



*We do the right thing.*

# Savannah River Site HLW Update NSNFP / HLW Strategy Meeting - Idaho Falls, ID



March 24 - 25, 2010

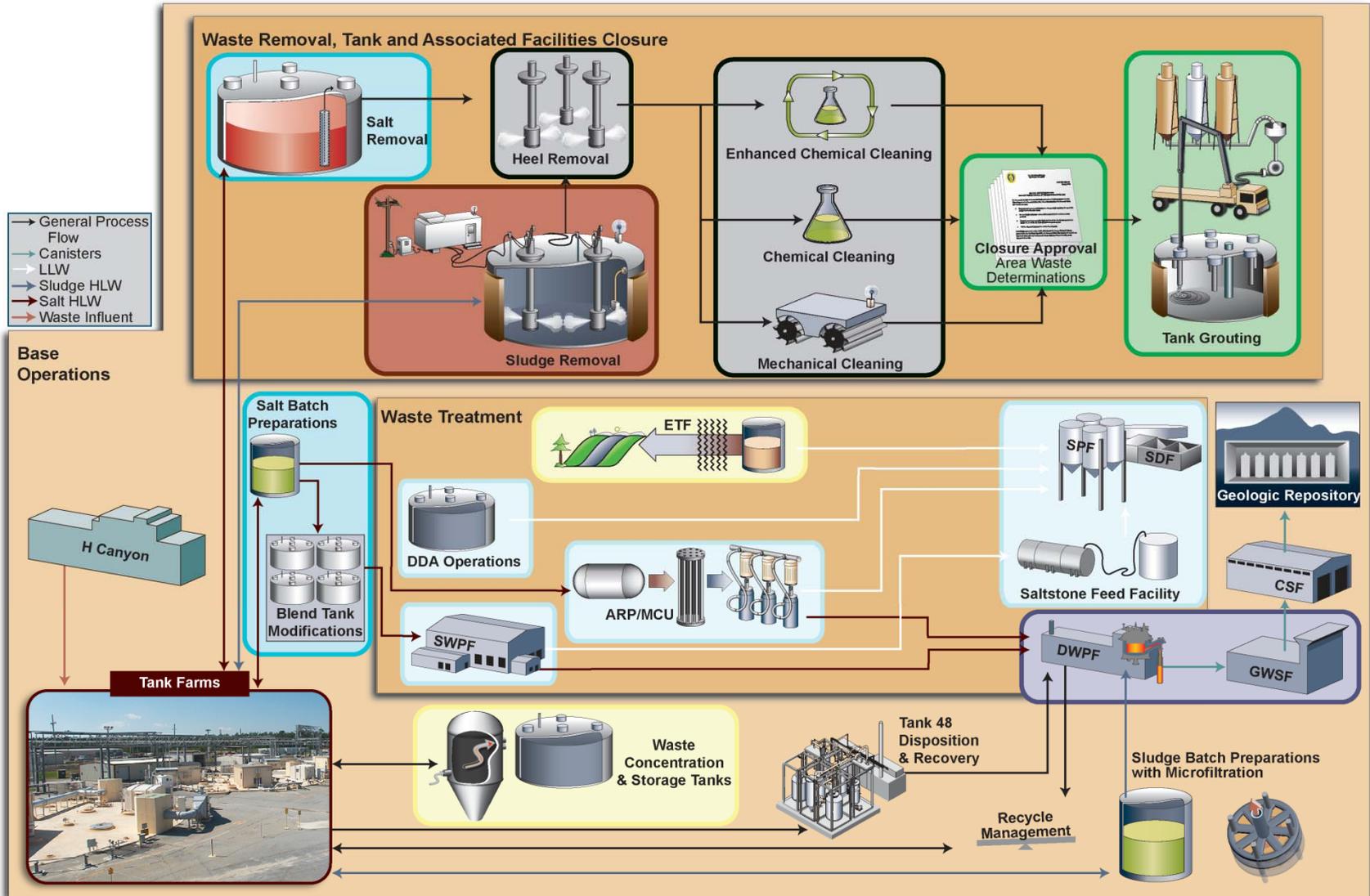
John E. Owen

Savannah River Remediation LLC

SRR-WSE-2010-00057

- Savannah River Remediation LLC assumed the SRS Liquid Waste Contract from WSRC on July 1, 2009.
- SRR Partners
  - URS
  - Bechtel
  - CH2MHill
  - B&W Technical Services Group
- SRR Subcontractors
  - Areva - Integrated Subcontractor
  - Energy Solutions - Critical Subcontractor
  - URS Safety Management Solutions (formerly WSMS)- Critical Subcontractor
- 6 year contract period - July 2009 to July 2015 with possible 2 year extension

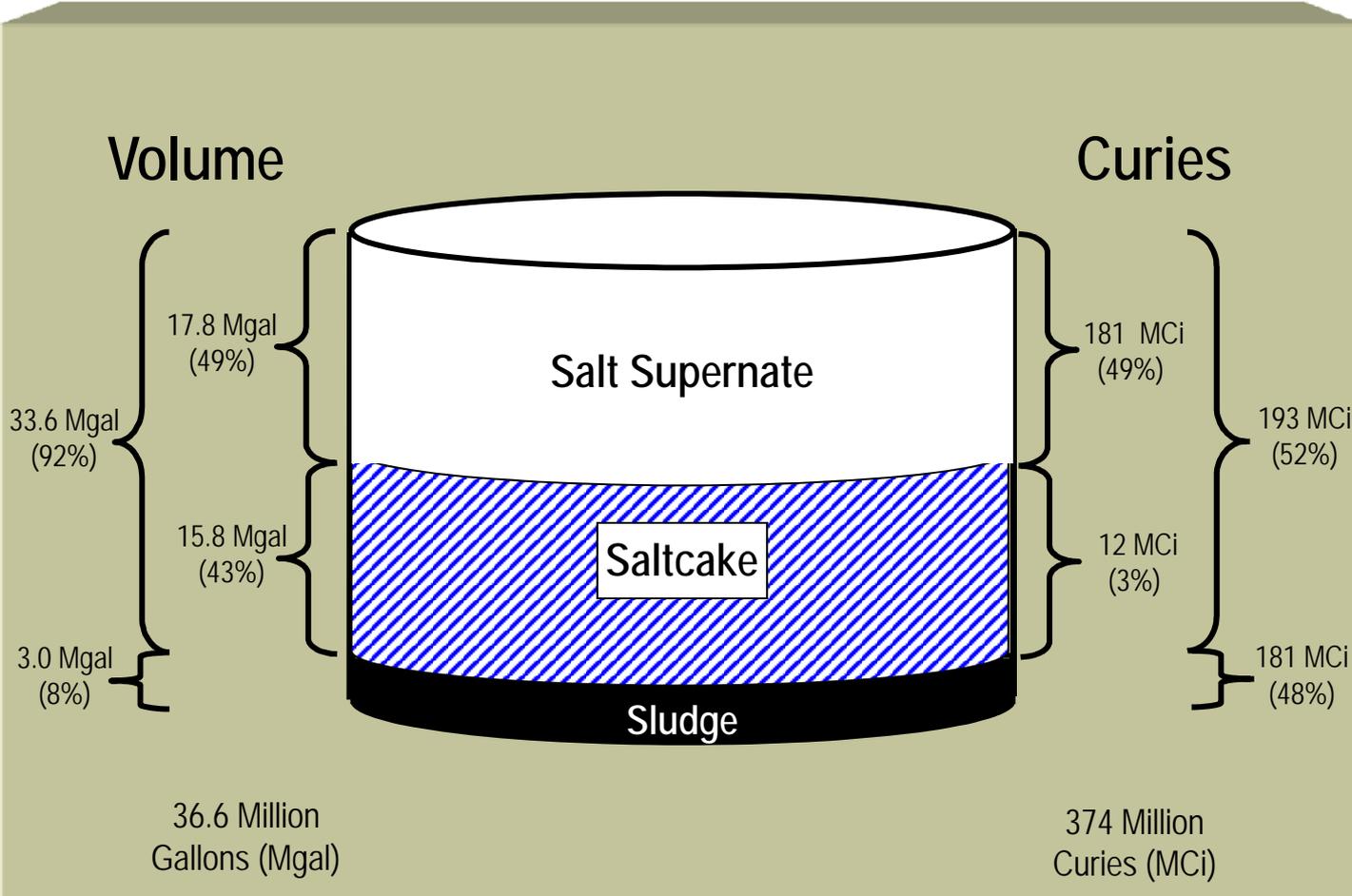
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- Close Remaining 22 Non-Compliant Tanks in 8 Years
  - Deploy Enhanced Chemical Cleaning
  - Reduce time required for closure documentation
- Double ARP/ MCU throughput to 40,000 gal/wk
- Increase DWPF canister production to
  - 325 canisters/yr in August 2010
  - 400 canisters/yr in January 2012

- Federal Facility Agreement (FFA) - Remove from service and close all non-compliant tanks (1-24) no later than 2022.
- Site Treatment Plan - "Upon the beginning of full operations, DWPF will maintain canister production sufficient to meet the commitment for the removal of backlogged and currently generated waste inventory by 2028."

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Inventory values as of 2009-12-31

Salt Supernate



Saltcake



Sludge



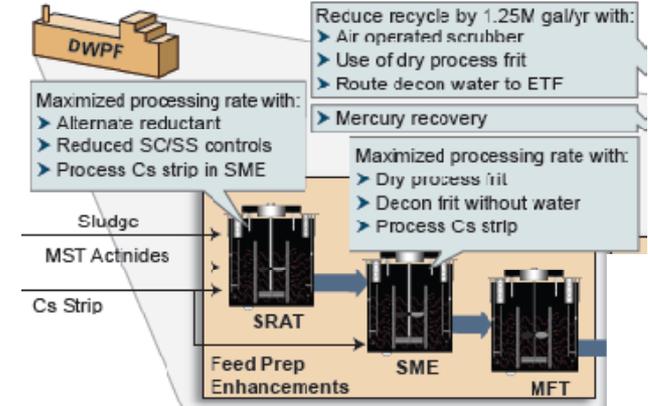
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## Melter Bubblers

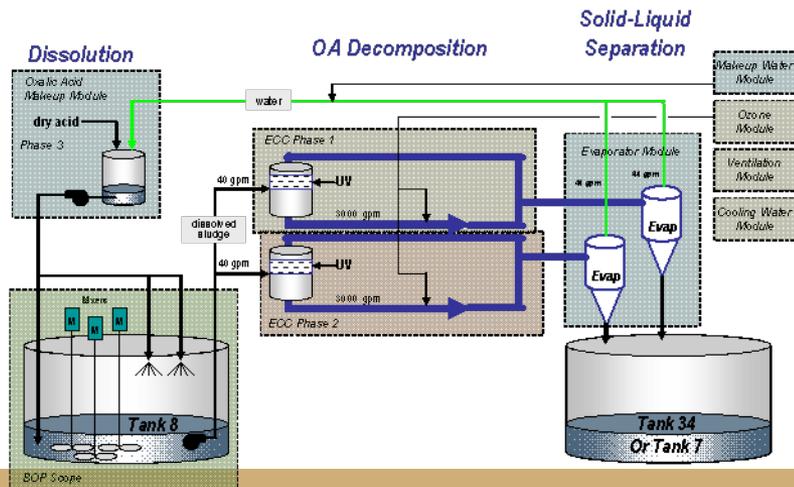


Thanks to Vitreous State  
Laboratory

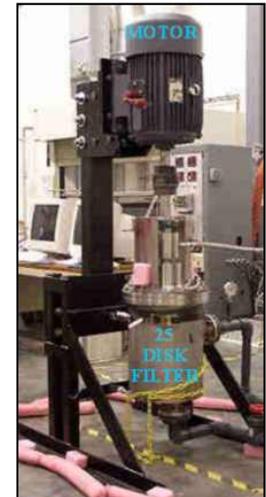
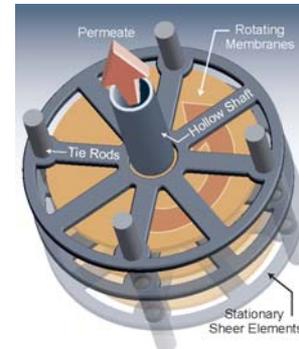
## DWPF Process Enhancements



## Enhanced Chemical Cleaning



## Rotary Microfiltration



- 2888 Canisters Produced (thru March 16)
- 3.0M Gallons Sludge
- Processing Sludge Batch 5 thru July 2010
- Sludge Batch 6 Ready Date - July 15 2010
- Melter 2 - 7 years operation to date
- Bubblers - August 2010

## Melter Comparison

	Melter # 1	Melter # 2
Years of Operation	8.5 yrs of operation: (May 1994 to November 2002) 6.5 yrs of radioactive operation	7.0 yrs operation to date: (March 2003 through March 2010) (108% of Melter 1 radioactive operation)
Total Canisters Produced	1339 radioactive canisters 80 non-radioactive canisters	1549 radioactive canisters (116% of Melter 1)
Total Amount of Radioactive Glass Produced	5.2M lbs	6.03 M lbs (116% of Melter 1)

- Melter 2 Replacement Outage - September 2011
- Melter-3
  - Assembled
  - Upon decision to replace Melter-2:
    - Replace “shelf life” items
    - Detailed inspection
    - Load with startup glass
  - Operational Life Expectancy - 6 Years
- Melter-4
  - K-3 refractory / Pour Spout Bellows - Received.
  - Drain Valve - June 2010 ship date
  - Components - July 2010 ship date
  - Vessel & frame - fabrication in progress - August 2011 ship date
  - Assembly Complete - November 2013

- August 28 2008 - DOE-SR directs WSRC to maintain the fissile isotope concentration at or below the preclosure limit defined in the License Application of 897 g/m<sup>3</sup>.
- September 4 2008 - WSRC commits to maintain fissile concentration at or below 897 g/m<sup>3</sup>. Sludge Batch 5 waste loading constrained to 33 wt %.
- February 4 2010 - DOE-SR directs SRR to rescind the 897 g/m<sup>3</sup> limitation on HLW canister fissile concentration.
- Impact - About 12 additional canisters
- Currently evaluating increased Pu loading in glass

- GWSB #1
  - 2244 canisters (2252 maximum)
- GWSB #2
  - 630 canisters (2340 maximum)
- GWSB #3 (available July 2015)
  - Design to be modified to accommodate remaining canister production at SRS
  - Total Canister production - about 7200 canisters

- GWSB Design Life - 50 years
- GWSB Operational Life - 100 years with continuing maintenance - roof and exterior.
- Structural Integrity Program

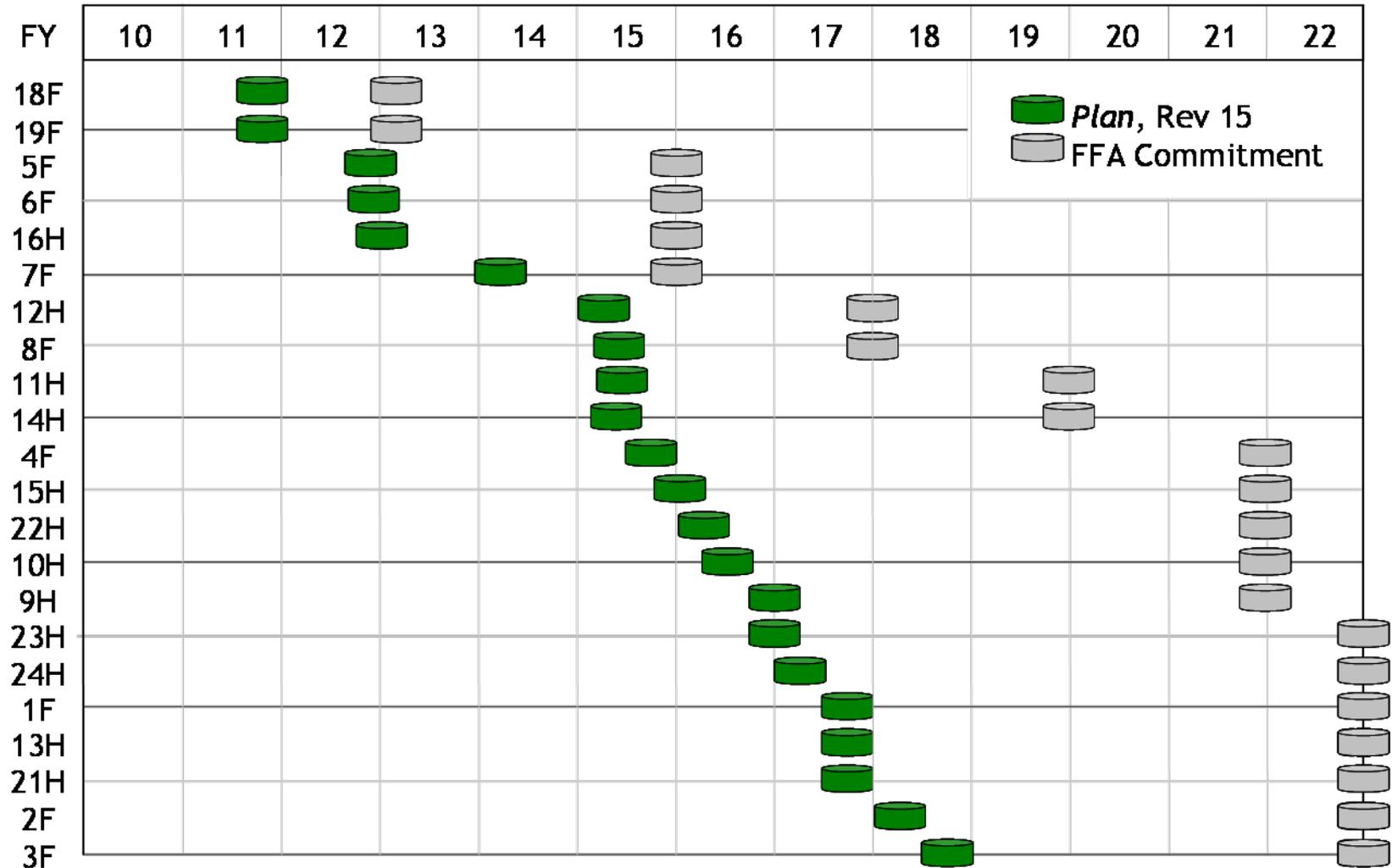
## DWPF Operating Permit - SC DHEC

- “The permittee shall notify the Department within six (6) months of the Temporary Glass Waste Storage Facility reaching the point where two (2) years of canister storage remains. The notification shall include an update of any changes in when the canisters will be transferred to the Permanent Federal Repository.
- The permittee shall also include a report on conditions in the Temporary Glass Waste Storage Facility including any maintenance and/or operations problems which may have occurred during facility loading.
- Any additional glass waste storage must receive prior approval from this Department.”

- SC DHEC has been briefed on System Plan Rev. 15 which includes construction of GWSB #3.
- No legal appeal has been filed to date with respect to continuing canister storage at SRS.

Key Milestone	Revision 14	Revision 15
Date when all Type I, II, and IV tanks are closed	FY22	FY18
Sludge processing complete	Sept 2030	May 2023
Salt Processing Complete	Sept 2030	Dec 2030
Total number of canisters produced	~6,300	~7,200
–Salt only canisters produced	0	250
Initiate ARP/MCU Processing	Mar 2008	Apr 2008 (actual)
Initiate SWPF Processing	Sept 2012	May 2013
–Salt Solution Processed via DDA only	2.6 Mgal	2.8 Mgal
–Salt Solution Processed via ARP/MCU	4.3 Mgal	5.2 Mgal
–Salt Solution Processed via SWPF	90.3 Mgal	89 Mgal
<b>Total Salt Solution Processed</b>	<b>97.2 Mgal</b>	<b>97 Mgal</b>
GWSB #3 Available	Sept 2019	July 2015

## Tank Closure Milestones



- Tank 48 waste treatment is complete and the tank is available for unrestricted service by December 2014
- Tank 50 is available for unrestricted service with higher levels of radioactivity by October 2011.

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**March 2010 Walls to Elevation 116' Complete**



**August 2009 Base Mat Complete**



**December 2009 Progress on Walls**



- |                |  |
|----------------|--|
| September 2007 | Deputy Secretary approved project baseline and limited construction  |
| August 2008    | Started basemat rebar installation   |
| December 2008  | Deputy Secretary approved full construction  |
| January 2009   | First basemat concrete placed  |
| August 2009    | Basemat 100% complete. <ul style="list-style-type: none"><li>-10,200 cubic yards of concrete</li><li>-1,200 concrete trucks</li><li>- Equal to a football field 6 feet deep</li><li>-1,500 tons of reinforcing steel rod.</li><li>-End to end, steel stretches 150 miles</li></ul> |
| February 2010  | Wall to Elevation 116' Complete  |

- The Salt Waste Processing Facility (SWPF) becomes operational May 2013 with SCDHEC approval
- SWPF tie-ins will require a four-month outage of DWPF operations beginning February 2013
- The SWPF processing rates are:
  - 3.75 million gallons (Mgal) of salt solution processed in the initial twelve months of operation
  - 6.0 Mgal/yr (nominal rate) of salt solution processed per year beginning in the second year of operation

- Currently resolving processing issue of high residual solvent in the strip effluent stream to DWPF.
- 872K gallons salt solution processed to date
- ARP/MCU Salt Batch #3 forecast ready date - April 2010.
- ARP / MCU - Remain operational until 6 months before SWPF startup to allow for SWPF tie-ins

- Since Saltstone Startup
  - Treated 5.78 Mgal of salt solution
- Since 1Q07:
  - Treated 3.48 Mgal of salt solution
  - Poured 29,000 cubic yards of grout
  - Immobilized 482 kCi of radionuclides (primarily Cs-137/Ba-137m)
- Typical Daily Processing Volumes (previous three months operation)
  - Receive 30,000 gals salt solution from Tank 50
  - Transfer 42,200 gals grout to Vault
  - Return 1,650 gals drain water to Salt Feed Tank
- Currently in 10 Week Outage to Replace Dry Feeds Control System

- Original vault design
- New Vault 2 design is internally sealed and designed to handle full height static head.

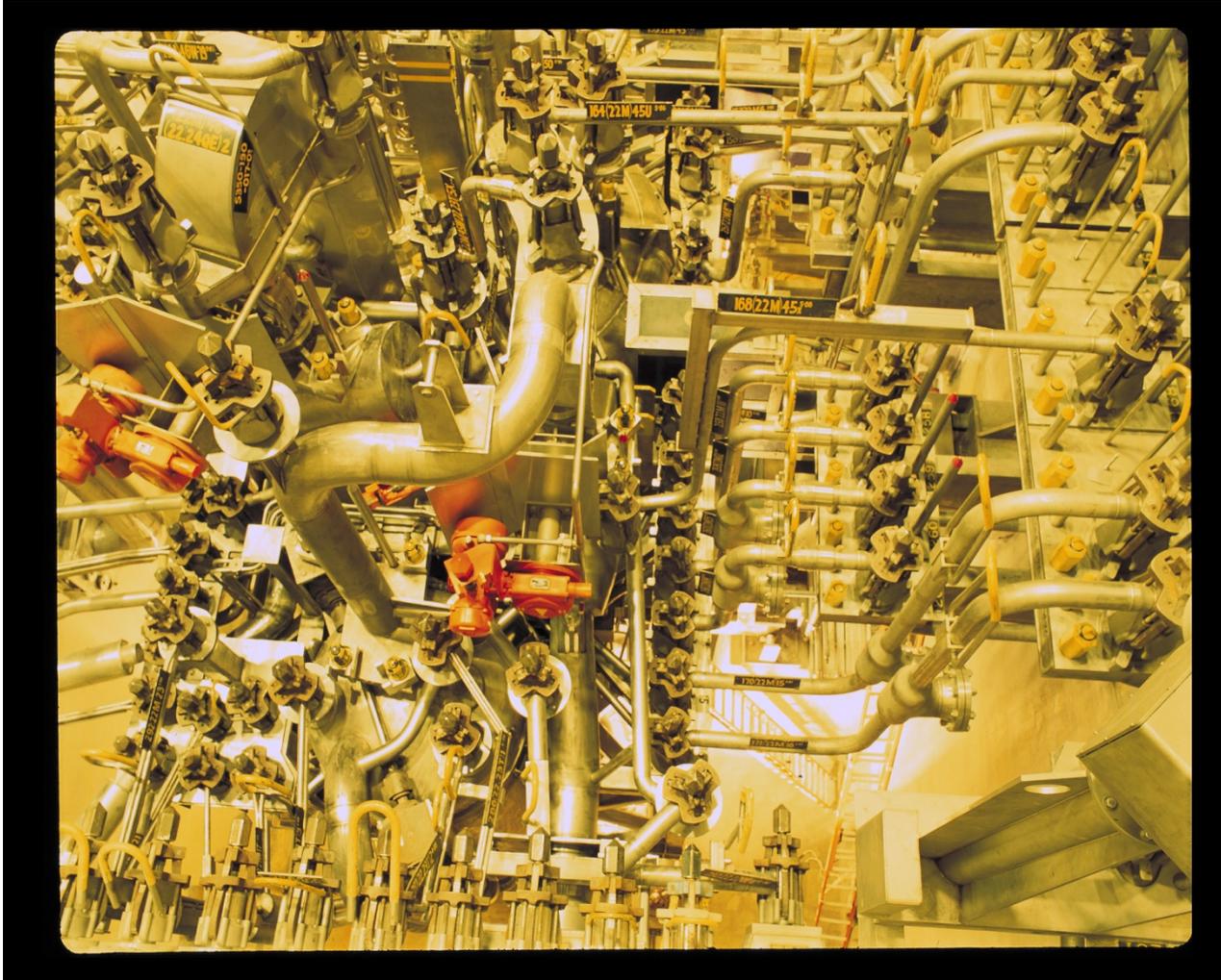


- Future Activities
  - New feed facility to replace Tk 50 / Salt Feed Tank System
  - Integration with SWPF
    - Higher throughput
    - Close-coupled facilities
  - Construction and tie-in of new vaults
    - Required every 6 to 12 months at SWPF production rates

# Backup Slides

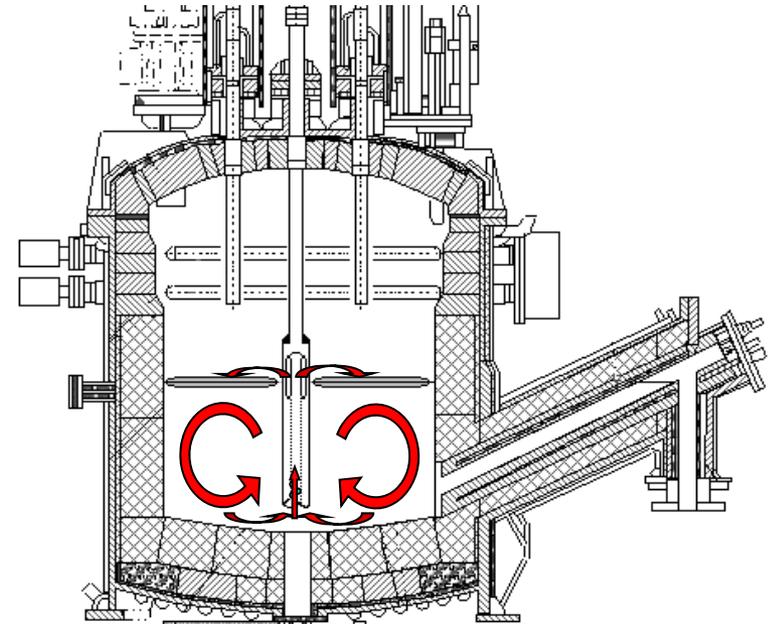
## DWPF Melter Performance

- Design Capability
  - 228 lb/hr (8 lb/hr-sq ft)
  - 410 canisters / yr
  - Based on pilot melter work with waste simulants
- Field Capability
  - Performance with actual sludge less than design
  - Function of batch composition
- Process Enhancements to Compensate
  - Frit composition tailored to waste macrobatch (MB)
  - Melter engineering enhancements

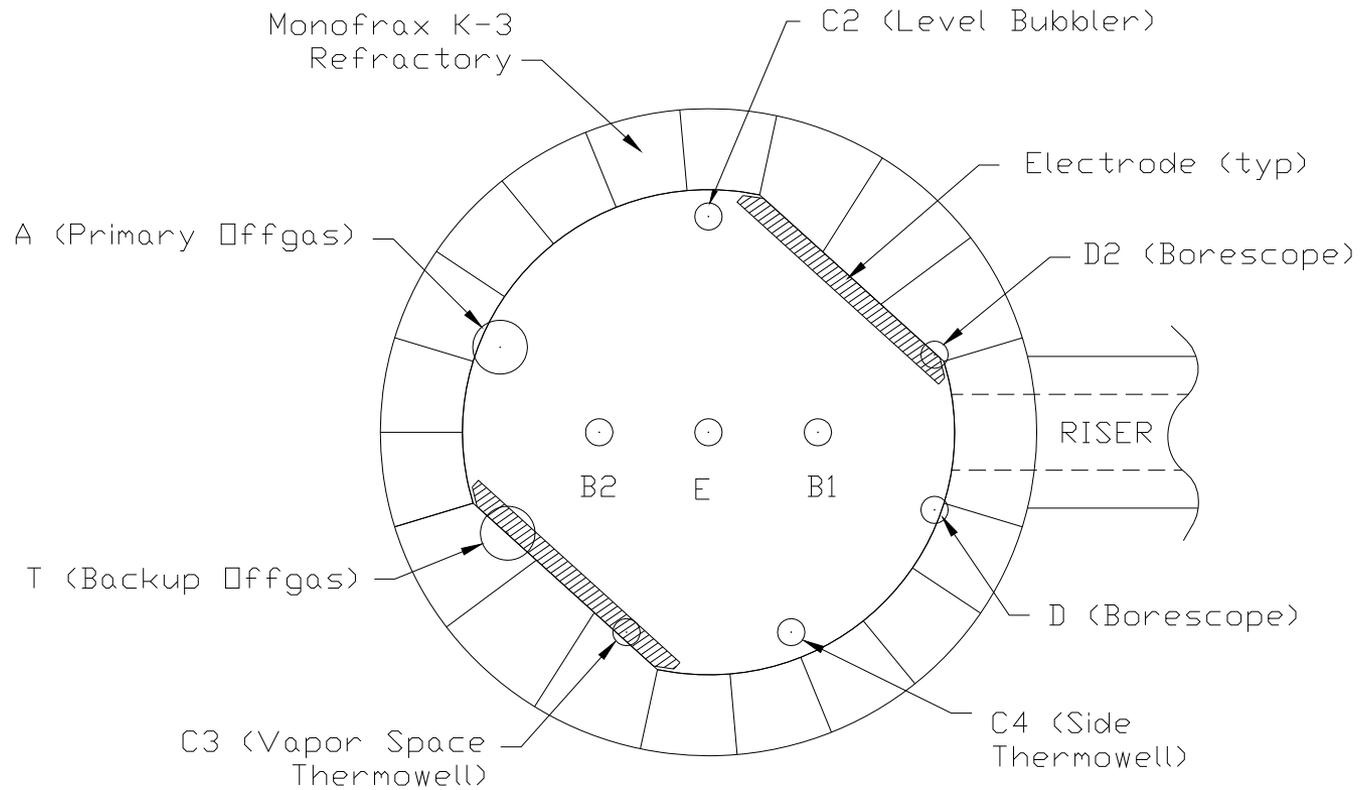


## Glass Pump Concept

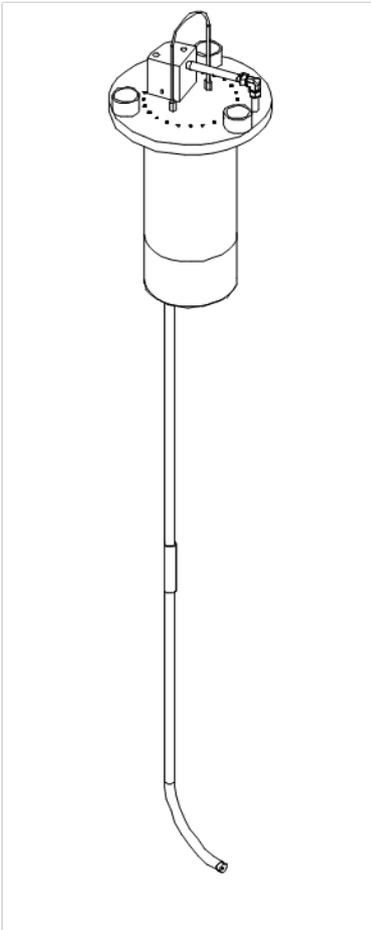
- Increase melt rate
- Utilize glass lift pump technology to increase convection in glass pool
- Similar technology used by West Valley for air-lift glass pouring
- Increase in convection results in increased melt rate and production improvement.
- Clemson University testing confirmed design concepts.



# DWPF Melter Bubblers

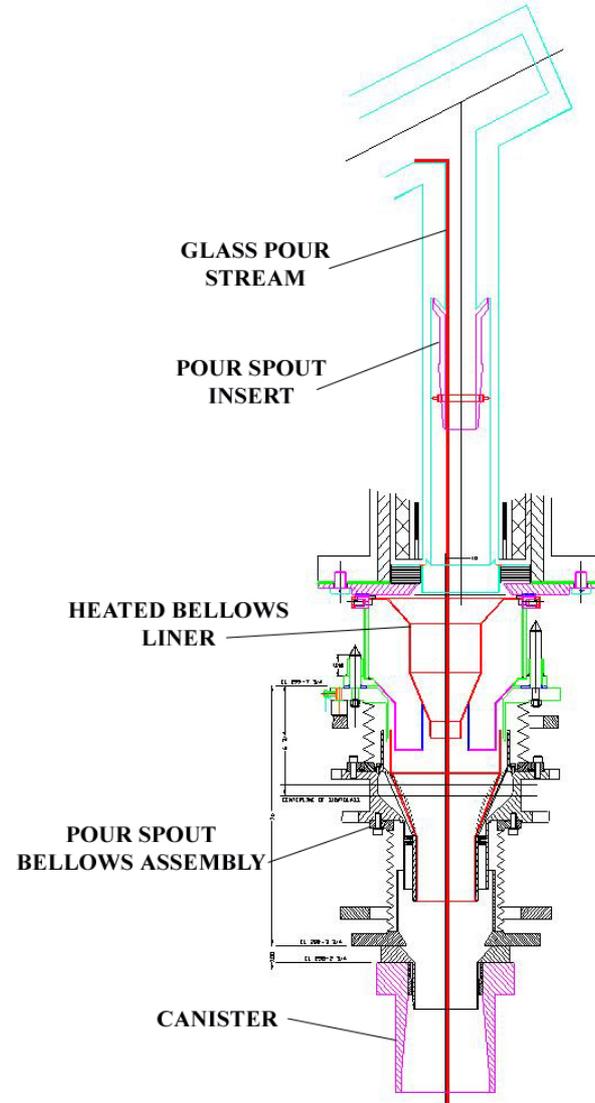
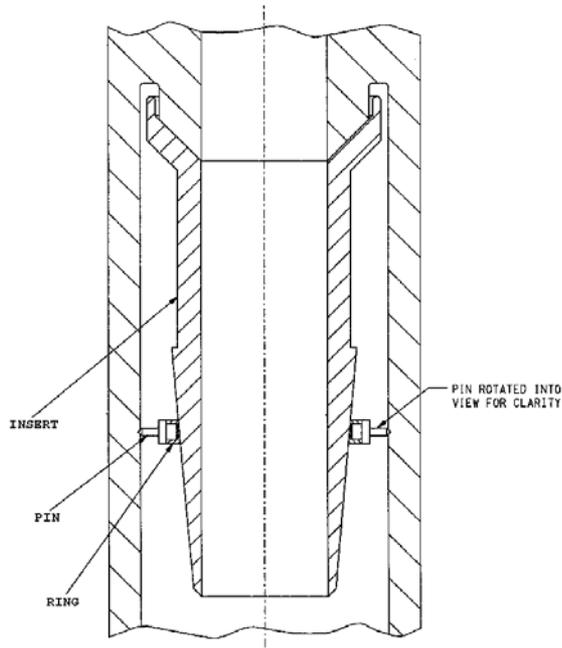


## DWPF Melter Bubblers



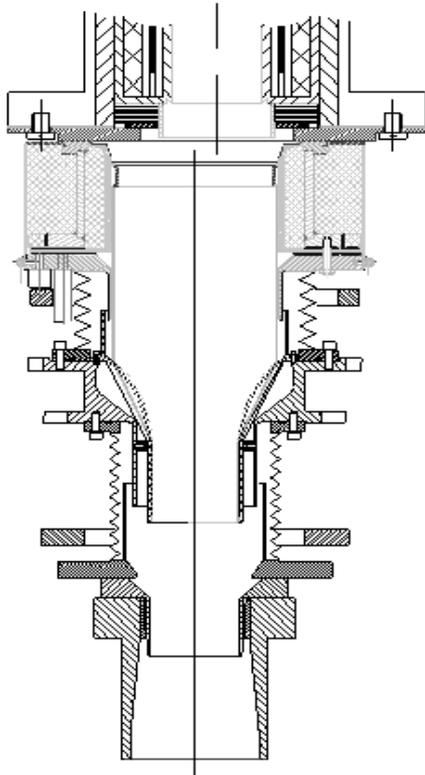
- Concept
  - Install single feed tube in nozzle E
  - Install bubblers in Nozzles B1 & B2
  - Install 3 function device in nozzle C2
    - Bubbler
    - Level probe
    - Melter plenum pressure sensing
  - Install 2 function device in nozzle C4
    - Bubbler
    - Thermowell

## Melter Insert

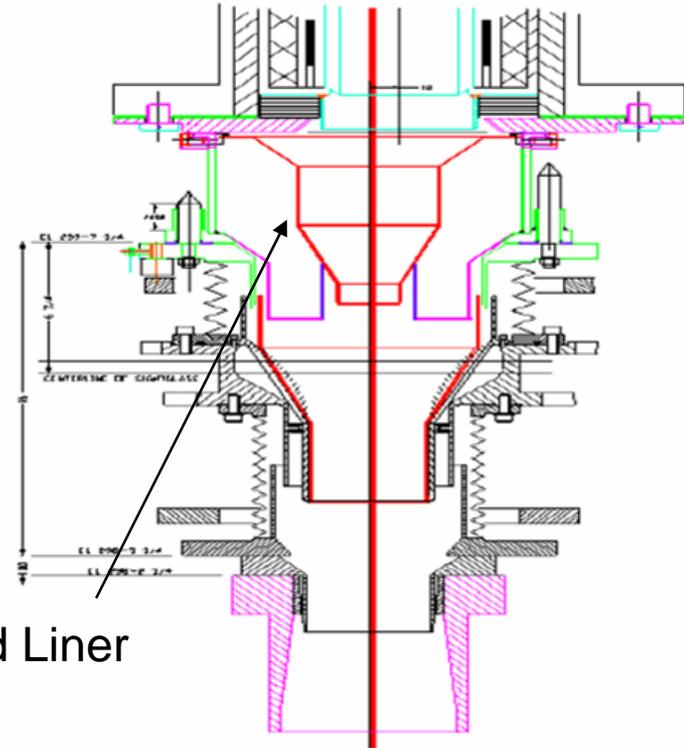


## Melter Bellows Heated Liner

Melter Bellows Before



Melter Bellows After



Heated Liner