



**Savannah River
Remediation**

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Savannah River Site F-Tank Farm NRC Onsite Observation Visit



August 27 & 28, 2013

SRR-CWDA-2013-00116, Revision 1

NRC F-Tank Farm Onsite Observation			
Tuesday, August 27, 2013			
Start	End	Topic	Location
8:00	9:00	Badging/Travel	Meet 703-46A
9:00	9:15	Opening Remarks & Inbrief	705-1C, Room 34 A-B
9:15	10:00	Tank 5 & 6 Grouting Overview	705-1C, Room 34 A-B
10:00	12:00	F-Tank Farm Field Observation (Tanks 5 & 6)	F-Tank Farm
12:00	1:00	Lunch	766-H
1:00	3:30	Technical Discussions	705-1C, Room 34 A-B
3:30	4:15	NRC Internal Review	705-1C, Room 34 A-B
4:15	4:45	NRC Outbrief	705-1C, Room 34 A-B
4:45	5:00	Travel/NRC Depart	703-46A

NRC F-Tank Farm Onsite Observation			
Wednesday, August 28, 2013			
Start	End	Topic	Location
8:00	8:30	Arrive/Travel	Meet 703-46A
8:30	10:30	Technical Discussions	705-1C, Room 34 A-B
10:30	11:15	NRC Internal Review	705-1C, Room 34 A-B
11:15	11:45	NRC Outbrief	705-1C, Room 34 A-B
11:45	12:00	Travel/NRC Depart	703-46A

8/27

- Grouting Operations
 - Schedule
 - Equipment Grouting
 - Cooling Coil Grouting
 - Annulus Grouting
 - Riser Grouting
 - Tank 5 & 6 Grouting Video
- F-Tank Farm Status
 - Status of Tank Closure Activities
- Action Item Status

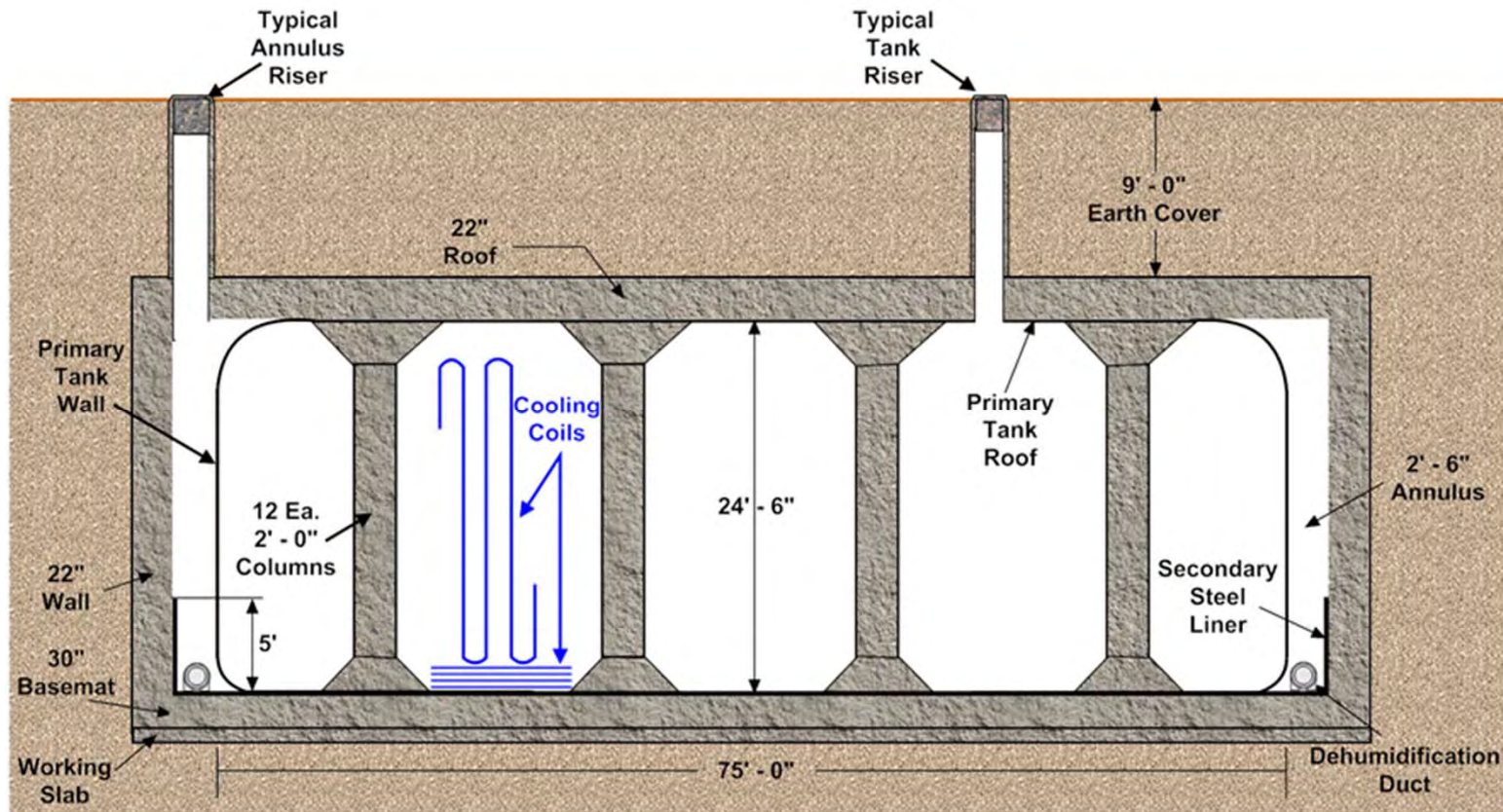
8/28

- Industrial Hygiene Monitoring Plan for FTF Tanks 18/19
- FTF Tanks 18/19 Final Configuration Report
- FTF Tank Release Documentation (e.g., Tank 8)
- FTF Inventory Follow-up

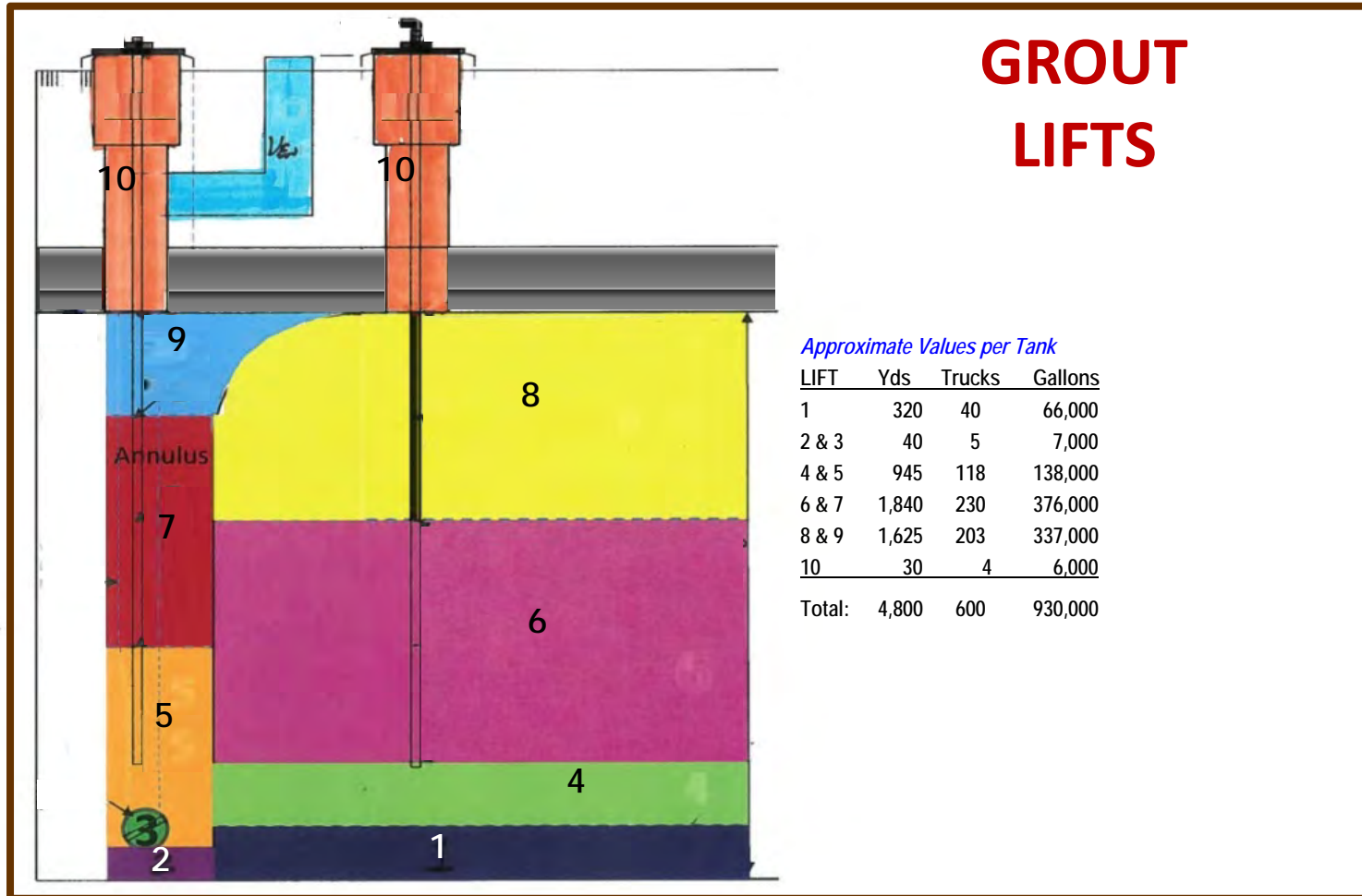
F-Tank Farm Field Observations

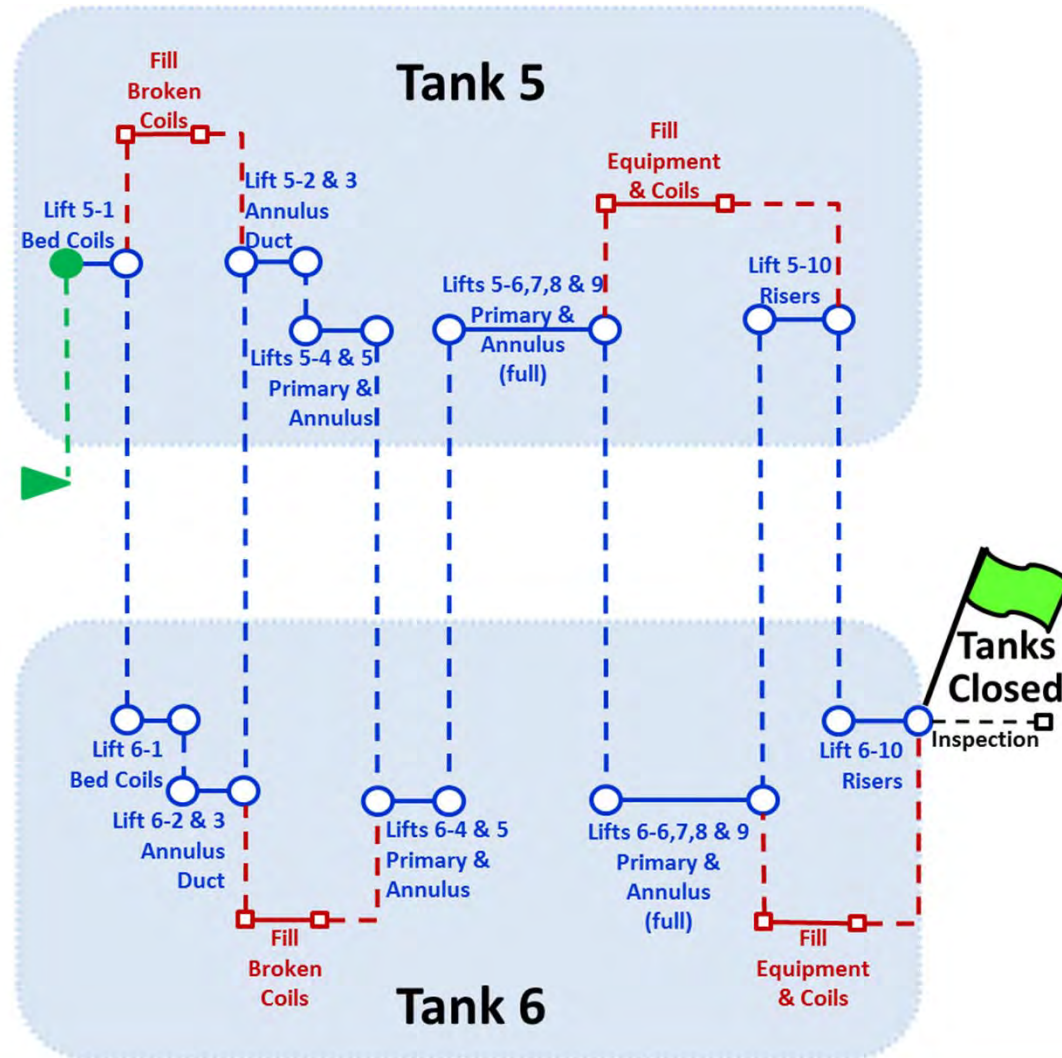
- Tank 5/6 Grouting Overview
- Status: Tanks 5/6
- Field Observation Briefing
- Field Observation (Tanks 5/6)
- Depart for Lunch

Typical Type I Tank

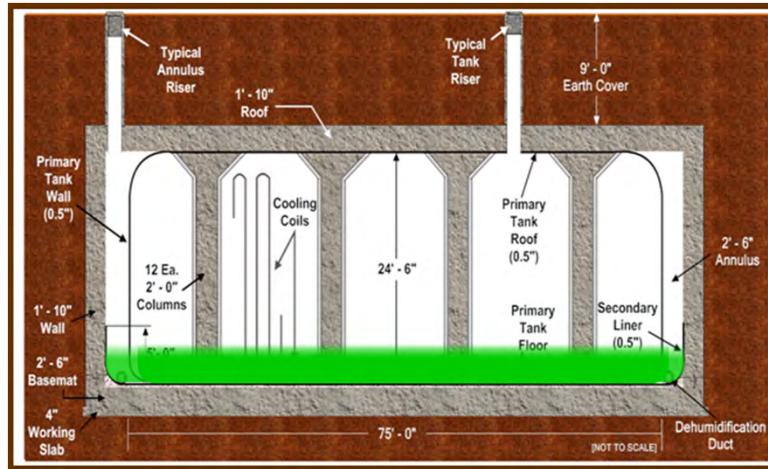


- Delivery option same as Tanks 18/19
 - Vendor trucks from off-site
- Bulk fill grout is the same formula as Tanks 18/19 with adjustment to enhance flow
 - High Range Water Reducer admixture adjusted
 - Tank 5/6 slump flow working range 26-30 inches
 - Tank 18/19 slump flow working range 24-28 inches
- In-tank equipment filled with same formula as Tanks 18/19 equipment fill grout
- Multiple fill locations available for each tank
- Cooling coils filled with grout specifically developed for coil fill





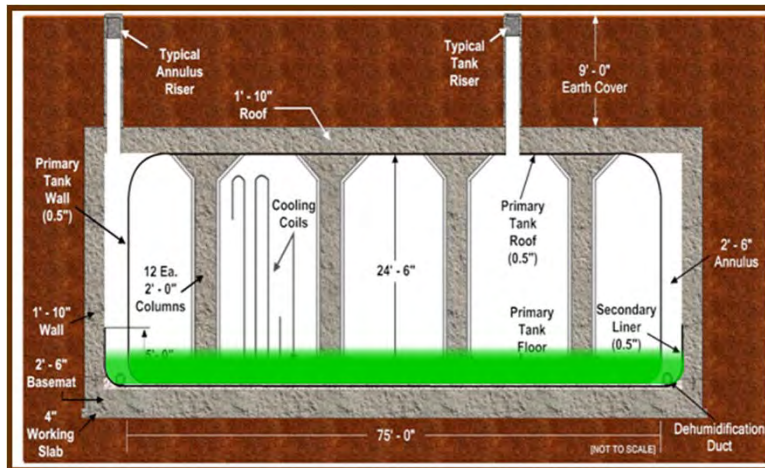
Tank 5



Tank 5

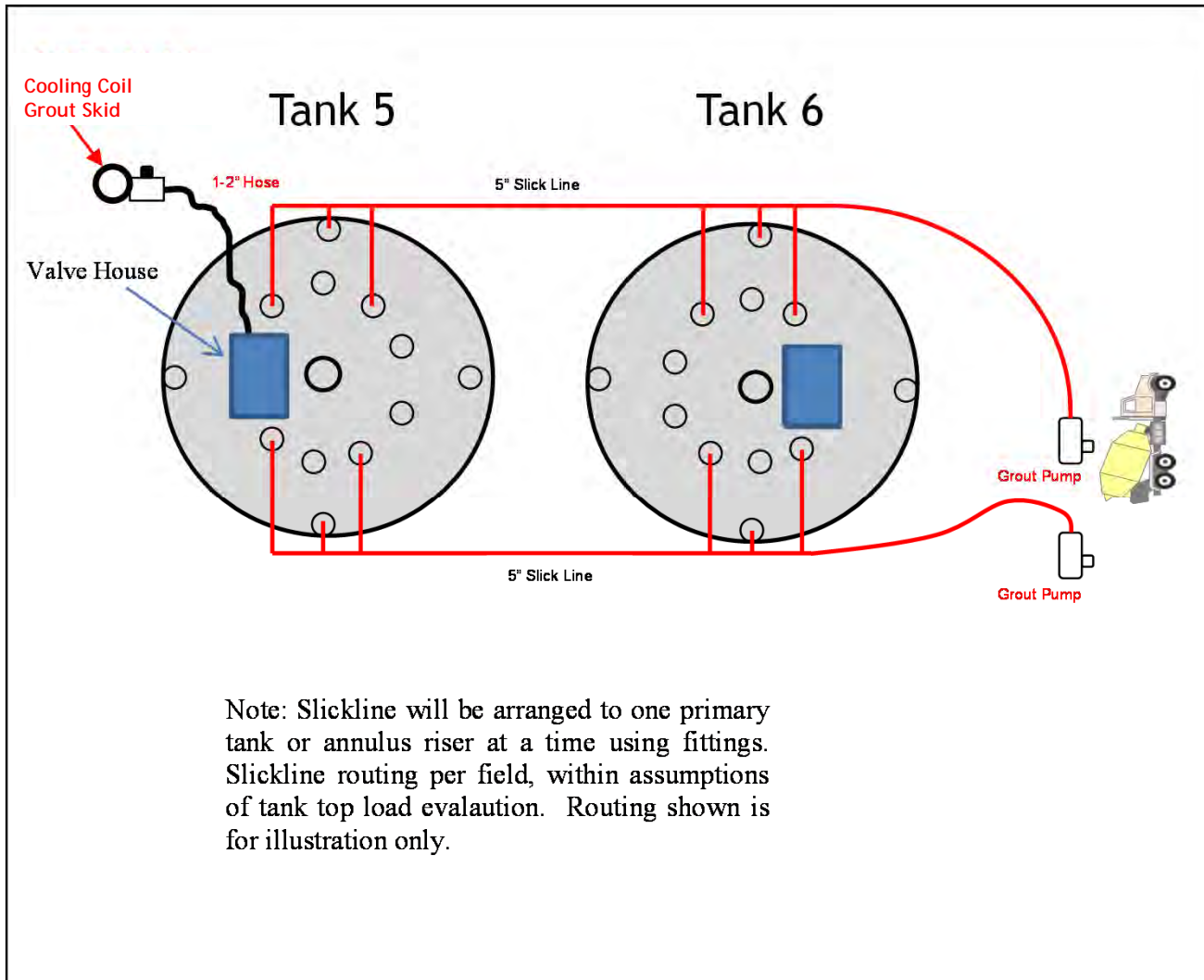
- ~10 % Full
- 58 Total Trucks To Date
- ~93,000 Total Gallons To Date

Tank 6



Tank 6

- ~10 % Full
- 60 Total Trucks To Date
- ~96,000 Total Gallons To Date



Tanks 5/6 Bulk Fill Grout Pumps

We do the right thing.

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Tanks 5/6 Cooling Coil Fill Grout Skid

We do the right thing.

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Tanks 5/6 Bulk Grout Fill

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Grout Truck Arrival and Check-in:

- Every Truck
 - Batch Tickets (Multiple Verifications)
 - Grout mix
 - Timing < 90 minutes
 - Revolutions < 300
 - Point of delivery water additions
- Daily
 - First Batch & at least one truck after first 100 cubic yards
 - Molding Cylinders (7)
 - Compressive Strength (7 and 28-days)
 - Spread
 - Temperature
 - Unit weight/yield
 - Bleeding of grout
 - Air Content
- Additional testing frequency as determined by Construction Discipline Engineer (CDE)

Video of Grout Placement:

- Continuous during grout placement

We do the right thing.

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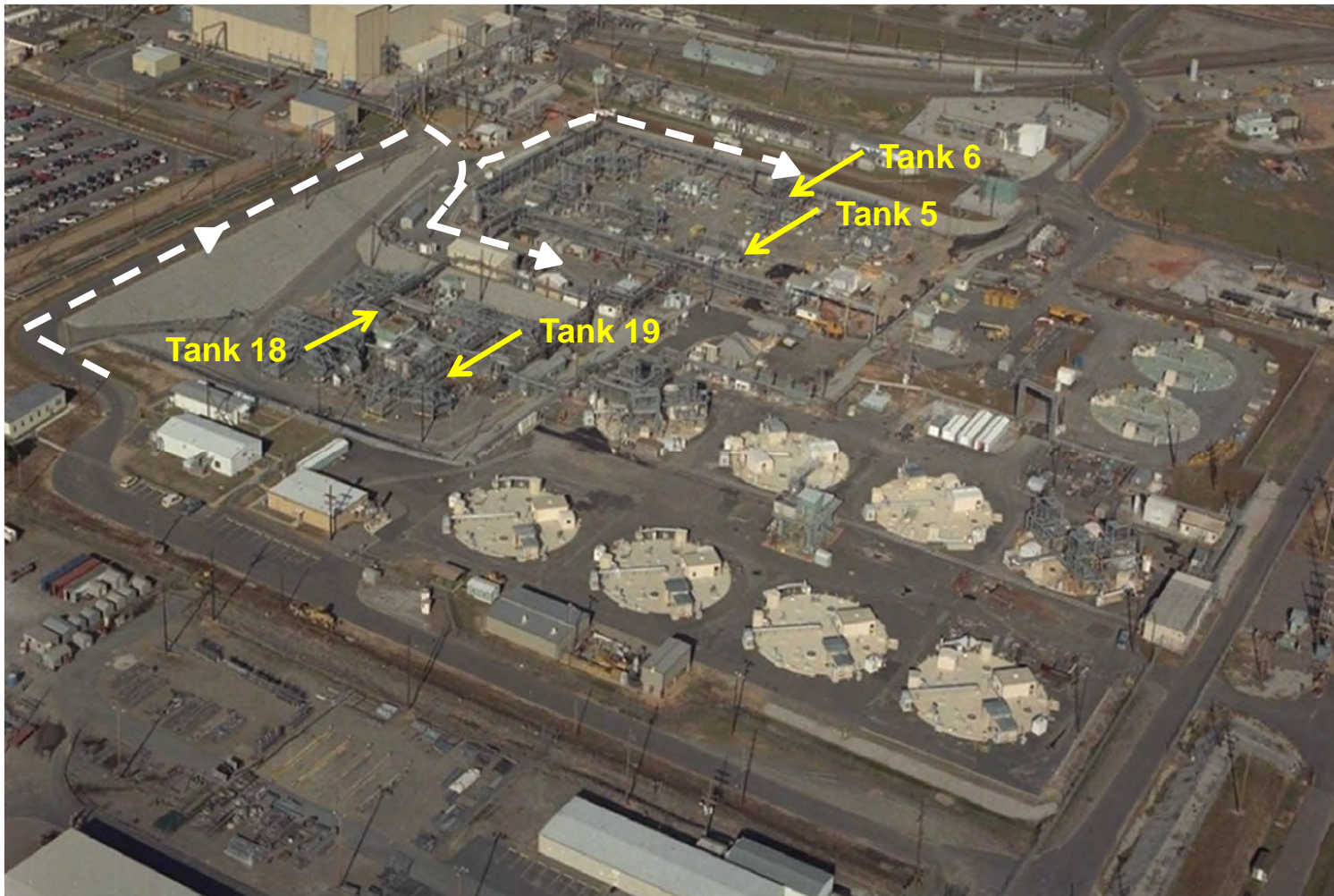


Control Trailer Camera View





- F-Tank Farm is a property protection area, no security escorts required for uncleared personnel within area.
- Personnel involved in tour should stay in contact with designated SRS personnel in order to provide instruction in the event of a need to shelter or evacuate the work area.
- Grout Test area and truck unloading area is considered a construction work zone
- Construction work zones at a minimum require hard hat, side shield safety glasses and sturdy work shoes.
- Personnel requiring access to these work areas will attend a safety briefing and sign safe work permit for applicable work package(s).
- In addition to requiring standard Personal Protective Equipment for a construction work zone, the area around the grout pump is designated as requiring hearing protection.
- Uncured grout is highly alkaline. In the event that grout comes in contact with skin or clothing, you will be directed to nearest eye wash/safety shower for flushing.
- No areas on tour path requires sign in on a Radiological Work Permit (RWP) or wearing of rad dosimetry.
- Heat oasis station is available for cool off and hydration as required.



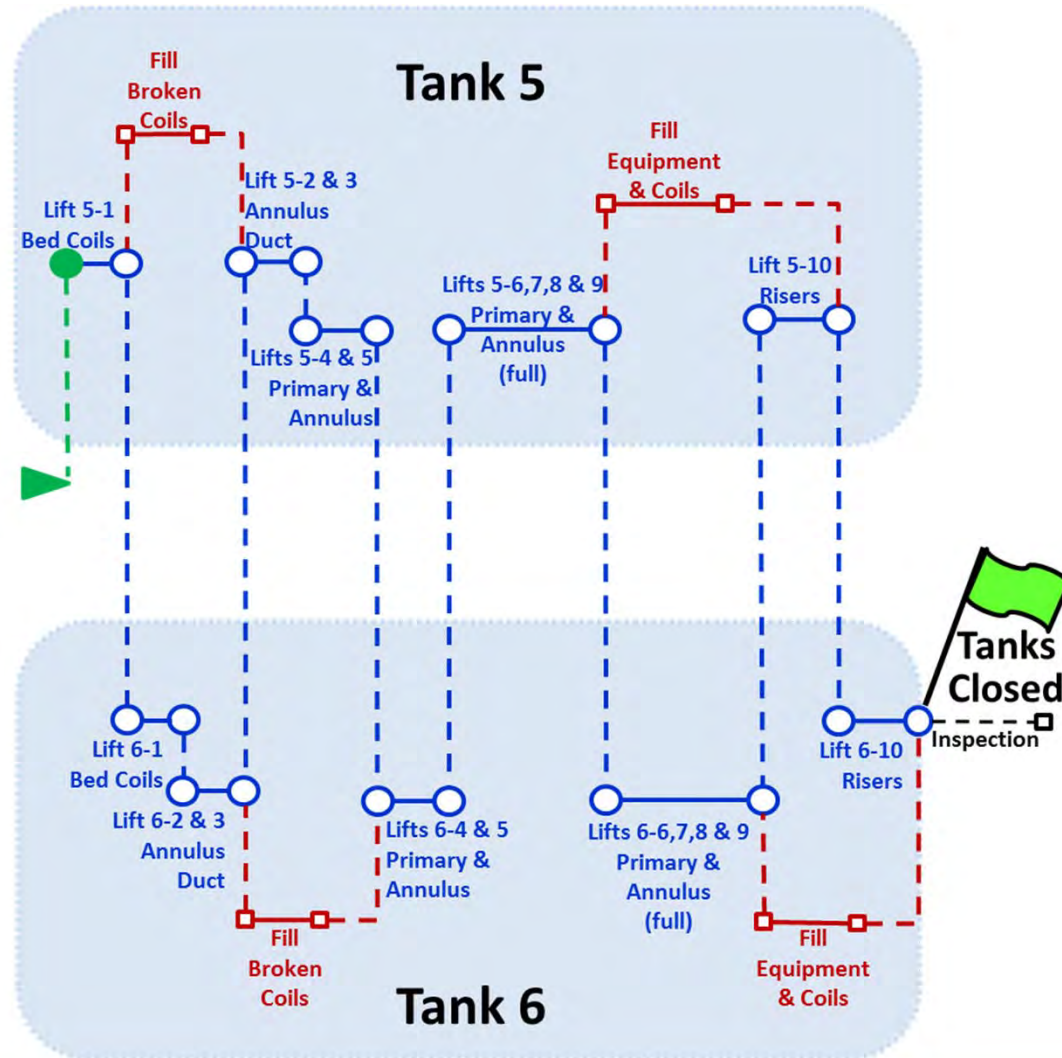
Technical Discussions: 8/27/2013

- Grouting Operations
 - Schedule
 - Equipment Grouting
 - Cooling Coil Grouting
 - Annulus Grouting
 - Riser Grouting
 - Tank 5 & 6 Grouting Video
- F-Tank Farm Status
 - Status of Tank Closure Activities
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Tanks 5/6 Grouting Schedule

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- Equipment fill grout will be prepared in small batches
- SRR personnel pre-mix dry ingredients by weight
- Water is combined with the dry materials as required, mixture is allowed to hydrate with low shear mixer
- High shear mixer engaged to finish grout mixing and thin the grout
- Grout is metered into equipment by gravity via hose and funnel
- Equipment has high point vent that collects overflow indicating filling complete

Documentation for Equipment Fill Grout

- *Tank 18 and 19-F Equipment Fill Grout Material Evaluation and Recommendations, SRNL-STI-2011-00592*
- *Tank 18 and 19-F Tier 1A Equipment Fill Mock Up Test Summary, SRNL-STI-2011-00564*
- *Summary Report of the Equipment Grout Mock-up Test, SRR-CES-2012-00031*



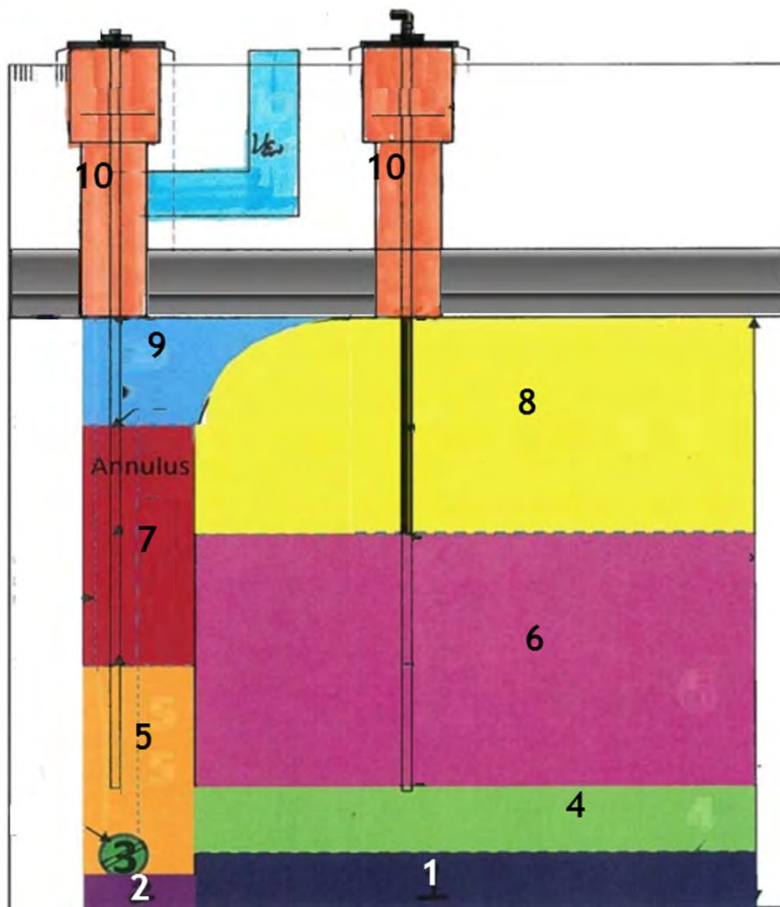
- Cooling coil grout is prepared using a commercial grout skid
- Dry ingredients are premixed at vendor facility and delivered in a Super Sack®
- SRR personnel batch a fixed amount of water with the contents of the Super Sack® (i.e., dry materials) and mix the contents
- Pump is used to meter grout into cooling coils
- Totalizer at flow meter provides real time quantity of grout added
- Intact cooling coils will be grouted from the coil inlet. When grout is visually detected at cooling coil outlet, additional grout shall be introduced for a prescribed volume
- Grout/flush water interface volume from intact coils will be collected and disposed of separately
- Coils having guillotine failure were previously flushed, coils will be grouted from each end (inlet and outlet) into the waste tank

Documentation for Cooling Coil Fill Grout

- *Closure of HLW Tanks - Formulation for a Cooling Coil Grout, WSRC-STI-2008-00172*
- *Closure of HLW Tanks - Phase 2 Full Scale Cooling Coils Grout Fill Demonstrations, WSRC-STI-2008-00298*



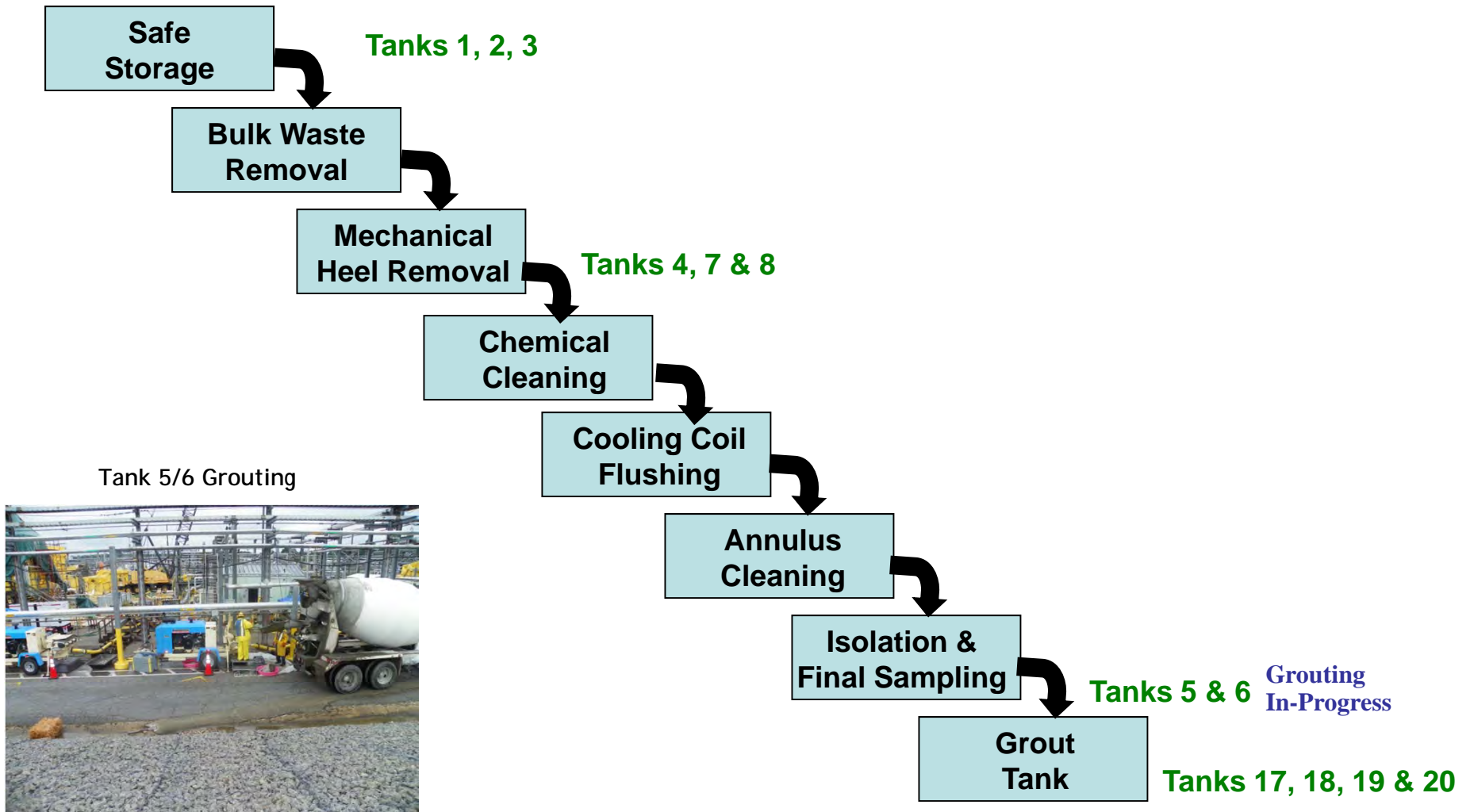
- Bulk fill grout will be used to fill annulus
- A bed of grout 6 to 12 inches deep will be poured to support annulus ventilation duct (Lift 2)
- Grout introduced into the duct through the tank annulus ventilation inlet piping (vertical leg) and allowed to flow into the horizontal legs of the ventilation ducting. (Lift 3)
- Distribution holes (registers) located on top of the horizontal ducting will be visually monitored for grout exiting the holes
- After horizontal ventilation ducting is filled, remainder of annulus may be grouted (Lift 5, 7 & 9)
- Vertical sections of annulus ducting (inlet and exhaust) will be filled to grade level



- Tanks 5 and 6 each have nine primary tank risers and four annulus risers
- Risers will be filled with bulk fill grout until the grout is level with the riser opening (Lift 10)

Tank 5/6 Grout Video

- Primary Tank Grout Fill (Lift 1)
- Annulus Grout Fill (Lift 2 and 3)
- Cooling Coil Grout fill (Broken Coils)



Status: Tank Closure

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Tank	Bulk Waste Removal						DOE, SCDHEC, EPA Approvals	Tank Cleaning			DOE, SCDHEC, EPA Concurrence	Residual		Isolate Tank [2]	Closure Docs Approved (CIWRD/Tr2)	FFA Closure Forecast [1]	FFA Closure Commitment (CY)
	Phase I			Remaining Phases				Mechanical	Chemical	Annulus		Sample	Analyze				
	Prep	Mix	Transfer	Prep	Mix	Transfer											
17							D/S/E	N/A	N/A	D/S/E							
20							D/S/E	N/A	N/A	D/S/E							
18							D/S/E	N/A	N/A	D/S/E						2012	2012
19							D/S/E	N/A	N/A	D/S/E						2012	2012
5							D/S/E			D/S/E						2013	2015
6							D/S/E			D/S/E						2013	2015
16							D/S/E			D/S/E	Aug-13					2015	2015
12							D/S/E		Jul-13	N/A	Jan-14					2015	2015
11							D/S/E	Oct-15								2018	2017
4							D/S/E	Feb-24								2028	2021
7							D/S/E	Apr-25								2028	2022
8							D/S/E	Apr-25								2028	2022
24						Jul-17										2027	2022
21					Jul-17				N/A	N/A						2025	2022
22					Jul-17				N/A	N/A						2026	2021
13			Jun-20													2023	2022
3		May-22														2028	2021
10					Feb-15	Feb-15										2022	2017
14	May-16															2024	2019
15	May-15															2024	2021
9	Mar-20															2024	2021
2	Feb-22															2028	2022
23	Oct-16								N/A	N/A						2026	2019
1	Feb-23															2028	2022

Key:

Mo-Yr	Activity planned start or resume (mo/yr)
Green	Activity is complete
N/A	Activity is not needed
Mo-Yr	Activity is in progress, projected finish (mo/yr)
Red box or text	denotes change vs. last report

[1] FFA Closure forecast dates per LWSP rev 18.
 [2] Ventilation and essential instrumentation may remain until final tank grouting
 [3] Forecast dates per LWSP rev 18 for tanks in BWR and Cleaning Process.

Both F-Tank Farm and H-Tank Farm tanks are shown for completeness, however, H-Tank Farm tanks are not within the scope of Section 3116 Determination for Closure of F-Tank Farm at the Savannah River Site

Action Items

1. DOE to provide NRC an electronic copy of presentation material [SRR-CWDA-2013-00051, revision 1] including action items and attendance rosters. (Complete)
2. DOE to provide NRC *2012 Annual Groundwater Monitoring Report for the F- and H-Area Radioactive Liquid Waste Tank Farms* (SRNS-RP-2013-00118), when available. (Complete)
3. DOE to provide NRC *Tanks 18 and 19 Final Configuration Report for F-Tank Farm at the Savannah River Site*, when available. (Complete)
4. DOE to provide NRC *Savannah River Site Liquid Waste Facilities Performance Assessment Maintenance Program - FY2013 Implementation Plan*, when available. (Complete)

Action Items (cont'd)

5. DOE to provide NRC copies of GSA Eastern and Western groundwater reports. (Complete)
6. DOE to arrange for a walkdown of seepage basins, process sewer line, etc. during future NRC FTF onsite observation visit. (Complete)
7. DOE to provide NRC radiological dose reports for Tank 5 & 6 final sampling and characterization. (Complete)
8. DOE to provide NRC information on air doses (radiological) within F-Tank Farm. (Complete)
9. DOE to provide NRC Tank 18 & 19 pre-job ALARA reviews. (Complete)
10. DOE to provide NRC with industrial hygiene monitoring plan and FARMS plan for Tank 18 & 19, as well as associated results of monitoring. (Complete w/exception of IH plan/results which will be discussed this visit)

Action Items (cont'd)

11. DOE/NRC to arrange follow-up clarification phone call concerning Tank 18 grouting video provided as a follow-up to the June 2012 FTF onsite observation visit. (Complete)
12. DOE/NRC to arrange follow-up clarification phone call regarding Tank 8 Plume (Call scheduled/cancelled)
 - Cs/Sr ratios (analytical techniques)
 - Sr mobility
 - Hydrological Systems
13. DOE to provide NRC electronic copies of additional reference documents requested as part of NRC review of Tank 5 and 6 final inventory documentation. (Complete)

Action Items (cont'd)

14. DOE/NRC to arrange follow-up clarification phone call regarding mapping methodology (Complete)
 - Include clarification of annulus volume determination (100% inspection versus 4-riser access)
 - Consider sending sample crawler video
15. Provide video of Tank 5/6 Annulus inspection (Complete)
16. DOE/NRC to arrange follow-up clarification phone call on Tank 5/6 Special Analysis (Complete)
17. DOE/NRC to determine schedule for follow-up clarification phone calls (Complete)

Action Items (Follow-up Phone Calls)

1. DOE provide response in writing or another telecon to NRC main points about water segregation and previously provided observations (5/1/2013 phone call)
2. DOE provide specification of “pigs” (5/1/2013 phone call)
(Information to be provided this visit, SRR-CWDA-2013-00103)
3. DOE provide e-mail with methodology for doing inventory adjustments and examples of using it (5/15/2013 phone call)
(Information to be provided this visit, SRR-CWDA-2013-00103)



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FTF NRC Observation Visit- Outbrief: 8/27/2013

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NRC FTF Outbrief

- NRC Staff Outbrief
- Action Items Captured

NRC F-Tank Farm Onsite Observation			
Wednesday, August 28, 2013			
Start	End	Topic	Location
8:00	8:30	Arrive/Travel	Meet 703-46A
8:30	10:30	Technical Discussions	705-1C, Room 34 A-B
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11:45	12:00	Travel/NRC Depart	703-46A

Technical Discussions: 8/28/2013

- Industrial Hygiene Monitoring Plan for FTF Tanks 18/19
- FTF Tanks 18/19 Final Configuration Report
- FTF Tank Release Documentation (e.g., Tank 8)
- FTF Inventory Follow-up
 - Tank 5/6 Special Analysis information provided in SRR-CWDA-2013-00103, Attachment 2
 - Action Item Follow-up from 5/15/2013 phone call
 - NRC questions on *Liquid Waste Tanks Residual Sampling-Quality Assurance Program Plan*, SRR-CWDA-2011-00117
 - Questions provided via e-mail 8/21/2013



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FTF NRC Observation Visit- Final Outbrief: 8/28/2013

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SRR-CWDA-2013-00116, Rev. 1

NRC FTF Outbrief

- NRC Staff Outbrief
- Action Items Captured
- Closing Statements

Action Items

1. DOE to provide NRC an electronic copy of presentation material [SRR-CWDA-2013-00116, Revision 1] including action items and attendance rosters.
2. DOE to provide NRC an electronic copy of *Follow-up in Support of U.S. Nuclear Regulatory Commission Monitoring Activities in F-Tank Farm*, SRR-CWDA-2013-00103.
3. DOE to provide NRC with electronic copies of *Liquid Waste Tank Residuals Sampling and Analysis Program Plan*, SRR-CWDA-2011-00050, Revision 2 and *Liquid Waste Tanks Residual Sampling-Quality Assurance Program Plan*, SRR-CWDA-2011-00117, Revision 1. (Including Tracked Changes Version and Final Version)

Action Items (Cont'd)

4. DOE to provide NRC with Idaho grout drop report *Grout/CLSM Testing and Selection for the INTEC Tank Farm Closure*, EDF-6715.
5. DOE to provide NRC with basis for the 10-foot grout drop height.
6. DOE to provide NRC with Tank 5/6 Special Analysis PORFLOW files (NRC to provide hard drive)
7. DOE to provide NRC with *Task Technical and Quality Assurance Plan for Determining the Radionuclide Release from Tank Waste Residual Solids*, SRNL-STI-2013-00203.

NRC F-Tank Farm Monitoring Visit
August 27, 2013
F-Tank Farm Tour/Technical Discussions

Name	Affiliation	Phone
LARRY ROMANOWSKI	SRR	
Linda Sutton	DOE-HQ	
Sherril Ross	DOE-SR	
JAMES RUSH	SRR	
Kent Rosenberger	SRR	
Chris Grossman	NRC	
LEAH PARKS	NRC	
HARRY FELSNER	NRC	
CHRIS MCKENNEY	NRC	
Leigh Beatty	SCDHEC	
Barry Mullinax	SCDHEC	
Cynthia S Bair	NRC	
Don Ferguson	DOE/SA	
Byron Amick	SCDHEC	
Steve Thomas	SRR	
RANA O'BRYEN	SRR	
Mark Mahoney	SRR	

NRC F-Tank Farm Monitoring Visit
August 28, 2013
Technical Discussions/Outbrief

Name	Affiliation	Phone
LARRY ROMANOWSKI	SRR	
Bruce Martin	SRR	
Steve Thomas	SRR	
Christopher Grossman	NRC	
LEAH PARKS	NRC	
HARRY FELSNER	NRC	
CHRISTOPHER MCKENNEY	NRC	
Barry Mullinax	SCDHEC	
Cynthia Bair	NRC	
Mark Layton	SRR	
Sherril R. Ross	DOE-SR	
Joe Paratch	see	
SKIP WIGGINS	SRR	
Greg Arthur	SRR	
Mark Mahoney	SRR	
Ben Dean	SRR	
Linda Sutton	DOE-HQ	
Byron Amick	SCDHEC	
Scott. Simons	SCDHEC-Aiken	
Don Ferguson	DOE/SA	
Amanda Watson	DOE-SR	

