Savannah River Remediation
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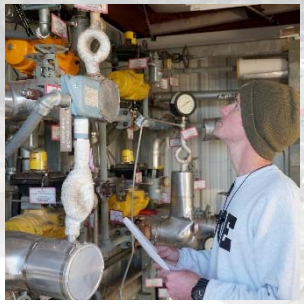
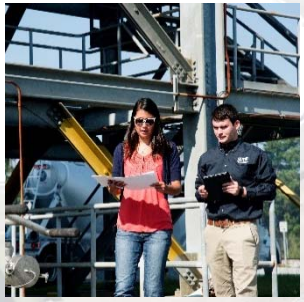
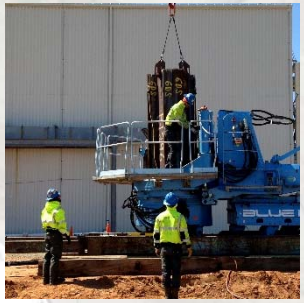
July 13, 2020







Proposal to Cease Waste Removal Activities in F-Area Diversion Boxes 5 and 6

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Waste Disposal Authority

SRR-CWDA-2020-00059
Revision 0

Safety SRR Integrity SRR Ownership SRR Teamwork SRR Continuous Improvement

Briefing Outline

- Objectives of Today's Meeting
- Background
  - Ancillary Structures
  - Diversion Boxes
- Regulatory Considerations
- Evolution of the 1F Evaporator System
- Discussion on FDB-5
- Discussion on FDB-6
- Path Forward
- Request for DOE, SCDHEC and EPA Concurrence

Acronyms

CGCP	Consolidated General Closure Plan
CLSM	Controlled Low-Strength Material
CTS	Concentrate Transfer System
DB	Diversion Box
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FDB	F-Area Diversion Box
FPP	F-Area Pump Pit
FPT	F-Area Pump Tank
FTF	F-Area Tank Farm
FW	Flush Water
HTF	H-Area Tank Farm
LDB	Leak Detection Box
MREM/HR	Millirem per Hour
PA	Performance Assessment
SCDHEC	South Carolina Department of Health and Environmental Control
SRR	Savannah River Remediation

Objective of Today's Meeting

Obtain mutual agreement among DOE, SCDHEC and EPA to:

- Suspend waste removal activities from the following F-Area **Ancillary Structures:**
  - **F-Area Diversion Box 5 (FDB-5)**
  - **F-Area Diversion Box 6 (FDB-6)**
- Enter the *Sampling and Analysis Phase*, including developing the final residual inventories, for these two Ancillary Structures

What are *Ancillary Structures* and *Diversion Boxes*?

What is an *Ancillary Structure*?

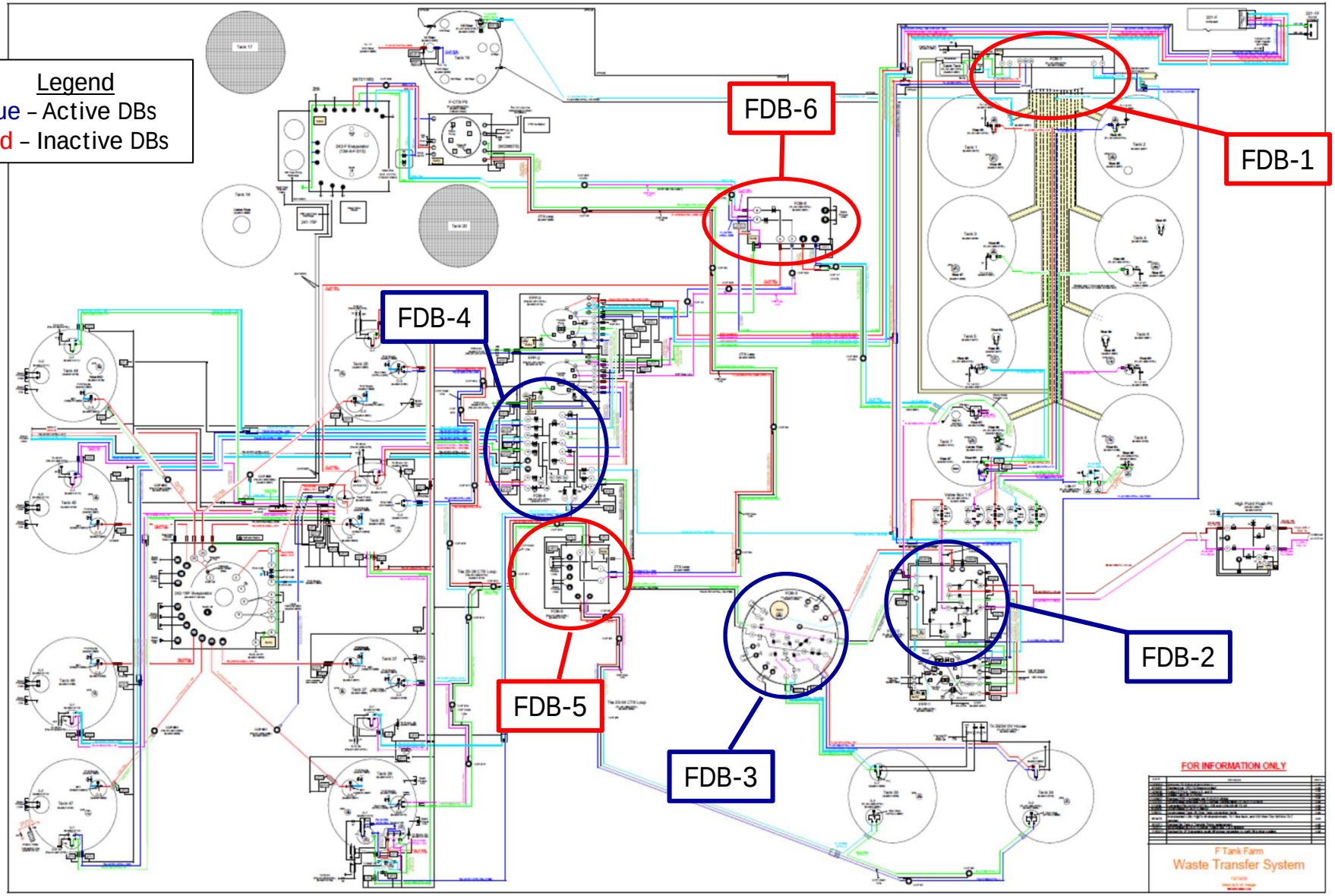
According to the Section 5.3 of the Consolidated General Closure Plan (CGCP), Ancillary Structures are defined as follows:

> *The FTF and HTF both contain ancillary structures with internal equipment having a residual contaminant inventory that must be accounted for as a part of facility closure. These ancillary structures and equipment include buried transfer lines, pump tanks, and evaporators, all of which have been in contact with liquid waste during the operating life of the facilities. The ancillary equipment was used in the FTF and HTF to transfer waste (e.g., transfer lines, pump tanks) and reduce waste volume through evaporation (e.g., evaporator systems). 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.*

What is a *Diversion Box*?

- Diversion boxes are part of the waste transfer line system in the Tank Farms
- A diversion box is an underground concrete structure that contains a series of connection points, known as nozzles, that are associated with different transfer lines that lead to waste tanks, other diversion boxes, or other ancillary structures such as pump tanks
- By the use of *jumpers* that connect from one nozzle to another, waste in the tank farms can be transferred from one point to another while minimizing the number of required transfer lines
- As a practical matter, the diversion box serves as secondary containment for the jumpers within that particular diversion box

Transfer Line Diagram for FTF

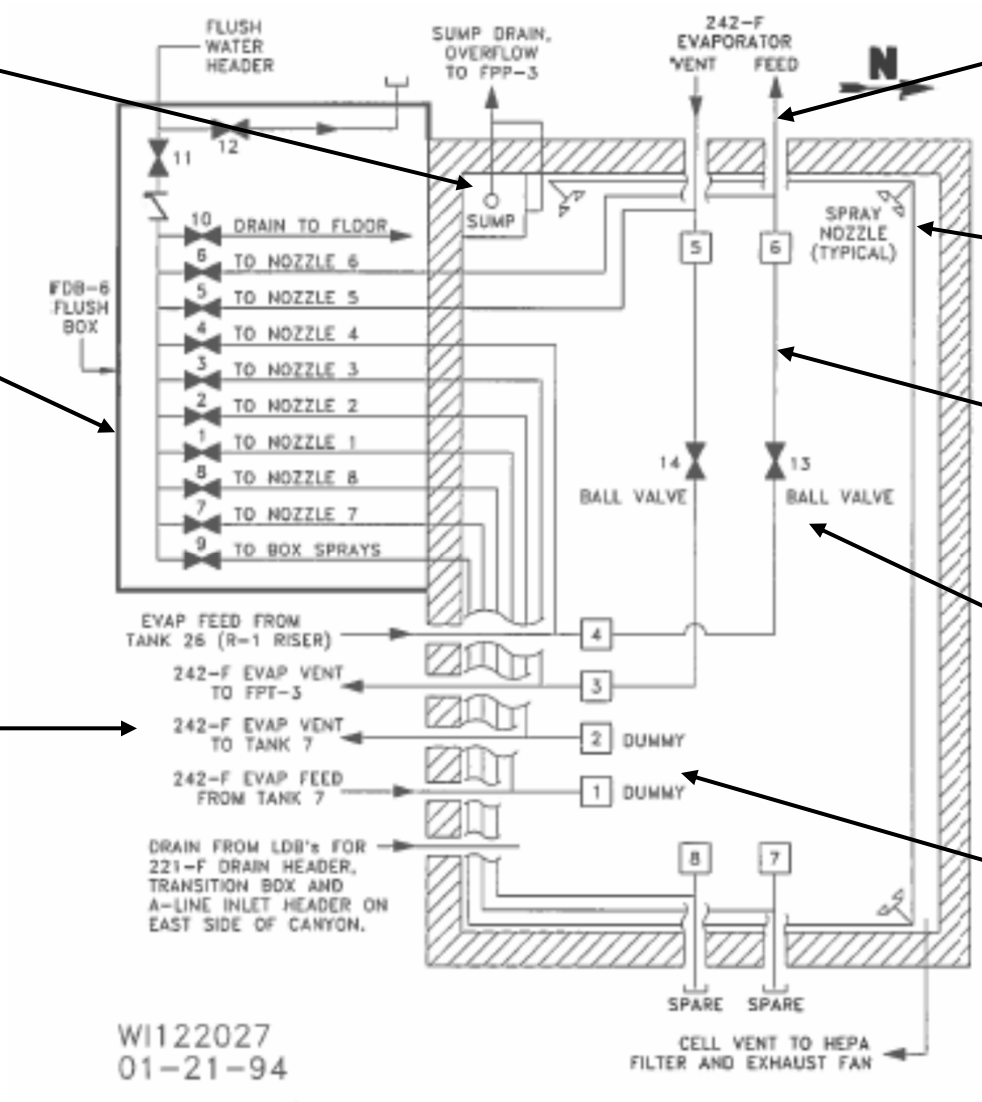


Diversion Box Example – Plan View

Sump drain that drains to a pump pit

Water lines to allow the flushing of jumpers

Transfer lines connecting to nozzles



Transfer lines connecting to nozzles

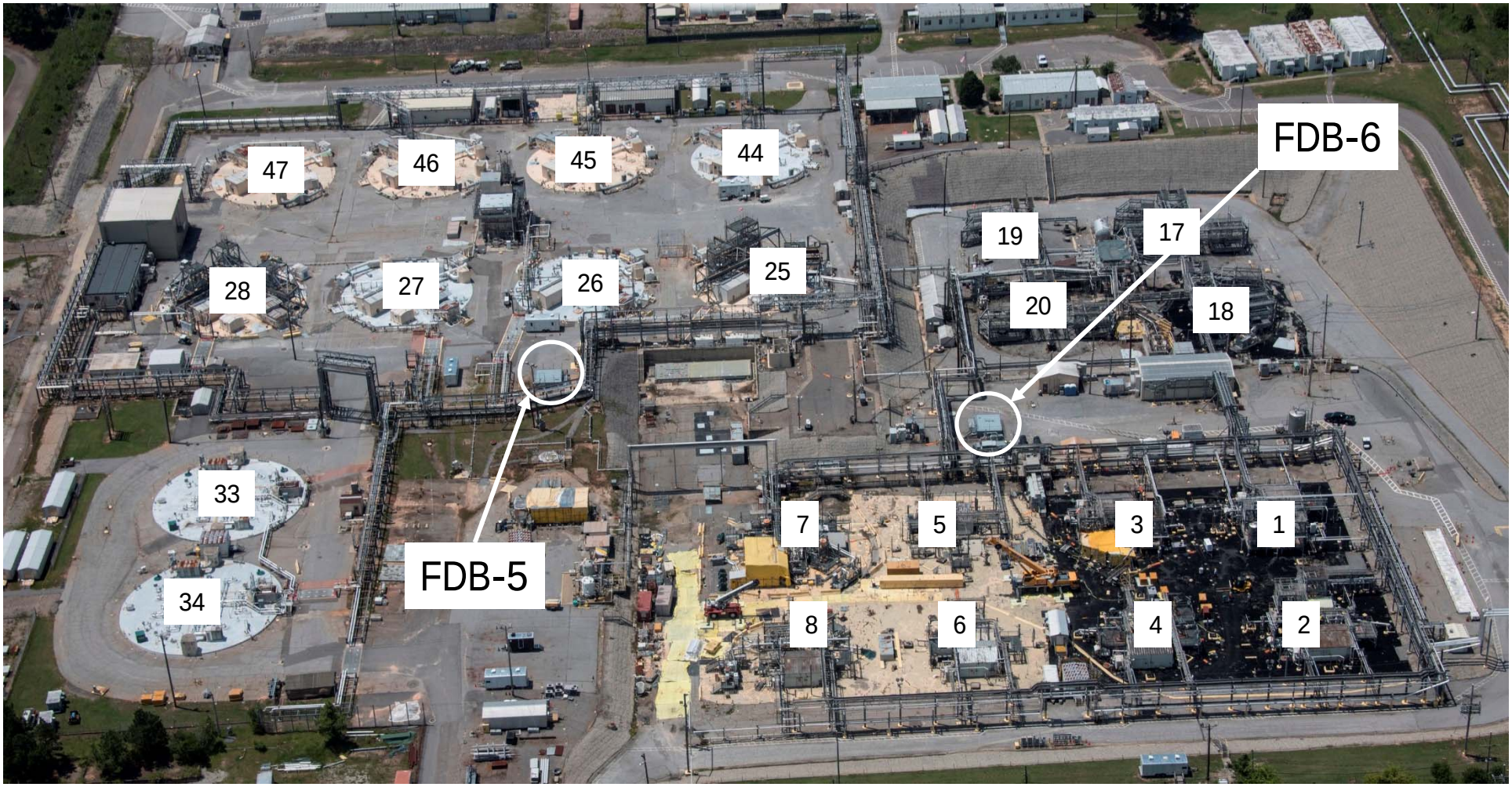
Water sprays to minimize cell/vault contamination

Jumper connecting Nozzle “4” and Nozzle “6”

Valves are often included on jumpers to control flow

A “Dummy” is a cap on a nozzle that is not in “use”

F-Tank Farm Looking West



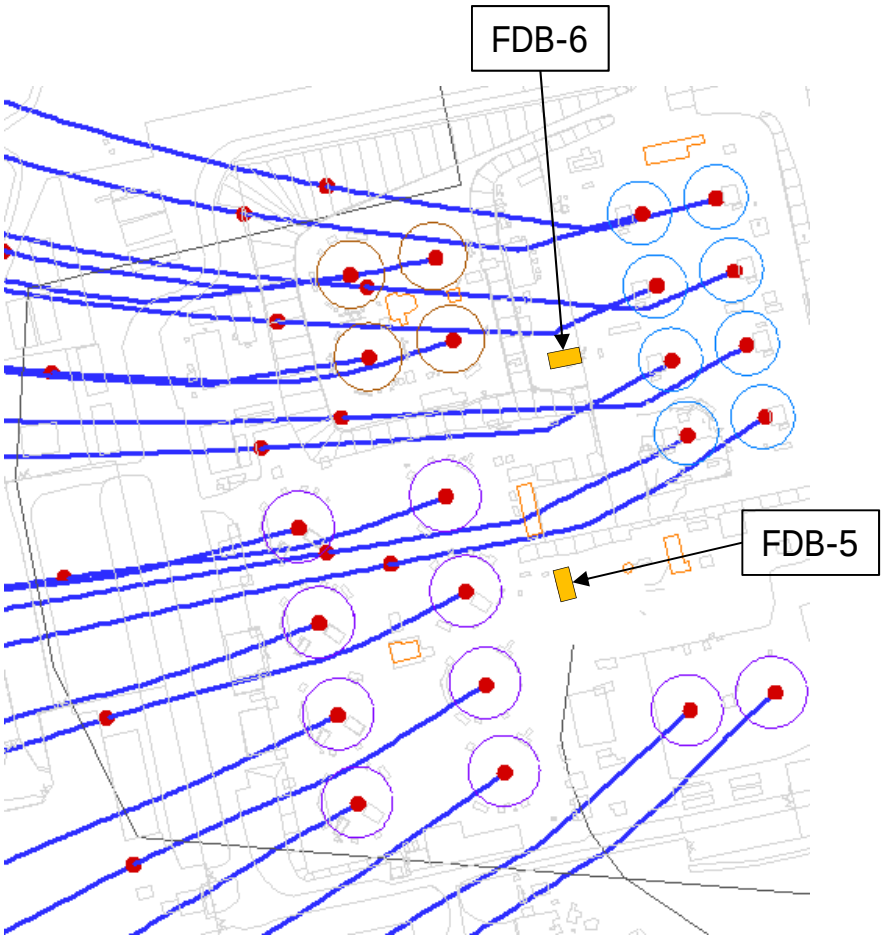
Regulatory Considerations

F-Tank Farm Performance Assessment

- The FTF Performance Assessment (PA) was issued in 2010
  - Special Analyses were completed in support of the operational closure of Tanks 18/19 and then Tanks 5/6
- For the PA, source inventories were assigned to some FTF Ancillary Structures based on projections of remaining residuals
  - All transfer lines were assigned an inventory
- No inventory was assigned to FDB-5 and FDB-6 since:
  - The cells served as secondary containment structures
  - The cells are stainless steel lined and had flushing capabilities
  - There were no significant events during their operational history that would result in significant accumulation of residual material solids
- The diversion boxes are assumed to be filled with grout (or equivalent) to prevent future subsidence and protect the integrity of the closure cap over time

Performance Assessment Considerations

- The Tanks 5 and 6 Special Analysis calculated the all pathways peak dose for FTF as ~3 mrem at 10,000 years after closure from all sources (tanks and ancillary structures)
  - Approximately an order of magnitude below the 25 mrem performance objective for a future member of the public
- All ancillary structures were assumed to "fail" and begin contaminant releasing at 500 years after closure
  - FDB-5 and FDB-6 were not assigned a residual inventory in the FTF PA
- A Special Analysis will be developed to specifically analyze how sensitive the PA results and conclusions are with respect to FDB-5 and FDB-6 residual inventories



Consolidated General Closure Plan (CGCP)

- The CGCP provides the protocols "by which DOE intends to remove from service the waste tanks and ancillary structures …"
- It states that "The FTF and HTF both contain ancillary structures with internal equipment having residual contaminant inventory that must be accounted for as part of facility closure."
  - "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."

Consolidated General Closure Plan (CGCP)

- With regards to residuals characterization in Ancillary Structures, the CGCP states the following (highlighting added):

  The 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 the SCDHEC and EPA. [SRR-CWDA-2011-00050, SRR-CWDA-2011-00117] In some cases, process knowledge and historical sampling may be used to support residuals characterization.

  If residuals in an ancillary structure require sampling for characterization, a sampling approach and plan consistent with the LWTRSAPP to collect and analyze representative samples will be developed. [SRR-CWDA-2011-00050]

- Table 11.2-1 of the CGCP identifies the specific FTF waste tanks and ancillary structures that must be *removed from service* using the Closure Module process

Tanks and Ancillary Structures Subject to CGCP

Table 11.2-1 in CGCP (Continued on next slide)

Waste Tank System Listed in SCDHEC Construction Permit #17,424-IW	SRS Identifier[a]	Closure Module / Addendum Document Number	Removal from Service Date[b]
Tank 1	FL-241901-WTE-TK-1		
Tank 2	FL-241902-WTE-TK-2		
Tank 3	FL-241903-WTE-TK-3		
Tank 4	FL-241904-WTE-TK-4		
Tank 5	FL-241905-WTE-TK-5	SRR-CWDA-2012-00071	December 2013
Tank 6	FL-241906-WTE-TK-6	SRR-CWDA-2012-00071	December 2013
Tank 7	FL-241907-WTE-TK-7		
Tank 8	FL-241908-WTE-TK-8		
Tank 17	FL-241917-WTE-TK-17	PIT-MISC-0004	December 1997
Tank 18	FL-241918-WTE-TK-18	SRR-CWDA-2010-00003	September 2012
Tank 19	FL-241919-WTE-TK-19	SRR-CWDA-2010-00003	September 2012
Tank 20	FL-241920-WTE-TK-20	PIT-MISC-0002	July 1997
Tank 25	FM-241925-WTE-TK-25		
Tank 26	FM-241926-WTE-TK-26		
Tank 27	FM-241927-WTE-TK-27		
Tank 28	FM-241928-WTE-TK-28		
Tank 33	FL-241933-WTE-TK-33		
Tank 34	FL-241934-WTE-TK-34		
Tank 44	FM-241944-WTE-TK-44		
Tank 45	FM-241945-WTE-TK-45		
Tank 46	FM-241946-WTE-TK-46		
Tank 47	FM-241947-WTE-TK-47		
242-F (1F) Evaporator Pot	EP 41.20 (W230983)		
Condenser	EP 41.20-2 (W230983)		
Cesium Removal Column Pump Tank	EP 13-1 (W713707)		
Overheads Tank South	EP 42.20-1 (W231013)		
Overheads Tank North	EP 42.20-2 (W231013)		
Overheads Diverting Tank	EP 13-2 (W713707)		

[a] Either the Smart Plant Component Location Indicator number or engineering drawing number showing the component.

[b] As used here, the *Removal From Service Date* is the DOE letter date documenting operational closure to SCDHEC and EPA.

Tanks and Ancillary Structures Subject to CGCP

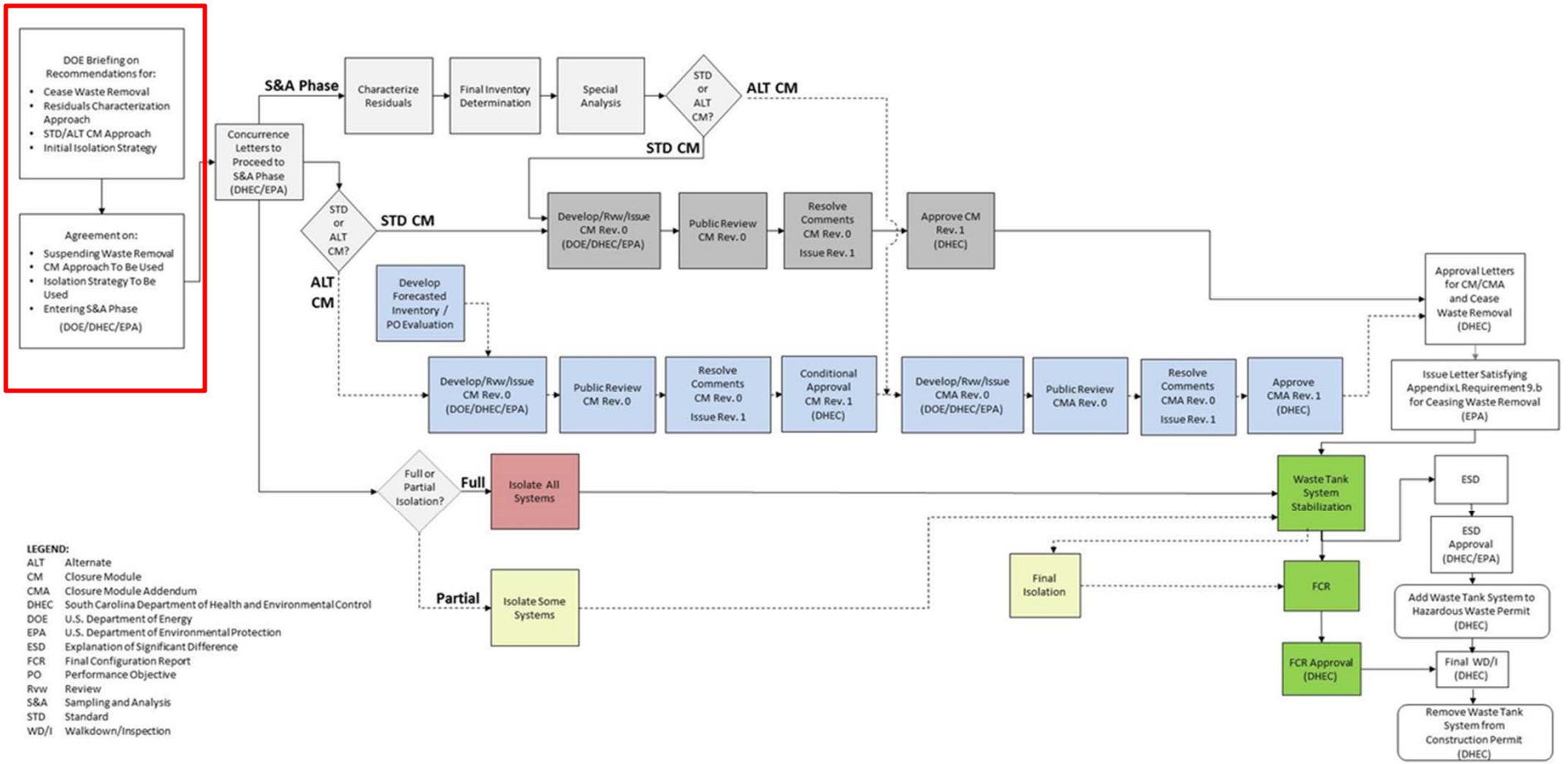
Table 11.2-1 in CGCP (Continued)

Waste Tank System Listed in SCDHEC Construction Permit #17,424-IW	SRS Identifier[a]	Closure Module / Addendum Document Number	Removal from Service Date[b]
242-3F Concentrate Transfer System	EP 100 (W235849)		
242-16F (2F) Evaporator Pot	FM-242016-WEE-EVP-1		
Condenser	FM-242016-WEE-COND-1		
Mercury Collection Tank	FM-242016-WEE-TK-5		
Cesium Removal Column Pump Tank	FM-242016-WEE-TK-6		
Overheads Tank #1, South	FM-242016-WEE-TK-8		
Overheads Tank #2, North	FM-242016-WEE-TK-9		
FPP-1	FL-641000-IT-PPIT-1		
FPT-1	FL-641000-IT-TK-1		
FPP-2	FM-241021-WTS-PPIT-2		
FPT-2	FM-241021-WTS-TK-2		
FPP-3	FM-241021-WTS-PPIT-3		
FPT-3	FM-241021-WTS-TK-3		
FDB-1	FL-241002-WTS-DBX-1		
FDB-2	FL-641000-WTS-DBX-2		
FDB-3	FL-241077-WTS-DBX-3		
FDB-4	FM-241021-WTS-DBX-4		
FDB-5	FM-241033-WTS-DBX-5		
FDB-6	FL-241032-WTS-DBX-6		
F-Area Catch Tank	FL-241091-WTS-TK-1		

[a] Either the Smart Plant Component Location Indicator number or engineering drawing number showing the component.

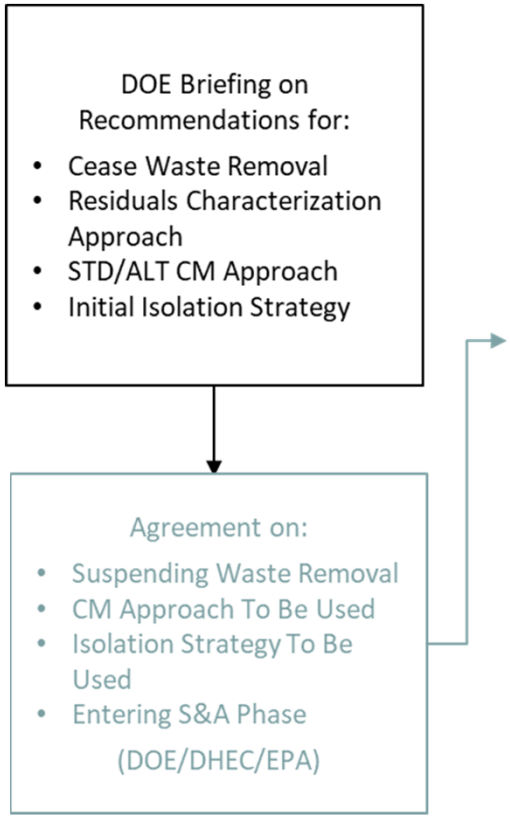
[b] As used here, the *Removal From Service Date* is the DOE letter date documenting operational closure to SCDHEC and EPA.

Figure 11.4-1 in CGCP



Protocols to be followed to ultimately result in the operational closure of waste tank systems and ancillary structures

Today's Focus



1. We do not believe additional waste removal actions are warranted or required for FDB-5 and FDB-6
   a. These DBs were "cleaned" as necessary by flushing the stainless-steel lined cells when waste was present
   b. No additional cleaning has been performed since the use of these DBs were discontinued in the late 1980's
2. "Process knowledge" will be used to determine individual inventories for FDB-5 and FDB-6
   a. Collecting samples and performing laboratory analyses is not warranted because no significant accumulation of residual solids are present in either diversion box
3. We will use the "Standard" Closure Module approach which quantifies hazards and documents risk, and
4. We currently plan to fully isolate both of these diversion boxes prior to filling with grout

Pathway to Closure

We believe we are here – Waste Removal Complete for FDB-5 and FDB-6

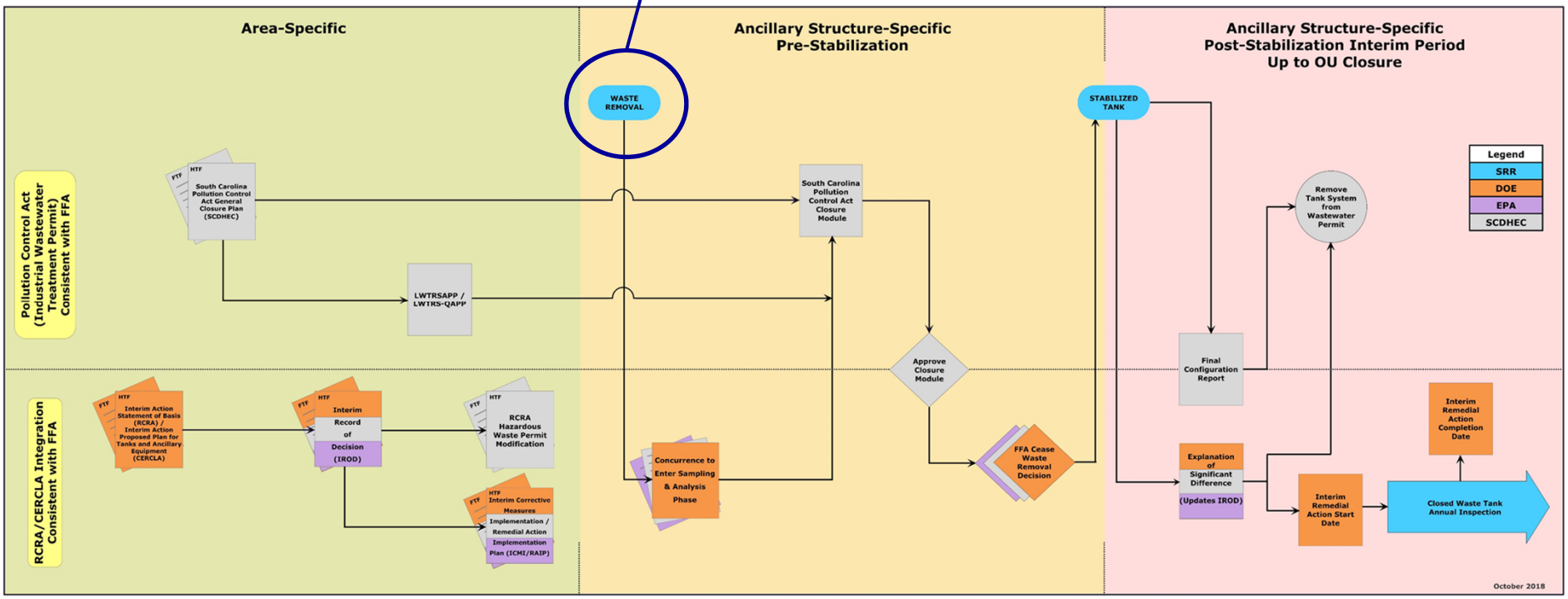


Figure 10-3.1 from SRR-CWDA-2017-00015, Rev. 1, *Consolidated General Closure Plan for F-Area and H-Area Waste Tank Systems*

Pathway to Closure

Focus of Today's Discussion – Agreement to Move to *Sampling & Analysis Phase*

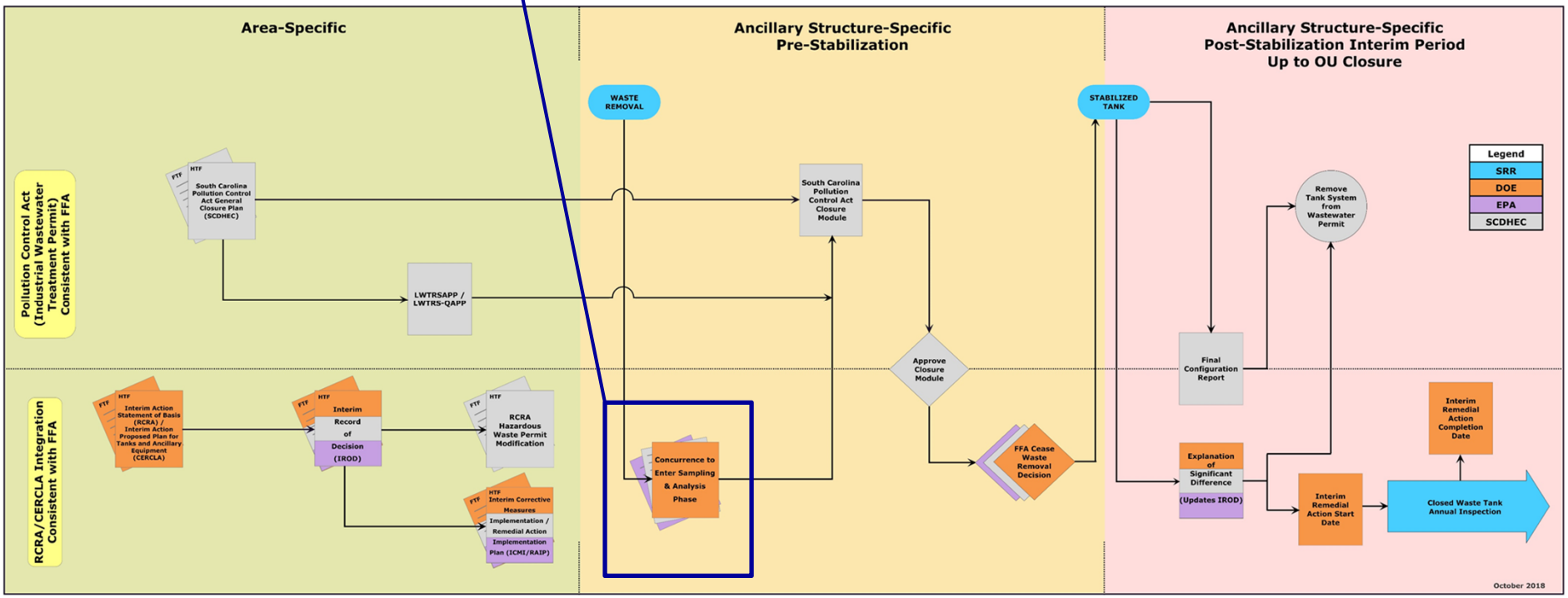


Figure 10-3.1 from SRR-CWDA-2017-00015, Rev. 1, *Consolidated General Closure Plan for F-Area and H-Area Waste Tank Systems*

Pathway to Closure

If Agreement to Proceed is Reached, Next Phase is to Quantify Hazards and Document Risk Through Closure Module Process

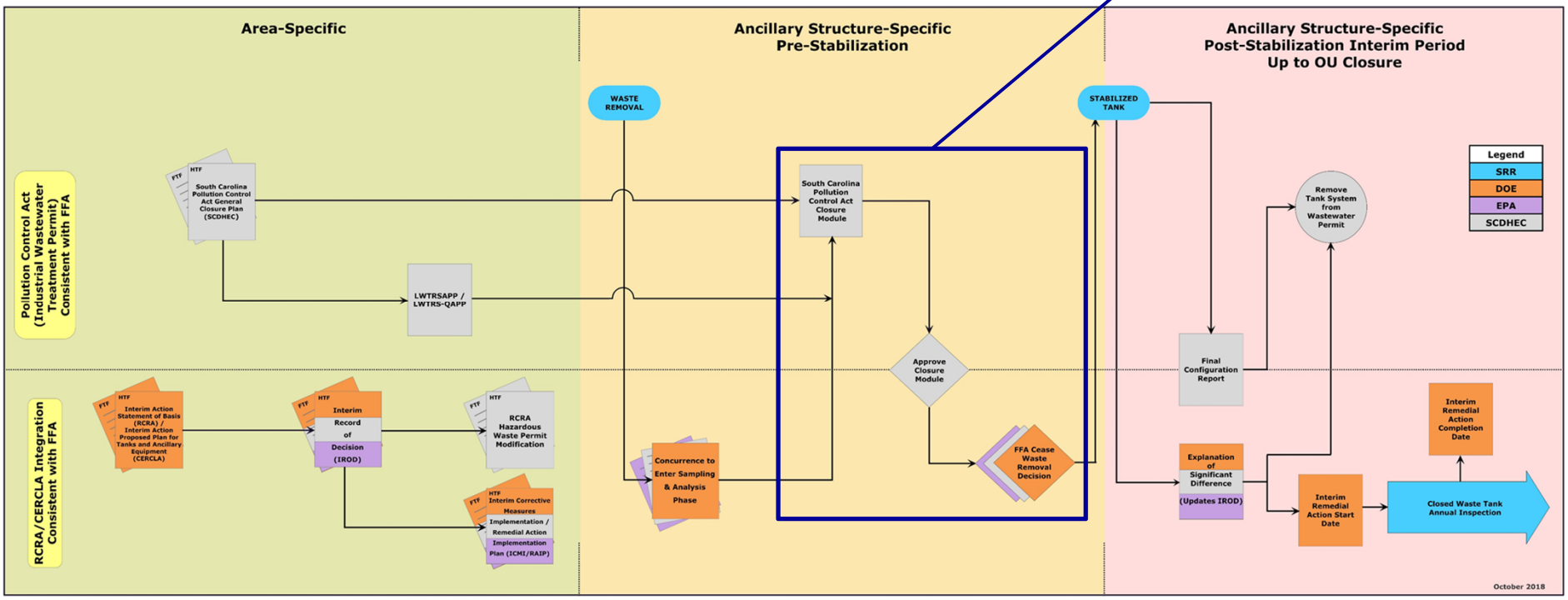
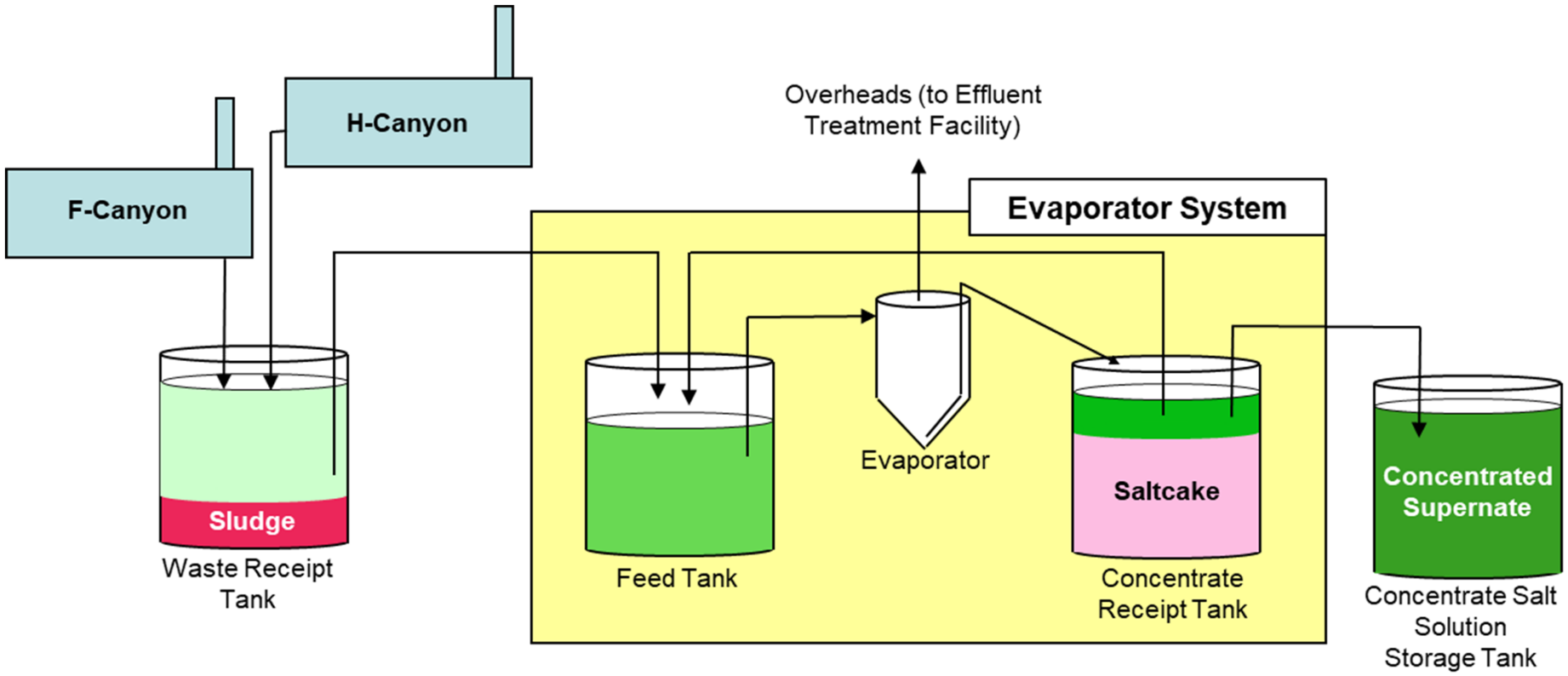


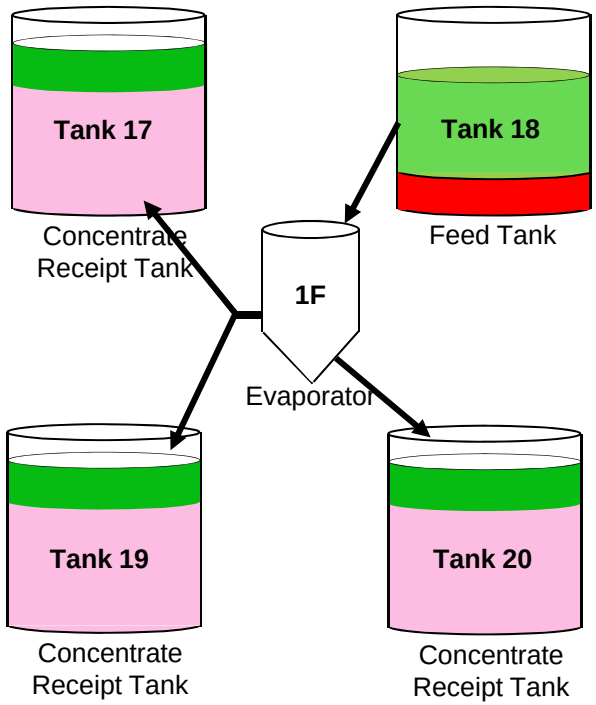
Figure 10-3.1 from SRR-CWDA-2017-00015, Rev. 1, *Consolidated General Closure Plan for F-Area and H-Area Waste Tank Systems*

The Evolution of the *1F Evaporator System* Over Time and the Role of FDB-5 and FDB-6

SRS Liquid Waste Evaporator Systems



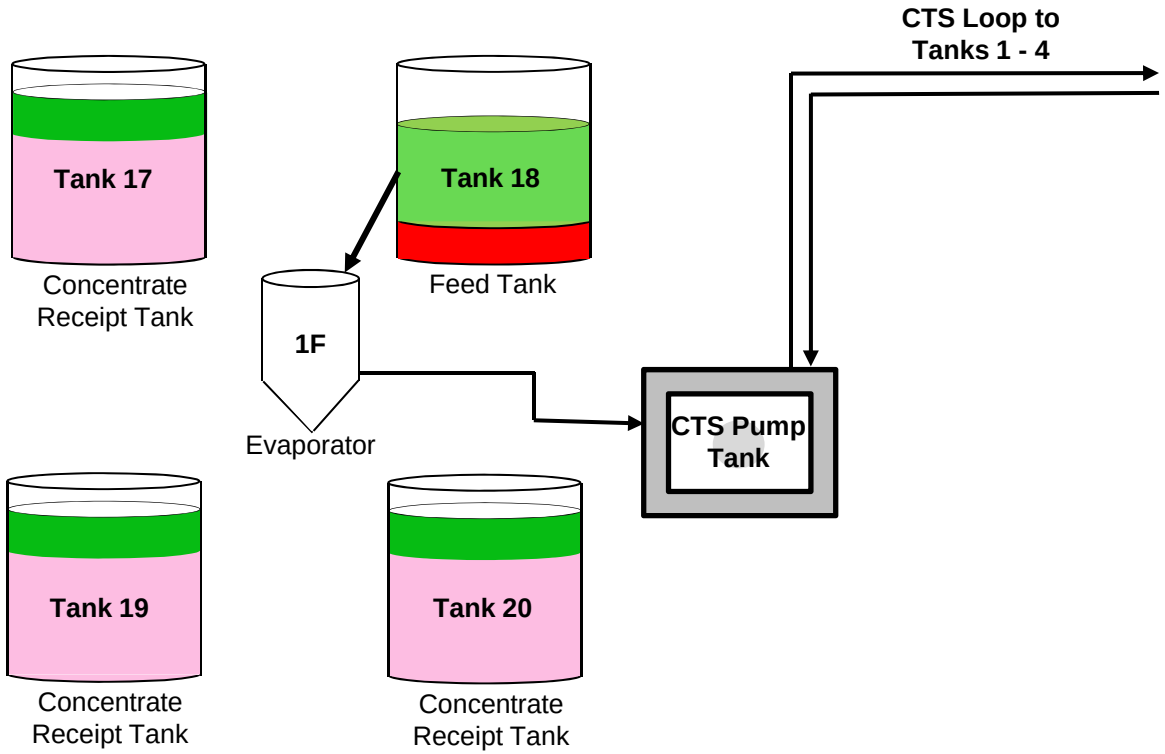
Original Configuration of the 1F Evaporator System



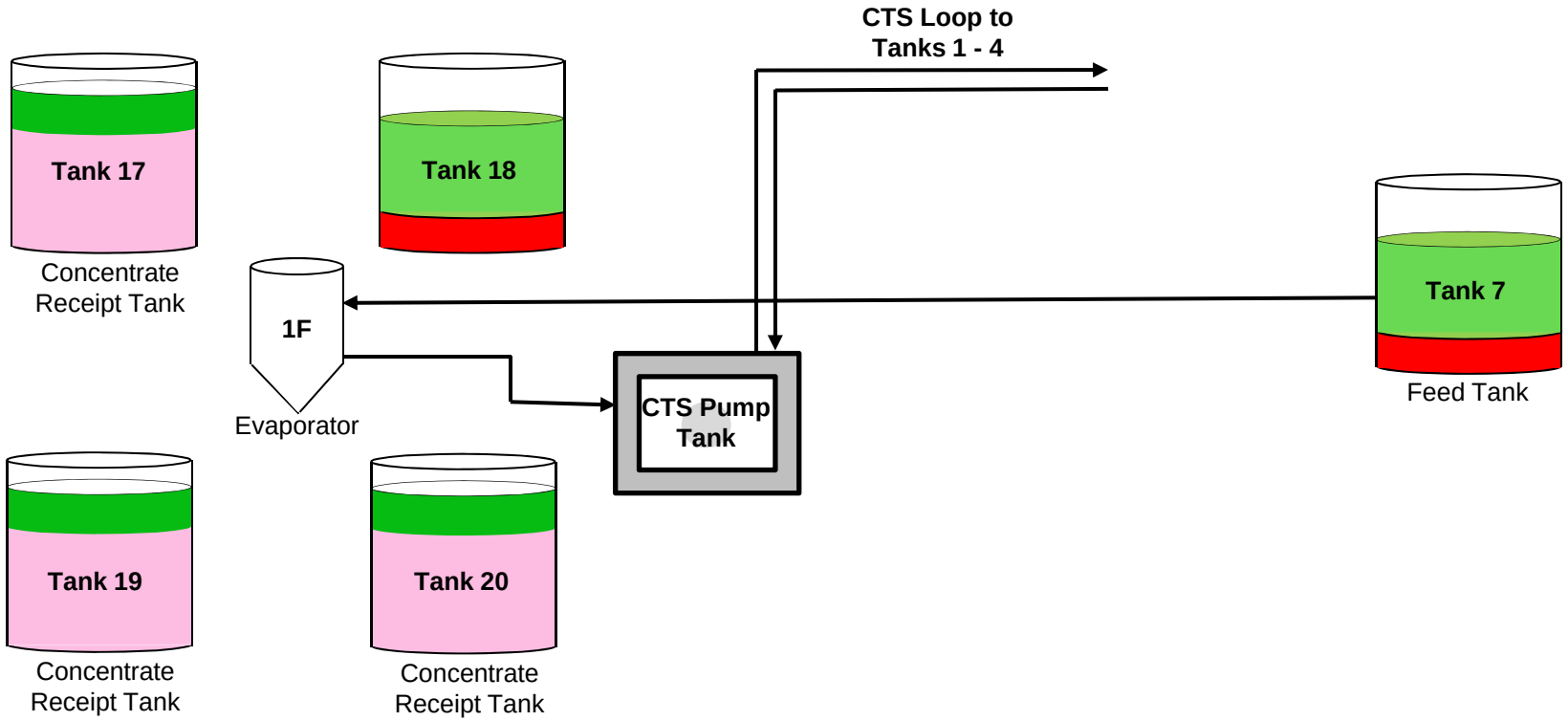
Concentrate Transfer System (CTS)

- The F-Area Concentrate Transfer System was constructed to allow the concentrated supernate from the 1F Evaporator System to be transferred to other waste tanks in F-Tank Farm
- The 1F Evaporator concentrate was steam lifted to the CTS for periodic transfer to a designated waste tank
- A transfer line loop was also originally included to allow concentrate to be sent to Tanks 1 – 4
  - Tanks 1 - 3 received concentrate. Tanks 1 and 2 currently contain approximately 500,000 gallons of saltcake. Tank 3 contains approximately 350,000 gallons of saltcake following a salt removal campaign in 2019.
  - Tank 4 did not receive concentrate and remained a F-Canyon Receipt Tank (i.e., a tank with PUREX sludge waste and supernate)

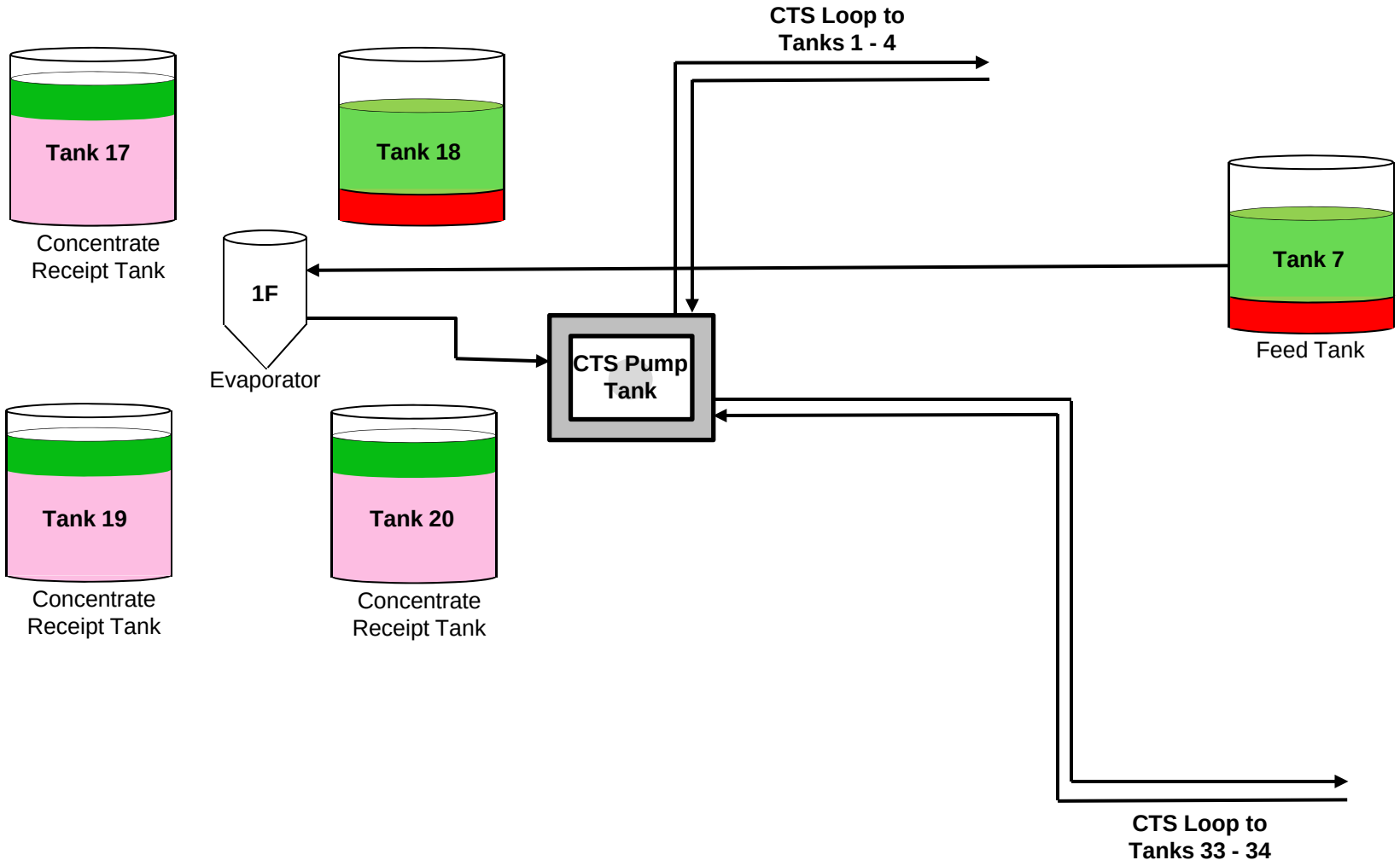
Concentrate Transfer System (CTS) Added



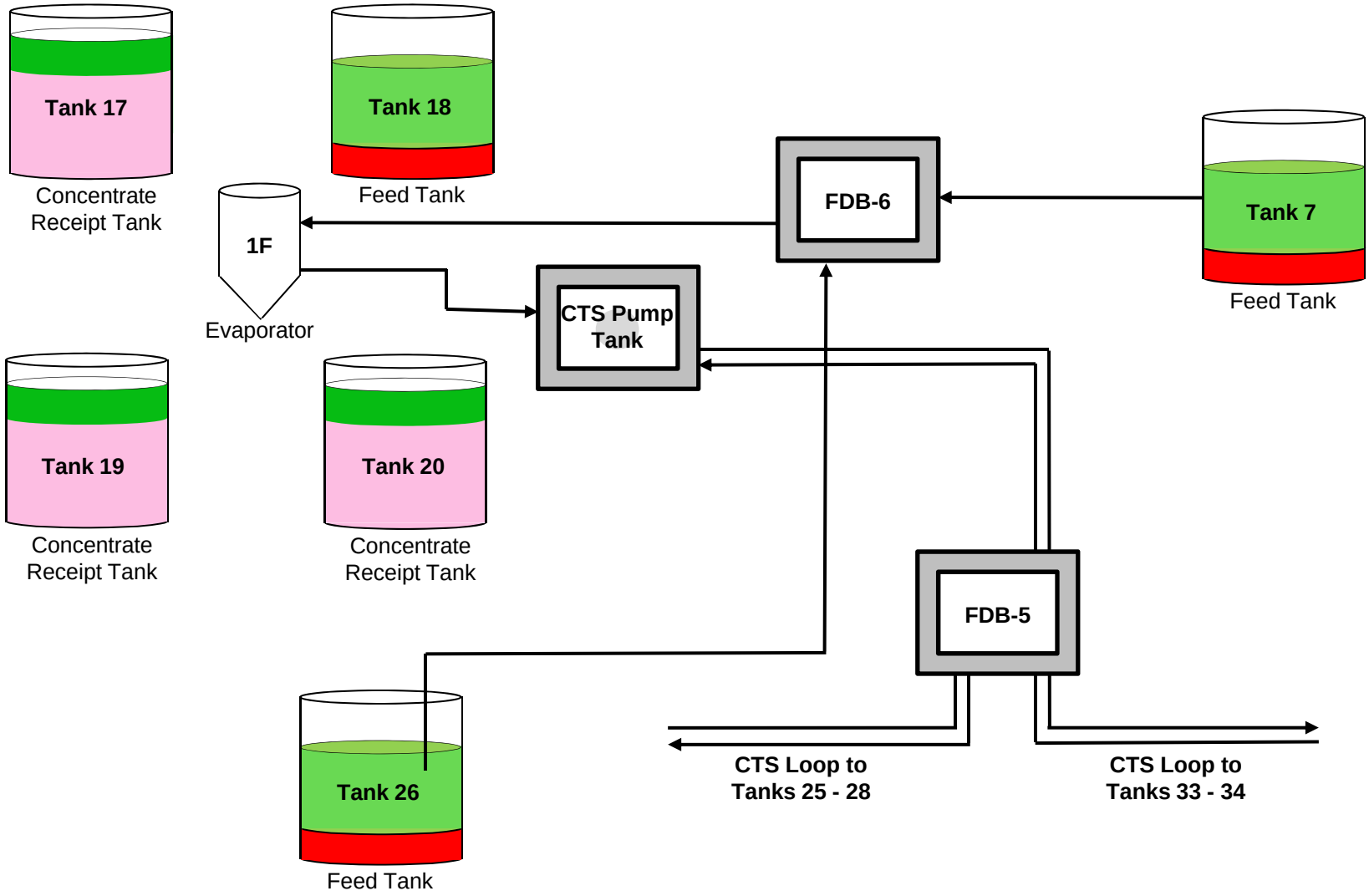
Transfer Line from Tank 7 Added



Loop Lines Added to Tanks 33/34

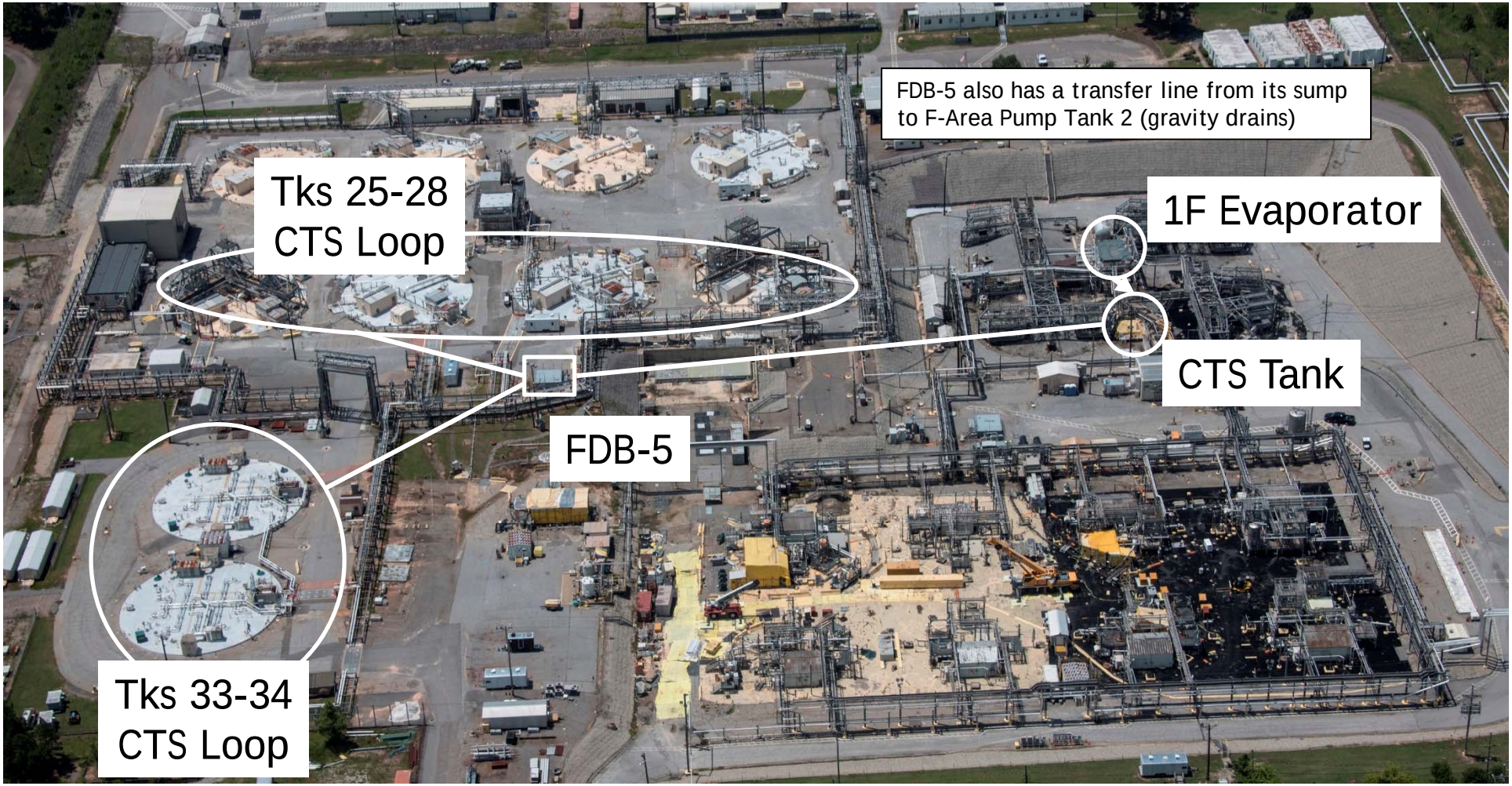


FDB-5 and FDB-6 Added



F-Area Diversion Box 5 (FDB-5)

FDB-5 Connections

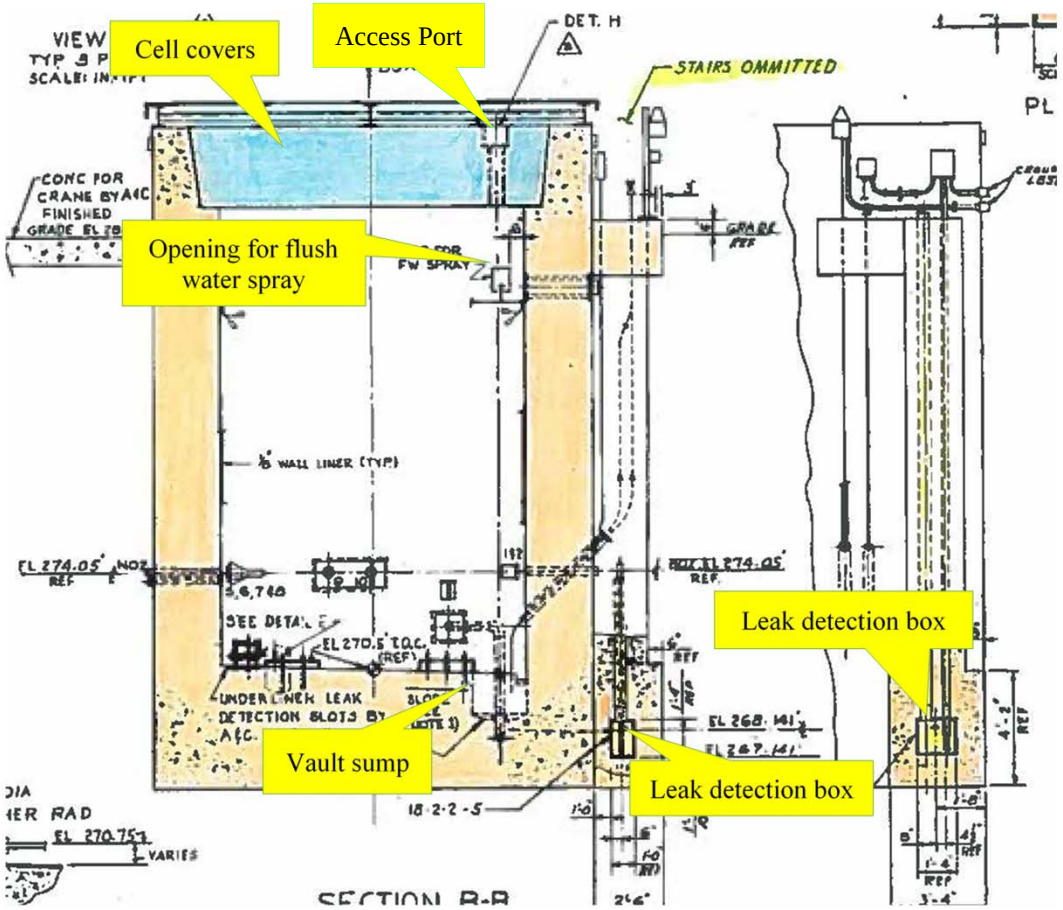


FDB-5 Construction

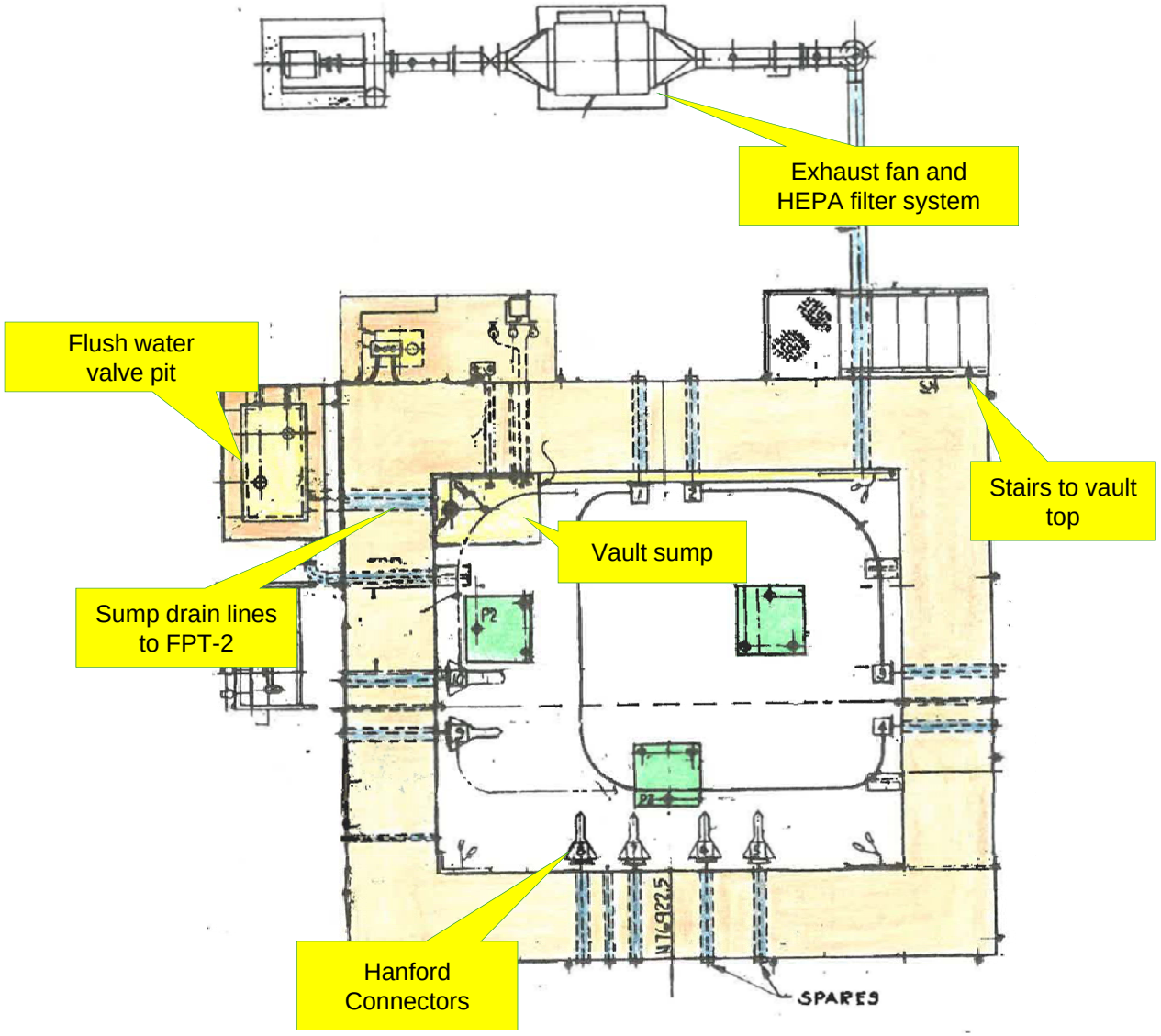
- FDB-5 is a 13 ft. long, 11.25 ft. wide, 17.2 ft. deep concrete structure
- It consists of 2.5 ft. thick walls, approximately 4.5 ft. thick floor slab, and three removable 3 ft. thick cell covers
- FDB-5 is **stainless steel lined** and has a sump that **gravity drains to F-Area Pump Tank (FPT)-2**
- FDB-5 was constructed with a single access port of 5-in. schedule 40 pipe located in the northernmost cell cover above the sump

FDB-5 Section View

Showing FDB-5 Concrete Walls Complete



FDB-5 Plan View



FDB-5 Structure Characteristics

The FDB-5 structure is comprised of three segments:

- **Main Diversion Box**
  - Contains jumpers and connections capable of routing 1F Evaporator concentrate to the 20-, 30- and 40-series tanks
  - The interior of the DB is lined with stainless steel to allow effective decontamination of the cell
- **Sump**
  - A sump is located in the diversion box floor and gravity drains to Pump Tank 2
  - The sump is also lined with stainless steel
- **Flush Water Valve Pit**
  - A valve box located at grade and contains flush water lines and associated valving
  - This valve box arrangement allowed the inside of the DB to be flushed prior to cell entry

	Length (ft)	Width (ft)	Height (ft)	Volume (cu ft)	Volume (gal)	Number of Trucks (8 cu yd)
Diversion Box	13	11.25	17.17	2511	18783	11.62
Sump	3	2	1.6	9.6	72	0.04
Valve Pit	3	1.5	2.7	12.0	90	0.06

The total volume is approximately 19,000 gallons and requires approximately 12 truckloads of grout to fill

FDB-5 Operational Service

- FDB-5 was in service from 1979 through 1988
  - **FDB-5 became obsolete when the 1F Evaporator was permanently taken out of service**
  - **Good operational records exist; original site contractor built, operated and shutdown the 1F Evaporator System**
- FDB-5 was constructed to connect the CTS to the 20-series, 30-series and 40-series tanks in FTF
  - Because the transfer lines connecting to FDB-5 were exclusively associated with evaporator concentrate from 1F System, only salt waste passed through the FDB-5 jumpers
  - **No "Fresh Canyon Waste" or "Sludge Slurry" transfers passed through FDB-5**
- During its service time, concentrated supernate was transferred to Tanks 25, 27, 33 and 34
  - A CTS loop for the 40-series tanks was never constructed

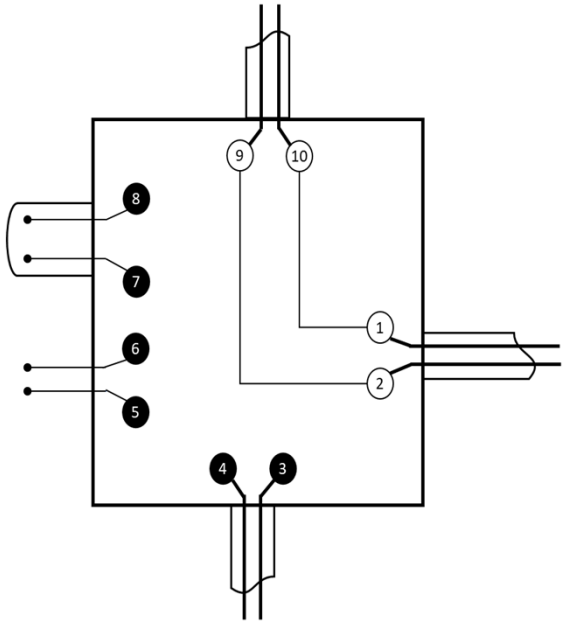
FDB-5 Operations History

- Little to no records of significant operational events
- Interviews of FTF operations personnel
  - FDB-5 had a history of jumpers plugging from CTS waste crystalizing in the transfer lines, particular during the winter months
  - A skill of the craft *catheterization procedure* was used to dissolve and flush the salt waste from the jumper
  - The catheterization procedure involved inserting a lance fed with water into the jumper and allowing the water to dissolve and flush the salt waste from the jumper
  - After the catheterization procedure was complete, the interior walls were washed using the water lance
  - **The dissolved waste material and wash water accumulated in the sump within the cell where it collected then drained to FPT-2**

FDB-5 Current Status

- FDB-5 connects to inactive transfer lines that have no further mission
- Jumpers currently connect Nozzles 1 and 10, and Nozzles 2 and 9
  - All other nozzles are capped with dummy (blank) Hanford Connectors
- FDB-5 was sprayed down to remove contamination as necessary
- Stainless steel lined walls and sumps minimized residual contamination levels
- Diversion box not designed to hold material
  - Liquid waste would drain to sump via sloped floor, then would passively drain by gravity to FPT-2 (Sump drain typically left open - not plugged)

Current configuration of FDB-5



Currently jumpered from CTS Pump Tank to the inactive 20-series loop

FDB-5 Current Nozzle Configuration

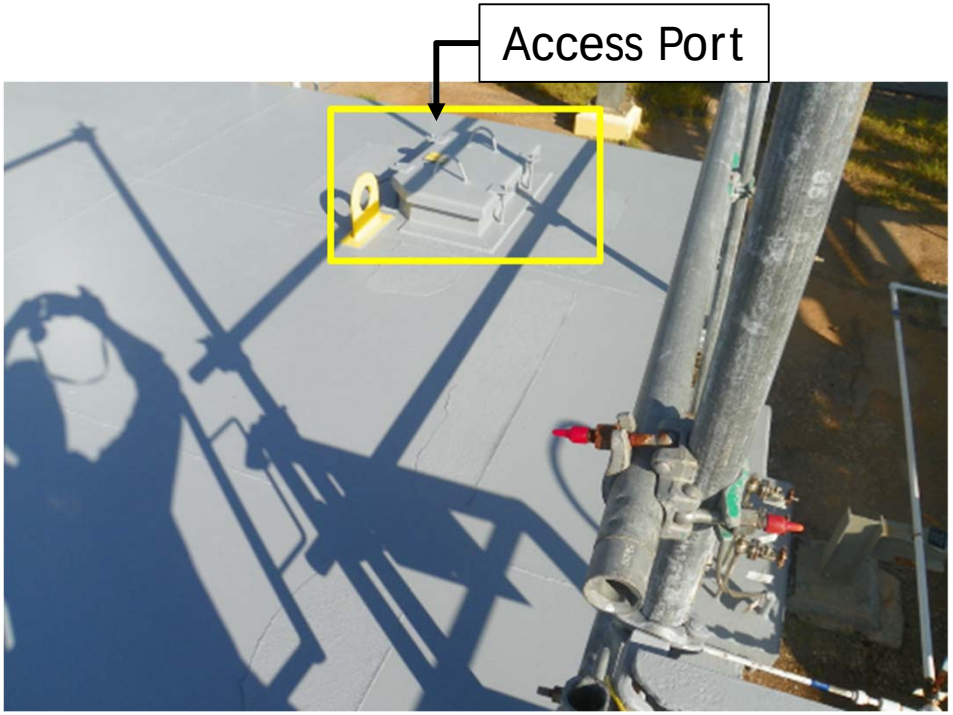
Nozzle Designation	Purpose	STATUS	
		Internal	External
1	From CTS Pump Tank	Jumpered to Nozzle 10	Dummy Hanford Connector in CTS Pump Pit
2	To CTS Pump Tank	Jumpered to Nozzle 9	Dummy Hanford Connector in CTS Pump Pit
3	From Tank 33	Dummy Hanford Connector	Tank 33 Riser C2
4	To Tank 34	Dummy Hanford Connector	Tank 34 Riser C2
5	Spare	Dummy Hanford Connector	Capped @ FDB 5
6	Spare	Dummy Hanford Connector	Capped @ FDB 5
7	Spare	Dummy Hanford Connector	Capped @ FDB 5
8	Spare	Dummy Hanford Connector	Capped @ FDB 5
9	From Tank 28	Jumpered to Nozzle 2	Tank 28 Riser C2
10	To Tank 25	Jumpered to Nozzle 1	Tank 25 Riser C2

FDB-5 Today

FDB-5 Flush Water Valve Pit

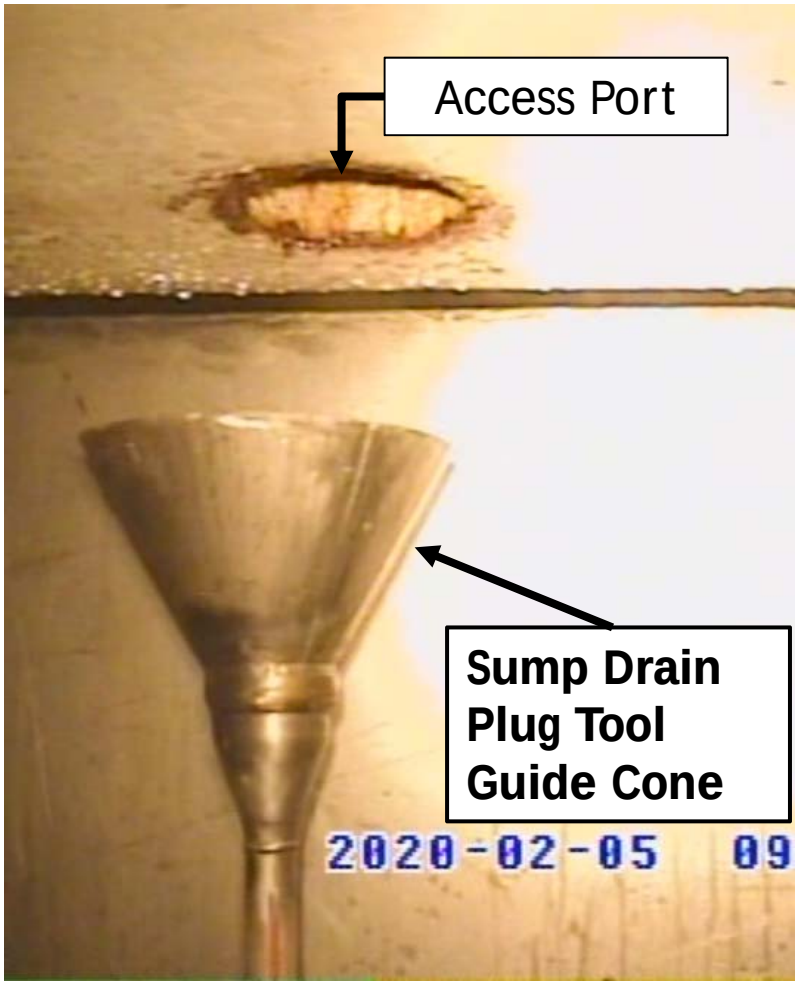
FDB-5 Access

- FDB-5 has a set of three, 3 ft. thick interlocking concrete cell covers for shielding and contamination control
- A single-piece metal rain cover sits over the cell covers
- As originally built, a single access port passed through both the rain cover and a cell cover
- The access port is over the sump

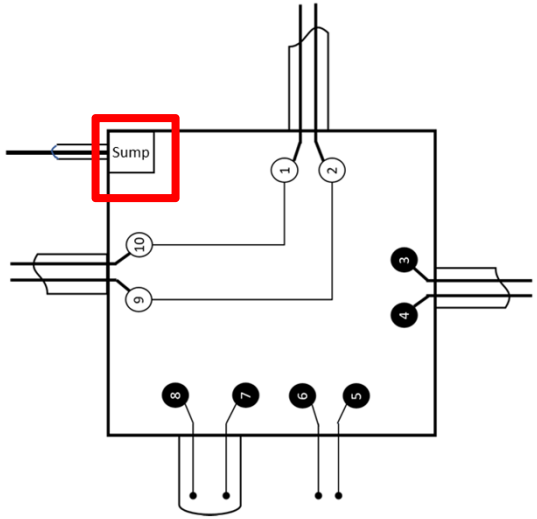


FDB-5 Access

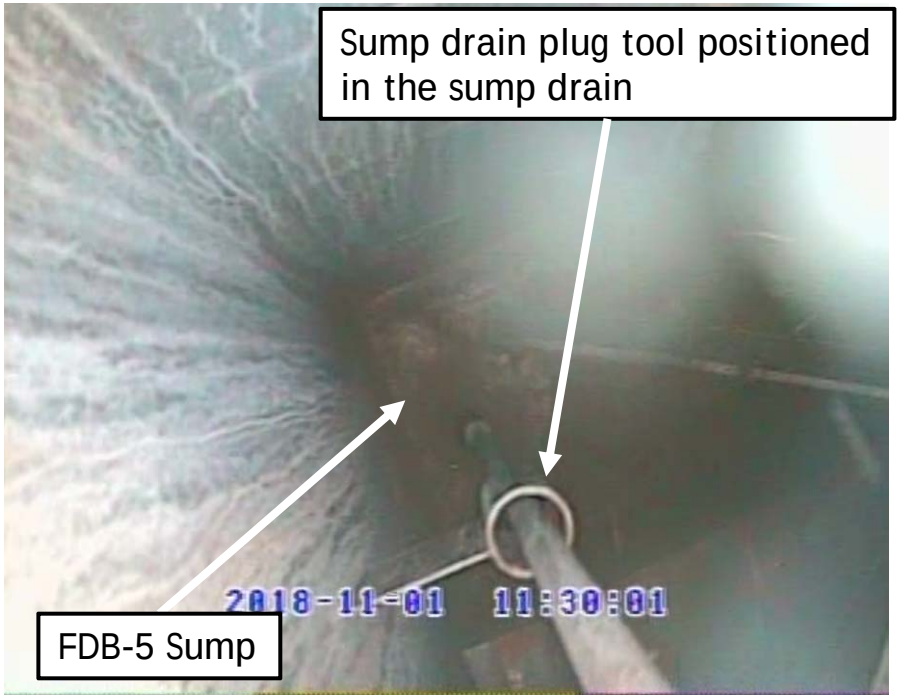
- The access port was blocked by a sump drain plug tool guide cone; therefore, only limited access for video inspection of the box using this port was possible
- On 11/1/2018, workers attempted to move the guide tool to allow camera access.
- The guide tool could only be pushed down; thereby plugging the sump drain
- The inspection was partially successful, and only a “lipstick” camera could be inserted into the cell because there was not enough room for a high resolution camera to fit around the guide cone



FDB-5 Video Inspection 11/1/2018

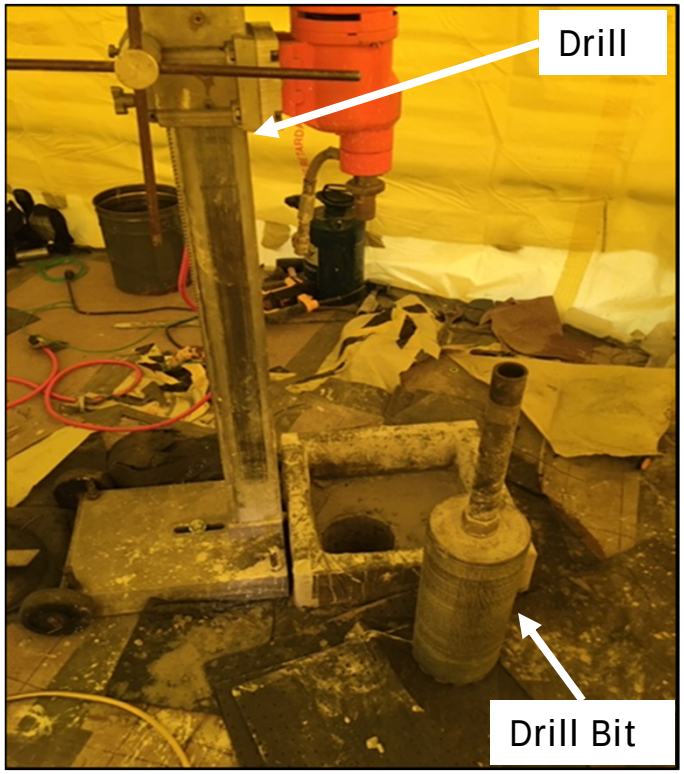


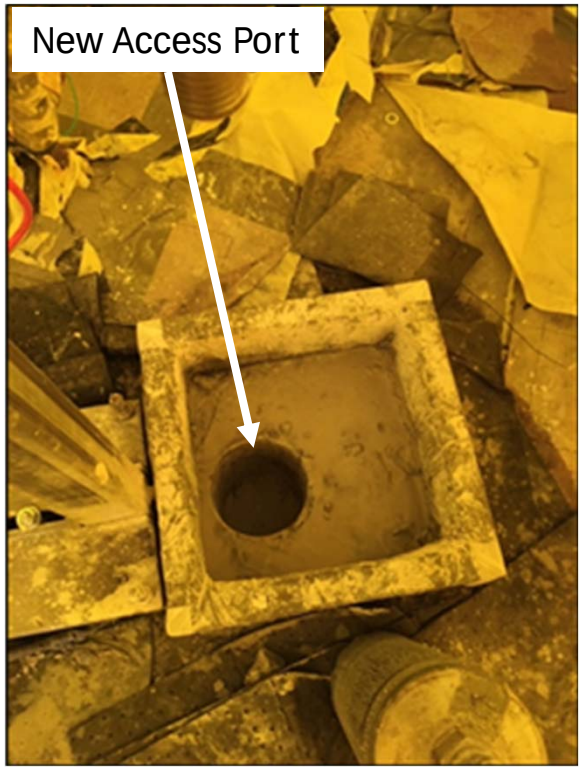
- **"Lipstick" camera shot taken through access port and around equipment obstacle.**



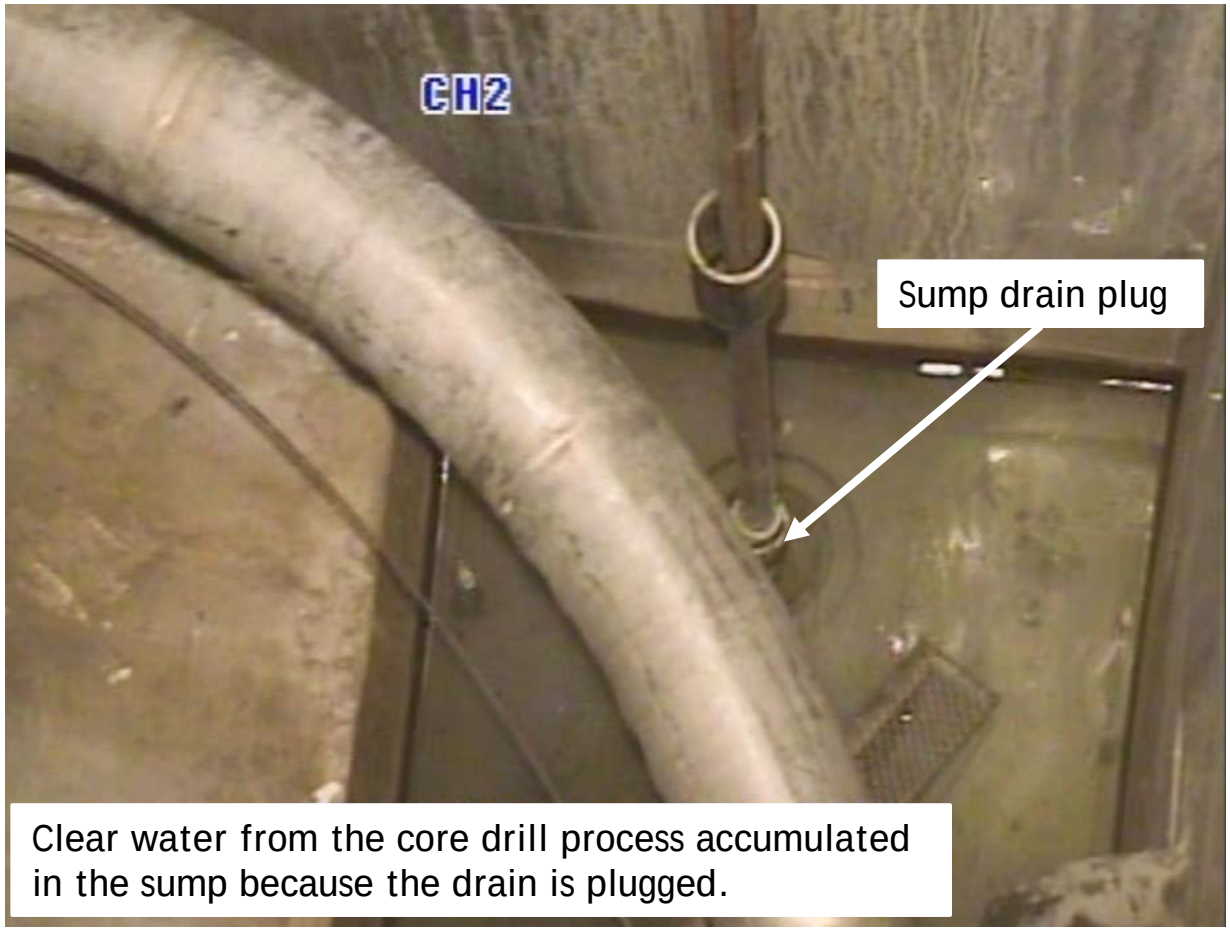
FDB-5 Access

- On 2/5/2020, a new core drilled access port was core drilled over the sump near the existing access port to allow access for a high resolution camera.



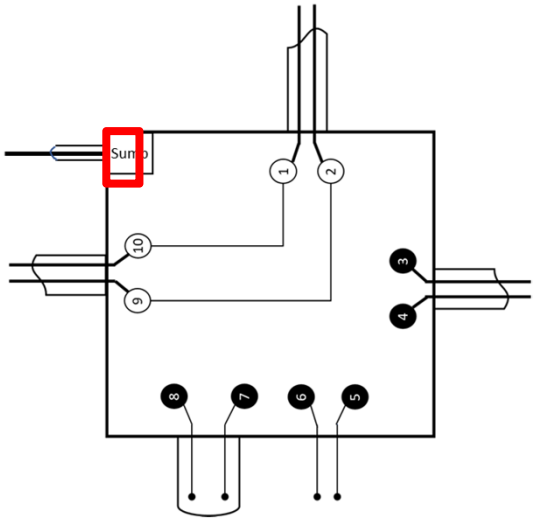


FDB-5 Interior Inspection 2/5/2020



Clear water from the core drill process accumulated in the sump because the drain is plugged.

Northeast Corner

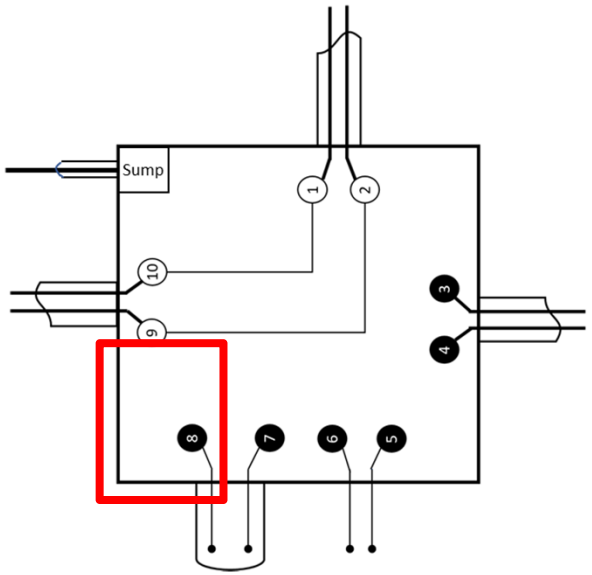


Sump and walls are free of accumulated solids

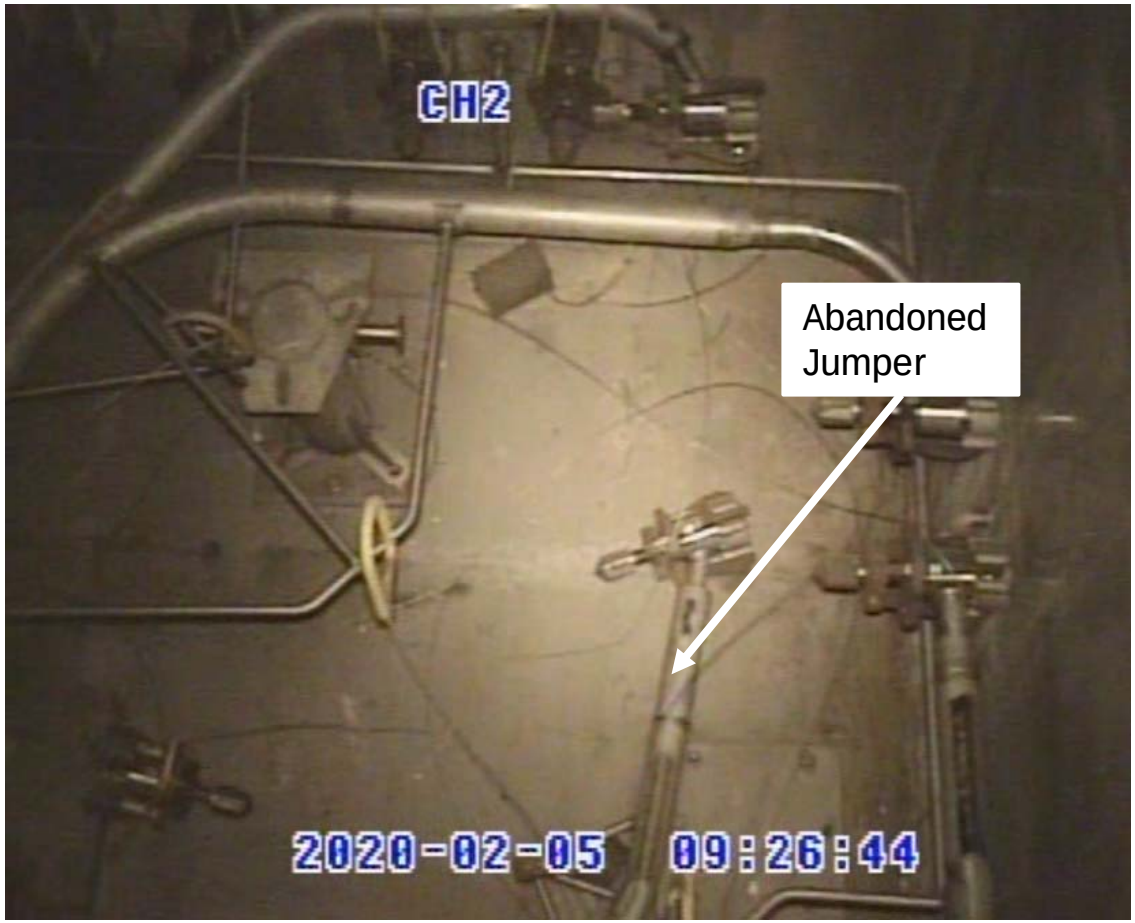
FDB-5 Interior Inspection

Walls and cell covers free of accumulated solids

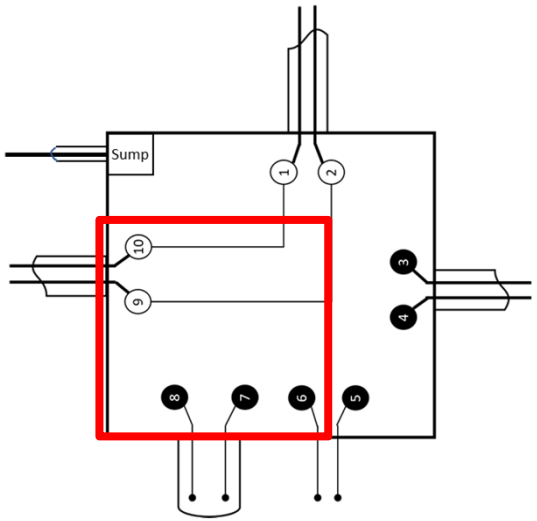
Northwest Corner (Upper)



FDB-5 Interior Inspection



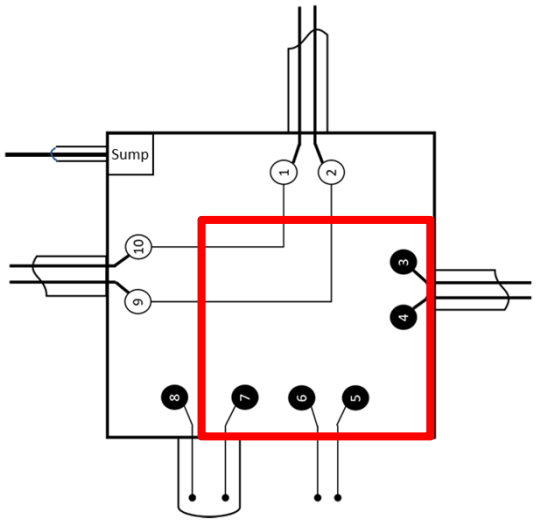
Northwestern Floor Area



Floor Area has no accumulated solids

FDB-5 Interior Inspection

Southwestern Floor Area

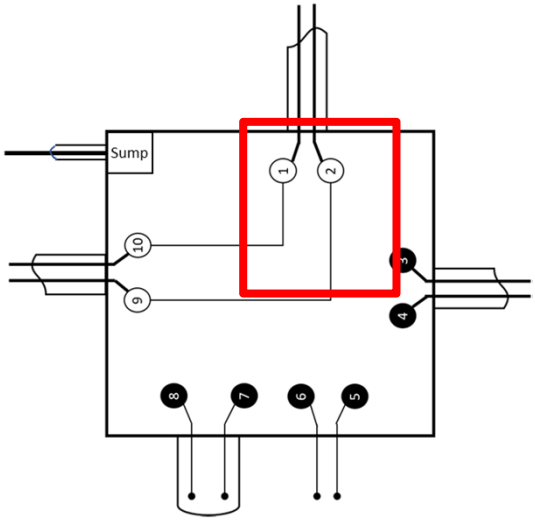


Floor Area has no accumulated solids

FDB-5 Interior Inspection

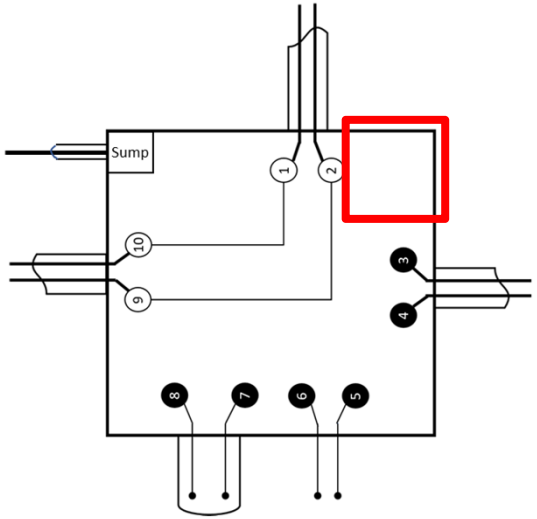
Floor Area has no accumulated solids

Southeastern Floor Area



FDB-5 Interior Inspection

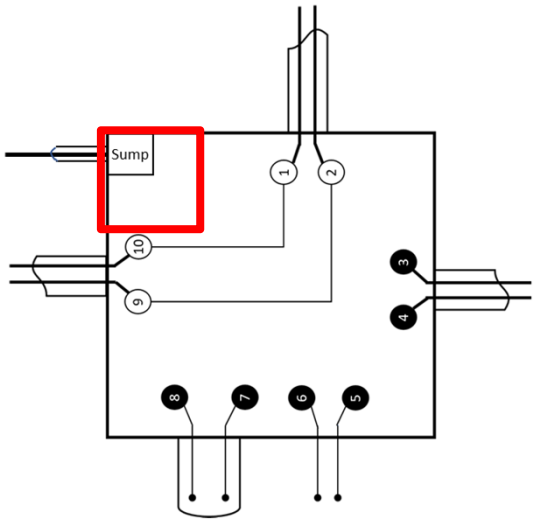
Southeastern Corner Floor Area



Floor Area has no accumulated solids

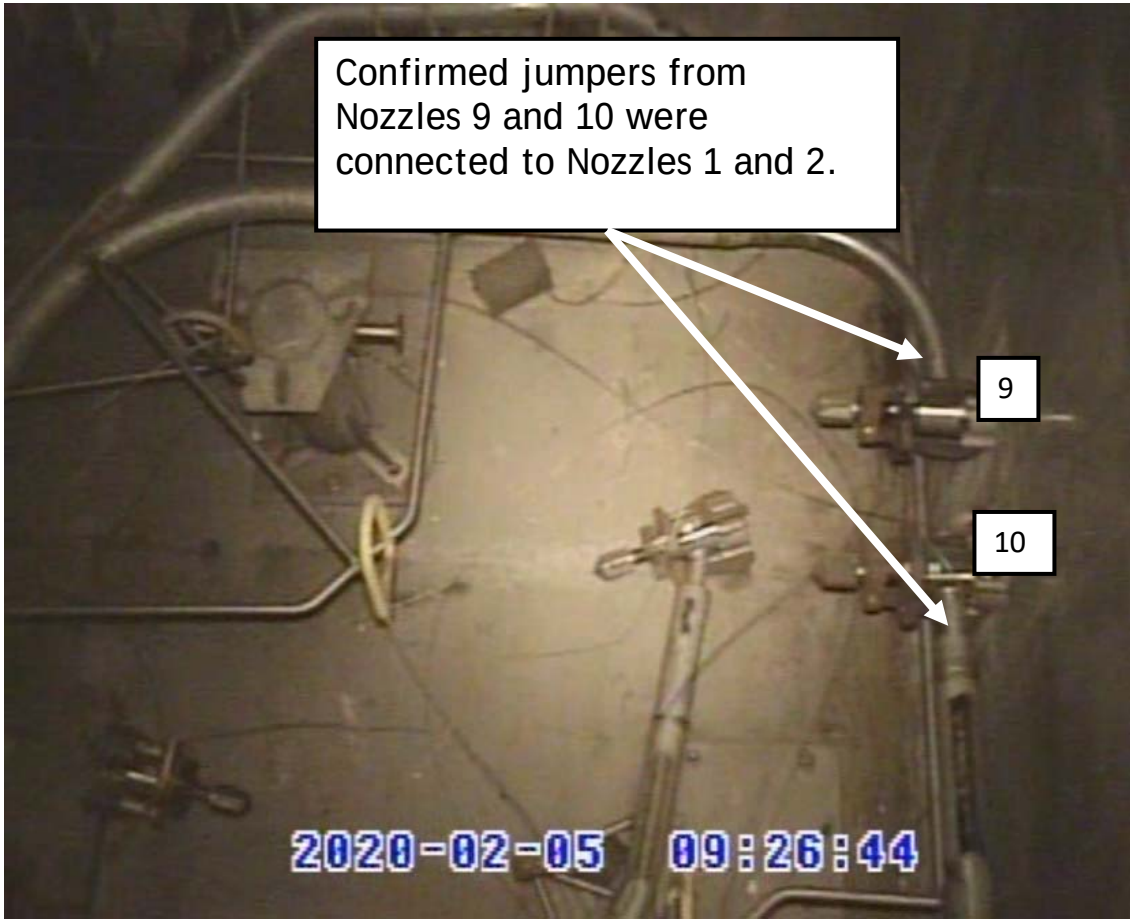
FDB-5 Interior Inspection

Northeastern Floor Area

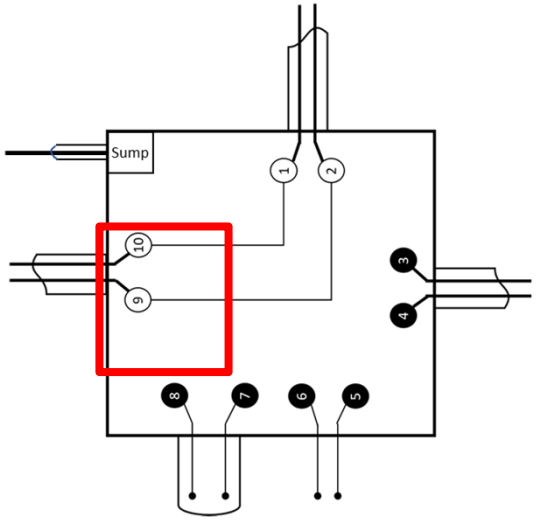


Sump, Walls and Floor Area have no accumulated solids

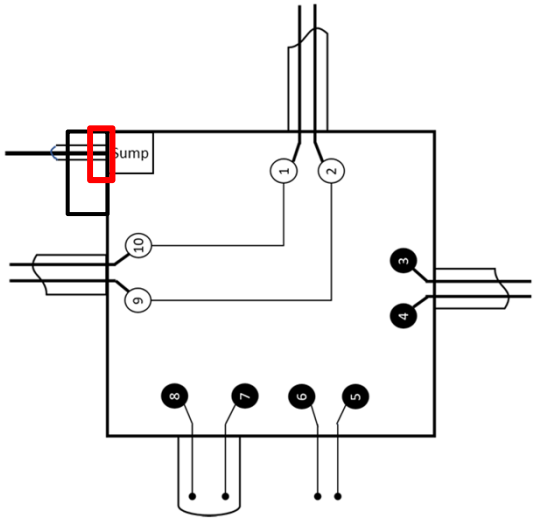
FDB-5 Interior Inspection



North Floor Area

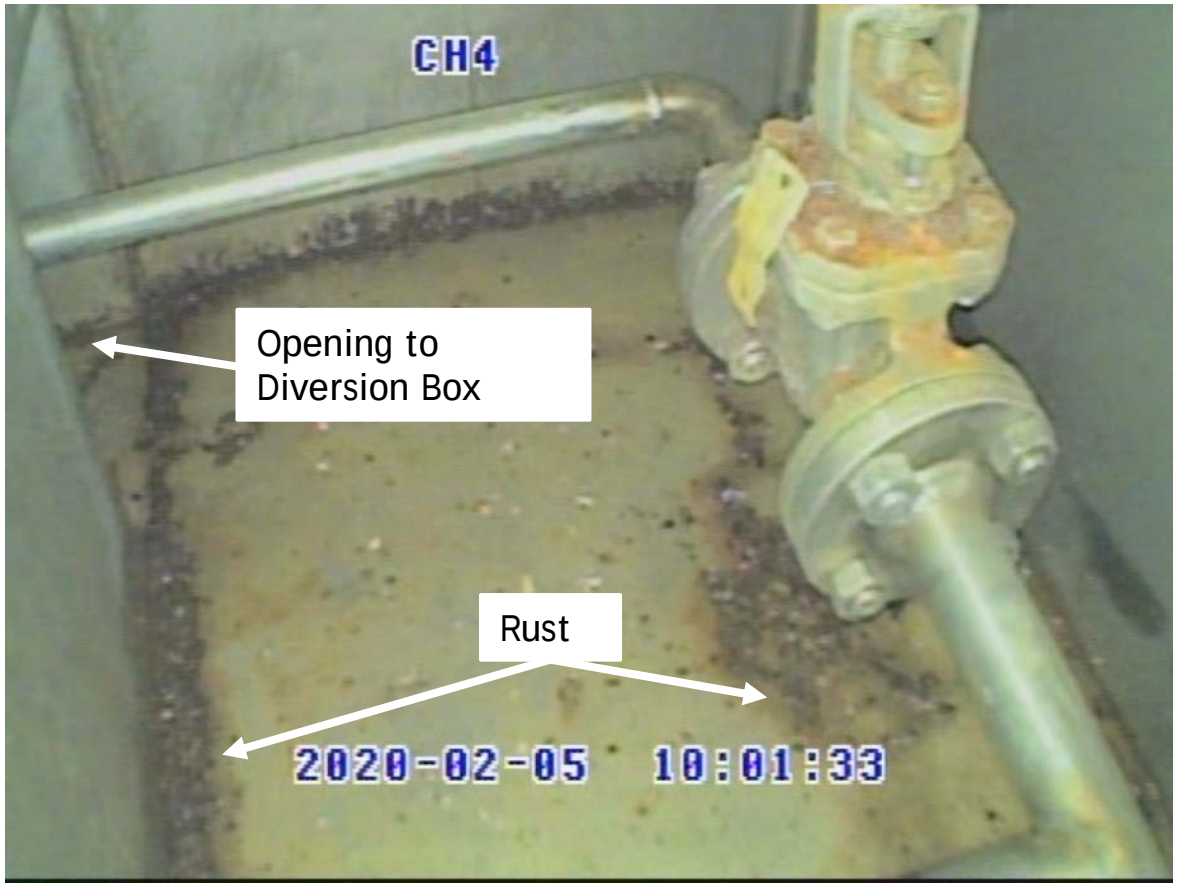


FDB-5 Interior Inspection

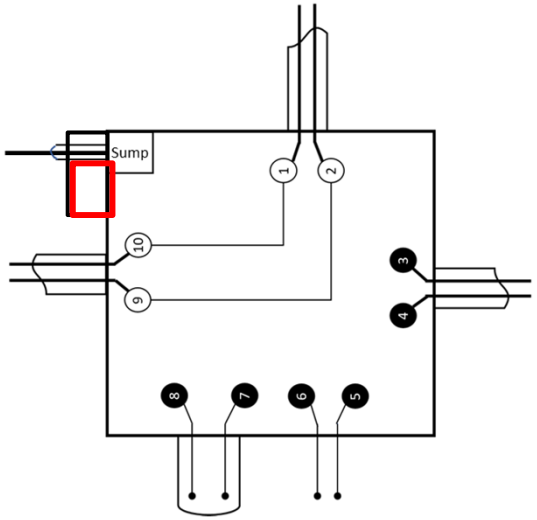


Opening of Flush Water Valve Pit to Vault free of accumulated solids

FDB-5 Flush Water Valve Pit Interior Inspection



West Floor Area and Walls



Floor and walls are free of accumulated solids

Current Status of FDB-5

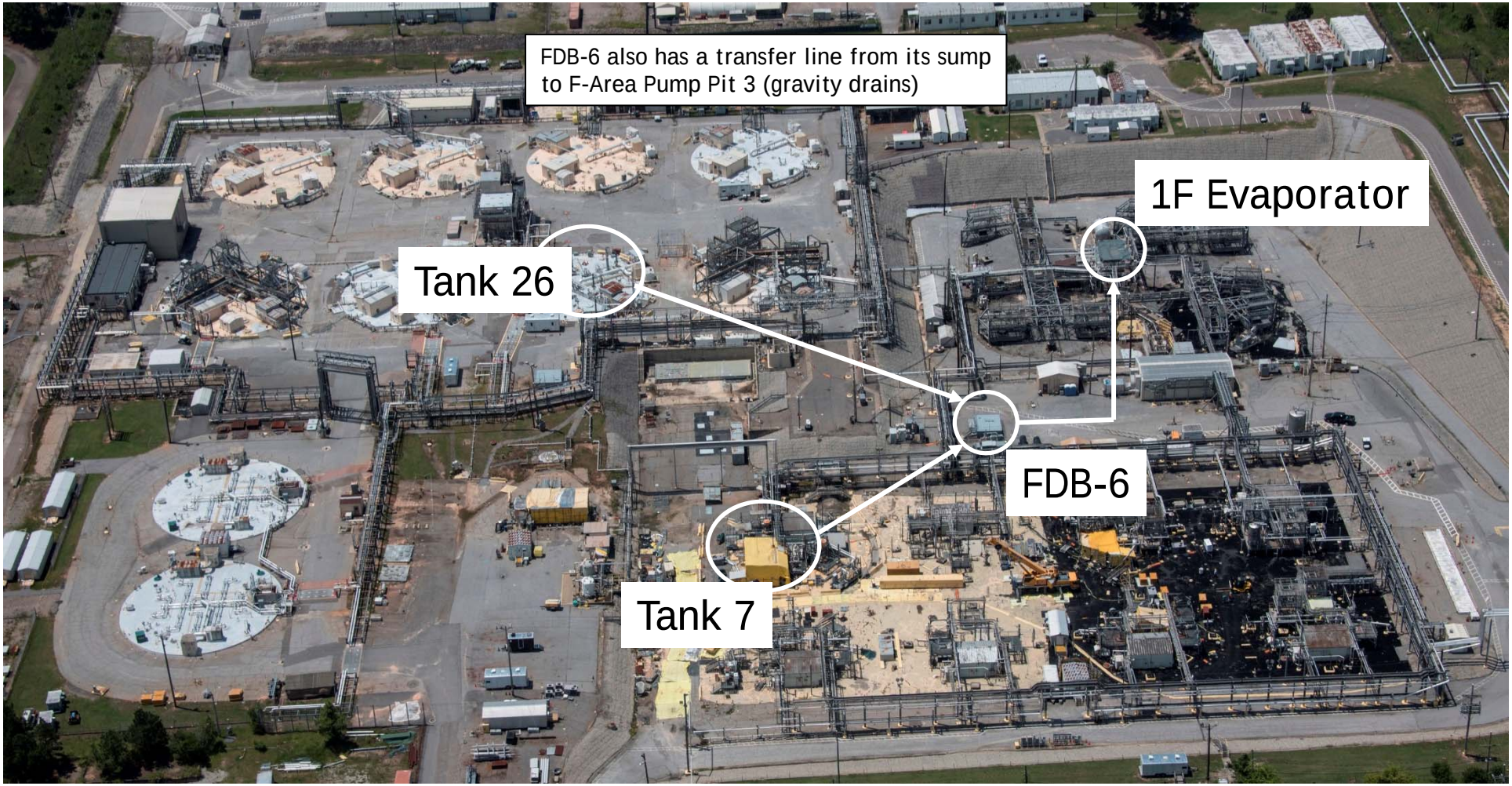
- A video inspection of FDB-5 was performed on 02/05/2020
  - A high-resolution camera was used to perform the inspection
  - **Radiation rate at open access port was 1 mrem/hr; low rate is indicative of minimum contamination**
  - **A smear "sample" of the floor near the sump was taken The readings of the smear sample confirmed there** is only surface contamination and not appreciable material volumes.
- The video inspection confirmed
  - The stainless steel walls, floor, sump and Flush Water Valve Pit were found to be free of accumulated solids
  - The sump contained clear water introduced during the core drilling process
  - Wall nozzles were confirmed to be either blanked with dummy Hanford connectors or connected to jumpers as shown on existing drawings.

Current Status of FDB-5 (continued)

- The video inspection results are consistent with our process knowledge - historical records and employee experience – of FDB-5 operations and expected conditions
- Two abandoned jumpers are located on the FDB-5 floor
  - These jumpers were likely used to connect the CTS to Tanks 33 and 34.
  - Based on the service of these jumpers to transfer 1F Evaporator concentrate solution and flushing with water after transfers, there is no reason to believe these jumpers contain appreciable waste solids

F-Area Diversion Box 6 (FDB-6)

FDB-6 Connections



FDB-6 Construction

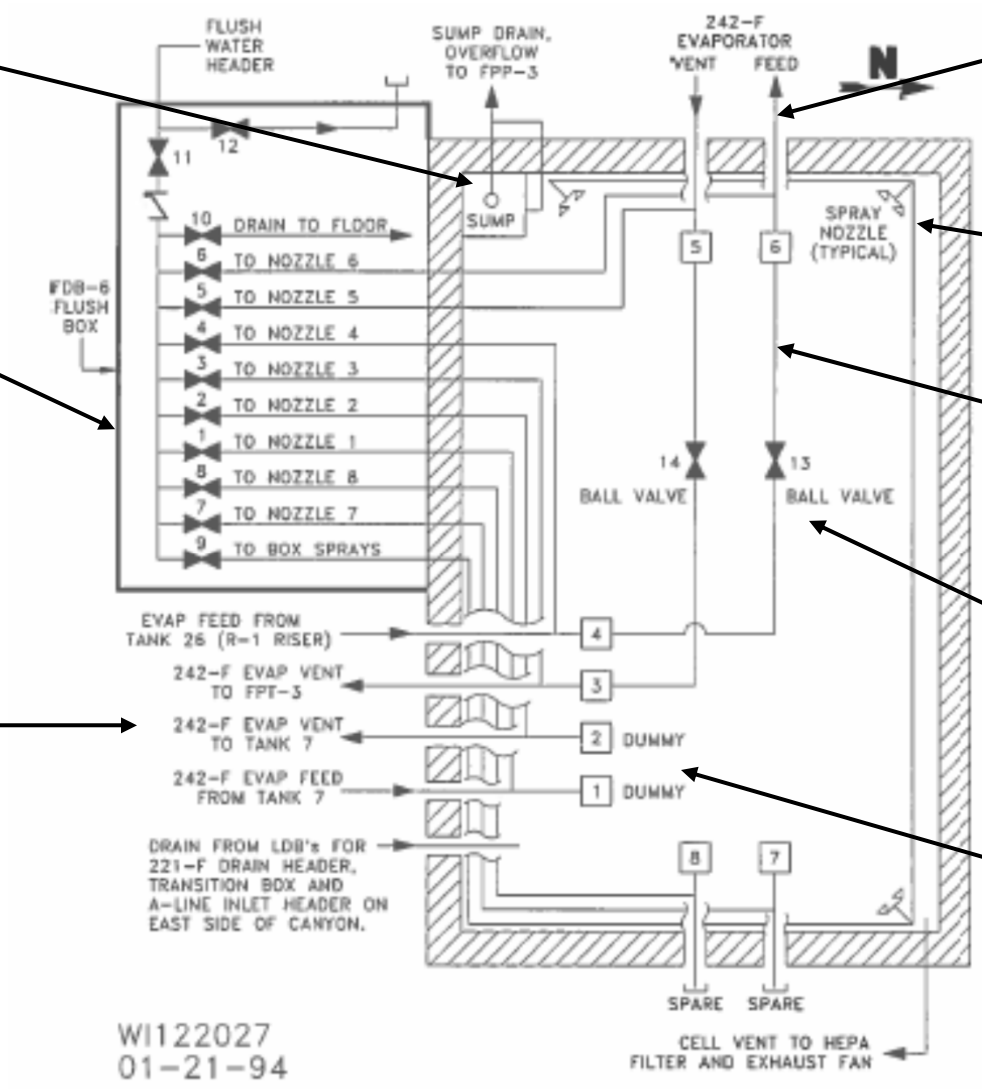
- FDB-6 was installed so that the 1F Evaporator System could be fed from Tank 26 as well as from Tank 7
- The DB is stainless steel lined and has a sump that **gravity drains to F-Area Pump Pit (FPP)-3**
- FDB-6 is a 15 ft. long, 11 ft. wide, 18 ft. deep concrete structure
- It consists of 2.5 ft. thick walls, approximately 4 ft. thick floor slab, and five removable 3 ft. thick concrete cell covers
- Four access ports pass through the cell covers/rain cover
  - One port of 5-in. schedule 40 pipe is located near the southern edge of the westernmost cell cover
  - Three ports of 5-in. schedule 40 pipe are located in near linear alignment, with nearly equidistant spacing in the cell cover adjacent to the westernmost cell cover

FDB-6 Layout

Sump drain that flows to Pump Pit 3

Water lines to allow the flushing of jumpers

Transfer lines connecting to nozzles



Transfer lines connecting to nozzles

Transfer lines connecting to nozzles

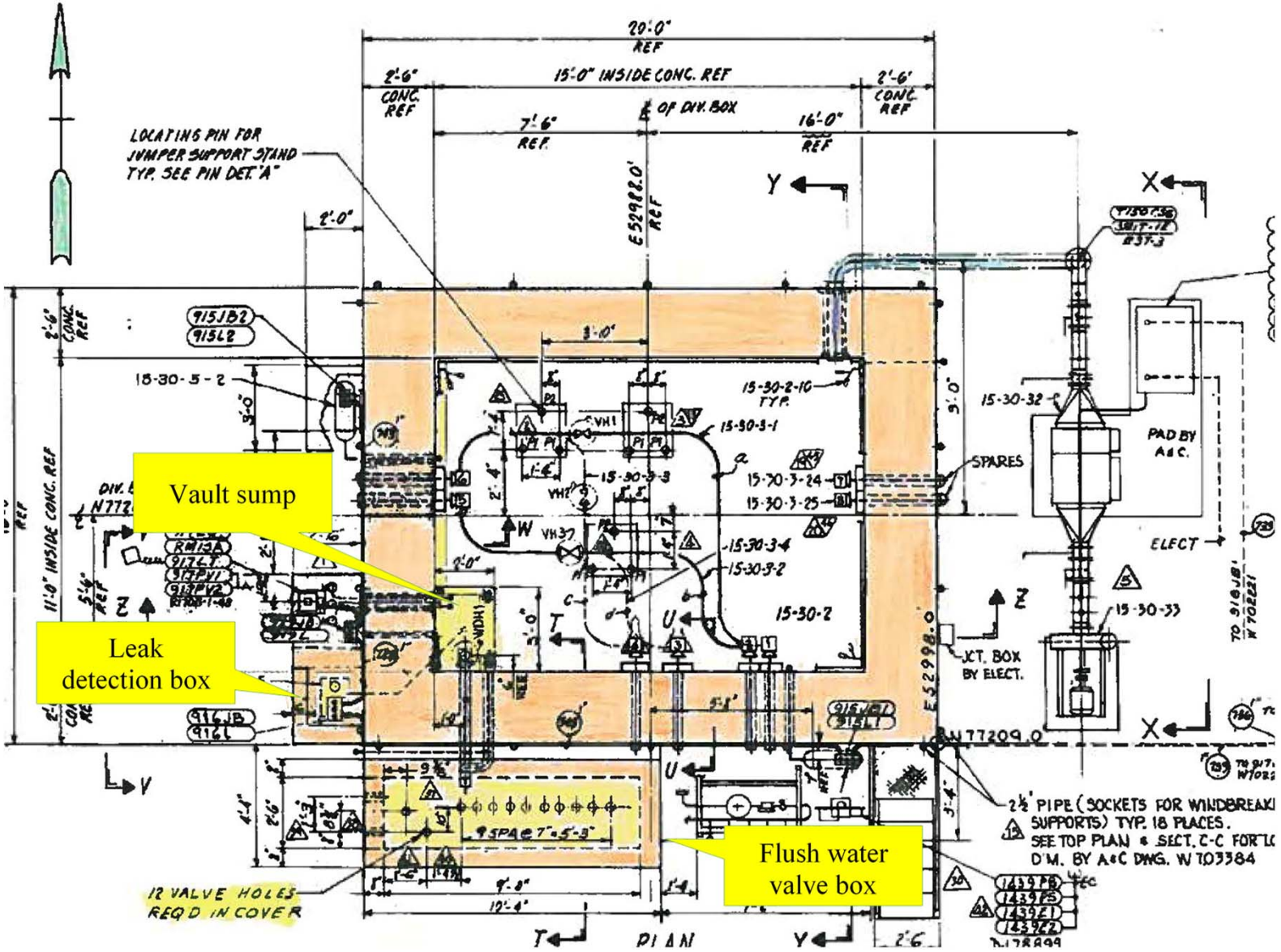
Water sprays for cell decontamination

Jumper connecting Nozzle “4” and Nozzle “6”

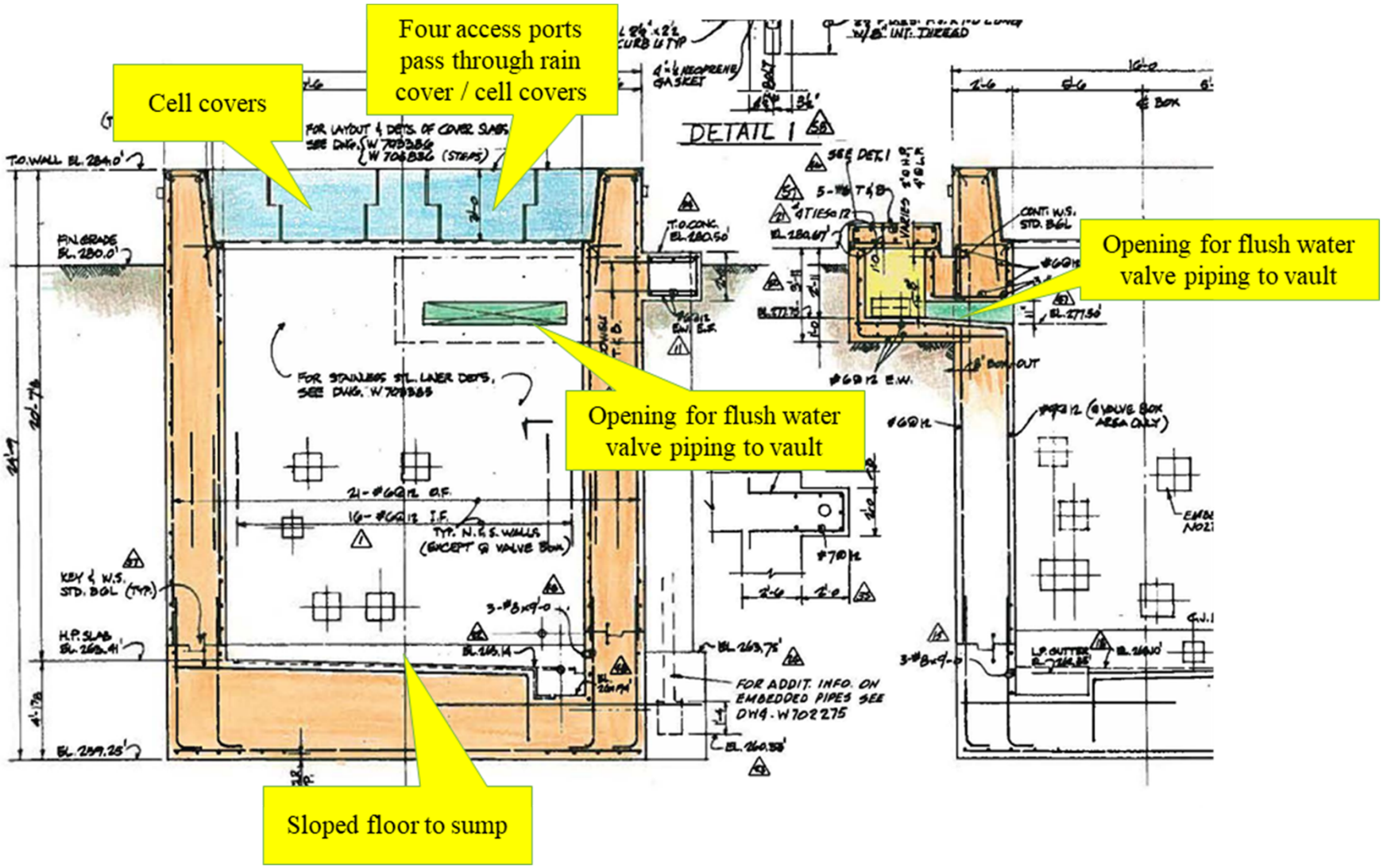
Valves are often included on jumpers to control flow

A “Dummy” is a cap on nozzle that is not in “use”

FDB-6 Plan View



FDB-6 Section View



FDB-6 Structure Characteristics

- The FDB-6 structure is comprised of three segments:
- **Main Diversion Box**
  - Contains jumpers and connections capable of routing feed to the 1F Evaporator from Tank 7 or Tank 26
  - The interior of the DB is lined with stainless steel to allow effective decontamination of the cell
- **Sump**
  - A sump is located in the floor of the main diversion box and gravity drains to FPP-3
  - The sump is lined with stainless steel
- **Flush Water Valve Pit**
  - The valve box located at grade contains flush water lines and associated valving
  - The wall nozzle design allowed the jumpers to be flushed
  - Allowed the cell to be flushed

	Length (ft)	Width (ft)	Height (ft)	Volume (cu ft)	Volume (gal)	Number of Trucks (8 cu yd)
Diversion Box	15	11	18	2970	22216	13.7
Sump	3	2	1.2	7.2	54	0.03
Valve Pit	9	2.5	2.9	65.3	488	0.3

The total volume is approximately 22,750 gallons and requires approximately 15 truckloads of grout to fill

FDB-6 Operational Service

- FDB-6 was in service from 1979 through 1988
  - **FDB-6 became obsolete when the 1F Evaporator was permanently taken out of service**
  - **Good operational records exist; original site contractor built, operated and shutdown the 1F Evaporator System**
- FDB-6 was constructed to connect Tank 7 and Tank 26 as feed sources for the 1F Evaporator System
- Because the transfer lines connecting to FDB-6 were exclusively associated with supernate transfers to feed the 1F System, only supernate (salt waste) passed through the FDB-6 jumpers
- **No "Fresh Canyon Waste" or "Sludge Slurry" transfers passed through FDB-6**

FDB-6 Operations History

- No records of operational events associated with waste transfers through FDB-6
- Based on review of historical documentation and interviews of FTF operations personnel
  - FDB-6 has had no known inadvertent waste leakage into the FDB structure
  - In March 1979, after hydrotesting of the feed line from FDB-6 to the 242-1F Evaporator, contaminated water was found in the FDB-6 sump
    - The water source appeared to be leakage from a dummy (blank) Hanford connector
    - Decontamination reduced the level of transferable contamination

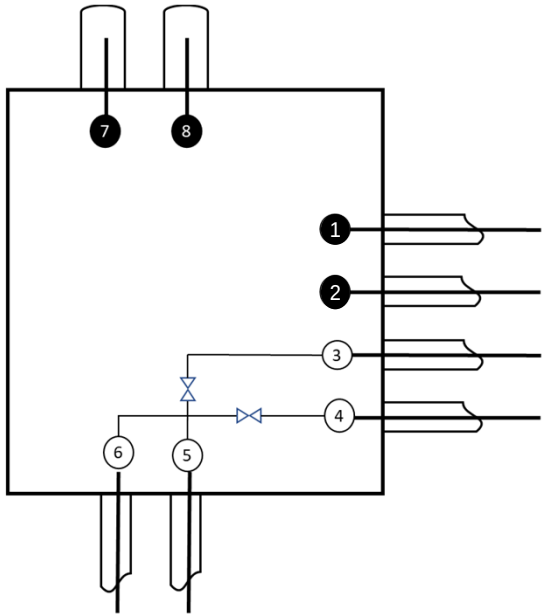
FDB-6 Operations History

- In December 1979, 10 inches of water were drained from the FDB-6 sump.
  - The water was low in contamination, so the source was suspected to be rainwater.
- Unlike FDB-5, FDB-6 has no history of jumper pluggage
- Unlike FDB-5, only feed for the evaporator (supernate) passed through the box (i.e., no evaporator concentrate)
- **FDB-6 has historically had very low dose rates**

FDB-6 Current Status

- FDB-6 connects inactive transfer lines that have no further mission
- Jumpers currently connect Nozzles 3 and 5, and Nozzles 4 and 6
  - All other nozzles are capped with dummy Hanford Connectors
- FDB-6 was sprayed down to remove contamination, as necessary
- **Stainless steel lined walls and sump minimized residual contamination levels**
- **Diversion box not designed to hold material**
  - Liquid waste would drain to sump via sloped floor, then would passively drain by gravity to FPP-3 (Sump drain typically left open - not plugged)

Current configuration of FDB-6



Currently jumpered from 1F Evaporator to Tank 26 and FPT-3

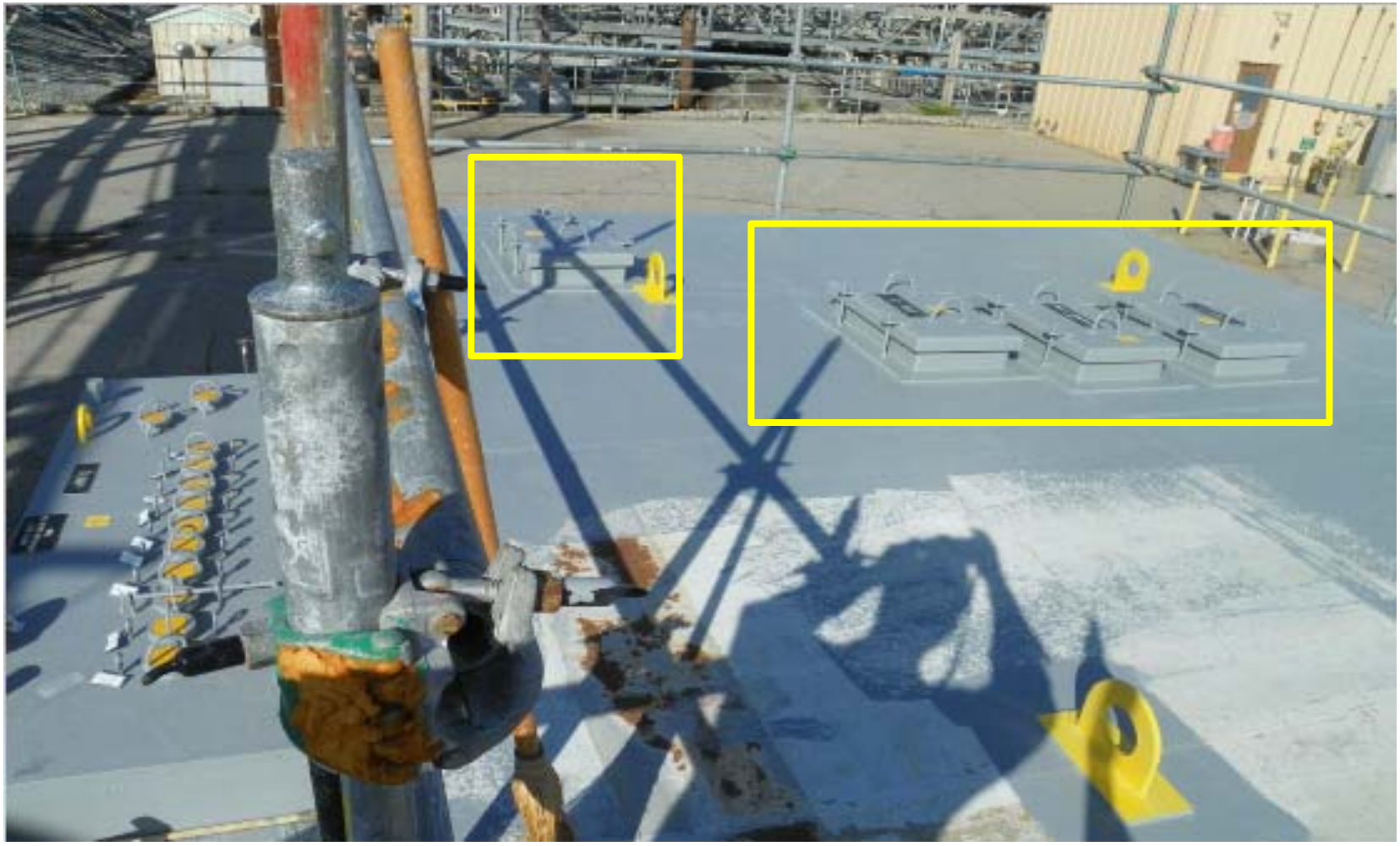
FDB-6 Nozzle Configuration

Nozzle Designation	Purpose	STATUS	
		Internal	External
1	Evaporator Feed from Tank 7	Dummy Hanford Connector	Tank 7 Riser 1
2	1F Evaporator Vent Line to Tank 7	Dummy Hanford Connector	Tank 7 Wall Penetration
3	1F Evaporator Vent Line to FPT-3	Jumpered to Nozzle 5	Connected to FPT-3, Nozzle 11
4	Evaporator Feed from Tank 26	Jumpered to Nozzle 6	Tank 26 Riser R1
5	From 1F Evaporator - Vent Line	Jumpered to Nozzle 3	Blanked in 1F Evaporator Cell
6	Feed to 1F Evaporator	Jumpered to Nozzle 4	Blanked in 1F Evaporator Cell
7	Spare	Dummy Hanford Connector	Capped @ FDB-6
8	Spare	Dummy Hanford Connector	Capped @ FDB-6

FDB-6 Today

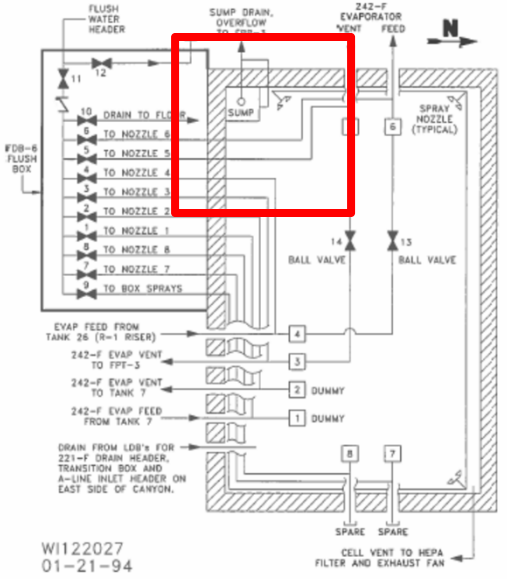
FDB-6 Flush Water Valve Pit

FDB-6 Access Points



FDB-6 Interior Inspection

Southwest Corner

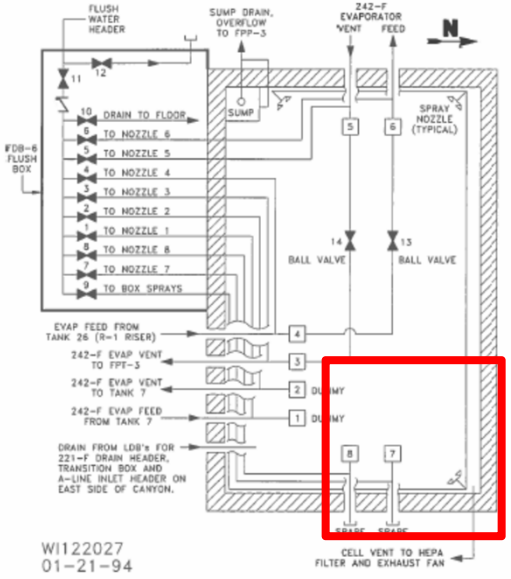


Sump, floor area and walls are free of accumulated solids

FDB-6 Interior Inspection 7/13/2018

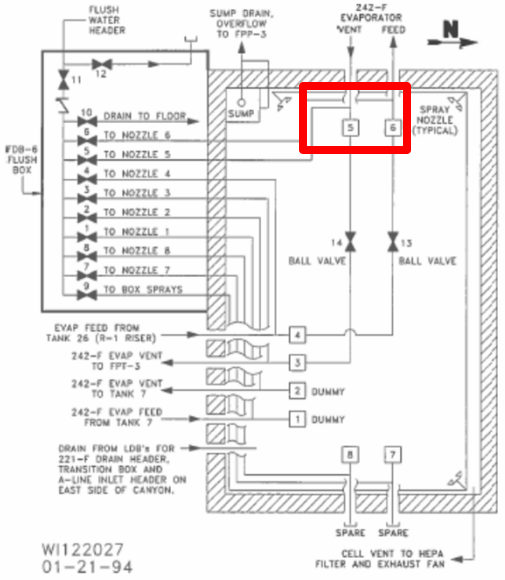
Walls and cell covers free of accumulated solids

Northeast Corner (Upper)



FDB-6 Interior Inspection

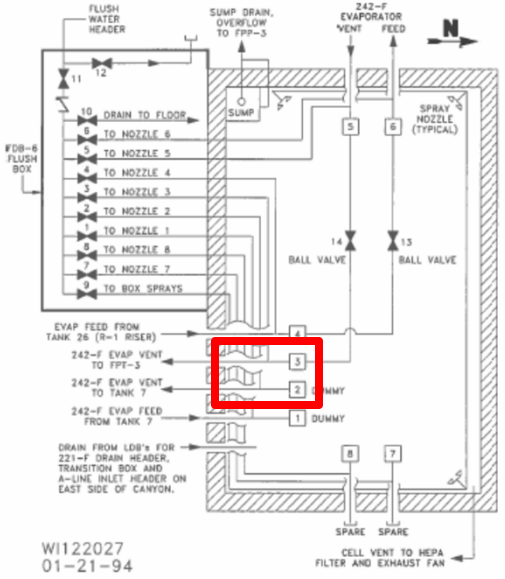
Western Floor Area



Floor area has no accumulated solids

FDB-6 Interior Inspection

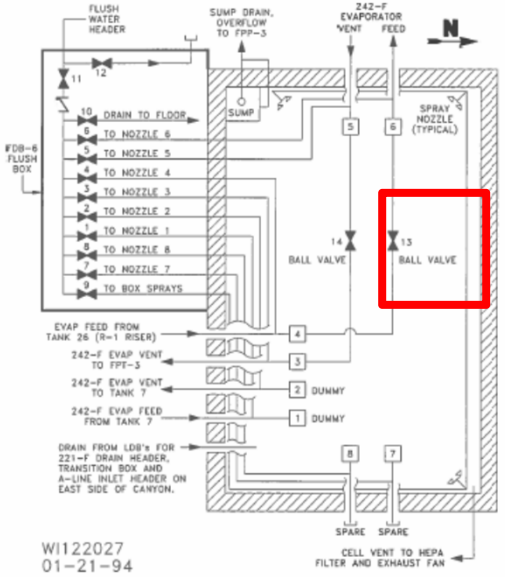
Southern Wall/Floor



Potential small salt deposit below nozzle 4? Solids < one gallon

FDB-6 Interior Inspection

Northern wall and floor

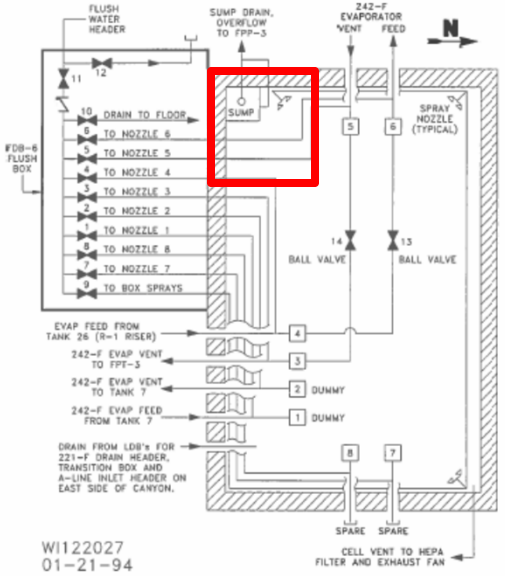


Floor area has no accumulated solids

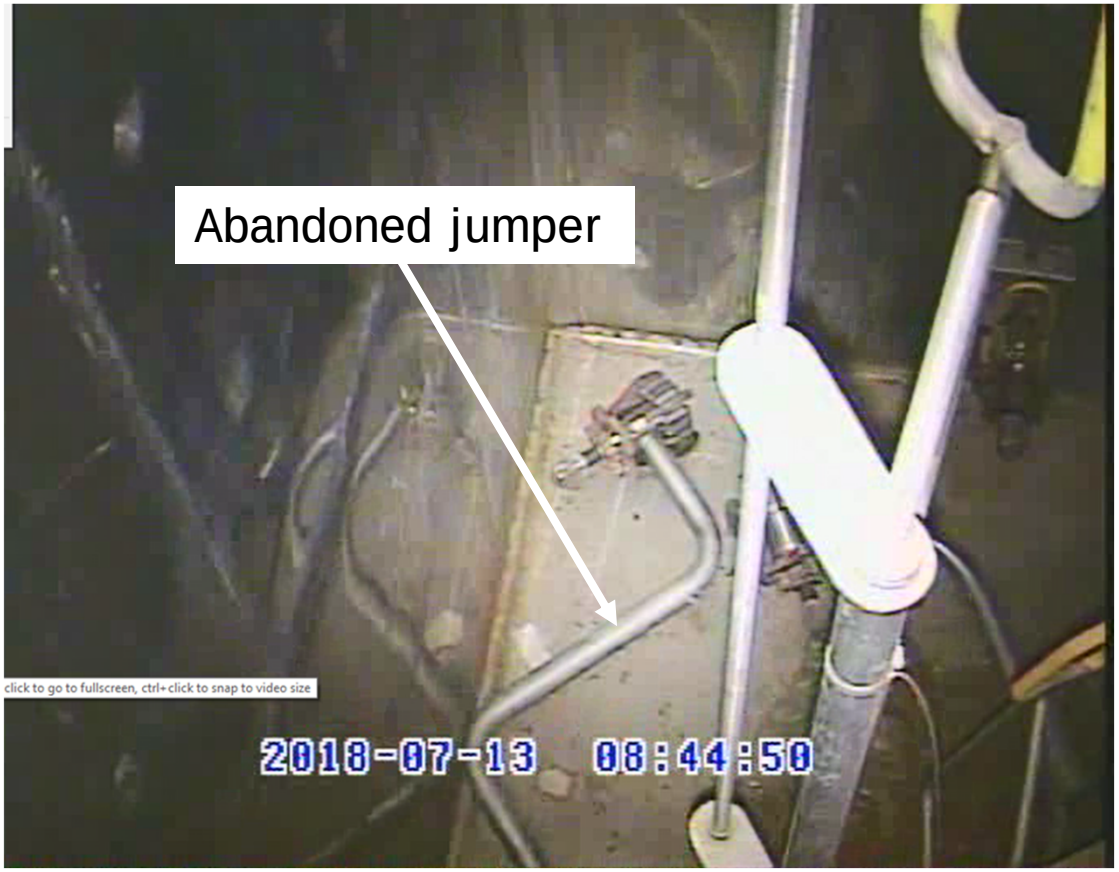
FDB-6 Interior Inspection

Wall or equipment has no accumulated solids

Southwest Corner (Above Sump)

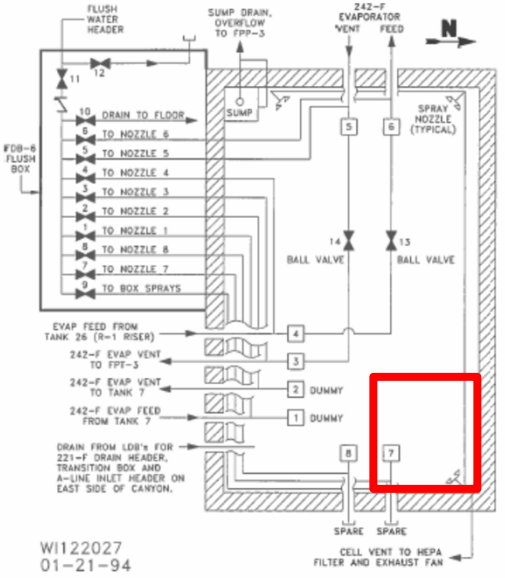


FDB-6 Interior Inspection

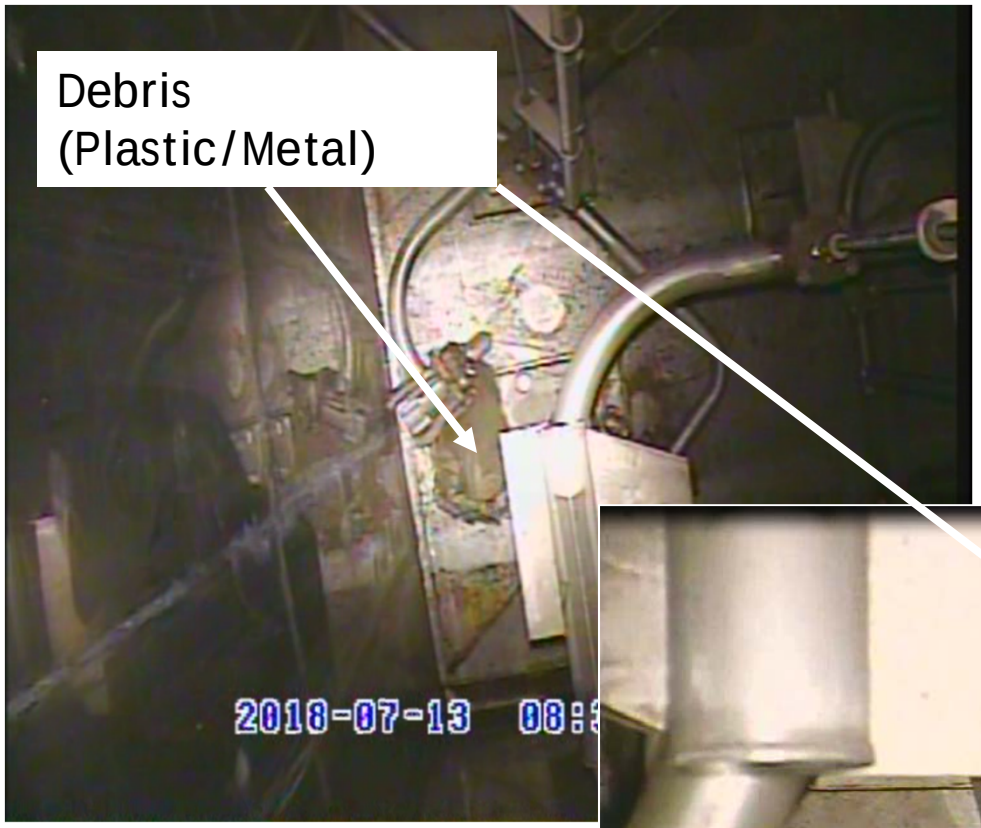


Walls and floor have no accumulated solids

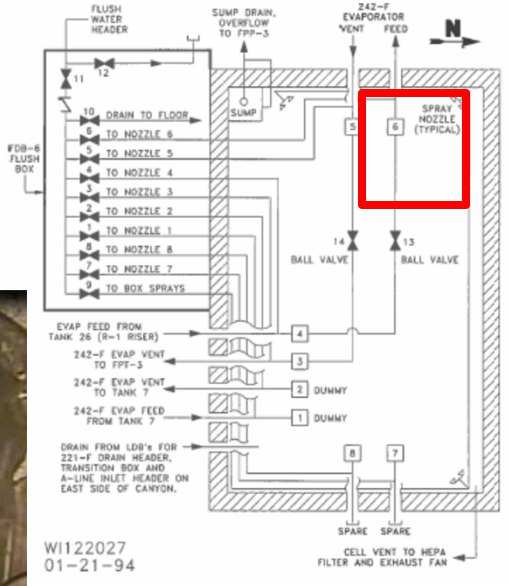
Northeast Corner



FDB-6 Inspection

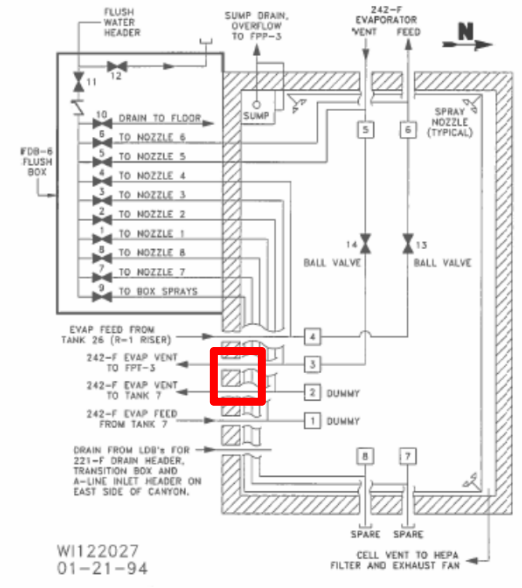


Northwest Corner



FDB-6 Inspection

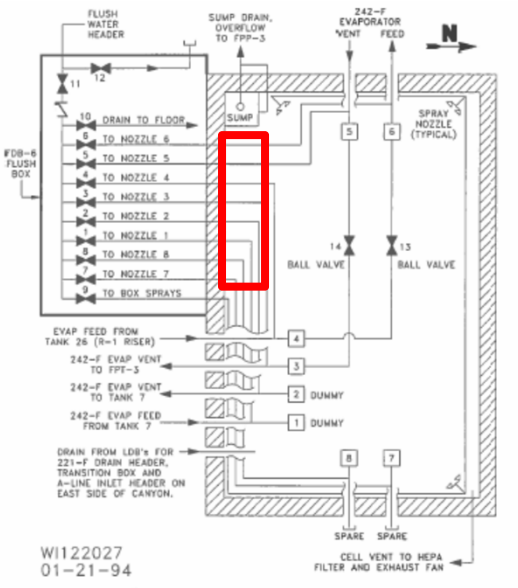
Southeast Wall



FDB-6 Inspection

Opening of Flush Water Valve Pit free of accumulated solids

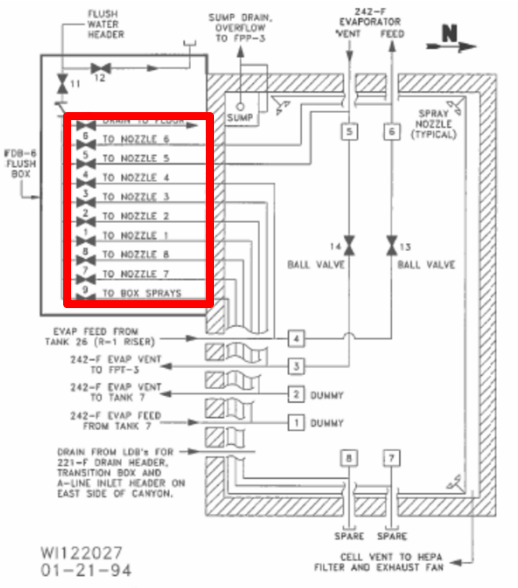
Floor Area, Walls and Ceiling



FDB-6 Flush Water Valve Pit Interior Inspection

Floor, walls, and ceiling are free of accumulated solids

Floor Area, Walls and Ceiling



Current Status of FDB-6

- FDB-6 was sprayed down to remove contamination, as necessary
- Stainless steel lined walls and sump minimized residual contamination levels
  - Diversion box and sump not designed to hold material
    - Liquid waste would drain to sump via sloped floor, then would passively drain by gravity to FPP-3
- A video inspection of FDB-6 was performed on 07/13/2018
  - Inspection was performed through one of the existing access ports
  - **Radiation rate at open access port was 1 mrem/hr; low rate is indicative of minimum contamination**
  - The stainless steel walls, floor and sump, and Flush Water Valve Pit were found to be generally free of accumulated solids or liquids
    - **A small quantity – less than one gallon – of potential salt solids was noted on the floor under Nozzle 4**
  - Wall nozzles were either blanked with dummy Hanford connectors or connected to jumpers as shown on existing drawings.

Current Status of FDB-6 (continued)

- The video inspection results were are consistent with our process knowledge - historical records and employee experience – of FDB-6 operations and expected conditions
- Two abandoned jumpers are located on the FDB-6 floor
  - Likely these jumpers were used to connect Tank 7 to the 1F Evaporator System when it was used as the feed source
  - Based on the service of these jumpers to transfer supernate feed to the evaporator and flushing with water after transfers, there is no reason to believe these jumpers contain appreciable waste solids

Path Forward for FDB-5 and FDB-6

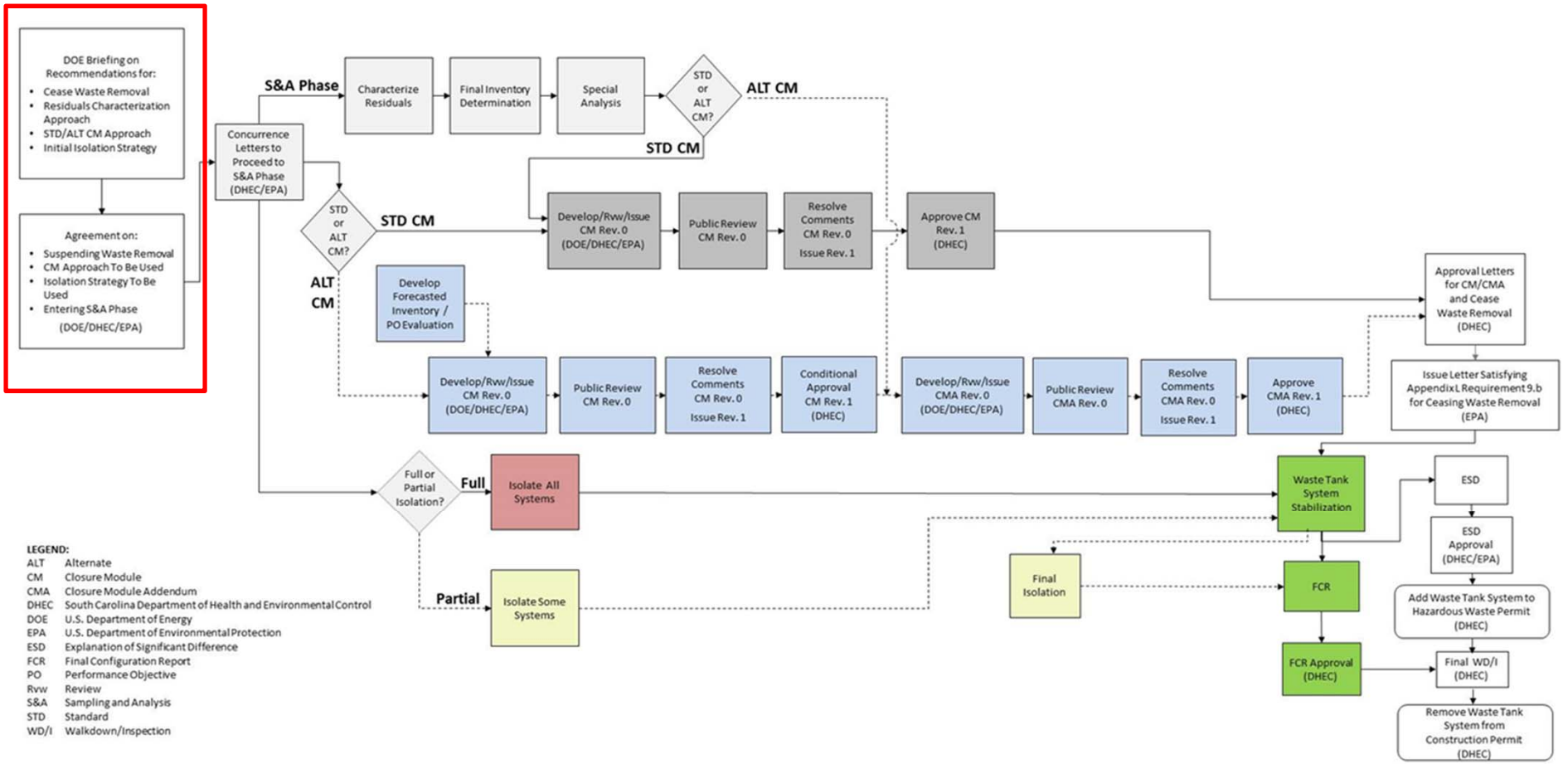
Summary

- We believe FDB-5 and FDB-6 contain negligible quantities of accumulated sludge or salt waste
- We do not believe additional waste removal actions are warranted or required for these two ancillary structures
  - Process histories and recent camera inspections support this conclusion
- Consistent with Section 8.0 of the CGCP, a formal sampling and analysis plan is not warranted because there is not a significant accumulation of solids
  - Rather, process knowledge will be used to develop final residual inventories for each diversion box
  - The Special Analysis process will be used to inform on the impacts of operationally closing these Ancillary Structures without additional cleaning

Summary (continued)

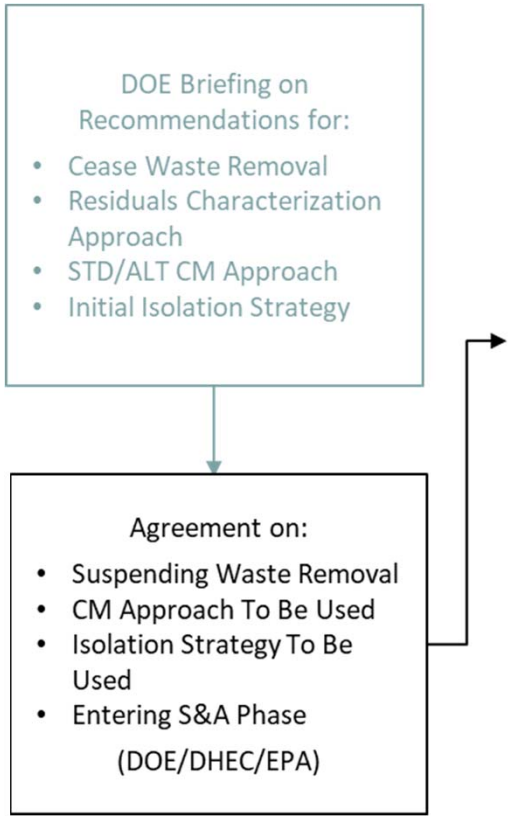
- A qualitative assessment indicates that there is *reasonable assurance* that the *Consolidated General Closure Plan* performance objectives will be met if no additional cleaning is performed on these diversion boxes
- A discussion on "practicability" of additional waste removal will be included in the FDB-5/FDB-6 Closure Module
  - An *Inventory Determination* report will be issued that will include the method and supporting details describing how process knowledge was used to develop the final residual inventories for these Ancillary Structures

Figure 11.4-1 in CGCP



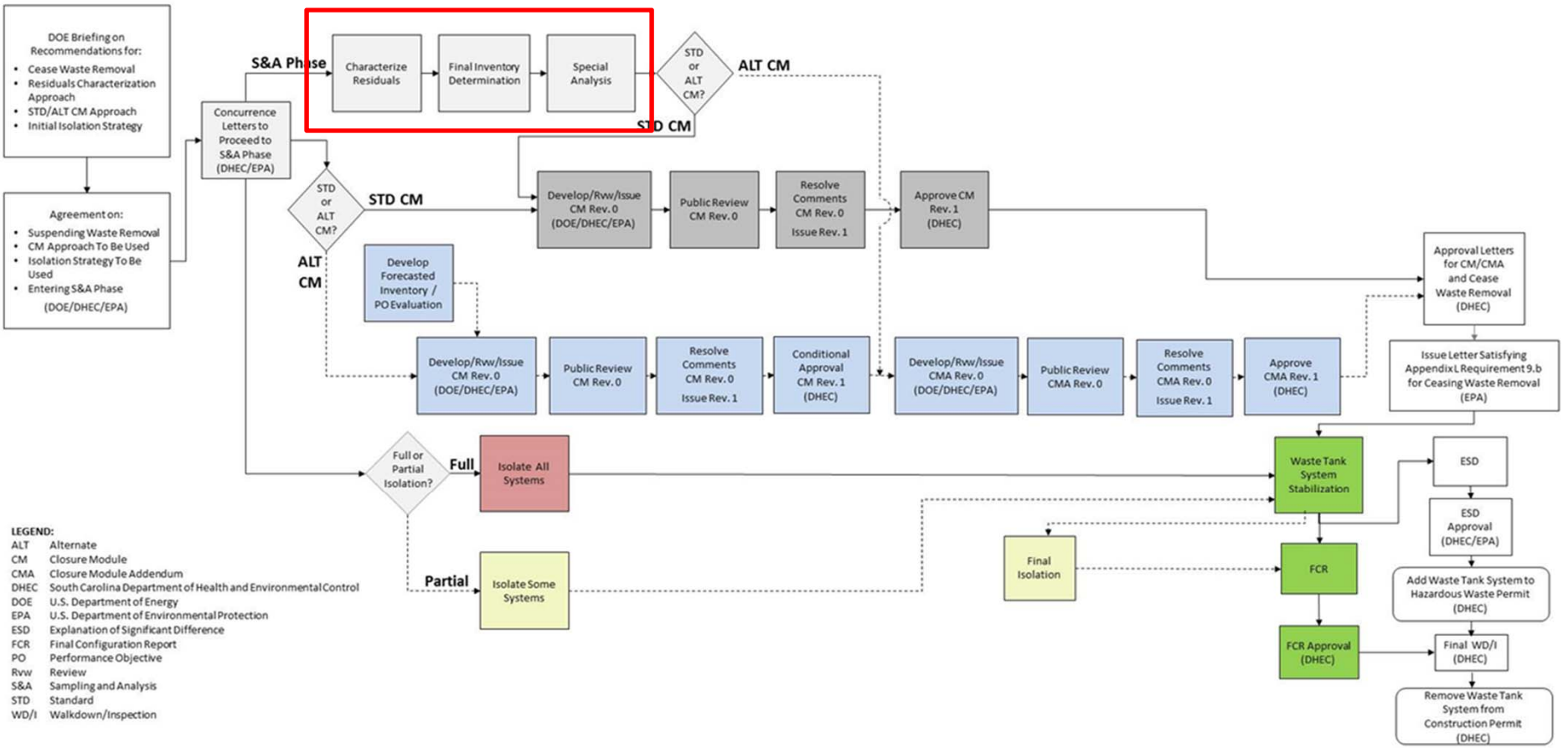
The process outlined in the CGCP to be followed to ultimately result in the operational closure of waste tank systems and ancillary structures

Agreements We Are Requesting



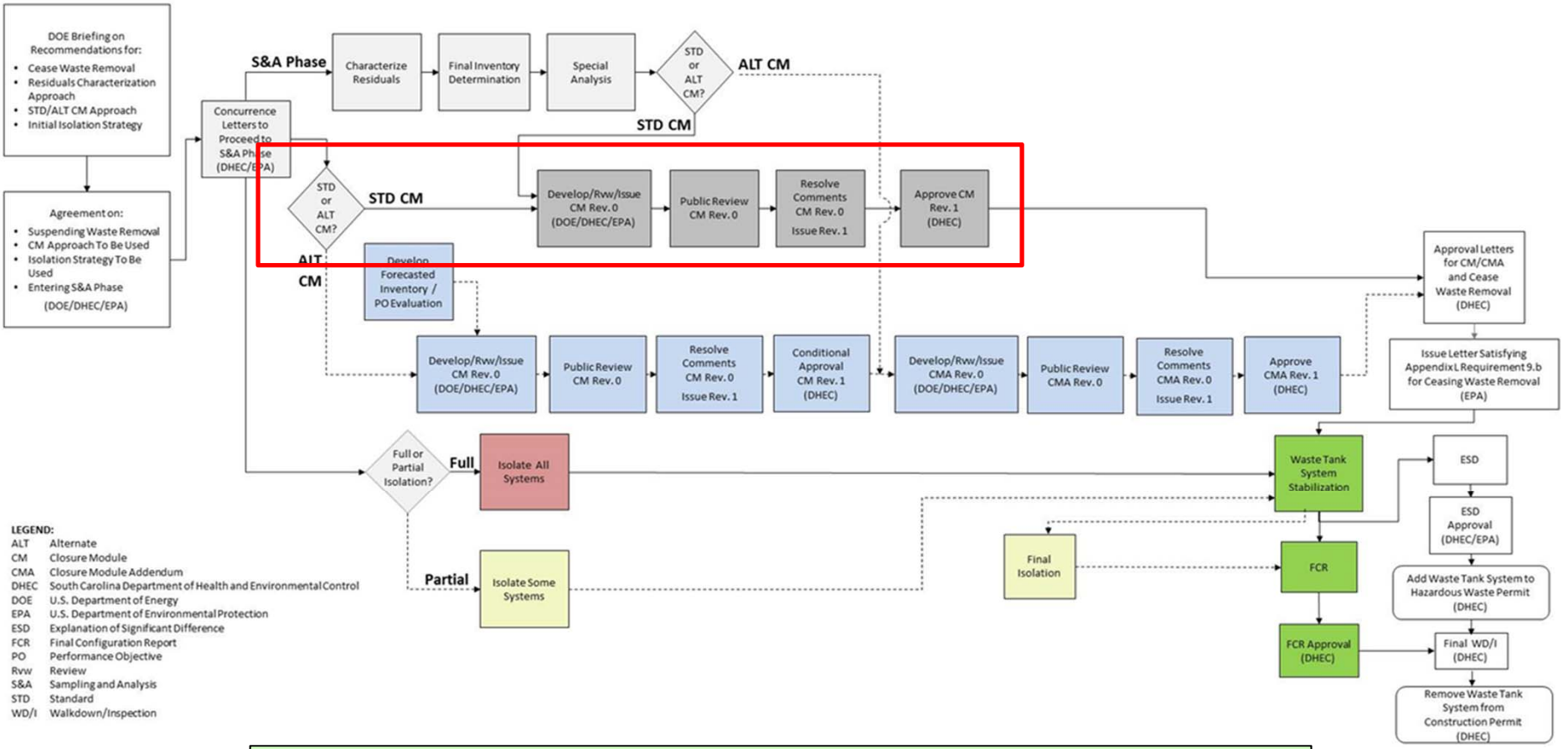
1. **Additional waste removal actions are not necessary for these two ancillary structures**
2. **Process knowledge can be utilized to assign a final residual inventory (i.e., to characterize) for FDB-5 and FDB-6**
3. **DOE will draft a Closure Module for FDB-5 and FDB-6 using the *Standard Closure Module* approach**
4. **The Closure Module will include appropriate isolation and stabilization descriptions using the *Full Isolation* approach**

Residuals Characterization Approach



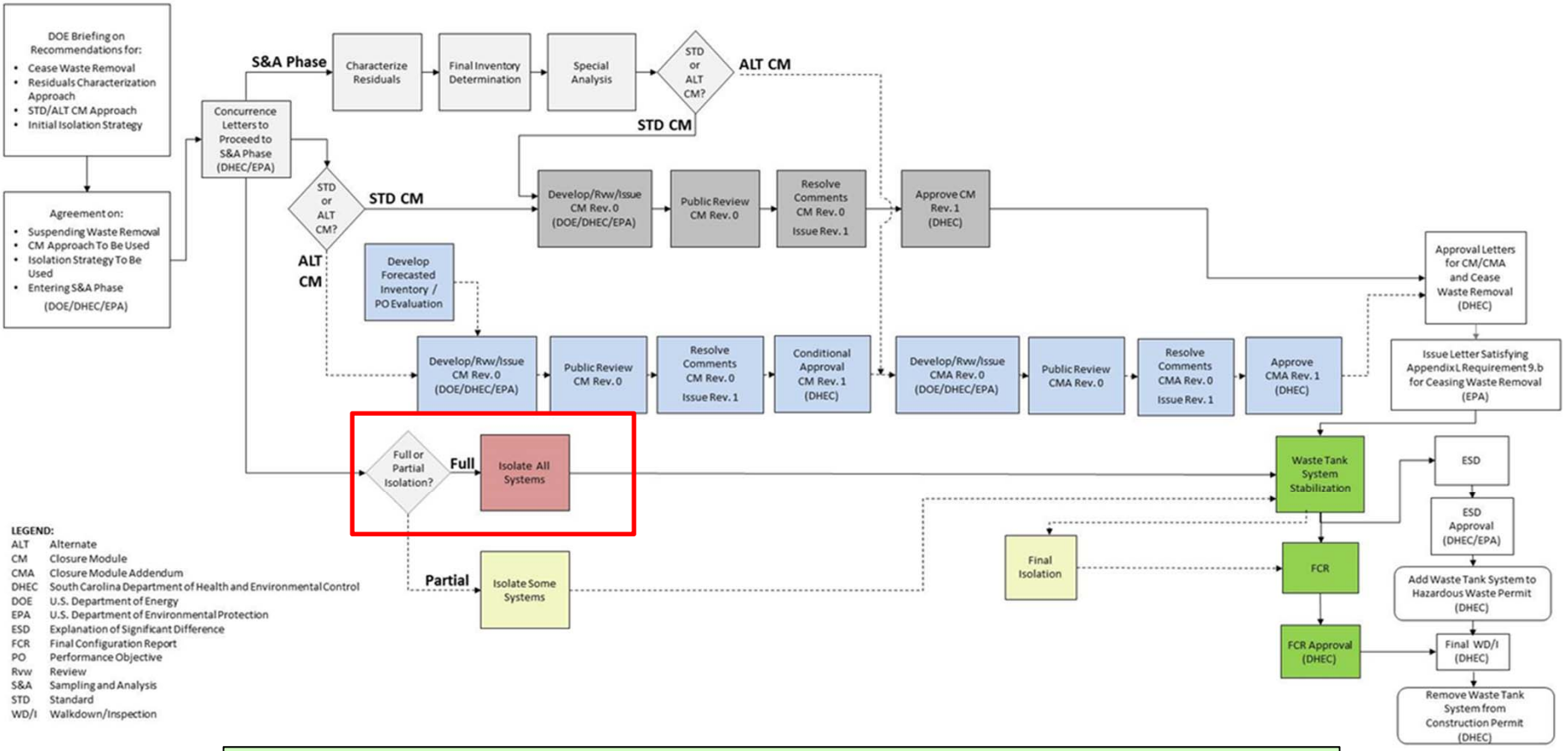
Process knowledge to characterize residuals and assign final residual inventories will be utilized

Closure Module Path Forward



The *Standard Closure Module Approach*, as described in the CGCP, will be utilized

Isolation Path Forward

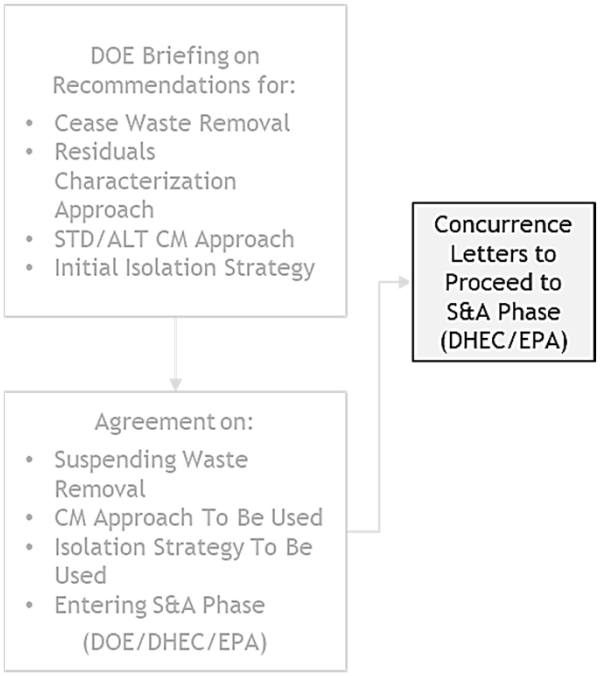


The *"Full" Isolation Approach*, as described in the CGCP, will be utilized

Stabilization Path Forward

- **Both FDB-5 and FDB-6 are large void spaces that must be isolated and filled to ensure that future subsidence of the FTF Closure Cap does not occur**
- **Since there is not a significant quantity of radionuclides remaining in the DBs, an engineered grout designed to reduce radionuclide migration is not required**
- **The DBs will be isolated by ensuring the DB wall nozzles are not open (i.e., a jumper or Hanford Connector is in place), and that the sump drain/overflow lines and leak detection box lines are plugged, ensuring no ability to add waste/chemicals to the DBs**
- **FDB-5 and FDB-6 will be filled with a flowable, self-leveling fill material such as Controlled Low Strength Material (CLSM) grout**
  - Note: As described in the CGCP, Section 2.0, SCDHEC approval for the use of an alternate grout (e.g., CLSM) will be sought
  - The bulk of Tanks 17 and 20 were filled with CLSM in 1997

Requested Action



The three agencies agree that, based upon the described qualitative assessment, there is reasonable assurance that it is appropriate to suspend waste removal activities and enter the operational closure process using a single closure module for FDB-5 and FDB-6 utilizing process knowledge for residuals characterization.

Next Action

- **DOE will forward a letter to SCDHEC and EPA formally requesting concurrence to proceed to the Sampling and Analysis phase in FDB-5 and FDB-6**
  - This presentation will be attached as a primary reference
  - The requested action is a preliminary, non-binding concurrence based on the qualitative information available at this time and presented today
- **As stated earlier, a detailed characterization process is not necessary because there are no significant accumulation of solids in these diversion boxes**
  - The characterization of FDB-5 and FDB-6 residual waste will be based on process knowledge
  - As part of Closure Module development, DOE will coordinate meeting(s) with SCDHEC and EPA to specifically discuss the characterization approach
- **DOE and the Liquid Waste Contractor will proceed in developing the regulatory documentation necessary to operationally close FDB-5 and FDB-6**
  - DOE will coordinate with SCDHEC and EPA to establish a schedule for the development, review and approval of the Closure Module consistent with the approach described in the CGCP