THE LIQUID WASTE SYSTEM — A STATUS —

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Safety Integrity Ownership Teamwork Continuous Improvement
Cold War Legacy: 35 million gallons of High-Level Waste

- The mission is to retrieve, process, treat and dispose of the legacy tank waste, and to close the tanks and ancillary structures, as quickly, safely and efficiently as possible.
- 43 of the 51 waste tanks are still active storing or supporting waste processing.
  - 8 waste tanks have been operationally closed.

The first high-level waste entered F-Tank Farm in November 1954 and into H-Tank Farm in August 1955 - Approaching 70 years ago!

- A significant investment has been made in the four key processing and treatment facilities:
  - Tank Farms
  - Defense Waste Processing Facility (DWPF);
  - Salt Waste Processing Facility (SWPF)
  - Saltstone Production Facility (SPF)
170 acres
3 miles in length

Saltstone Production/Disposal Facilities

H-Tank Farm
- 29 tanks
- 2 evaporators (2H & 3H)
- Volume reduction and pre-treatment occurs in H Area

F-Tank Farm
- 22 tanks

Inter-Area Line
- 2.2 miles
- Pump pits at each end
- Diversion boxes at each end and at high point in the middle

Effluent Treatment Facility

Initial Service/Operation

<table>
<thead>
<tr>
<th>Tanks 1 - 8</th>
<th>1954 - 1961</th>
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<tbody>
<tr>
<td>(Type I - FTF)</td>
<td></td>
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<tr>
<td>Tanks 9 - 12</td>
<td>1955</td>
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<tr>
<td>(Type I - HTF)</td>
<td></td>
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<tr>
<td>Tanks 13 - 16</td>
<td>1956 - 1960</td>
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<tr>
<td>(Type II)</td>
<td></td>
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<tr>
<td>Tanks 17 - 20</td>
<td>1959 - 1961</td>
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<tr>
<td>(Type IV - FTF)</td>
<td></td>
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<tr>
<td>Tanks 21 - 24</td>
<td>1961 - 1965</td>
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<tr>
<td>(Type IV - HTF)</td>
<td></td>
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<tr>
<td>Tanks 29 - 32</td>
<td>1971 - 1974</td>
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<tr>
<td>(Type III - HTF)</td>
<td></td>
</tr>
<tr>
<td>Tanks 33 - 34</td>
<td>1973 - 1974</td>
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<tr>
<td>(Type III - FTF)</td>
<td></td>
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<tr>
<td>Tanks 35 - 37</td>
<td>1977 - 1978</td>
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<tr>
<td>(Type IIIA - HTF)</td>
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<tr>
<td>Tanks 25 - 28</td>
<td>1980</td>
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<tr>
<td>(Type IIIA - FTF)</td>
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<tr>
<td>Tanks 44 - 47</td>
<td>1981 - 1982</td>
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<tr>
<td>(Type IIIA - HTF)</td>
<td>(Tank 46 - 1994)</td>
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<td>Tanks 38 - 43</td>
<td>1981 - 1986</td>
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<tr>
<td>(Type IIIA - HTF)</td>
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<tr>
<td>2H Evaporator System</td>
<td>1982</td>
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<td>Tanks 48 - 51</td>
<td>1983 - 1986</td>
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<tr>
<td>(Type IIIA - HTF)</td>
<td></td>
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<tr>
<td>ETF</td>
<td>1988</td>
</tr>
<tr>
<td>SPF/SDF</td>
<td>1990</td>
</tr>
<tr>
<td>DWPF</td>
<td>1996</td>
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<tr>
<td>3H Evaporator System</td>
<td>2000</td>
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<tr>
<td>SWPF</td>
<td>2021</td>
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</tbody>
</table>
The Highly Integrated Liquid Waste System

H-Canyon Separations Facility

Receipt of up to 300 kg/als/year

Safe Storage

Waste Retrieval

Tank Cleaning

Operational Closure

Effluent Treatment Facility (ETF)

Sludge Batching

Salt Batching

Salt Processing (TCCR)

Salt Processing (SWPF)

Salt Waste Processing Facility (Parsons)

HLW Treatment (DWPFP)

HLW Canisters GWSBs 1 & 2

LLW Treatment (SPF)

Saltstone Disposal Units

Tank Farm Operations (FTF and HTF)

Waste Treatment

Low-Level Waste Disposal Facility

The Three End States

- **H-Canyon Separations Facility**: Receipt of up to 300 kg/a/year

- **Safe Storage**

- **Effluent Treatment Facility (ETF)**

- **Tank Cleaning**

- **Operational Closure**

- **Waste Retrieval**

- **Sludge Batching**

- **Salt Batching**

- **Salt Processing (TCCR)**

- **Salt Processing (SWPF)**

- **Salt Processing (DWPFF)**

- **HLW Treatment**

- **HLW Canisters GWSBs 1 & 2**

- **Vitrified HLW in Sealed Stainless Steel Canisters**

- **Low-Level Salt Waste in Engineered Waste Form known as Saltstone**

- **Saltstone Disposal Units**
In 2021, SRR prepped, qualified and transferred over 2,300,000 gallons of salt solution to SWPF - Nearly DOUBLED the previous record!

- A key area of focus is preparing and transferring salt batches to meet the future rate of up to 9 million gallons per year
- Waste retrieval efforts increased significantly during FY21 to prepare tanks for salt and sludge removal activities
- Waste retrieval activities ranging from initial design work to field installation of mixing and transfer pumps is being performed for 11 salt tanks - Tanks 2, 3, 9, 10, 27, 28, 29, 31, 37, 44 and 47 - and five sludge tanks - Tanks 14, 15, 33, 35 and 39
- Salt batch qualification time has been reduced from 6 months to 6-7 weeks
Ancillary Structure Operational Closures

- F-Area Diversion Boxes (FDB) 5 and 6 were two HLW transfer support structures dedicated to operation of the now inactive 1F Evaporator System
  - 1F Evaporator last operated in 1989
- Developed regulatory strategy for closure of first-of-a-kind inactive ancillary structures
- Completed all regulatory documentation and received approval/concurrence from DOE, SCDHEC and EPA to proceed
- Initiated grouting activities
- Estimated completion of FFA milestone well before the December 31, 2022 commitment date
- DWPF poured 59 canisters of vitrified high-level waste during FY21, maximizing Strip Effluent (SE) volume per canister while ensuring that SWPF operations were never impacted
  - Received 195 kgals of SE and 38 kgals of filtered solids from SWPF
  - Significantly increased canister loading of salt waste

- Introduced a new antifoaming agent
  - Reduced foaming and flammable vapors in vessels, allowing higher boiling rates to increase facility throughput rates

- Preparing to convert from a formic acid to a glycolic acid flowsheet to further increase throughput rates

- Completed construction of Melter 4

Since 1996, DWPF has produced 16.4 million pounds of vitrified waste incorporating over 62.4 million curies within 4,250+ canisters
LLW Treatment & Disposal - Saltstone Facilities

- Saltstone Production Facility received and treated 3,143 kgals of decontaminated salt solution from Tank 50 in FY21
  - Smashed previous production records for SPF
  - 5,079 kgals of saltstone was emplaced in SDU 6
- SRR has hired, trained and qualified personnel needed for three-shift operations that will commence in 2022
- Modifications to the Saltstone Hopper Overflow Container (SHOC) tank will decrease impact of process upsets

- SPF transitioned to a two-component saltstone formulation
  - 60 wt% Blast Furnace Slag + 40 wt% Fly Ash; elimination of cement
- Followed a decade of research, testing and modeling
- Doubles dry materials storage
Saltstone Disposal Units

- SDU 6 is currently receiving saltstone grout from the SPF
- SDU 7, the second of the mega-unit design, completed construction activities, readiness reviews and received Authority to Operate
  - SDU 7 project was completed 8 months ahead of the original schedule and $32M under the approved Total Project Costs
- SDU 8 has completed tank construction and is undergoing prestressing
- SDU 9 has completed emplacement of floor sections and multiple wall panels
- SDUs 10-12 awaiting FY22 funding
2021 Was A Year of Progress

Record Setting Production Performance

- ~4,000 kgals of salt feed prepared/qualified in the Tank Farms
- ~2,300 kgals of salt fed to SWPF
- ~3,140 kgals of decontaminated salt solution treated at SPF
- ~5,079 kgals of saltstone emplaced in the SDUs

Notable Achievements

- Met all SWPF feed requests and receipt of SWPF products
- Reduced Salt Batch qualification to < 7 weeks
- Actively preparing 16 tanks for waste removal
- Implemented new antifoaming agent in DWPF
- Completed regulatory requirements and began closure of FDB-5/6
- Completed construction and placed SDU 7 into Operations mode ahead of schedule and under budget