



Savannah River Site Environmental Management Program

Liquid Tank Waste Stabilization And Disposition

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Waste Disposition Project

January 23, 2007

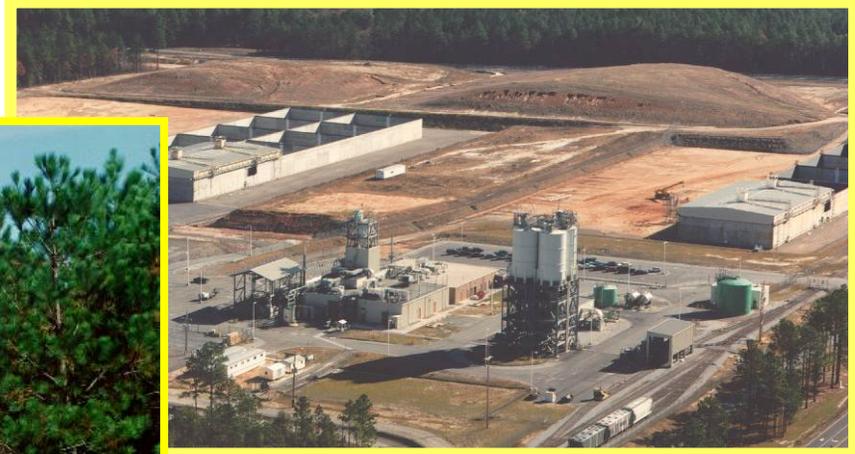
Mission: Store, Treat and Stabilize Legacy of Radioactive Waste



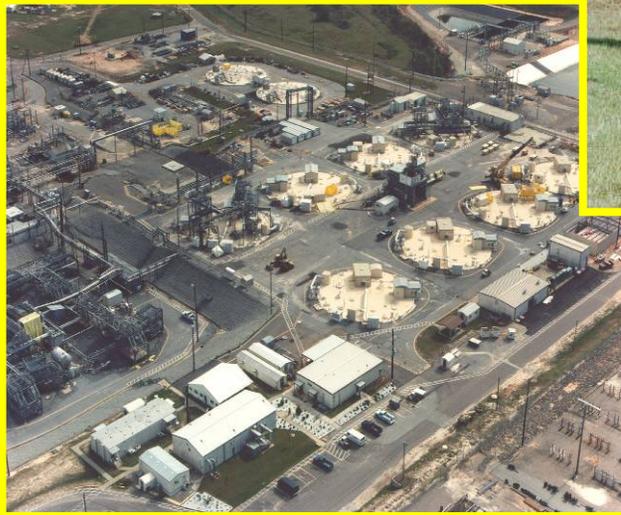
Waste in Tanks



DWPF Canister



Saltstone Facility



Tank Farms



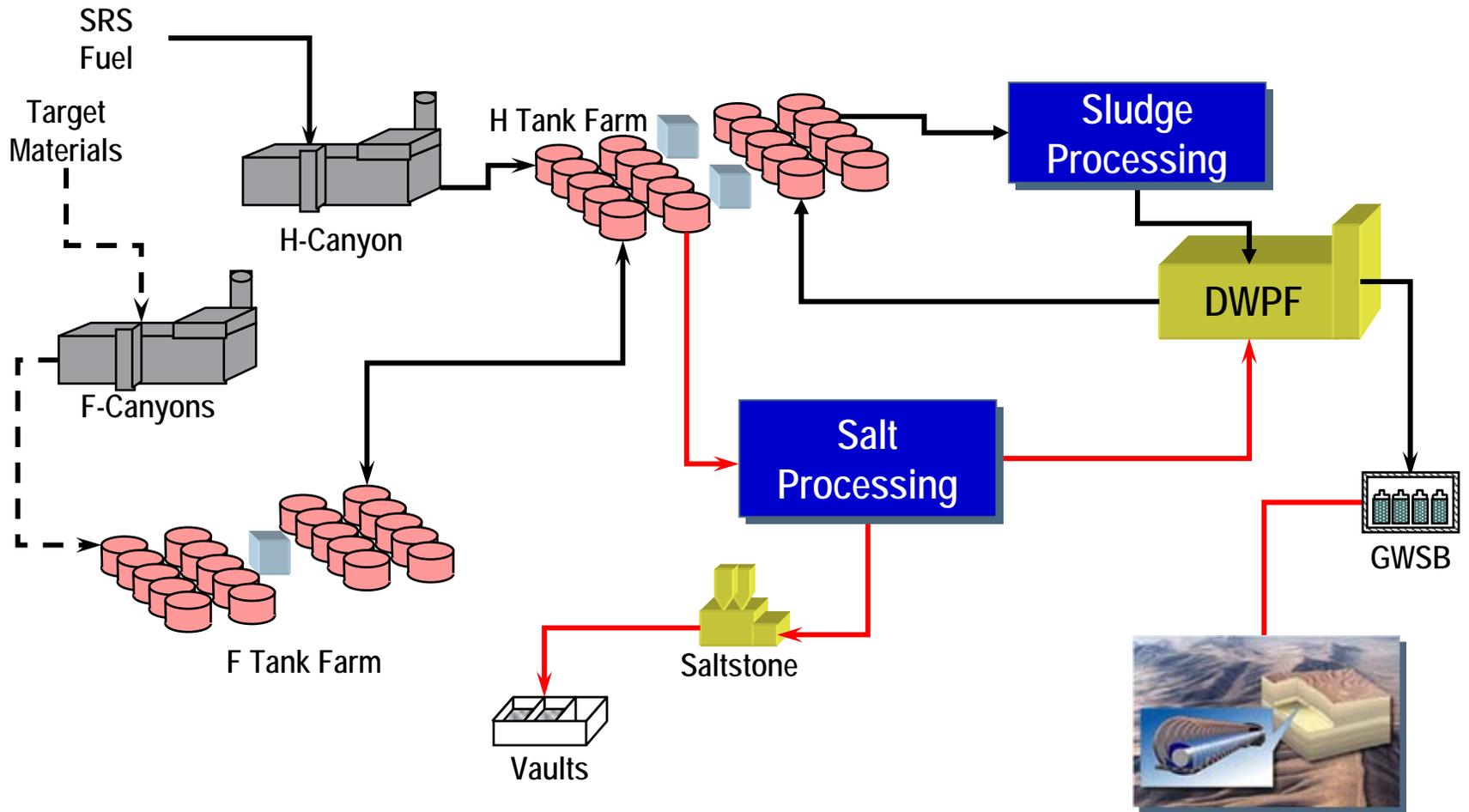
Effluent Treatment Facility

Program Description

This project includes program activities to disposition approximately 36 Million Gallons of Radioactive Liquid Waste and closure of related remaining 49 underground storage tanks

- F and H Tank Farms Operations
- Waste Removal and sludge preparation
- DWPF operations
- Glass Waste Storage Buildings
- Effluent Treatment Facility
- Saltstone operations
- Interim Salt Processing facilities modifications and operations
- Salt Waste Processing Facility design, construction, operation

SRS Liquid Waste System



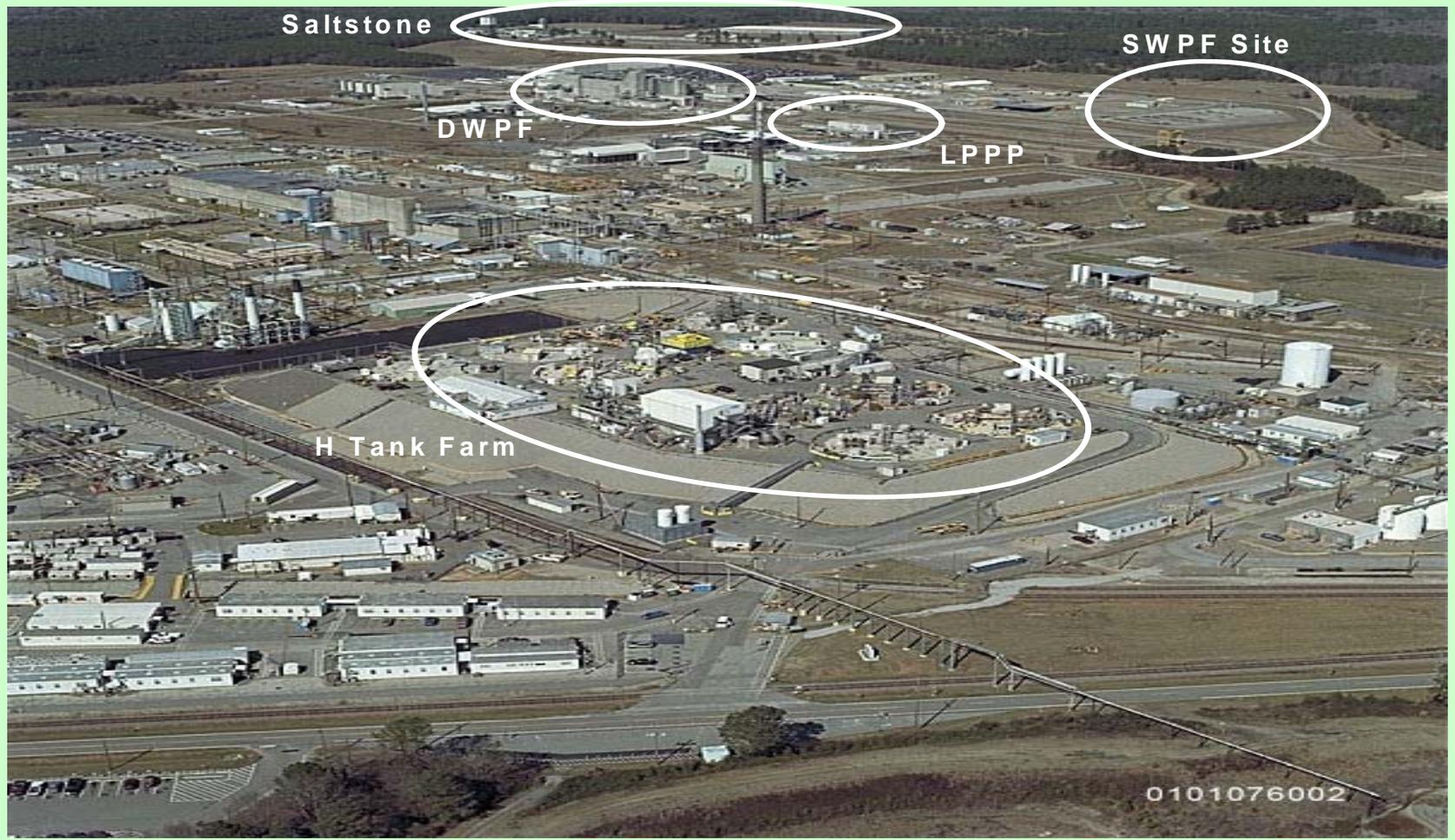
DWPF - Defense Waste Processing Facility
GWSB - Glass Waste Storage Building

Federal Repository

Planning Development

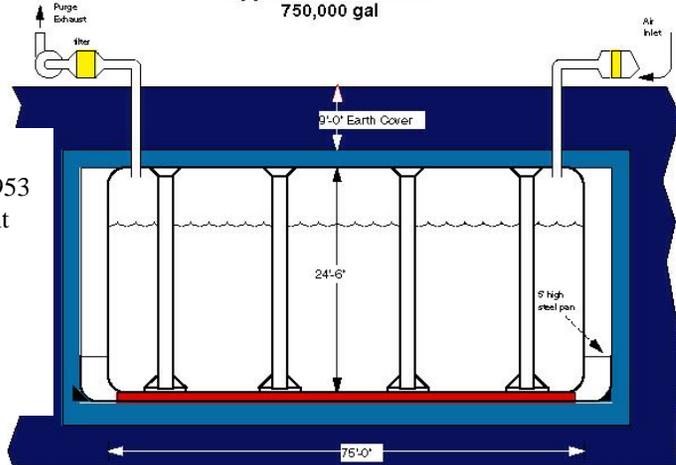
- A SRS FY06-FY12 Liquid Waste Disposition Processing Plan (DPP) (rev. 0) was issued 5/06.
 - Establishes a planning basis for processing through initial startup of Salt Waste Processing Facility.
 - DPP Revision 1 will be issued in the next few months.
- The SRS HLW System Plan was first issued in 12/92 and the current revision (13) is 12/02.
 - After issuance of DPP Rev. 1 a new Lifecycle Liquid Waste Disposition System Plan will be issued later in the year.

Liquid Waste Tank Waste Stabilization and Disposition



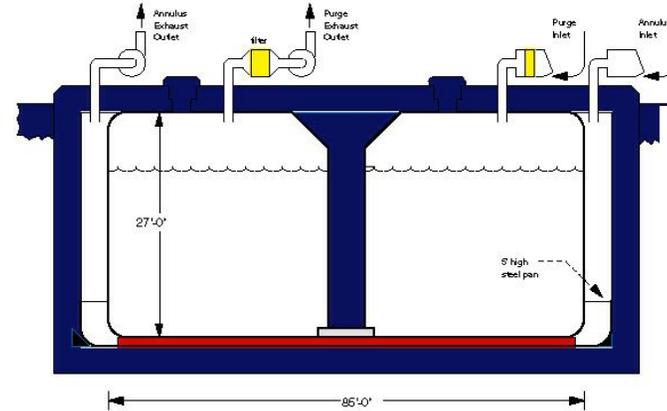
SRS High-Level Waste Tanks

Type I Waste Tank
750,000 gal



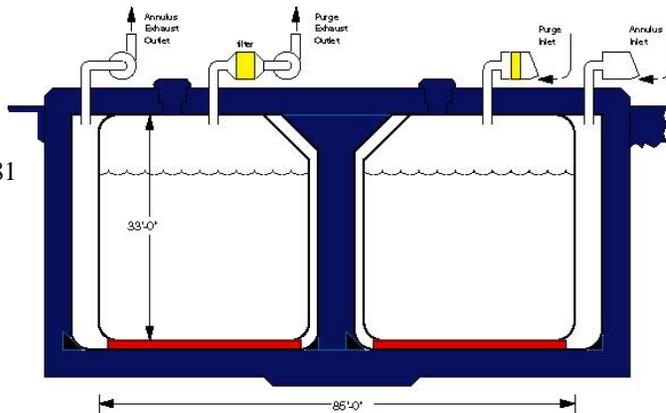
- 12 Tanks
- Built 1951 - 1953
- Non-Compliant
- Only 5 foot Secondary

Type II Waste Tank
1,030,000 gal



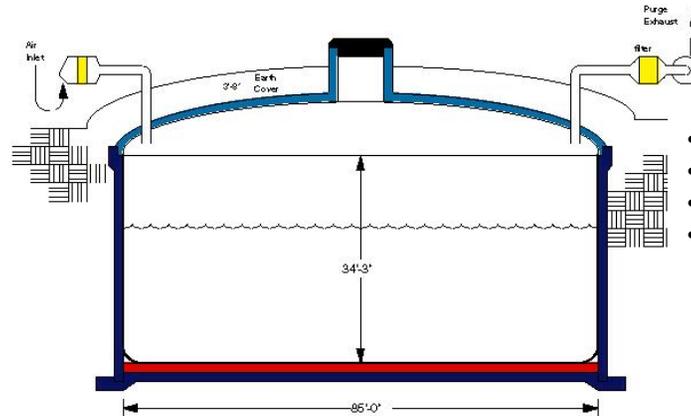
- 4 Tanks
- Built 1955-1956
- Non-Compliant
- Only 5 foot Secondary

Type III Waste Tank
1,300,000 gal



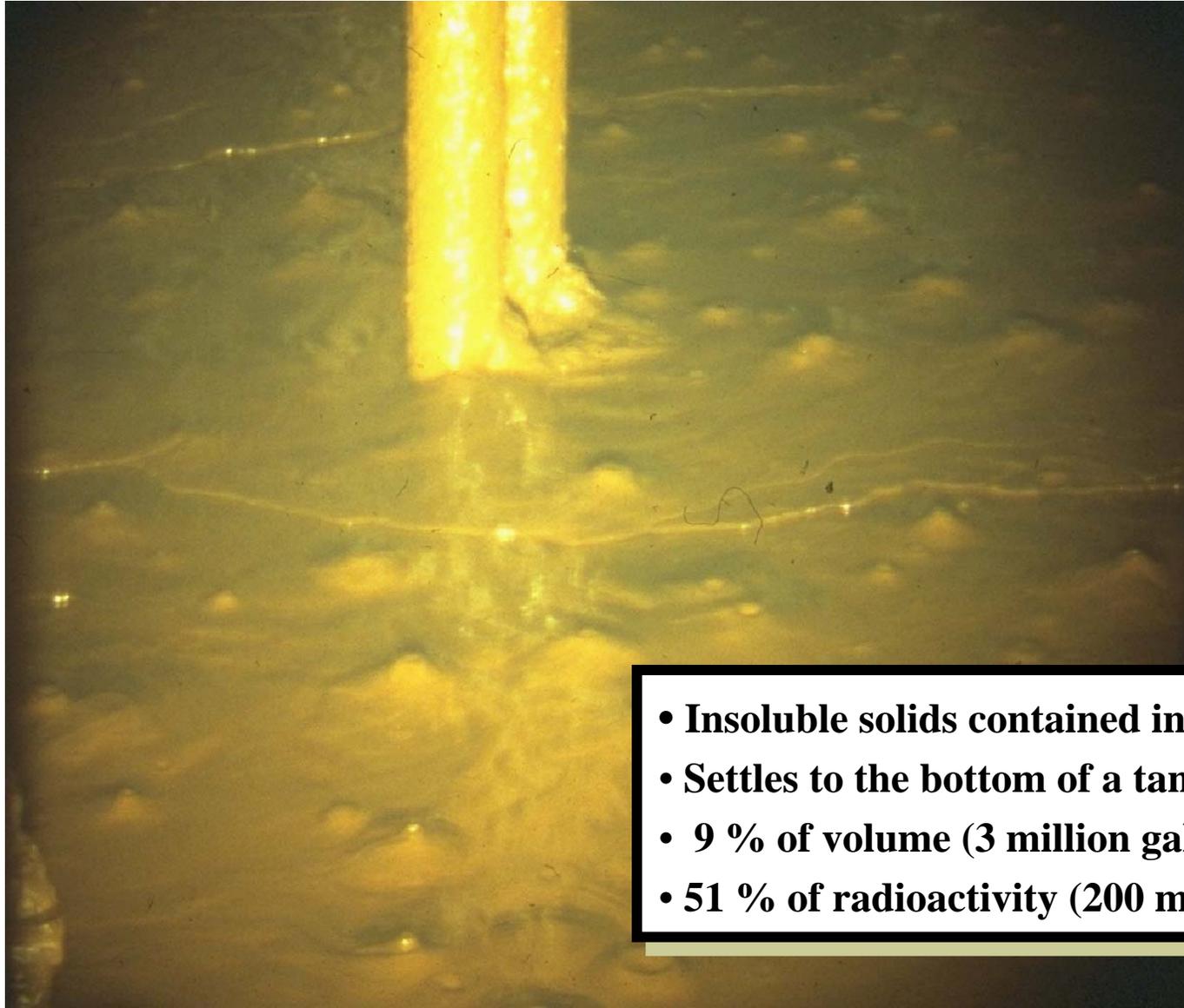
- 27 Tanks
- Built 1967-1981
- Compliant
- Full Secondary

Type IV Waste Tank
1,300,000 gal



- 8 Tanks
- Built 1958-1962
- Non-Compliant
- No Secondary

SLUDGE STORED IN A WASTE TANK



- **Insoluble solids contained in the waste**
- **Settles to the bottom of a tank**
- **9 % of volume (3 million gallons)**
- **51 % of radioactivity (200 million curies [Ci])**

SALT STORED IN A WASTE TANK



Concentrated Supernate



Salt Cake

- **Liquid Portion of the waste**
- **Contains dissolved Salts**
- **Stored in three forms**
 - Unconcentrated Liquid ...
 - Supernate
 - After Evaporation ...
 - Concentrated Supernate
 - Salt Cake (crystallized)
- **91 % of volume (33 million gallons)**
- **49 % of radioactivity (200 million curies)**
- **Primarily Cesium-137**

DEFENSE WASTE PROCESSING FACILITY



Defense Waste Processing Facility

- FY06
 - 245 Actual Canisters Produced
 - 347 Equivalent Canisters Produced

- 2247 Total Canisters Produced (as of 1/22/07 AM)
 - 33 Canisters for FY07 to date

- Sludge Batch Status
 - Blending qualification studies being performed to blend Sludge Batch 3 and Sludge Batch 4 are ongoing.
 - The current ready date for Sludge Batch 4 is 4/13/2007.
 - The current ready date for Sludge Batch 5 is 2/26/2008.

SHIELDED CANISTER TRANSPORTER



GLASS WASTE STORAGE BUILDING #1



Glass Waste Storage Building #2



EFFLUENT TREATMENT FACILITY

- **Treats low-level radioactive waste since 1988 that was formerly sent to seepage basins. Treated streams include:**
 - **Evaporator overheads**
 - **Segregated cooling water**
 - **Contaminated surface water runoff**
 - **Other site needs such as ER purge water**
- **Processes approximately 10 million gallons per year utilizing:**
 - **pH adjustment**
 - **Filtration**
 - **Organic removal**
 - **Reverse osmosis**
 - **Ion exchange**
- **Treated streams are released to permitted outfall**

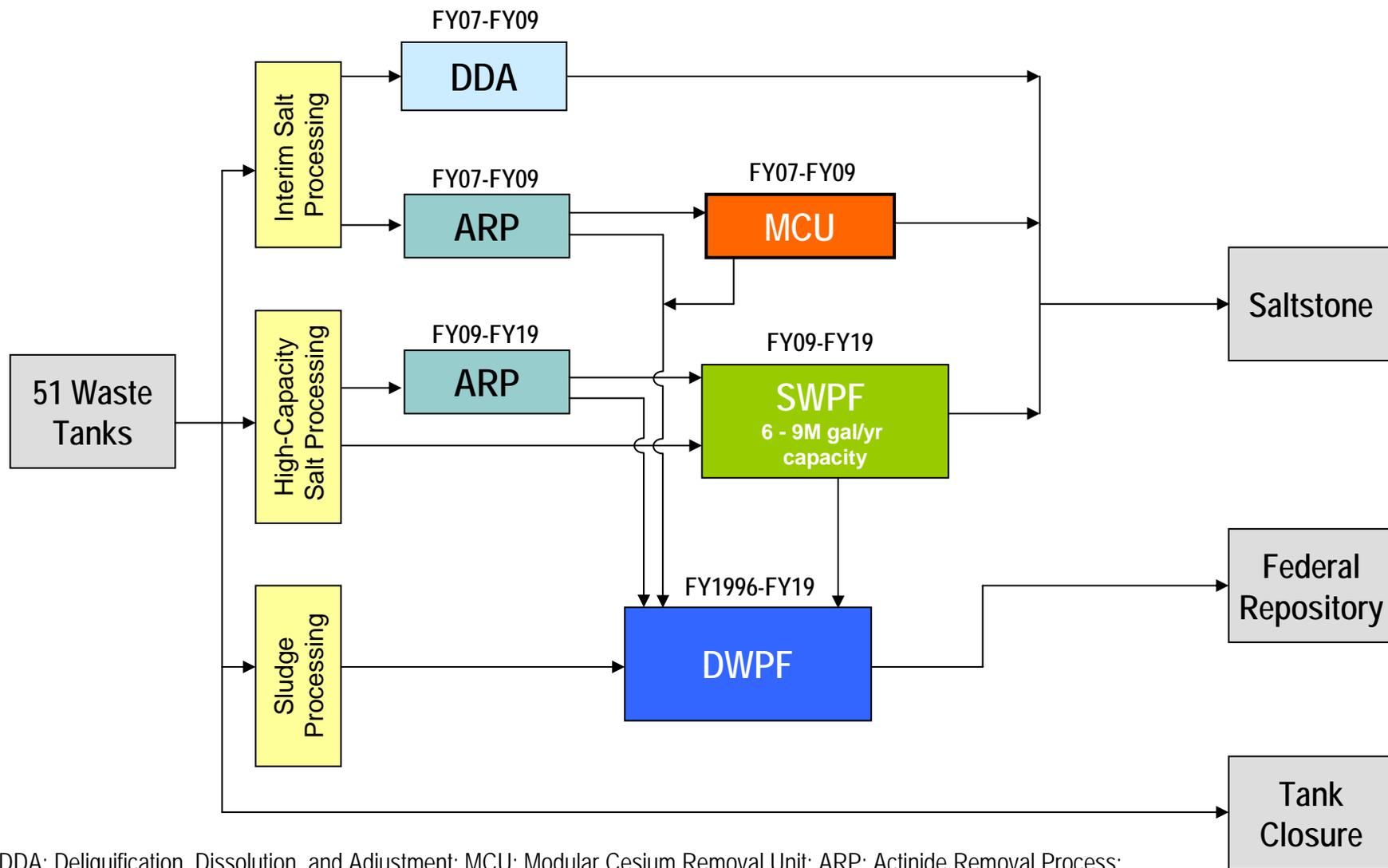


SALTSTONE FACILITY



- **Treats and permanently disposes of low-level filtrate by stabilization in a solid, cement-based waste (grout)**
- **Operations began in 1991 and operated intermittently through 2003 to process various low level liquid waste streams.**
- **Grout is pumped to above-ground engineered vaults**
- **Facility restarted this year processing material from Tank 50.**
- **Modifications made in 2004-2005 to support processing salt waste up to 0.2 Ci./gal Cesium -137.**

SRS Liquid Waste Disposition Paths



DDA: Deliquification, Dissolution, and Adjustment; MCU: Modular Cesium Removal Unit; ARP: Actinide Removal Process;
SWPF: Salt Waste Processing Facility; DWPF: Defense Waste Processing Facility

Salt Processing Background

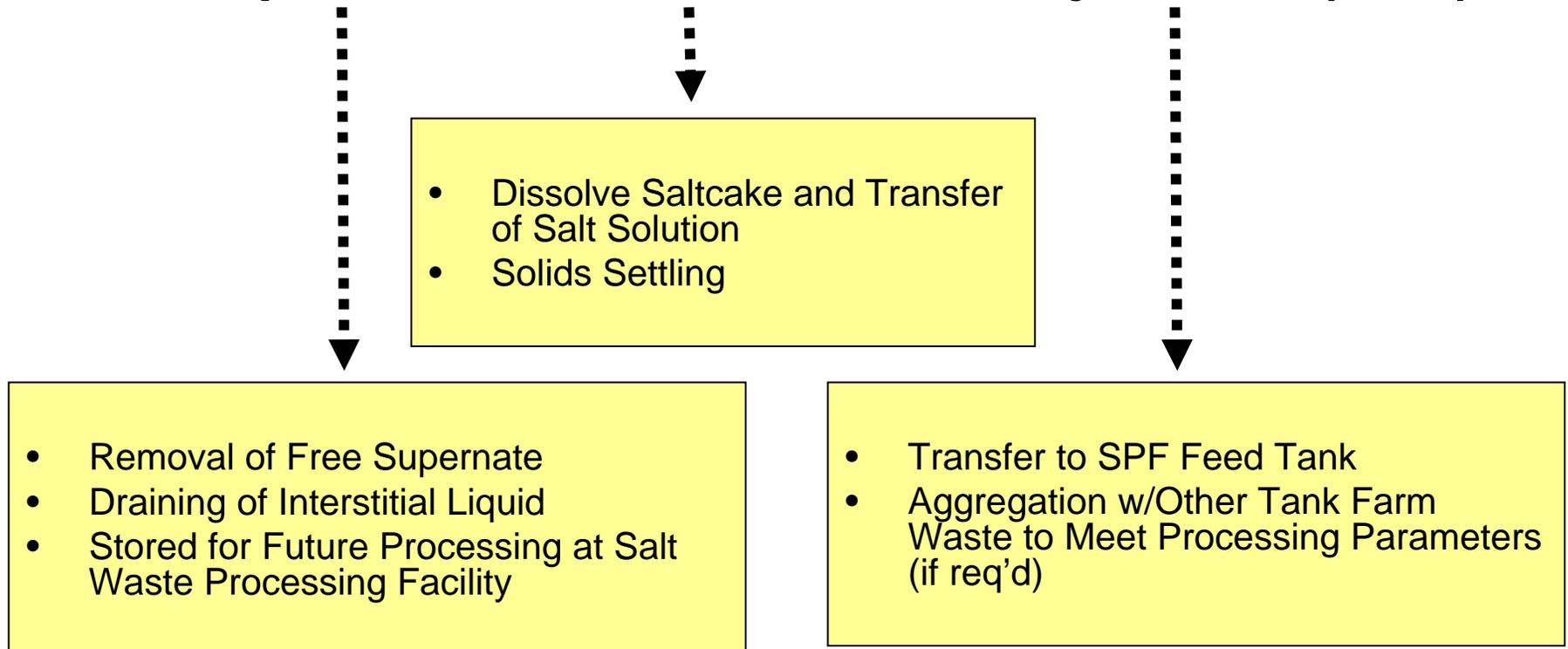
- Interim Processing Plan (IPP) (June 2005) for SRS waste disposition previously developed through collaborative effort between DOE, WSRC and SC
- Waste Determination for salt processing per FY2005 NDAA Section 3116 prepared by DOE in consultation with NRC
 - Demonstrated requirements met
- Plan resulted in maximum disposition of 3 – 5 MCi in Saltstone Disposal Facility vaults

Salt Processing Plan

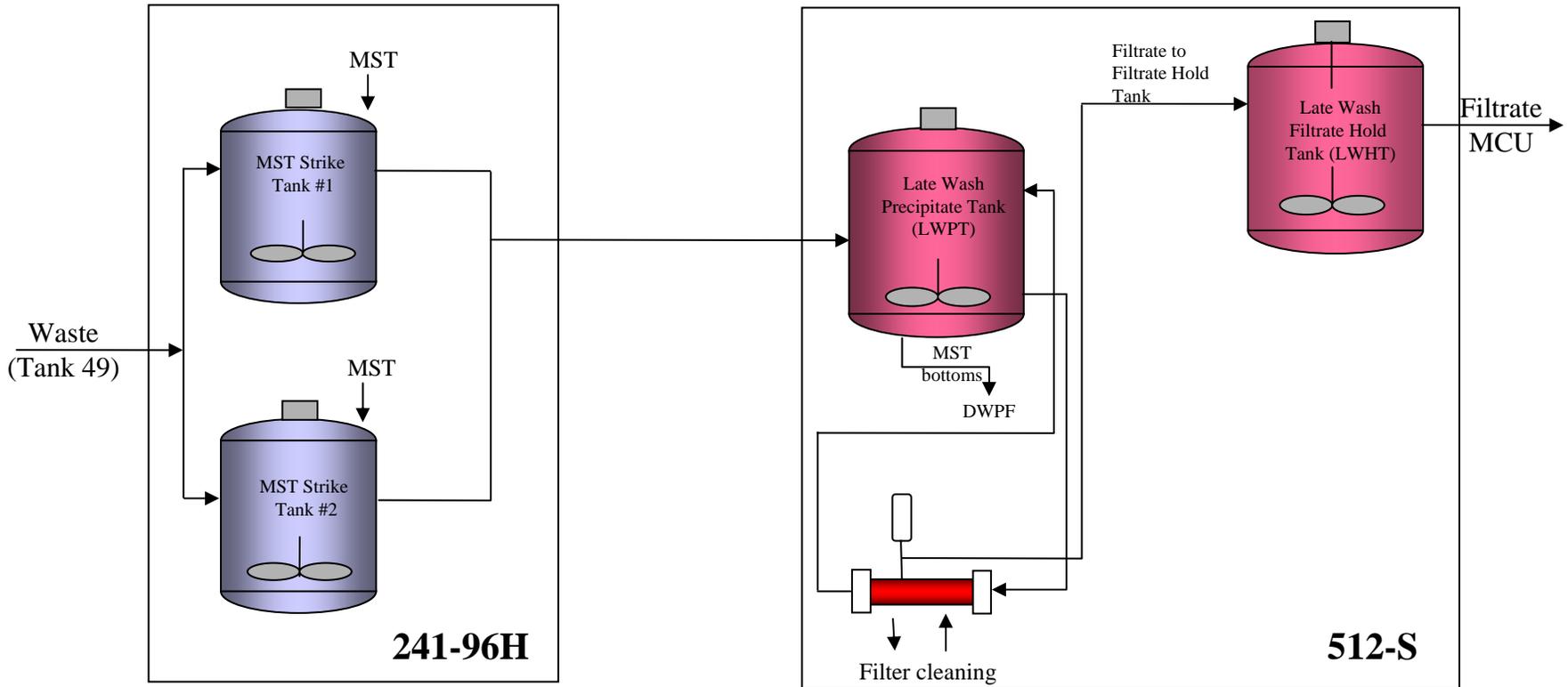
- Plan developed around four key processes:
 - Deliquification, Dissolution and Adjustment (DDA)
 - Actinide Removal Process (ARP)
 - Modular Caustic Side Solvent Extraction Unit (MCU)
 - Salt Waste Processing Facility (SWPF)

DDA Process

Deliquification, Dissolution, and Adjustment (DDA)



Actinide Removal Project (ARP)



Issues and Challenges

- Completion of Section 3116 process
 - Salt Processing
 - Tank Closure
- Sludge canister production rates of Sludge Batches 4 to 6.
- Tank Space Management pending Salt Processing.
- Availability of federal repository