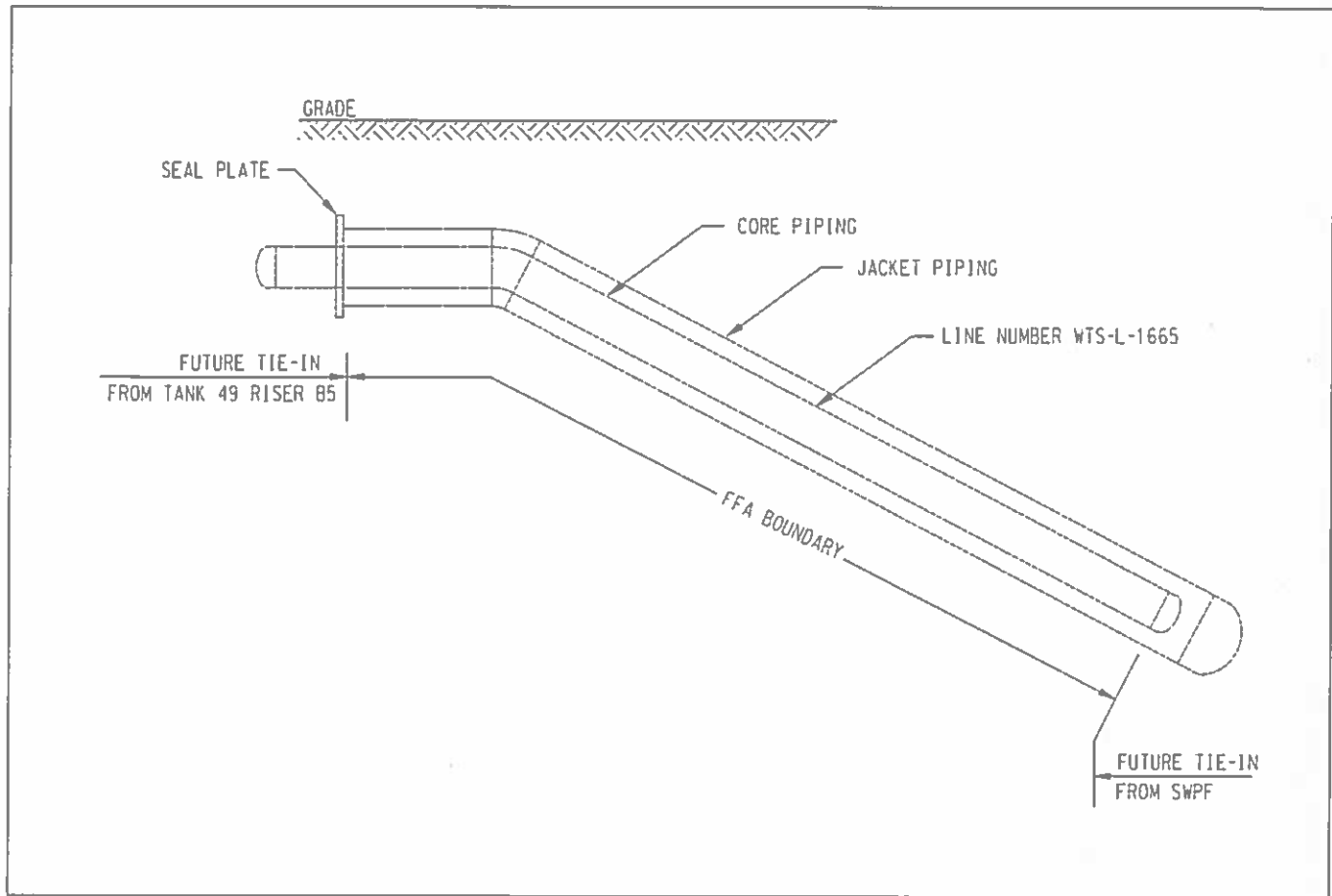


FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
Waste Tank 49H New Transfer Line Installation

M-ESR-H-00462
Revision 0
Page 9 of 9

9.0 ATTACHMENT

9.1 Waste Tank 49H New Waste Transfer Line



Savannah River Site

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT

FOR

WASTE TANK 49H NEW TRANSFER LINE INSTALLATION

M-ESR-H-00474

REVISION 0

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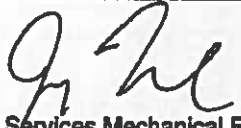
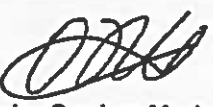
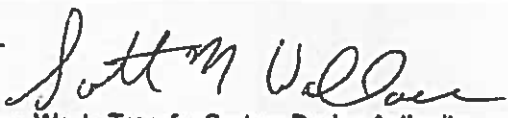
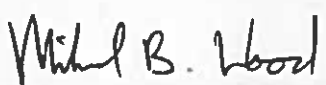
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FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
Waste Tank 49H New Transfer Line Installation

M-ESR-H-00474
Revision 0
Page 3 of 9

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

PREPARER  Jeremy Brackman, Design Services Mechanical Engineer Project Management, Design and Construction Services	DATE 4-27-17
REVIEWER  Oren Webb, Design Services Mechanical Engineer Project Management, Design and Construction Services	5/1/17
APPROVAL  Scott Wallace, Waste Transfer System Design Authority Tank Farm Engineering	5/2/17
APPROVAL  Michael B. Wood, Design Services Project Engineer, Project Management, Design and Construction Services	5.2.17

SUMMARY OF CHANGES

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

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY	5
2.0	DESIGN INFORMATION.....	5
3.0	WASTE COMPATIBILITY	6
4.0	FOUNDATION SUPPORT	7
5.0	LEAK DETECTION AND PAST LEAKS	7
6.0	INSPECTIONS	7
7.0	DETERMINATION OF SECONDARY CONTAINMENT	7
8.0	PROFESSIONAL ENGINEER CERTIFICATIONS (DESIGN AND CONSTRUCTION).....	8
9.0	ATTACHMENT	9
9.1	WASTE TANK 49H NEW WASTE TRANSFER LINE.....	9

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 purpose of the Blend and Feed portion of the Salt Waste Processing Facility (SWPF) Integration Program is to modify the H-Area Tank Farm (HTF) tanks to blend salt waste and feed the waste to the SWPF. Tank 49H will receive waste from tanks designated as Blend Tanks and feed the salt waste to the SWPF. A new waste transfer path from Tank 49H Riser B5 to SWPF will be required.

This task is divided into four FFA reports. The scope of this FFA is for a portion of the new waste transfer line. To accomplish this, jacketed waste transfer piping (WTS-L-1665) will be installed west of the concrete culvert and capped near the Strip Effluent line tie-in location. This modification will be conducted per Design Change Package (DCP) M-DCP-H-15016 (Ref. 2.4.2) and associated DCFs, C-DCF-H-04442 (Ref. 2.4.11), P-DCF-H-02138 (Ref. 2.4.12), P-DCF-H-02141 (Ref. 2.4.13) and C-DCF-H-04449 (Ref. 2.4.14).

The remainder of the Tank 49H waste transfer line tie-ins will be installed per M-DCP-H-09017 (Ref. 2.4.5) and FFA Assessment Report M-ESR-H-00388 (Ref. 2.4.6), M-DCP-H-09017 (Ref. 2.4.5) and FFA Assessment Report M-ESR-H-00465 (Ref. 2.4.10), and M-DCP-H-15004 (Ref. 2.4.3) and FFA Assessment Report M-ESR-H-00462 (Ref. 2.4.4).

2.0 Design Information

2.1 This modification includes the following activity:

- 2.1.1 Installation of approximately 35 feet of new stainless steel waste transfer line core (WTS-L-1665) with a carbon steel jacket piping as a secondary containment. See Attachment 9.1 for FFA boundary.

2.2 Applicable SRS Engineering Standards and Engineering Guides:

- 2.2.1 SRS Engineering Standard 15060, Rev. 18, ASME B31.3 Additional Requirements for SRS Piping Systems
- 2.2.2 SRS Engineering Standard 05057, Rev. 5, Control of Welding
- 2.2.3 SRS Engineering Guides 15060-G, Rev. 7, Application of ASME B31.3

2.3 Applicable National Codes & Standards:

2.3.1 ASME B31.3-2010 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 M-DCP-H-15016, Rev. 1, Tank 49 Jacketed Transfer Line Installation
- 2.4.3 M-DCP-H-15004, Rev. 0, Tank 49 Jacketed Transfer Line Installation
- 2.4.4 M-ESR-H-00462, Rev. 0, Federal Facility Agreement Assessment Report for Waste Tank 49H Transfer Line Modifications
- 2.4.5 M-DCP-H-09017, Rev. 3, Waste Tank 49H Process Modifications
- 2.4.6 M-ESR-H-00388, Rev. 1, Federal Facility Agreement Assessment Report for Waste Tank 49H Transfer Line Modifications
- 2.4.7 M-ML-H-07285, Rev. 5, Piping Data Sheet Package for Waste Tank 49H Process Modification
- 2.4.8 Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991
- 2.4.9 T-CLC-H-01028, Rev. 6, Tank 49H Riser B5 STP Discharge to Waste Transfer Piping Analysis
- 2.4.10 M-ESR-H-00465, Rev. 0, Federal Facility Agreement Assessment Report for Waste Tank 49H New Transfer Line and Tie-In to Rock Bank
- 2.4.11 C-DCF-H-04442, Rev. 1, Tank 49 Interarea Transfer Line Modification
- 2.4.12 P-DCF-H-02138, Rev. 0, Tank 49 Transfer Line Installation
- 2.4.13 P-DCF-H-02141, Rev. 2, Tank 49 Interarea Transfer Line Modification
- 2.4.14 C-DCF-H-04449, Rev. 0, Tank 49H Riser B5 RSS Interarea Transfer Line Supports

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 line WTS-L-1665 and all the pipe supports were evaluated and were found to be satisfactory, see T-CLC-H-01028 (Ref. 2.4.9).

5.0 Leak Detection and Past Leaks

As stated in the Phase II Assessment Report (Ref. 2.4.8), 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 B31.3-2010 (Ref. 2.3.1)
- SRS Engineering Standard 15060 (Ref. 2.2.1)
- SRS Engineering Standard 05057 (Ref. 2.2.2)
- SRS Engineering Guide 15060-G (Ref. 2.2.3)
- Piping Data Sheet Package M-ML-H-07285 (Ref. 2.4.7)

Examination and leak testing inspections requirements for the transfer line are contained in the Quality Inspection Plan of M-DCP-H-15016 (Ref. 2.4.2).

7.0 Determination of Secondary Containment

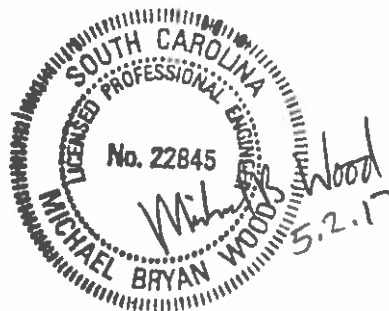
The primary and secondary containments associated with this modification will replicate the existing line arrangement which satisfies FFA requirements and the requirements stated in Section 2.1 of the Phase II Assessment Report (Ref. 2.4.8) as previously evaluated in Section 3.7.2 of this same report. 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 M-DCP-H-15016 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-15016 and associated DCFs. The tests conducted to demonstrate leak tightness were found acceptable.

Stamp

Name: Andrew R. Redwood
License Number: 20525

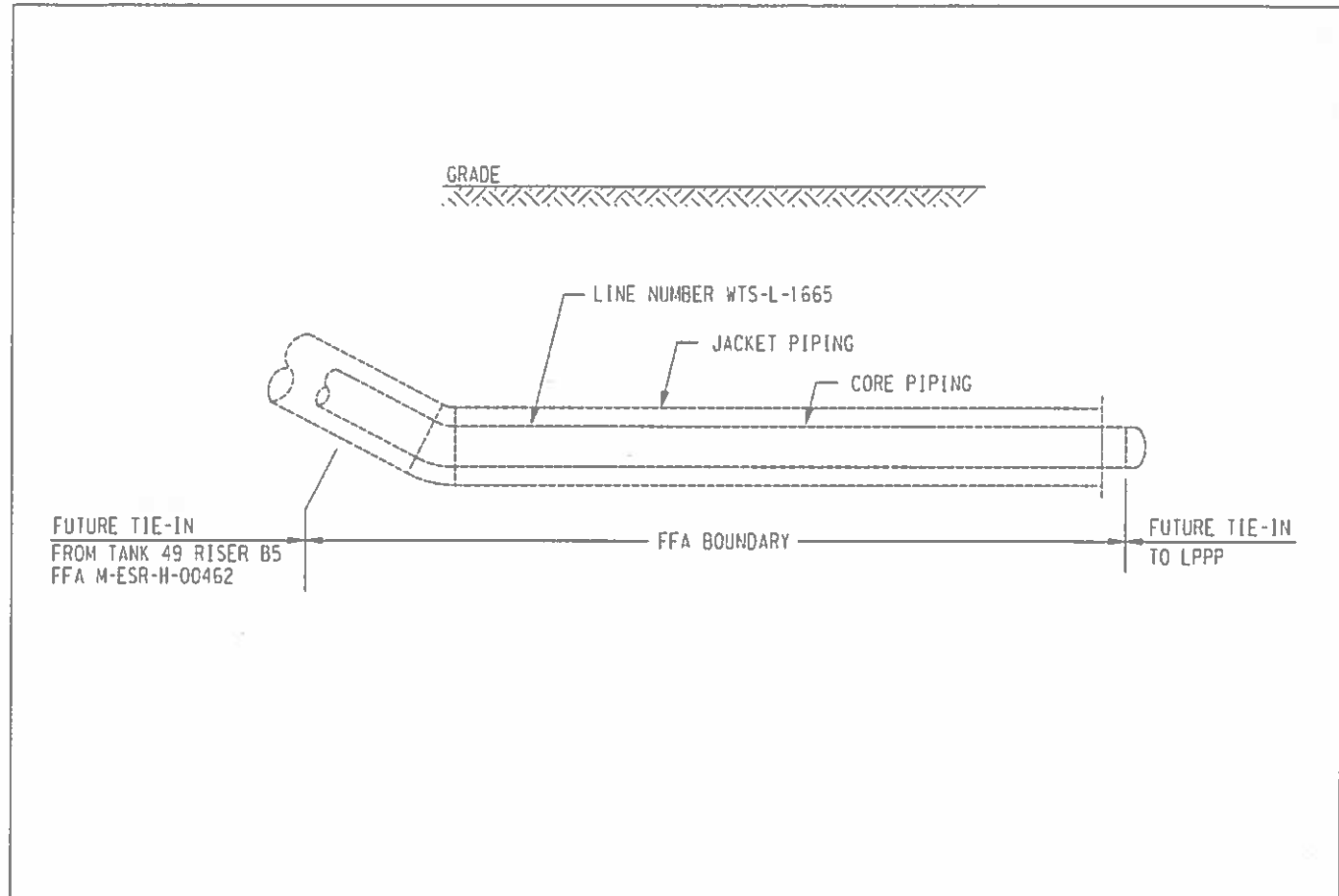


FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
Waste Tank 49H New Transfer Line Installation

M-ESR-H-00474
Revision 0
Page 9 of 9

9.0 ATTACHMENT

9.1 Waste Tank 49H New Waste Transfer Line



Savannah River Site

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT

FOR

WASTE TANK 49H TRANSFER LINE BACKFILL

M-ESR-H-00521

REVISION 0

DISCLAIMER

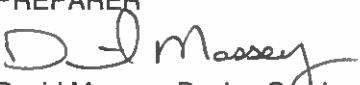
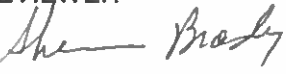



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FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
for Waste Tank 49H Transfer Line Backfill

M-ESR-H-00521
Revision 0
Page 3 of 9

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

PREPARER  David Massey, Design Services Mechanical Engineer Project Management, Design and Construction Services	DATE 10.31.17
REVIEWER  Sherman Brady, Design Services Mechanical Engineer Project Management, Design and Construction Services	10-31-17
APPROVAL  Jim Stokes, Design Authority H Tank Farm Project Engineering	10-31-17
APPROVAL  Richard Broomfield, Design Authority CPC & ARP System	10/31/17
APPROVAL  Michael B. Wood, Design Services Project Engineer, Project Management, Design and Construction Services	10.31.17

SUMMARY OF CHANGES

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

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY.....	5
2.0	DESIGN INFORMATION	5
3.0	WASTE COMPATIBILITY	6
4.0	FOUNDATION SUPPORT	6
5.0	LEAK DETECTION AND PAST LEAKS	6
6.0	INSPECTIONS.....	6
7.0	DETERMINATION OF SECONDARY CONTAINMENT	7
8.0	PROFESSIONAL ENGINEER CERTIFICATIONS (DESIGN AND CONSTRUCTION).....	8
9.0	ATTACHMENT	9
9.1	WASTE TANK 49H WASTE TRANSFER LINE BACKFILL	9

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 purpose of the Blend and Feed portion of the Salt Waste Processing Facility (SWPF) Integration Program is to modify the H-Area Tank Farm (HTF) tanks to blend salt waste and feed the waste to the SWPF. Tank 49H will receive waste from tanks designated as Blend Tanks and feed the salt waste to the SWPF. A new waste transfer path from Tank 49H Riser B5 to SWPF will be required.

The scope of this FFA is to mitigate the risk associated with future tie-in of waste transfer lines (WTS-L-1755-3"-PS202C-CE, WTS-L-1459-3"-PS202C-CE, and WTS-L-1657-3"-PS202C-CE) at the Modular Caustic Unit (MCU) by physically accessing existing buried waste lines for exploratory work to determine piping layout. In association with this task, the existing backfill material will be removed and new backfill material will be added in an interim condition until the future tie-in is completed. This task will be conducted per Design Change Form (DCF) C-DCF-H-04483 (Ref. 2.4.2), and is not divided into two or more FFA reports.

2.0 Design Information

2.1 This modification includes the following activities:

- 2.1.1 Excavate the existing buried waste transfer lines.
- 2.1.2 Perform exploratory work to determine piping layout.
- 2.1.3 Add new waste transfer line backfill material.
- 2.1.4 Add a radiation shield plate (1" steel plate) over the new backfill material.
- 2.1.5 Remove the northwest portion of the Nitrogen Vaporizer concrete slab.

2.2 Applicable SRS Engineering Standards and Engineering Guides:

- 2.2.1 SRS Engineering Standard 01110, Rev. 6, Civil Site Design Criteria
- 2.2.2 SRS Engineering Guides 15250-G, Rev. 2, Mechanical Insulation

2.3 Applicable National Codes & Standards:

- 2.3.1 None

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 C-DCF-H-04483, Rev. 0, Tank 49 – MCU Tie-in Exploratory Excavation
- 2.4.3 Assessment Report, Phase II for the F and H Area High Level Radioactive Waste Tank Farms, Rev. 0, 1991
- 2.4.4 SW6-V2-WM-WC-2109, Rev 0, Backfilling of Excavations

3.0 Waste Compatibility

The modifications in the scope of this assessment will not introduce any other materials that will invalidate the existing waste characterization.

4.0 Foundation Support

The new backfill material was evaluated and was found to be satisfactory to support waste transfer lines WTS-L-1755-3"-PS202C-CE, WTS-L-1459-3"-PS202C-CE, and WTS-L-1657-3"-PS202C-CE WTS-L-1665, see C-DCF-H-04483 (Ref. 2.4.2) for backfill compaction requirements.

5.0 Leak Detection and Past Leaks

As stated in the Phase II Assessment Report (Ref. 2.4.3), 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

Excavation, backfill material, installation of backfill, examination, and testing shall be in accordance with:

- SRS Engineering Standard 01110 (Ref. 2.2.1)
- SRS Engineering Guide 15060-G (Ref. 2.2.2)

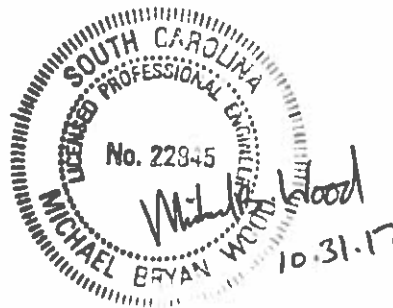
Backfill material inspection, installation, and testing are contained in the Quality Inspection Plan of C-DCF-H-04483 (Ref. 2.4.2) and SW6-V2-WM-WC-2109 (Ref. 2.4.4).

7.0 Determination of Secondary Containment

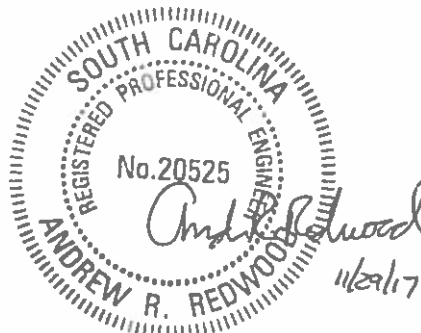
The primary and secondary containments associated with this modification will replicate the existing line arrangement which satisfies FFA requirements and the requirements stated in Section 2.1 of the Phase II Assessment Report (Ref. 2.4.3) as previously evaluated in Section 3.7.2 of this same report.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

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
for Waste Tank 49H Transfer Line BackfillM-ESR-H-00521
Revision 0
Page 8 of 9**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 new backfill material detailed in Design Change Form C-DCF-H-04483 complies with applicable engineering standards and the requirements of Appendix B of the Federal Facility Agreement.

StampName: **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 backfill material was performed in accordance with the approved design in Design Change Form C-DCF-H-04483.

StampName: **Andrew R. Redwood**
License Number: **20525**

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
for Waste Tank 49H Transfer Line Backfill

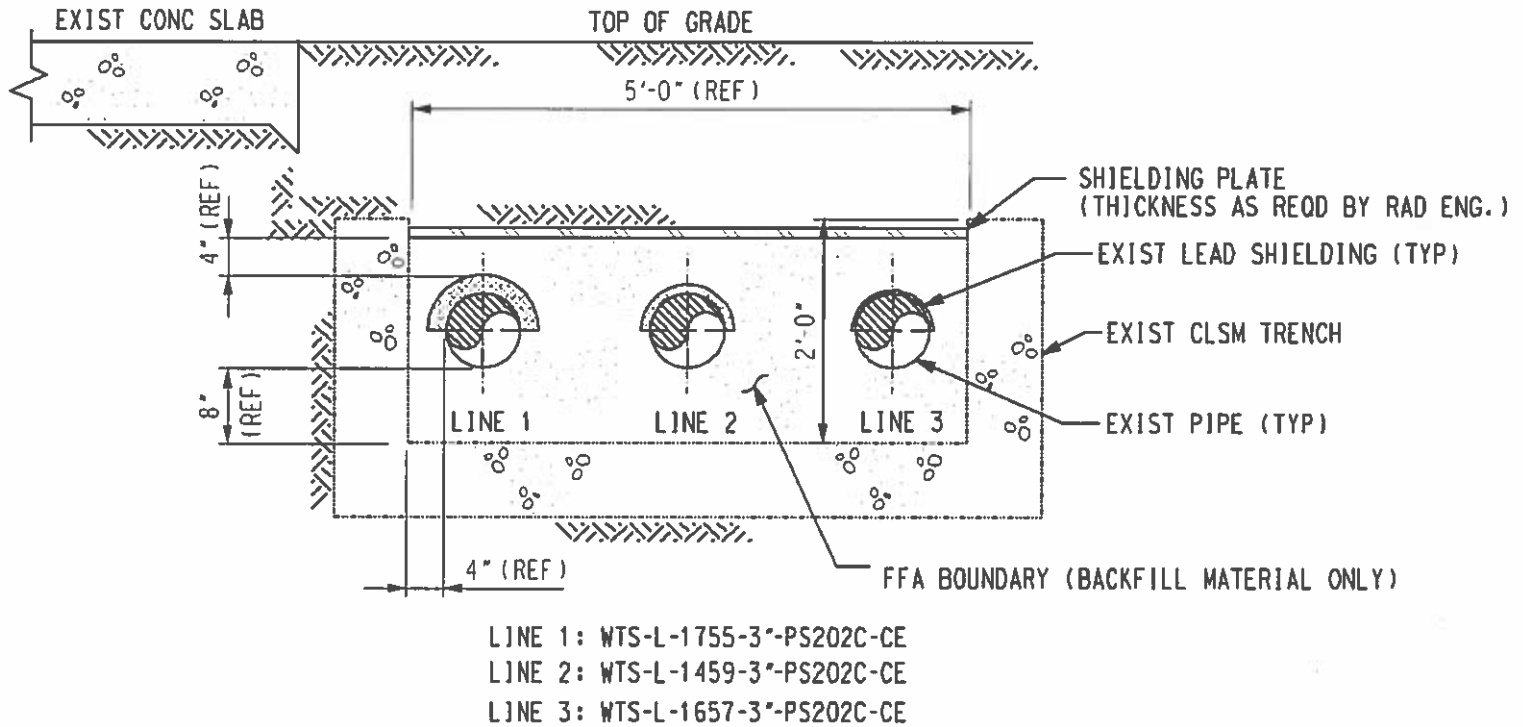
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Revision 0

Page 9 of 9

9.0 ATTACHMENT

9.1 Waste Tank 49H Waste Transfer Line backfill



Savannah River Site

FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT

FOR

242-25H EVAPORATOR VESSEL MODIFICATION CONICAL CAP INSTALLATION

**M-ESR-H-00519
REVISION 0**

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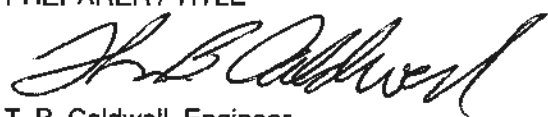
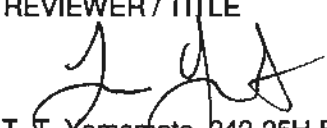
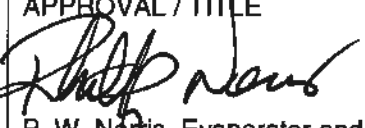

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FEDERAL FACILITY AGREEMENT ASSESSMENT REPORT
242-25H Evaporator Modification Conical Cap Installation

M-ESR-H-00519
Revision 0
Page 3 of 16

APPROVAL SIGNATURES / SUMMARY OF CHANGES

APPROVALS

PREPARER / TITLE  T. B. Caldwell, Engineer SRR Engineering	DATE 10/19/2017
REVIEWER / TITLE  T. T. Yamamoto, 242-25H Engineer SRR Engineering	10/19/17
APPROVAL / TITLE  P. W. Norris, Evaporator and ETP Engineering Manager SRR Engineering	10/19/17
APPROVAL / TITLE  J. P. Schwenker, Jr., Tank Farm Facility Engineering Manager SRR Engineering	10/19/17

This document has been verified, including evaluation against questions A through M of SRS Manual E7, Procedure 2.60, Section 5.3.1 (Revision 17)

SUMMARY OF CHANGES

Rev. No.	Reason for Change	Pages Affected	Issue Date
0	Initial issue	All	10/19/2017

TABLE OF CONTENTS

1.0	Executive Summary	5
2.0	Design Information	6
2.1	Overview	6
2.2	Activities Include (Scope)	7
2.3	Applicable SRS Engineering Standards and Engineering Guides	8
2.4	SRS Supporting Calculations	8
2.5	Applicable National Codes & Standards.....	9
2.6	Reference Documents.....	9
2.7	Vendor Documents.....	10
3.0	Waste Compatibility	10
4.0	Foundation Support.....	11
5.0	Leak Detection and Past leaks.....	12
6.0	Inspections	12
7.0	Determination of Secondary Containment	13
8.0	Professional Engineer Certifications (Design and Construction)	14
8.1	Design	14
8.2	Construction and Installation	14
9.0	Attachments	15
9.1	Sketch of 242-25H Evaporator and Conical Cap Repair	16

1.0 Executive Summary

This Assessment Report satisfies the requirements of Section IX and Appendix B of the Savannah River Site (SRS) Federal Facility Agreement (FFA, Reference 2.6.11).

SRS Tank Farm evaporators help manage available storage space by evaporating excess water from the waste forms. One of the two operating evaporators (the 242-25H Evaporator, also known colloquially as the “3H Evaporator”) developed a through-wall penetration in the vessel body (at the bottom of the vessel cone) caused by abrasive erosion caused by flow from the steam lance (an apparatus inserted in the bottom cone to promote mixing thereby improving evaporator efficiency). The evaporator operated leak free for 16 years; the desired design life is 30 years. As designed, the secondary containment captured any leakage. Savannah River Remediation LLC (SRR) initiated patching the vessel body with a conical cap using remote welding techniques (high radiation fields prevent hands-on installation and inspection). The conical cap, when installed, will serve as a barrier between the waste forms and secondary containment.

Patching the 25H Evaporator vessel includes laser-powder injection welding a Hastelloy® G-30¹ alloy conical cap to the bottom of the vessel, thereby encompassing the through-wall penetration. The conical cap is comprised of two (2) welded pieces: a hemispherical head and a weld ring. The conical cap will be delivered to the Site already assembled. The conical cap will attach to the vessel by welding with Inconel and Hastelloy® powder. Welders and technicians (under the direction of SRR Engineering) will install the conical cap using remote robotic equipment.

This assessment demonstrates that after installing the conical cap, the 242-25H Evaporator will meet the following criteria:

- The vessel with the conical cap has the structural integrity, seams, connections, and pressure controls necessary to ensure the vessel has sufficient structural strength
- The vessel with the conical cap is compatible with the hazardous and radioactive substances to be processed
- The vessel with the conical cap has adequate corrosion protection

Therefore, the assessment ensures the conical cap restores the evaporator to a condition where it will not collapse, rupture, or fail as a direct or indirect result of the modification.

¹ Hastelloy® and Hastelloy® G-30® are registered trademarks of Haynes International, Kokomo, Indiana.

2.0 Design Information

2.1 Overview

Figure 1 depicts an isometric cross section of the 242-25H Evaporator vessel and the location of the through-wall penetration. The penetration is directly beneath the end of the steam lance.

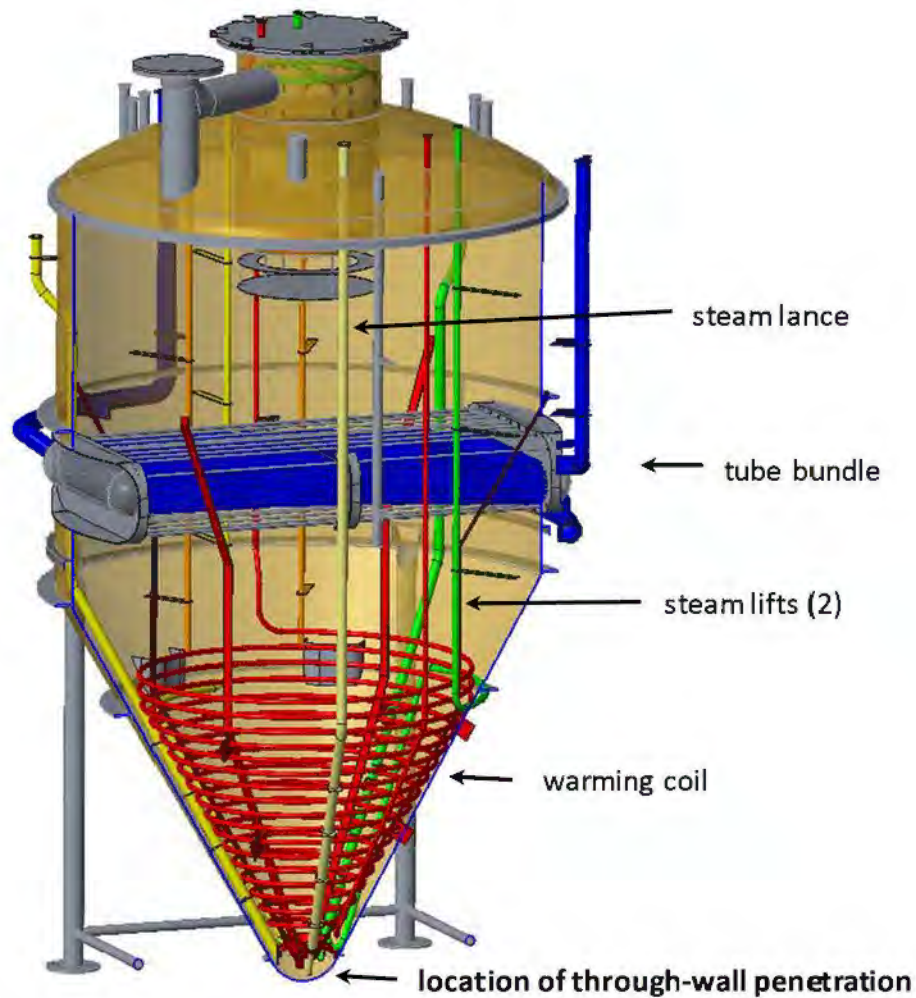


Figure 1 242-25H Evaporator vessel with location of through-wall penetration

Figures 2 and 3 represents the conical cap being positioned in place and the remote-welding configuration.

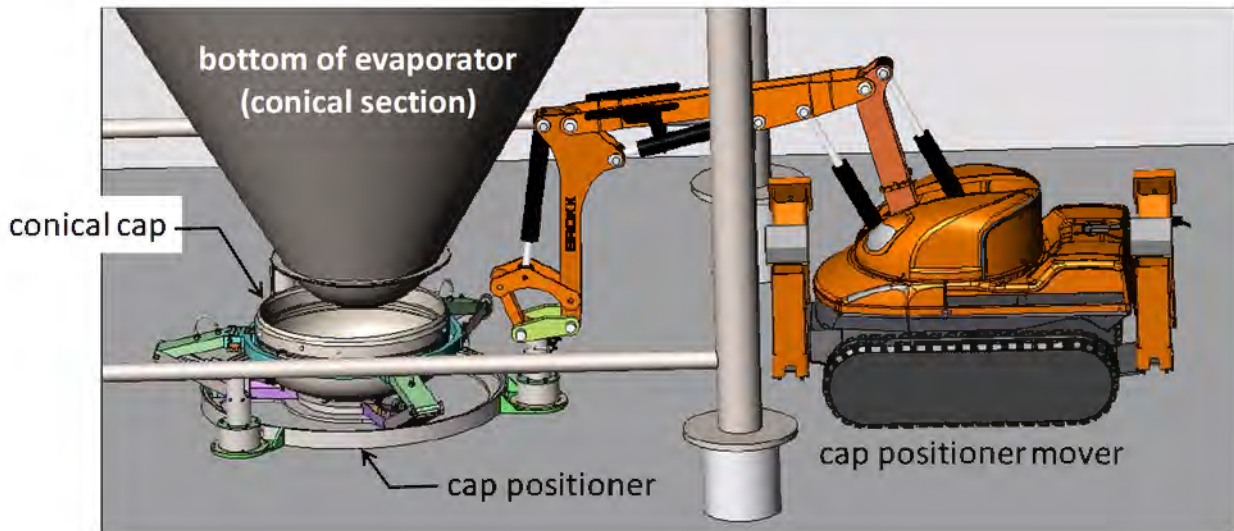


Figure 2 Conical cap being hoisted into position on the evaporator vessel

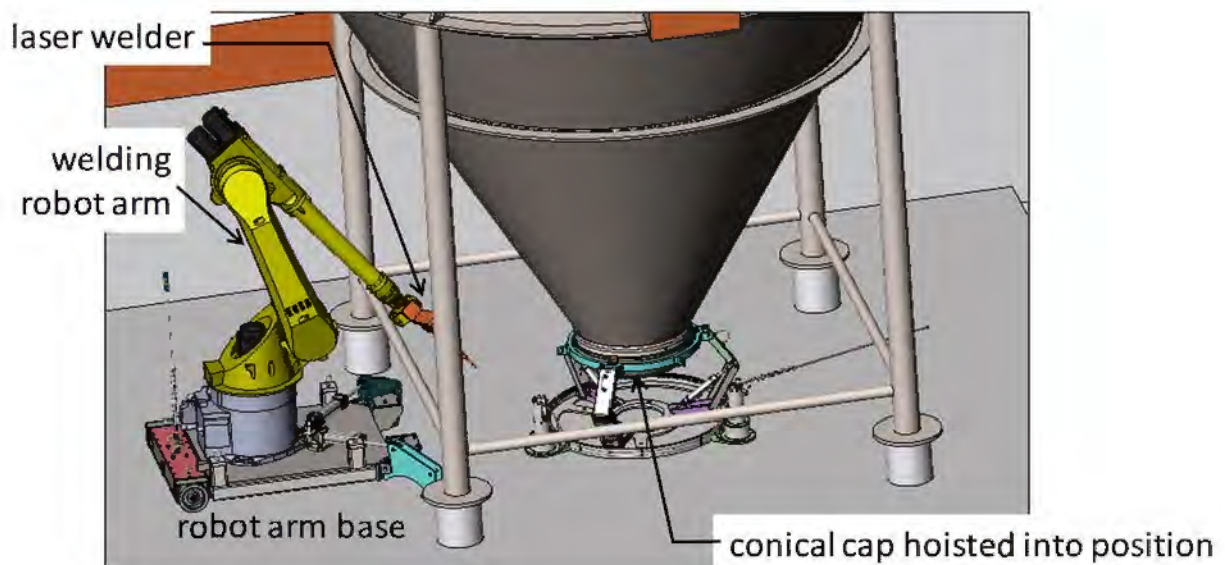


Figure 3 Conical cap being positioned and ready for laser welding

2.2 Activities Include (Scope)

- 2.2.1 Removing lagging from the evaporator vessel exposing the through-wall penetration at the bottom of the cone.
- 2.2.2 Inspecting the through-wall penetration and assessing the extent of damage.
- 2.2.3 Fabricating a conical cap from a hemispherical head and machined ring.
- 2.2.4 Deploying remote-operated machines (robots) into the evaporator vessel cell:

- 2.2.4.1 Cap positioner – hydraulic lift on casters.
- 2.2.4.2 Cap positioner mover.
- 2.2.4.3 Welding robot arm – KUKA KR 30 with a long reach arm.
- 2.2.4.4 Robot arm base – “Sumo Rocky” designed by Areva.
- 2.2.4.5 Remote powder injection laser welder using Inconel 625 powder as the root pass and base layer with Hastelloy® G30® powder for the buildup material.
- 2.2.5 Drilling two weep holes into the vessel (near the through-wall penetration) to permit and encourage pressure equalization between the vessel volume and the annular space created by the conical cap.
- 2.2.6 Installing (welding) the conical cap onto the vessel.
- 2.2.7 Performing post modification non-destructive examination (remote visual inspection only).
- 2.2.8 Performing standing water pressure test.
- 2.2.9 Performing leak check at operating pressure and temperature (in-service leak test).
- 2.2.10 Continue with routine surveillance and inspections.

2.3 Applicable SRS Engineering Standards and Engineering Guides

- 2.3.1 SRS Engineering Practices Manual, WSRC-IM-95-58, Rev. 78:
 - 2.3.1.1 01401-G, Revision 4, “Nondestructive Examination”
- 2.3.2 SRS Engineering Standards Manual, WSRC-TM-95-1, Revision 112:
 - 2.3.2.1 01060, Revision 12, “SRS Structural Design Criteria”
 - 2.3.2.2 15062, Revision 2, “Program Manual for American Society Mechanical Engineers ASME Section VIII Division 1”
 - 2.3.2.3 15063, Revision 3, “Program Manual for the National Board of Boiler and Pressure Vessel Inspectors National Board Inspection Code (NBIC) ‘R’ Code Symbol Stamp for the Repair/Alteration of Pressure Retaining Items at Field Sites Controlled by This Location”

2.4 SRS Supporting Calculations

- 2.4.1 Calculation Amendment T-ECA-H-00048, Revision 0, “3H Evaporator Evaluation for Effect of Thermal Load on Concrete Walls, Cell Cover, Floor and Base Mat,” Savannah River Remediation LLC, Aiken, South Carolina, March 29, 2017.
- 2.4.2 Calculation M-CLC-H-03451, Revision 0, “242-25H Evaporator – Concrete Temperatures Following Evaporator Repair,” Savannah River Remediation LLC, Aiken, South Carolina, March 1, 2017.

- 2.4.3 Calculation T-CLC-H-01230, Revision 0, "ASME Code Evaluation of Repair Modifications to 3H Evaporator," Savannah River Remediation LLC, Aiken, South Carolina, August 1, 2017.

2.5 Applicable National Codes & Standards

- 2.5.1 American Concrete Institute Report ACI 349.1R-07 "Reinforced Concrete Design for Thermal Effects on Nuclear Power Plant Structures," ACI Committee 349, Farmington Hills, Michigan, 2007.
- 2.5.2 American Concrete Institute Standard ACI 349-13 "Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary," ACI Committee 349, Farmington Hills, Michigan, 2013.
- 2.5.3 American Petroleum Institute Recommended Practice 14E "Recommended Practice for Design and Installation of Offshore Production Platform Piping Systems," Fifth Edition, American Petroleum Institute Production Department, Washington, DC, January 1991 (Reaffirmed January 2013).
- 2.5.4 American Society of Mechanical Engineers, *ASME Boiler and Pressure Vessel Code*, Section II, Part D "Properties (Customary)," ASME Boiler and Pressure Vessel Committee on Pressure Vessels, New York City, New York, 2015.
- 2.5.5 American Society of Mechanical Engineers, *ASME Boiler and Pressure Vessel Code*, Section VIII, Division 1 "Rules for Construction of Pressure Vessels," ASME Boiler and Pressure Vessel Committee on Pressure Vessels, New York City, New York, 2015.
- 2.5.6 American Society of Mechanical Engineers, *ASME Boiler and Pressure Vessel Code*, Section VIII, Division 2 "Rules for Construction of Pressure Vessels – Alternate Rules," ASME Boiler and Pressure Vessel Committee on Pressure Vessels, New York City, New York, 2015.

2.6 Reference Documents

- 2.6.1 G-PSQ-H-00003, Revision 0, "242-25H Evaporator Repair Quality Assurance Project Plan," Savannah River Remediation LLC, Aiken, South Carolina, February 2017.
- 2.6.2 M-DCF-H-13170, Revision 0, "25H Evaporator Pot Preliminary Holes for Repair," Savannah River Remediation LLC, Aiken, South Carolina, June 26, 2017.
- 2.6.3 M-DCF-H-13217, Revision 0, "25H Lance Steam Gang Valve Orifice Resize," Savannah River Remediation LLC, Aiken, South Carolina, August 24, 2017.
- 2.6.4 M-DCF-H-13221, Revision 0, "25H Evaporator Vessel Leak Repair," Savannah River Remediation LLC, Aiken, South Carolina, September 15, 2017.
- 2.6.5 SRNL-STI-2017-00562, Revision 0, "Corrosion Testing of Alternate Materials for the 242-25H Evaporator Replacement," J. I. Mickalonis, Savannah River National Laboratory, Aiken, South Carolina, August 2017.

- 2.6.6 SRR Manual SW11.6-SVP-45, "Structural Integrity Program Requirements," Section 4.5 "242-16H and 242-16F Evaporator Cell and Jumper Piping Inspections," Revision 2, Savannah River Remediation LLC, Aiken, South Carolina, June 20, 2009.
- 2.6.7 SRR Manual SW11.6-SVP-45, "Structural Integrity Program Requirements," Section 4.6 "242-25H Evaporator Cell, Cell Cover, Condenser Cell, GDL Cell and Cell Cover, and Jumper Piping Inspections," Revision 3, Savannah River Remediation LLC, Aiken, South Carolina, November 9, 2010.
- 2.6.8 SRR-LWE-2017-00010, "25H Evaporator Non-Coded Repair," Interoffice Memorandum T. T. Yamamoto to D. C. Bumgardner, Savannah River Remediation LLC, Aiken, South Carolina, March 20, 2017.
- 2.6.9 SRR-LWE-2017-00097, "High-Level Waste Evaporator 242-25H – Leak Evaluation and Repair," Presentation by C. H. Keilers (SRR), T. T. Yamamoto (SRR), and J. R. Gregory (Areva), Savannah River Remediation LLC, Aiken, South Carolina, September 27, 2017.
- 2.6.10 T-DS-G-00016, "Structural Integrity Data Sheet," Revision 4, Savannah River Remediation LLC, Aiken, South Carolina, August 4, 2016.
- 2.6.11 WSRC-OS-94-42, Administrative Document Number 89-05-FF, *Federal Facility Agreement for the Savannah River Site*, Westinghouse Savannah River Company, Aiken South Carolina, August 16, 1993 (including latest revision dated 31 July 2017, Savannah River Remediation LLC, Aiken, South Carolina).

2.7 Vendor Documents

- 2.7.1 SRRA106112-000001, Revision 35, "Areva Inc. ASME Section III, Division 1 & Section XI I NBIC Quality Assurance Manual for Fabrication and Shop Assembly Of N, NA, NPT, and NS Items and as a Material Supply Organization and for Nuclear Repairs in Accordance with NBIC Document Number 56-1151178-35," Areva, Lynchburg, Virginia, July 28, 2017
- 2.7.2 SRRA106112-000003, Revision D, "Technical Requirements Document," Areva Federal Services LLC, Charlotte, North Carolina, September 14, 2017.
- 2.7.3 SRRA106112-000009 through SRRA106112-000015, Revision D, "Drawings," Areva Federal Services LLC, Charlotte, North Carolina, September 14, 2017.

3.0 Waste Compatibility

The through-wall failure was caused by erosion from abrasive impingement of steam and salt solids on the vessel wall (an operating condition), and not from material compatibility problems with the waste form [Reference 2.6.9]. The original evaporator systems were made from austenitic stainless steels, which is susceptible to intragranular attack of halides and nitrates (common constituents in high-level waste). Therefore, Hastelloy® G-3® (Alloy G3, UNS N06985) was chosen for the original 242-25H Evaporator vessel material. Hastelloy® G-3® was

shown to have superior resistance (to that of austenitic stainless-steel alloys) to halide and nitrite grain boundary attack, and shown to be resistant to highly oxidizing acids.

Hastelloy® G-3® is composed nominally of 44% nickel, 22% chromium, 20% iron, and 7% molybdenum. However, that alloy is no longer readily available. The original alloy manufacturer now provides Hastelloy® G-30® (Alloy G30, UNS N06030) as the replacement, which is composed nominally of 43% nickel, 30% chromium, 15% iron, 5.5% molybdenum, 5% cobalt, and 2.5% tungsten. With higher concentrations of chromium, cobalt and tungsten, the nickel-based Hastelloy® G-30® shows slightly superior corrosion resistance over its predecessor, and over most of the other nickel and iron based alloys in complex oxidizing, halide-rich, and nitrate-rich environments. Hastelloy® G-30® has been used successfully as the tube-bundle material for a similar unit (242-16H Evaporator) without failure for the past twenty-one (21) years.

Furthermore, Hastelloy® G-30® is basically the same as other high-nickel alloys regarding formability. The alloy is generally stiffer than austenitic stainless-steel alloys, thereby providing added structural rigidity. The G-30® alloy is less prone to thermal expansion than the G-3® alloy. The G-30® alloy is easily weldable using Gas-Tungsten Arc, Gas Metal Arc and shielded Metal Arc, methods being used for the conical cap installation. The welding characteristics are like those of Hastelloy® G-3®.

The other alloy considered was Inconel Alloy 625, which has a higher yield strength and lower thermal expansion coefficients than the Hastelloy® alloys (with equal corrosion resistance) [Reference 2.6.5]. However, the Inconel alloy does not have relevant evaporator usage, although Inconel 625 is used as the weld filler material because of its strength and formability.

Because the materials used for the modification is equal to or better than the original alloy, the modification will not introduce any materials that will invalidate the existing waste characterization, materials compatibility evaluations, or increase the possibility of vessel failure from incompatibility with the waste forms.

4.0 Foundation Support

The modification removes existing thermal insulation from the evaporator vessel so that the remote installation can be made. Reinstallation of the insulation is not planned. This configuration will expose the surrounding concrete foundation to higher ambient cell temperatures. An analysis shows that the surrounding concrete foundation and structure will not be degraded by the increased thermal effects caused by evaporation operation [Reference 2.4.1]. The analysis concludes the following for operating the evaporator with the modified configuration:

- Maximum temperatures within the evaporator cell concrete will not exceed the maximum allowable temperature of 150°F as restricted by ACI Standard 349 [Reference 2.5.2].
- Maximum uniform temperature change within the evaporator cell concrete will not exceed the maximum guideline of 50°F identified in ACI Report 349.1R [Reference 2.5.1].

- Maximum temperature gradient within the evaporator cell concrete will not exceed the maximum guideline of 100°F identified in ACI Report 349.1R [Reference 2.5.1].

Operating the structure within the standards and guidelines referenced herein ensures no undue degradation or detrimental effects caused by the higher exposure to heat. Other than increased thermal exposure, there are no other effects or changes being made to the foundation or surrounding structure.

5.0 Leak Detection and Past leaks

The through-wall penetration was caused by erosion from salt solids projected onto the vessel wall by steam flow from the steam lance. The steam lance is an apparatus (a steam pipe aimed directly towards the bottom cone) that is used to promote mixing of the waste slurry during operation. The lance helps keep solids from collecting and solidifying in the bottom cone.

The cause of the through-wall penetration was ascertained by studying the operating conditions and correlating those conditions with industry-accepted practice. Using the API Recommended Practice [Reference 2.5.3, Section 2] as a guideline, operating conditions indicate that it is unlikely that pure liquid or vapor impingement caused the through-wall failure. The 242-25H Evaporator flow regimes are below the API erosion curve for pure steam or liquid, and therefore not likely the cause of the through-wall penetration. However, solid salt particles projected by steam flow from the steam lance exacerbates the condition and is likely the cause of the accelerated erosion [Reference 2.6.9]. Therefore, to prevent recurrence, the steam lance will be modified to drastically reduce the steam flow (and in turn, lower the velocity), which will either eliminate or significantly reduce the likelihood of erosion [Reference 2.6.3]. Therefore, the possibility of a future leak to occur from this mechanism is unlikely.

No modifications are being made to existing leak detection systems. Moreover, removing the insulation from the evaporator vessel (thereby exposing the vessel wall) provides a means for early leak detection (and location identification) using remote visual techniques.

6.0 Inspections

The 242-25H Evaporator vessel was originally fabricated to ASME Boiler and Pressure Vessel Code (BPVC) Section VIII, Division 1. However, extremely high radiation levels prevent using hands-on nondestructive examination techniques of the repair as required by the ASME BPVC (i.e., radiographic, ultrasonic, and liquid penetrant). Therefore, the installation of the conical cap cannot be credited as a repair or modification per the ASME BPVC. Providentially, the service does not require a vessel that meets the ASME BPVC. According to the current ASME BPVC Code, the Code does not apply for vessels where the design pressure at the top of the vessel does not exceed 15 psig [Reference 2.5.5, Paragraph U-1(c)(2)(-h)]. The open-top design of the SRS waste evaporators essentially prevents pressurization, and the vessel operates at atmospheric pressure (or slightly above). Therefore, the repair will not require an "NR" stamp according to the ASME BPVC.

For diligence in assuring a leak-tight repair, the modification will meet the intent of the ASME BPVC. The non-code repair will follow the Areva "NR" Quality Manual [Reference 2.7.1], which provides equivalent protection and ensures a level of safety greater than or equal to the level of protection afforded by the ASME BPVC. Full-scale welding mockups will simulate field conditions, and hands on inspections of the mockup welds (including cross-sectional examination of the welds) will help ensure the quality of the field welds. Once the conical cap is installed and the field welds are in place, high-definition remote camera inspections will verify duplication of the mockup results. Figure 4 shows the mock up welds (in progress) at the vendor test and fabrication facility.



Figure 4 Several weld passes are needed to complete the installation (the remote welder removed to show the weld passes in progress)

The vessel will then be filled with water for a standing water pressure test, and then followed by an in-service leak test. The insulation will remain off for future periodic remote inspections conducted according to the tank farm facility data sheet [Reference 2.6.10] using approved surveillance procedures [References 2.6.6 and 2.6.7].

7.0 Determination of Secondary Containment

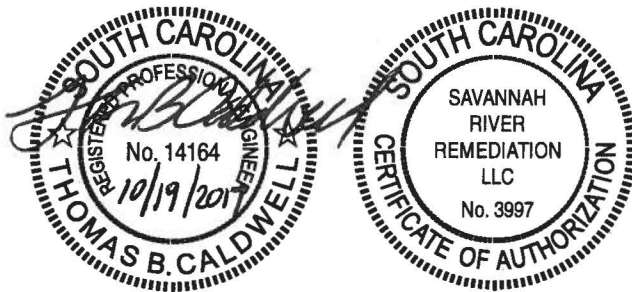
This modification will not breach or affect the secondary containment (the evaporator cell wall and lining). The conical cap installation restores the integrity of the primary containment. Therefore, no further assessment of the primary and secondary containment of this modification is required.

8.0 Professional Engineer Certifications (Design and Construction)

8.1 Design

This assessment report was prepared under my supervision and direction. I certify that the design for the modifications detailed in M-DCF-H-13221 complies with the applicable engineering standards and meets the requirements of Appendix B of the Federal Facility Agreement for leak tightness of primary containment.

Stamp



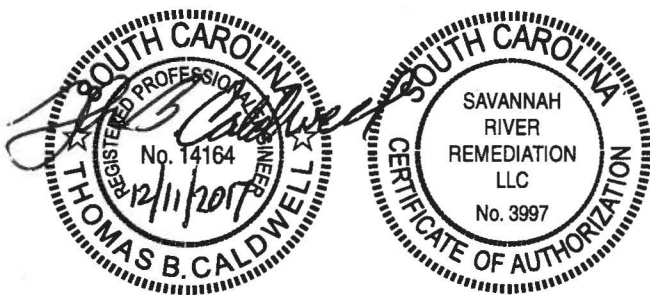
Name: Thomas B. Caldwell

License No.: 14164

8.2 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 conical cap on the 242-25H Evaporator vessel was in accordance with the approved design detailed in M-DCF-H-13221.

Stamp



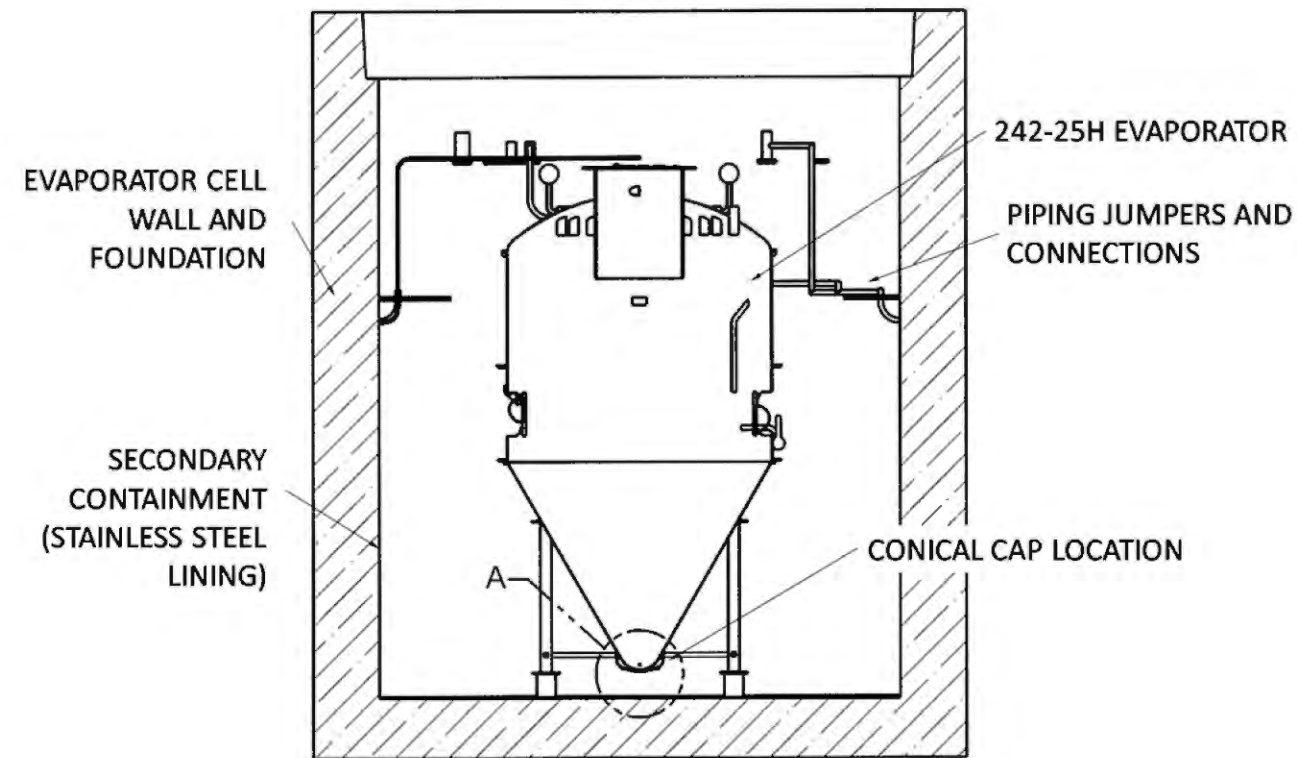
Name: Thomas B. Caldwell

License No.: 14164

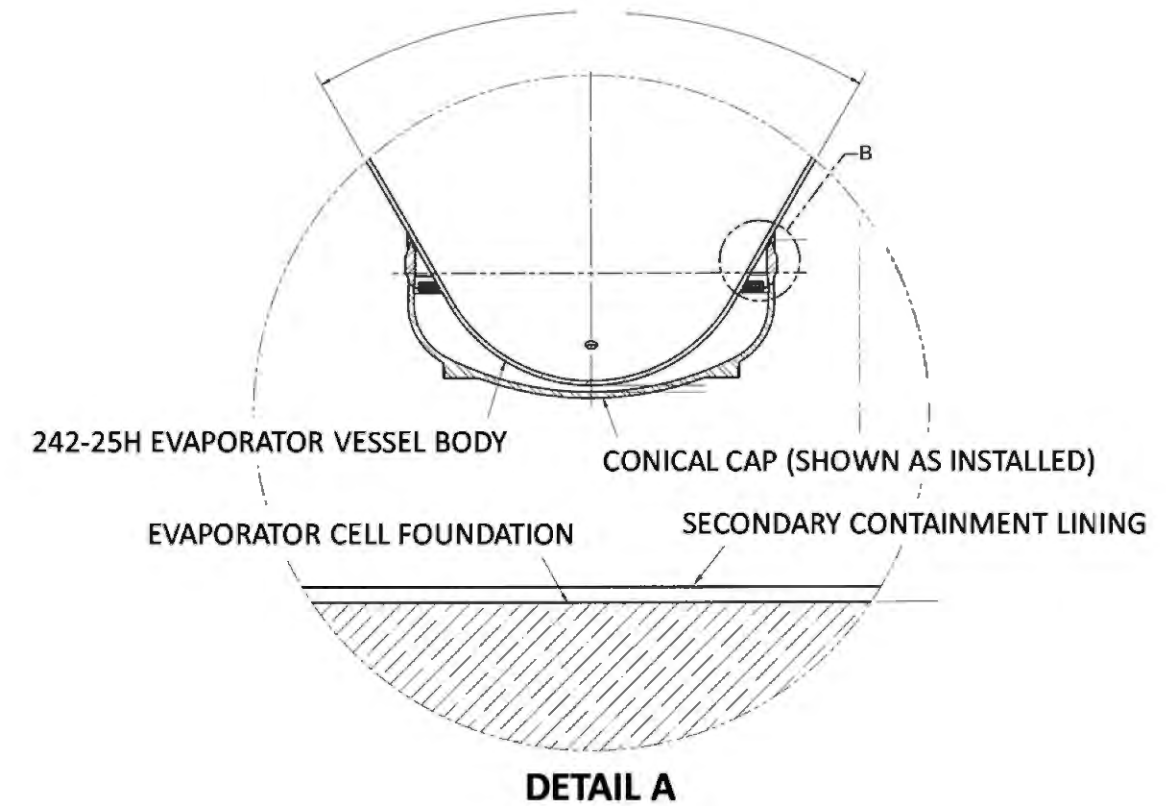
9.0 Attachments

9.1 Sketch of 242-25H Evaporator and Conical Cap Repair

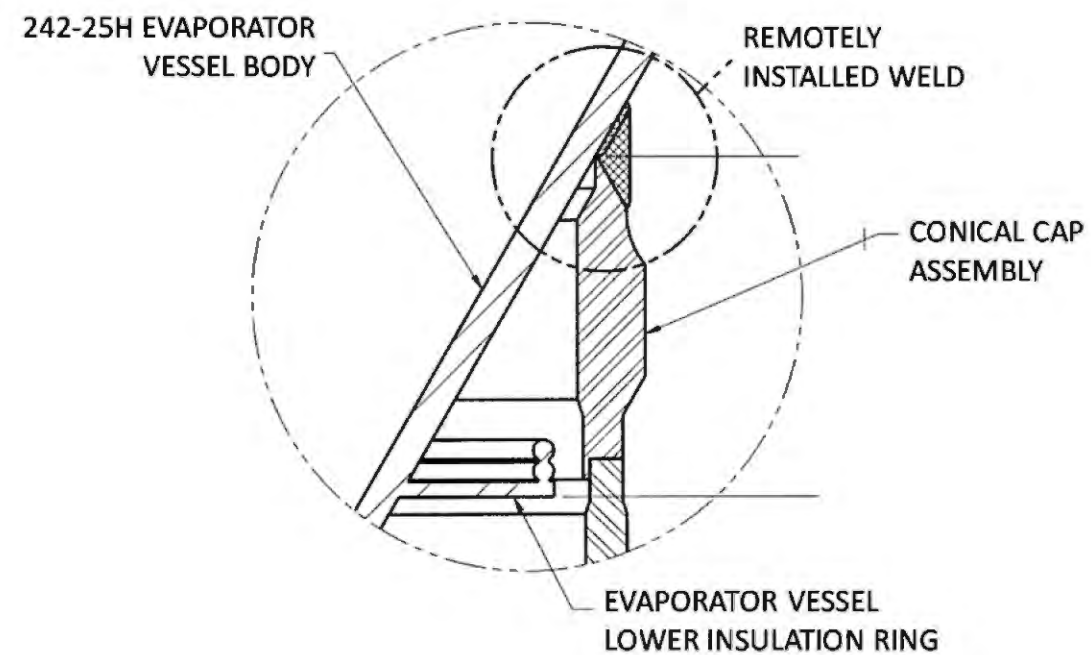
9.1 Sketch of 242-25H Evaporator and Conical Cap Repair



242-25H EVAPORATOR AND JUMPERS
 (PLAN VIEW)



DETAIL A



DETAIL B