



Savannah River
Remediation

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COMPLETION OF TANK 11H BULK WASTE REMOVAL EFFORTS

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Ginger Dickert

Manager, Closure & Waste Disposal Authority

Neil Davis

Deputy Program Manager, Waste Removal and Tank Closure

SRR-WRC-2011-0003

Meeting Purpose

- Inform SCDHEC and EPA of completion of Bulk Waste Removal Efforts (BWRE) for Tank 11
- Preliminary notification of FFA Appendix L commitment for completion of BWRE for 1 old-style tank by 9/30/11
- Request approval for continued use of Tank 11 for storing Aluminum rich supernate in accordance with FFA Appendix L BWRE definition

- Regulatory drivers
- How BWRE were achieved
- Status of and plans for Tank 11

Per the FFA:

- Completing efforts to remove the bulk of waste (waste includes salt cake, sludge solids, and contaminated liquids) from a tank leaving only a residual heel;
- Sufficient liquid may be added subsequent to this point to facilitate heel cleaning and removal; and
- Any further addition of contaminated liquids after completion of BWRE may occur with concurrence by SCDHEC and EPA

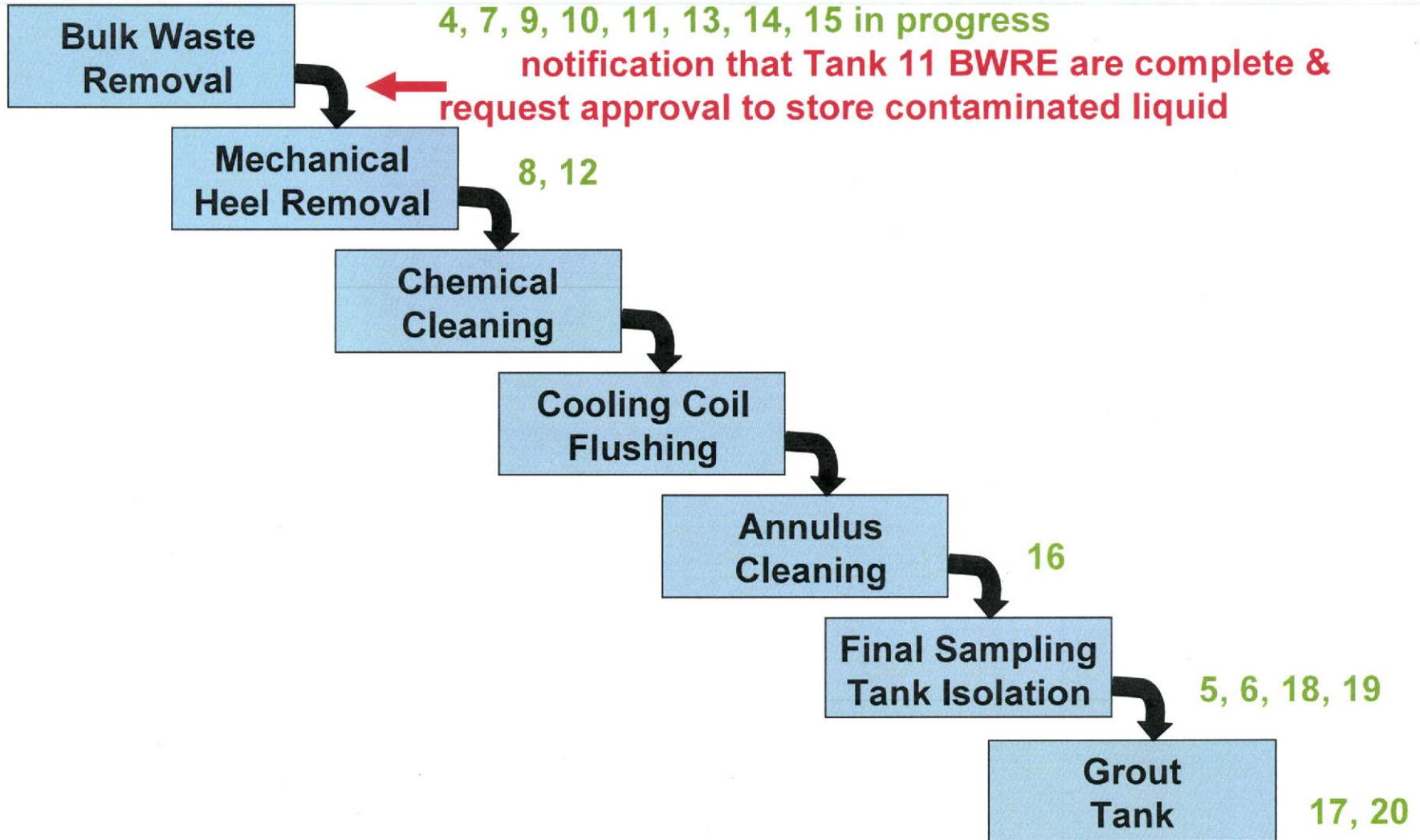
- BWRE milestones are an interim step designed to show progress of cleanup activities toward ultimate closure
- The FFA states in part:
 - DOE will determine when BWRE are complete
 - DOE will inform SCDHEC/EPA throughout the process
 - DOE will receive input upon completion of BWRE

- BWRE reduce the risk of storing waste in old-style tanks on an interim basis
- BWRE reduce the risk of storing waste in any tank by transferring that waste to the appropriate treatment (sludge or salt processing)
- Use of “old-style” tank space after completion of BWRE facilitates waste removal and tank closure activities

- BWRE are accomplished via campaigns
- Each campaign is tank dependent
- At the end of campaigns, DOE will document completion of BWRE
- SCDHEC/EPA informed of campaign efforts

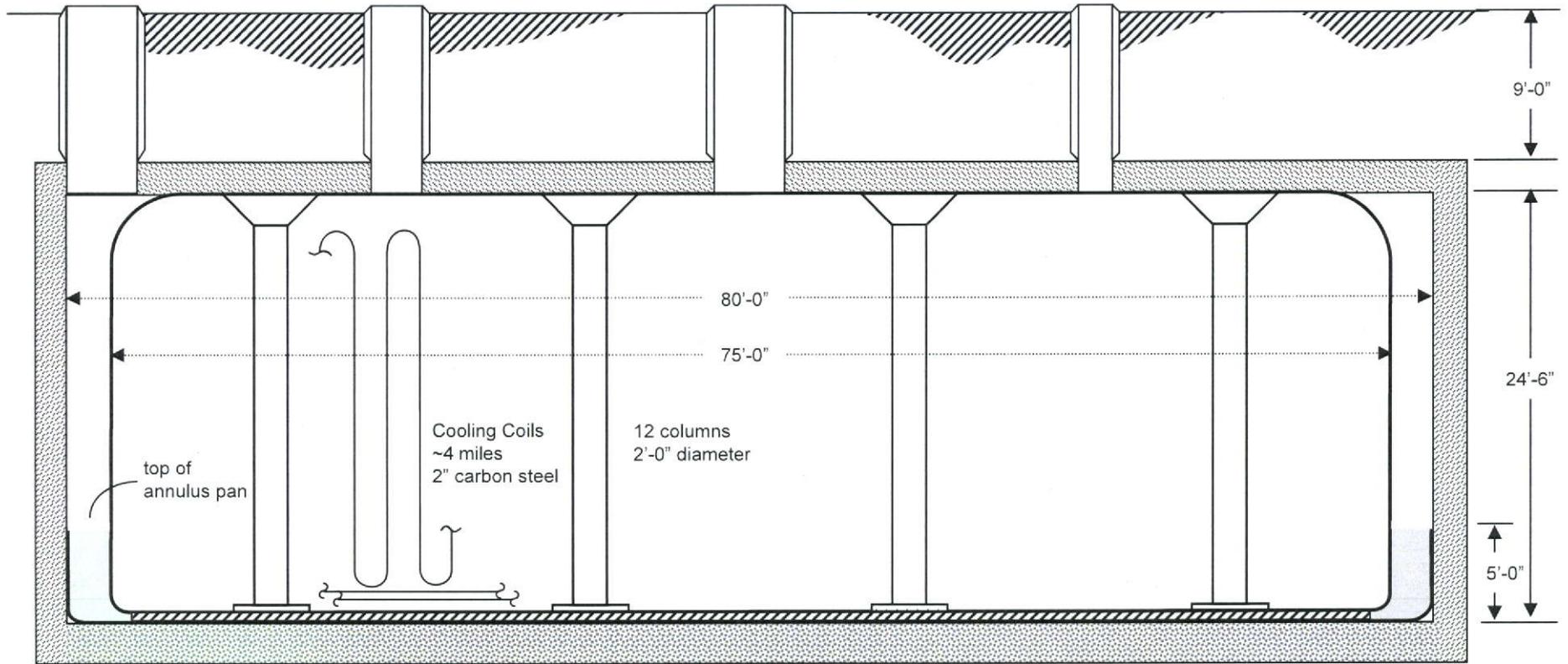
Closure Sequence

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4 Annulus Risers

9 Primary Tank Risers



TYPE I
750,000 gallons

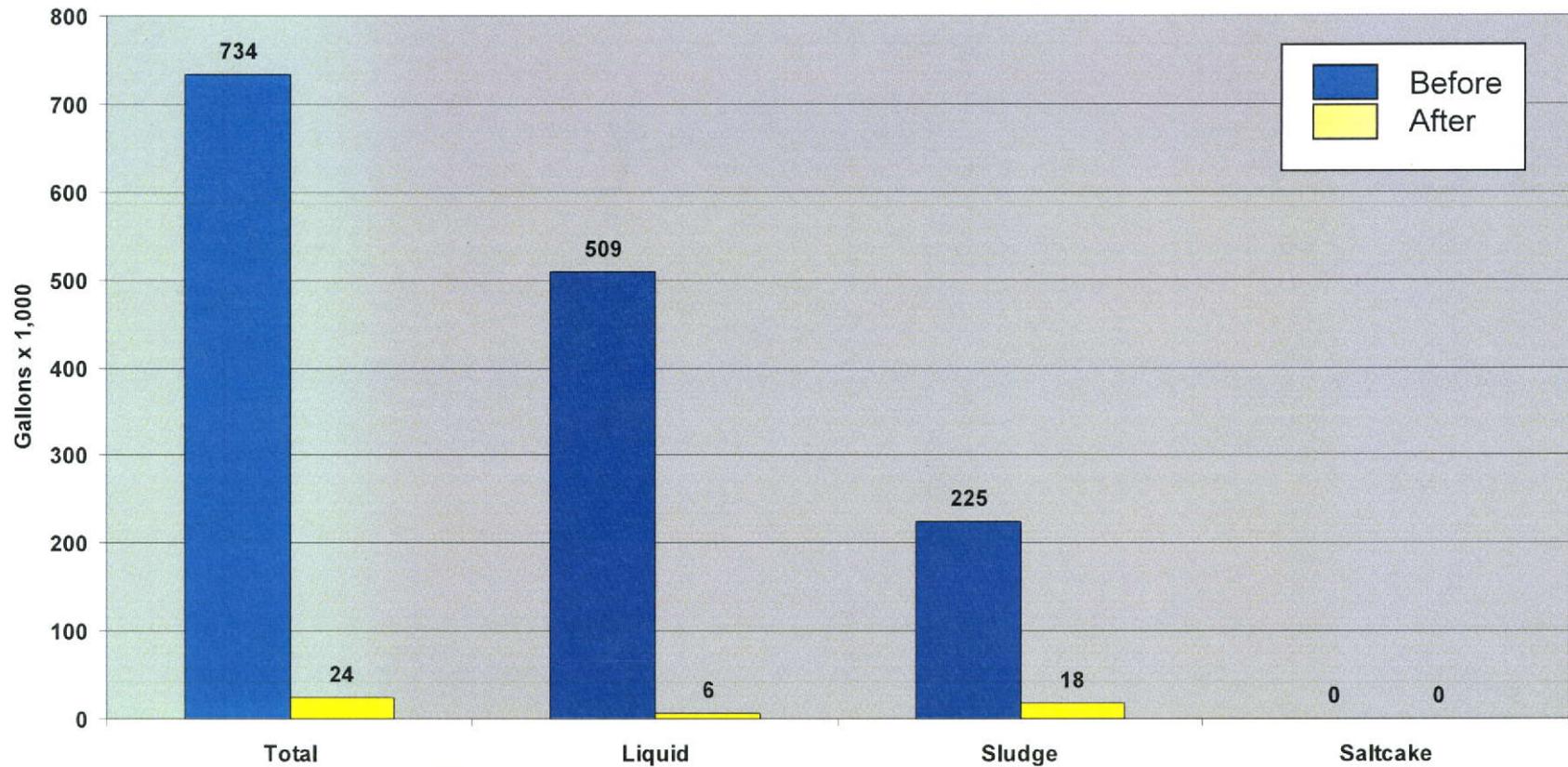
- Commissioned in 1955 [1]
- Received H-Canyon waste starting July 1955 [1]
- Maximum waste level
 - 271” vs. fill limit of 271” or 734,000 gallons [1]
- Frequent supernate decants and fresh waste refills
- Performed high pressure sluicing in Oct 1969 [1]
 - Transferred 65” (176,000 gal) of sludge to Tank 13
- Continued receiving H-Canyon waste through Jan 1982 [3]
- Removed from active service 1989 [2]
- Returned to active service 2004 for resumption of BWRE [4]

- Total of 2 known leak sites [2]
 - 1 @ 235" above tank floor discovered in 1974
 - 1 @ 189" above tank floor discovered in 1982
 - Trace amounts on outside of tank primary wall and on annulus floor [8]
 - Both leak sites are currently dry and stable
- 25% of the tank wall has been inspected [2]
 - Ability to inspect all areas limited by access
 - No indication of other leak sites
- Latest tank wall inspection completed in April 2010
- Liquid level maintained below lowest known leak site

- BWRE started in Oct 1969
 - Supernate level 205" (557,000 gal), sludge level 83" (225,000 gal)
 - Goal to remove sludge and convert the tank to salt receipt service
 - Supernate and sludge removal via high pressure sluicing
 - Sludge volume reduced from 225 kgal to 49 kgal using 854 kgal water
 - Presence of mounds prevented conversion of the tank to salt service
 - BWRE put on hold
- Operations service between 1970-1981
 - Continued adding H-Canyon waste
- Began preparations for resumption of BWRE in 2000
 - Designed and installed 4 new 1,200 gpm Lawrence mixer pumps and 1 new transfer pump
 - Cost was \$17,000,000 [9] and duration was 4 years

- BWRE performed Feb 2004 through May 2005 [4]
 - Consisted of 5 more sludge removal campaigns
 - 4,400 hours of slurring with Lawrence mixer pumps [4]
 - Sludge volume reduced from 138,000 gal to 18,000 gal using 775,000 gal of water [4]
 - H-Area sludge more difficult to remove than F-Area sludge
- Mixer pumps moved to Tank 12 and used to complete BWRE on Tank 12

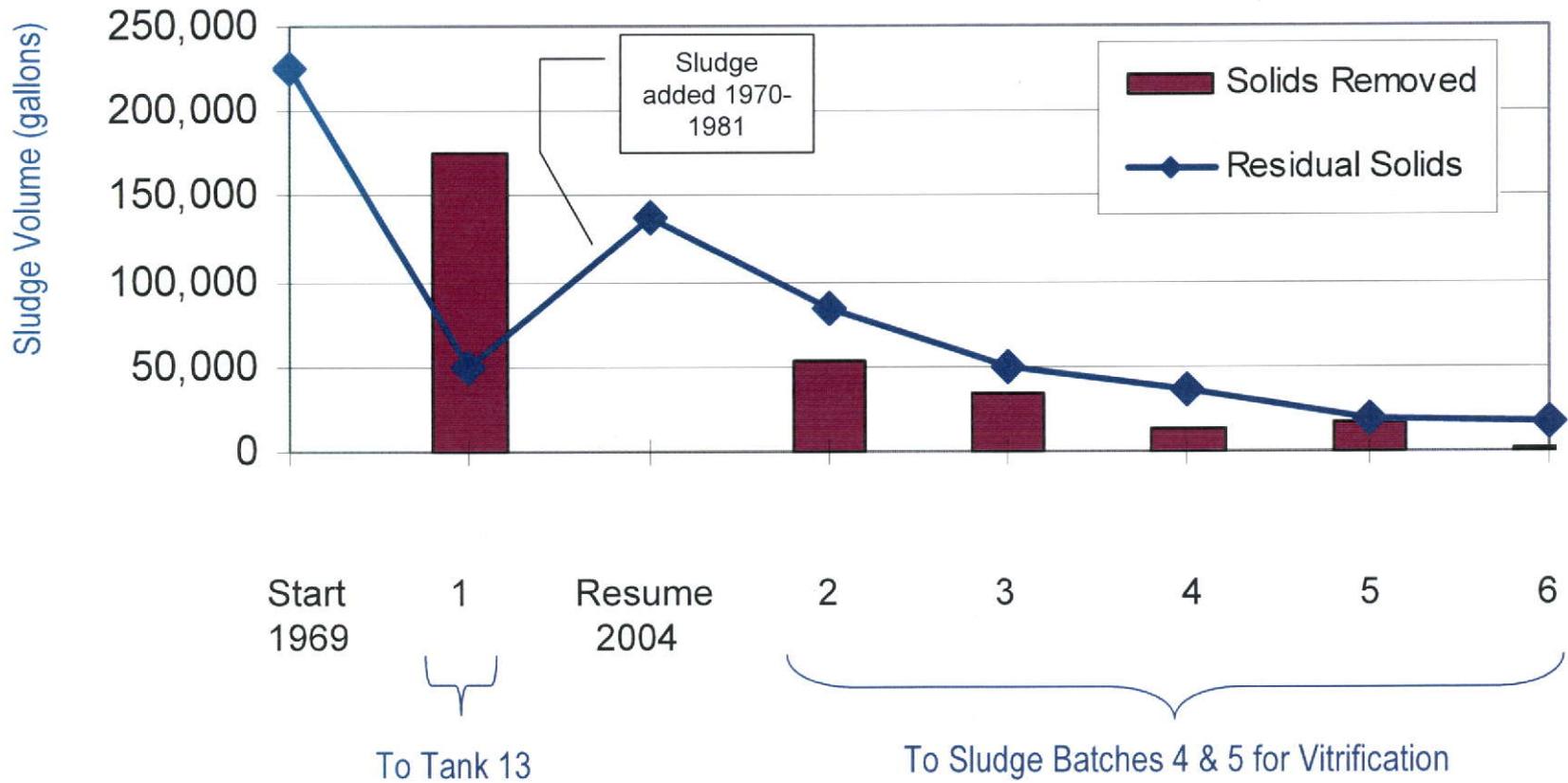
Waste Volumes before and after BWRE [1, 4]



Note – aluminum rich supernate liquid was added post-BWRE

Sludge Removal Results

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Waste Removal Campaigns [1, 4]

- BWRE started in 1969 (1st campaign) with supernate and sludge removal via high pressure sluicing
- Received additional sludge waste 1970 -1981
- Followed by 5 additional BWRE campaigns in 2004-2005
- BWRE declared complete after:
 - 6 days of high pressure sluicing using 854 kgal of water
 - 4,400 hours of slurry pump operations using 775 kgal of water
- Bulk waste volume reduced by 97%
 - 734,000 gal to 24,000 gal (18,000 gal sludge, 6,000 gal supernate)

- Sludge Batch 5 consisted primarily of the waste removed from Tank 11
- Tank 11 waste had a very high aluminum concentration that was reduced via the Low Temperature Aluminum Dissolution process
 - Removing Aluminum:
 - Reduced sludge volume requiring vitrification (50-150 canisters) and improved DWPF production rates
 - Shortened life cycle and reduced risk
 - Storage of aluminum-rich supernate could not:
 - Impact Evaporator systems or Waste Removal/Treatment missions
 - Allow re-precipitation of Aluminum solids
 - Exceed corrosion chemistry limits and structural integrity inspection program requirements
- Approval from SCDHEC received Sept 2007 with specific follow-up actions [10]
- Aluminum-rich supernate added to Tank 11 in 2008 after completion of BWRE
 - Total volume 348,000 gal [5]: supernate 330,000 gal, sludge 18,000 gal [4]
 - Liquid level is well below known leak sites
 - Material and storage process similar to Tank 8

- Tank level maintained below lowest known leak site
 - 128” of waste in the tank
 - 189” lowest known leak site
- No new leak evidence observed
- Leak sites remain stable [2]
- Preparations for heel removal in progress

Al	Aluminum
BWRE	Bulk Waste Removal Efforts
DOE	Department of Energy
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
FY	Fiscal Year
gal	gallon
kg	kilogram
Kgal	thousand gallons
SCDHEC	South Carolina Department of Health and Environmental Control

1. History of Waste Tank 11 1955 Through 1974, DPSPU 78-11-12, September 1978
2. Annual Waste Tank Inspection Program, SRR-STI-2010-00283, June 2010
3. Waste Management Programs Report for December 1981, DPSP 81-21-12, January 1982
4. Tank 11 Batch-E Transfer Sludge Mapping, M-ESR-H-00256, May 2005
5. H Tank Farm Morning Report, January 18, 2011
6. Liquid Waste System Plan, Revision 16, SRR-LWP-2009-00001, January 2011
7. Contract DE-AC09-09SR22505 – Contract Performance Baseline Revision 1 (CPB Rev 1) Independent Baseline Review (IBR) Revisions, SRR-CAA-2010-00296, September 30, 2010
8. SRS High Level Waste Tank Leaksite Information (Rev. 5), C-ESR-G-00003, January 4, 2011
9. Baseline Change Proposal Form, S-W183/112R0, May 7, 2003
10. Approval for Use of Tank 11H, B. Mullinax to R. Campbell, September 4, 2007