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Revision 1

Savannah River Site F-Area Tank Farm Deactivation Plan and Closure Strategy

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Prepared by: Savannah River Remediation LLC
Waste Disposal Authority
Aiken, SC 29808

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APPROVALS

Author:

Ben Dean Digitally signed by Ben Dean
Date: 2020.05.26 07:08:06 -04'00'

W. B. Dean — Date
Waste Disposal Authority
Savannah River Remediation LLC

Reviewer:

LARRY ROMANOWSKI (Affiliate) Digitally signed by LARRY ROMANOWSKI (Affiliate)
Date: 2020.05.26 09:30:05 -04'00'

L. B. Romanowski — Date
Waste Disposal Authority
Savannah River Remediation LLC

Management Approval:

STEVEN THOMAS (Affiliate) Digitally signed by STEVEN THOMAS (Affiliate)
Date: 2020.05.26 10:39:52 -04'00'

S. A. Thomas — Date
Manager, Waste Disposal Authority
Savannah River Remediation LLC

EXECUTIVE SUMMARY

Under the Atomic Energy Act of 1954, as amended, the U.S. Department of Energy (DOE) regulates and manages its radioactive wastes and associated facilities, subject to certain additional federal, state, and local requirements. DOE Order 435.1 and its associated manual, guide and technical standard (DOE O 435.1, DOE M 435.1-1, DOE G 435.1-1, DOE-STD-5002-2017) requires the DOE to manage such waste in a manner that protects the public, workers and the environment, and that complies with applicable federal, state and local laws. The Savannah River Site (SRS) F-Area Tank Farm (FTF) underground radioactive waste tanks and ancillary structures are regulated under a South Carolina Department of Health and Environmental Control (SCDHEC) issued wastewater treatment facility construction permit, Construction Permit #17,424-IW, and the SRS Federal Facility Agreement (FFA) which will control the subsequent remediation of FTF. [DHEC_01-25-1993, WSRC-OS-94-42]

Operational closure of FTF waste tanks and ancillary structures (e.g., evaporators, diversion boxes, pump pits) will be performed in phases, with waste tanks and ancillary structures being operationally closed individually or in groups. As waste tanks and ancillary structures are operationally closed, they will be isolated from the rest of FTF and rendered inoperable. In addition to operational closure of the waste tanks and ancillary structures, final closure of FTF will also require the final disposition of other processing equipment/structures located within FTF and final decisions regarding the extent of remediation of FTF soil and groundwater. Final closure may include installation of an engineered closure cap as illustrated in Figure ES-1.

Figure ES-1: FTF Final Closure Cap Conceptual Design

For the purposes of this document the term "operational closure" is being utilized to represent the isolation and stabilization of individual ancillary structures and waste tanks from the remainder of

FTF and is considered synonymous with the term "removal from service." Operational closure of the waste tanks and ancillary structures does not represent final Resource Conservation and Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) closure of the FTF as discussed in the SRS FFA. For the purposes of this document, the term "final closure" will be used to represent final RCRA/CERCLA closure of FTF as described in the FFA.

In support of environmental restoration activities at SRS, DOE, the U.S. Environmental Protection Agency (EPA), and SCDHEC signed the SRS FFA pursuant to Section 120 of the CERCLA and Sections 3008(h) and 6001 of the RCRA. The agreement became effective in August 1993. As part of this comprehensive agreement, DOE committed to remove from service those liquid radioactive waste tank systems that do not meet the standards set forth in Appendix B of the FFA. Appendix B of the FFA also defines the specific waste tank systems that are subject to the agreement. The plan and schedule for this work is shown in FFA Appendix L. [WSRC-OS-94-42]

The FFA is currently based on a strategy that relies on an area-by-area clean-up to fulfill its requirements. The FTF Area Operable Unit (FTF OU), described in FFA Appendix C, was created to address historical spill sites in FTF not covered by Construction Permit #17,424-IW that may require response actions under the FFA. The FTF OU also includes the F-Area Retention Basin, 281-8F. Once the waste tanks and ancillary structures have been operationally closed and/or decommissioned, a decision for the final area remediation and final closure of the FTF OU under the FFA can be established through a proposed plan and Record of Decision (ROD). Appendix E of the FFA provides the current agreed to date for issuance of the FTF OU ROD.

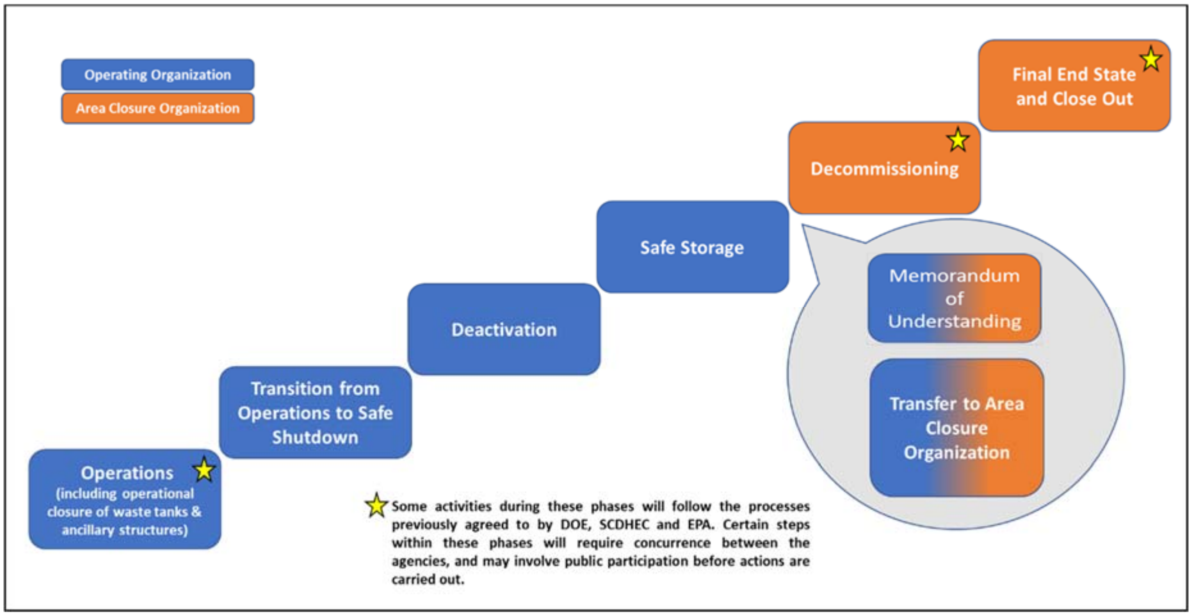
In April 2019, DOE, SCDHEC, and EPA entered into an agreement that suspended the remaining Appendix L waste tank Bulk Waste Removal Efforts and Operational Closure milestones. The agreement added several new milestones including, among others, development of an "F-Tank Farm (FTF) Deactivation Plan." The 2019 Suspension Agreement was incorporated into Appendix L through a minor modification to the FFA. The agreement also modified the FFA Appendix E milestone date for issuance of the FTF OU ROD to the current date of January 2040. [SRNS-OS-2019-00117]

This document has been developed to fulfill DOE's FFA commitment to provide the FTF Deactivation Plan by June 30, 2020. A "Deactivation Plan" is not a prescribed regulatory document. This document has been developed to meet the intent of the plan as discussed between DOE, SCDHEC and EPA during development of the 2019 Suspension Agreement. In addition to discussing the steps necessary to complete deactivation of FTF, this document goes further and outlines the activities necessary to reach final closure of the FTF OU. This document provides background information on FTF including descriptions of the FTF waste tanks, ancillary structures, and other processing equipment/structures. The document also describes the steps that will be required to transition FTF from a currently operating facility to the end state of final closure of the FTF OU. Options for sequencing of the different FTF OU final closure steps and the potential impact on the relative timing of achieving FTF OU final closure are also discussed. The operational closure dates provided in this document represent the dates from the latest revision of the Liquid Waste System Plan, Revision 21, are subject to change, and are not provided as DOE commitments. [SRR-LWP-2009-00001] Waste tank operational closure schedule dates for the

FFA will be set per the 2019 Suspension Agreement. The FTF OU ROD date is set per FFA Section XIX, *Scoping Work Priorities*, and Section XX, *Timetables and Deadlines*.

The facility disposition phases leading to final closure of the FTF OU are shown in Figure ES-2.

Figure ES-2: Process for the Final Closure of the FTF OU



Operational closure of FTF waste tanks and ancillary structures will be performed in phases, with waste tanks and ancillary structures being cleaned, isolated and stabilized individually or in groups as they become available upon completion of their operational mission. Operational closure of the waste tanks and ancillary structures is just one of the steps that will be required to achieve final closure of the FTF OU as described in the FFA.

The closure process, at a high level, will include the following phases:

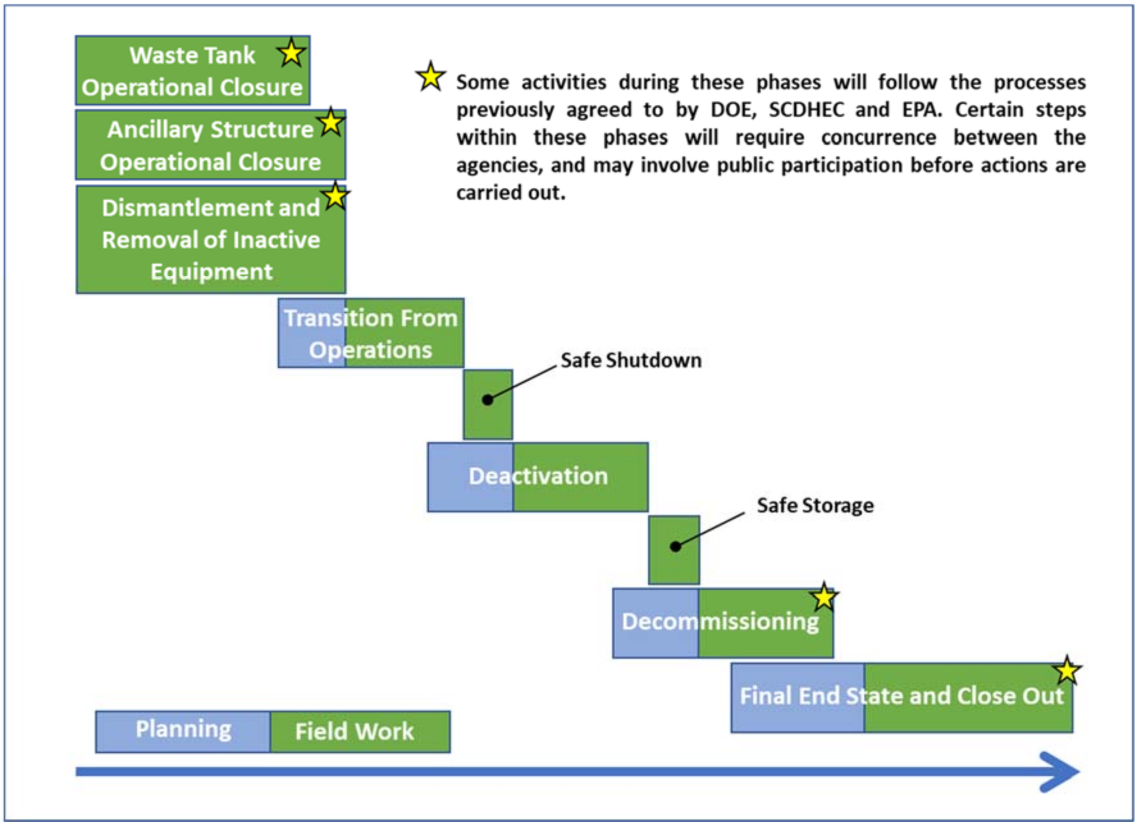
- Operations – operational closure of all FTF waste tanks and ancillary structures will be carried out as agreed upon between DOE, SCDHEC, and EPA in the *Consolidated General Closure Plan for F-Area and H-Area Waste Tank Systems*. [SRR-CWDA-2017-00015]
- FTF Transition from Operations – FTF will need to be formally acknowledged by DOE to be an excess facility and subsequently placed in a safe shutdown state awaiting Deactivation.
- FTF Deactivation – FTF will be placed in a safe and stable condition by the elimination or reduction of residual hazards. Deactivation protects the health of the workers, public and the environment and minimizes the long-term cost of surveillance and maintenance.
- Safe Storage Period – an interim period after Deactivation where FTF is in a passively safe and stable condition awaiting Decommissioning.
- FTF Decommissioning – during this phase residual hazards are eliminated permanently. A range of possible alternative end states for the various structures is evaluated, and the

preferred alternative is selected. The possible alternatives might include in situ disposal, demolition and removal, or possibly another alternative. Decommissioning will be conducted consistent with *Memorandum of Agreement for Achieving an Accelerated Cleanup Vision at the Savannah River Site* signed by DOE, SCDHEC, and EPA. [MOA_07-2003]

- Final End State and Close Out – Decommissioning will not always be the final action, as is anticipated to be the case with FTF. During this phase, the site is evaluated to determine if any remedial action for soil or groundwater is required to complete the cleanup. In addition, the final end state of FTF will be determined, the final FTF OU ROD will be issued and Corrective/Remedial Actions will be implemented. It is during this phase that a final closure cap, if selected as part of the final remedy for the FTF OU, would be placed over FTF.

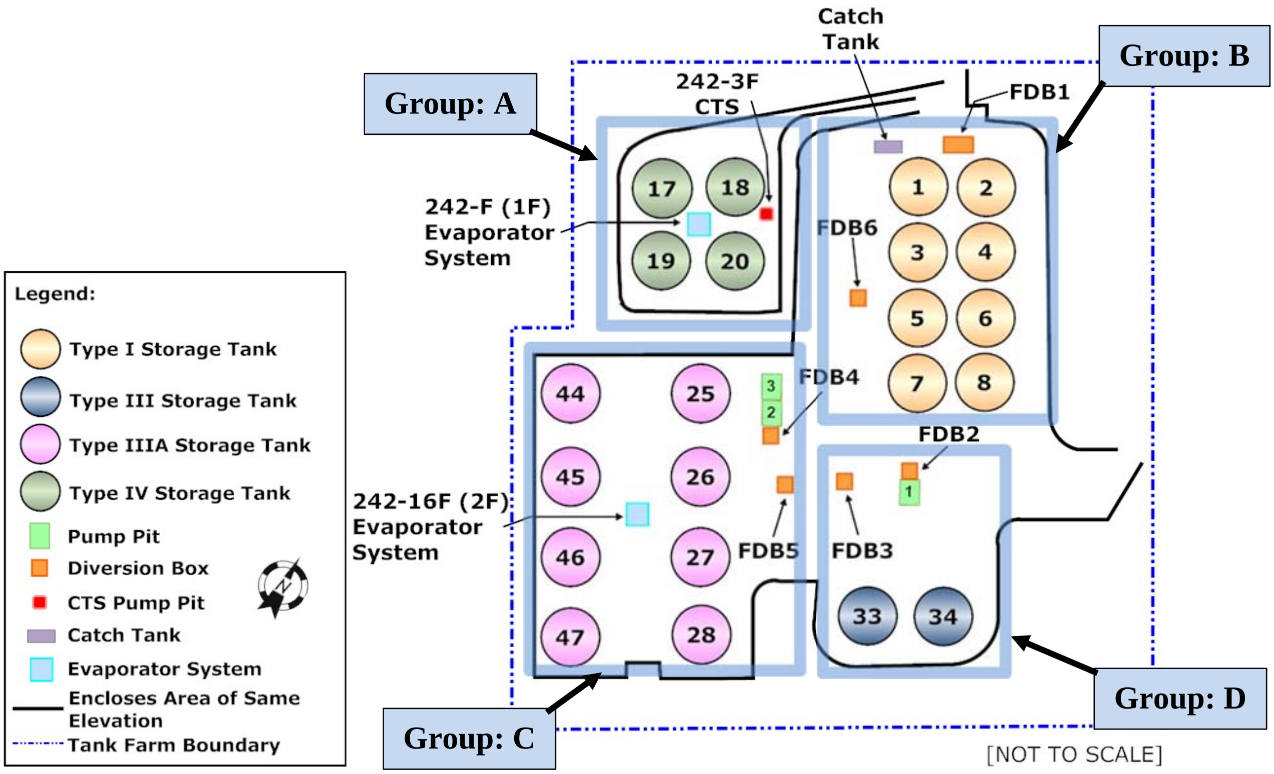
The sequencing of the phases and how they are applied to the various areas within FTF will impact the overall timing for the final closure of the FTF OU. Performing steps in parallel, to the extent possible, could accelerate the final FTF OU closure. The extent to which the activities can be performed in parallel will be dependent on many factors. The benefits gained by applying additional resources required to perform tasks in parallel will need to be evaluated against the potential impacts to other risk reduction activities such as on-going waste removal and salt/sludge batch preparation, infrastructure maintenance/upgrades and waste disposition activities. Figure ES-3 illustrates the opportunities that would be available for performing activities in parallel.

Figure ES-3: Process for the Final Closure of the FTF OU



Due to the manner in which the tanks were constructed, FTF is arranged such that it can be divided into tank groupings. The groups are based on the geographical locations which coincide with the waste tank types. FTF was expanded several times with each expansion naturally segregating the tanks into distinct groupings. The separate groupings within FTF are illustrated in Figure ES-4. For the purpose of discussions within this document, the groupings have been designated as Groups A-D.

Figure ES-4: FTF Tank Groupings



One option to achieve final closure of the FTF OU includes closing all of FTF at one time without performing any interim closure actions on individual sub-areas of FTF. Alternatively, as waste tanks and ancillary structures within a sub-area, such as the areas represented by Group A through Group D in Figure ES-4, are operationally closed, a second option is to proceed with interim closure of the sub-area, including potential installation of an interim closure cap over that sub-area. In the latter option, final closure of the FTF OU would then be initiated following the completion of operational closure for all remaining FTF waste tanks and ancillary structures which had not previously been part of an interim closure action. Performing interim closure of sub-areas of FTF could potentially further accelerate the final closure of FTF OU, but such activities could divert funding from other higher risk reduction activities within the Liquid Waste System such as legacy waste treatment to reduce volume, toxicity, and mobility. Based on the current anticipated waste tank closure sequencing/timing, a potential sequence would be interim closure of the Group A sub-area, interim closure of the Group B sub-area, followed by final closure of the FTF OU, including potential installation of a final closure cap, if determined to be part of the final remedy for the FTF OU, after all waste tanks and ancillary structures in Groups C and D are operationally closed. However, interim closure of sub-areas within FTF followed by final closure of FTF would increase the overall cost of FTF OU closure because it would require duplicate activities such as:

- Isolation of equipment/utilities/piping between individual sub-areas that would not be necessary if all FTF is closed at once as part of final closure of the FTF OU.
- Placement of an interim cap, if necessary, would require that final remediation decisions be made not just for structures but also for the remediation of soil or groundwater within that sub-area, each sub-area would need to proceed all the way through the Facility Disposition Process, including issuance of an Interim ROD (IROD) for each individual sub-area. The process would then be repeated for final closure of the FTF OU.

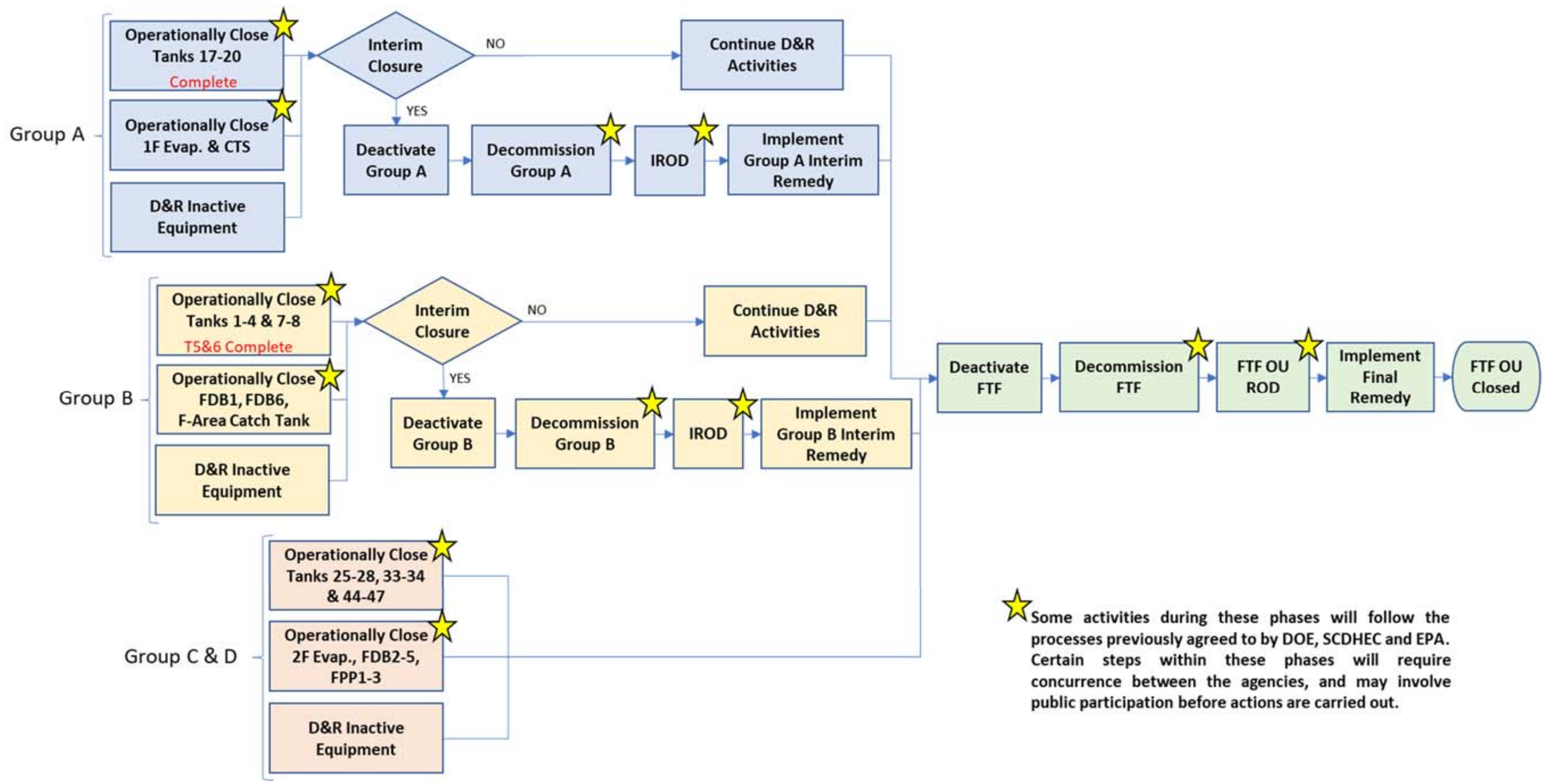
The decision to move forward with interim closure of a sub-area within FTF will be highly dependent on the timing for completion of operational closure of waste tanks and ancillary structures within the other sub-areas. The regulatory process required to get to the issuance of an IROD, leading to possible placement of an interim closure cap over a sub-area, is anticipated to be a multi-year process for each IROD. DOE will need to evaluate whether the additional costs of individual sub-area isolation and duplication of the regulatory process is worth the benefit of potentially accelerating the overall final FTF OU closure timeframe.

In order to accelerate the final closure of the FTF OU, DOE will employ the following strategy to the extent practical:

- As ancillary structures complete their operational mission, operational closure of the FTF ancillary structures will be performed in parallel with operational closure of the FTF waste tanks.
- As waste tanks and ancillary structures are operationally closed, dismantlement and removal (D&R) of process equipment/support structures which are no longer needed will be carried out as funding priorities allow.
- Planning for the Transfer From Operations, Deactivation, and Decommissioning phases will be carried out such that field implementation activities within those phases can be initiated as early as possible.
- As operational closure of the FTF waste tanks and ancillary structures is completed within sub-areas of FTF, DOE will evaluate the costs and benefits of moving forward with interim closure of those specific sub-areas with respect to impacts on other SRS Liquid Waste System risk reduction activities versus potential improvement to the final FTF OU closure date.

Figure ES-5 provides an overview of DOE’s closure strategy for the FTF OU.

Figure ES-5: FTF OU Closure Strategy



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AHA	Assisted Hazards Analysis
ALARA	As Low As Reasonably Achievable
ASA	Auditable Safety Analysis
BWRE	Bulk Waste Removal Efforts
CAB	Citizens Advisory Board
CDEP	Completion of Decommissioning End Points Document
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CGCP	Consolidated General Closure Plan
CMI	Corrective Measures Implementation Plan
CMIP	Configuration Management Implementation Plan
CMS	Corrective Measures Study
CTS	Concentrate Transfer System
D&R	Dismantlement and Removal
D&D	Deactivation and Decommissioning
DB	Diversion Box
DOE	U.S. Department of Energy
DOE-HQ	U.S. Department of Energy-Headquarters
DOE-SR	U.S. Department of Energy-Savannah River
DPFR	Decommissioning Project Final Report
DPP	Deactivation Project Plan
DSA	Documented Safety Analysis
DWPF	Defense Waste Processing Facility
EEC	Environmental Evaluation Checklist
EPA	U.S. Environmental Protection Agency
ERAP	Environmental Restoration/Area Projects
ESD	Explanation of Significant Difference
ETP	Effluent Treatment Project
FCDP	Facility Condition Documentation Package
FDB	F-Area Diversion Box
FCR	Final Configuration Report
FDE	Facility Decommissioning Evaluation
FFA	Federal Facility Agreement
FPP	F-Area Pump Pit
FPT	F-Area Pump Tank
FS	Feasibility Study
FTF	F-Area Tank Farm
FTF OU	F-Tank Farm Area Operable Unit
FY	Fiscal Year
GSA	General Separations Area
HASP	Health and Safety Plan
HLW	High-Level Waste
HTF	H-Area Tank Farm

ID	Identification
IROD	Interim Record of Decision
LDB	Leak Detection Box
LLW	Low-Level Waste
LTS	Long-term Surveillance
LW	Liquid Waste
LWTRSAPP	Liquid Waste Tank Residuals Sampling and Analysis Program Plan
LWTRS-QAPP	Liquid Waste Tank Residuals Sampling – Quality Assurance Program Plan
MCC	Motor Control Center
MCi	million curies
MLDB	Modified Leak Detection Box
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NBN	No Building Number
OU	Operable Unit
PA	Performance Assessment
PP	Pump Pit
RACR	Remedial Action Complete Report
RAIP	Remedial Action Implementation Plan
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
S&M	Surveillance and Maintenance
SB	Statement of Basis
SCDHEC	South Carolina Department of Health and Environmental Control
SDF	Saltstone Disposal Facility
SIRIM	Site Item Reportability and Issues Management
SOW	Statement of Work
SPF	Saltstone Production Facility
SRS	Savannah River Site
SWPF	Salt Waste Processing Facility
TCCR	Tank Closure Cesium Removal
VFD	Variable Frequency Drive
WOW	Waste-on-Wheels

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1.0 INTRODUCTION

Since the early 1950s, the primary mission of Savannah River Site (SRS) had been to produce nuclear materials for national defense and deep space missions. The processes used to recover these nuclear materials from production reactor fuel and target assemblies in the chemical separations areas at SRS generated significant volumes of liquid radioactive waste. This waste is currently stored in F and H Areas near the center of the site. Today, the primary focus at SRS is environmental restoration with the highest priority being removal, treatment, and disposal of the waste in the F-Area Tank Farm (FTF) and the H-Area Tank Farm (HTF).

Under the Atomic Energy Act of 1954, as amended, the U.S. Department of Energy (DOE) regulates and manages its radioactive wastes and associated facilities, subject to certain additional federal, state, and local requirements. DOE Order 435.1 and its associated manual, guide and technical standard (DOE O 435.1, DOE M 435.1-1, DOE G 435.1-1, DOE-STD-5002-2017) requires the DOE to manage such waste in a manner that protects the public, workers and the environment, and that complies with applicable federal, state and local laws. The SRS FTF underground radioactive waste tanks and ancillary structures are regulated under a South Carolina Department of Health and Environmental Control (SCDHEC) issued wastewater treatment facility construction permit, Construction Permit #17,424-IW, and the SRS Federal Facility Agreement (FFA) which will control the subsequent remediation of FTF. [DHEC_01-25-1993, WSRC-OS-94-42]

Operational closure of FTF waste tanks and ancillary structures will be performed in phases, with waste tanks and ancillary structures being operationally closed individually or in groups. As waste tanks and ancillary structures are operationally closed, they will be isolated from the rest of FTF and rendered inoperable. In addition to operational closure of the waste tanks and ancillary structures, final closure of FTF will also require the final disposition of other processing equipment/structures located within FTF and final decisions regarding the extent of remediation of FTF soil and groundwater.

For the purposes of this document the term “operational closure” is being utilized to represent the isolation and stabilization of individual ancillary structures and waste tanks from the remainder of FTF and is considered synonymous with the term “removal from service.” Operational closure of the waste tanks and ancillary structures does not represent final Resource Conservation and Recovery Act (RCRA)/Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) closure of the FTF as discussed in the SRS FFA. For the purposes of this document, the term “final closure” will be used to represent RCRA/CERCLA closure of FTF as described in the FFA.

In this document the term “ancillary structures” will refer to structures, systems, and equipment within the FTF, other than the underground waste storage tanks, that may contain a residual inventory and must be accounted for as part of the final closure of FTF. These ancillary structures include such things as buried transfer lines, pump tanks, and evaporators, all of which have been in contact with liquid waste during the operating life of the facilities. A list of the FTF ancillary structures is provided later in the document.

In support of environmental restoration activities at SRS, DOE, the U.S. Environmental Protection Agency (EPA), and SCDHEC signed the SRS FFA pursuant to Section 120 of the CERCLA and

Sections 3008(h) and 6001 of the RCRA. The agreement became effective in August 1993. As part of this comprehensive agreement, DOE committed to remove from service those liquid radioactive waste tank systems that do not meet the standards set forth in Appendix B of the FFA. Appendix B of the FFA also defines the specific waste tank systems that are subject to the agreement. The plan and schedule for this work is shown in FFA Appendix L. [WSRC-OS-94-42]

The FFA is currently based on a strategy that relies on an area-by-area clean-up to fulfill its requirements. The FTF Area Operable Unit (FTF OU), described in FFA Appendix C, was created to address historical spill sites in FTF not covered by Construction Permit #17,424-IW that may require response actions under the FFA. The FTF OU also includes the F-Area Retention Basin, 281-8F. Once the waste tanks and ancillary structures have been operationally closed, a decision for the final area remediation and final closure of the FTF OU under the FFA can be established through a proposed plan and Record of Decision (ROD). Appendix E of the FFA provides the current agreed to date for issuance of the FTF OU ROD.

In April 2019, DOE, SCDHEC, and EPA entered into an agreement that suspended the remaining Appendix L Bulk Waste Removal Efforts (BWRE) and operational closure milestones. The agreement added several new milestones including, among others, development of an "F-Tank Farm (FTF) Deactivation Plan", water addition to HTF Tank 9 to begin salt dissolution, and operational closure of F-Area Diversion Box (FDB)5 and FDB6. The 2019 Suspension Agreement was incorporated into Appendix L through a minor modification to the FFA. The agreement also modified the FFA Appendix E milestone date for issuance of the FTF OU ROD to the current date of January 2040. [SRNS-OS-2019-00117]

1.1 Purpose and Objectives

This document has been developed to fulfill DOE's FFA commitment to provide the FTF Deactivation Plan by June 30, 2020. A "Deactivation Plan" is not a prescribed regulatory document. This document has been developed to meet the intent of the plan as discussed between DOE, SCDHEC and EPA during development of the 2019 Suspension Agreement. In addition to discussing the steps necessary to complete deactivation of FTF, this document goes further and outlines the activities necessary to reach final closure of the FTF OU. This document provides background information on FTF including descriptions of the FTF waste tanks, ancillary structures, and other processing equipment/structures. The document also describes the steps that will be required to transition FTF from a currently operating facility to the end state of final closure of the FTF OU. Options for sequencing of the different FTF OU final closure steps and the potential impact on the relative timing of achieving FTF OU final closure are also discussed. The operational closure dates provided in this document represent the dates from the latest revision of the Liquid Waste System Plan, Revision 21, are subject to change, and are not provided as DOE commitments. [SRR-LWP-2009-00001] Waste tank operational closure schedule dates for the FFA will be set per the 2019 Suspension Agreement. The FTF OU ROD date is set per FFA Section XIX, *Scoping Work Priorities*, and Section XX, *Timetables and Deadlines*.

1.2 Document Outline

Section 1: Introduction – describes document purpose, objectives, and structure.

Section 2: Facility Descriptions – provides a description of the FTF, the FTF waste tanks, the FTF ancillary structures, and examples of other process equipment and structures located in FTF.

Section 3: F-Tank Farm Closure – provides an overview of the steps that will be required to transition the FTF from an operating facility to its final end state at closure.

Section 4: Tank Farm Division/Waste Tank Grouping – describes the different areas within FTF and provides an overview of the waste tank and potential ancillary structure operational closure sequencing based on current system planning assumptions.

Section 5: F-Tank Farm Closure Options – evaluates the different options for sequencing of the FTF closure steps and discusses the impacts on the acceleration of FTF OU closure.

Section 6: Closure Strategy – describes the strategy that DOE will utilize to achieve final closure of the FTF OU.

Section 7: Summary – summarizes the closure strategy for the FTF OU.

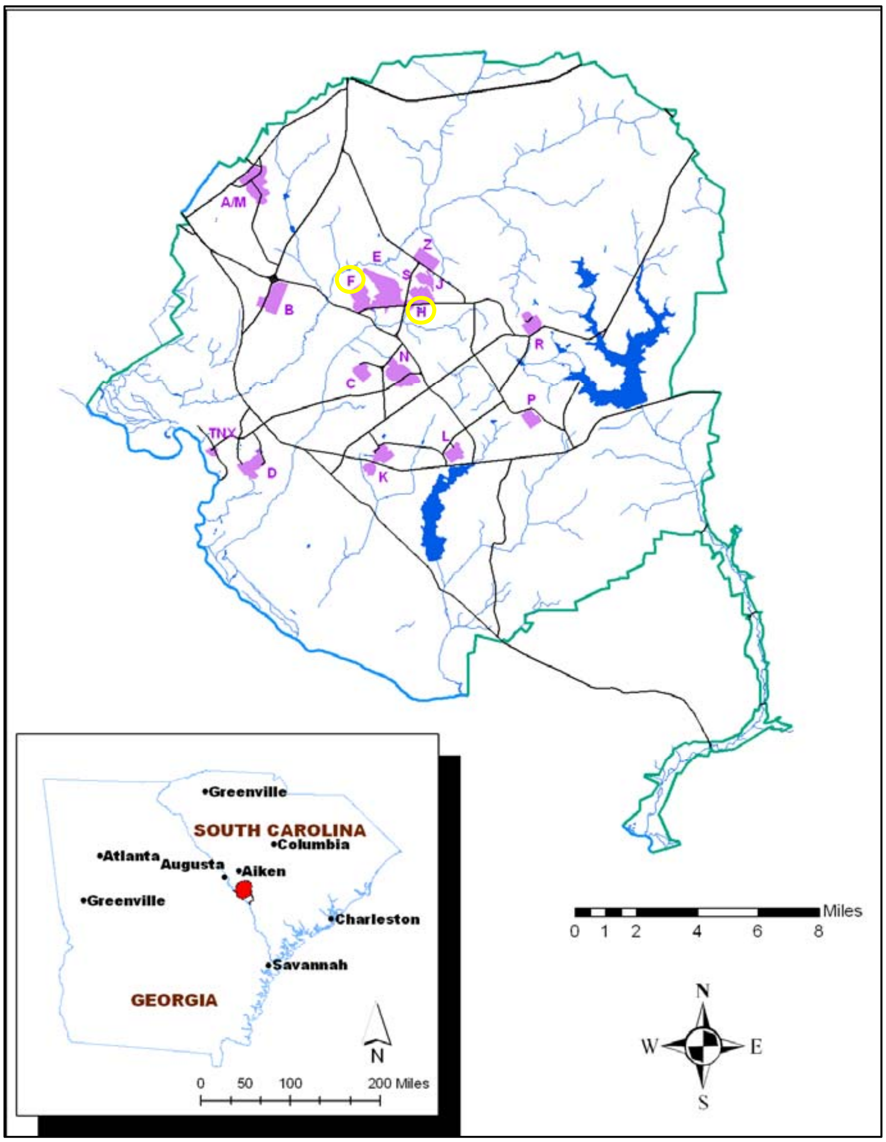
Attachments: References – provides references utilized in this document.

Attachment A – contains, by fiscal year, the current system planning sequencing for operational closure of the FTF waste tanks and the timing for when ancillary structures would be available to begin the operational closure process.

2.0 FACILITY DESCRIPTIONS

A legacy of the SRS mission was the generation of liquid waste from chemical separations processes in both F and H Areas. Since the beginning of SRS operations, an integrated waste management system consisting of several facilities designed for the overall processing of liquid waste has evolved. Two of the major components of this system are the FTF and HTF located in F and H Areas respectively, which are near the center of the site (Figure 2.0-1). The F- and H-Canyon facilities separated plutonium, neptunium, uranium, and other products from irradiated fuel and target assemblies using chemical separations processes. The tank farms, which store and process waste from the chemical separations processes, include waste tanks and associated ancillary structures that concentrate waste (i.e., Evaporator systems) and that permit the transferring of waste (i.e., the Waste Transfer Systems).

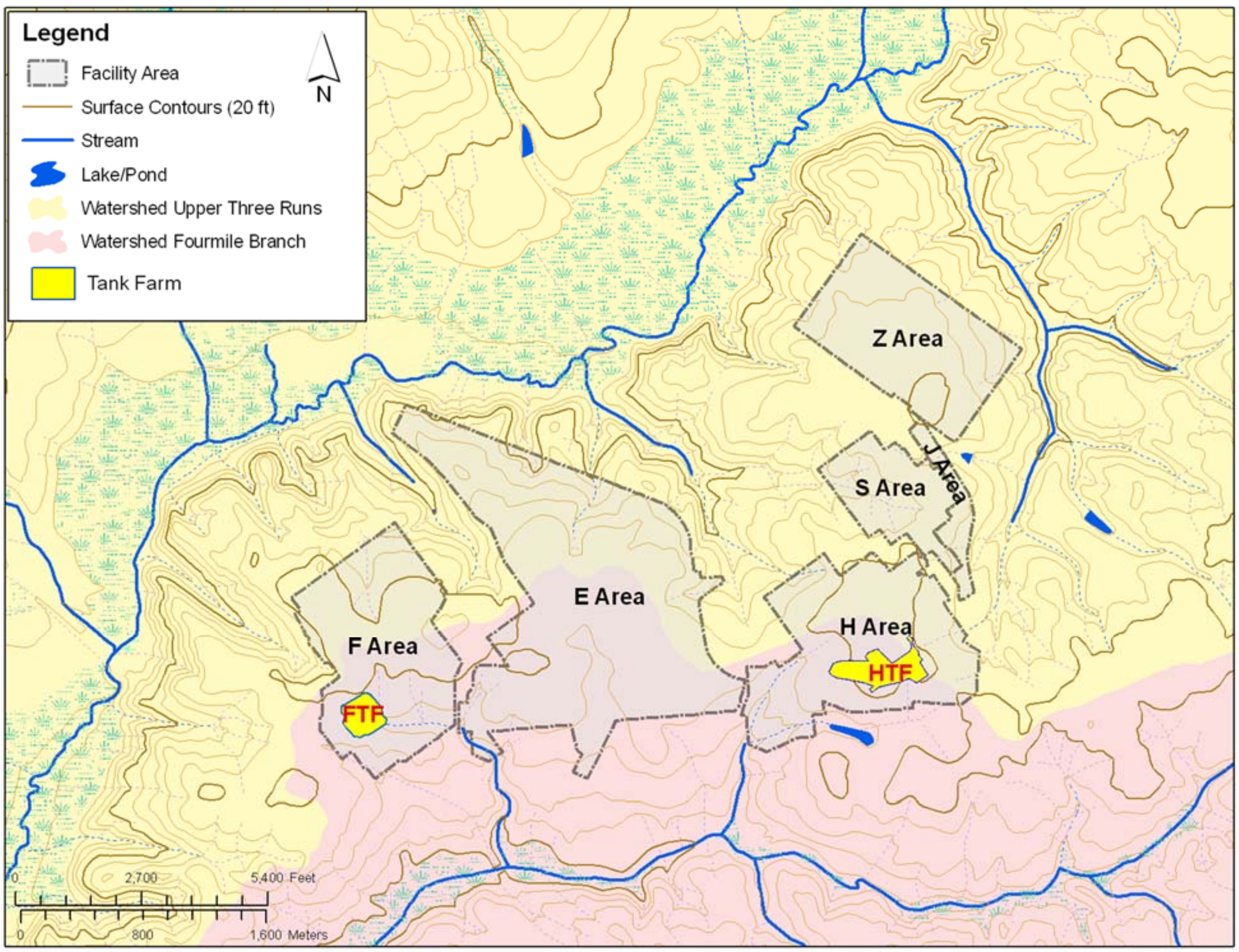
Figure 2.0-1: SRS Operational Area Location Map



2.1 FTF Description

The FTF site was chosen because of its favorable terrain and proximity to the F-Canyon Separations Facility (the major waste generation source for FTF), which is located near the center of the site, away from the SRS boundaries. The General Separations Area (GSA) is located atop a ridge running southwest to northeast that forms the drainage divide between two watersheds, the Upper Three Runs to the north and Fourmile Branch to the south. The GSA contains the F-Area Separation Facility, the S-Area Defense Waste Processing Facility (DWPF), the Z-Area Saltstone Facility, the E-Area Low-Level Waste Disposal Facilities, and the J-Area Salt Waste Processing Facility (SWPF). Figure 2.1-1 shows the location of F Area, FTF, H Area, and HTF within the GSA.

Figure 2.1-1: Layout of the General Separations Area

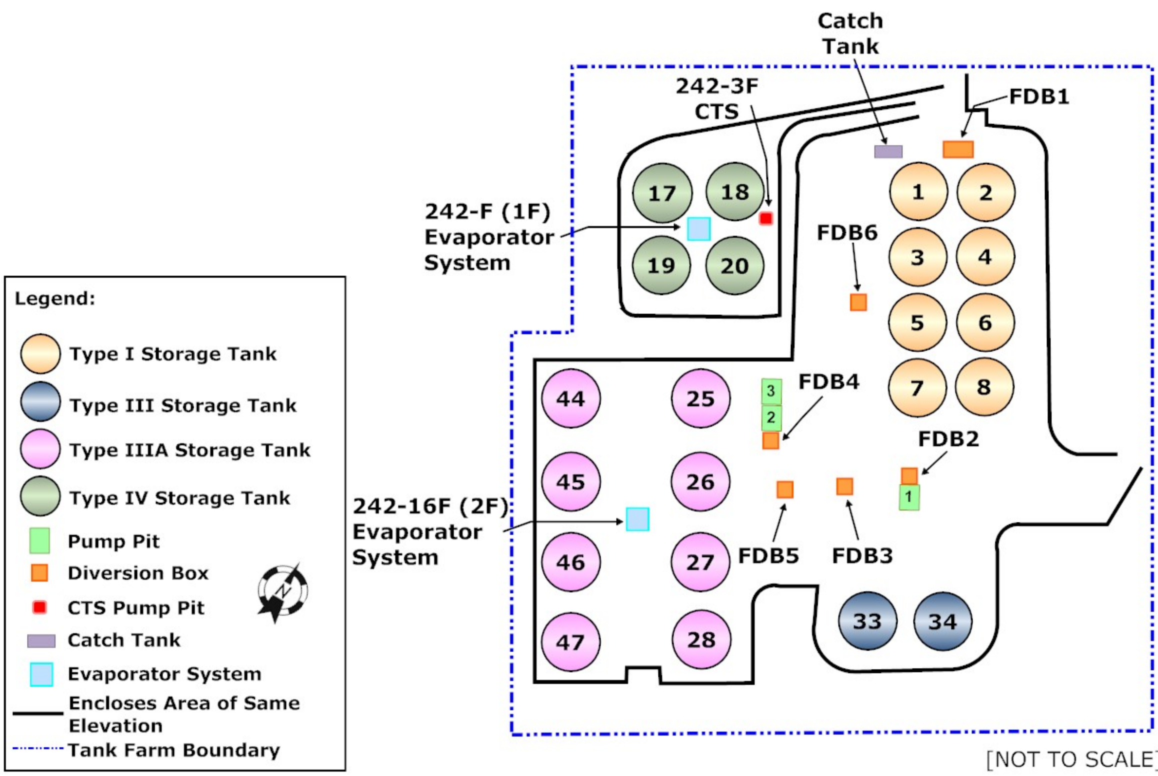


The FTF was constructed to receive waste generated by various SRS production, processing and laboratory facilities. The use of FTF isolated these wastes from the environment, SRS workers and the public. With FTF, facilities are in place to pretreat the accumulated sludge and salt solutions (supernate) to enable the management of these wastes within other SRS facilities such as the DWPF and Saltstone Production Facility (SPF). These treatment facilities convert the sludge and salt wastes to more stable forms suitable for permanent disposal in a federal repository or the Saltstone Disposal Facility (SDF), as appropriate. The Effluent Treatment Project (ETP), located southeast of the HTF, collects and treats wastewater and evaporator overheads from FTF and HTF operations.

The FTF is a 22-acre site consisting of 22 waste tanks, two evaporator systems, six diversion boxes (DBs), one catch tank, a concentrate transfer system (CTS) tank, three pump pits (PPs) including a pump tank, one CTS PP, and over 45,000 linear feet of transfer pipelines including valve boxes and associated leak detection systems (Figure 2.1-2).

There are three principal waste tank design types in FTF. The tanks range in size from 750,000 gallons to 1.3 million gallons and have varying degrees of secondary containment and intra-tank interferences, such as cooling coils and roof support columns.

Figure 2.1-2: Layout of the F-Area Tank Farm



2.2 Waste Tanks

There are 51 underground liquid radioactive waste storage tanks at SRS, of which twenty-two waste tanks are located in the FTF. The main component of a waste tank is the primary liner that contains the liquid waste. The primary liners are cylindrical and made of carbon steel. There are four principal waste tank designs designated as Type I, II, III/IIIA, and IV.

The Type I and II primary liners are partially enclosed by a larger diameter, secondary liner (annulus pan) also made of carbon steel. The difference in primary and secondary liner diameters creates an annulus, which varies in size and capacity for each waste tank type. The secondary liner serves as a collection point for any leakage from the primary liner. An annulus ventilation system makes additional cooling of the exterior primary liner wall and control of the annulus air humidity possible. Most Type I and II tanks have a positive pressure annulus ventilation system while Type III/IIIA tanks have a negative pressure annulus ventilation system. The Type IV tanks do not have a secondary liner.

A reinforced concrete vault surrounds the primary liner of Type IV tanks and the secondary liners of Type I, II, and III/IIIA tanks and provides structural support and radiation shielding. The lowest part of the concrete vault is called the basemat and beneath the basemat of the Type I, II, and III/IIIA tanks is a working slab that was used as a foundation for the initial waste tank site construction. No working slab was used for the Type IV tank constructions.

The primary cooling method for the stored liquid waste uses a system of cooling coils (pipes) inside the primary liner. The cooling coils use chromated water for corrosion control and heat transfer. Cooling coils are installed in Type I, II, and III/IIIA tanks and the designs vary by waste tank type. Type IV tanks do not have cooling coils.

Risers on the tank top provide access to the primary tank and annulus interiors and are typically used for inspection and equipment insertion. Lead or concrete plugs are inserted into riser openings if no equipment is installed. Riser layout is dependent on the specific waste tank design.

The waste tanks were constructed during different time periods and design features were changed to incorporate improvements. Table 2.2-1 summarizes the FTF waste tank design types.

Table 2.2-1: Summary of FTF Waste Tank Design Types

Tank Number	Design Type	Year Constructed	Volume (gallons)[a]
1 - 8	I	1952	750,000
17 - 20	IV	1958	1,300,000
25 - 28	IIIA	1978	1,300,000
33	III	1969	1,300,000
34	III	1972	1,300,000
44 - 47	IIIA	1980	1,300,000

[a] Nominal fill capacity

2.2.1 Type I Tanks

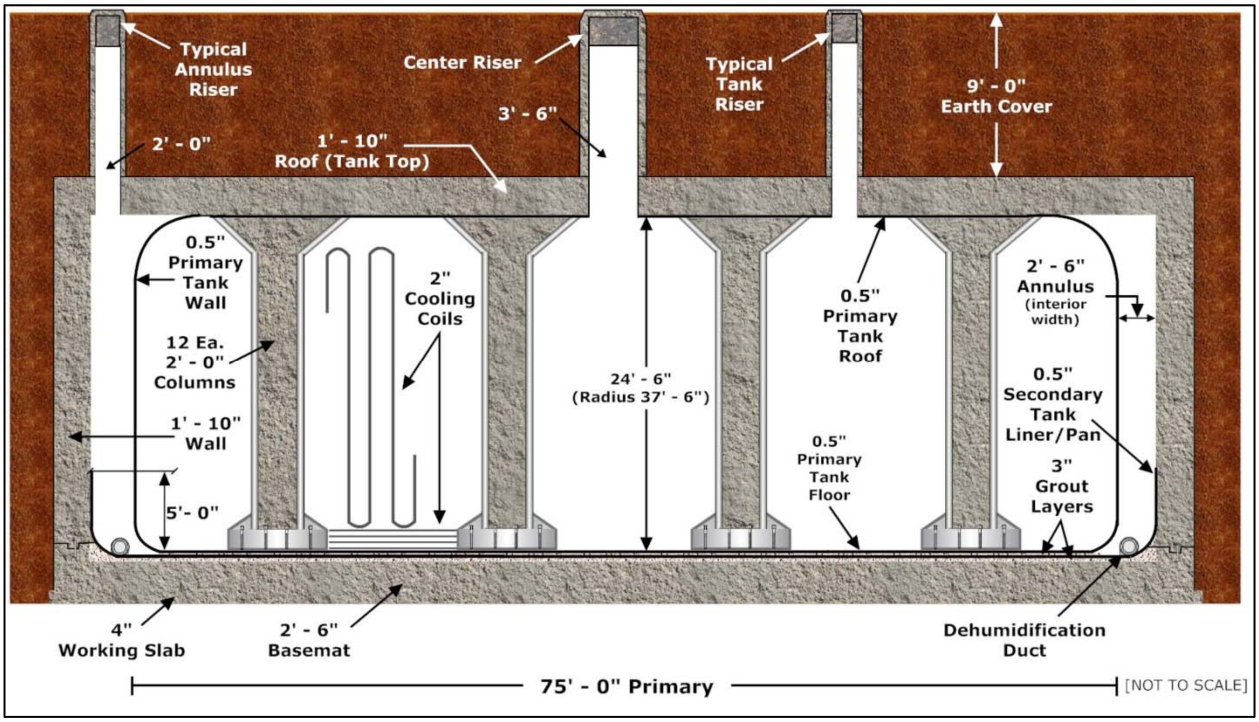
There are eight Type I tanks in FTF constructed in the early 1950s (Table 2.2-1). The Type I tank tops in FTF are approximately nine feet below grade. A typical Type I tank cross-section is shown in Figure 2.2-1. [SRS-REG-2007-00002]

Two Type I tanks in the FTF (Tanks 5 and 6) have been stabilized and operationally closed in accordance with the SRS FFA.

2.2.1.1 Type I Tank Primary and Secondary Liners

Type I tank primary liners have a 75-foot inside diameter and are 24 feet 6 inches high with a nominal operating capacity of 750,000 gallons. The primary liner sits inside a 5-foot high, 79-foot 11-inch inside diameter secondary liner (annulus pan). The primary and secondary liners are enclosed within an 83-foot 8-inch outside diameter concrete vault that creates an approximately 2-foot 5.5-inch wide annular space (Figure 2.2-1). [SRS-REG-2007-00002]

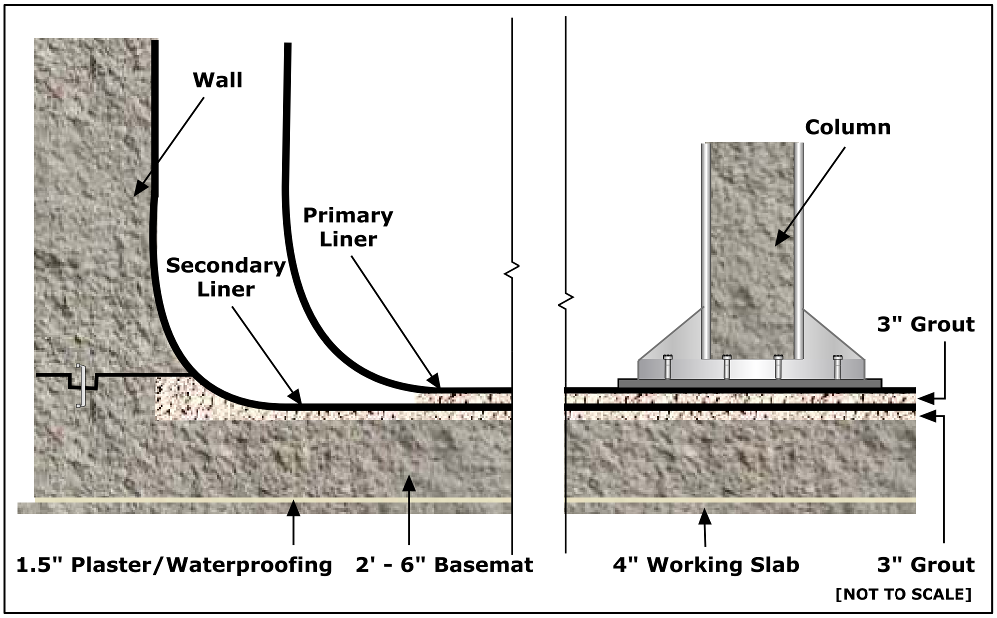
Figure 2.2-1: Typical Type I Tank Cross-Section



The Type I primary liner is made of 0.5-inch thick carbon steel. The liner wall is joined to the primary liner roof and floor with non-stress-relieved welded knuckle plates also made of carbon steel. The secondary liner is also made of 0.5-inch thick carbon steel. The top edge of the secondary liner has an L-shaped carbon steel stiffener lip that extends 6 inches perpendicularly inward from the liner edge with another 4-inch long section extending perpendicularly down from that edge. [SRS-REG-2007-00002]

The primary liner rests on a 3-inch thick layer of grout inside the secondary liner and the secondary liner sits on a 3-inch thick grout layer on top of the concrete basemat (Figure 2.2-2).

Figure 2.2-2: Typical Type I Tank Floor Configuration



2.2.1.2 Type I Tank Concrete Vault

An 83-foot 8-inch outside diameter concrete vault encloses a Type I tank. The vault is formed by the 1-foot 10-inch thick reinforced concrete roof and wall that surround the primary and secondary liners and connects to the basemat. The space between the vault and the primary liner creates a 2-foot 5.5-inch wide annulus. The vault wall was constructed using only horizontal construction joints. [SRS-REG-2007-00002]

The Type I tank tops in the FTF are approximately nine feet below grade.

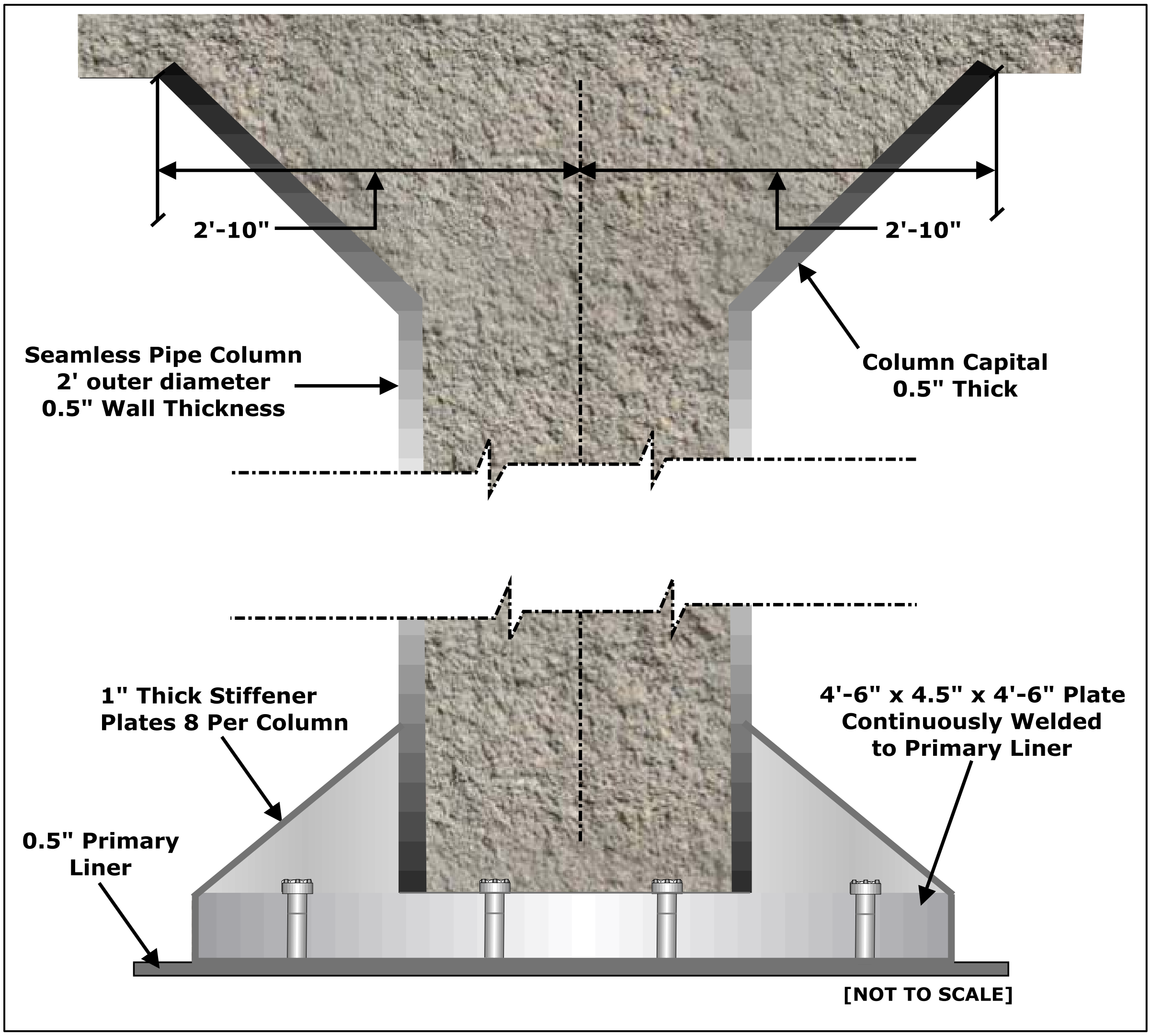
2.2.1.3 Type I Tank Working Slab and Basemat

Figure 2.2-2 shows the details of a typical Type I basemat, working slab, and liner floors. The working slab for a Type I tank is 4 inches thick, with a radius of 42 feet 5 inches. A 1.5-inch thick layer of plaster/waterproofing membrane sits above the working slab. A 30-inch thick reinforced concrete base (basemat) sits on top of the plaster. A 3-inch thick layer of construction grout fill sits on top of the basemat and the secondary liner rests on the grout. A 3-inch thick layer of grout lies between the bottom of the primary liner and the secondary liner. [SRS-REG-2007-00002]

2.2.1.4 Type I Tank Support Columns

The Type I tank roof is supported by 12 internal columns. Figure 2.2-3 shows the details for one of the support columns. These columns are 2-foot outside diameter, 0.5-inch thick carbon steel pipes filled with reinforced concrete. The columns have flared concrete-filled capitals at the top that are welded to the primary liner roof. The column base is welded to a base plate and anchored by welded vertical stiffener plates, and the base plate is welded to the primary liner floor. [SRS-REG-2007-00002]

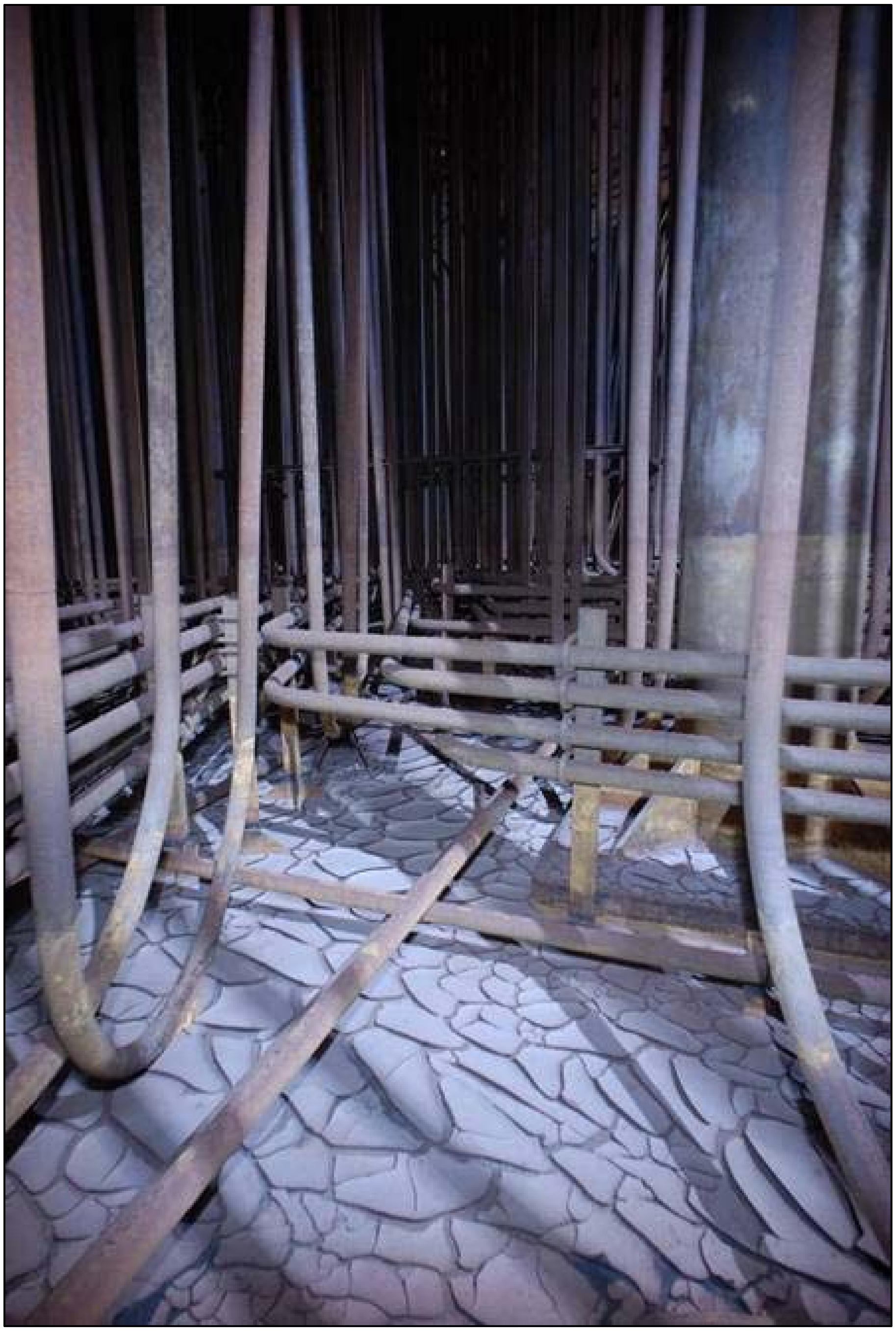
Figure 2.2-3: Type I Tank Support Column Dimension Details



2.2.1.5 Type I Tank Cooling Coils

Type I tanks contain horizontal and vertical arrays of 2-inch inside diameter Schedule 40 carbon steel pipe cooling coils (Figure 2.2-4). Each Type I tank contains 34 vertical cooling coils consisting of 604 vertical sections 18.5 feet long with 604 half-loops connecting the vertical sections. The cooling coils are supported by hanger and guide rods welded to the waste tank roof. Two horizontal cooling coil arrays crisscross the bottom of the waste tank and are supported by guide rods and angle iron struts welded to the waste tank floor. The lowest horizontal cooling coil is approximately 1 inch above the waste tank floor and the upper horizontal cooling coil is approximately 4 inches above the floor. The horizontal coils consist of 26 horizontal sections and 26 half-loops connecting the horizontal sections that were "field to fit" during their installation. The cooling water supply system pipes pass through the primary liner roof and flow is controlled in a valve house on the waste tank top. There are approximately 22,800 linear feet of cooling coils in a Type I tank. [SRS-REG-2007-00002]

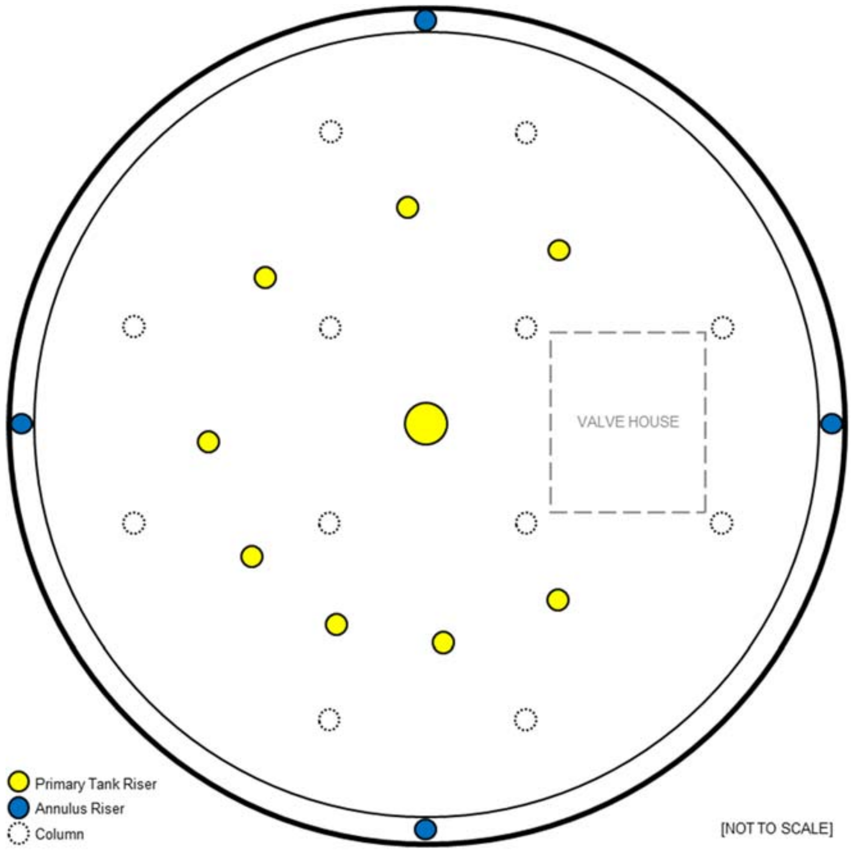
Figure 2.2-4: Type I Tank (Tank 5F) Cooling Coils



2.2.1.6 Type I Tank Access and Riser Configuration

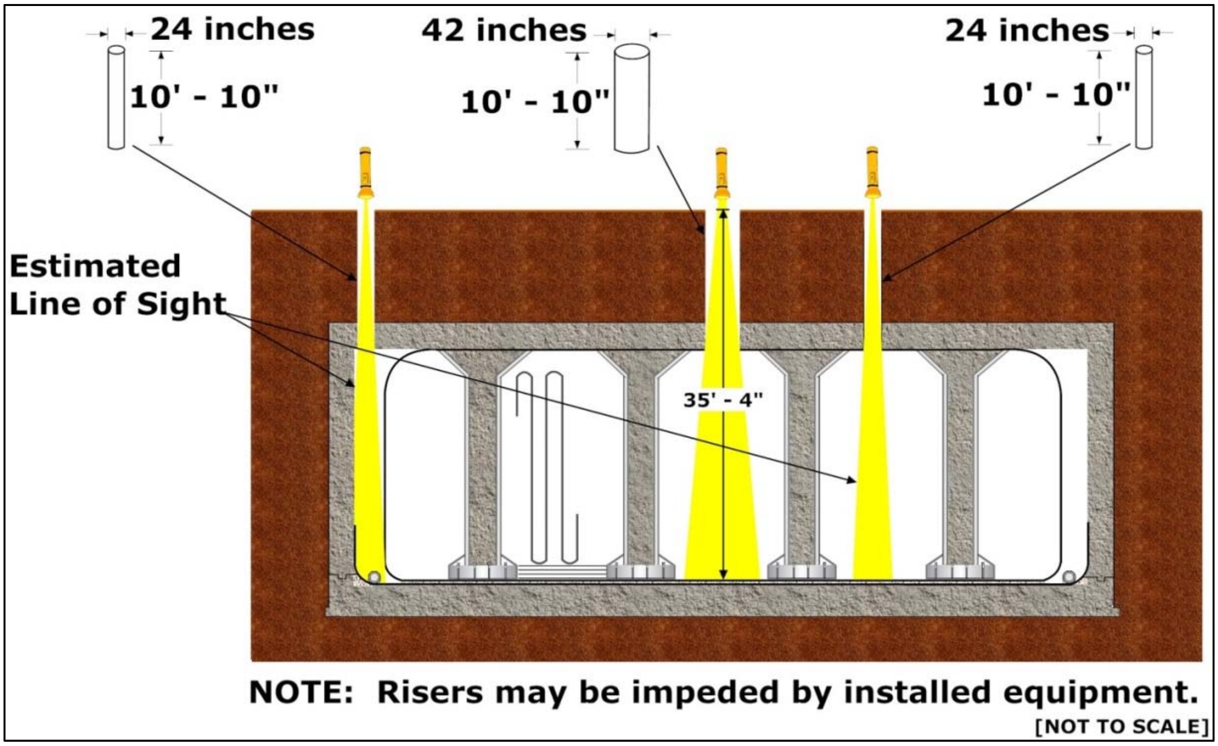
As originally designed and constructed, Type I tank roofs have nine primary liner and four annulus access risers. Type I primary tanks have one 42-inch diameter center riser and eight 24-inch diameter risers arranged in a circular pattern around the center riser. Each quadrant of the annulus contains a 24-inch diameter riser (Figure 2.2-5).

Figure 2.2-5: Typical Type I Tank Primary Liner and Annulus Riser Configuration



Access to a Type I tank interior is limited by the as-built riser size and arrangement, and distance from ground surface to the waste tank floor. As shown in Figure 2.2-6, riser dimensions restrict direct views of the waste tank floor to small circular areas beneath the risers. Tool manipulations and equipment types that can be successfully deployed are also limited by the as-built riser size, depth below grade, and proximity to obstructions such as cooling coils, columns, and equipment in adjacent risers. Riser use may also be blocked by installed or abandoned equipment such as thermocouples, conductivity probes, pumps, or transfer jets.

Figure 2.2-6: Typical Type I Tank Access Risers



2.2.2 Type II Tanks

There are no Type II tanks in the FTF.

2.2.3 Type III/IIIA Tanks

There are two Type III tanks and eight Type IIIA tanks in the FTF. The waste tank numbers, associated tank farm, and construction years are listed in Table 2.2-1. All Type III and IIIA tanks have an operating capacity of 1,300,000 gallons.

Construction details differ between Type III and IIIA tanks, but the major difference is the type of cooling coils used inside the primary liner. Type III tanks used deployable coolers that were inserted into the primary liner through the risers while Type IIIA tanks have permanently installed cooling coils (Figure 2.2-7 and Figure 2.2-8, respectively). [SRS-REG-2007-00002]

Type III/IIIA tanks also have an air ventilation/cooling system embedded in the center support column with supply ducts extending to the radial air grooves built into the insulating grout layer between the primary and secondary liners. Typical Type III and Type IIIA tank cross-sections are shown in Figure 2.2-7 and Figure 2.2-8, respectively.

Figure 2.2-7: Typical Type III Tank Cross-Section

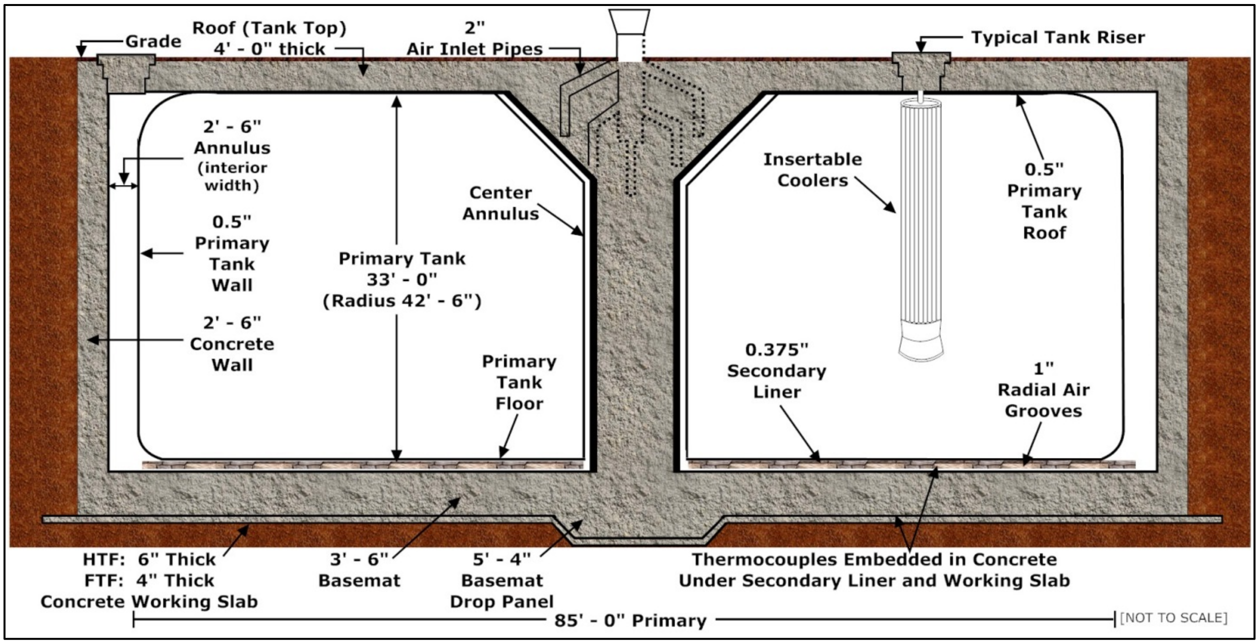
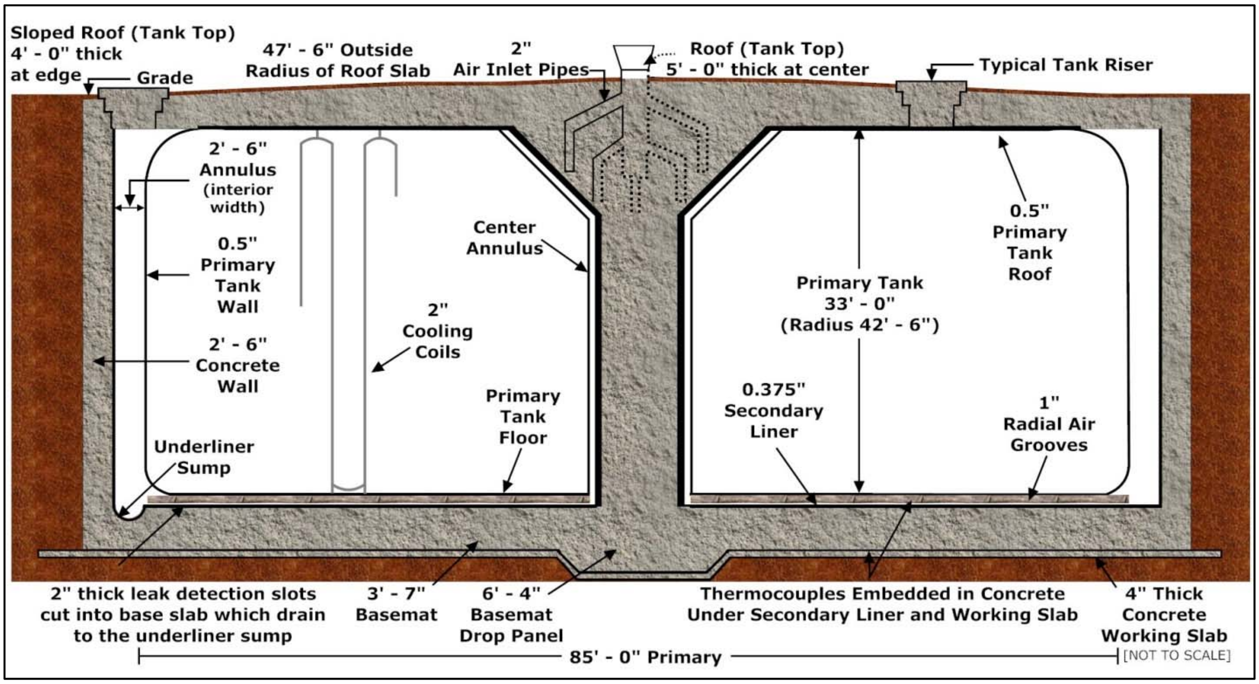


Figure 2.2-8: Typical Type IIIA Tank Cross-Section



2.2.3.1 Type III/IIIA Tank Primary and Secondary Liners

The primary liner in a Type III/IIIA tank is 85 feet in diameter and 33 feet high with a nominal operating capacity of 1,300,000 gallons. Type III/IIIA tanks have both a center and outer annulus. The center annulus is formed between the primary liner wall and the roof support column (Figure 2.2-7 and Figure 2.2-8).

The Type III/IIIA primary liner is made of 0.5-inch thick concentric carbon steel cylinders joined to circular top and bottom plates by curved knuckle plates. After construction, the Type III/IIIA primary liners were fully stress-relieved by heating to help prevent cracking. The Type III/IIIA secondary liner is 0.375-inch thick carbon steel and is the full height of the primary liner with a 90-foot 1.75-inch outside diameter forming a 2-foot 6-inch wide annular space between the primary and secondary liners (Figure 2.2-7 and Figure 2.2-8). [SRS-REG-2007-00002]

The primary liner sits on a bed of insulating material with a system of grooves radiating outward from the base of the central column so that ventilating air can flow through the slots, and any leakage from the primary liner bottom, or in the annulus around the center column, would flow to the outer annulus. The Type III tanks have a 6-inch thick layer of insulating material with 1-inch deep by 2-inch wide grooves. The Type IIIA tanks have an 8-inch thick layer of insulating material with 2-inch deep by 5-inch wide grooves.

2.2.3.2 Type III/IIIA Tank Concrete Vault

The Type III/IIIA tanks are completely enclosed in a reinforced concrete vault. The vault roof is a minimum of 48 inches thick with 30-inch thick walls. In FTF, all Type IIIA tank tops slope and thin from a 5-foot thickness at the tank center, to a 4-foot thickness at the perimeter to promote rainwater drainage. Because of the thick concrete roof, no earthen cover on a Type III/IIIA tank top is required for shielding. [SRS-REG-2007-00002]

2.2.3.3 Type III/IIIA Tank Working Slab and Basemat

The construction-working slab for the Type III tanks is a minimum of 6 inches thick and extends at least 30 feet beyond the edge of the waste tank. The working slab for Type IIIA tanks is a minimum of 4 inches thick and extends 25 feet beyond the edge of the waste tank. The excess working slab areas either were broken up or had an extensive network of 4-inch diameter holes drilled through them before the backfill surrounding the waste tanks was placed.

The basemat is 3 feet 6 inches thick in the Type III and 3 feet 7 inches thick in the Type IIIA tanks with a radius of 45 feet not including the annulus or vault wall. Both waste tank designs have a thicker drop panel section under the central column. The drop panel is 5 feet 4 inches thick under the Type III tanks and 6 feet 4 inches thick under the Type IIIA tanks (Figure 2.2-7 and Figure 2.2-8). [SRS-REG-2007-00002]

Type IIIA tanks have an underliner sump between the secondary liner bottom and basemat. A grid of 2-inch deep interconnected radial channels is grooved into the concrete basemat upon which the secondary liner rests. The channels are sloped to drain through a center collection pipe to a sump inside the concrete vault that encloses the waste tank. An access pipe extends to grade from the sump to allow for measurement, sampling, and pump-out of any accumulated liquid. The basemat in Type III tanks does not have leak detection channels.

The Type IIIA tanks also have conductivity probes that pass through the waste tank top concrete into the center annulus. Multiple conductivity probes are also installed in the outer annulus to provide redundant leak detection capability. No leakage from the primary liner into the Type III/IIIA secondary liners or concrete vaults has been detected.

2.2.3.4 Type III/IIIA Tank Support Column

The Type III/IIIA tank roof is supported by a steel-jacketed, reinforced concrete-filled center support column that was constructed as an integral part of the basemat. The design does not require the waste tank bottom to support the weight of the roof support column, as it does in the Type I and II tanks, thereby reducing stress on the bottom of the primary liner. Reinforcing bars of various lengths were placed throughout the center support column before it was filled with concrete. The central column diameter of 6 feet 2 inches varies slightly between the Type III and IIIA tanks. [SRS-REG-2007-00002]

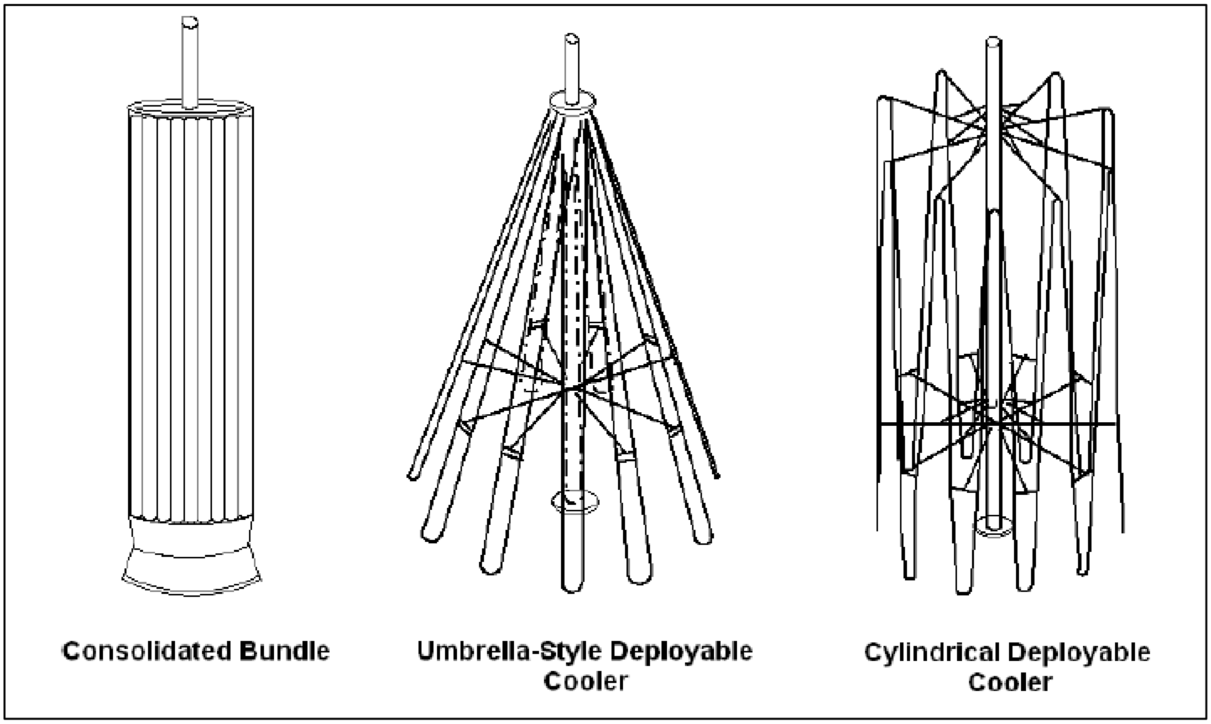
Type III/IIIA tanks have an air ventilation/cooling system supply ducts embedded in the center support column that connect to the radial air grooves in the insulating layer between the primary and secondary liners (Figure 2.2-9).

Figure 2.2-9: Type III/IIIA Tank Central Column and Vent Ductwork Construction Photo

2.2.3.5 Type III/IIIA Tank Cooling Coils

In the Type III tanks, deployable coolers were inserted into the primary liner through the waste tank risers and three types of cooler designs were used (Figure 2.2-10). The umbrella and cylindrical cooler styles were opened (deployed) after insertion. The consolidated bundle design did not require opening.

Figure 2.2-10: Insertable Coolers Used in Type III Tanks



All Type IIIA tanks in FTF have permanently installed cooling coils (Figure 2.2-11). The permanent vertical cooling coils are top and bottom supported and spaced on 3-foot triangular centers. There are typically 246 vertical coils mounted 9 inches above the waste tank floor. The bottom supports for the cooling coils are welded to the bottom of the waste tank. All the cooling coils are 2-inch inside diameter Schedule 40 carbon steel pipe. For the permanently installed coils, the cooling water supply system pipes pass through the primary liner roof and flow is controlled in a valve house on the waste tank top. There are approximately 15,900 linear feet of cooling coils in a Type IIIA tank. Cooling water is supplied to the risers containing deployable cooling coils through above-grade manifolds and piping on the surface of the waste tank roof. [SRS-REG-2007-00002]

The Type III/IIIA tanks do not have horizontal cooling coil arrays near the waste tank floor. As mentioned above, the Type III/IIIA primary liner bottoms are cooled by the air passing through the central column annulus and out through the radial air grooves in the insulating layer between the primary and secondary liners.

Figure 2.2-11: Cooling Coils in a Type IIIA Tank

2.2.3.6 Type III/IIIA Tank Access and Riser Configuration

Figure 2.2-12 and Figure 2.2-13 show the general configuration of the larger diameter access risers for Type III and IIIA tanks, respectively. However, not all risers are usable for access to the primary liner or annulus interiors because of the small diameter or permanently installed equipment. [SRS-REG-2007-00002]

Type III tanks typically have ten 3-foot diameter risers in the primary liner roof available for deployable cooler insertion. There are four 2-foot 6-inch diameter risers for annulus access.

Type IIIA tanks generally have five 3-foot diameter risers and two 4-foot 4-inch diameter risers in the primary liner roof. There are four 2-foot 6-inch diameter risers for annulus access.

Figure 2.2-12: Typical Type III Tank Riser Configuration

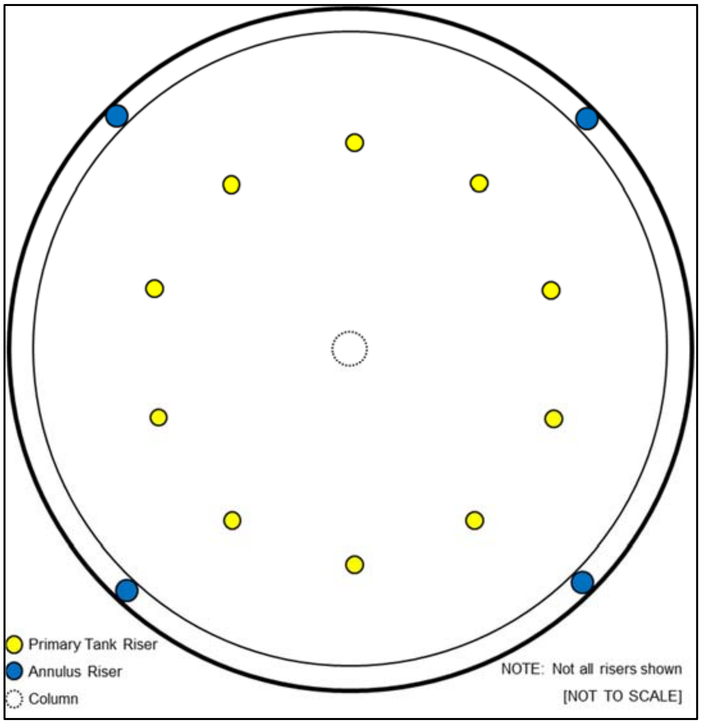
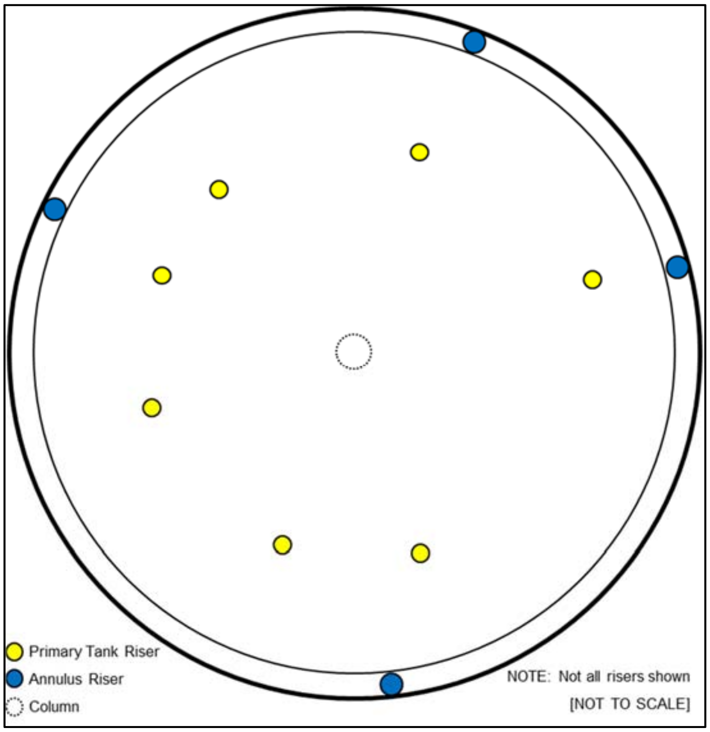


Figure 2.2-13: Typical Type IIIA Tank Riser Configuration

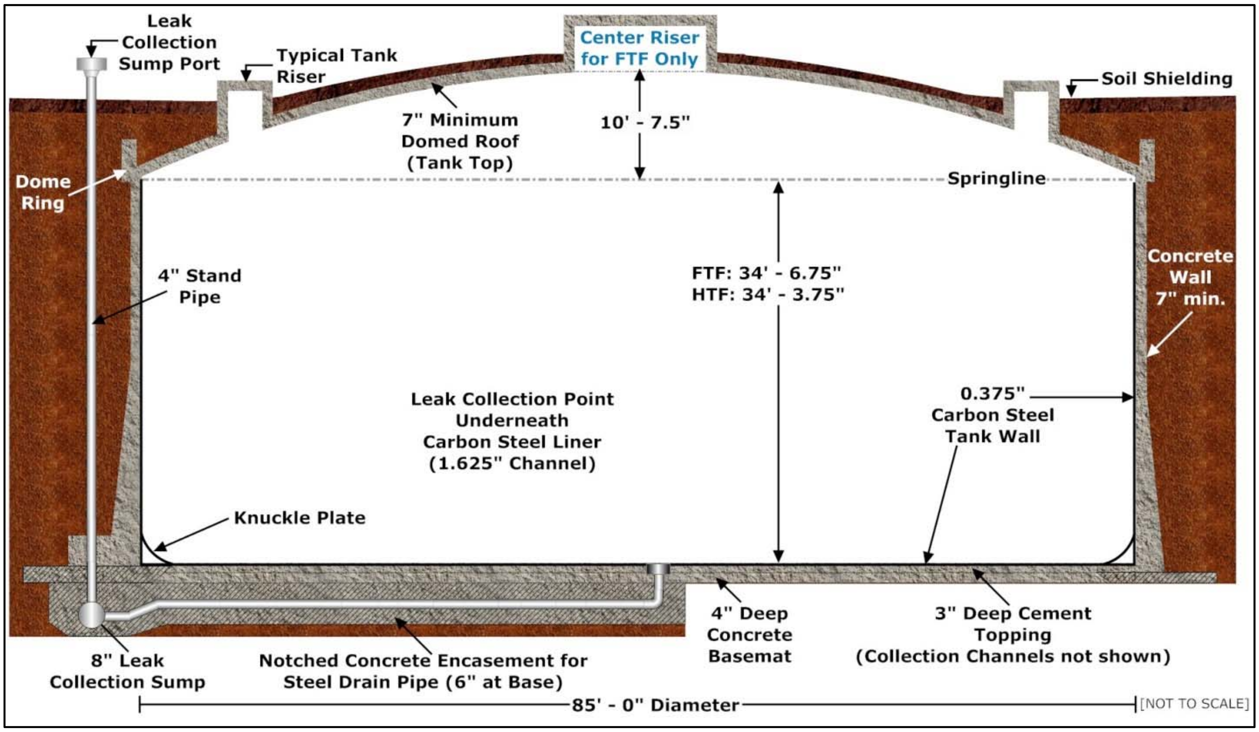


2.2.4 Type IV Tanks

There are four Type IV tanks in FTF that were constructed during the late 1950s (Table 2.2-1). Type IV tanks have a single carbon steel primary liner with a hemispherical, reinforced concrete roof. The Type IV tanks in FTF have a center roof rise. A typical Type IV tank cross-section is shown in Figure 2.2-14. [SRS-REG-2007-00002]

All four Type IV tanks in the FTF (Tanks 17 through 20) have been stabilized and operationally closed in accordance with the SRS FFA.

Figure 2.2-14: Typical FTF Type IV Tank Cross-Section



2.2.4.1 Type IV Tank Primary Liner

Type IV tanks are 85 feet in diameter and approximately 34 feet high at the side wall with a nominal operating capacity of 1,300,000 gallons. The primary liner wall and floor are made of 0.375-inch thick carbon steel and the liner wall is reinforced internally by three circumferential 4- by 4-inch, L-shaped, carbon steel stiffener bands. The primary liner is anchored externally to the enclosing concrete vault wall. The primary liner floor is essentially flat with no sump, significant low points, or slope.

The Type IV tank roof is a self-supporting, hemispherical dome made of 7- to 10-inch thick concrete. The dome has an internal curvature radius of 90 feet 4 inches and a maximum rise of 10 feet 7.5 inches above the springline (Figure 2.2-14). The waste tank roof is not lined with carbon steel on the inside. [SRS-REG-2007-00002]

There is no secondary containment (secondary liner) or an annulus in the Type IV tanks.

2.2.4.2 Type IV Tank Concrete Vault

The Type IV primary liner is completely enclosed in a concrete vault built around the primary liner with the vault wall and the roof dome ring constructed using shotcrete and reinforcing bars. The core wall was constructed of shotcrete layers, which were allowed to harden three days between subsequent layer installations. The shotcrete walls were constructed in vertical strips to avoid any horizontal joints around the waste tank and the joints between vertical strips were staggered in subsequent layers. The shotcrete was applied in successive layers with thicknesses varying from 0.75 inches to a maximum of 2 inches.

After the wall foundation and basemat had been set and cured, the space between them was filled with metallic, non-shrink grout with a compressive strength at least equal to that of the basemat. The wall and wall footing contain vertical and horizontal reinforcing steel bars. [SRS-REG-2007-00002]

A three-layer backfill system was emplaced around the outside of the concrete vault sidewall. Bags of vermiculite were placed in brick fashion on their long edges against the side of the vault to form a layer with an 8-inch minimum thickness. The bags are held in place by a retaining layer of special, manually compacted fill soil. The final test-controlled compacted fill was packed and rolled with heavy equipment to comply with moisture content and density specifications. The vermiculite fill provides a cushion layer for expansion and contraction of the primary liner resulting from temperature variations of the waste tank and contents.

2.2.4.3 Type IV Tank Working Slab and Basemat

A 4-inch thick reinforced concrete slab covered with a 3-inch thick wire-mesh reinforced cement layer comprises a nominal 7-inch thick basemat for the Type IV tanks.

As part of a leak detection system, drainage channels (1.625 inches deep and 3.625 inches wide at the top and 3.125 inches wide at the bottom) were formed in the 3-inch thick cement topping-layer. The channels coincide with the locations of welds and backup strips on the primary liner floor. A 3-inch diameter stainless steel drainpipe to collect any leakage is located at the center of the basemat and it discharges to an 8-inch diameter by 8-inch long collection chamber below the footing at the edge of the waste tank wall. A 4-inch diameter pipe provides access to the sump from the surface for testing and sampling purposes (Figure 2.2-15). [SRS-REG-2007-00002]

2.2.4.4 Type IV Tank Support Columns

Type IV tanks do not have internal support columns.

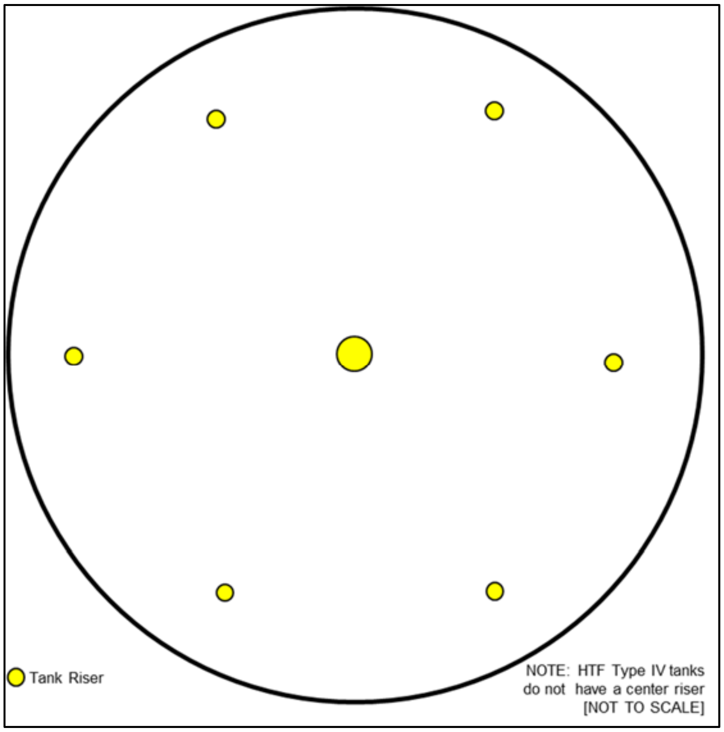
2.2.4.5 Type IV Tank Cooling Coils

Type IV tanks do not have cooling coils.

2.2.4.6 Type IV Tank Access and Riser Configuration

When viewed from above, the Type IV tanks have six 2-foot inside diameter primary liner access risers located at the 1, 3, 5, 7, 9, and 11 o'clock positions. The FTF Type IV tanks have an additional 10-foot inside diameter riser located in the center of the waste tank roof (Figure 2.2-15).

Figure 2.2-15: Typical FTF Type IV Tank Access Riser Configuration



2.3 Ancillary Structures

The FTF contains ancillary structures with internal equipment that may have a residual contaminant inventory that must be accounted for as a part of final closure of the FTF OU. These ancillary structures include buried transfer lines, pump tanks, and evaporators, many of which have been in contact with liquid waste during the operating life of the facilities. The ancillary structures were used in the FTF to transfer waste (e.g., transfer lines, pump tanks) and reduce waste volume through evaporation (e.g., the evaporator systems). In some cases, the ancillary structures served as access points for transfer systems and as secondary containment for associated jumpers (i.e., diversion boxes). The amount of contamination associated with these components depends on such factors as the component service life, its materials of construction, and the contaminating medium in contact with the component.

A listing of the ancillary structures in FTF is provided in Table 2.3-1. Other equipment and structures within the tank farms will be removed from service in compliance with applicable State and Federal regulations. The table indicates whether the structures are specifically noted in the FTF 3116 Basis Documents ("3116"), Construction Permit #17,424-IW ("IWW"), Consolidated General Closure Plan ("CGCP"), or FFA ("FFA"). In some instances, the ancillary structure may not be specifically listed but is included generically. Within the FTF 3116 Basis Documents the ancillary structures are listed in Section 2.1.12. [DOE/SRS-WD-2012-001] The listing of ancillary structures covered by the CGCP is provided in Table 11.2-1 of the CGCP for FTF. [SRR-CWDA-2017-00015] The ancillary structures for which the provisions of Section IX of the FFA apply are listed and identified in Appendix B of the FFA. [WSRC-OS-94-42]

Table 2.3-1: FTF Ancillary Structures

FTF Ancillary Structure	SRS Identifier[a]	3116	IWW	CGCP	FFA
242-F (1F) Evaporator					
Evaporator Pot	EP 41.20 (W230983)	X	X	X	X
Condenser	EP 41.20-2 (W230983)	X	X	X	
Cesium Removal Column Pump Tank	EP 13-1 (W713707)	X	X	X	X
Overheads Tank South	EP 42.20-1 (W231013)	X	X	X	X
Overheads Tank North	EP 42.20-2 (W231013)	X	X	X	X
Overheads Diverting Tank	EP 13-2 (W713707)	X	X	X	X
242-3F Concentrate Transfer System	EP 100 (W235849)	X	X	X	X
242-16F (2F) Evaporator					
Evaporator Pot	FM-242016-WEE-EVP-1	X	X	X	X
Condenser	FM-242016-WEE-COND-1	X	X	X	
Mercury Collection Tank	FM-242016-WEE-TK-5	X	X	X	X
Cesium Removal Column Pump Tank	FM-242016-WEE-TK-6	X	X	X	X
Overheads Tank #1, South	FM-242016-WEE-TK-8	X	X	X	X
Overheads Tank #2, North	FM-242016-WEE-TK-9	X	X	X	X
FPP-1					
Pump Pit	FL-641000-IT-PPIT-1	X	X	X	
F-Area Pump Tank (FPT)-1	FL-641000-IT-TK-1	X	X	X	X
FPP-2					
Pump Pit	FM-241021-WTS-PPIT-2	X	X	X	
FPT-2	FM-241021-WTS-TK-2	X	X	X	X
FPP-3					
Pump Pit	FM-241021-WTS-PPIT-3	X	X	X	
FPT-3	FM-241021-WTS-TK-3	X	X	X	X
FDB1	FL-241002-WTS-DBX-1	X	X	X	
FDB2	FL-641000-WTS-DBX-2	X	X	X	
FDB3	FL-241077-WTS-DBX-3	X	X	X	
FDB4	FM-241021-WTS-DBX-4	X	X	X	
FDB5	FM-241033-WTS-DBX-5	X	X	X	
FDB6	FL-241032-WTS-DBX-6	X	X	X	
F-Area Catch Tank	FL-241091-WTS-TK-1	X	X	X	
Valve Box 1	Valve Box 1 (M-M6-F-3289)	X	*		
Valve Box 2	Valve Box 2 (M-M6-F-3289)	X	*		
Valve Box 3	Valve Box 3 (M-M6-F-3289)	X	*		
Valve Box 4	Valve Box 4 (M-M6-F-3289)	X	*		
Valve Box 5	Valve Box 5 (M-M6-F-3289)	X	*		
LDB17 Valve Box	FL-241-908-WTS-LDB-17	X	*		
Valve Box 28A (i.e., three valve)	Shielded Valve Box (M-M6-F-3110)	X	*		
Valve Box 28B (i.e., single valve)	Shielded Valve Box (M-M6-F-3110)	X	*		
Transfer Lines, Type I Tank Transfer Line Encasements, LDBs, MLDBs	Various	X	*		

[a] Either the Smart Plant Component Location Indicator number or engineering drawing number (drawing number noted in parentheses) showing the component

X - Specifically listed in regulatory document

* - Not specifically listed but fall under "Associated tanks, pumps, and piping."

2.3.1 Evaporator Systems

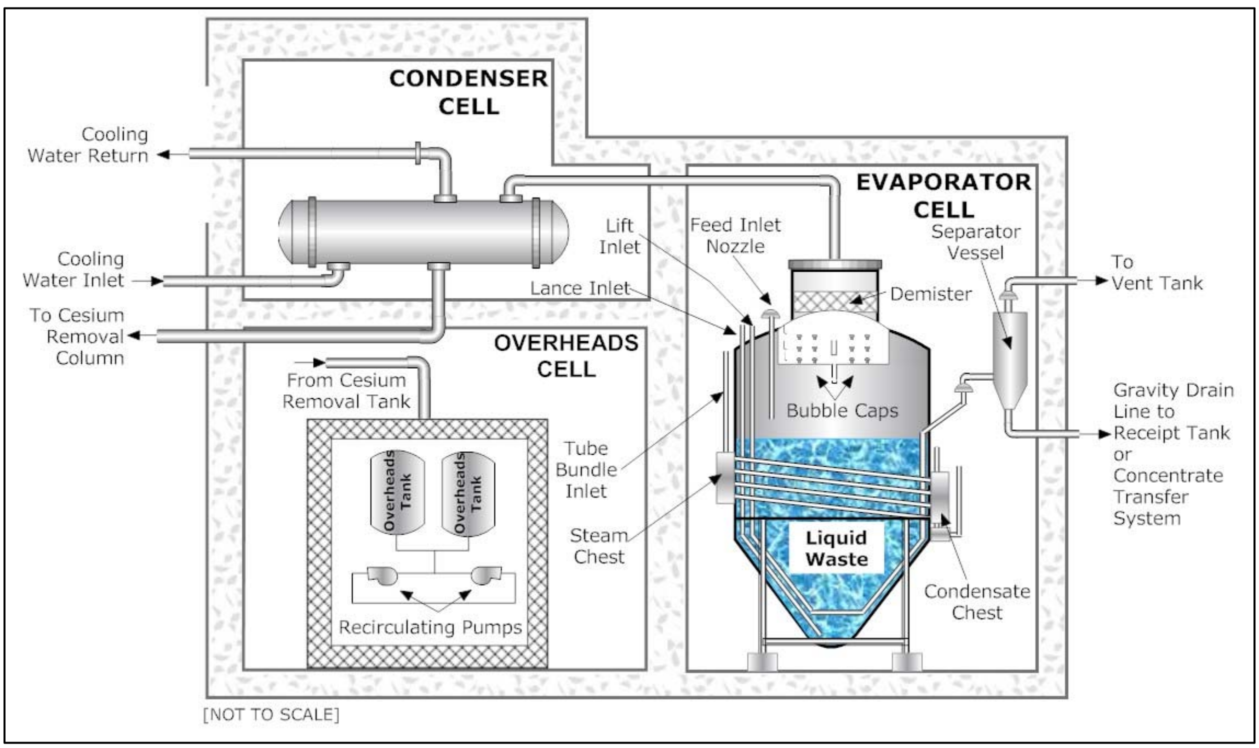
There are two evaporator systems in the FTF. The systems in FTF are the 242-F evaporator system (1F Evaporator) and the 242-16F evaporator system (2F Evaporator). The evaporators have been used to reduce the amount of liquid resulting from nuclear material processing. The evaporator systems are principally comprised of the evaporator, the overheads system, and the condenser. The 242-F evaporator systems also include a Condensate Transfer System, which was used to distribute evaporator concentrate throughout the respective tank farm. None of the CTS systems remain in operation today.

2.3.1.1 242-F Evaporator System

The 242-F evaporator is located in the middle of the Tank 17-20 cluster in the FTF; it began supernate evaporation in 1960 and ceased operation in 1988.

The evaporator cell in the system is a cuboid with a 16- by 15-foot base and a height of 25 feet. The cell includes a 2-foot square, 2.5-foot deep floor sump. The cell covers are 1-foot thick reinforced concrete. The cell provided secondary containment for the evaporator and served as shielding for personnel protection. Figure 2.3-1 shows the design of the 242-F evaporator systems. [SRS-REG-2007-00002]

Figure 2.3-1: 242-F Evaporator System Design

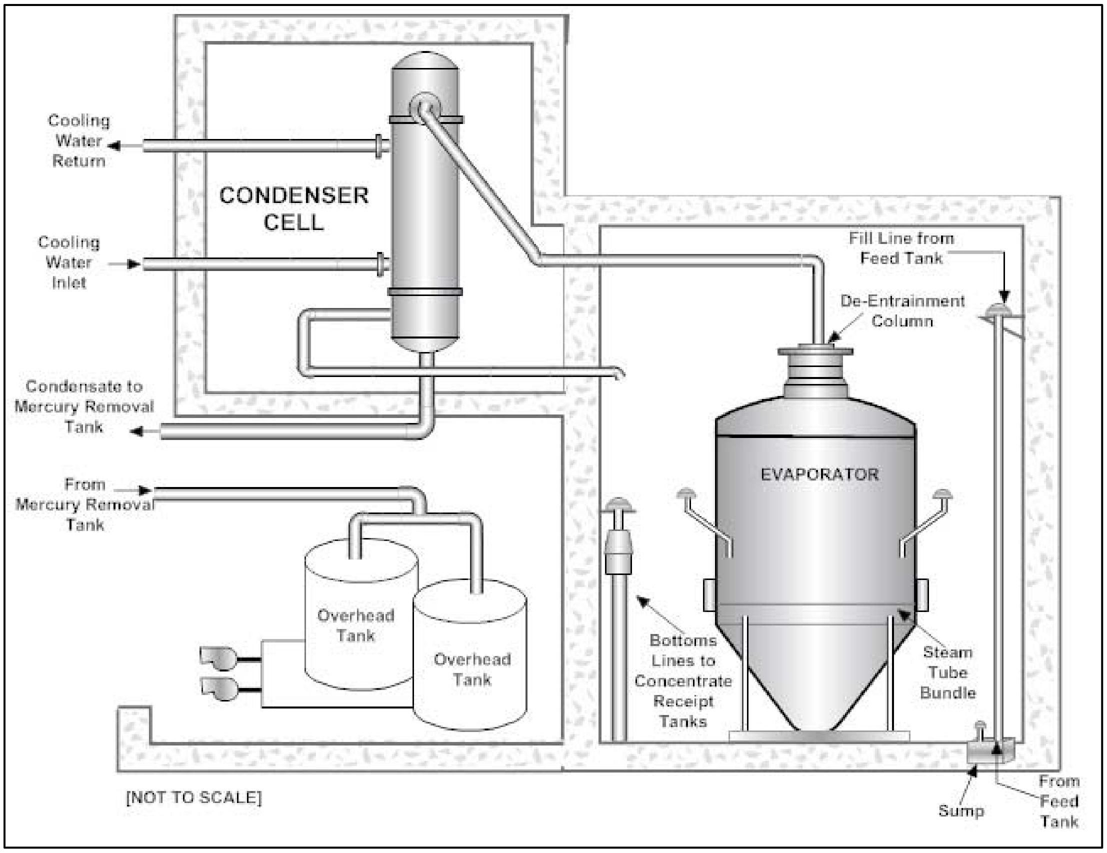


Note: Jumpers from the evaporator pot to the receipt tanks and from the feed tank to the condenser were not included to minimize the complexity of the figure.

2.3.1.2 242-16F Evaporator System

The 242-16F evaporator system contains three cells and a gang valve house. The evaporator cell contains the evaporator vessel (pot); the condenser cell contains the condenser; and an overheads cell contains overheads system components other than the condenser as shown in Figure 2.3-2.

Figure 2.3-2: 242-16F Evaporator System Design



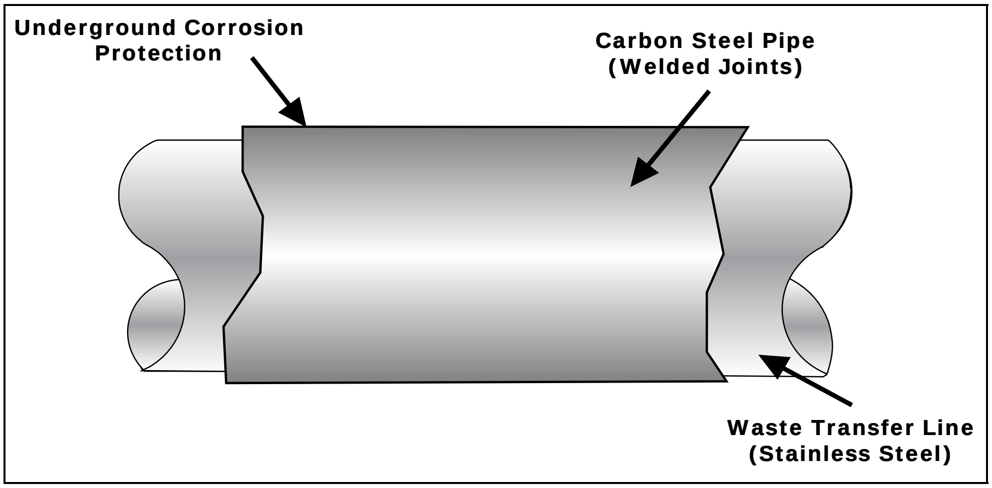
Note: Jumpers from the evaporator pot to the receipt tanks and from the feed tank to the condenser were not included to minimize the complexity of the figure.

2.3.2 Transfer Line Systems

There are over 45,000 feet of transfer line piping in FTF, with segments ranging from a few feet to over 4,000 feet. The FTF waste transfer lines are typically constructed of a stainless-steel primary core pipe and are generally located below ground. Those lines that are above, or near, the surface are shielded to minimize radiation exposure to personnel. Most of the primary transfer lines in FTF have secondary containments of some type. The majority of primary transfer lines are enclosed within another pipe (jacket) constructed of carbon steel, stainless steel, or cement-asbestos. These jackets typically drain to leak detection boxes (LDBs), modified LDBs (MLDBs), or to another primary or secondary containment vessel (e.g., a waste tank). The balance of the primary transfer lines are located inside covered, concrete encasements (covered troughs), that function as the secondary containment.

Multiple (core) waste transfer lines may be contained in a single secondary containment jacket or concrete encasement. Waste transfer lines are typically sloped to be self-draining and where a pipe transitions from one size to another, the bottom of the pipe is generally aligned to facilitate drainage to the intended waste tank without holding back any material. The line segments are supported using rod or disk-type core pipe spacers, core pipe supports, jacket supports, jacket guides, or other approved methods. Typically, core pipe spacers and supports are of stainless steel welded to the core pipe and jacket, while jacket supports and guides are of stainless steel with a concrete support. A typical transfer line is depicted in Figure 2.3-3. Additional transfer line details are provided in Section 3 of the associated FTF Performance Assessment (PA). [SRS-REG-2007-00002]

Figure 2.3-3: Typical Transfer Line Design



2.3.3 Leak Detection Boxes and Modified Leak Detection Boxes

The LDBs provide for the detection of leakage from a transfer line. LDBs are located at the low point of the transfer line being monitored, and any leakage from the line will gravity drain via drain piping from the transfer line jacket to an LDB. The LDBs have automatic conductivity probe leak detection, a dip tube set (pneumatic level instrumentation tubes) for manual verification of leaks, and overflow and drain lines to empty the LDB if necessary. The drain and overflow lines are typically kept plugged to allow leakage collection for detection by the conductivity probe. The LDB drain piping runs to the evaporator cell sump, or to a DB, PP, or drain cell. A typical LDB is shown in Figure 2.3-4.

The MLDBs serve the same purpose as the LDBs but are larger and are installed at low points that cannot gravity drain to a collection point. In addition to a conductivity probe, MLDBs also include a vent line to a DB or PP, an above-ground pressure gage to indicate if the diversion box is plugged or full, and a smear/cleanout pipe for measuring level and manual pump-out of collected leakage into the box. [SRS-REG-2007-00002] A typical MLDB is shown in Figure 2.3-5.

Figure 2.3-4: Typical Leak Detection Box

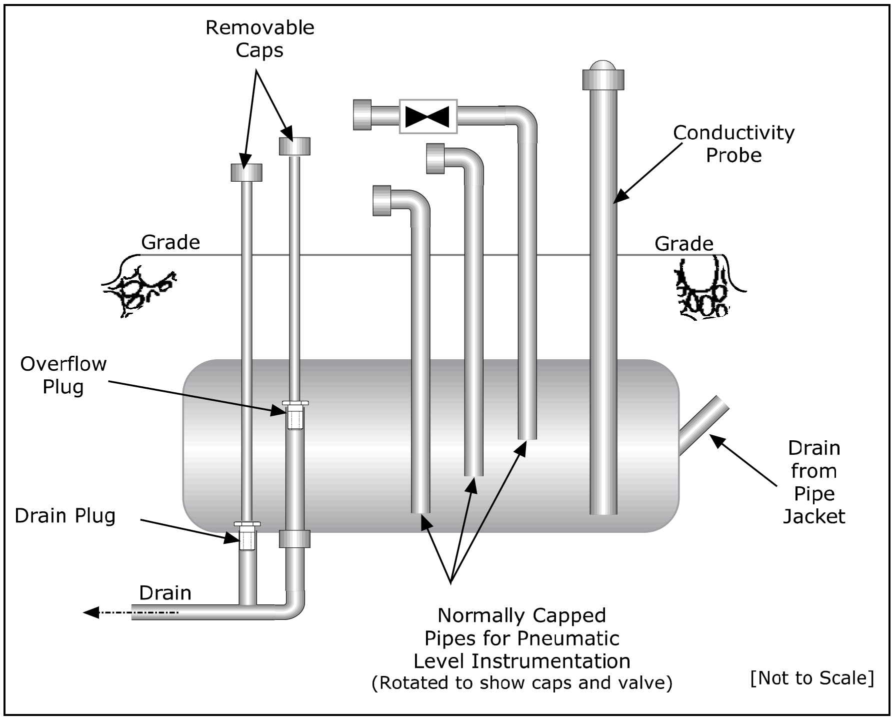
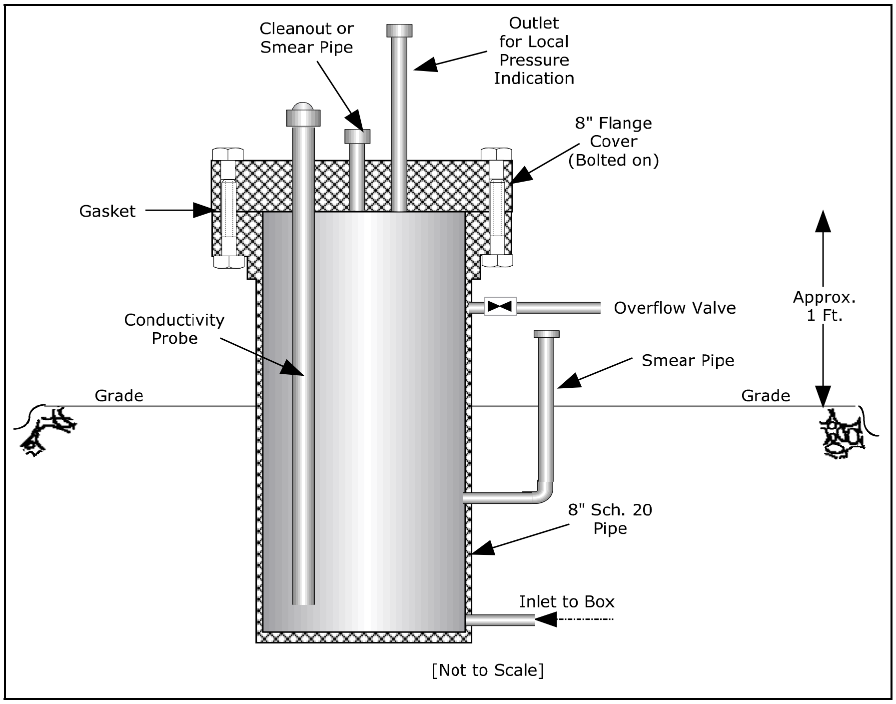


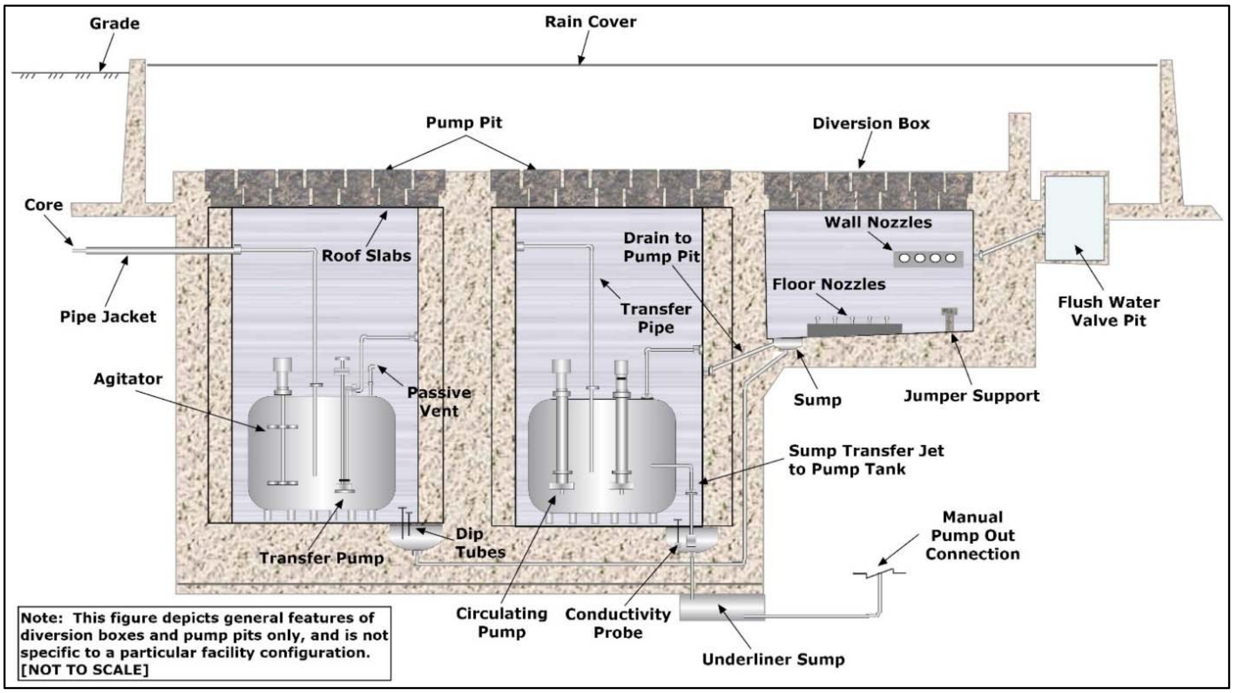
Figure 2.3-5: Typical Modified Leak Detection Box



2.3.4 Pump Pits and Pump Tanks

The FTF has three PPs (FPP-1 through FPP-3) and one CTS PP (242-3F). The PPs are reinforced concrete structures (usually lined with stainless steel) and are located below grade at the low points of the transfer lines. The PPs typically have walls that are 2 to 3 feet thick with sloped floors that are approximately 3 feet thick and concrete cell covers that are a minimum of 1.25 to 3 feet thick. All PPs house a pump tank and provide secondary containment for the pump tanks. Figure 2.3-6 shows a typical DB and PP design. Additional details of the PPs and pump tanks are provided in Section 3 of the associated FTF PA. [SRS-REG-2007-00002]

Figure 2.3-6: Typical Diversion Box and Pump Pit



2.3.5 Diversion Boxes and Valve Boxes

The FTF contains six DBs (FDB1 through FDB6). The DBs are reinforced concrete structures that provide a central location for waste transfer lines. The DBs contain transfer line nozzles to which jumpers are connected to direct waste transfers to the desired waste tanks and pump tanks. This reduces the number of transfer lines necessary to perform transfers among tanks and other facilities. Each of the DBs is associated with, and provides connections to, a group of waste tanks. The DBs are often constructed in conjunction with a PP. Figure 2.3-6 shows a typical DB and PP design. Additional DB details are provided in Section 3 of the associated FTF PA. [SRS-REG-2007-00002]

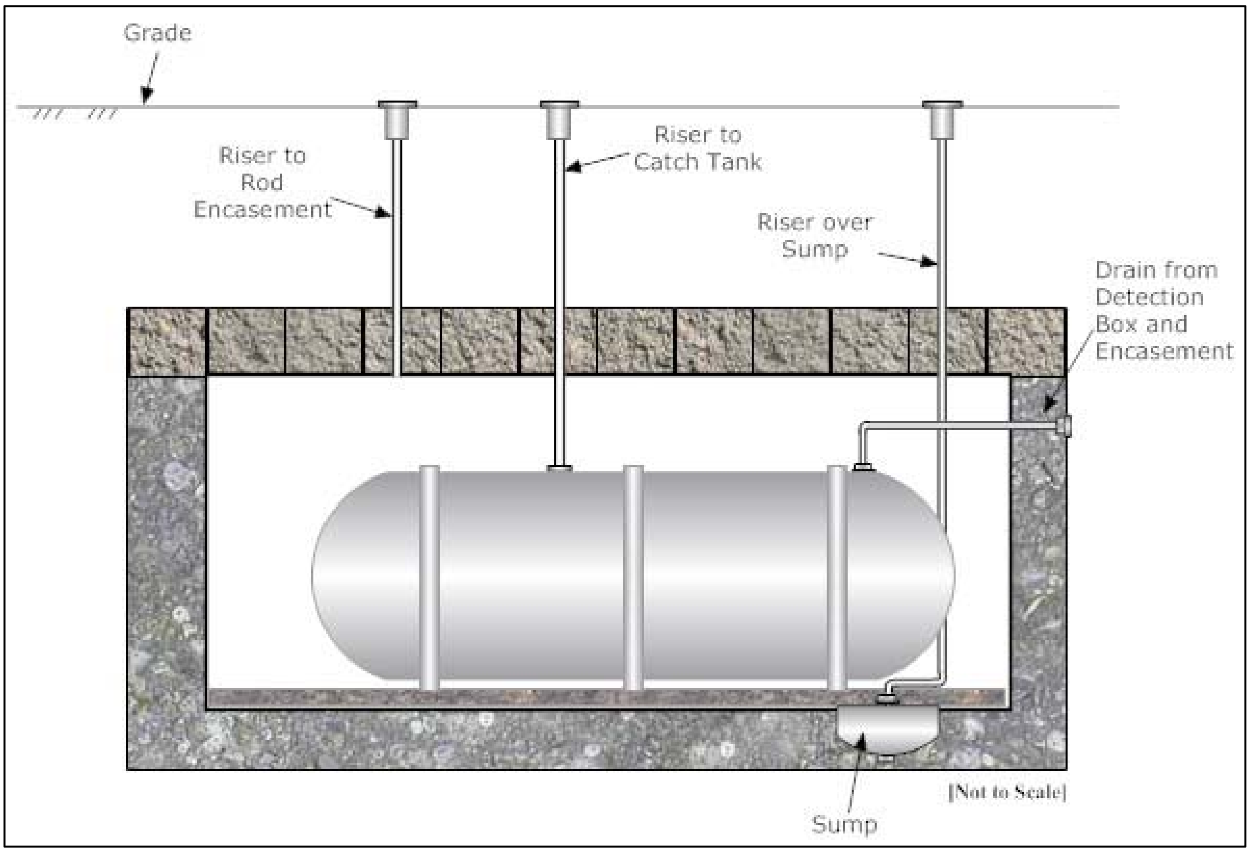
Valve boxes provide passive containment for valve manifolds used to transfer waste using common transfer lines. Valve boxes house permanently installed valve manifolds within a heavily shielded box constructed of stainless steel. Valve boxes are generally located adjacent to the waste tanks to allow transfers to be isolated as necessary.

All valve boxes contain conductivity probes that actuate control room alarms if leakage is detected. Leakage that collects in the valve box will generally drain to the associated waste tank, DB, or LDB. The valve boxes are described in Section 3 of the associated FTF PA. [SRS-REG-2007-00002]

2.3.6 Catch Tanks

There is a single catch tank in FTF (additional catch tanks are in HTF) designed to collect drainage from FTF DB-1 and the covered concrete troughs (encasements) containing the Type I tank transfer lines. Figure 2.3-7 shows a typical catch tank. Each stainless-steel catch tank has convex ends, a straight shell length of 30 feet, a diameter of 8 feet, and a capacity of approximately 11,700 gallons. Each catch tank is located in an underground reinforced concrete cell that rests on a 4-inch thick concrete construction slab. Each cell has walls that are 2.5 feet thick, a roof (cover) that is 2.25 feet thick, and floor that is approximately 3 feet 1.5 inches thick. The floor surface is sloped towards a floor sump that is 2 feet wide by 1-foot long and 1-foot deep that can be emptied through a surface riser. [SRS-REG-2007-00002]

Figure 2.3-7: Typical Catch Tank



2.4 Other FTF Equipment/Structures

In addition to the FTF waste tanks and ancillary structures which will be operationally closed under the process agreed to between DOE, SCDHEC, and EPA in the CGCP and described in Section 3.1 of this document, there are numerous other pieces of process equipment and other structures which will need to be dispositioned prior to final closure of the FTF OU. Examples of the types of process equipment or structures that will require such a decision are shown in Figure 2.4-1 and Figure 2.4-2. The equipment highlighted in Figure 2.4-1 are an inhibited water tank and a ventilation system filter box. Figure 2.4-2 provides an overview of all the structural steel remaining around operationally closed Tanks 17-20. Figure 2.4-3 provides a view of the top of Tank 6 showing the equipment and structures which remain although the tank has been operationally closed. Equipment and other structures such as these are located throughout FTF. In addition to processing equipment and other structures, there are a number of buildings such as storage buildings, office/change rooms, maintenance shops and trailers which will also need to be dispositioned. A listing of the buildings identified within the FFA is provided in Section 3.2.5 of this document.

Figure 2.4-1: View of Tank 17, Tank 19 and the 1F Evaporator

Figure 2.4-2: Structural Steel Surrounding Tanks 17-20

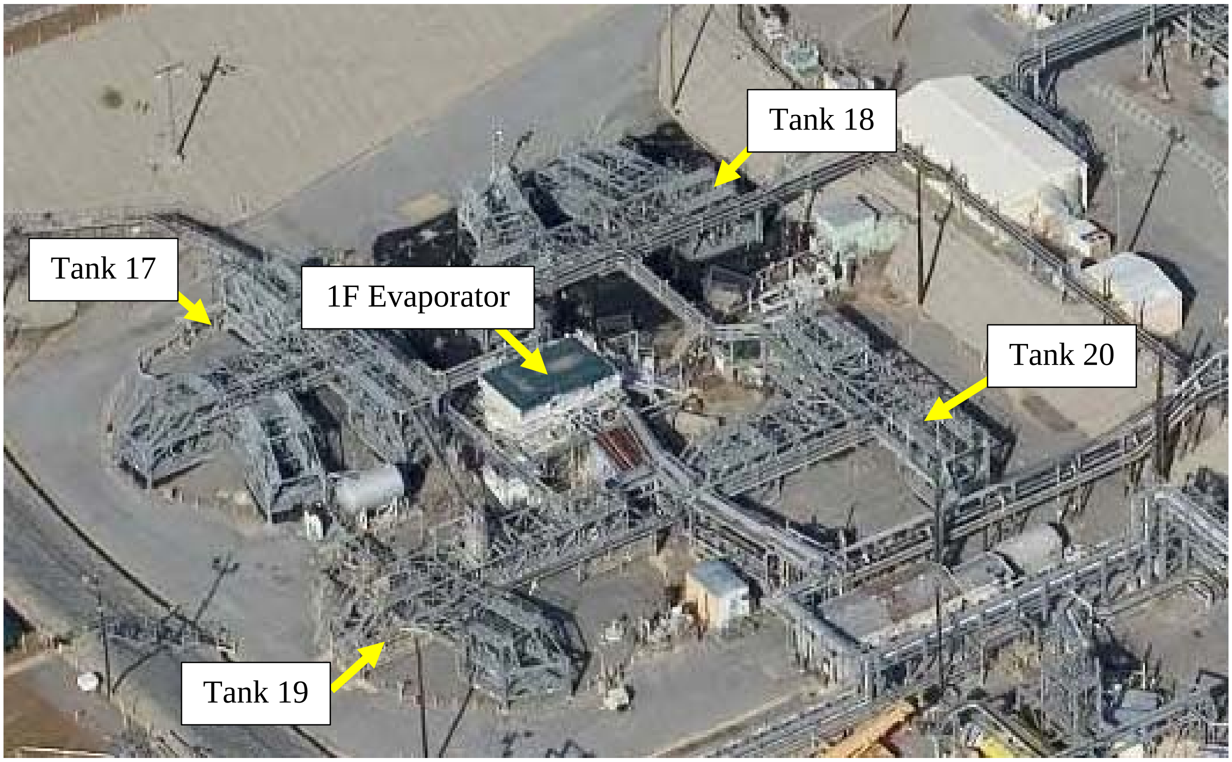
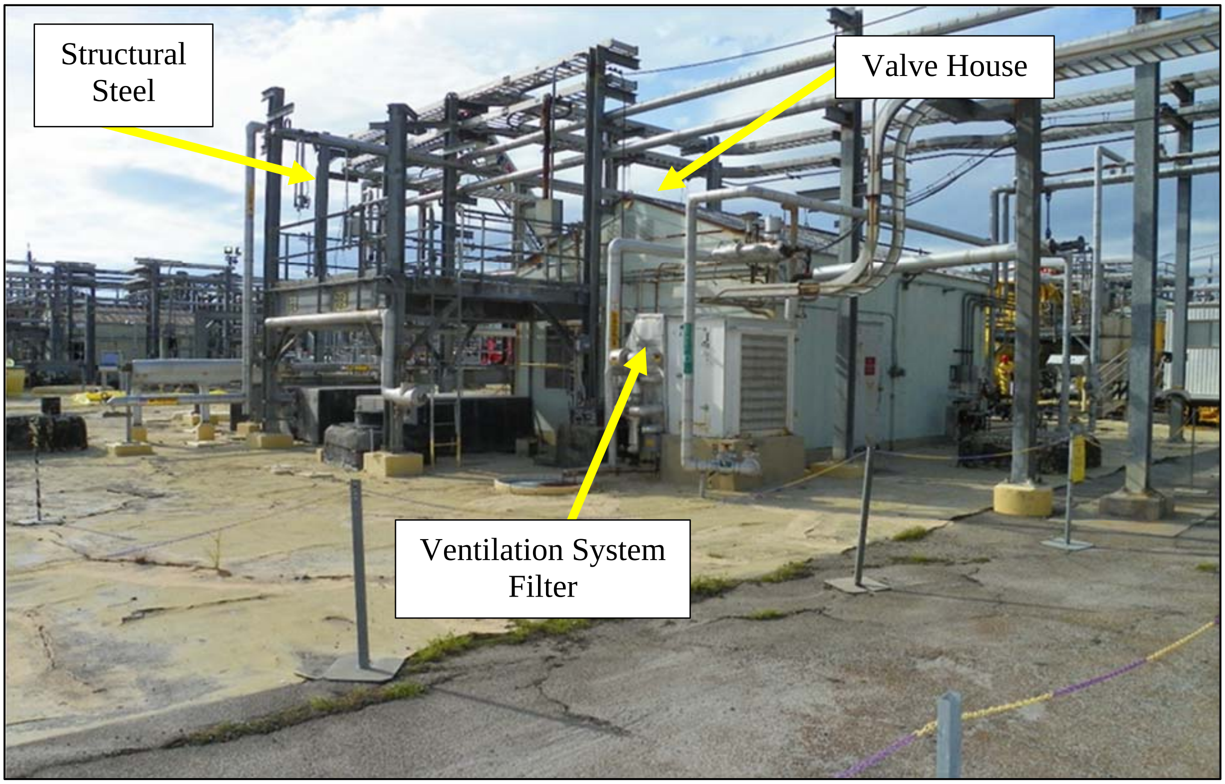


Figure 2.4-3: View of Tank 6 (Operationally Closed)



3.0 F-TANK FARM CLOSURE

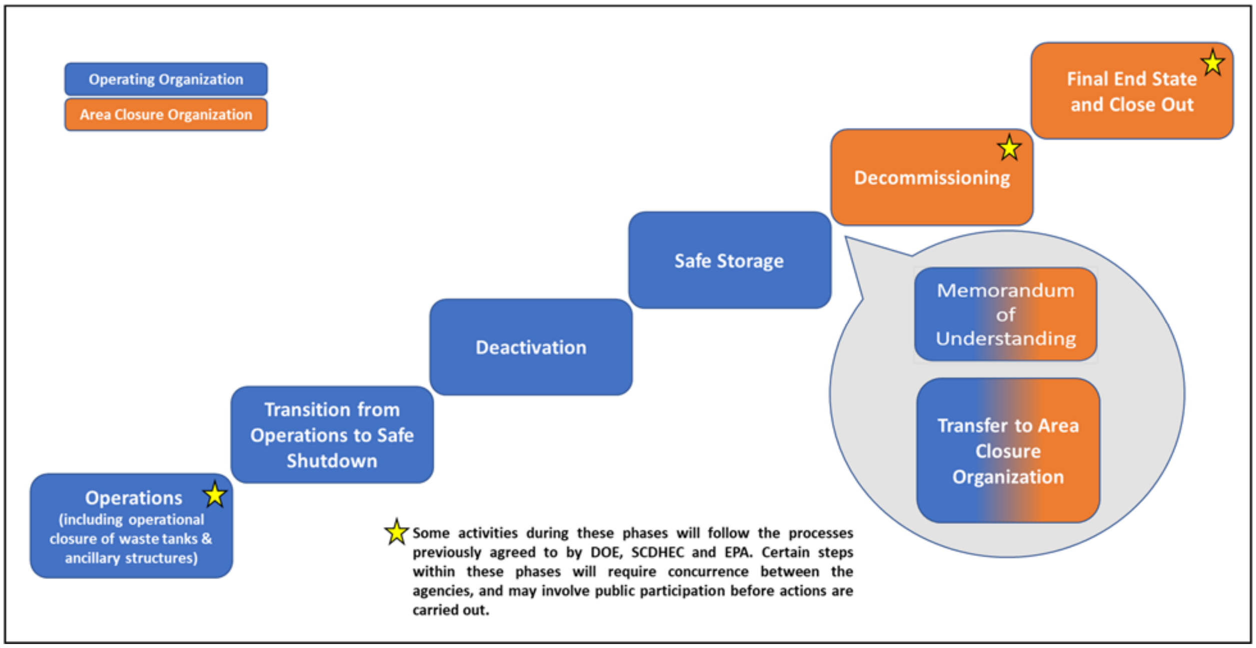
The final end state for FTF may include an engineered closure cap installed over all 22 FTF waste tanks and the FTF ancillary structures as illustrated in Figure 3.0-1.

Figure 3.0-1: FTF Closure Cap Conceptual Design

Operational closure of FTF waste tanks and ancillary structures will be performed in phases, with waste tanks and ancillary structures being cleaned, isolated and stabilized individually or in groups as they become available upon completion of their operational mission. Operational closure of the waste tanks and ancillary structures is just one of the steps that will be required to achieve final closure of the FTF OU as described in the FFA. The FTF OU not only includes the waste tanks, ancillary structures, and other facilities within the FTF, but also includes a number of radioactive and chemical spills which occurred within the FTF boundary, and the F-Area Retention Basin (i.e., 281-8F).

The facility disposition phases leading to final closure of the FTF OU are shown in Figure 3.0-2.

Figure 3.0-2: Process for the Final Closure of the FTF OU



The closure process will include the following phases:

- Operations – operational closure of all FTF waste tanks and ancillary structures will be carried out as agreed upon between DOE, SCDHEC and EPA in the *Consolidated General Closure Plan for F-Area and H-Area Waste Tank Systems* (CGCP). [SRR-CWDA-2017-00015]
- FTF Transition from Operations – FTF will need to be formally acknowledged by DOE to be an excess facility and subsequently placed in a safe shutdown state awaiting Deactivation.
- FTF Deactivation – FTF will be placed in a safe and stable condition by the elimination or reduction of residual hazards. Deactivation protects the health of the workers, public and the environment and minimizes the long-term cost of surveillance and maintenance.
- Safe Storage Period – an interim period after Deactivation where FTF is in a passively safe and stable condition awaiting Decommissioning.
- FTF Decommissioning – during this phase residual hazards are eliminated permanently. A range of possible alternative end states for the various structures is evaluated, and the preferred alternative is selected. The possible alternatives might include in situ disposal, demolition and removal, or possibly another alternative. Decommissioning is carried out consistent with DOE G 430.1-4, *Decommissioning Implementation Guide* and implemented at SRS through SRS Manual 1C, *Facility Disposition Manual*. [DOE G 430.1-4, 1C Manual]
- Final End State and Close Out – Decommissioning will not always be the final action, as is anticipated to be the case with FTF. During this phase, the site is evaluated to determine if any remedial action for soil or groundwater is required to complete the cleanup. In

addition, the final end state of FTF will be determined, the final FTF OU ROD will be issued and Corrective/Remedial Actions will be implemented. It is during this phase that a final closure cap, if selected as part of the final remedy for the FTF OU, would be placed over FTF.

On May 22, 2003, the Department of Energy - Savannah River Operations Office (DOE-SR), the EPA and SCDHEC agreed to support accelerated cleanup of SRS by signing the *Memorandum of Agreement for Achieving an Accelerated Cleanup Vision at the Savannah River Site*. [MOA_07-2003] This Memorandum of Agreement (MOA) outlines the processes agreed upon during the Decommissioning phase as well as the Final End State and Closeout phase.

3.1 Ongoing Operations

Ongoing operations within FTF include waste removal activities, both sludge removal and salt waste removal, within the remaining waste tanks which have not yet been operationally closed. The waste removal activities will continue to supply either sludge to support sludge batch preparation for feed to DWPF or dissolved salt solution to support salt batch preparation to support SWPF operations, or potential future Tank Closure Cesium Removal (TCCR) operations. During this time, as they become available for closure, DOE will continue to make progress on operational closure of both waste tanks and ancillary structures.

The CGCP sets forth the general protocols by which DOE intends to remove from service the waste tanks and ancillary structures at the FTF and HTF to protect human health and the environment in accordance with SCDHEC R.61-82, *Proper Closeout of Wastewater Treatment Facilities*, and *R.61-67, Standards for Wastewater Facility Construction*. [SRR-CWDA-2017-00015, SCDHEC R.61-82, SCDHEC R.61-67] The CGCP implements the applicable environmental regulatory standards and guidelines pertinent to removal from service of the waste tanks and ancillary structures and describes the process for evaluating the stabilized configuration of the waste tanks and ancillary structures. The CGCP also describes the method of stabilizing the waste tanks, ancillary structures and residual contamination associated with these systems. Additionally, the CGCP describes the integration of the operational closure activities with existing commitments to remove waste from the waste tanks and ancillary structures before removal from service, and ultimately to investigate, assess, and to take appropriate response action (if needed) concerning the FTF and HTF under the FFA.

The CGCP provides the following:

- Identifies the state environmental requirements and guidance that apply to the removal from service of FTF and HTF waste tanks and ancillary structures and describes how DOE will comply with these requirements.
- Describes the process DOE will follow in selecting waste removal and stabilization methods for individual waste tanks and ancillary structures as they are removed from service.
- Describes the process for characterization and quantification of residuals remaining in the waste tanks and ancillary structures following waste removal activities.
- Describes the methodology for determining impacts of individual removal actions such that the final closure of all FTF and HTF systems will comply with environmental standards.

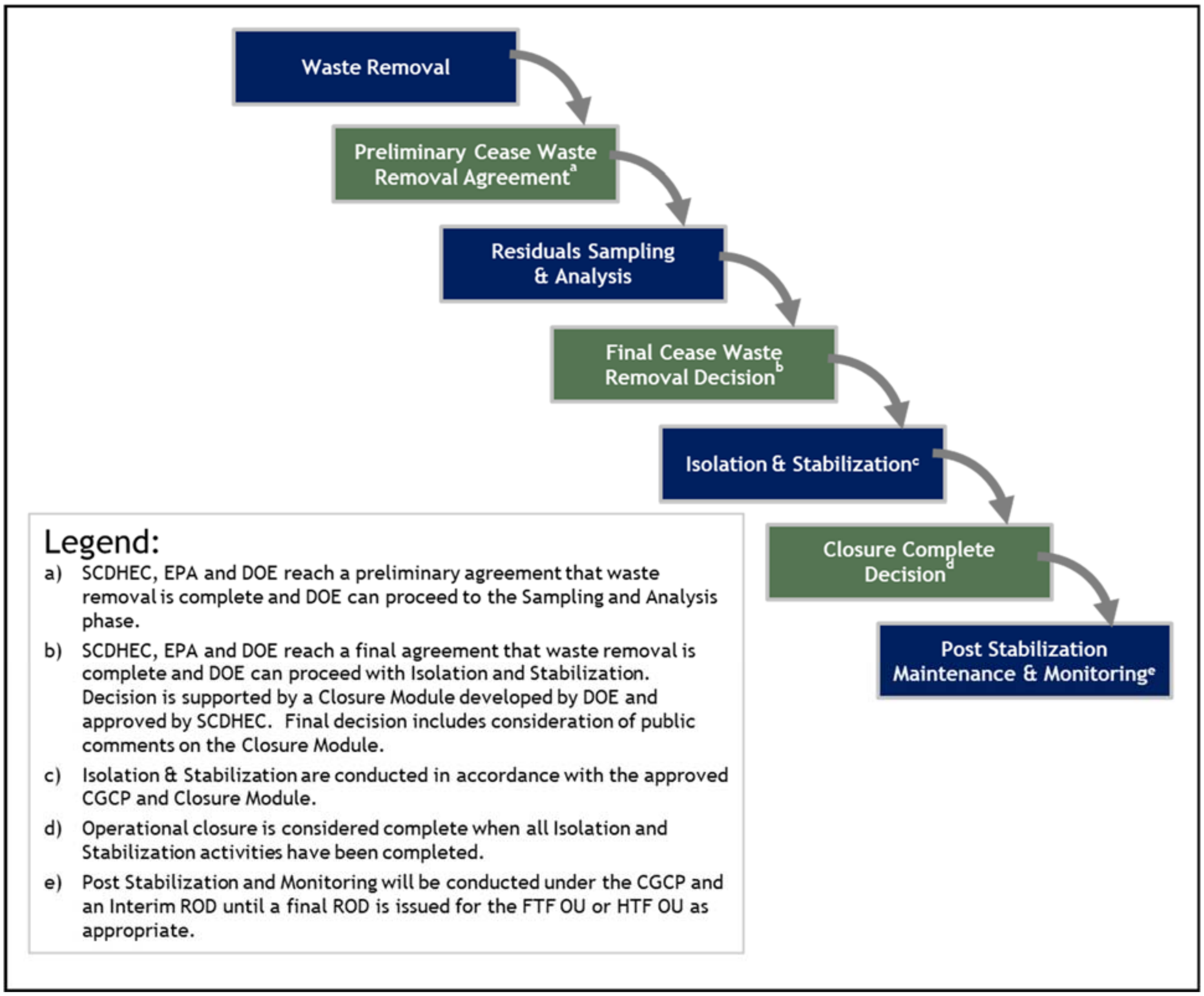
- Describes the specific documentation that will be required to detail waste removal activities, stabilization and facility status and the process that will be used, including points of public involvement, to review and approve this documentation and authorize removal from service.
- Describes the maintenance and monitoring of closed waste tanks and ancillary structures during the interim period until final closure of the FTF OU and HTF OU.
- Provides facility descriptions of each tank farm and types of tanks.

The process outlined in the CGCP is intended to comply with the requirements of SCDHEC R.61-82 and R.61-67 and be consistent with the requirements of the FFA, under which both FTF and HTF will eventually be assessed for any appropriate response action. The CGCP does not satisfy or replace the requirements of the DOE Manual 435.1-1, *Tier 1 Closure Plan for the F-Area Waste Tank Systems at the Savannah River Site* (SRR-CWDA-2010-00147), *Tier 1 Closure Plan for the H-Area Waste Tank Systems at the Savannah River Site* (SRR-CWDA-2014-00040) or Tier 2 Closure Plans. The CGCP is not updated on a standard, predetermined schedule but, instead, will be revised when either DOE or SCDHEC believes the process described in the document needs to be updated.

Operational closure of the FTF waste tanks and ancillary structures will be performed in phases, with waste tanks and ancillary structures being cleaned, isolated and stabilized individually or in groups. Regardless of the sequencing, all FTF waste tanks and ancillary structures will follow the steps outlined in Figure 3.1-1. Details on the various steps, along with the documentation requirements are briefly discussed below and additional details can be found in the CGCP. [SRR-CWDA-2017-00015]

To date in FTF, six tanks, Tank 5, Tank 6, and Tanks 17-20 have been operationally closed. No FTF ancillary structures have been operationally closed.

Figure 3.1-1: Operational Closure Process



3.1.1 Preliminary Cease Waste Removal Decision

When DOE considers, based on preliminary characterization information, waste removal to be complete, or not necessary, DOE will notify SCDHEC and EPA and provide any supporting documentation for review. This is typically done with a briefing to the agencies. If EPA and SCDHEC agree, they will independently provide letters of agreement to DOE. This agreement to proceed to the Residuals Sampling and Analysis step of the closure process is a preliminary agreement between the three agencies and if at any time during the subsequent activities it is determined that regulatory requirements cannot be met, additional waste removal will be necessary.

3.1.2 Residuals Sampling and Analysis

The residual material, referred to as "residuals" in each waste tank or ancillary structure will be characterized using the methodology and requirements in the *Liquid Waste Tank Residuals Sampling and Analysis Program Plan* (LWTRSAPP) and *Liquid Waste Tank Residuals Sampling - Quality Assurance Program Plan* (LWTRS-QAPP) that were reviewed and approved by SCDHEC and EPA. [SRR-CWDA-2011-00050, SRR-CWDA-2011-00117] In appropriate cases, process knowledge and/or historical sampling may be used to support residuals characterization.

3.1.3 Final Cease Waste Removal Decision

The results of the Residuals Sampling and Analysis step are used to determine the final residuals radiological and chemical inventory in the waste tank or ancillary structure. The final inventory is used as input to evaluate the long-term hazards associated with any remaining residuals and to verify that regulatory requirements have been met and agreed upon by the various regulatory agencies. The evaluations include such things as an analysis of impacts to a future hypothetical member of the public, comparison to existing waste classification standards, and cost-benefit analysis of removing additional waste. As specified in the CGCP, a Closure Module detailing the inventory and closure configuration, including isolation and stabilization plans, of individual or multiple waste tanks and/or ancillary structures will be submitted to SCDHEC for review and approval. The Closure Module will be provided to EPA Region 4 project managers for review to ensure consistency with the FFA requirements for overall remediation of the FTF and the HTF.

After approval of the Closure Module by SCDHEC, DOE will request concurrence from SCDHEC and EPA that waste removal is complete. Letters of agreement from SCDHEC and EPA constitute a three-agency agreement that waste removal activities are complete.

The CGCP does allow the Closure Module approval to occur in two steps if agreed to by DOE and SCDHEC. In that case a Closure Module will be issued utilizing a forecasted inventory and that Closure Module will be subsequently followed by a Closure Module Addendum which documents the final actual residuals inventory and any impacts it has on conclusions reached in the initial Closure Module.

3.1.4 Isolation and Stabilization

Waste Tank and ancillary structure isolation includes cutting and capping or blanking mechanical system components (e.g., transfer lines, water piping, air piping, steam piping) and disconnecting electrical power to all components. Prior to stabilization, waste tanks and ancillary structures must be isolated from the waste transfer and chemical addition systems and any other service that could increase the final waste inventory. Other services (e.g., ventilation, electrical, air) may be left operational during stabilization to aid in As Low As Reasonably Achievable (ALARA) work practices. In those cases, waste tanks and ancillary structures will be completely isolated from any remaining tank farm services after stabilization is finished.

Stabilization of waste tanks and ancillary structures will be done by filling them with a suitable material to stabilize any remaining residuals, maintain structural integrity and prevent future inadvertent intrusion. Internal components and equipment used for BWR and heel removal may be entombed in place as part of operational closure. Internal space in this equipment will also be filled to the extent practical to minimize void space. The current documentation does provide provisions for some of the smaller ancillary structures (e.g., transfer lines) not to be filled assuming all required closure requirements can be met.

3.1.5 Closure Complete Decision

At the completion of isolation and stabilization activities, DOE will prepare a Final Configuration Report (FCR) documenting the final condition of the waste tank or ancillary structure including that isolation and stabilization activities were completed as planned, and any differences that occur from original plans. The FCR will be provided to SCDHEC and EPA for review and will be approved by SCDHEC. If requested by SCDHEC, additional information will be provided and may include, but not be limited to, video, photographs, and signed-off work packages. Typically, the review of this information has been performed onsite by SCDHEC personnel and has been done prior to SCDHEC approval of the FCR.

3.1.6 Post Stabilization Maintenance and Monitoring

At the completion of isolation and stabilization activities and concurrence by DOE, SCDHEC and EPA that operational closure of a waste tank or ancillary structure is complete, the waste tank or ancillary structure will be removed from the SCDHEC issued wastewater treatment facility construction permit, Construction Permit #17,424-IW. DOE, SCDHEC and EPA determined that an interim remedial action was needed for the operationally closed waste tanks and ancillary structures to address the period between removal from Construction Permit #17,424-IW until final closure of the FTF OU. The interim remedial action would ensure that the integrity of stabilization actions implemented under the general closure plan(s) and system-specific closure modules will be protected from significant damage or deterioration during the interim period. As a result, for each tank farm an Interim Record of Decision (IROD) was issued for selection of an interim remedial alternative. For both FTF and HTF the preferred remedial alternative selected was “Annual Visible Engineered Barriers Inspections and Maintenance.”

When a waste tank or ancillary structure is closed, an Explanation of Significant Difference (ESD) will be prepared. The purpose of an ESD is to incorporate the operationally closed waste tank or ancillary structure into the associated Tank Farm IROD. This action subjects the ancillary structure to the interim remedial action listed in the applicable IROD. Once the ESD is approved, the SRS RCRA Hazardous Waste Permit is modified as needed to add the remedy selection (i.e., interim remedial action) for the associated tank farm to include the waste tank or ancillary structure that was operationally closed. Once added to the RCRA Hazardous Waste Permit, the waste tank or ancillary structure will be included as part of the Annual Visible Engineered Barriers Inspection. Once a waste tank or ancillary structure has been added to the RCRA Hazardous Waste Permit and the associated FCR has been approved, the waste tank or ancillary structure will be removed from Construction Permit #17,424-IW.

3.2 SRS Facility Disposition Process

At the end of a facility's life cycle, when it or its mission is no longer needed by DOE, the facility undergoes a process referred to as "disposition". This is a series of stages where the facility is brought from its condition and status at the time operations end to a final end state that involves either demolition, in situ disposal, or a combination of the two. The SRS policy for facility disposition describes several separate stages in this process and is governed by site Manual 1C, *Facility Disposition Manual*. [1C Manual] This section describes the generic process for dispositioning a facility at SRS. In the Facility Disposition Process the term “facility” is used to include buildings, utilities, structures, and other land improvements associated with an operation or service and dedicated to a common function. A facility can be contained inside a single building or portion of a building, or it can encompass several related buildings and/or other structures, such is the case with FTF.

The planning and execution for the disposition of excess facilities and/or associated equipment will be conducted using project management principles with a graded approach through the following life cycle phases:

- Transition from Operations
- Deactivation
- Safe Storage Awaiting Decommissioning
- Decommissioning
- Final End State and Close Out.

3.2.1 Transition from Operations

This stage includes the recognition that the facility is excess (i.e., it or its mission is no longer needed by DOE), the safe shutdown of the facility, and the formal transfer of the facility from operational status to excess status. Transfer of custody of the facility from the operating organization to the site environmental compliance/area closure organization may occur during this stage or may occur at a future stage.

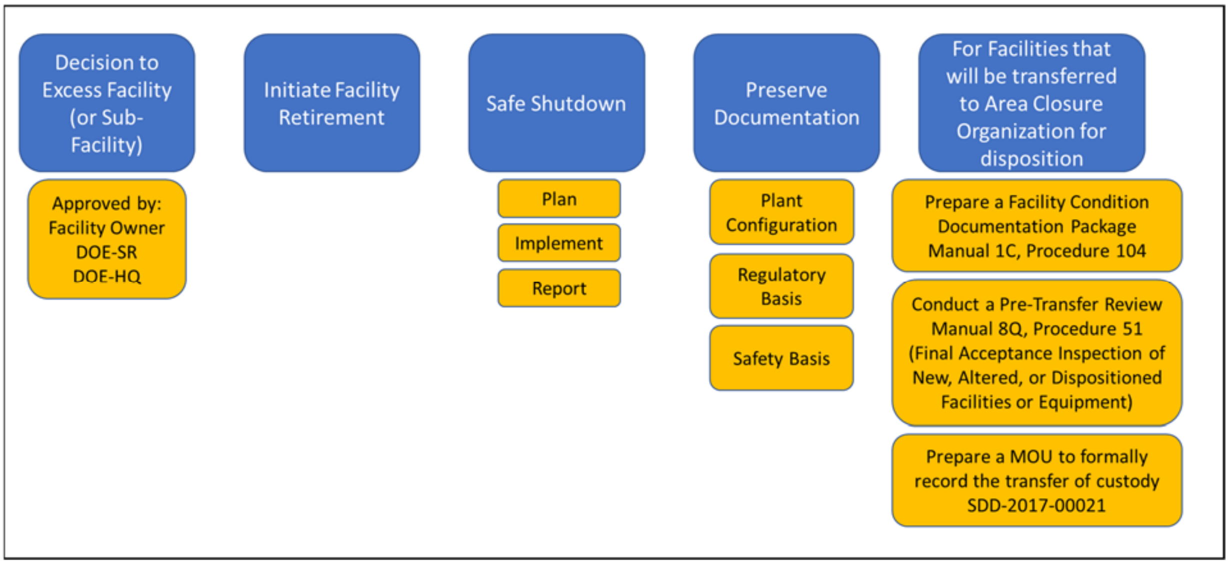
When an operating organization has a facility that is no longer required by DOE to carry out the mission of SRS, a series of actions are to be taken that transforms the status of the facility from operating, or operational, to safely shut down. These activities constitute entry into the facility disposition program. The status of the facility becomes "excess, awaiting deactivation." This transition from operational to excess status is achieved by the operating organization by the following activities (not necessarily in the order listed):

- Obtain an acknowledgement from the responsible DOE program office that the facility is no longer needed to support the SRS mission and can be considered excess
- Initiate retirement of the facility and its contents from the site asset management system
- Ensure the facility is listed as shutdown pending Deactivation and Decommissioning (D&D) on the Shared Site Structures Database
- Prepare a Safe Shutdown Plan that describes how it is intended to shut down the facility and place it into a safe and stable configuration The Safe Shutdown Plan describes the actions necessary to safely shut down the facility. It will designate the organization to perform, plan, and implement the activities described in the Safe Shutdown Plan. These tasks include the preparation and approval of the Environmental Evaluation Checklist (EEC) and a Power Services Utilization Permit.
- Prepare a Surveillance and Maintenance (S&M) Plan, as well as the performance of a Fire Protection Review.

- Shut down the facility in accordance with the Safe Shutdown Plan and commence the necessary surveillance and maintenance activities that keep the facility in a safe and stable configuration. Document the required surveillance and maintenance activities in the S&M Plan
- Develop a Facility Condition Documentation Package (FCDP).
  - Preserve documentation that serves to identify such things as the plant configuration, the safety envelope, the safety basis, the regulatory basis, any open commitments, audits, findings and incident reports
  - Assemble documentation and perform additional inspections and characterizations to describe the nature, amount, and physical distribution of process material, hazardous material, and radioactive material in the facility, including contamination
  - In the case of FTF, this will include the documentation prepared to support operational closure of the waste tanks and ancillary structures, such as residual inventory documentation and closure modules. In addition, it will include post operational closure documentation such as the IROD and annual inspection reports
- Update/cancel/revise/delete any preventative maintenance activities or open service orders and subcontracts.
- Prepare a Configuration Management Implementation Plan (CMIP) to identify the systems that are to remain operable and those that are non-operable, identify documents necessary for system operations and future disposition actions, identify and cancel documents that do not need updates, and the identification of any other action documents to address the facility shutdown.

Figure 3.2-1 provides a summary of the activities that occur in the Transfer from Operations phase.

Figure 3.2-1: Transition from Operations Actions



3.2.2 Deactivation

Grouping buildings and structures together during the Facility Disposition Process is encouraged to reduce the amount of documentation required. Deactivation is a series of activities carried out to transform a facility from the end of operations to a passive and stable state that can be maintained and monitored over a long time at minimal cost until final decommissioning can begin. Deactivation is intended to reduce or eliminate hazards to a state where there is no longer any significant risk to custodial or site employees, the public, or the environment and sometimes occurs over multiple phases. Deactivation is carried out as a project and typically includes activities that reduce the remaining hazards in the facility, such as the removal and processing of material, as well as, stabilization, decontamination, and isolation of the facility and its systems. It is important to review safety basis documents, licenses and permits, and Site Item Reportability and Issues Management (SIRIM) reports. After understanding documented hazards, an initial walkdown before deactivation allows the facility to identify all remaining hazards.

Deactivation includes the activities listed below (not necessarily in the order listed).

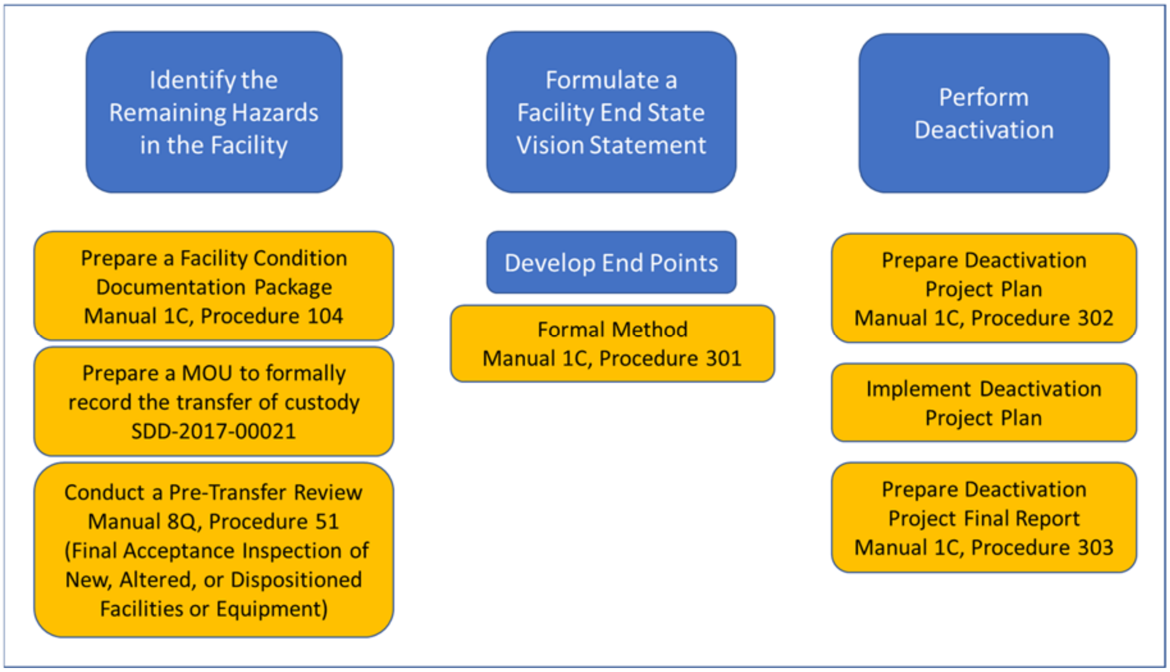
- Identify the remaining hazards in the facility. This can be done in a number of ways, including:
  - Obtain the information from a FCDP if one has been written or prepare an FCDP
  - Perform a walkdown inspection that follows a formal protocol
  - Characterize the nature, amount, and extent of contamination if necessary
  - Review the safety basis documentation
- Identify activities that are ongoing at the facility which represent a commitment of resources and determine the associated cost. This includes the following:
  - operation of essential equipment
  - preventive and corrective maintenance
  - surveillance
  - utility services, such as steam, electricity, compressed air, etc.
- Formulate and issue an End State Vision Statement. This is a description of the goals of a deactivation project and of what specific state the facility will be in after the deactivation is completed. This End State Vision should address the reduction of the residual hazards identified above and the reduction of the ongoing costs identified in the previous step.
- Develop a set of deactivation end points that will achieve the end state that was described in the approved End State Vision. Use a formal method for determining end points and involve the persons who will be doing the work in determining the end points. End points must be determined using a formal method
- Prepare a Deactivation Project Plan (DPP)
- Conduct a readiness evaluation as prescribed in DOE-STD-1120-2016, *Preparation of Documented Safety Analysis for Decommissioning and Environmental Restoration Activities including Appendices* and/or site Manual 12Q Assessment (if applicable)
- Carry out the deactivation project to achieve the deactivation end points in accordance with the DPP

- When Deactivation is completed and the facility is in a passively safe condition requiring minimum care and monitoring, a Deactivation Project Final Report is prepared to document project accomplishments and the facility status at that point.
- Modify the facility S&M program to take into account the changes made during deactivation. If a S&M Plan exists or was created during the transition from operations, revise it to reflect the post-deactivation requirements. If it does not exist, prepare a S&M Plan.
- Perform those configuration management activities that are necessary to reflect changes made during deactivation in accordance with the CMIP for the organization or facility
- Revise and update selected existing facility documentation to reflect the changes made to the facility during deactivation, if those changes materially affect the documents. Examples:
    - Changes to safety documents to reflect a change in facility hazard category
    - A revision of the facility's Fire Preplan to notify the site Fire Department of changes to facility access points and installed fire detection and suppression capabilities
    - A revision of the Material Control and Accountability Implementation Plan to identify changes to the Material Balance Area
    - A revision of the FCDP

Figure 3.2-2 provides an overview of the Deactivation phase activities. The specific procedures within the SRS 1C Manual are also identified. [1C Manual] Some of the focus areas of the Deactivation phase, which will be described in the Deactivation Project Plan, are the following:

- Air-Gap chemical, radiological, and electrical systems at the system boundary
- Pipes and conduits that penetrate the ground must be air-gapped
- Remove all hazardous, chemical, and flammable material, to the extent practicable
- Characterize the nature, amount, and extent of contamination
- Reduce/Remediate hazards – chemical, radiological, asbestos
- Remove buildings' furnishings
- Perform configuration management to reflect changes
    - Update drawings
    - Update safety basis documents
    - Update preventative maintenance procedures

Figure 3.2-2: Deactivation Phase Activities



During the Deactivation phase, decisions for disposition of various pieces of process equipment and or other structures will need to be made. Equipment may be left for dispositioning during the Decommissioning phase, or it may be dispositioned during the Deactivation phase. Examples of the types of process equipment or structures that will require such a decision are described in Section 2.4 of this document. Decisions regarding the disposition (i.e., removal or in-situ disposal) of equipment and structures such as these that remain after the Transfer from Operations will occur during development of the formal DPP generated during the Deactivation phase for FTF.

3.2.3 Safe Storage

There will be a stage, after Deactivation and before Decommissioning, when the facility is in a passively safe and stable condition awaiting decommissioning. Typically, during this period surveillance and maintenance and planning for decommissioning are the only activities occurring. Four items are required for a safe and cost-effective storage: entry control, surveillance and maintenance, equipment removal for reuse or sale, and planning for decommissioning.

Once deactivated, facilities can still contain residual hazards. It is important to ensure personnel who enter the deactivated facility have been briefed on potential hazards and have the proper equipment for conditions and in case of an emergency. During that period the facility must continue to have surveillance and maintenance performed. Surveillance includes periodic inspection of the facility to determine whether the established conditions or safety status are deteriorating and require corrective action and that nothing is being or can be released to the environment. Surveillance also includes monitoring the performance of essential systems that are kept in operation, if any, and monitoring releases from the facility to ensure that permits are not violated. Maintenance includes preventive maintenance to keep essential equipment in operating condition, and corrective maintenance, or repairs, to return essential equipment to service when it fails. Maintenance also includes repairs, or replacement, of structural features that are necessary for structural integrity and access control, and housekeeping activities in and around the facility.

Some equipment may be removed for reuse and sale. Requirements for removal include ensuring the authorization to remove the property, ensuring the equipment is isolated from the facility, and correcting any temporary openings or safety hazards within the facility after removal.

During safe storage, the organization with custody of the facility should begin planning for future decommissioning using DOE's *Decommissioning Implementation Guide* and the SRS *Facility Disposition Manual*. [DOE G 430.1-4, 1C Manual]

During this phase, the following activities are required:

- Prepare or update an existing S&M Plan to cover S&M activities required during the long-term safe storage period after deactivation
- Carry out the caretaking responsibilities during the long-term safe storage phase

Although it can occur in earlier stages, typically during or following the Safe Storage phase the facility will make the transition from the operating entity to the area closure organization for completion of the disposition program. A set of criteria has been established for this turnover point. Included on this list is that the area has been isolated from surrounding areas. [SDD-2017-00021] In general, most of the criteria are satisfied through the previous disposition program steps (i.e., Transition from Operations, Deactivation, Safe Storage).

3.2.4 Decommissioning

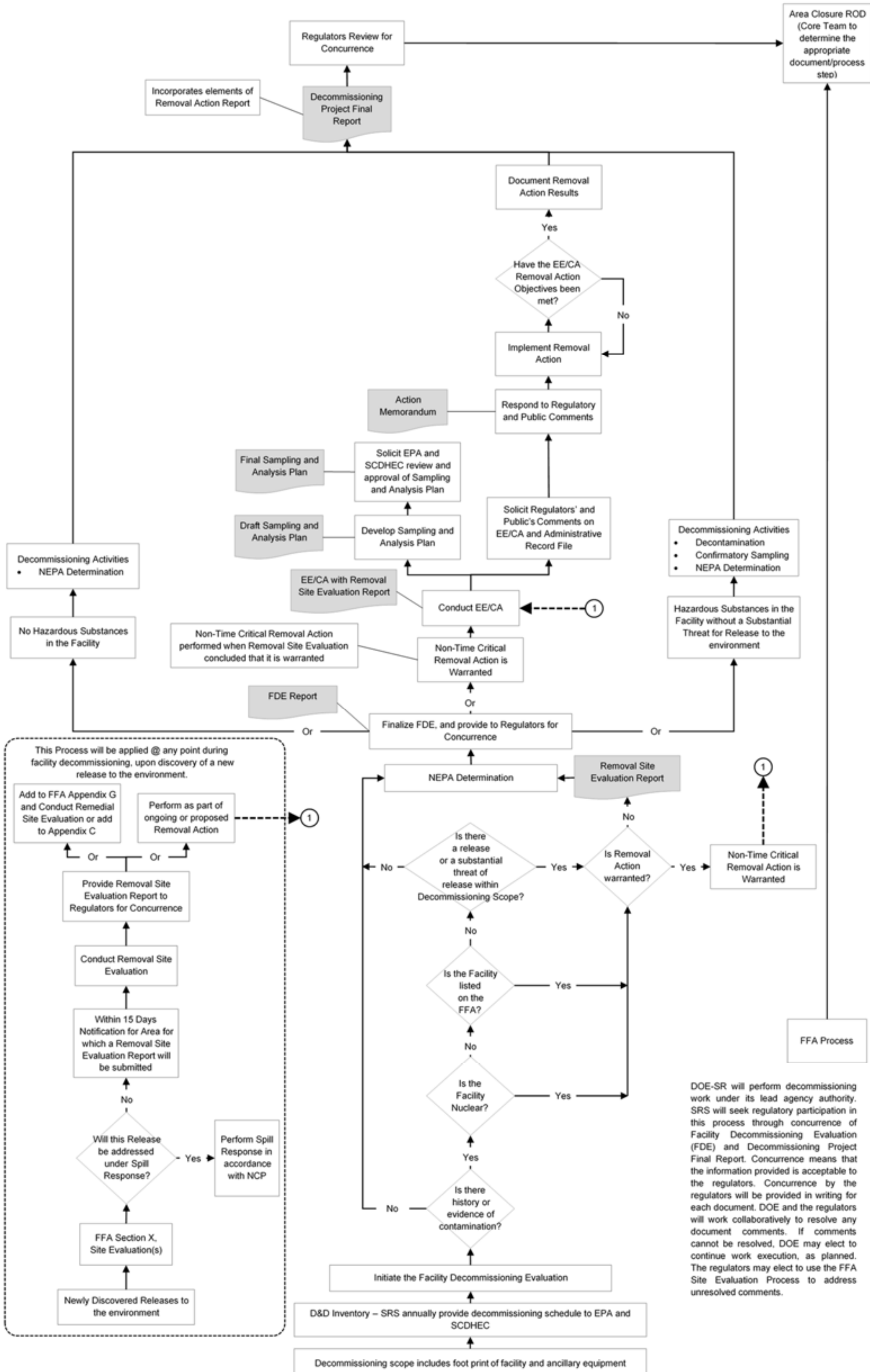
DOE has defined a decommissioning "framework" in DOE G 430.1-4, *Decommissioning Implementation Guide*. Site Manual 1C describes the activities related to decommissioning consistent with that framework. [DOE G 430.1-4]

During decommissioning, any unacceptable residual hazards are eliminated permanently. A range of possible alternative end states is evaluated and the best one chosen. The possible end states include demolition, in situ disposal, or a combination of the two. DOE O 430.1C, contains the requirement that decommissioning be done under CERCLA, in a manner negotiated between DOE and the U.S EPA, unless circumstances at the facility make it inappropriate. DOE G 430.1-4, describes this negotiated process, referred to as the "decommissioning framework".

On May 22, 2003, DOE-SR, EPA and SCDHEC agreed to support accelerated cleanup of the SRS by signing a *Memorandum of Agreement for Achieving an Accelerated Cleanup Vision at the Savannah River Site*. [MOA_07-2003]

As part of that MOA, the parties initiated a process of re-defining their strategic approach to cleanup based on a concept of executing work on an "area basis". The Area OU concept integrates characterization, assessment and remediation of SRS industrial areas that may include contaminated soils, sediments, and facility residuals that remain following D&D (e.g., slabs, sub-grade structures). The MOA also provided a flow path for decommissioning of excess facilities that demonstrates integration with the FFA (Figure 3.2-3).

Figure 3.2-3: Administrative Flow Path for Decommissioning Excess Facilities



An Area Completion Team was convened in September 2004, January 2005, and February 2005 to discuss the Area OU approach as well as project specific implementation of the Area concept, the parties established the *Area Completion Strategy for the Savannah River Site* for 14 major industrial areas at SRS (Table 3.2-1) including the FTF OU. These Area OUs are further defined in Appendix C.5. of the SRS FFA. Appendix E to the FFA lists the projected deliverable dates for all SRS RCRA/CERCLA units including the designated RCRA/CERCLA units and D&D Facilities (or Remnants) that May Warrant Response Action assigned to an Area OU.

Table 3.2-1: Area OU Projects

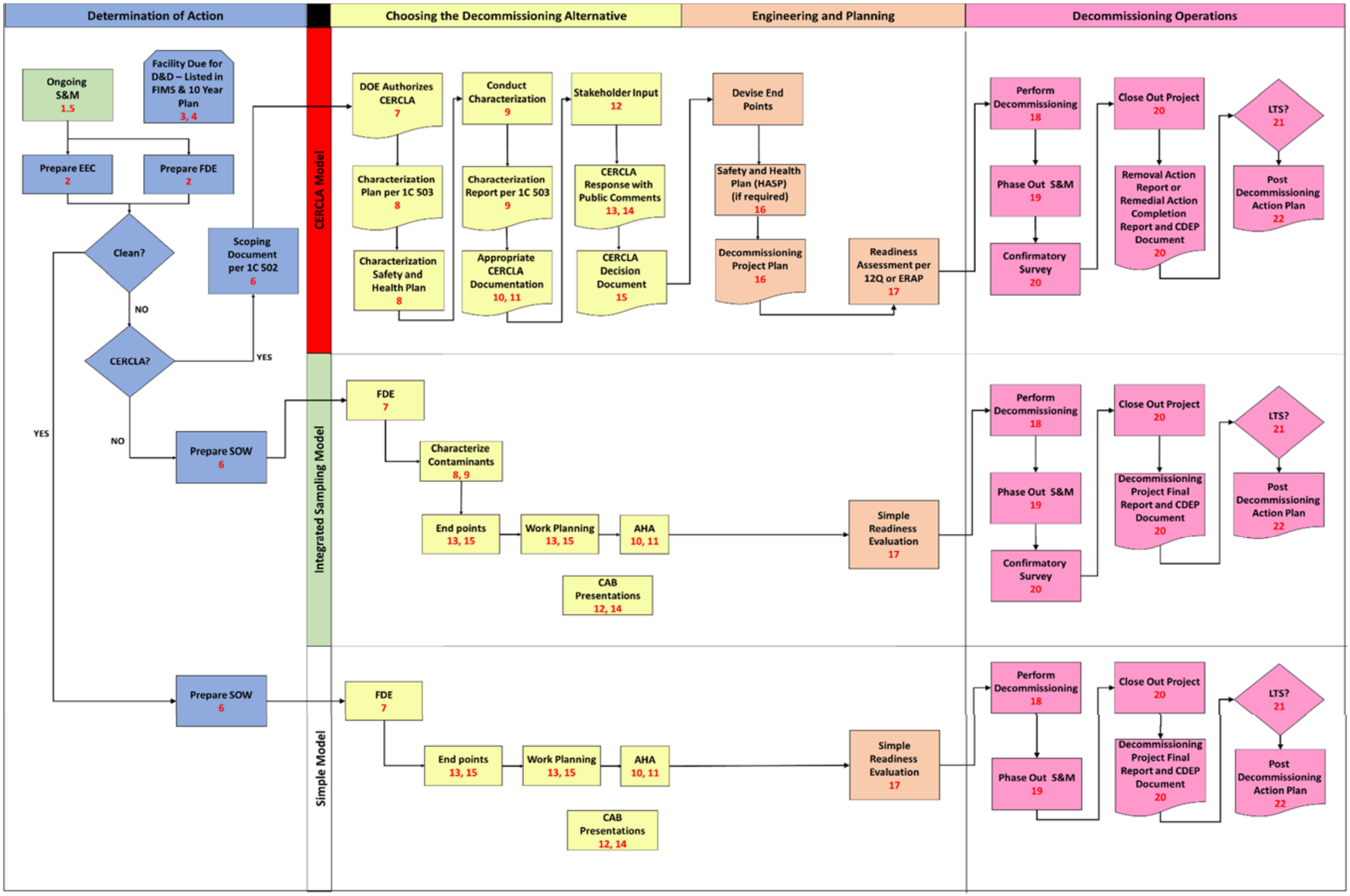
Area Operable Units	
T Area	K Area
M Area	L Area
P Area	A Area
R Area	F Area
N Area	F Tank Farm
C Area	H Area
D Area	H Tank Farm

Details on how to implement the decommissioning phase using the graded approach from the *Area Completion Strategy for the Savannah River Site* are described in site Manual 1C, *Facility Disposition Manual*. [1C Manual] Figure 3.2-4 provides how the strategy is captured in Manual 1C. The approach in the decommissioning framework is to be applied to contaminated facilities (i.e., facilities that have structural components and/or systems contaminated with hazardous chemicals and/or radioactive substances), and includes the activities listed below (not necessarily in the order listed). The majority of documents required by site Manual 1C are internal documents to SRS and are not to be consider regulatory documentation requiring concurrence by outside regulatory agencies.

- Obtain a decision from DOE to decommission the facility based on residual hazards, the cost of maintaining the facility, the physical condition of the facility and other relevant factors (Framework STEPS 1-4, Figure 3.2-4)
- Continue S&M activities until the facility is decommissioned (Framework STEP 5, Figure 3.2-4)
- Determine whether the decommissioning project will be conducted as a CERCLA action, based on the nature and extent of the hazards and the degree of complexity (Framework STEP 2, Figure 3.2-4). This is done by preparing a Facility Decommissioning Evaluation (FDE)

- Prepare a Decommissioning Scoping Document (Framework STEP 6, Figure 3.2-4)
- Based on information contained in the FDE and Decommissioning Scoping Document, DOE will make a determination of whether to proceed with decommissioning (Framework STEP 7, Figure 3.2-4)
- Gather additional information, evaluate alternative action scenarios for decommissioning the facility, assess the relative costs and risks of the decommissioning alternatives, and select a preferred alternative, with appropriate regulator and stakeholder input (Framework STEPS 8-15, Figure 3.2-4)
- Determine a set of decommissioning end points that will achieve the end state that was decided on as the preferred alternative. Use a formal method for determining end points and involve the persons who will be doing the work in determining the end points
- Prepare a Decommissioning Project Plan (Framework STEP 16, Figure 3.2-4)
- Conduct engineering, procurement, and other preparations for commencing decommissioning field activities in accordance with the Decommissioning Project Plan and established SRS procedures and requirements
- Perform and document a readiness evaluation for starting field operations (Framework STEP 17, Figure 3.2-4)
- Conduct decommissioning field activities in accordance with the Decommissioning Project Plan (Framework STEP 18, Figure 3.2-4)
- Phase out S&M activities (Framework STEP 19, Figure 3.2-4)
- Perform a final verification survey to confirm that decommissioning objectives have been met. Perform independent verification activities if required (Framework STEP 20, Figure 3.2-4)
- Prepare the appropriate regulatory required document(s) and obtain regulator concurrence (Framework STEP 20, Figure 3.2-4).
- Decommissioning may not always be the final site action where follow-on remedial evaluation for soils and water bodies may be required, as may be the case with the FTF OU. In these cases, facilities may require long-term surveillance (LTS) (Framework STEP 21, Figure 3.2-4).
- For facilities where further action is determined to be necessary, a Post-Decommissioning Action Plan will be prepared. The plan will contain such things as any follow-up clean-up or remediation of soil or groundwater required, identify continuing monitoring requirements, and identify any maintenance required with residual features at the facility (Framework STEP 22, Figure 3.2-4).

Figure 3.2-4: Approach for Decommissioning Excess Facilities



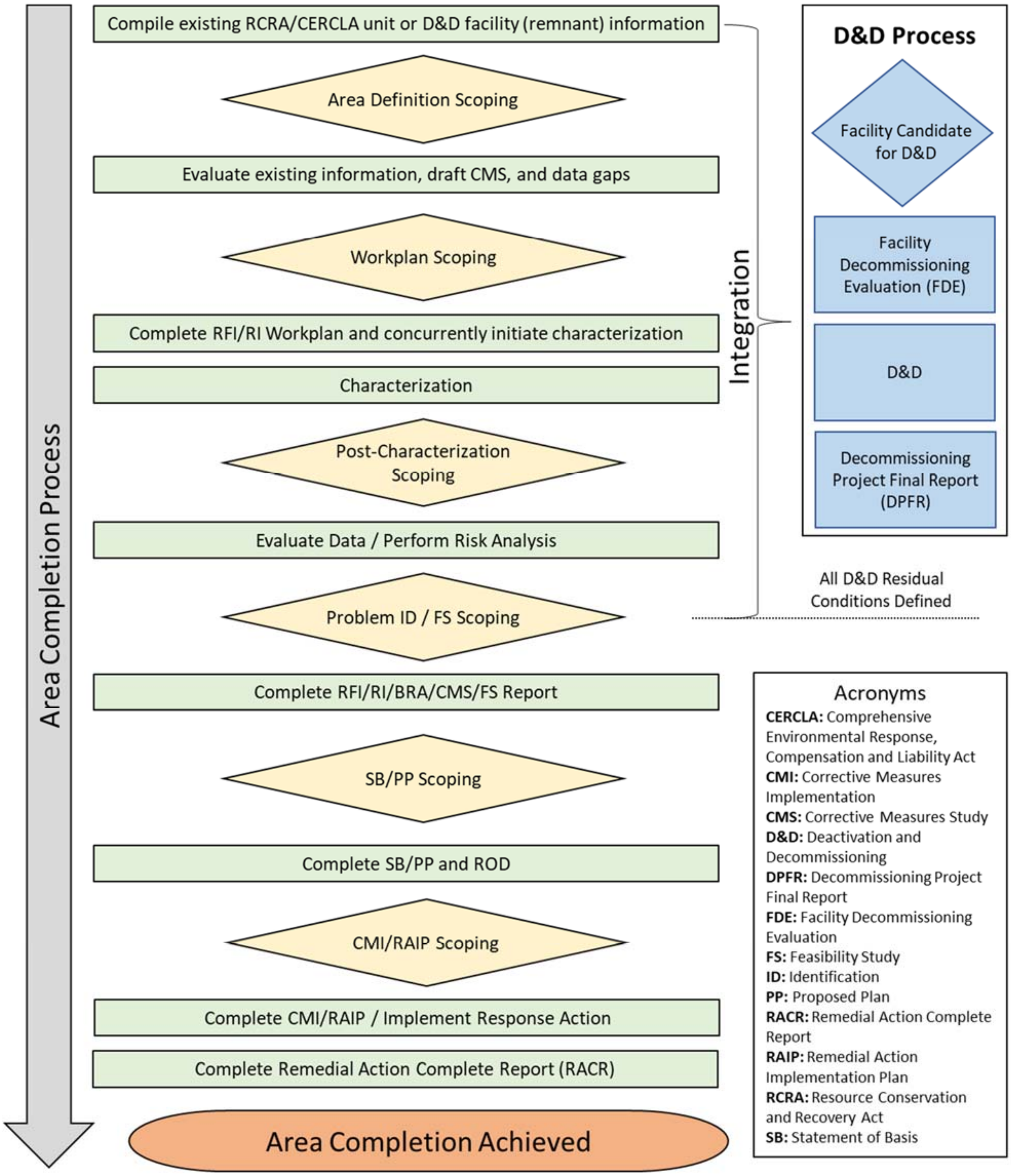
3.2.5 Final End State and Close Out

Decommissioning is typically not the final action, particularly at sites where follow-on remedial evaluation for soil and ground water is required to complete the Area cleanup, as is anticipated to be the case with the FTF OU. When this is the case, follow-up responsibilities will be included in ongoing regulatory remedial action programs. In most cases, remedial assessment and any needed action will follow the process agreed to by DOE, SCDHEC and EPA on May 22, 2003. This agreement is documented and approved by the three parties in the *Memorandum of Agreement for Achieving an Accelerated Cleanup Vision Savannah River Site.* In addition, long-term monitoring of the site may be required, whether or not additional remedial action is performed. [MOA_07-2003] After decommissioning is completed, the following actions are required:

- Determine whether any additional remedial action for soils or water bodies is required. Determine whether any post-decommissioning monitoring of residual contamination or releases is necessary. Document these requirements, if any, in a Post Decommissioning Action Plan (Framework STEPS 21-22, Figure 3.2-4) These steps will likely occur concurrently with the FFA process.
    - Final Closure of the FTF OU will follow the process outlined in the MOA and described within the FFA.

The Area Completion Strategy for the Savannah River Site provides the process under which the FTF OU will be closed. [ERD-EN-2005-0084] The methodology is integrated with the FFA. Figure 3.2-5, reproduced from the document, provides an overview of the scoping meetings, technical activities and points of D&D integration associated with the Area Completion process as outlined in the document. A detailed description of the Area OU scoping process is provided in Appendix A of that document.

Figure 3.2-5: Area Completion Process



It is during this phase that decisions will be made regarding the end state of the FTF OU, including final remedial actions for spills within the FTF OU identified in Appendix C.5 of the FFA and provided in Table 3.2-2. In addition, decisions will be made regarding buildings/structures identified in FFA Appendix K.1 (referred to as "D&D Facilities" in the FFA), and provided in Table 3.2-3, to determine if they may require additional action after decommissioning. During the Decommissioning phase, the buildings/structures which may requiring additional action will be moved from FFA Appendix K.1 to Appendix C.4. The FTF OU also includes the F-Area Retention Basin, 281-8F.

Table 3.2-2: Spills Associated with the FTF OU

FFA Spills included in the FTF OU
Combined Spills from 242-F, No Building Number (NBN);
Spill on 10/01/71 of 100 ft^2 of Flush Water-Rad, NBN;
Spill on 06/26/75 of 250 ft^3 of Rad Contaminated Soil, NBN;
F-Area Tank Farm, 241-F [F-Area Tank Farm Groundwater Operable Unit;
Spill on 05/01/57 of 125 ft^2 of rad liquid from solvent trailer (formerly Index No. 200) (WMF-008);
Flush of Feed Pump to 242-F Spill Water in the Ground, 04/01/66 (WMF-017);
Tank 19 Contaminated Area (WMF-001 & -002);
242-F Contaminated Area (WMF-003);
Tank 8 Contaminated Area (WMF-005);
Spill on 01/19/83 of 1000 ft^2 of Radioactive Spill, NBN;
Spill on 04/14/81 of 3 gal of Contaminated Flush Water-Rad, NBN;
Spill on 05/30/78 of Unknown of Sump Overflow, NBN;
Spill on 10/16/81 of 30 gal of Low-Level Waste from Trailer, NBN;
Spill on 06/06/79 of <1 gal of Contaminated Liquid, NBN;
Spill on 03/01/66 of 500 ft^2 of Flush Water-Rad, NBN;
Spill on 04/57 of Rad Liquid from Solvent Trailer, NBN;
Spill on 05/28/81 of 9000 gal Chromated Water, NBN

Table 3.2-3: Buildings/Structures to be Decommissioned which are Associated with the FTF OU

Buildings/Structures to be Decommissioned	
241-104F Storage and Supply Building	241-917F Waste Storage Tank
241-11F Gang Valve House	241-918F Waste Storage Tank
241-13F West Pump House	241-91F Waste Certification Building
241-17F East Pump House	241-920F Waste Storage Tank
241-18F Control Room/Motor Control Center (MCC)	241-925F Waste Storage Tank
241-20F Cooling Towers/Pumphouse Ser 25-28, 44-47	241-926F Waste Storage Tank
241-21F FDB4 and FPPs 2 and 3	241-927F Waste Storage Tank
241-28F Office/Change Rooms	241-928F Waste Storage Tank
241-2F FDB1	241-933F Waste Storage Tank
241-32F FDB6 Diversion Box	241-934F Waste Storage Tank
241-33F FDB5 Diversion Box	241-93F ALARA Storage Building
241-53F Air Compressor Building	241-944F Waste Storage Tank
241-58F Maintenance Shop Building	241-945F Waste Storage Tank
241-62F MCC Building	241-946F Waste Storage Tank
241-64F Air Compressor Building	241-947F Waste Storage Tank
241-65F Breathing Air Compressor Building	241-97F Cooling Water Basin
241-74F Control Room/MCC	241-99F MCC Building
241-75F Cesium Removal Control Pump House	242-10F Radcon Trailer Near Tank 4
241-84F Interim Record Storage	242-11F Radcon Trailer Near 1F Evaporator
241-901F Waste Storage Tank	242-12F Radcon Trailer Near 2F Evaporator
241-902F Waste Storage Tank	242-16F 2F Evaporator
241-903F Waste Storage Tank	242-1F Waste Evaporator #1 Control House
241-904F Waste Storage Tank	242-3F CTS Pit
241-905F Waste Storage Tank	242-8F Radcon Trailer Near FDB2
241-906F Waste Storage Tank	242-9F Radcon Trailer Near Tanks 33/34
241-907F Waste Storage Tank	242-F 1F Evaporator
241-908F Waste Storage Tank	641-F Inter Transfer Lines Diversion Box/Pump Pit (FDB2)

4.0 TANK FARM DIVISION/WASTE TANK GROUPING

Due to the manner in which the tanks were constructed, FTF is arranged such that it can be divided into tank groupings. The groups are based on the geographical locations which coincide with the waste tank types (Section 2.2). FTF was expanded several times with each expansion naturally segregating the tanks into distinct groupings. The separate groupings within FTF are illustrated in Figure 4.0-1 and listed in Table 4.0-1. For the purpose of discussions within this document, the groupings have been designated as Groups A-D.

Figure 4.0-1: FTF Tank Groupings

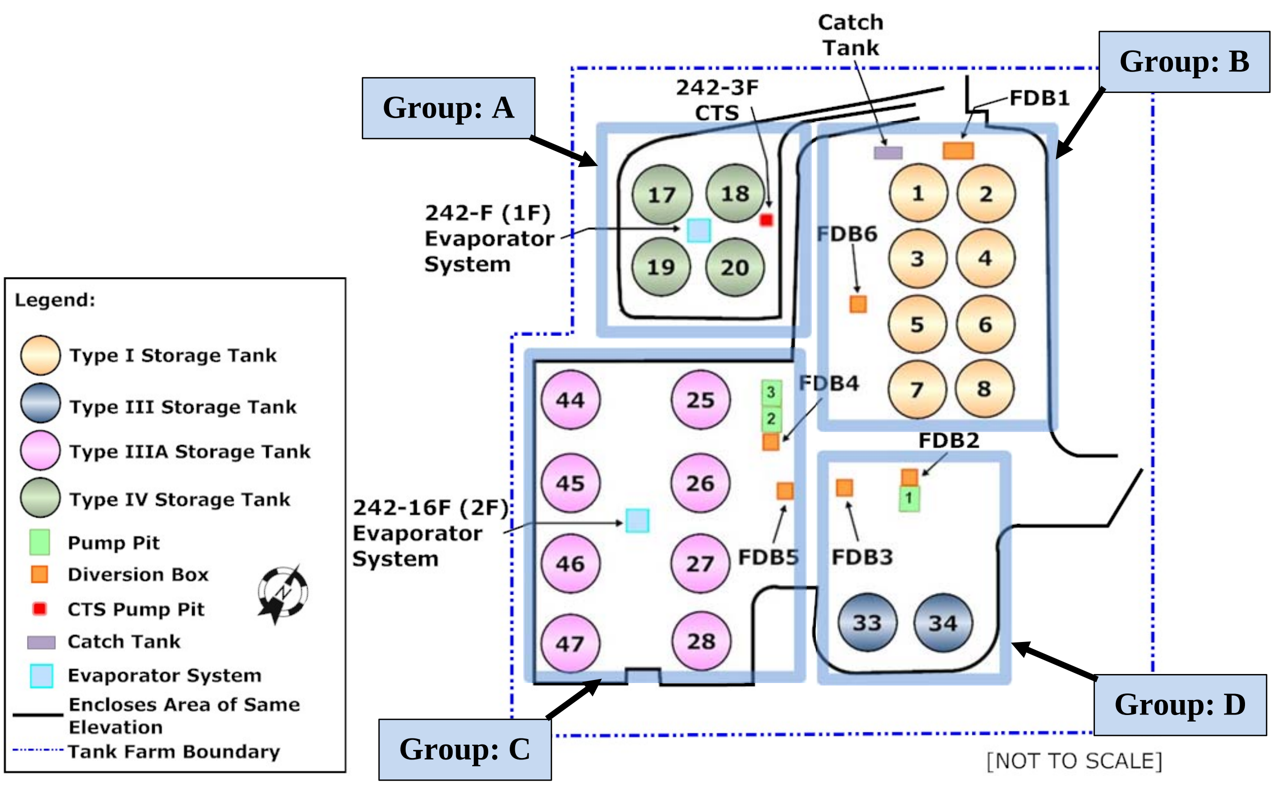


Table 4.0-1: FTF Areas

Group	Waste Tanks	Ancillary Structures
A: Type IV Tanks	17-20	1F Evaporator, CTS Pump Pit
B: Type I Tanks	1-8	FDB1, FDB6, Catch Tank
C: Type IIIA Tanks	25-28 & 44-47	2F Evaporator, FDB4, FDB5, FPP2, FPP3
D: Type III Tanks	33 & 34	FDB2, FDB3, FPP1

Group A includes the Type IV Tanks (i.e., Tanks 17-20) which are all operationally closed (i.e., waste removal complete, isolated and filled with grout). This group of tanks are located at a lower elevation than the rest of the FTF. The ancillary structures in this area are the 1F Evaporator System and the CTS, both of which are inactive and need to be operationally closed.

The Type I Tanks (i.e., Tanks 1-8) are situated together in one corner of FTF, Group B. Tanks 5 and 6 are operationally closed. BWRE has been completed in Tanks 4, 7 and 8. These tanks will still require final heel removal before being operationally closed. Tanks 1, 2 and 3 each contain a considerable amount of saltcake. BWRE has been initiated in Tank 3 with the first salt dissolution campaign having been completed in 2019. Planning for Tank 2 salt dissolution is underway and efforts for Tank 1 will begin at a future date. The ancillary structures associated with this area are FDB1, FDB6 and the F-Area Catch Tank, all of which are inactive and are available to be operationally closed.

The next group of tanks are the Type IIIA tanks (i.e., Tanks 25-28 and 44-47) located in Group C. BWRE has not been completed on any of these tanks. Field activities have been initiated for salt dissolution in Tanks 27 and 44. Project planning for salt dissolution activities in Tanks 28 and 47 have been initiated. These tanks surround the 2F Evaporator, this ancillary structure is inactive but has not been operationally closed. The other ancillary structures in this area are FDB4, FDB5, FPP2 and FPP3. Of these ancillary structures, FDB5 is the only one that is currently inactive, all other are being used to support operations.

The last grouping, Group D, is around the Type III tanks (i.e., Tanks 33 and 34). Both of these tanks will require additional waste removal prior to being operationally closed. Planning for sludge removal in Tank 33 has been initiated. The ancillary structures associated with this area are FDB2, FDB3 and FPP1, all of which are actively supporting operations.

Additional details regarding Groups A through D are provided in Sections 4.2 through 4.5 of this document.

4.1 System Planning

The Liquid Waste (LW) System Plan documents a strategy to operate the LW System at SRS to receive, store, treat, and dispose of radioactive LW and to close waste storage and processing facilities. [SRR-LWP-2009-00001] The LW System is a highly integrated operation involving safely storing LW in underground storage tanks; removing, treating, and dispositioning the low-level waste (LLW) fraction in concrete SDUs; vitrifying the higher activity waste at DWPF; and storing the vitrified waste in stainless steel canisters pending permanent disposition. After waste removal and processing, the storage and processing facilities are cleaned and operationally closed.

The Tank Farms have received over 160 million gallons of waste from 1954 to the present. The volume of waste has been reduced via evaporation, as well as dispositioned via vitrification at DWPF and disposal at the SDF. The Tank Farms currently store approximately 35 million gallons of waste containing approximately 247 million curies (MCi) of radioactivity. As of December 31, 2019, DWPF had produced 4,210 vitrified waste canisters. (Note: All volumes and curies reported as current inventory in the Tank Farms are as of December 31, 2019)

Successful and timely salt waste removal and disposal is integral to efforts to proceed with all aspects of tank cleanup and removal from service, extending well beyond permitted disposal of the solidified low-activity salt waste streams themselves. Removal of salt waste enables some tanks to be removed from service in anticipation of future closure. It also is necessary for the preparation of salt waste feed batches for SWPF and TCCR, and continued removal and stabilization of the high-activity sludge fraction of the waste at DWPF. Preparing the sludge for processing in DWPF generates salt waste which must be stored for future disposition via volume reduction in the evaporators or treatment by TCCR or SWPF.

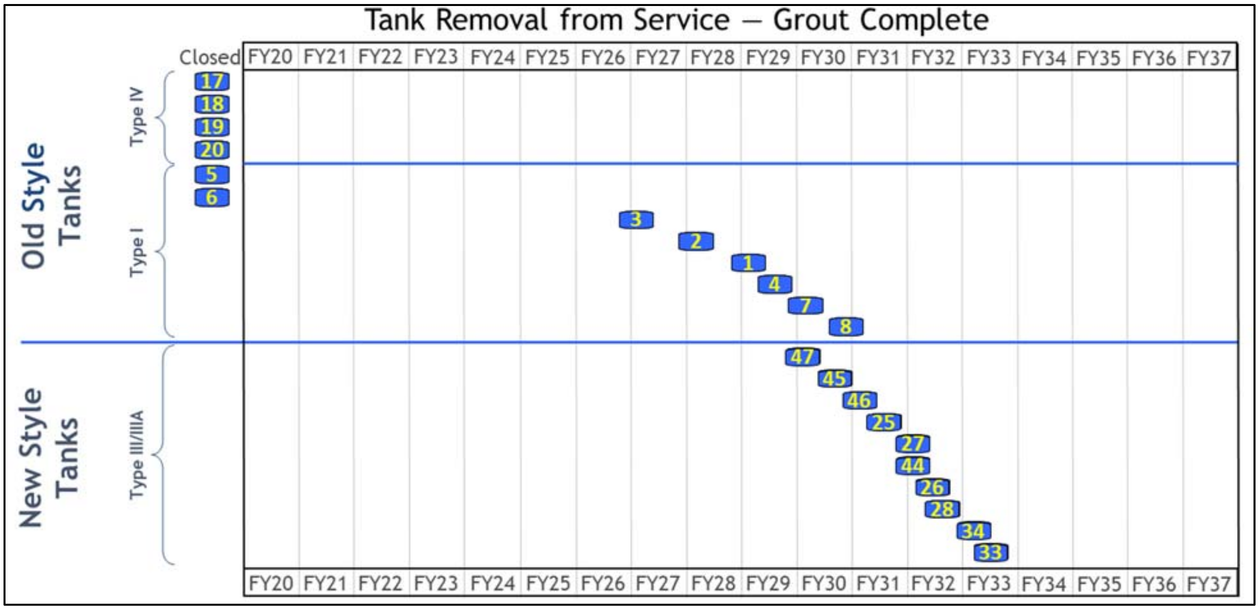
The latest revision of the System Plan, Revision 21, forecasts the best possible outcome for dispositioning the waste in the SRS tank farms via optimistic operation of waste removal, TCCR, SWPF, DWPF, and the Saltstone facilities. This optimistic case assumes timely receipt of the funding required to: install waste removal equipment, for processing facilities to operate at stated rates, and maintain and replace equipment, as necessary. It assumes no major equipment failures other than the one Melter replacement. It also assumes no major changes in safety requirements that would negatively affect the current planning basis for the storage, removal, transfer, or processing of waste.

4.1.1 Tank Closure Sequence

The waste in the FTF is in the process of being removed. Once removed, the tanks and equipment will be operationally closed. System Plan Revision 21 is a planning basis for disposition of existing and future high-level waste (HLW) and removal of radioactive liquid waste tanks from service. The document also goes into detail about the processes used to remove waste from the tanks, the assumptions used for the timing prediction, and descriptions of the systems used in the process. The System Plan assumes thirty-six months from the last removal of any material from a waste tank until the completion of grouting. The System Plan predicts the waste removal of FTF to be complete by 2031 and the last FTF waste tank operationally closed in 2033. [SRR-LWP-2009-00001]

Revision 21 of the System Plan does not consider the closure of the ancillary structures within the Tank Farm. Appendix E of System Plan Revision 21 contains a chart of scheduled events to help close both FTF and HTF. The chart includes Key Milestones, outages, and dates for the closure of tanks. Figure 4.1-1 shows the projected Fiscal Year (FY) operational closure dates of the FTF tanks according to System Plan Revision 21. The dates provided are from System Plan Revision 21, are subject to change, and are not provided as DOE commitments. Waste tank and ancillary structure operational closure schedule dates for the FFA will be set per the 2019 Suspension Agreement.

Figure 4.1-1: Liquid Waste System Plan Tank Removal Progression – FTF Only



According to System Plan Revision 21, Tank 3 would become operationally closed in FY2027. The following year, FY2028, Tank 2 would be closed. In FY2029, Tank 1 and Tank 4 would be closed. Tanks 7, 8, 45, and 47 are scheduled to close in FY2030. In FY2031, Tanks 25 and 46 would close. Tanks 26, 27, 28, and 44 are scheduled to close in FY2032. The final FTF tanks, Tanks 33 and 34 would be operationally closed in FY2033.

4.1.2 Ancillary Structure Closure

Currently, none of the FTF ancillary structures have been operationally closed. An FFA milestone for the operational closure of FDB5 and FDB6 to be completed by December 31, 2022 has been established. Tanks 17-20 are already closed. Nearby these tanks are four under-liner sumps, 242-3F CTS, and the 242-F Evaporator System. These ancillary structures are no longer needed for operations and are available to be operationally closed. Tanks 1-8 are expected to be closed by FY2031. The ancillary structures in the area of these tanks, F-Area Catch Tank, FDB1, and FDB6, as well as the Type I tank transfer line encasement, are no longer needed for operations and are available for operational closure. By FY2032, Tanks 25-28 and Tanks 44-47 will be operationally closed. There are several ancillary structures located in the vicinity of these tanks several of which, including FDB4, FPP2 and FPP3, are currently needed to support operations. These tanks surround the 2F Evaporator, which is inactive but the potential use of some part of the 2F structure to support future operations is being considered. Therefore, when it will be available for operational closure is uncertain. The other ancillary structure in this area, FDB5, is no longer needed for operations and is available for operational closure. Tanks 33 and 34 will be the last to close in the FTF and the ancillary structures within their area are still needed to support operations. The likely availability of when the FTF ancillary structures would no longer be needed to support operations and would therefore be available for operational closure is listed in Table 4.1-1. This table shows each of the ancillary structures in FTF and the likely availability. This indicates when these structures are available to begin the operational closure process.

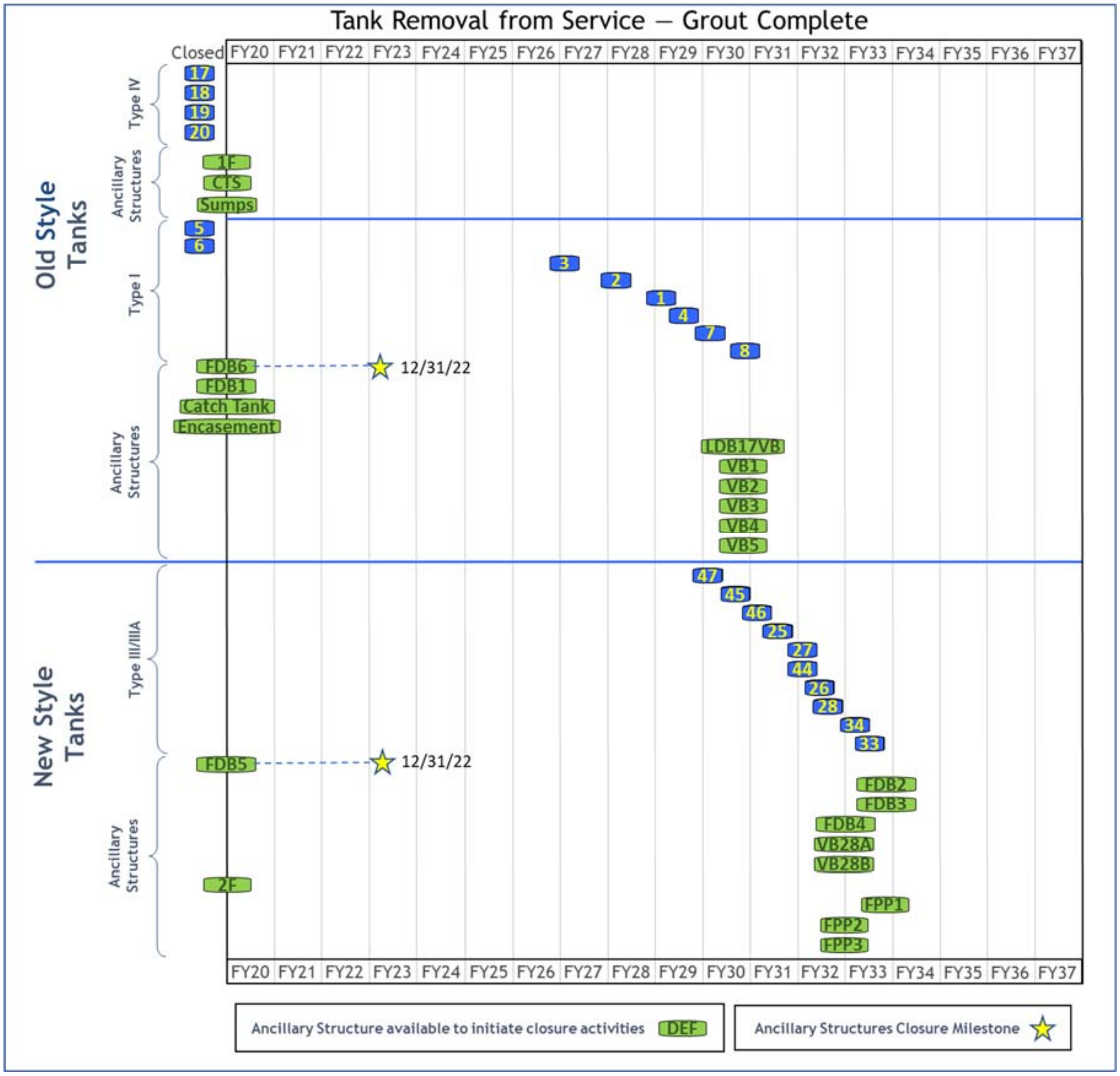
Table 4.1-1: FTF Ancillary Structures Availability

FTF Ancillary Structure	Likely Availability
242-F (1F) Evaporator *Evaporator Pot* *Condenser* *Cesium Removal Column Pump Tank* *Overheads Tank South* *Overheads Tank North* *Overheads Diverting Tank*	Available
242-3F Concentrate Transfer System	Available
242-16F (2F) Evaporator *Evaporator Pot* *Condenser* *Mercury Collection Tank* *Cesium Removal Column Pump Tank* *Overheads Tank #1, South* *Overheads Tank #2, North*	Currently shutdown. The potential use of some portion of the 2F Evaporator system to support future operations is being considered, therefore, when it would be available for operational closure is uncertain.
FPP-1 *Pump Pit* *FPT-1*	After the last waste tank operational closure (Tank 33)
FPP-2 *Pump Pit* *FPT-2*	After the last Type IIIA waste tank operational closure (Tank 28)
FPP-3 *Pump Pit* *FPT-3*	
FDB1	Available
FDB2	After the last waste tank operational closure (Tank 33)
FDB3	After the last Type IIIA waste tank operational closure (Tank 28)
FDB4	
FDB5	Available (Planned for operational closure by 12/31/2022)
FDB6	
F-Area Catch Tank	Available
Valve Box 1	After the last Type I waste tank operational closure (Tank 8)
Valve Box 2	
Valve Box 3	
Valve Box 4	
Valve Box 5	
LDB17 Valve Box	
Valve Box 28A (i.e., three valve)	After the last waste tank operational closure (Tank 33)
Valve Box 28B (i.e., single valve)	
Transfer Lines, Type l Tank Transfer Line Encasements, LDBs, MLDBs	Various as tank operational closures occur

Based on the current System Plan (Revision 21) and current use.

Figure 4.1-2 shows the System Plan Revision 21 tank closure dates and, based on the timing of those tank closures, the dates for when ancillary structures would be available to begin the operational closure process.

Figure 4.1-2: Liquid Waste System Plan Tank Removal Progression – FTF Only with Ancillary Structures

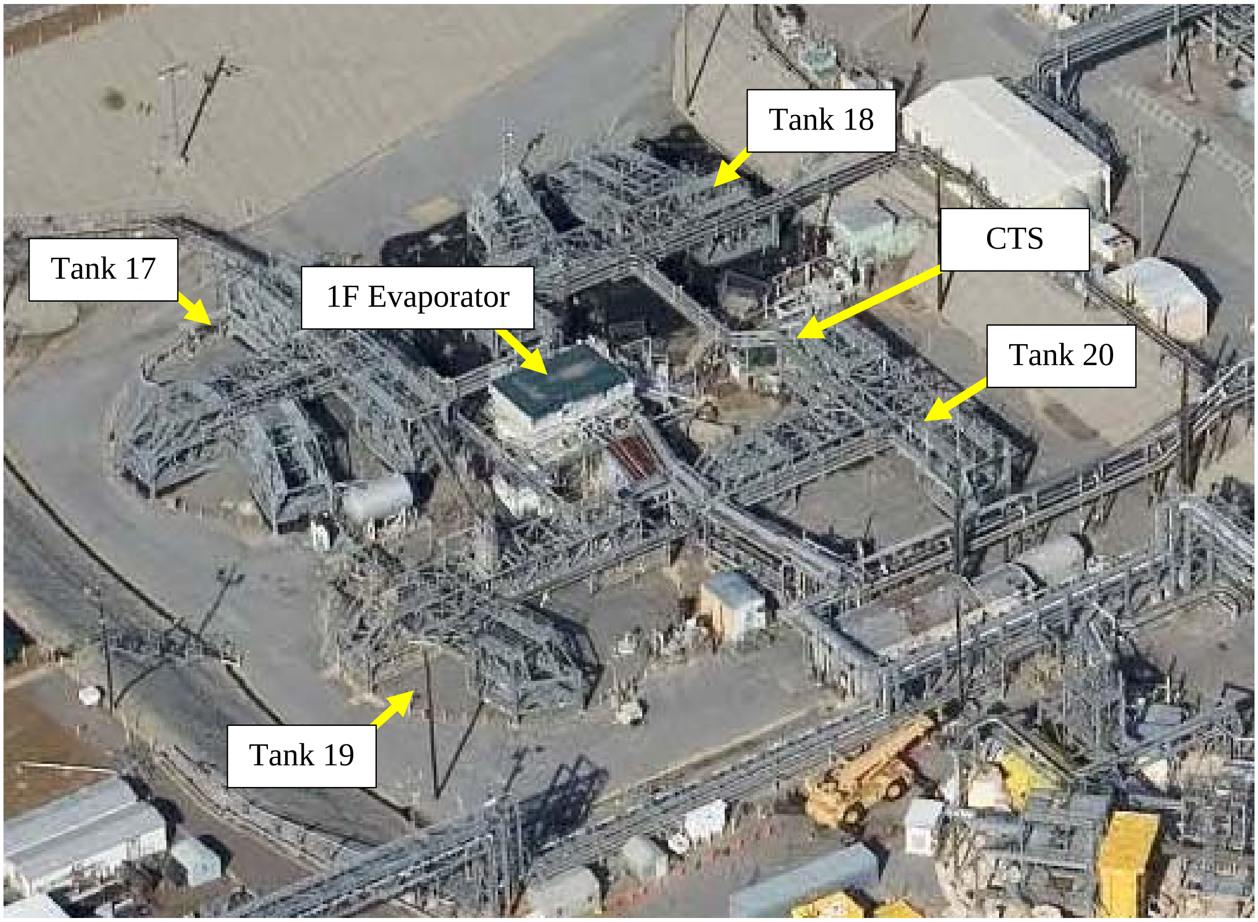


Attachment A to this document provides the System Plan Revision 21 fiscal year by fiscal year status of waste tank operational closure and subsequent availability of ancillary structures to begin the operational closure process.

4.2 Group A: Tanks 17-20

The area surrounding Tanks 17-20 is shown in Figure 4.2-1. As discussed in Section 2.2.4, all four of these tanks are operationally closed. This group of tanks are located at a lower elevation than the rest of the FTF. There is very little operating equipment or operational activities occurring in this area except for minimal surveillance and maintenance activities. None of the ancillary structures in this area have been operationally closed.

Figure 4.2-1: Tanks 17 and 19, 1F Evaporator, and CTS



Section IX of the FFA establishes the requirements for the prevention and mitigation of releases or potential releases at or from the high-level radioactive waste tank system(s) which are identified in Appendix B of the FFA. Section IX of the FFA also establishes requirements for the remediation of tank system(s) that are removed from service. The waste tank systems within this area (i.e., Group A) which are identified in Appendix B of the FFA are provided in Table 4.2-1. Appendix B of the FFA primarily lists tanks associated with the various ancillary structures (e.g., pump tanks) and does not specifically list the surrounding secondary containment (e.g., pump pits, diversion boxes) as may be identified in other documents such as the CGCP.

Table 4.2-1: Group A Waste Tank Systems Subject to Section IX of the FFA

FFA Appendix B Waste Tank Systems
High-Level Radioactive Waste Tanks 17-20
242-F (1F) Evaporator Pot o *Mercury Collection Tank* o *Cesium Removal Column Pump Tank* o *Overheads Tank, North* o *Overheads Tank, South* o *Overheads Diverting Tank*
F-Area Concentrate Transfer System Pump Tank

4.2.1 Waste Tank 17-20

Tanks 17-20 are Type IV waste tanks which have all been operationally closed. Tanks 17 and 20 were operationally closed in 1997, and Tank 18 and 19 in 2012. The tanks have individually been isolated from the FTF Waste Transfer System and FTF support systems.

This closure process consisted of identification and isolation of transfer lines, drain lines, water, air, and steam supply lines, ventilation systems, power and instrumentation lines, and all other penetrations into or out of the waste tank. Isolation of these systems was performed at the electrical control rooms for electrical services and instrumentation, and for mechanical systems at the system supply headers located off of the top of the waste tank. Where practical, accessible piping and conduit was removed creating physical breaks from the waste tank. Other pipes were plugged or capped to isolate them from the FTF transfer line system. Isolating all systems from the waste tank rendered the waste tank closed to waste processing activities.

After isolation, the waste tanks were stabilized by filling with grout. As the waste tanks were filled, grout material flowed into the abandoned waste tank and riser penetrations, thereby sealing and effectively isolating the abandoned lines. This eliminated the risk of transferring waste into or out of the waste tank through the abandoned lines. The tank risers have all been capped with concrete as shown in Figure 4.2-2.

Figure 4.2-2: Examples of Capped Waste Tank Risers

There are below grade underliner sumps associated with these waste tanks that will need to be addressed prior to the closure of the FTF OU. Drainage channels underneath these waste tanks were used for leak detection. For each tank, a drainpipe to collect leakage is located at the center of the basemat and runs to a collection sump below the footing at the edge of the waste tank wall. A pipe connects the leak collection sump to the surface so that a leak collection probe might be placed in the sump.

4.2.2 Ancillary Structures

The ancillary structures located within this area (i.e., Group A) are identified in Table 4.2-2.

Table 4.2-2: Group A Ancillary Structures

FTF Ancillary Structures
242-F (1F) Evaporator o *Evaporator Pot* o *Condenser* o *Cesium Removal Column Pump Tank* o *Overheads Tank South* o *Overheads Tank North* o *Overheads Diverting Tank*
242-3F, F- Area Concentrate Transfer System o *Concentrate Transfer System Pump Tank* o *Concentrate Transfer System Pump Pit*

The 1F Evaporator and the CTS located within this area are no longer in service and are available to be operationally closed.

The evaporator was used to reduce the amount of liquid resulting from nuclear material processing. The evaporator system is principally comprised of the evaporator, the overheads system, and the condenser. The 242-F evaporator system also includes a CTS, which was used to distribute evaporator concentrate throughout the tank farm. The transfer lines to and from the 242-F evaporator and 242-3F CTS as well as the utilities and services (e.g., electricity, steam, ventilation, etc.) have been isolated by physically disconnecting and blanking-off the service and process lines. This isolation methodology incapacitates all motive forces and ensures no waste will enter any of these facilities.

Figure 4.2-3 shows the 1F Evaporator as well as its location within FTF. Figure 4.2-4 shows the CTS as well as its location within FTF.

Figure 4.2-3: 242-F: (1F) Evaporator

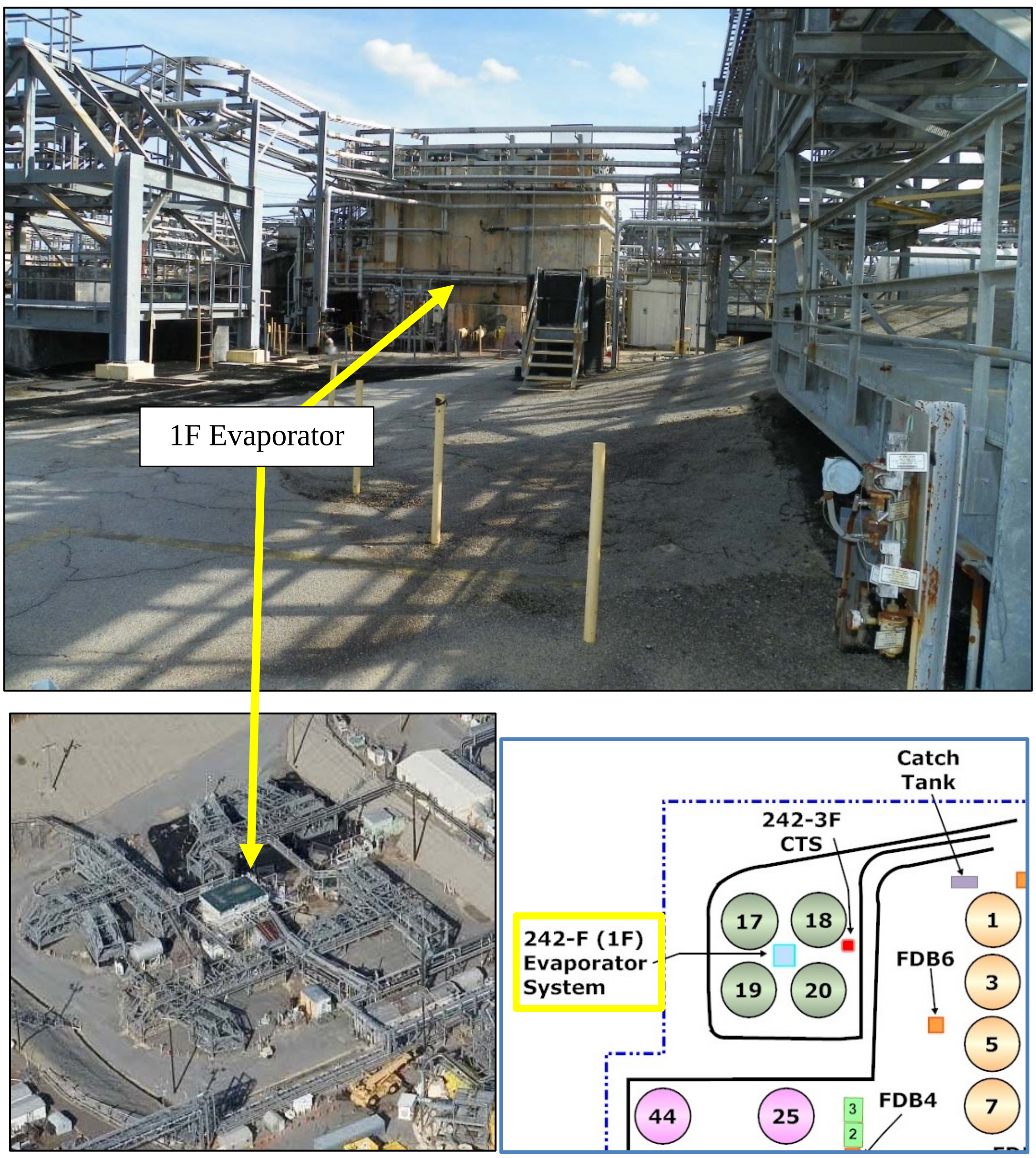
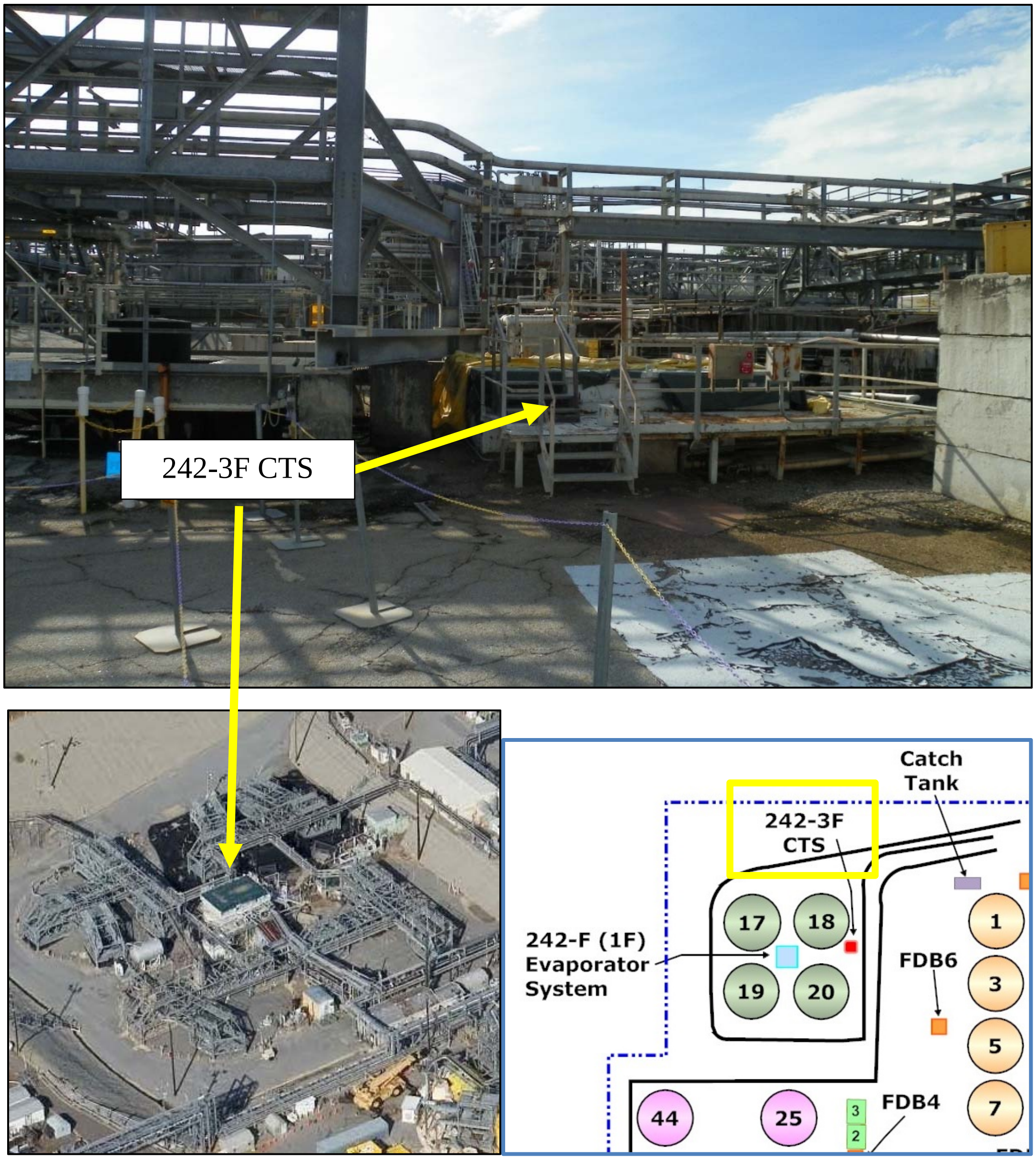


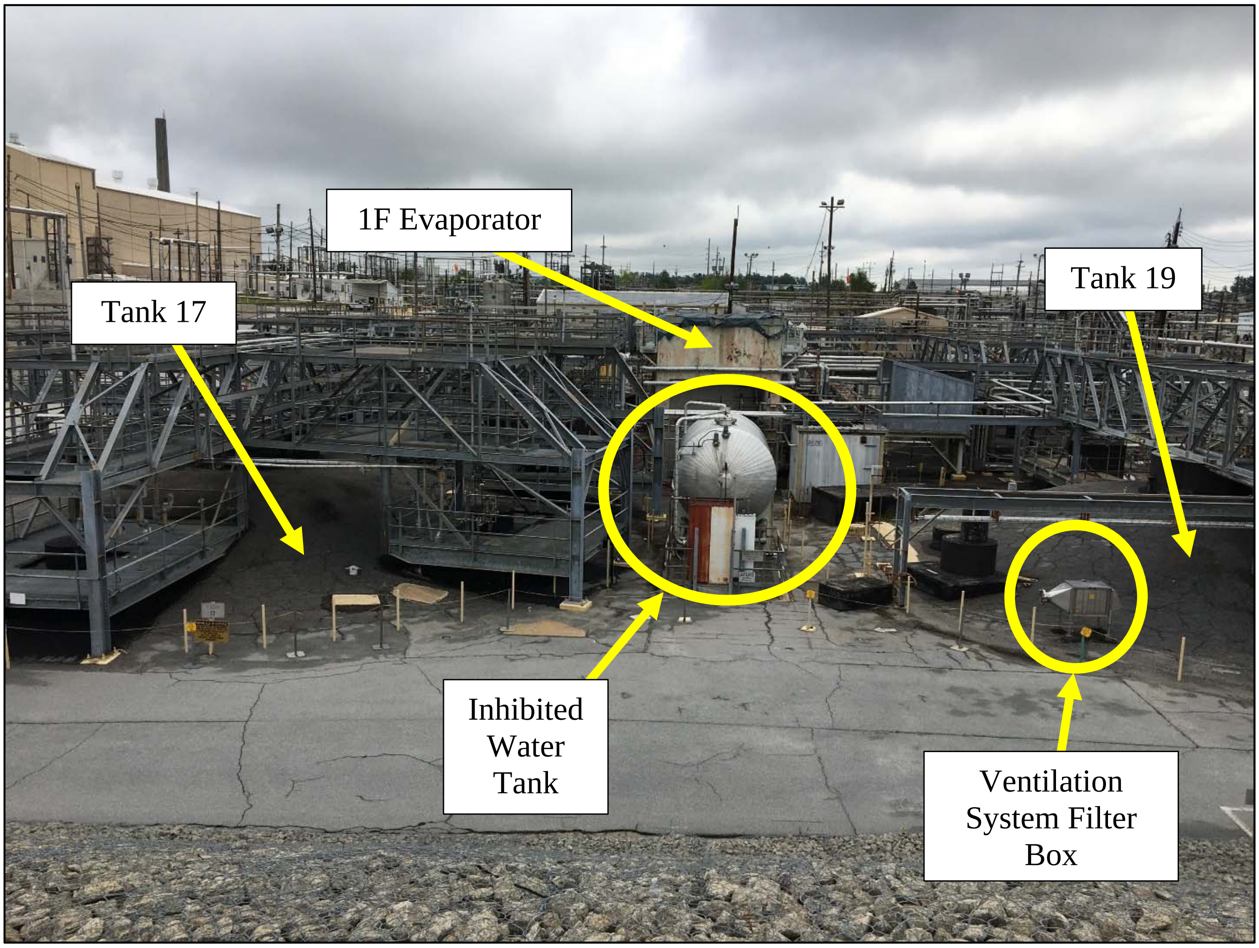
Figure 4.2-4: 242-3F CTS



4.2.3 Other Equipment

This area contains a significant amount of structural steel. These structures could hinder the closure of the ancillary structures and will need to have a decision regarding disposition (i.e., removal or in-situ disposal) relative to the final end state for FTF. Also, there are various other pieces of equipment that are not needed and could be removed and dispositioned appropriately, if needed to be done in support of final closure of FTF. Figure 4.2-5 shows a view of the 1F evaporator. In this figure, the considerable amount of structural steel can be seen. Also, there is an inhibited water tank situated in front of the 1F Evaporator as well as portion of a ventilation system. These types of equipment within this area are no longer in use and would be available now to start the removal process, which would ease the workload during the Deactivation and Decommissioning phases of FTF.

Figure 4.2-5: Tanks 17 and 19 and the 1F Evaporator



The ability to access the CTS for closure is limited. Figure 4.2-6 shows the Tanks 17-20 area with the CTS and 1F Control Room highlighted. Figure 4.2-7 through Figure 4.2-12 show various access angles to the CTS, also showing the limiting degree of access. This activity would also benefit from a reduction in congestion in the area and removal of some of the remaining structures/equipment may be necessary to support operational closure.

Figure 4.2-6: Tanks 17-20

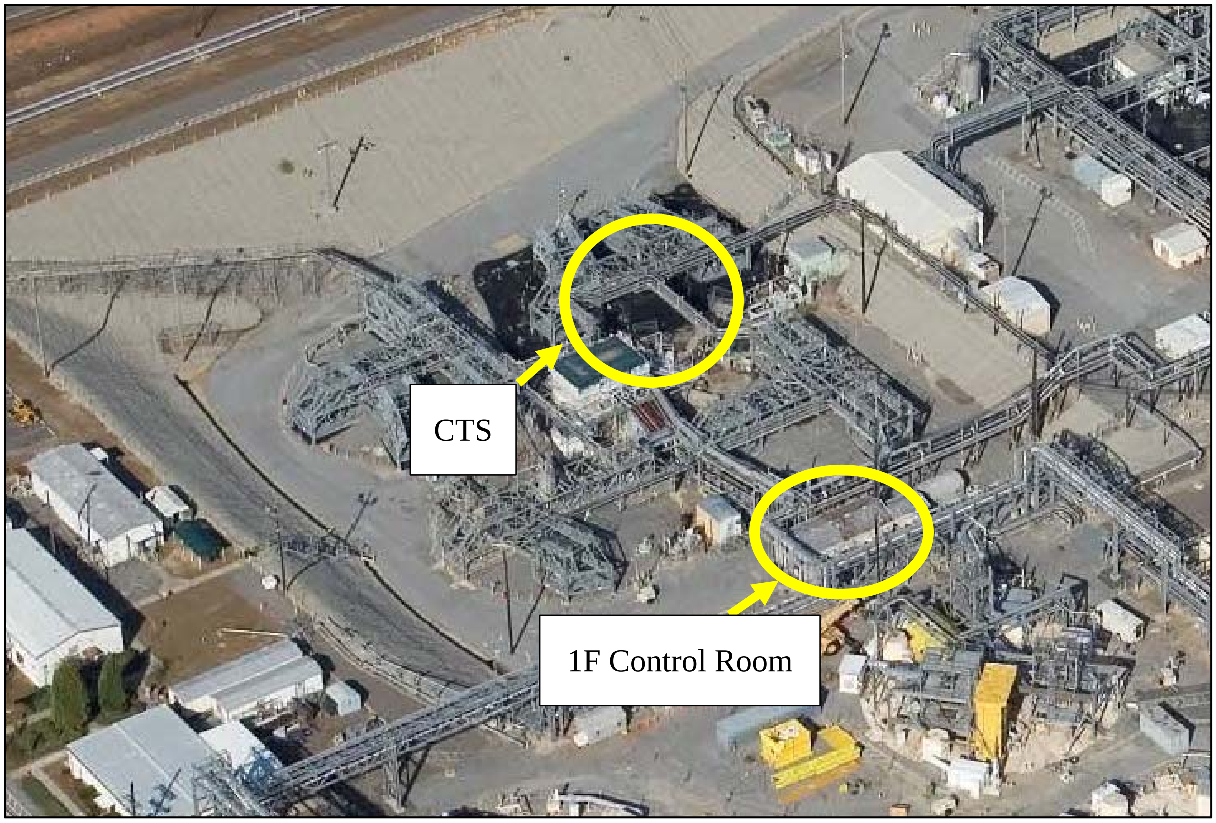


Figure 4.2-7: Viewpoint

Figure 4.2-8: Limited Access Near 1F Control Room

Figure 4.2-9: Viewpoint

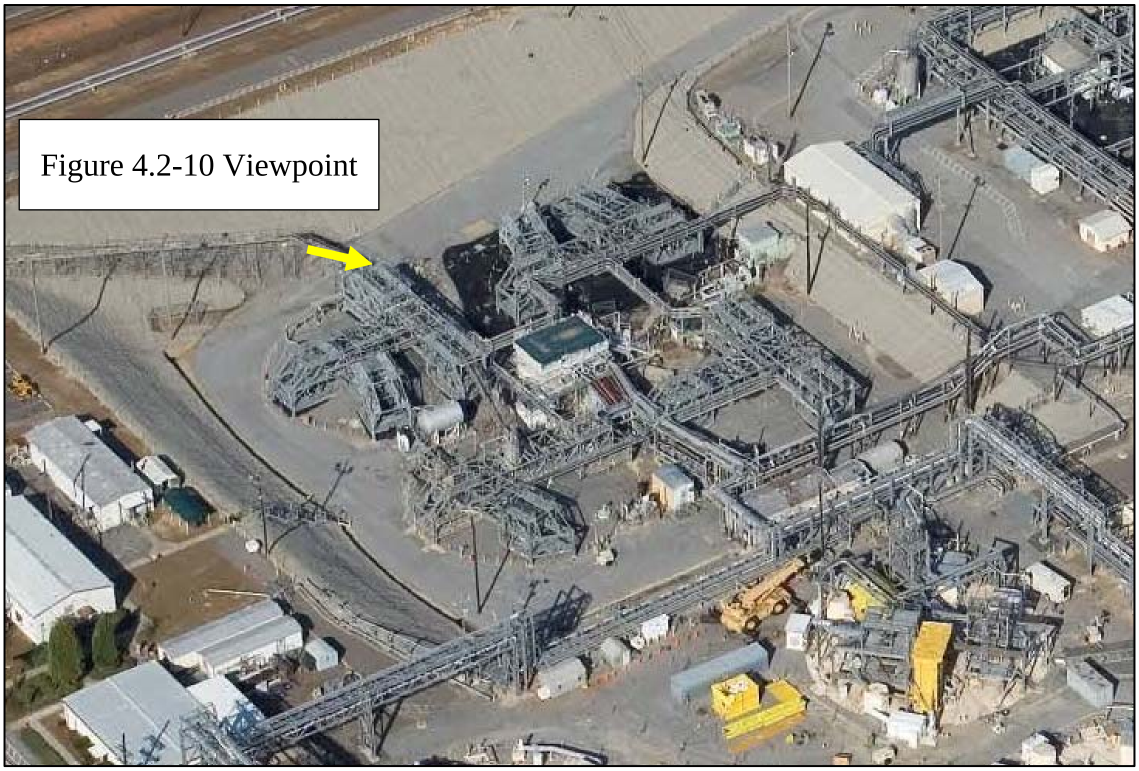


Figure 4.2-10: View of CTS from North of 1F Evaporator

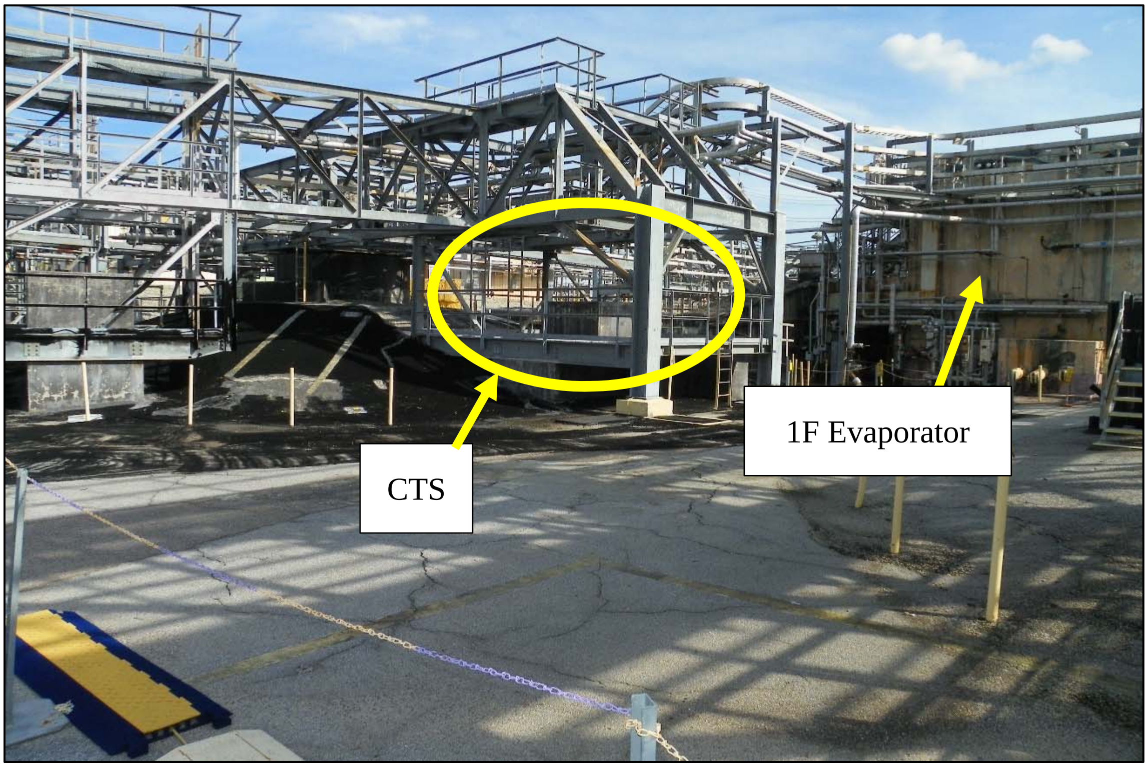


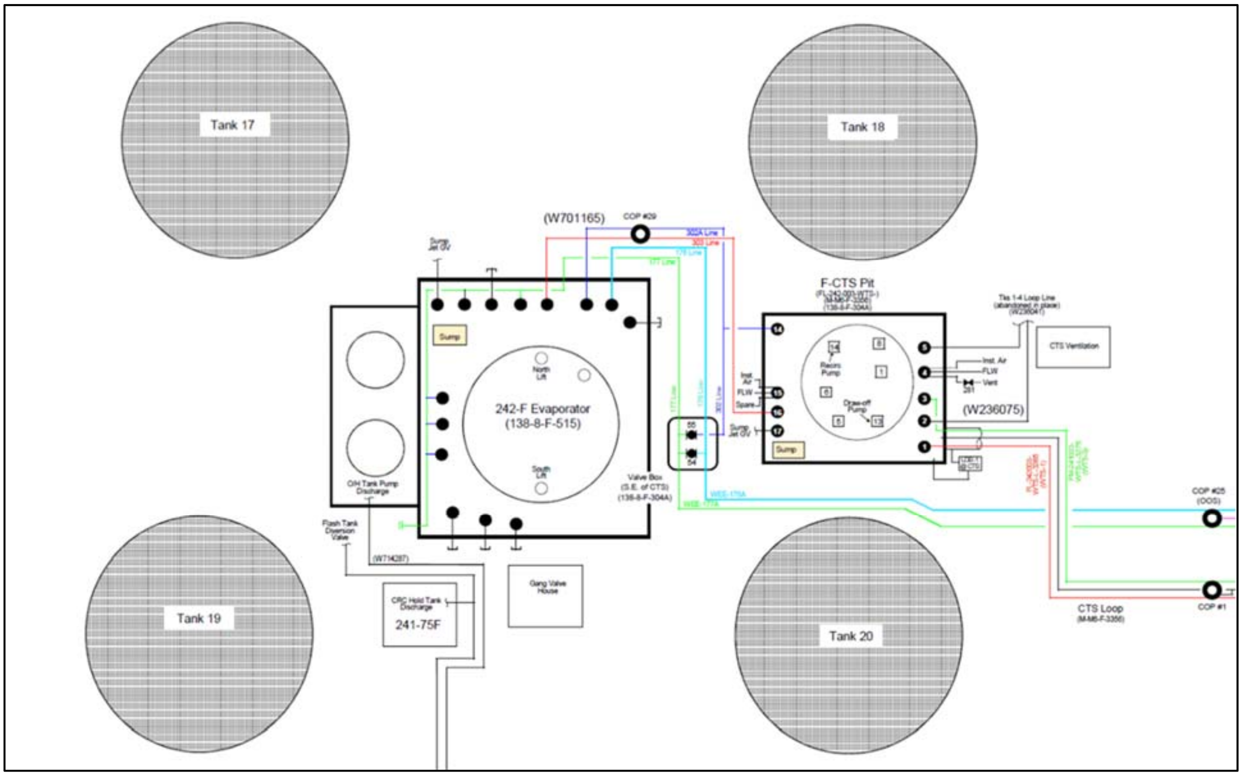
Figure 4.2-11: Viewpoint

Figure 4.2-12: View from above the Ventilation System

4.2.4 Isolation Considerations

If it is decided to isolate this area from the other areas during the deactivation phase, the transfer lines into and out the area will need to be air-gapped. Figure 4.2-13 illustrates the transfer lines in this area. Transfer lines that cross the figure boundary would have to be isolated if this area is decommissioned independently from the other areas. Other system utilities (electrical, instrumental, steam, water) would also have to be isolated if the area is decommissioned independently.

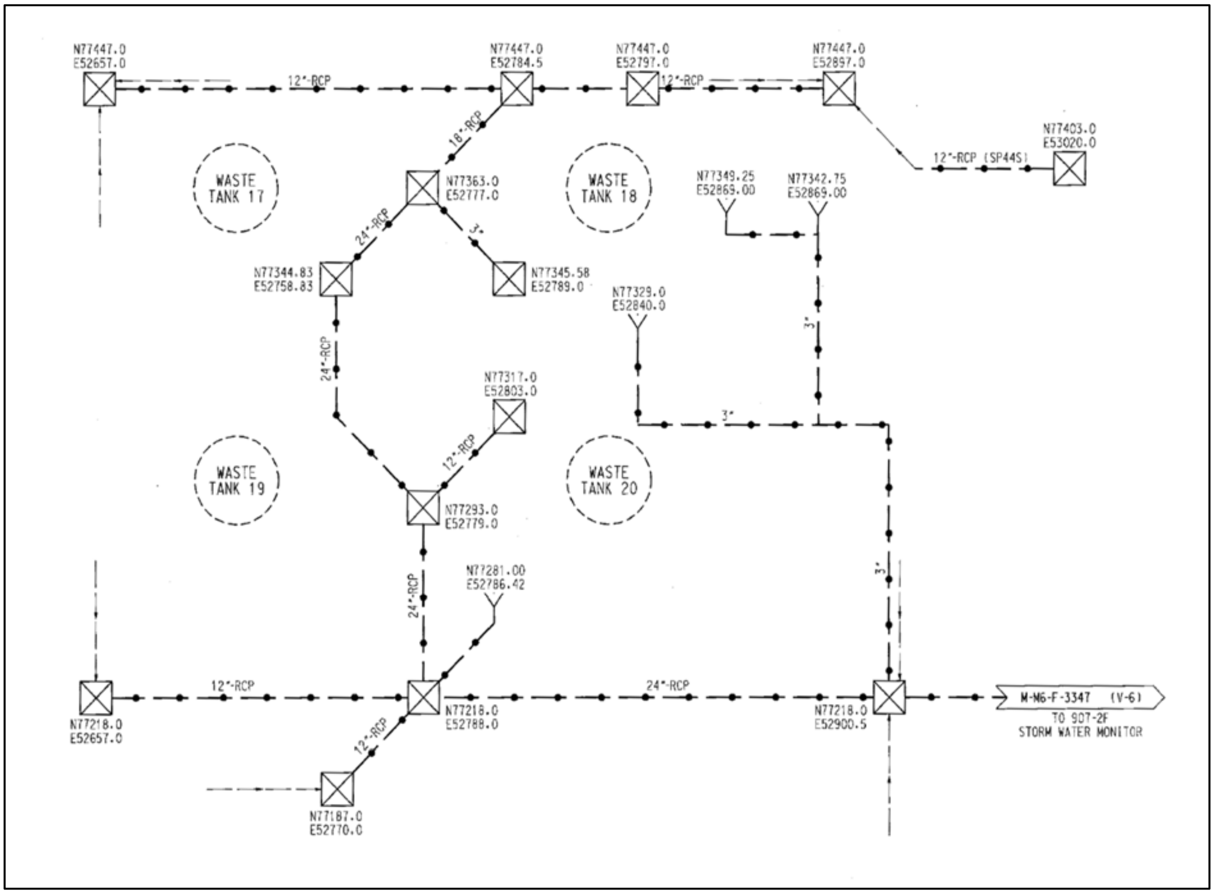
Figure 4.2-13: Group A Transfer Line Isolations



Also present in this area is the 1F Control Room. While the control room is not operational, control and alarms points instrument lines pass through this structure. These points are associated with all the waste tanks in FTF. If this area is decommissioned separately from the other areas, these instrument lines would need to be rerouted out of this area.

The storm sewer system in this area is independent from the other areas in FTF and therefore will not require physical work to be isolated from the other areas. Figure 4.2-14 shows the storm sewer system for Group A. [M-M6-F-3346] There should be no issue concerning isolation of this storm sewer system.

Figure 4.2-14: Group A Storm Sewer System



4.2.5 FFA Building/Structures to be Decommissioned

Prior to and during decommissioning, facilities will be evaluated to determine if there has been a release or there is a substantial threat of a release of hazardous substances to the environment. The buildings/structures planned for or undergoing decommissioning are identified in Appendix K.1 of the FFA. [WSRC-OS-94-42] As agreed upon by DOE, SCDHEC and EPA, the buildings/structures listed in Appendix K.1 will be evaluated during the Decommissioning phase of the Facility Disposition Process to determine if any remediation of is required. Buildings/structures that the three parties agree require no further evaluation or no response action will be moved to Appendix K.2 of the FFA. Buildings/structures that the three parties agree may warrant a response action will be listed on Appendix C.4 of the FFA. Buildings/structures listed on Appendix C.4 of the FFA will require a determination as to whether a response action is warranted. The buildings/structures listed in Appendix C.4 will become subunits of the Area OU. The buildings/structures within Group A that are currently listed in Appendix K.1 of the FFA are provided in Table 4.2-3.

Table 4.2-3: Group A FFA Buildings/Structures to be Decommissioned

Buildings/Structures to be Decommissioned
241-28F Office/Change Rooms
241-58F Maintenance Shop Building
241-75F Cesium Removal Control Pump House
241-917F Waste Storage Tank
241-918F Waste Storage Tank
241-919F Waste Storage Tank
241-920F Waste Storage Tank
242-11F Radcon Trailer Near 1F Evaporator
242-1F Waste Evaporator #1 Control House
242-3F CTS Pit
242-F 1F Evaporator

4.2.6 FFA Spills

Appendix C of the FFA contains the RCRA/CERCLA units as defined by the FFA. [WSRC-OS-94-42] For the FTF OU, Appendix C also includes a list of documented spills considered to be part of the operable unit. The need for any remediation of the listed spills will need to be evaluated as part of FTF OU closure. The listed spills within this area (i.e., Group A) which will need to be evaluated as part of the FTF OU closure are provided in Table 4.2-4.

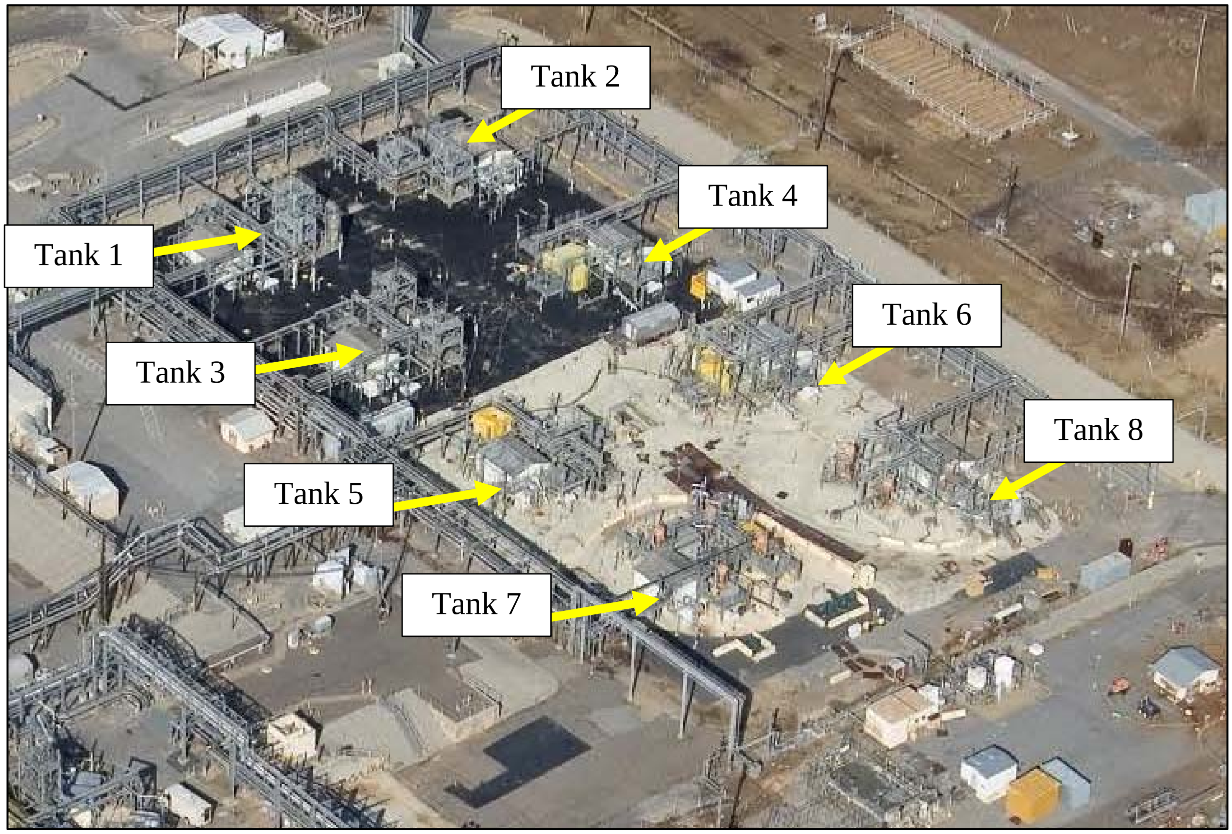
Table 4.2-4: Group A FFA Spills included in the FTF OU

FFA Spills included in the FTF OU
Flush of Feed Pump to 242-F Spill Water in the Ground, 04/01/66 (WMF-017)
Tank 18 Tank 19 Contaminated Area (WMF-001 & -002)

4.3 Group B: Tanks 1-8

The area surrounding Tanks 1-8 is shown in Figure 4.3-1. As discussed in Section 2.2.1, only Tanks 5 and 6 are operationally closed. The remaining tanks (Tanks 1-4, 7, and 8) are still operational. None of the ancillary structures in this area have been operationally closed.

Figure 4.3-1: Group B



Section IX of the FFA establishes the requirements for the prevention and mitigation of releases or potential releases at or from the high-level radioactive waste tank system(s) which are identified in Appendix B of the FFA. [WRSC-OS-94-42] Section IX of the FFA also establishes requirements for the remediation of tank system(s) that are removed from service. The waste tank systems within this area (i.e., Group B) which are identified in Appendix B of the FFA are provided in Table 4.3-1.

Table 4.3-1: Group B Systems Subject to the FFA

FFA Appendix B Waste Tank Systems
High-Level Radioactive Waste Tanks 1-8

4.3.1 Waste Tanks 1-8

Tanks 1-8 are Type I waste tanks. Tanks 5 and 6 were operationally closed in 2013, and the tanks have individually been isolated from the FTF Waste Transfer System and FTF support systems.

This closure process consisted of identification and isolation of transfer lines, drain lines, water, air, and steam supply lines, ventilation systems, power and instrumentation lines, and all other penetrations into or out of the waste tank. Isolation of these systems was performed at the electrical control rooms for electrical services and instrumentation, and for mechanical systems at the system supply headers located off of the top of the waste tank. Where practical, accessible piping and conduit was removed creating physical breaks from the waste tank. Other pipes were plugged or capped to isolate them from the FTF transfer line system. Isolating all systems from the waste tank rendered the waste tank closed to waste processing activities.

After isolation, the waste tanks were stabilized by filling with grout. As the waste tanks were filled, grout material flowed into the abandoned waste tank and riser penetrations, thereby sealing and effectively isolating the abandoned lines. This eliminated the risk of transferring waste into or out of the waste tank through the abandoned lines.

BWRE have been completed in Tanks 4, 7 and 8. These tanks will still require final heel removal before being operationally closed. Tanks 1, 2 and 3 each contain a considerable amount of saltcake. BWRE has been initiated in Tank 3 with the first salt dissolution campaign having been completed in 2019. Planning for Tank 2 salt dissolution is underway and efforts for Tank 1 will begin at a future date.

4.3.2 Ancillary Structures

The ancillary structures in this area are listed in Table 4.3-2. Several of these structures are no longer used in operations and are available for operational closure: FDB1, FDB6, F-Area Catch Tank and the Tanks 1-8 transfer line encasement. However, the other ancillary structures are still used to support operations.

Table 4.3-2: Group B Ancillary Structures

FTF Ancillary Structure
FDB1
FDB6
F-Area Catch Tank
Valve Box 1
Valve Box 2
Valve Box 3
Valve Box 4
Valve Box 5
LDB17 Valve Box
Transfer Lines, Type l Tank Transfer Line Encasements, LDBs, MLDBs

Figure 4.3-2 and Figure 4.3-3 show the location of several of the ancillary structures.

Figure 4.3-2: FDB1, Catch Tank, and Transfer Piping Encasement Locations (FDB6 not shown)

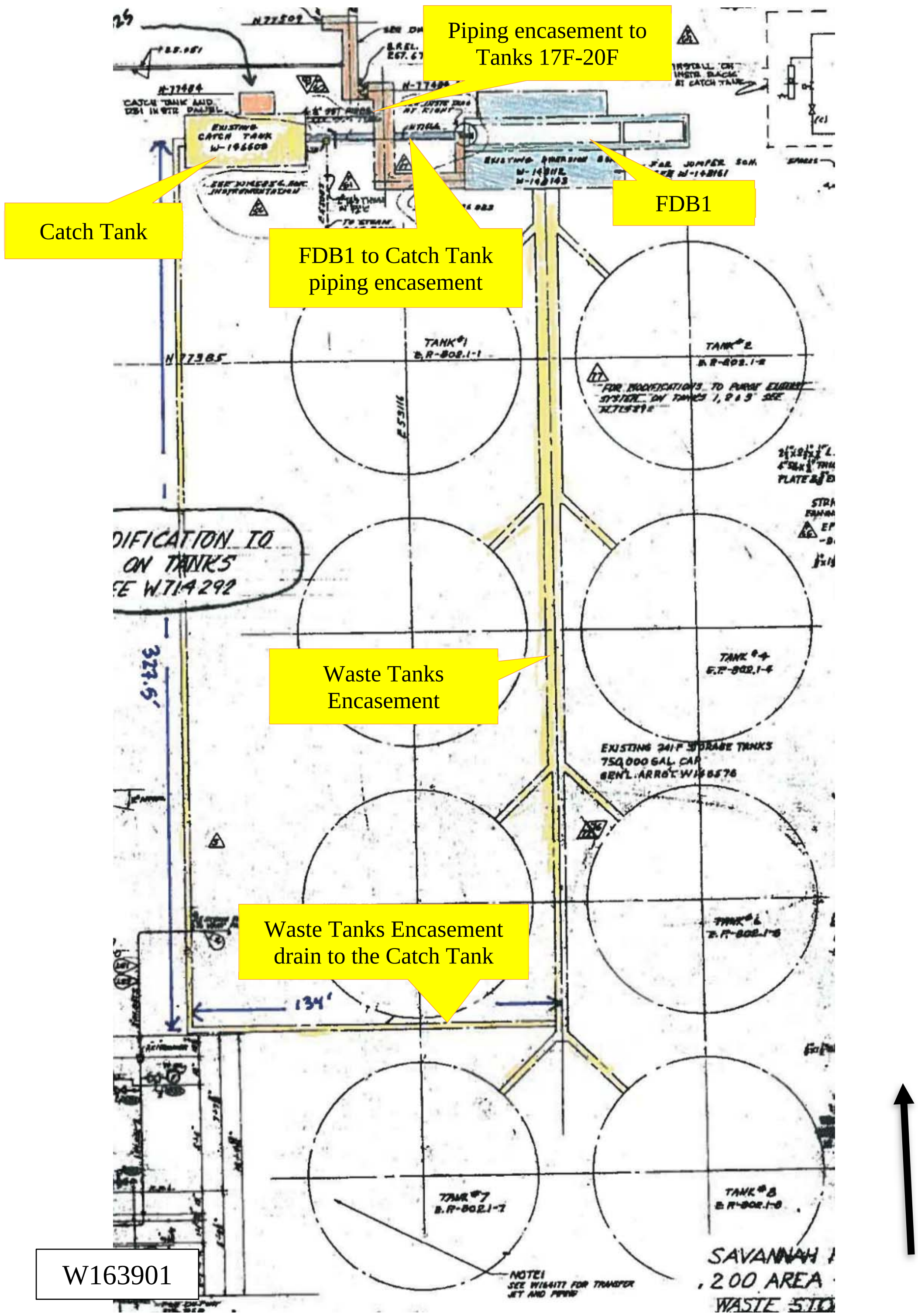
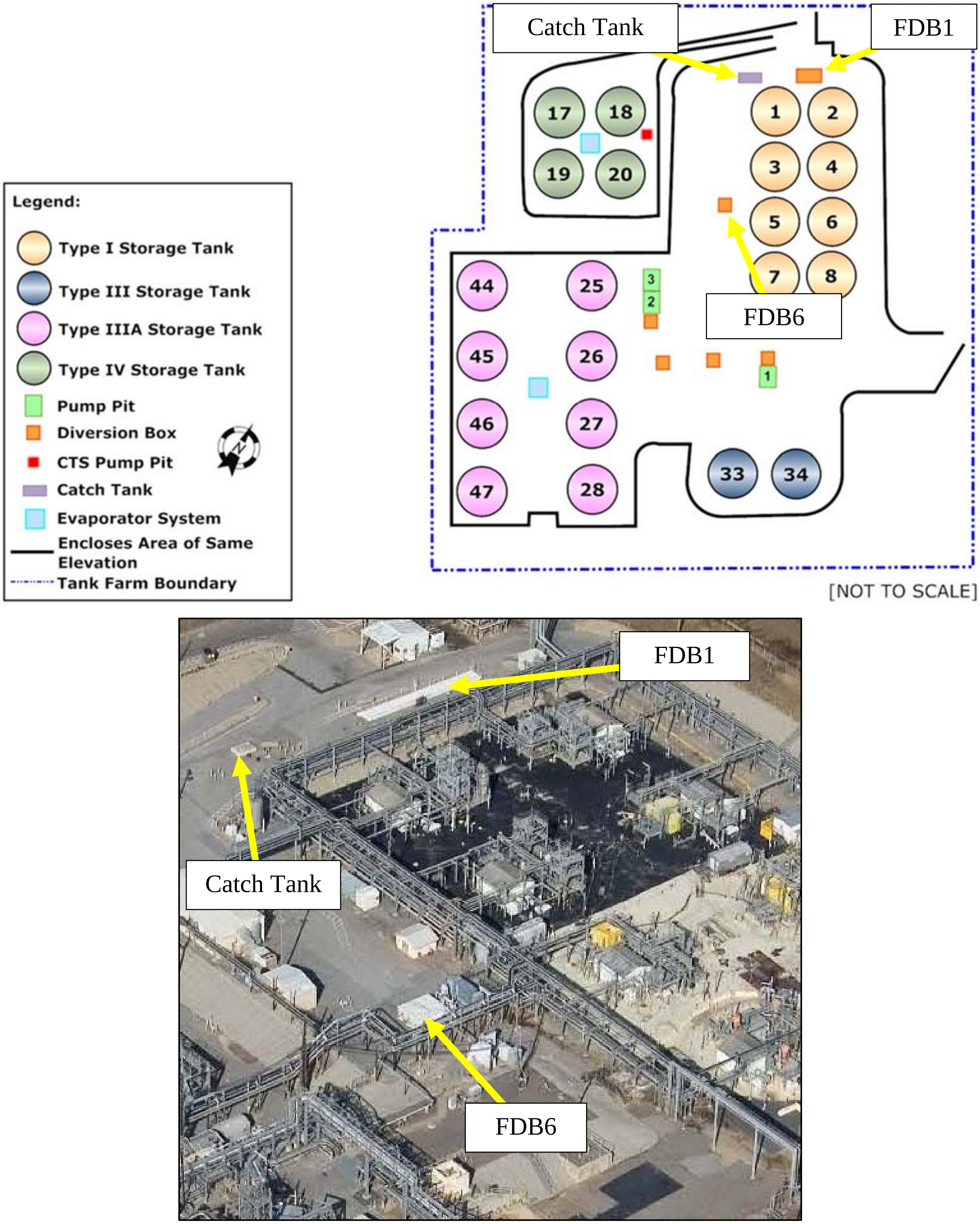


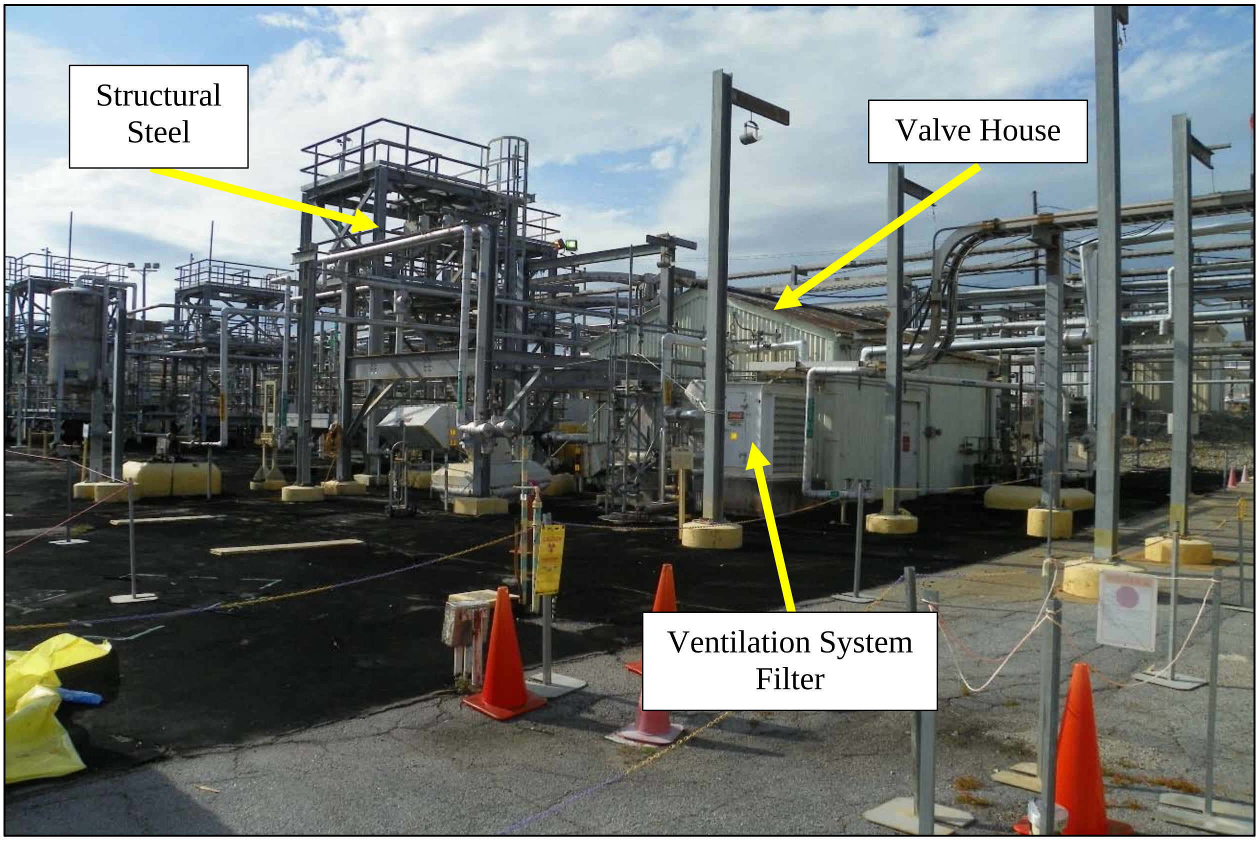
Figure 4.3-3: FDB1, FDB6, and Catch Tank Locations



4.3.3 Other Equipment

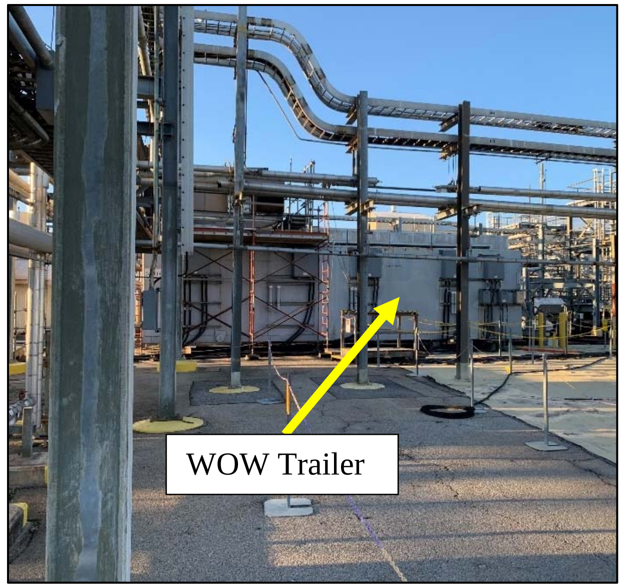
The tank tops of Tanks 1-8 contain a considerable amount of equipment such as the valve house, ventilation system components, and structural steel that will need to be evaluated for disposition (i.e., removal or in-situ disposal) prior to final closure. Figure 4.3-4 provides an example of the types of equipment/structures located on top of the waste tanks.

Figure 4.3-4: Tank 4



The Waste on Wheels (WOW) control trailer is in this area and is shown in Figure 4.3-5. WOW is a standalone mobile control center for waste removal equipment. It contains Variable Frequency Drives (VFDs), a Motor Control Center, and disconnects for mixer pumps and transfer pumps used in waste removal from a tank. It also contains other instrumentation for temperature and tank level indication as well as interlocks and a data collection device. WOW is currently obsolete, and design documentation is in review for Dismantlement and Removal (D&R) of the WOW skid in FTF.

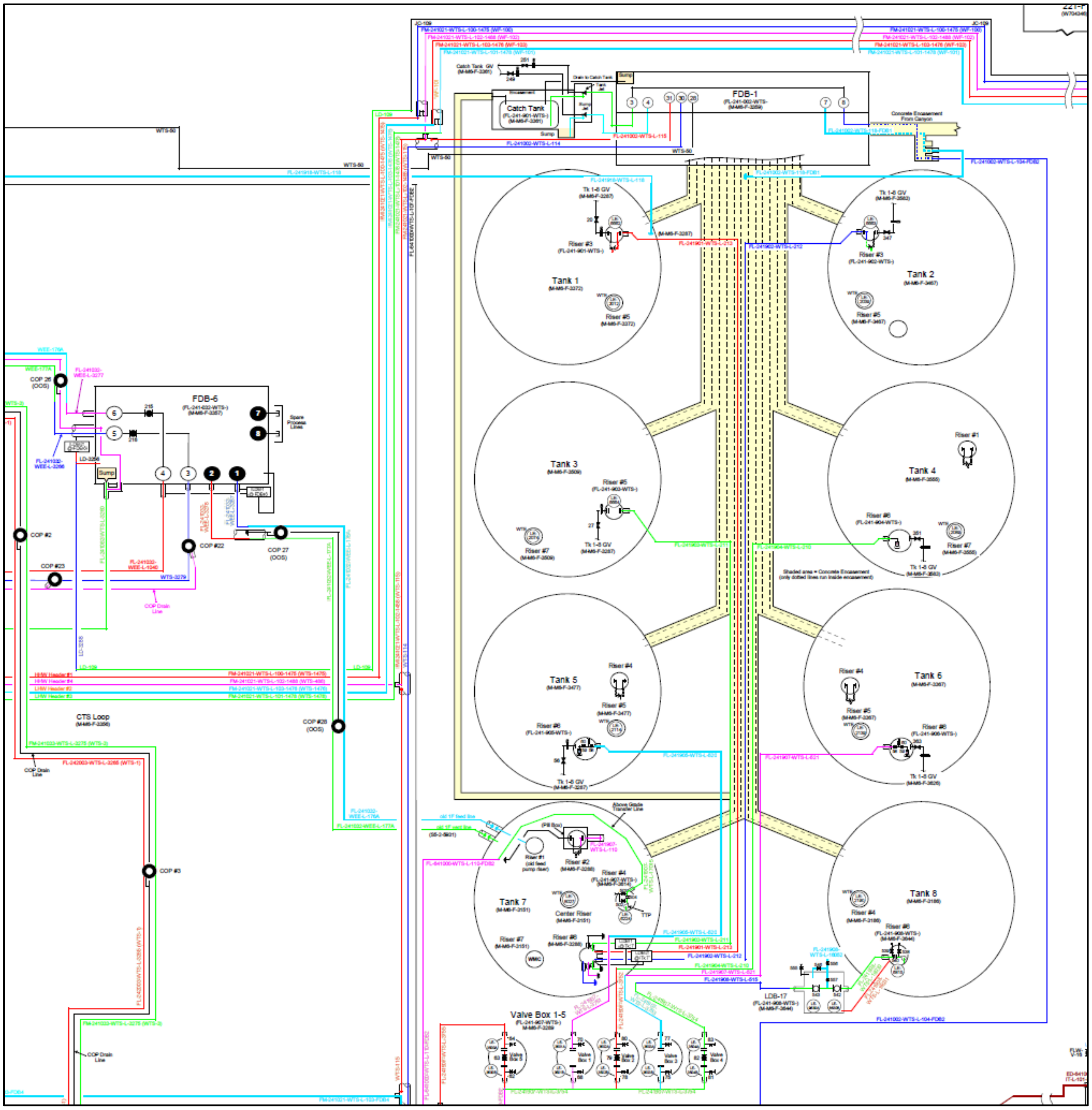
Figure 4.3-5: WOW Control Trailer



4.3.4 Isolation Considerations

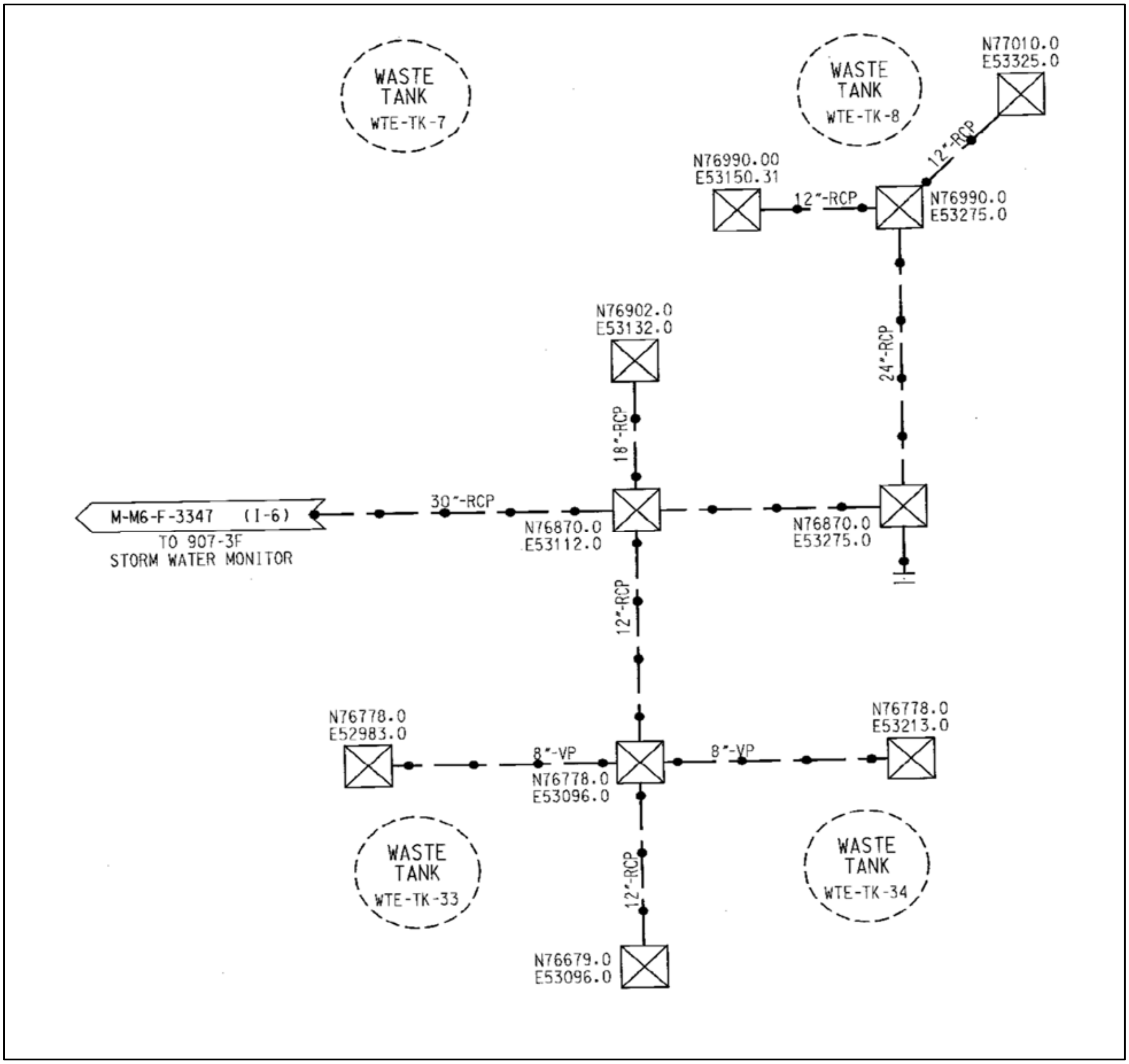
If it is decided to isolate this area from the other areas during the deactivation phase, the transfer lines into and out the area will need to be air-gapped. Figure 4.3-6 illustrates the transfer lines in this area. Transfer lines that cross the figure boundary would have to be isolated if this area is decommissioned independently from the other areas. Other system utilities (electrical, instrumental, steam, water) would also have to be isolated if the area is decommissioned independently.

Figure 4.3-6: Group B: Transfer Line Isolations



The storm sewer system in this area is tied to the storm sewer associated with Group D (Tanks 33-34). [M-M6-F-3346] Figure 4.3-7 shows the storm sewer system for Group B. Isolation of Group B would require addressing the storm sewer connection to Group D.

Figure 4.3-7: Group B Storm Sewer System



4.3.5 FFA Buildings/Structures to be Decommissioned

Prior to and during decommissioning, facilities will be evaluated to determine if there has been a release or there is a substantial threat of a release of hazardous substances to the environment. The buildings/structures planned for or undergoing decommissioning are identified in Appendix K.1 of the FFA. [WSRC-OS-94-42] As agreed upon by DOE, SCDHEC and EPA, the buildings/structures listed in Appendix K.1 will be evaluated during the Decommissioning phase of the Facility Disposition Process to determine if any remediation is required. Buildings/structures that the three parties agree require no further evaluation or no response action will be moved to Appendix K.2 of the FFA. Buildings/structures that the three parties agree may warrant a response action will be listed on Appendix C.4 of the FFA.

Buildings/structures listed on Appendix C.4 of the FFA will require a determination as to whether a response action is warranted. The buildings/structures listed in Appendix C.4 will become subunits of the Area OU. The buildings/structures within Group B that are currently listed in Appendix K.1 of the FFA are provided in Table 4.3-3.

Table 4.3-3: Group B FFA Buildings/Structures to be Decommissioned

Buildings/Structures to be Decommissioned
241-2F FDB1
241-32F FDB6 Diversion Box
241-62F MCC Building
241-74F Control Room/MCC
241-901F Waste Storage Tank
241-902F Waste Storage Tank
241-903F Waste Storage Tank
241-904F Waste Storage Tank
241-905F Waste Storage Tank
241-906F Waste Storage Tank
241-907F Waste Storage Tank
241-908F Waste Storage Tank
242-10F Radcon Trailer Near Tank 4

4.3.6 FFA Spills

Appendix C of the FFA contains the RCRA/CERCLA units as defined by the FFA. [WSRC-OS-94-42] For the FTF OU, Appendix C also includes a list of documented spills considered to be part of the operable unit. The need for any remediation of the listed spills will need to be evaluated as part of FTF OU closure. The listed spills within this area (i.e., Group B) which will need to be evaluated as part of the FTF OU closure are provided in Table 4.3-4.

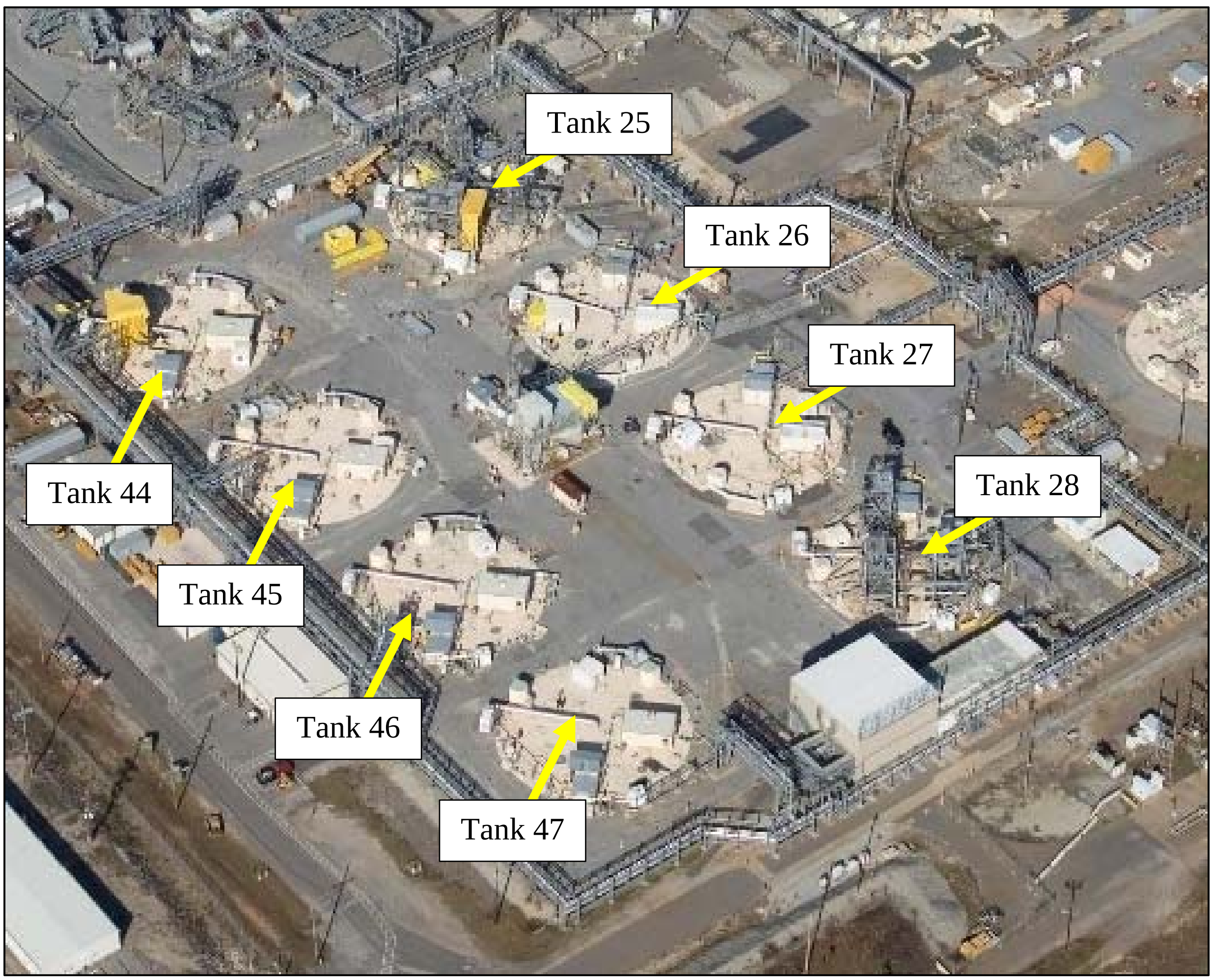
Table 4.3-4: Group B FFA Spills included in the FTF OU

FFA Spills included in the FTF OU
Spill on 05/01/57 of 125 ft[2] of rad liquid from solvent trailer (formerly Index No. 200) (WMF-008); North of Tank 1
Tank 7 Contaminated Area (WMF-004)
Tank 8 Contaminated Area (WMF-005)

4.4 Group C: Tanks 25-28 and 44-47

The area surrounding Tanks 25-28 and 44-47 shown in Figure 4.4-1. As discussed in Section 2.2.3 all of the waste tanks in this area still operational. None of the ancillary structures in this area have been operationally closed.

Figure 4.4-1: Tanks 25-28 and 44-47



Section IX of the FFA establishes the requirements for the prevention and mitigation of releases or potential releases at or from the high-level radioactive waste tank system(s) which are identified in Appendix B of the FFA. [WSRC-OS-94-42] Section IX of the FFA also establishes requirements for the remediation of tank system(s) that are removed from service. The waste tank systems within this area (i.e., Group C) which are identified in Appendix B of the FFA are provided in Table 4.4-1. Appendix B of the FFA primarily lists tanks associated with the various ancillary structures (e.g., pump tanks) and does not specifically list the surrounding secondary containment (e.g., pump pits, diversion boxes) as may be identified in other documents such as the CGCP.

Table 4.4-1: Group C Systems Subject to the FFA

FFA Appendix B Waste Tank Systems
High-Level Radioactive Waste Tanks 25-28 and 44-47
242-16F (2F) Evaporator Pot o *Mercury Collection Tank* o *Cesium Removal Column Pump Tank* o *Overheads Tank, North* o *Overheads Tank, South*
F Pump Tank #2
F Pump Tank #3

4.4.1 Waste Tanks 25-28 and 44-47

Tanks 25-28 and 44-47 are Type IIIA waste tanks. Bulk Waste Removal Efforts have not been started on any of these tanks. Field activities have been initiated for salt dissolution in Tanks 27 and 44. Project planning for salt dissolution activities in Tanks 28 and 47 have been initiated.

4.4.2 Ancillary Structures

The ancillary structures in this area are listed in Table 4.4-2. Several of these structures are no longer used in operations and are available for operational closure, including the 2F Evaporator and FDB5. The 2F Evaporator has been shut down, however, the possibility to use a portion of the building to support a future transfer paths is being considered. Therefore, when the structure will be available for operational closure is uncertain. The remaining ancillary structures are still supporting operations. The location of the Group C ancillary structures is shown in Figure 4.4-2. The 2F evaporator is shown in Figure 4.4-3. Figure 4.4-4 shows the location of FDB4, FPP2 and FPP3. The location of FDB5 is shown in Figure 4.4-5.

Table 4.4-2: Group C Ancillary Structures

FTF Ancillary Structure
242-16F (2F) Evaporator o *Evaporator Pot* o *Condenser* o *Mercury Collection Tank* o *Cesium Removal Column Pump Tank* o *Overheads Tank #1, South* o *Overheads Tank #2, North*
FPP2 o *Pump Pit* o *FPT-2*
FPP3 o *Pump Pit* o *FPT-3*
FDB4
FDB5
Valve Box 28A (i.e., three valve)
Valve Box 28B (i.e., single valve)

Figure 4.4-2: Group C Ancillary Structure Locations

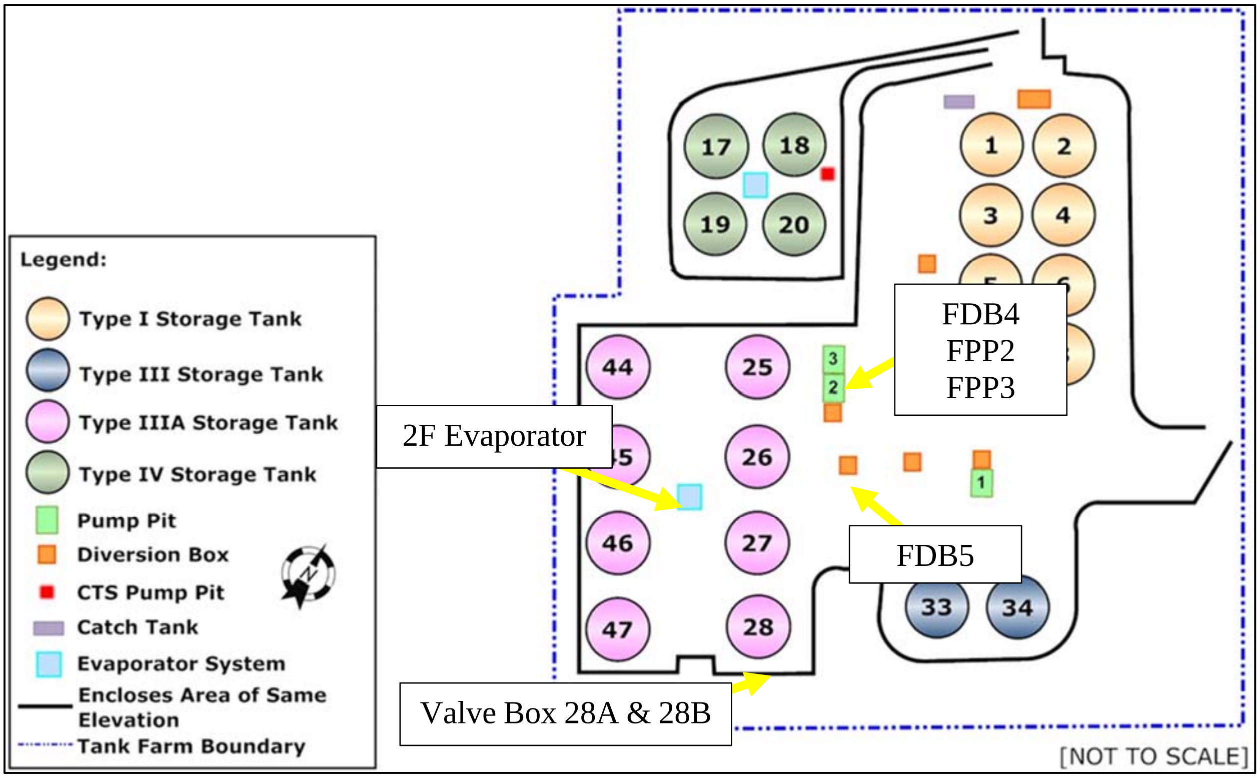


Figure 4.4-3: 2F Evaporator

Figure 4.4-4: FDB4, FPP2 and FPP3

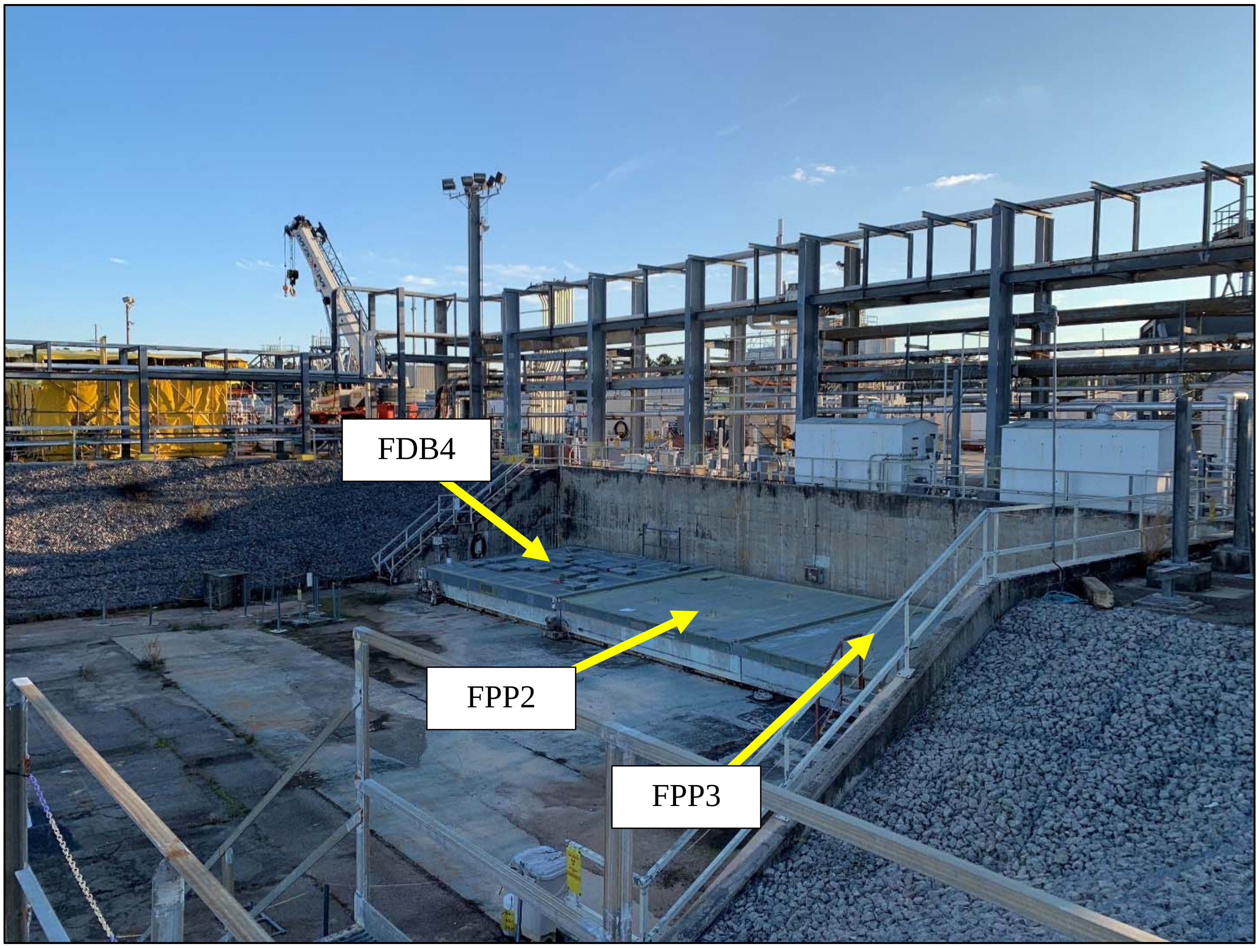


Figure 4.4-5: FDB5

4.4.3 Other Equipment

The tank tops in this area contain a considerable amount of equipment such as the valve house, ventilation system components, and varying degrees of structural steel that will need to be evaluated for disposition (i.e., removal or in-situ disposal) prior to final closure. Figure 4.4-6 provides an example of the types of equipment/structures located on top of the waste tanks.

Figure 4.4-6: Tank 47 and Tank 28

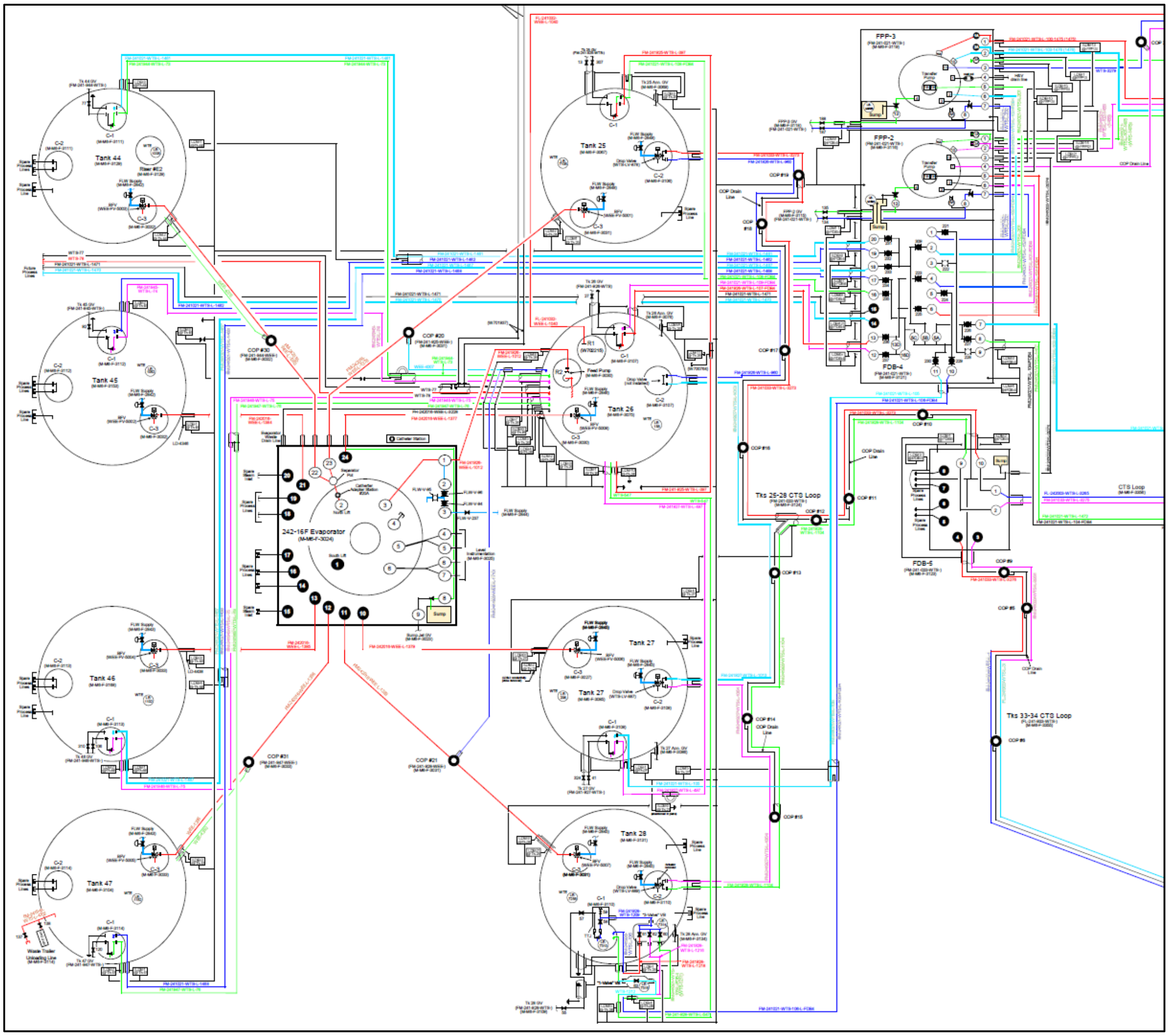
The other substantial structure in this area is the FTF 241-18F control room, shown in Figure 4.4-7. This is the current control room and is used for managing the entire FTF. The control will remain operational until the final waste transfer out of FTF are completed.

Figure 4.4-7: 241-18F Control Room

4.4.4 Isolation Considerations

If it is decided to isolate this area from the other areas during the deactivation phase, the transfer lines into and out the area will need to be air gapped. Figure 4.4-8 illustrates the transfer lines in this area. Transfer lines that cross the figure boundary would have to be isolated if this area is decommissioned independently from the other areas. Other system utilities (electrical, instrumental, steam, water) would also have to be isolated if the area is decommissioned independently.

Figure 4.4-8: Group C Transfer Line Isolations



The storm sewer system in this area is independent from the other areas in FTF. [M-M6-F-3127, M-M6-F-3126] Figure 4.4-9 and Figure 4.4-10 show the storm sewer system for Group C.

Figure 4.4-9: Group C Storm Sewer System (Tanks 25-28)

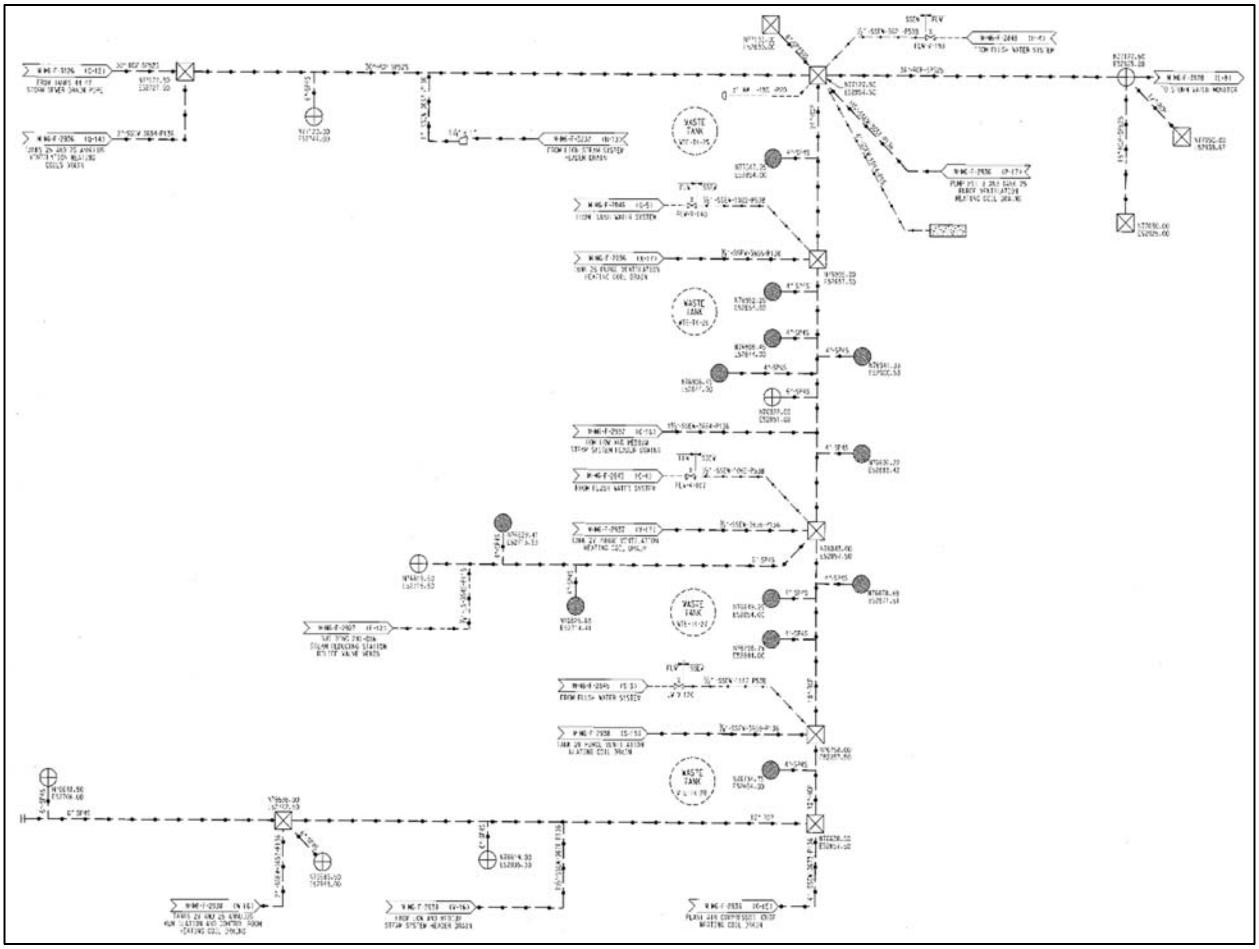
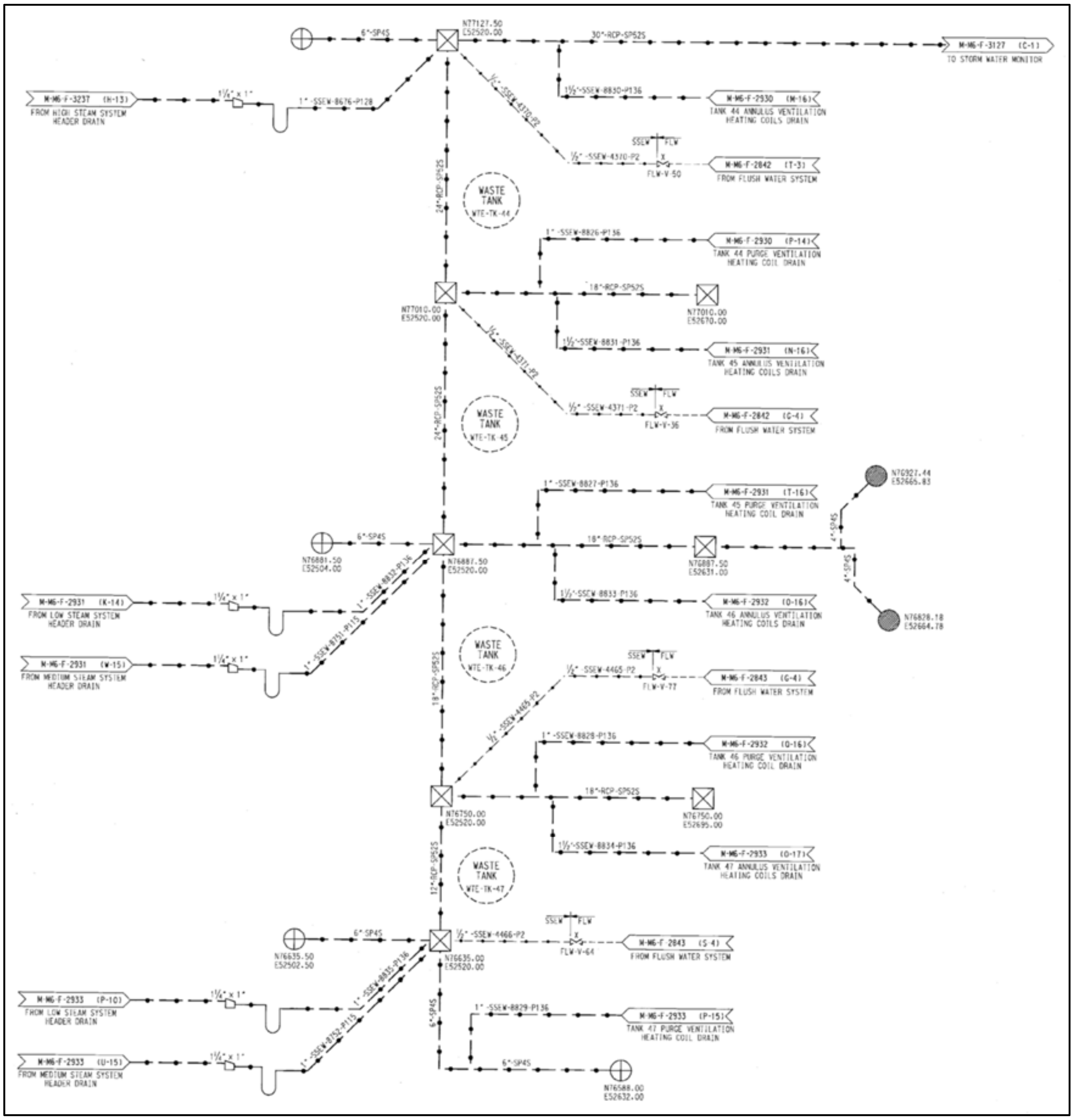


Figure 4.4-10: Group C Storm Sewer System (Tanks 44-47)



4.4.5 FFA Buildings/Structures to be Decommissioned

Prior to and during decommissioning, facilities will be evaluated to determine if there has been a release or there is a substantial threat of a release of hazardous substances to the environment. The buildings/structures planned for or undergoing decommissioning are identified in Appendix K.1 of the FFA. [WSRC-OS-94-42] As agreed upon by DOE, SCDHEC and EPA, the buildings/structures listed in Appendix K.1 will be evaluated during the Decommissioning phase of the Facility Disposition Process to determine if any remediation is required. Buildings/structures that the three parties agree require no further evaluation or no response action will be moved to Appendix K.2 of the FFA. Buildings/structures that the three parties agree may warrant a response action will be listed on Appendix C.4 of the FFA. Buildings/structures listed on Appendix C.4 of the FFA will require a determination as to whether a response action is warranted. The buildings/structures listed in Appendix C.4 will become subunits of the Area OU. The buildings/structures within Group C that are currently listed in Appendix K.1 of the FFA are provided in Table 4.4-3.

Table 4.4-3: Group C FFA Buildings/Structures to be Decommissioned

Buildings/Structures to be Decommissioned
241-104F Storage and Supply Building
241-18F Control Room/MCC
241-21F FDB4 and FPPs 2 and 3
241-33F FDB5 Diversion Box
241-53F Air Compressor Building
241-65F Breathing Air Compressor Building
241-91F Waste Certification Building
241-925F Waste Storage Tank
241-926F Waste Storage Tank
241-927F Waste Storage Tank
241-928F Waste Storage Tank
241-93F ALARA Storage Building
241-944F Waste Storage Tank
241-945F Waste Storage Tank
241-946F Waste Storage Tank
241-947F Waste Storage Tank
242-12F Radcon Trailer Near 2F Evaporator
242-16F 2F Evaporator

4.4.6 FFA Spills

Appendix C of the FFA contains the RCRA/CERCLA units as defined by the FFA. [WSRC-OS-94-42] For the FTF OU, Appendix C also includes a list of documented spills considered to be part of the operable unit. The need for any remediation of the listed spills will need to be evaluated as part of the Area OU closure. There are no known listed spills within this area (i.e., Group C).

4.5 Group D: Tanks 33 & 34

The area surrounding Tanks 33 and 34 is shown in Figure 4.5-1. As discussed in Section 2.2.3 both of these waste tanks are still operational. None of the ancillary structures in this area have been operationally closed. As discussed in Section 4.1, these tanks are anticipated to be the last waste tanks to be operationally closed. The ancillary structures in this area will be used to support the last transfers out of FTF and therefore will be operationally closed after the last waste material has been transferred from FTF.

Figure 4.5-1: Tanks 33 and 34

Section IX of the FFA establishes the requirements for the prevention and mitigation of releases or potential releases at or from the high-level radioactive waste tank system(s) which are identified in Appendix B of the FFA. [WSRC-OS-94-42] Section IX of the FFA also establishes requirements for the remediation of tank system(s) that are removed from service. The waste tank systems within this area (i.e., Group D) which are identified in Appendix B of the FFA are provided in Table 4.3-1. Appendix B of the FFA primarily lists tanks associated with the various ancillary structures (e.g., pump tanks) and does not specifically list the surrounding secondary containment (e.g., pump pits, diversion boxes) as may be identified in other documents such as the CGCP.

Table 4.5-1: Group D Systems Subject to the FFA

FFA Appendix B Waste Tank Systems
High-Level Radioactive Waste Tanks 33-34
F Pump Tank #1

4.5.1 Waste Tanks 33 and 34

Tanks 33 and 34 are Type IIIA waste tanks and will require additional waste removal prior to being operationally closed. Planning for sludge removal in Tank 33 has been initiated.

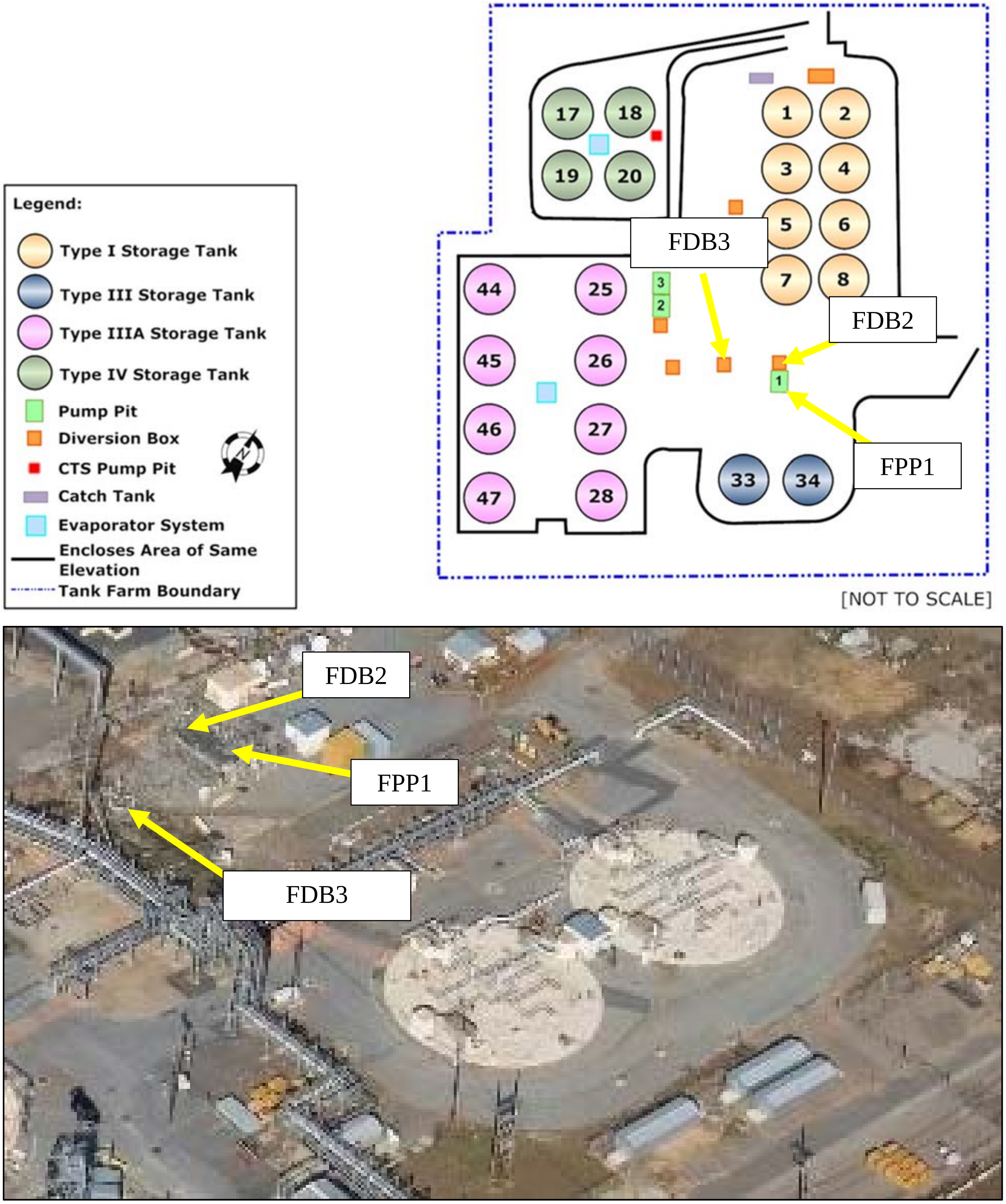
4.5.2 Ancillary Structures

The ancillary structures in this area are listed in Table 4.5-2. All the ancillary structures in this area are supporting operations. The location of the Group D ancillary structures is shown in Figure 4.5-2.

Table 4.5-2: Group D Ancillary Structures

FTF Ancillary Structure
FPP1 o *Pump Pit* o *FPT1*
FDB2
FDB3

Figure 4.5-2: FDB2, FDB3, and FPP1 Locations



4.5.3 Other Equipment

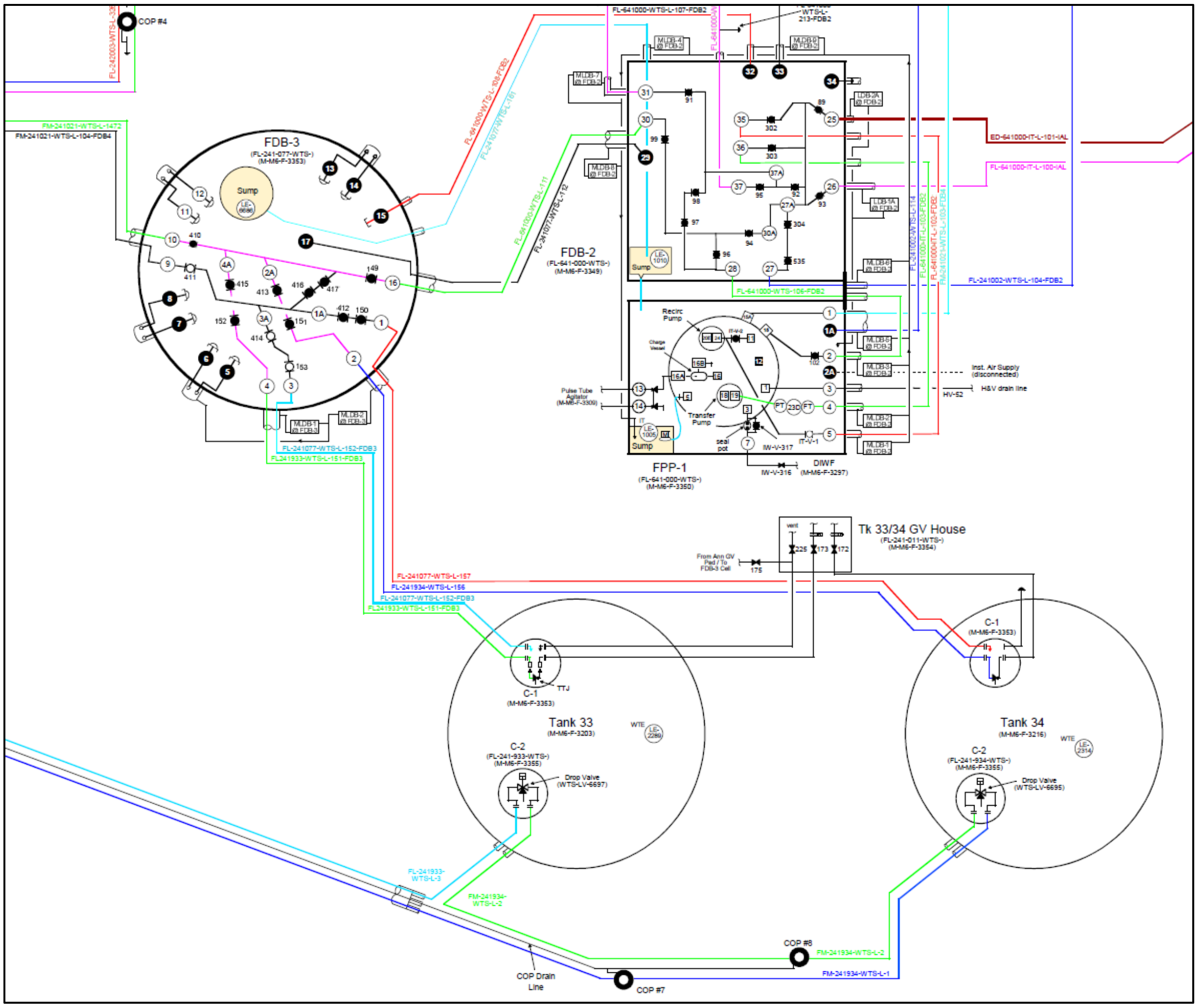
The tank tops in this area contain a limited amount of equipment such as the valve house, ventilation system components, and various structural supports that will need to be evaluated for disposition (i.e., removal or in-situ disposal) prior to final closure. Figure 4.5-3 provides an example of the types of equipment/structures located on top of these waste tanks.

Figure 4.5-3: Tank 33

4.5.4 Isolation Considerations

If it is decided to isolate this area from the other areas during the deactivation phase, the transfer lines into and out the area will need to be air-gapped. Figure 4.5-4 illustrates the transfer lines in this area. Transfer lines that cross the figure boundary would have to be isolated if this area is decommissioned independently from the other areas. Other system utilities (electrical, instrumental, steam, water) would also have to be isolated if the area is decommissioned independently.

Figure 4.5-4: Group D Transfer Line Isolations



4.5.5 FFA Buildings/Structures to be Decommissioned

Prior to and during decommissioning, facilities will be evaluated to determine if there has been a release or there is a substantial threat of a release of hazardous substances to the environment. The buildings/structures planned for or undergoing decommissioning are identified in Appendix K.1 of the FFA. [WSRC-OS-94-42] As agreed upon by DOE, SCDHEC and EPA, the buildings/structures listed in Appendix K.1 will be evaluated during the Decommissioning phase of the Facility Disposition Process to determine if any remediation is required. Buildings/structures that the three parties agree require no further evaluation or no response action will be moved to Appendix K.2 of the FFA. Buildings/structures that the three parties agree may warrant a response action will be listed on Appendix C.4 of the FFA. Buildings/structures listed on Appendix C.4 of the FFA will require a determination as to whether a response action is warranted. The buildings/structures listed in Appendix C.4 will become subunits of the Area OU. The buildings/structures within Group D that are currently listed in Appendix K.1 of the FFA are provided in Table 4.5-3.

Table 4.5-3: Group D FFA Buildings/Structures to be Decommissioned

Buildings/Structures to be Decommissioned
241-11F Gang Valve House
241-933F Waste Storage Tank
241-934F Waste Storage Tank
242-8F Radcon Trailer Near FDB2
242-9F Radcon Trailer Near Tanks 33/34
641-F Inter Transfer Lines Diversion Box/Pump Pit (FDB2)

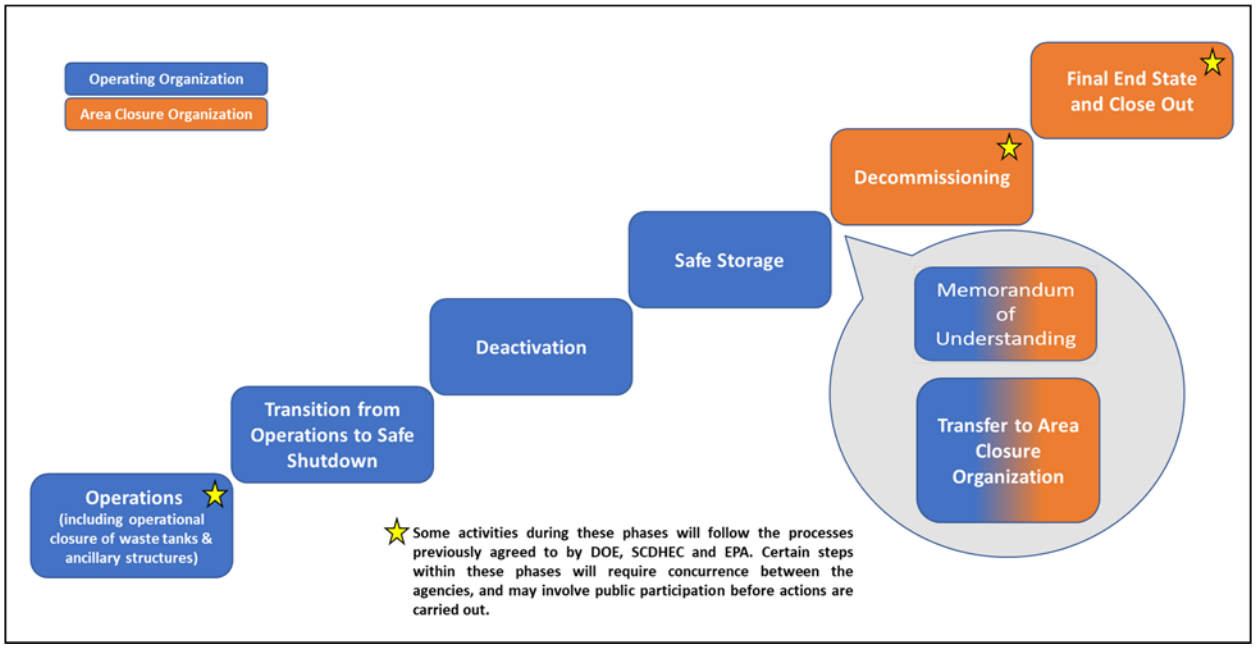
4.5.6 FFA Spills

Appendix C of the FFA contains the RCRA/CERCLA units as defined by the FFA. [WSRC-OS-94-42] For the FTF OU, Appendix C also includes a list of documented spills considered to be part of the operable unit. The need for any remediation of the listed spills will need to be evaluated as part of FTF OU closure. There are no known listed spills within this area (i.e., Group D).

5.0 F-TANK FARM CLOSURE OPTIONS

As discussed in Section 3.0, the closure of the FTF OU will involve the sequence of phases shown in Figure 5.0-1

Figure 5.0-1: Process for the Final Closure of the FTF OU

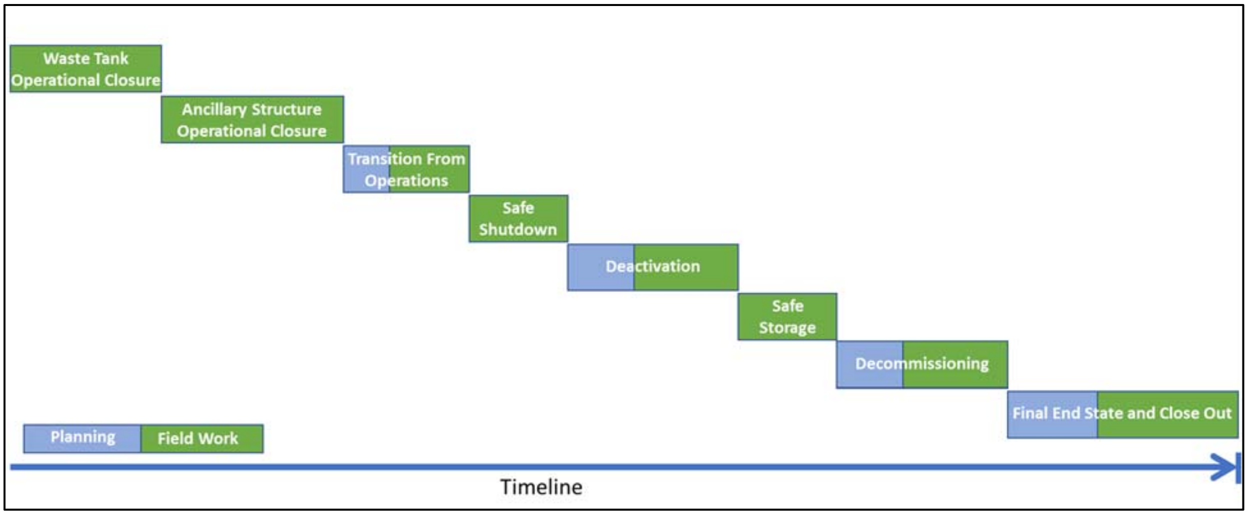


The sequencing of the phases and how they are applied to the various areas within FTF will impact the overall timing for the final closure of the FTF OU. Performing steps in parallel, to the extent possible, could accelerate the final closure of the FTF OU.

5.1 FTF OU Closure Sequencing

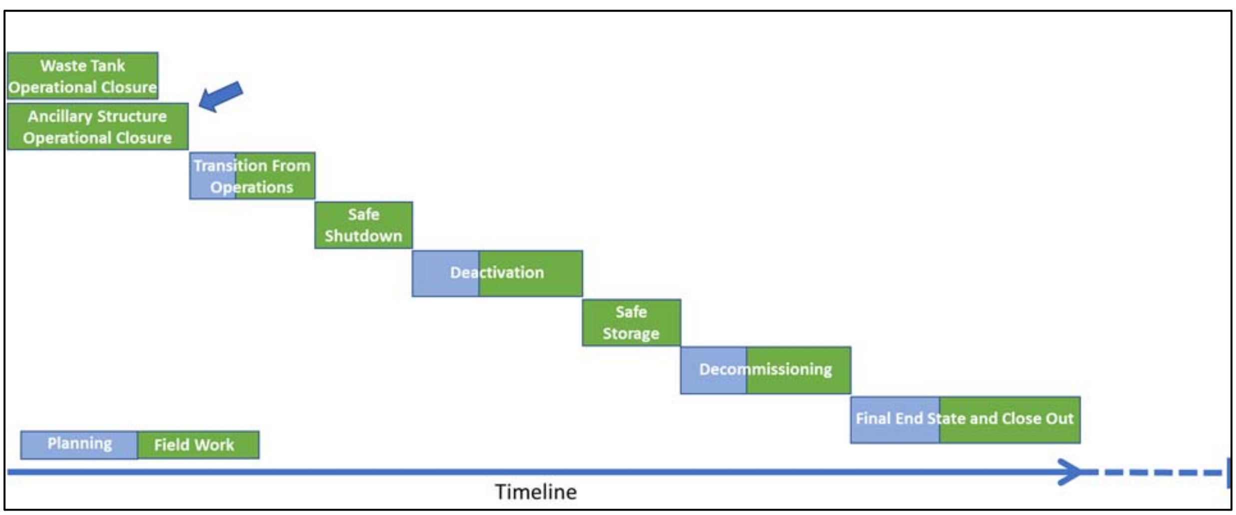
The steps involved in the Facility Disposition Process are shown in Figure 5.1-1. The Transition from Operations, Deactivation, Decommissioning, and Final End State and Closeout phases all involve a series of planning/approval steps, discussed in Section 3.0, that must occur prior to the commencement of field implementation activities. Performing all of the phases in series, as shown in Figure 5.1-1, would result in the longest duration to achieve final closure of the FTF OU. The timeline does not represent an accurate depiction of event durations but rather a relative order of the events.

Figure 5.1-1: Closure Timeline



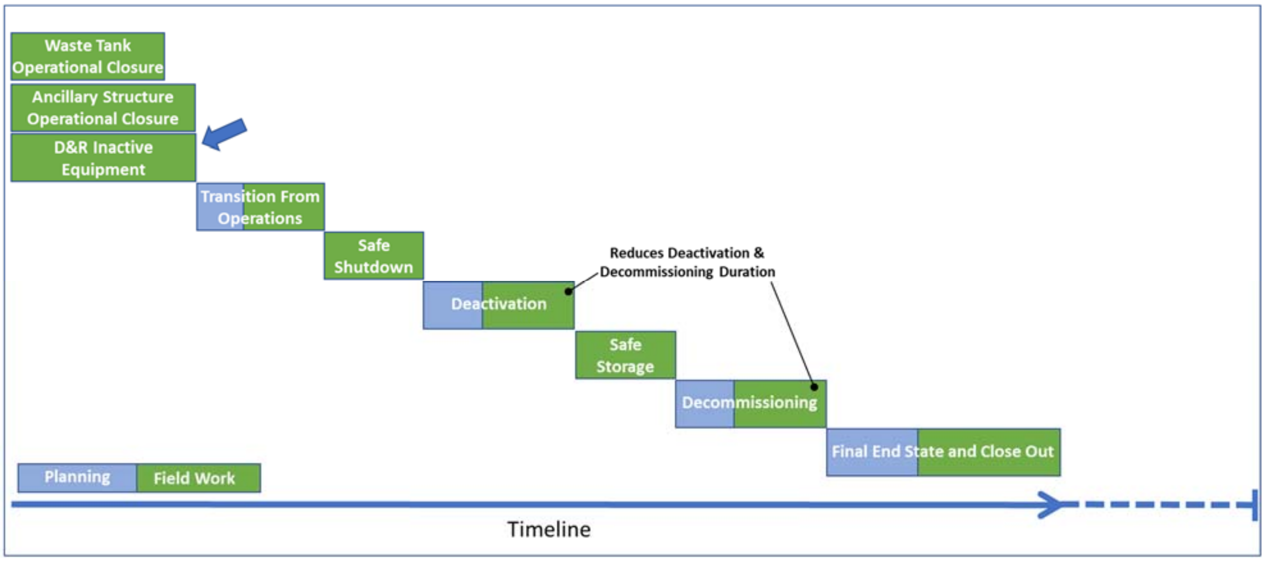
Given the tank operational closure sequencing and the timing for availability of ancillary structures to begin the operational closure process, discussed in Section 4.1, the first opportunity for accelerating the closure of the FTF OU is to initiate operational closure of ancillary structures, to the extent possible, in parallel with tank operational closure activities. Several of the FTF ancillary structures will not be available for operational closure until waste has been removed from all the FTF waste tanks. Therefore, operational closure of the ancillary structures will lag operational closure of the waste tanks to some extent. Operationally closing the ancillary structures in parallel with ongoing operational waste tank closure activities, as shown in Figure 5.1-2, will reduce the amount of time after the final waste tank operational closure until the final ancillary structure is operational closed.

Figure 5.1-2: Closure Timeline - Early Ancillary Structure Closure



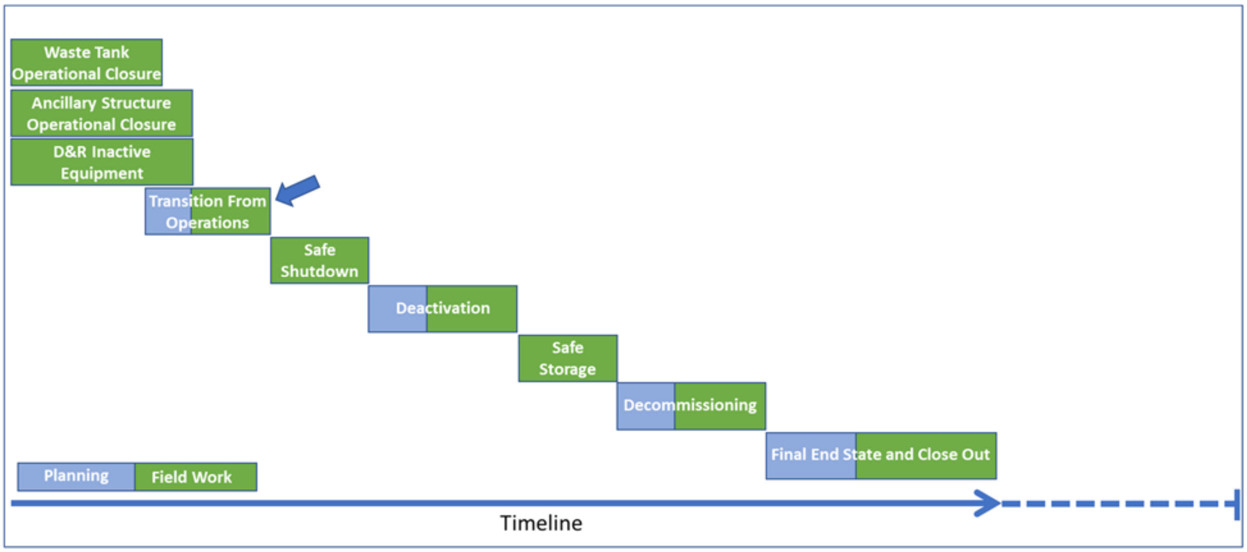
As waste tanks and ancillary structures are operationally closed, other equipment/structures associated with those systems such as process tanks, ventilation systems and structural supports will no longer be needed to support operations. Initiating D&R of this type of equipment as it becomes available provides another opportunity to accelerate the overall timeline for the closure of the FTF OU. The D&R of supporting process equipment and support structures in parallel with operational closure of the waste tanks and ancillary structures, to the extent possible, will reduce the duration of the future Deactivation and Decommissioning phases. This sequencing is shown in Figure 5.1-3 and could involve such things as removal of process equipment, process tanks, structural steel and hazardous materials.

Figure 5.1-3: Closure Timeline - Early D&R Activities



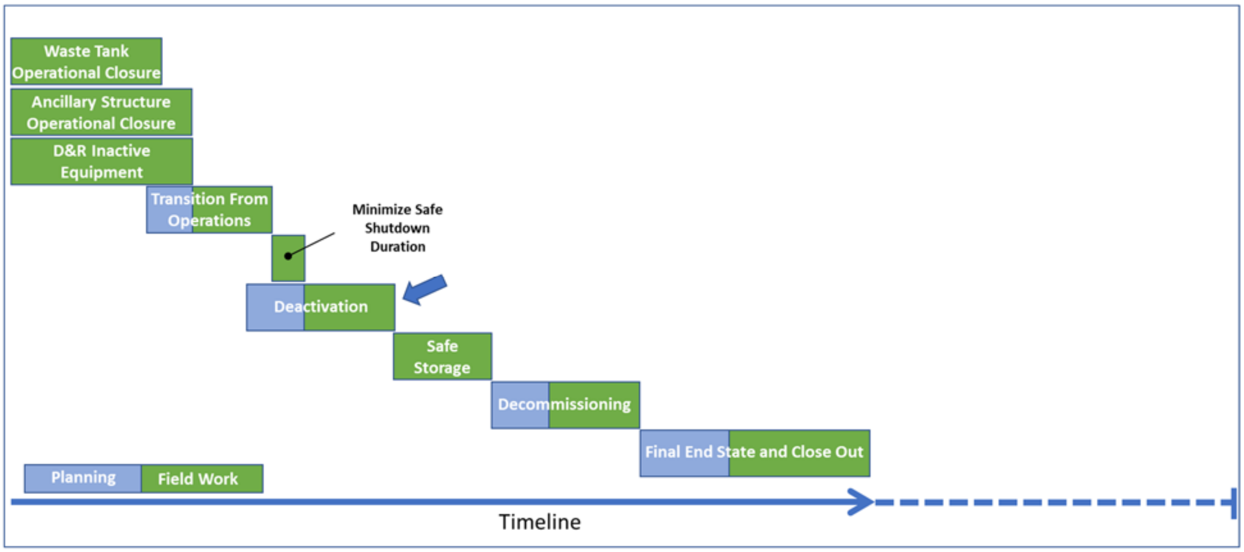
A reduction in the duration it takes to transfer from an operating facility to a safe shutdown mode can be accomplished by initiating the planning for the transfer well in advance of when the facility is anticipated to be done with its operational mission. Activities would involve such things as initiating the facility retirement process, development of the Safe Shutdown Plan and S&M Plan and initiating development of the FCDP. Performing these types of activities prior to the facility completing its operational mission will shorten the duration to reach the Safe Shutdown state, as shown in Figure 5.1-4.

Figure 5.1-4: Closure Timeline - Early Planning for Transition From Operations



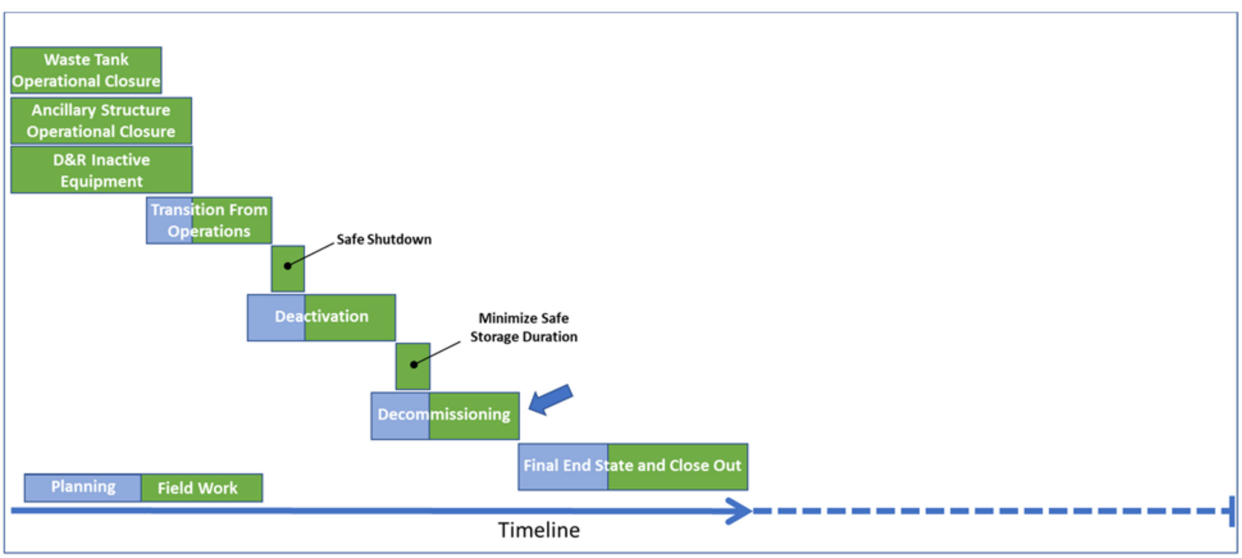
As is the case with initiating activities to transfer FTF from an operating facility to a safe shutdown state well in advance of the end of operations, initiating activities for the Deactivation phase ahead of completing the Transfer From Operations will also reduce the overall duration for FTF closure. As FTF gets closer to the end of operations, the condition of the FTF heading into the Deactivation phase will be better understood. For example, what equipment still remains within FTF that was not able to undergo D&R early, what are the hazards that will still remain after the Transfer From Operations, and what utilities/piping still require isolation. Initiation of such things as identifying remaining hazards, initiating characterization of existing hazards, formulating the End State Vision and initiating development of the formal DPP required by site Manual 1C, would all potentially reduce the duration FTF would remain in the Safe Storage phase. Performing more comprehensive hazards removal and isolation during the Safe Shutdown and Deactivation phases also has the potential to reduce the duration of the Decommissioning phase. Initiating the planning and documentation preparations well in advance will reduce the duration that FTF remains in the safe shutdown state awaiting Deactivation, as shown in Figure 5.1-5.

Figure 5.1-5: Closure Timeline - Early Planning for Deactivation



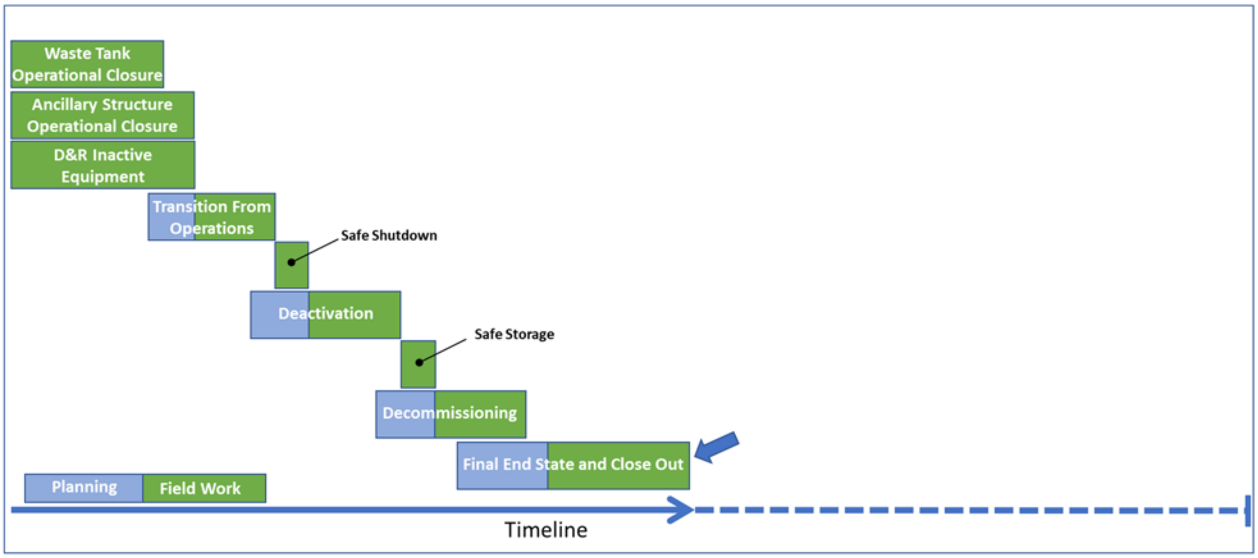
The outcome of the Deactivation phase is to place FTF in a passively safe and stable condition awaiting decommissioning. During this period, which in the case of some facilities may span decades, surveillance, maintenance and planning for decommissioning are the only activities. The duration for which a facility is required to remain in the Safe Storage phase can be reduced by initiating, to the extent possible, planning for Decommissioning. This would involve such things as ensuring early turnover of FTF to the area closure project organization at the end of Deactivation, initiation of a Decommissioning Scoping Document and an FDE. Initiating the planning and documentation preparations in advance, to the extent possible, will reduce the duration that FTF remains in the Safe Storage phase awaiting Decommissioning, as shown in Figure 5.1-6.

Figure 5.1-6: Closure Timeline - Early Planning for Decommissioning



For FTF, the Final End State and Close Out will be final closure of the FTF OU. As discussed in Section 3.2.5, the Area Completion Strategy for Savannah River Site provides the process under which the FTF OU will be closed. [ERD-EN-2005-0084] As provided in that strategy document, and shown in Figure 3.2-5, some steps within the Area Completion Process can be performed in parallel with the Decommissioning process. Initiation of the activities required for closure of the FTF OU in parallel with Decommissioning activities, to the extent possible, is another opportunity to reduce the overall duration for the closure of the FTF OU, as shown in Figure 5.1-7.

Figure 5.1-7: Closure Timeline - Integration of Area Operable Unit Closure with Decommissioning Phase

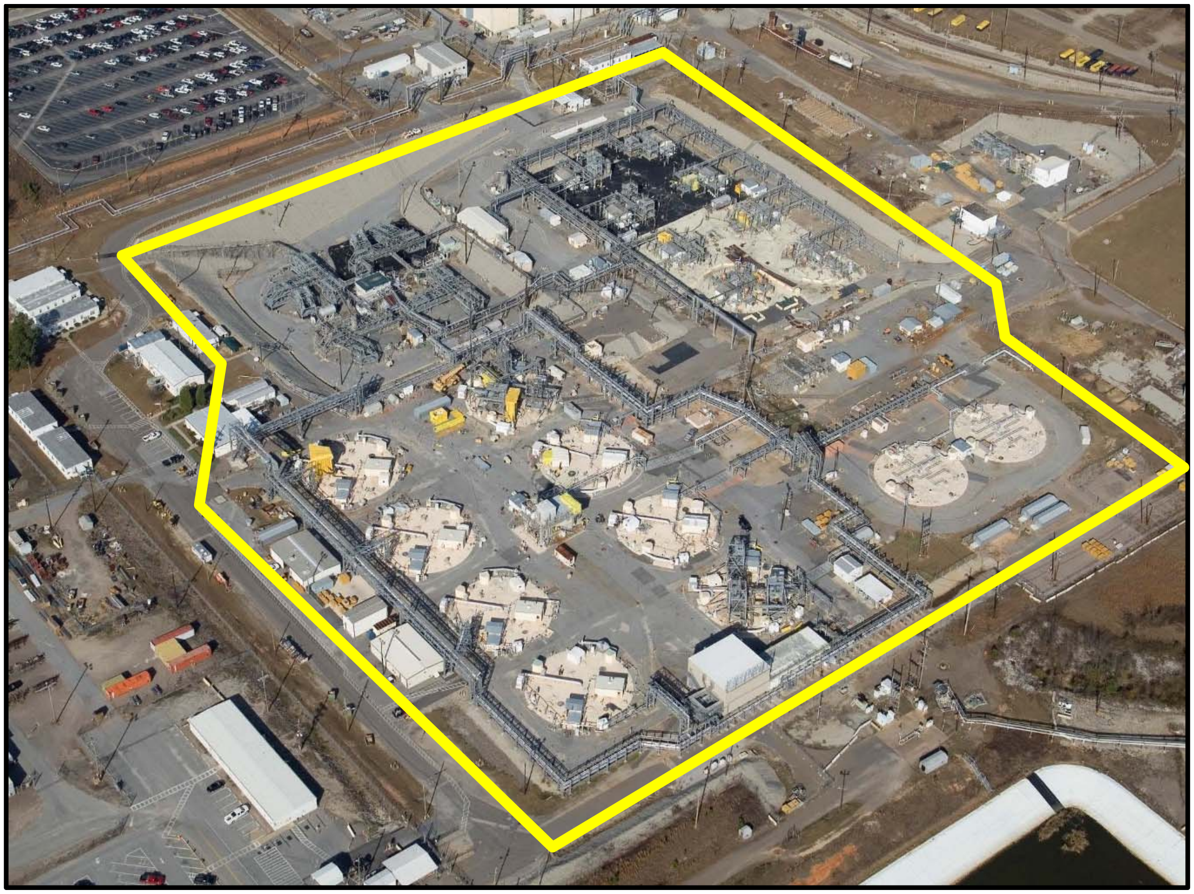


The extent to which the activities can be performed in parallel will be dependent on many factors. The benefits gained by applying additional resources required to perform tasks in parallel will need to be evaluated against the potential impacts to other risk reduction activities such as on-going waste removal and salt/sludge batch preparation, infrastructure maintenance/upgrades and waste disposition activities. Performing these tasks in parallel will be dependent on the available funding and funding priorities at the time.

5.2 Interim Closure of FTF Areas

One option to achieve final closure of the FTF OU includes closing all of FTF at one time. Under this option, once all of the waste tanks and ancillary structures within FTF have been operationally closed, the entire area would go through the Facility Disposition Process including Transition from Operations, Deactivation, Decommissioning, and Final End State and Close Out. As part of Deactivation, FTF would be isolated from other facilities by isolating utilities/piping at the boundary shown in Figure 5.2-1.

Figure 5.2-1: FTF Isolation Boundary

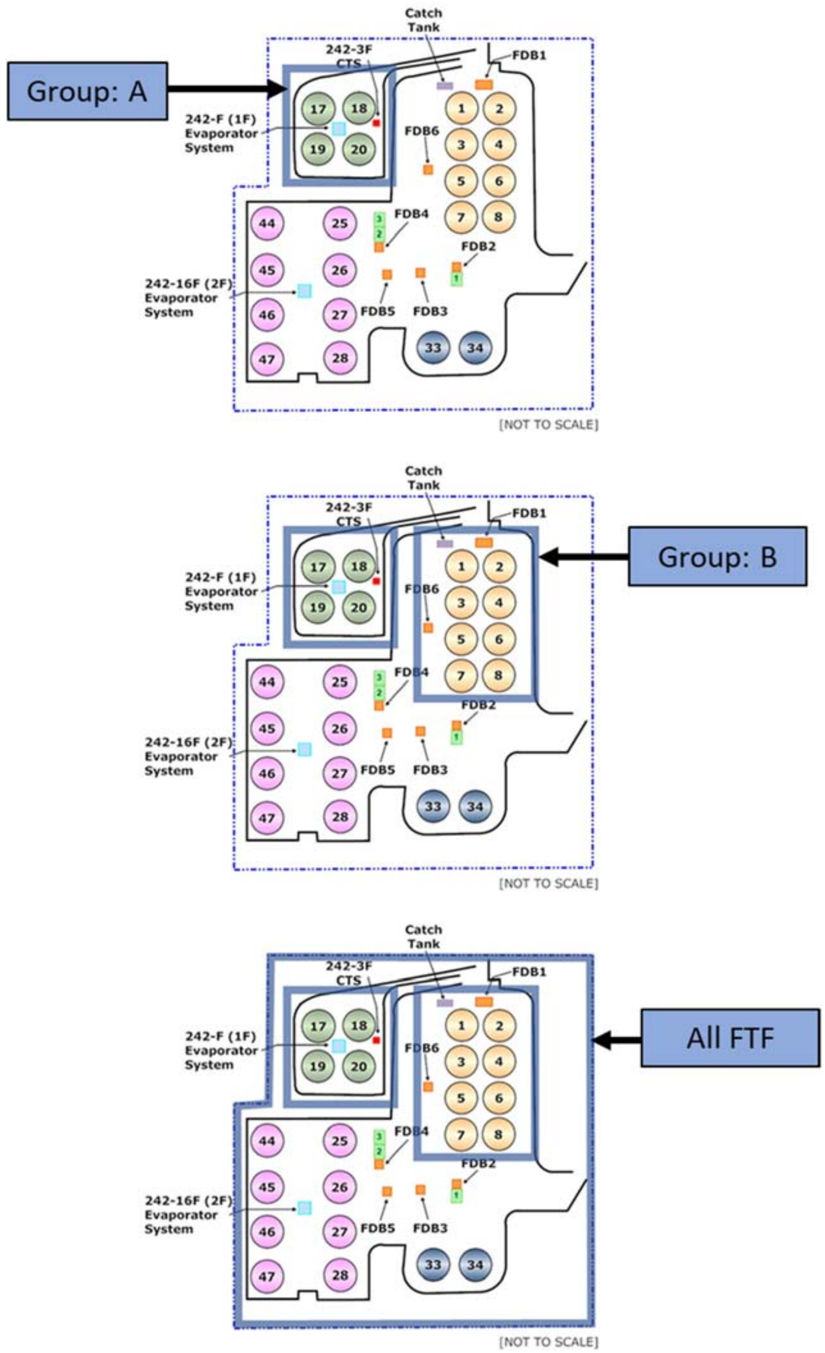


After completion of the Deactivation and Decommissioning phases, final closure of the FTF OU would be carried out under a single ROD applicable to the entire FTF OU.

Alternatively, as waste tanks and ancillary structures within a sub-area, such as the areas represented by Group A or Group B in Figure 4.0-1, are operationally closed, a second option is to proceed with interim closure of the sub-area. In the latter option, final closure of the FTF OU would then be initiated following the completion of operational closure for all remaining FTF waste tanks and ancillary structures which had not previously been part of an interim closure action. Performing interim closure of sub-areas of FTF could potentially further accelerate the closure of FTF, but such activities could divert funding from other higher risk reduction activities within the Liquid Waste System.

Based on the current anticipated waste tank closure sequencing/timing, a potential sequence would be interim closure of the Group A sub-area, interim closure of the Group B sub-area, followed by final closure of the FTF OU after all waste tanks and ancillary structures in Groups C and D are operationally closed. Due to the timing of operational closure of Tanks 33 and 34 being so close to the closure of Tank 28, subdividing the Type III and Type IIIA groupings does not make sense. The logical order would be to perform interim closure of the area around Tanks 17-20 (i.e., Group A), followed by the area around Tanks 1-8 (i.e., Group B), then closure of all FTF as part of the final closure of the FTF OU. This sequencing is shown in Figure 5.2-2.

Figure 5.2-2: Interim Closure Progression



Interim closure of sub-areas within FTF followed by closure of FTF as part of final closure of the FTF OU would increase the overall cost of FTF OU closure because it would require duplicate activities such as:

- Isolation of equipment/utilities/piping between individual sub-areas that would not be necessary if all FTF is closed at once.

- Interim remediation decisions be made not just for structures but also for the remediation of soil or groundwater within that sub-area, each area would need to proceed all the way through the Facility Disposition Process, including issuance of an IROD for each individual area. The process would then be repeated for final closure of the FTF OU.

The decision to move forward with interim closure of a sub-area within FTF will be highly dependent on the timing for completion of operational closure of waste tanks and ancillary structures within the other sub-areas. The regulatory process required to get to the issuance of an IROD is anticipated to be a multi-year process for each IROD. DOE will need to evaluate whether the additional costs of individual area isolation, potential issues with significant construction activities being required within a still active tank farm, and duplication of the regulatory process is worth the benefit of potentially accelerating the overall final FTF OU closure timeframe.

In either closure option, final closure of FTF OU at one time or the interim closure of subsections of FTF option, there are a number of activities that are required regardless of the option chosen. As mentioned previously, the interim closure approach would require additional steps (e.g., isolation of the sub-area from other sub-areas) and some duplicative activities (e.g., multiple sets of facility disposition documentation, individual IRODs as well a Final ROD). A summary of the activities within the different tank groupings that are required for either option "Required" or additional activities "Additional" to support interim closure, are outlined in the following sections.

5.2.1 Interim Closure of Tanks 17-20 Area (Group A)

Interim closure of the Tanks 17-20 Area prior to final closure of the FTF OU would require the following actions to be performed:

- Operationally close Waste Tanks 17-20 [Required-complete]
- Operationally close Ancillary Structures: 1F Evaporator and the CTS [Required]
- Prepare individual area documentation packages for Transfer from Operations and Deactivation [Additional]
- Isolate utilities from other sub-areas (Groups B-D) [Additional]
- Isolate transfer lines from other sub-areas (Groups B-D) [Additional]
- Relocate signal cables from the 1F Control Room [Additional]
- Perform field activities for Transfer from Operations and Deactivation [Required]
- Prepare individual area documentation packages for Decommissioning phase [Additional]
- Perform field activities for Decommissioning [Required]
- Prepare/Issue IROD for interim closure of Group A area [Additional]
- Evaluate remediation of soil/groundwater and perform as needed [Required]
- Close Storm Drain System [Required]

- Install interim closure cap, if part of the selected interim remedy – The area will need to be filled in both options, but additional erosion control features may need to be added to an interim cap that would not be needed otherwise [Additional]
- Configuration control of drawings, procedures, Documented Safety Analysis (DSA), etc. – Although certain work will be needed in final closure of the FTF OU, because other areas of FTF will still be operational additional work to maintain configuration control during the interim period will be required [Additional]

5.2.2 Interim Closure of Tanks 1-8 Area (Group B)

Interim closure of the Tanks 1-8 Area prior to final closure of the FTF OU would require the following actions to be performed:

- Operationally close Waste Tanks 1-8 [Required, Tanks 5 and 6 complete]
- Operationally close Ancillary Structures: FDB1, FDB6, the F-Area Catch Tank, and the transfer line encasement [Required]
- Prepare individual area documentation packages for Transfer from Operations and Deactivation [Additional]
- Isolate utilities from other sub-areas (Groups C-D) [Additional]
- Isolate transfer lines from other sub-areas (Groups C-D) [Additional]
- Perform field activities for Transfer from Operations and Deactivation [Required]
- Prepare individual area documentation packages for Decommissioning phase [Additional]
- Perform field activities for Decommissioning [Required]
- Prepare/Issue IROD for interim closure of Group B area [Additional]
- Evaluate remediation of soil/groundwater and perform as needed [Required]
- Isolate Storm Drain System from Area D [Additional]
- Close Storm Drain System [Required]
- Install interim closure cap, if part of the selected interim remedy – The area will need to be filled in both options, but additional erosion control features may need to be added to an interim cap that would not be needed otherwise [Additional]
- Configuration control of drawings, procedures, DSA, etc. – Although certain work will be needed in final closure of the FTF OU, because other areas of FTF will still be operational additional work to maintain configuration control during the interim period will be required [Additional]

5.2.3 Final Closure of FTF OU (Groups A-D)

The final closure of the FTF OU would require the following actions to be performed:

- Operationally close Waste Tanks 25-28, 33-34, and 44-47
- Operationally close Ancillary Equipment: 2F Evaporator, FDB2, FBD3, FBD4, and FDB5
- Prepare final FTF OU closure documentation package for Transfer from Operations and Deactivation phases
- Isolate utilities at FTF boundary
- Isolate transfer lines at FTF boundary
- Perform field activities for Transfer from Operations and Deactivation
- Prepare final FTF OU closure documentation package for Decommissioning phase
- Perform field activities for Decommissioning
- Prepare/Issue final FTF OU ROD
- Evaluate remediation of soil/groundwater and perform as needed
- Close Storm Drain System
- Install final FTF closure cap if included in the selected final remedy for the FTF OU
- Configuration control of drawings, procedures, DSA, etc. – Because FTF will no longer have any operational areas, the level to which drawings, procedures, DSA will need to be revised for configuration control purposes will be minimized. [Required]

6.0 CLOSURE STRATEGY

In order to accelerate the final closure of the FTF OU, DOE will employ the following strategy to the extent practical:

- As ancillary structures complete their operational mission, operational closure of the FTF ancillary structures will be performed in parallel with operational closure of the FTF waste tanks.
  - By performing operational closure of ancillary structures in parallel with on-going waste removal and waste tank operational closure activities, to the extent practical, the time period from the end of the last waste tank closure until the time when FTF may transition from operations will be minimized.
- As waste tanks and ancillary structures are operationally closed, D&R of process equipment/support structures which are no longer needed will be carried out as funding priorities allow.
  - The D&R of supporting process equipment and support structures in parallel with operational closure of the waste tanks and ancillary structures, to the extent practical, will reduce the duration of the future Transfer from Operations, Deactivation and Decommissioning phases.
- Planning for the Transfer From Operations, Deactivation, and Decommissioning phases will be carried out such that field implementation activities within those phases can be initiated as early as possible.
  - A reduction in the duration it takes to transfer from an operating facility to a safe shutdown mode can be accomplished by initiating the planning for the transfer well in advance of when the facility is anticipated to be done with its operational mission. Activities would involve such things as initiating the facility retirement process, development of the Safe Shutdown Plan and S&M Plan and initiating development of the FCDP. Performing these types of activities prior to the facility completing its operational mission will shorten the duration to reach the Safe Shutdown state.
  - As is the case with initiating activities to transfer FTF from an operating facility to a safe shutdown state well in advance of the end of operations, initiating activities for the Deactivation phase ahead of completing the Transfer From Operations phase will also reduce the overall duration for FTF OU closure. As FTF gets closer to the end of operations, the condition of FTF heading into the Deactivation phase will be better understood. For example, what equipment still remains within FTF that was not able to undergo D&R early, what are the hazards that will still remain after the Transfer From Operations phase, and what utilities/piping still require isolation. Initiation of such things as identifying remaining hazards, initiating characterization of existing hazards, formulating the End State Vision and initiating development of the formal DPP required by site Manual 1C, would all potentially reduce the duration FTF would remain in the Safe Storage phase. Performing more comprehensive hazards removal and isolation during the Safe Shutdown and

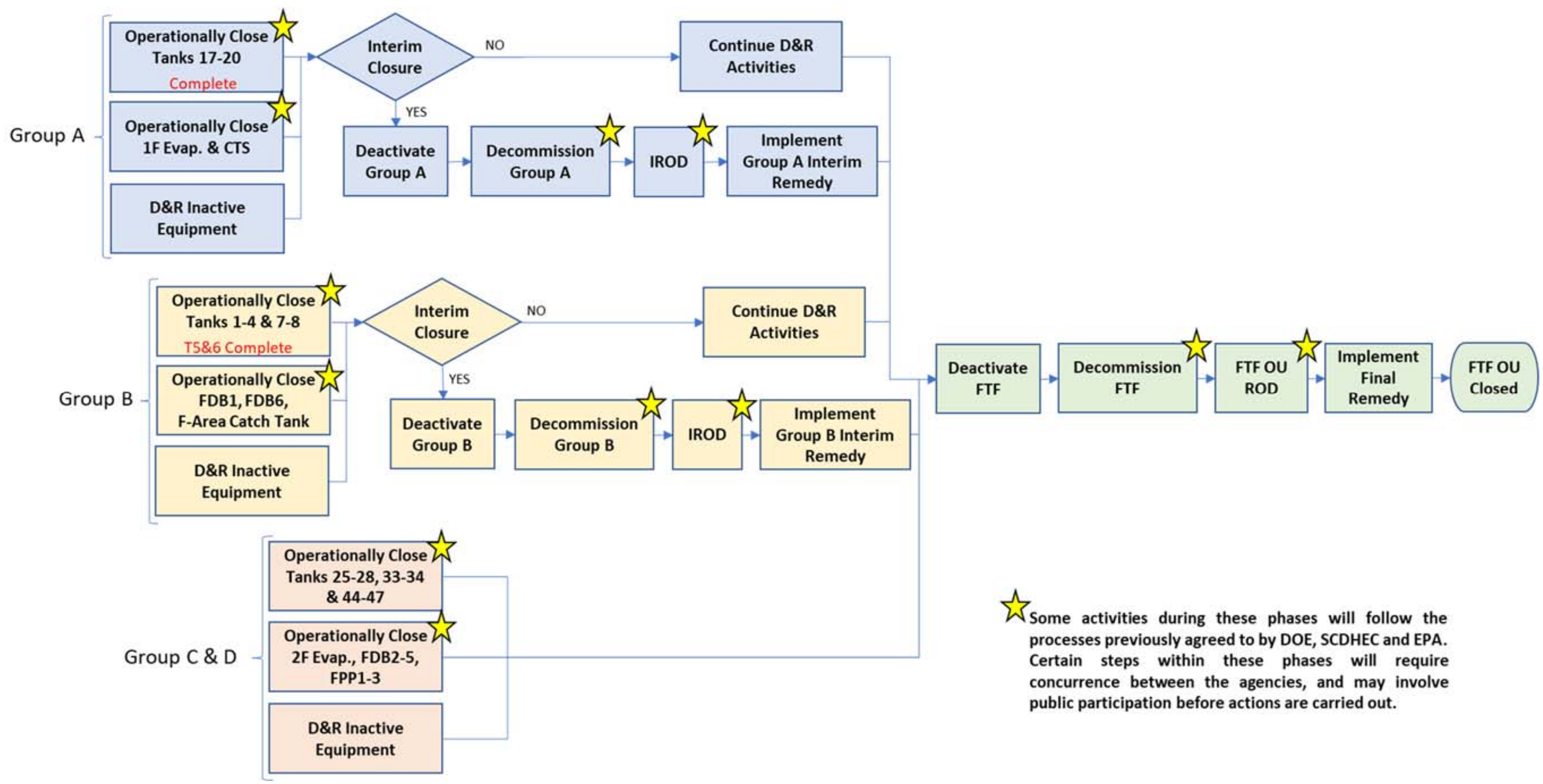
Deactivation phases also has the potential to reduce the duration of the Decommissioning phase. Initiating the planning and documentation preparations well in advance will reduce the duration that FTF remains in the safe shutdown state awaiting Deactivation

- The duration for which a facility is required to remain in the Safe Storage phase can be reduced by initiating, to the extent practical, planning for facility Decommissioning. This would involve such things as ensuring early turnover of the facility to the area closure organization at the end of Deactivation, initiation of a Decommissioning Scoping Document and a FDE. Initiating the planning and documentation preparations in advance, to the extent practical, will reduce the duration that FTF remains in the Safe Storage phase awaiting Decommissioning

- As operational closure of the FTF waste tanks and ancillary structures is completed within sub-areas of FTF, DOE will evaluate the costs and benefits of moving forward with interim closure of those specific areas with respect to impacts on other SRS Liquid Waste System risk reduction activities versus potential improvement to the final FTF OU closure date.
    - Performing interim closure of sub-areas of FTF could potentially further accelerate the closure of the FTF OU, but such activities could divert funding from other higher risk reduction activities within the Liquid Waste System. The costs and benefits of moving forward with interim closure of a sub-area will need to be evaluated based on conditions at that time.

Figure 6.0-1 provides an overview of DOE's closure strategy for the FTF OU.

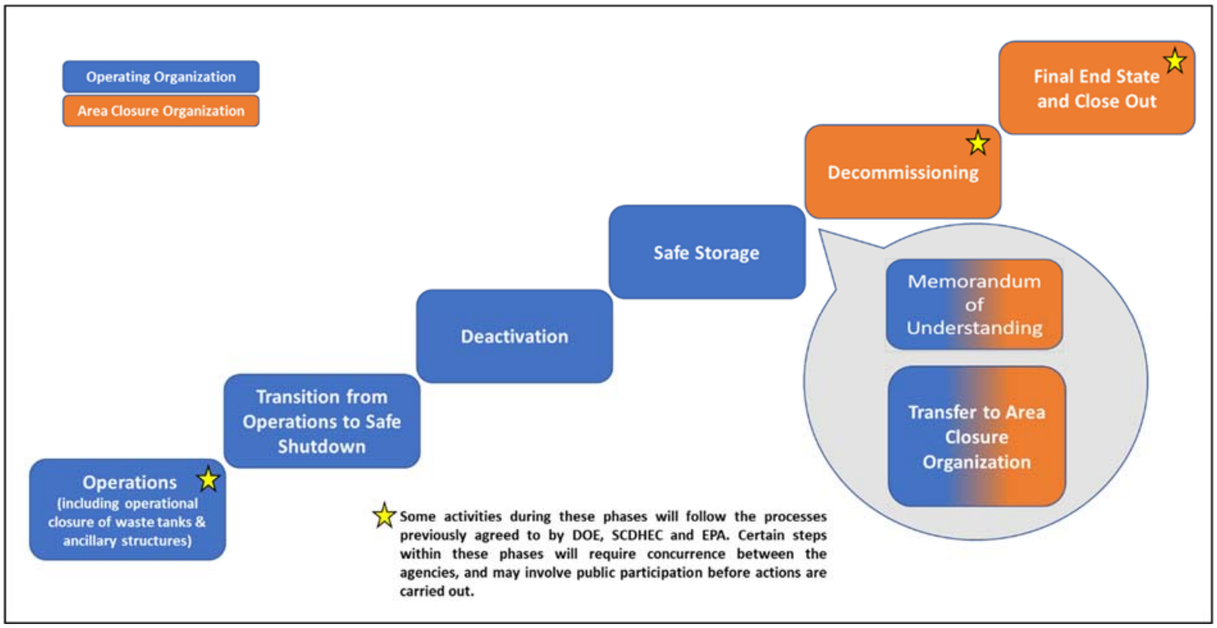
Figure 6.0-1 FTF OU Closure Strategy



7.0 SUMMARY

The Facility Disposition Process phases leading to final closure of the FTF OU are shown in Figure 7.0-1.

Figure 7.0-1 Process for the Final Closure of the FTF OU



Operational closure of FTF waste tanks and ancillary structures will be performed in phases, with waste tanks and ancillary structures being cleaned, isolated and stabilized individually or in groups as they become available upon completion of their operational mission. Operational closure of the waste tanks and ancillary structures is just one of the steps that will be required to achieve final closure of the FTF OU as described in the FFA.

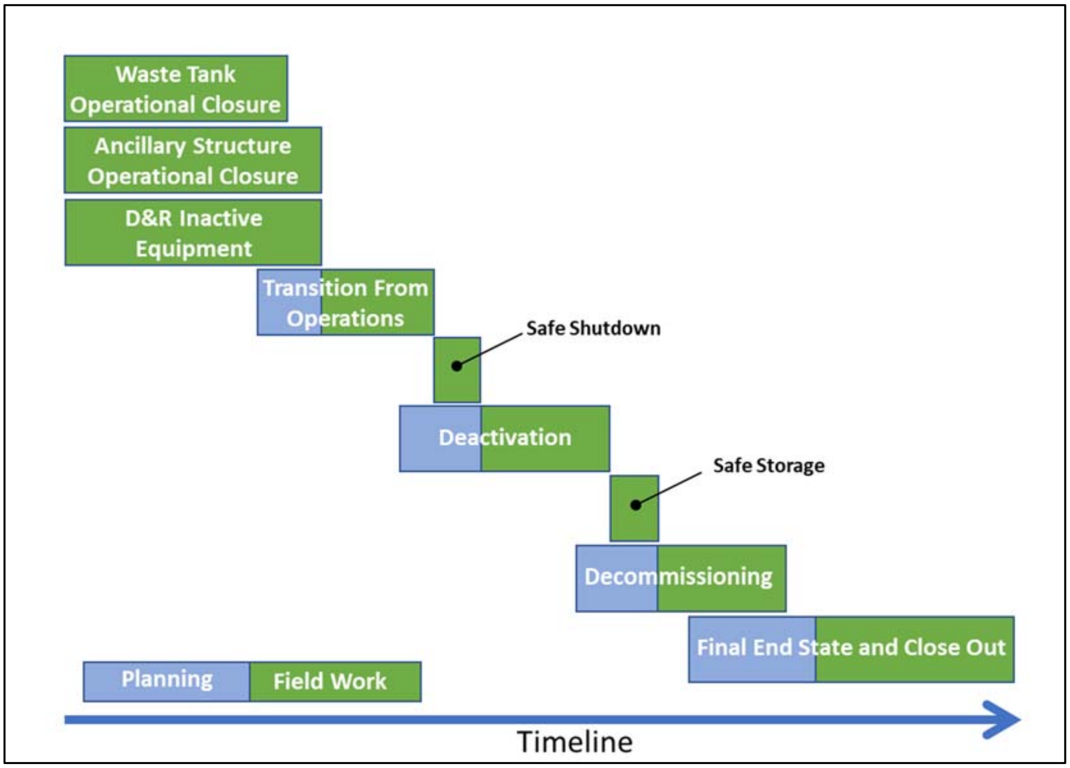
The closure process, at a high level, will include the following phases:

- Operations – operational closure of all FTF waste tanks and ancillary structures will be carried out as agreed upon between DOE, SCDHEC and EPA in the *Consolidate General Closure Plan for F-Area and H-Area Waste Tank Systems*. [SRR-CWDA-2017-00015]
- FTF Transition from Operations – FTF will need to be formally acknowledged by DOE to be an excess facility and subsequently placed in a safe shutdown state awaiting Deactivation.
- FTF Deactivation – FTF will be placed in a safe and stable condition by the elimination or reduction of residual hazards. Deactivation protects the health of the workers, public and the environment and minimizes the long-term cost of surveillance and maintenance.
- Safe Storage Period – an interim period after Deactivation where FTF is in a passively safe and stable condition awaiting Decommissioning.

- FTF Decommissioning – during this phase residual hazards are eliminated permanently. A range of possible alternative end states for the various structures is evaluated, and the preferred alternative is selected. The possible alternatives might include in situ disposal, demolition and removal, or possibly another alternative. Decommissioning will be conducted consistent with *Memorandum of Agreement for Achieving an Accelerated Cleanup Vision at the Savannah River Site* signed by DOE, SCDHEC and EPA. [MOA_07-2003]
- Final End State and Close Out – Decommissioning will not always be the final action, as is anticipated to be the case with FTF. During this phase, the site is evaluated to determine if any remedial action for soil or groundwater is required to complete the cleanup. In addition, the final end state of FTF will be determined, the final FTF OU ROD will be issued and Corrective/Remedial Actions will be implemented. It is during this phase that a final closure cap, if selected as part of the final remedy for the FTF OU, would be placed over FTF.

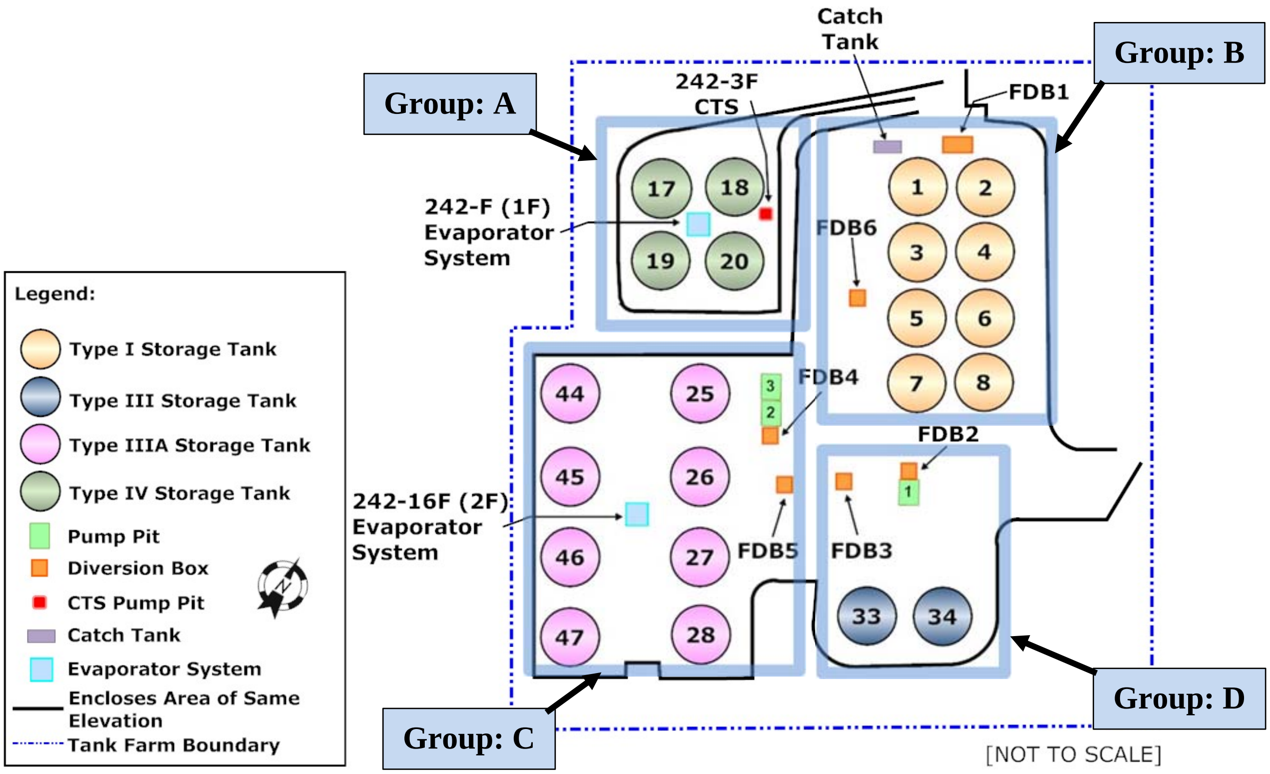
The sequencing of the phases and how they are applied to the various areas within FTF will impact the overall timing for the final closure of the FTF OU. Performing steps in parallel, to the extent possible, could accelerate the final closure of the FTF OU. The extent to which the activities can be performed in parallel will be dependent on many factors. The benefits gained by applying additional resources required to perform tasks in parallel will need to be evaluated against the potential impacts to other risk reduction activities such as on-going waste removal and salt/sludge batch preparation, infrastructure maintenance/upgrades and waste disposition activities. Figure 7.0-2 illustrates the opportunities that would be available for performing activities in parallel.

Figure 7.0-2 Process for the Final Closure of the FTF OU



Due to the manner in which the tanks were constructed, FTF is arranged such that it can be divided into tank groupings. The groups are based on the geographical locations which coincide with the waste tank types. FTF was expanded several times with each expansion naturally segregating the tanks into distinct groupings. The separate groupings within FTF are illustrated in Figure 7.0-3. For the purpose of discussions within this document, the groupings have been designated as Groups A-D.

Figure 7.0-3 FTF Tank Groupings



One option to achieve final closure of the FTF OU includes closing all of the FTF OU at one time without performing any interim closure actions on individual sub-areas of FTF. Alternatively, as waste tanks and ancillary structures within a sub-area, such as the areas represented by Group A or Group B in Figure 7.0-3, are operationally closed, a second option is to proceed with interim closure of the sub-area. In the latter option, final closure of the FTF OU would then be initiated following the completion of operational closure for all remaining FTF waste tanks and ancillary structures which had not previously been part of an interim closure action. Performing interim closure of sub-areas of FTF could potentially further accelerate the closure of the FTF OU, but such activities could divert funding from other higher risk reduction activities within the Liquid Waste System. Based on the current anticipated waste tank closure sequencing/timing, a potential sequence would be interim closure of the Group A sub-area, interim closure of the Group B sub-area, followed by final closure of the FTF OU after all waste tanks and ancillary structures in Groups C and D are operationally closed. However, interim closure of sub-areas within FTF followed by final closure of the FTF OU could increase the overall cost of FTF OU closure because it would require duplicate activities such as:

- Isolation of equipment/utilities/piping between individual sub-areas that would not be necessary if the FTF OU is closed without sub-areas being closed.
- Interim remediation decisions be made not just for structures but also for the remediation of soil or groundwater within that sub-area, each area would need to proceed all the way through the Facility Disposition Process, including issuance of an IROD for each individual area. The process would then be repeated for final closure of the FTF OU.

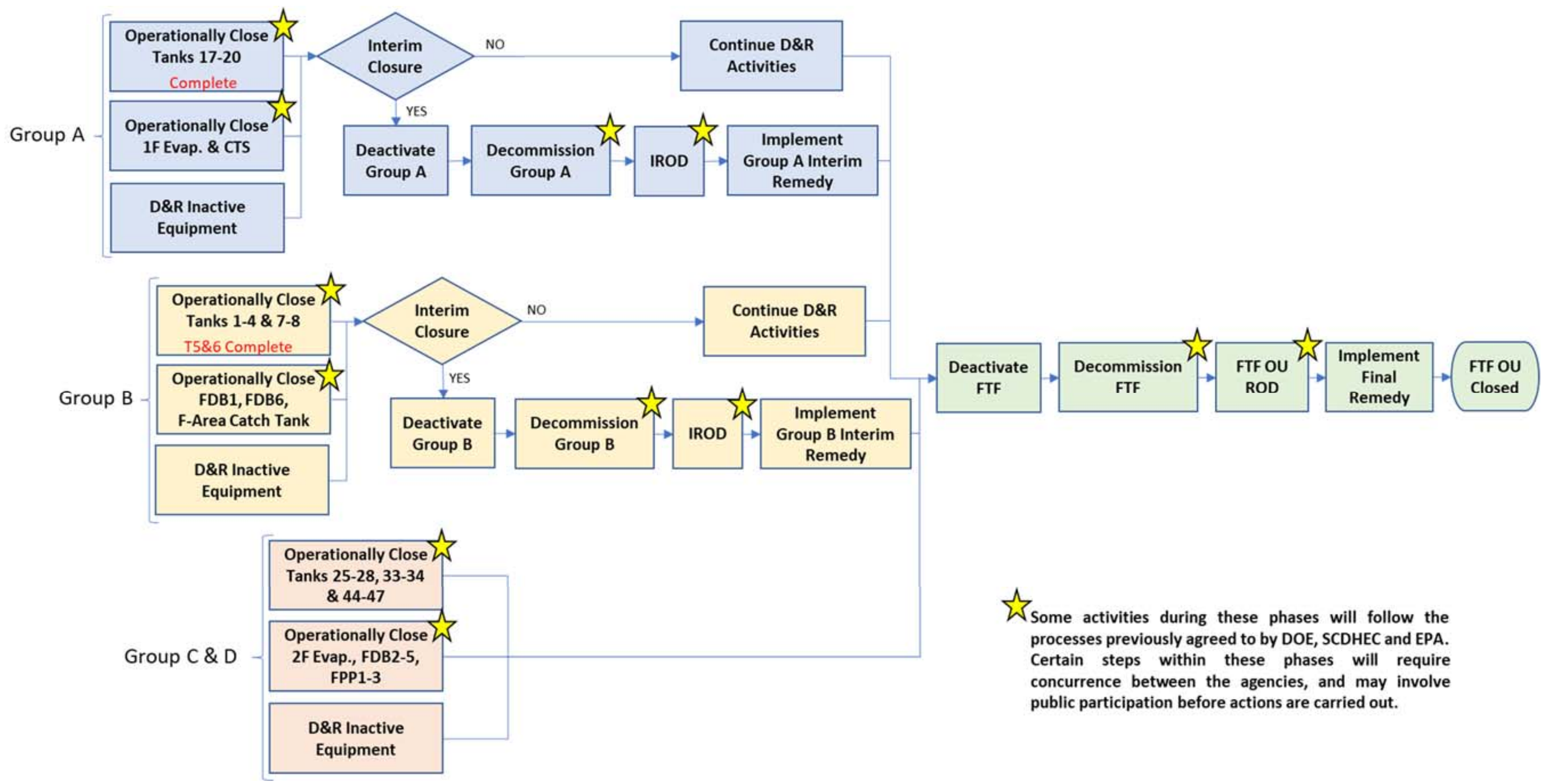
The decision to move forward with interim closure of a sub-area within FTF will be highly dependent on the timing for completion of operational closure of waste tanks and ancillary structures within the other sub-areas. The regulatory process required to get to the issuance of an IROD, leading to implementation of an interim remedy for the sub-area, is anticipated to be a multi-year process for each IROD. DOE will need to evaluate whether the additional costs of individual area isolation, potential issues with significant construction activities being required within a still active tank farm, and duplication of the regulatory process is worth the benefit of potentially accelerating the overall final FTF OU closure timeframe.

In order to accelerate the final closure of the FTF OU, DOE will employ the following strategy to the extent practical:

- As ancillary structures complete their operational mission, operational closure of the FTF ancillary structures will be performed in parallel with operational closure of the FTF waste tanks.
- As waste tanks and ancillary structures are operationally closed, D&R of process equipment/support structures which are no longer needed will be carried out as funding priorities allow.
- Planning for the Transfer From Operations, Deactivation, and Decommissioning phases will be carried out such that field implementation activities within those phases can be initiated as early as practical.
- As operational closure of the FTF waste tanks and ancillary structures is completed within sub-areas of FTF, DOE will evaluate the costs and benefits of moving forward with interim closure of those specific areas with respect to impacts on other SRS Liquid Waste System risk reduction activities versus potential improvement to the final FTF OU closure date.

Figure 7.0-4 provides an overview of DOE’s closure strategy for the FTF OU.

Figure 7.0-4 FTF OU Closure Strategy



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ATTACHMENT A

The dates provided in this attachment are from System Plan Revision 21, are subject to change, and are not provided as DOE commitments. [SRR-LWP-2009-00001] Waste tank and ancillary structure operational closure schedule dates for the FFA will be set per the 2019 Suspension Agreement.

Figure A-1: FY 20 FTF Status

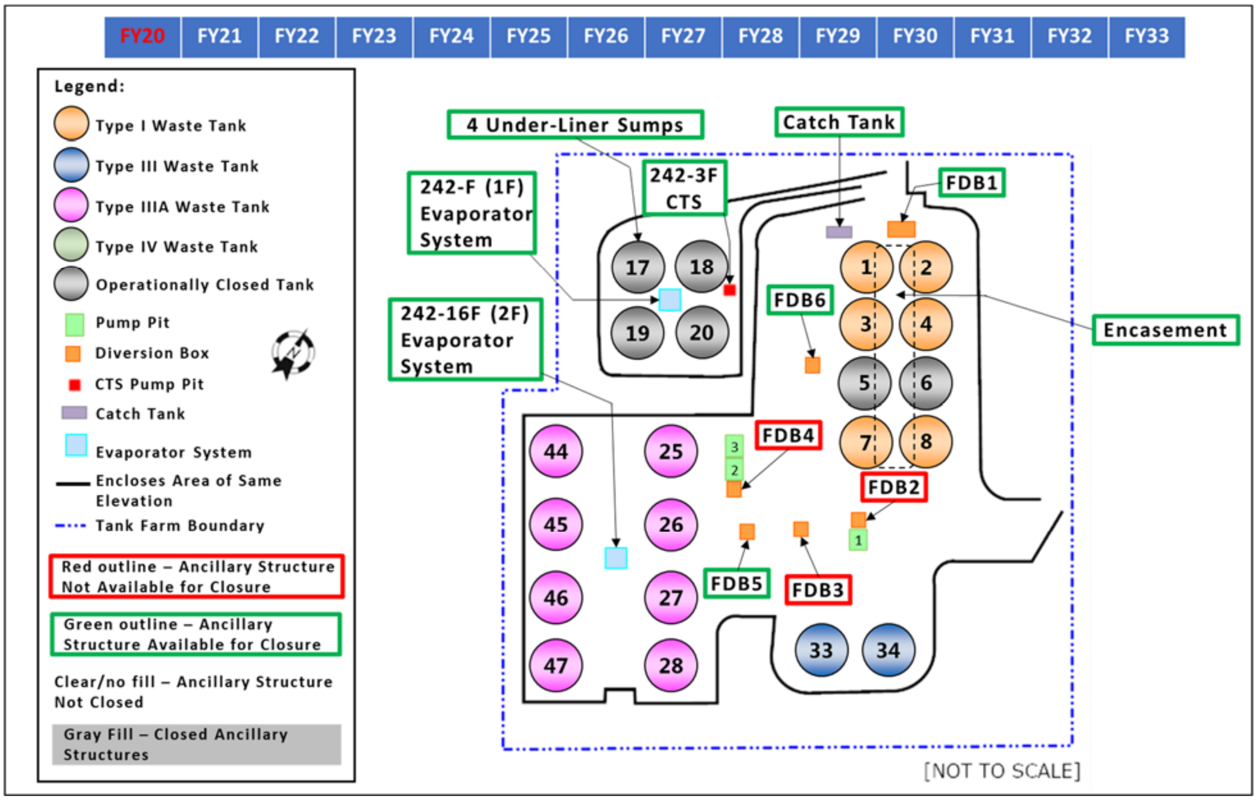

Figure A-2: FY 21 FTF Status

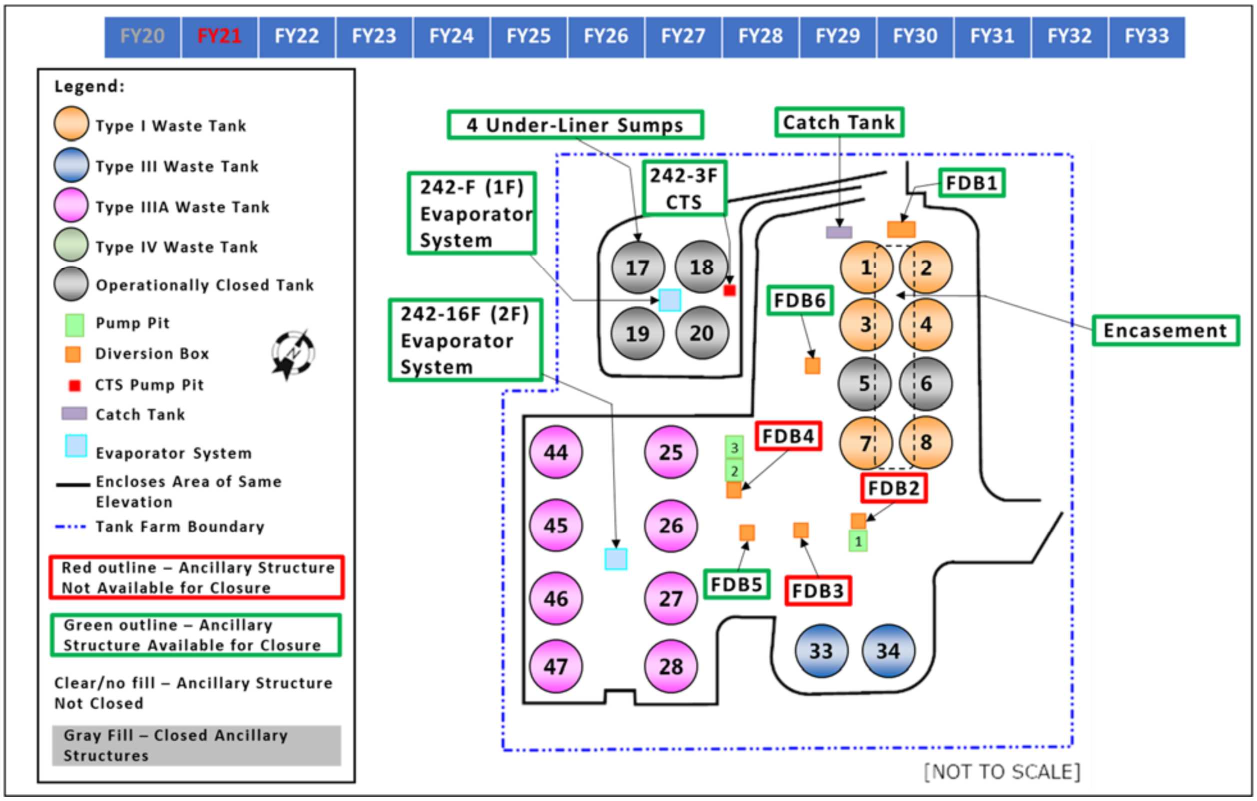

Figure A-3: FY 22 FTF Status

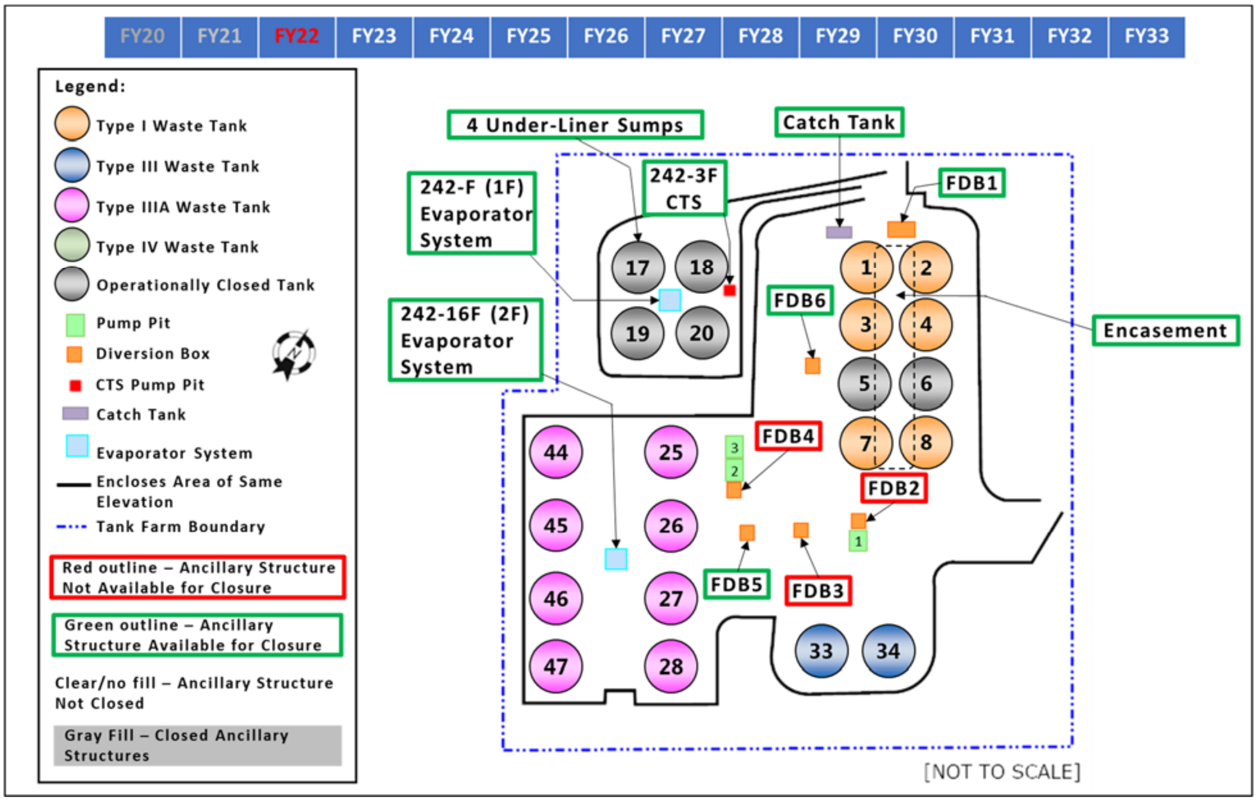

Figure A-4: FY 23 FTF Status

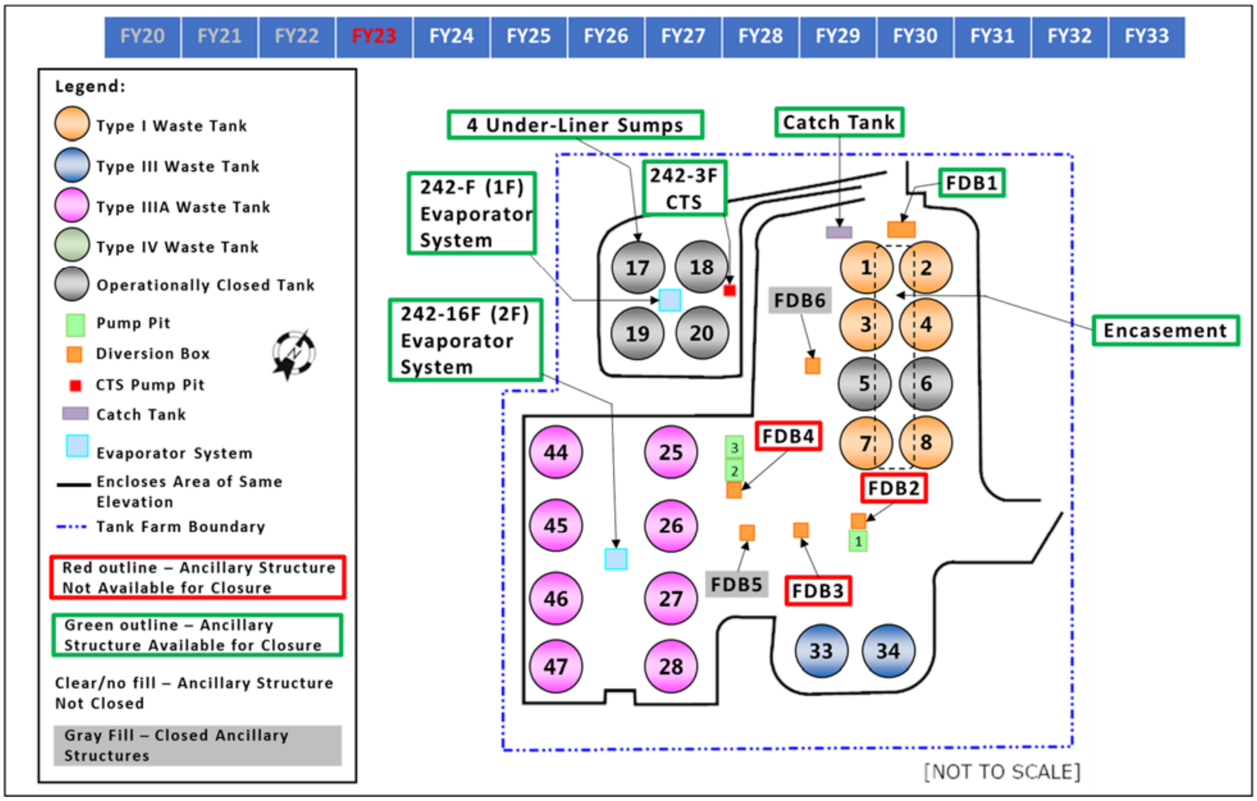

Figure A-5: FY 24 FTF Status

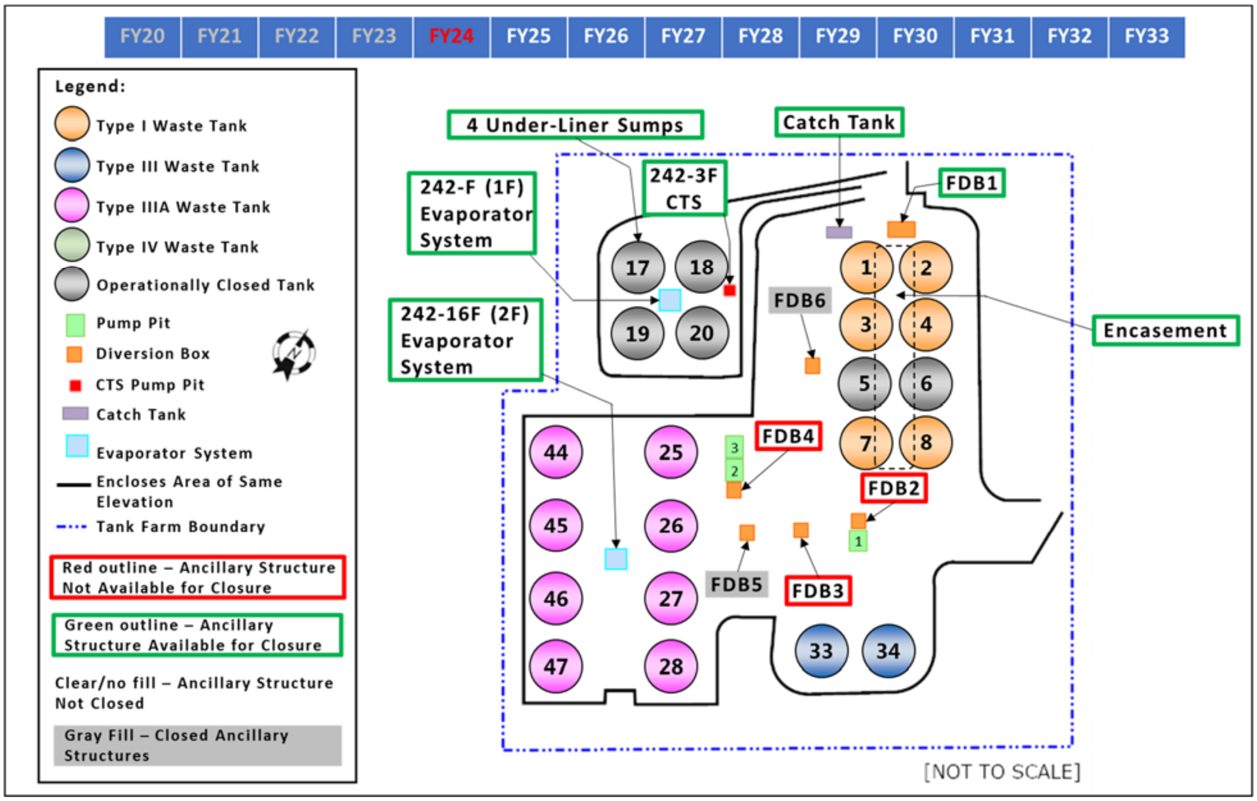

Figure A-6: FY 25 FTF Status

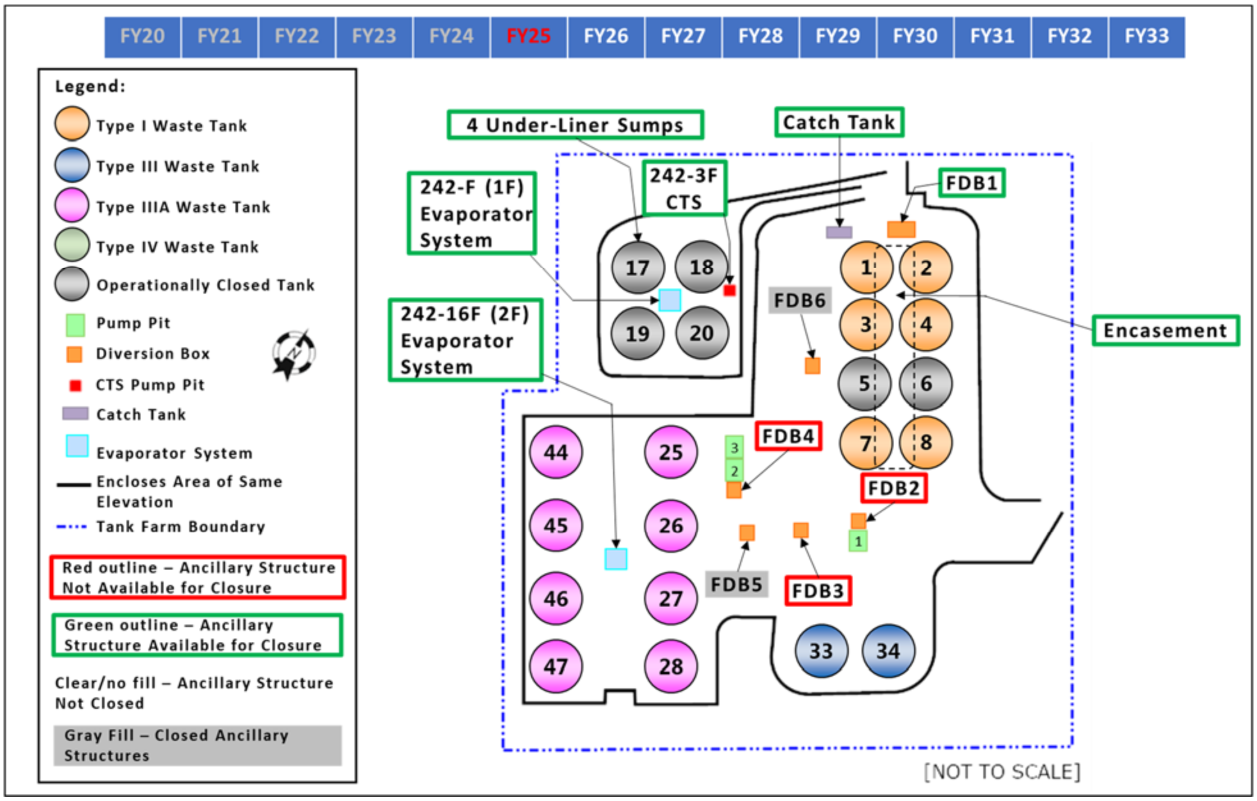

Figure A-7: FY 26 FTF Status

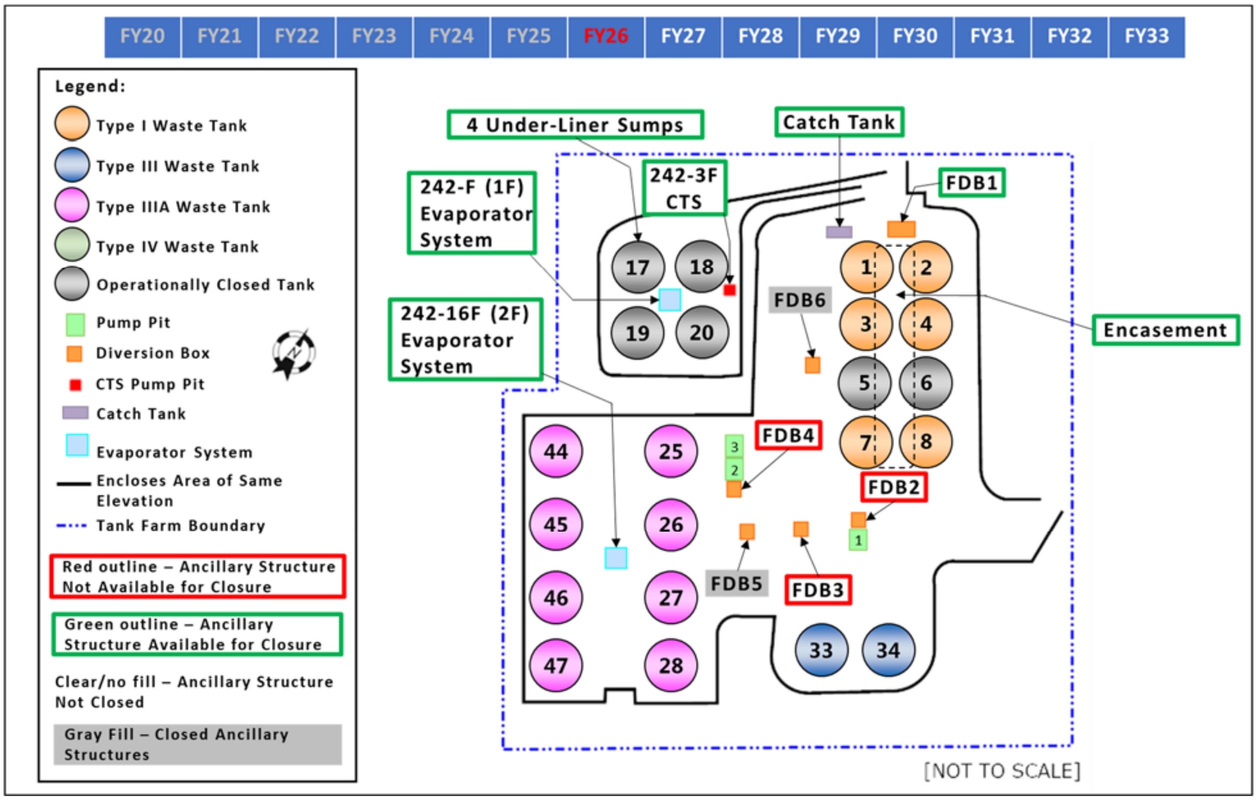

Figure A-8: FY 27 FTF Status

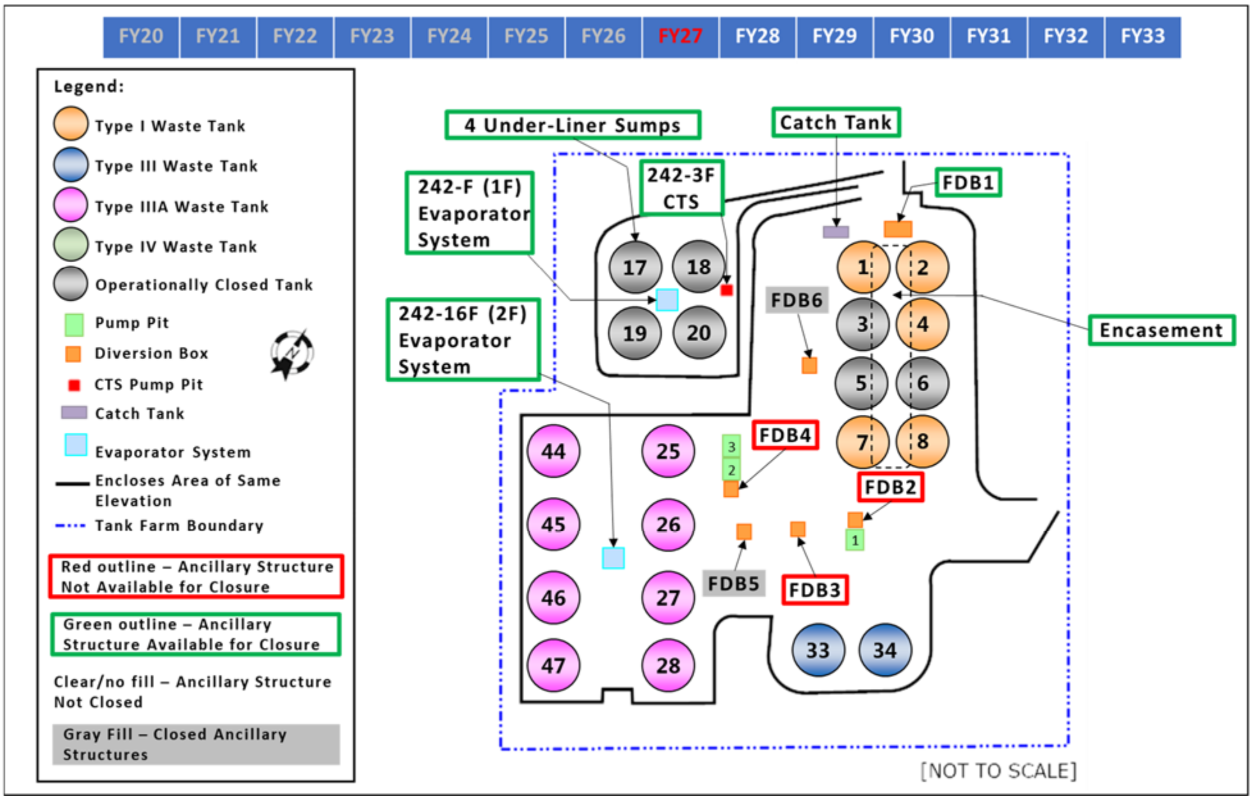

Figure A-9: FY 28 FTF Status

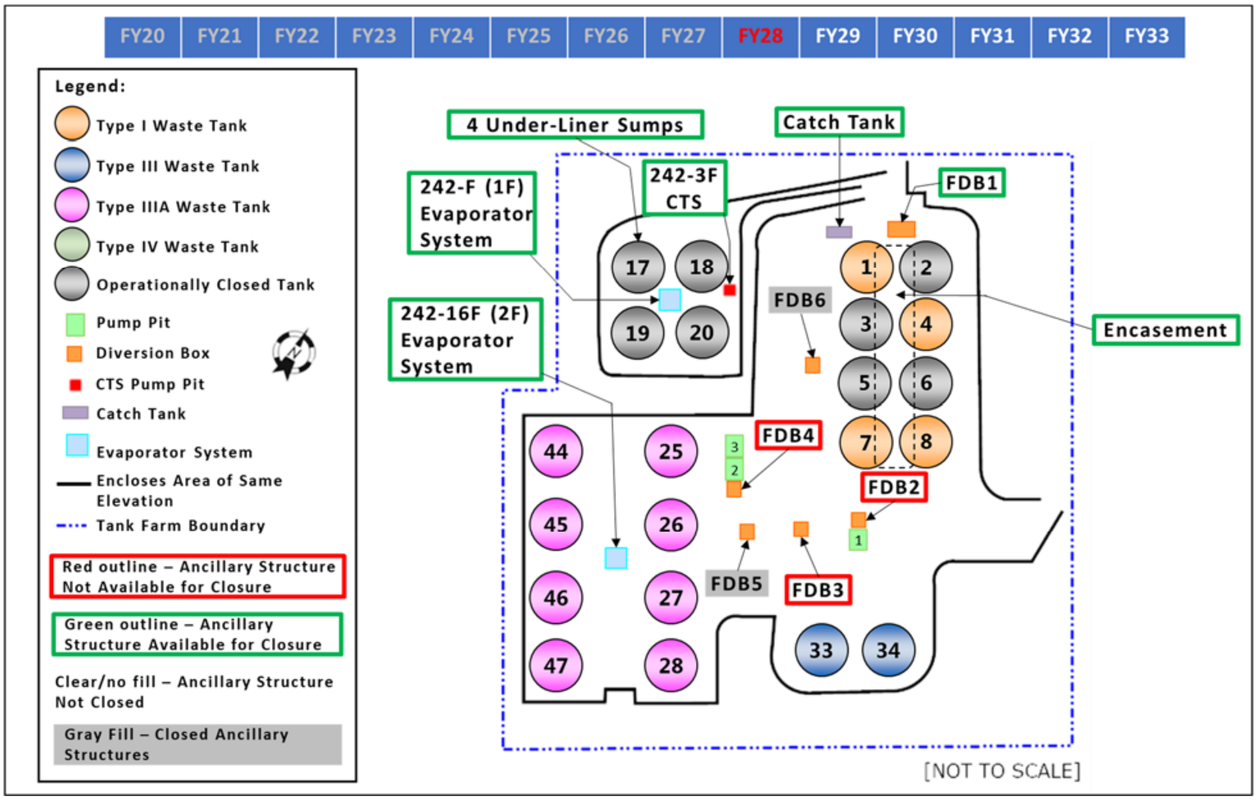

Figure A-10: FY 29 FTF Status

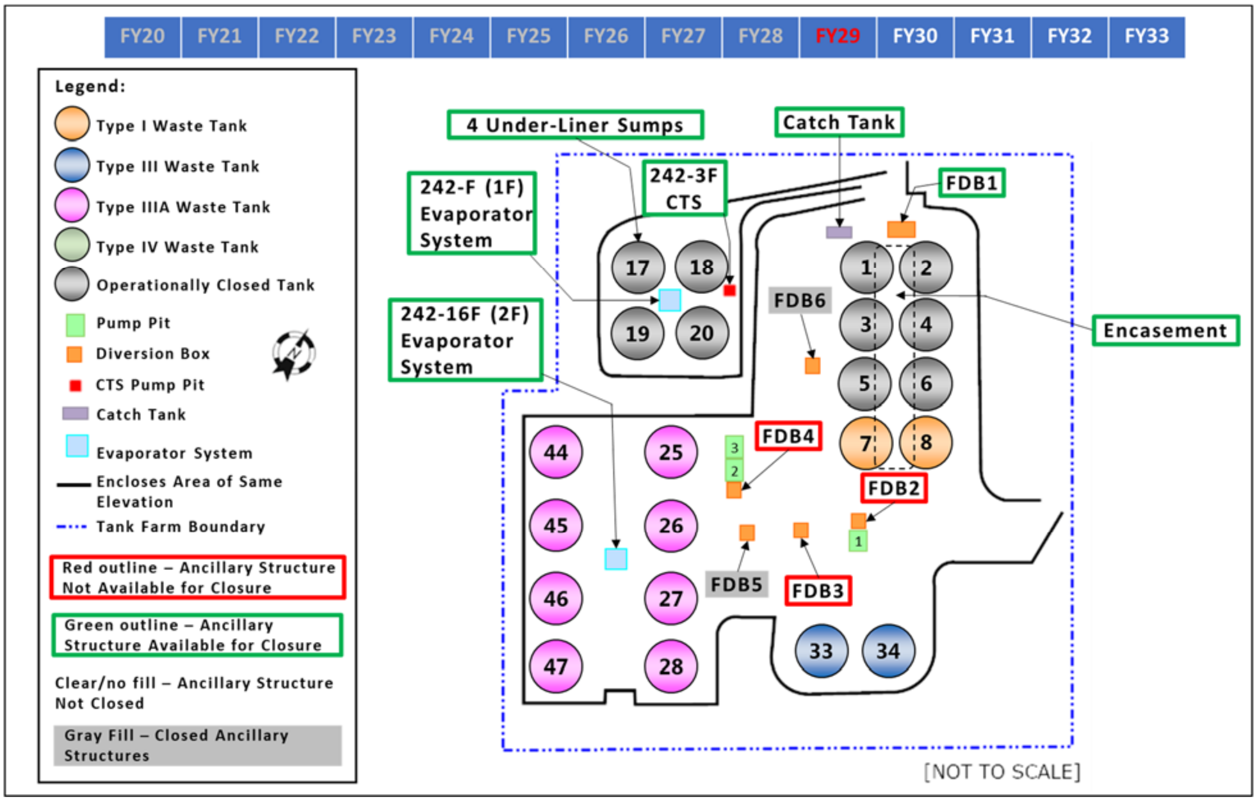

Figure A-11: FY 30 FTF Status

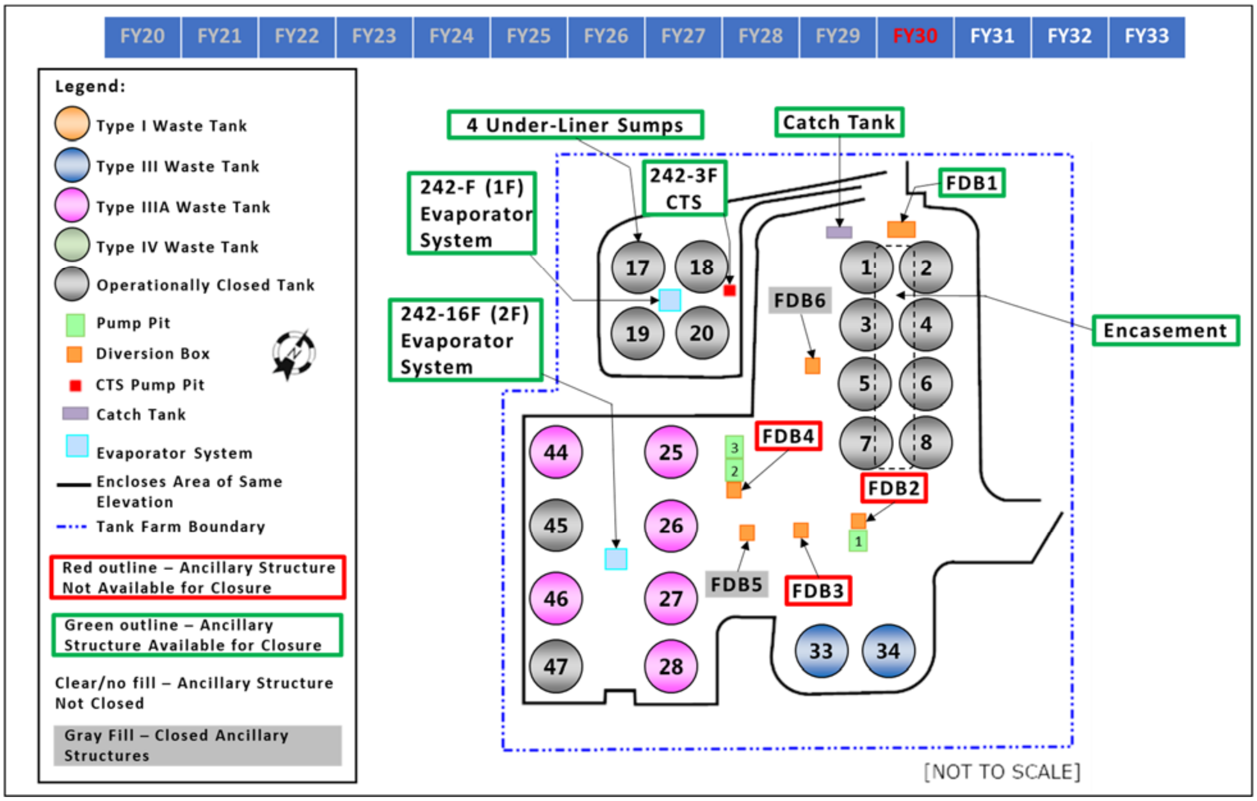

Figure A-12: FY 31 FTF Status

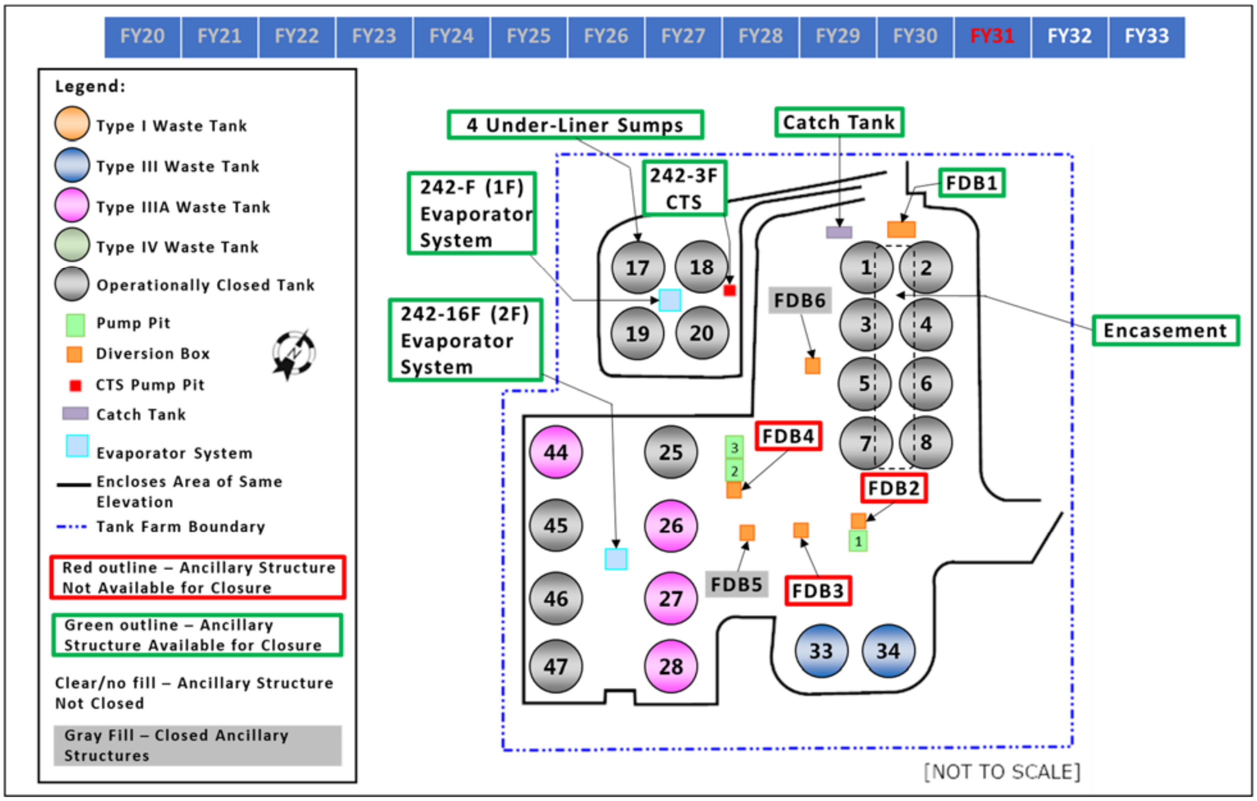

Figure A-13: FY 32 FTF Status

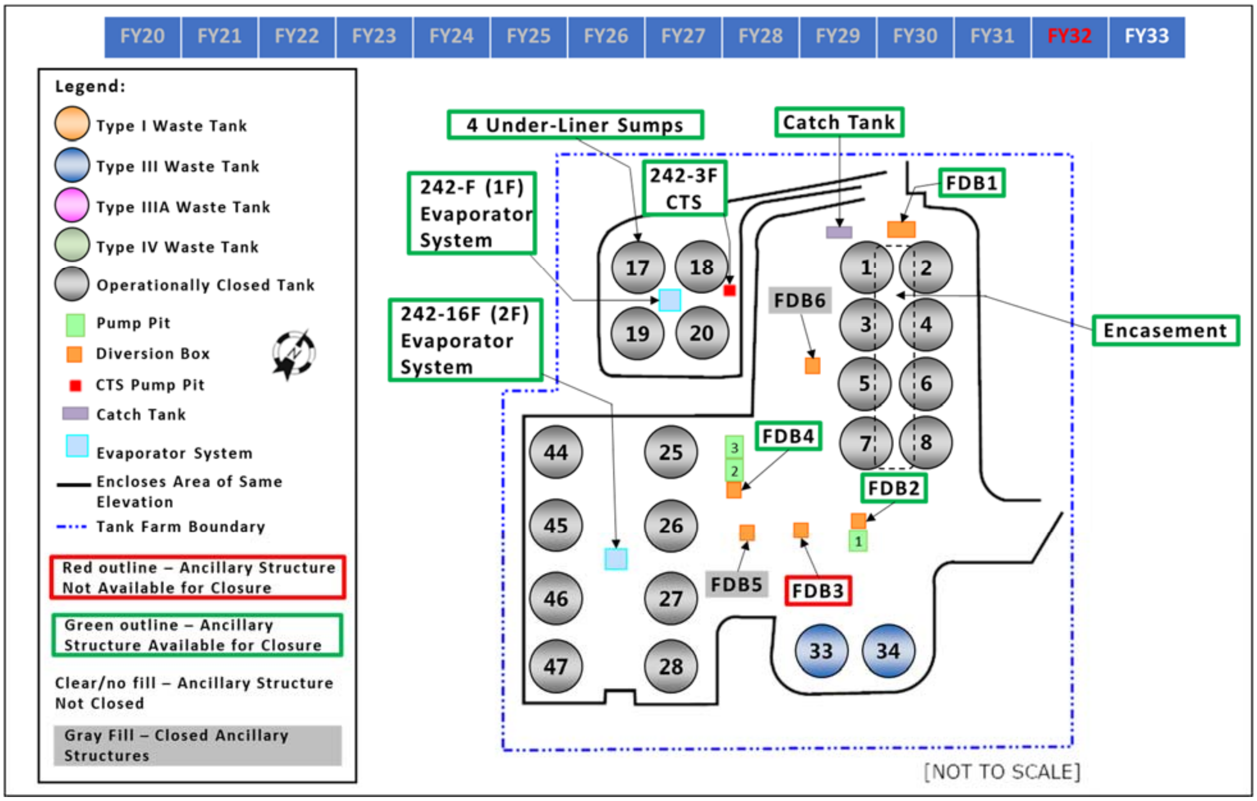

Figure A-14: FY 33 FTF Status