



**Savannah River
Remediation**

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NRC Salt Waste Monitoring Updates

August 7, 2012

SRR-CWDA-2012-00108

- Processing Facility Update
 - Processing history
 - Operations planning
 - Worker exposure
- Disposal Unit Status
 - SDU 2 A/B
 - SDUs 3/5
- QA Overview
- SDU 3A Liquid Collection System*
- Formed Core Sampling Details*
- Inventory
- R&D Update

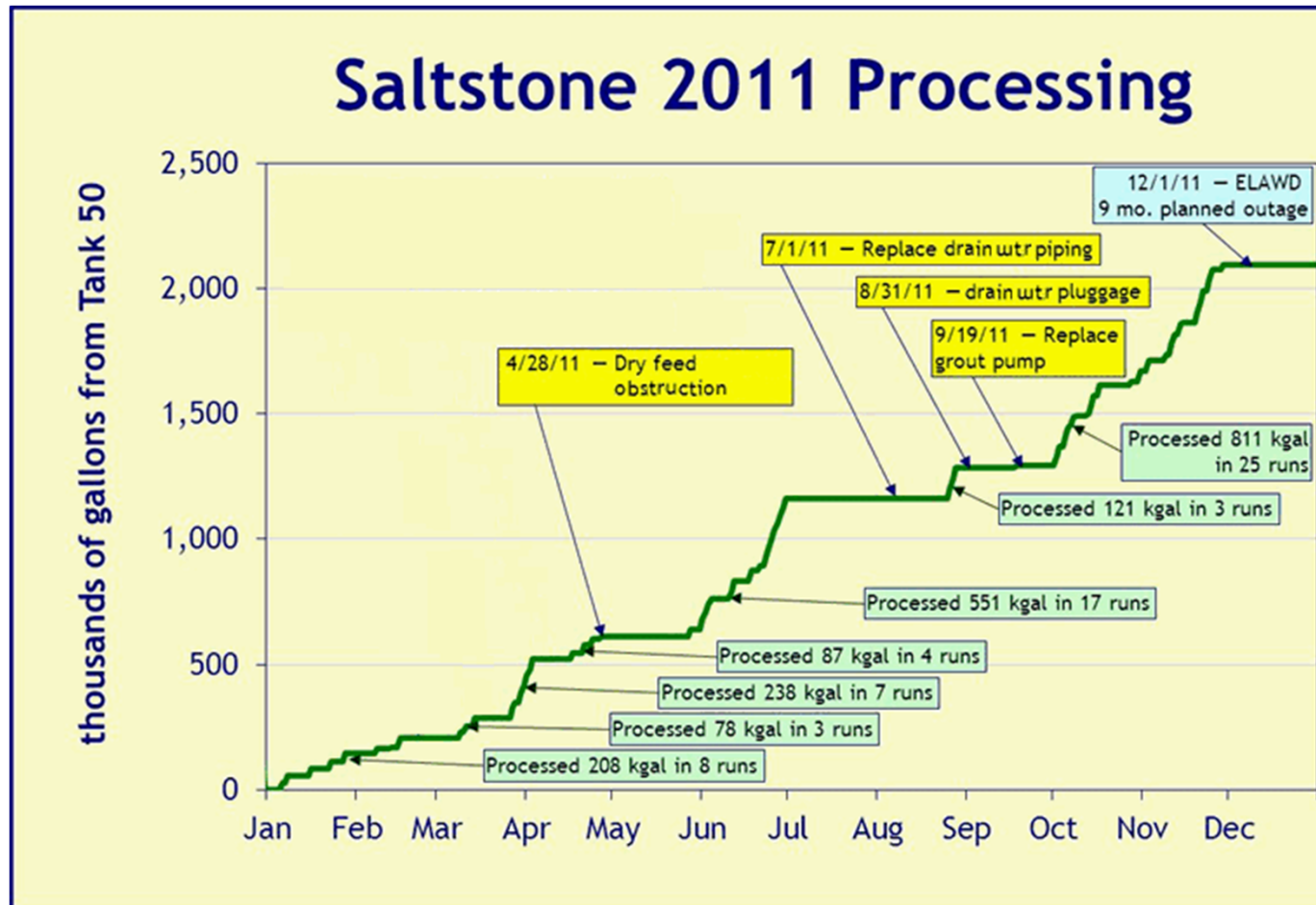
* Denotes additions to the agenda as requested by U. S. NRC during conduct of the observation

- SPF Operating Outage
 - Facility entered outage 12/11/2012
 - SDU 2 tie-in & startup activities included in SPF outage window

Saltstone Processing: 2011-2012

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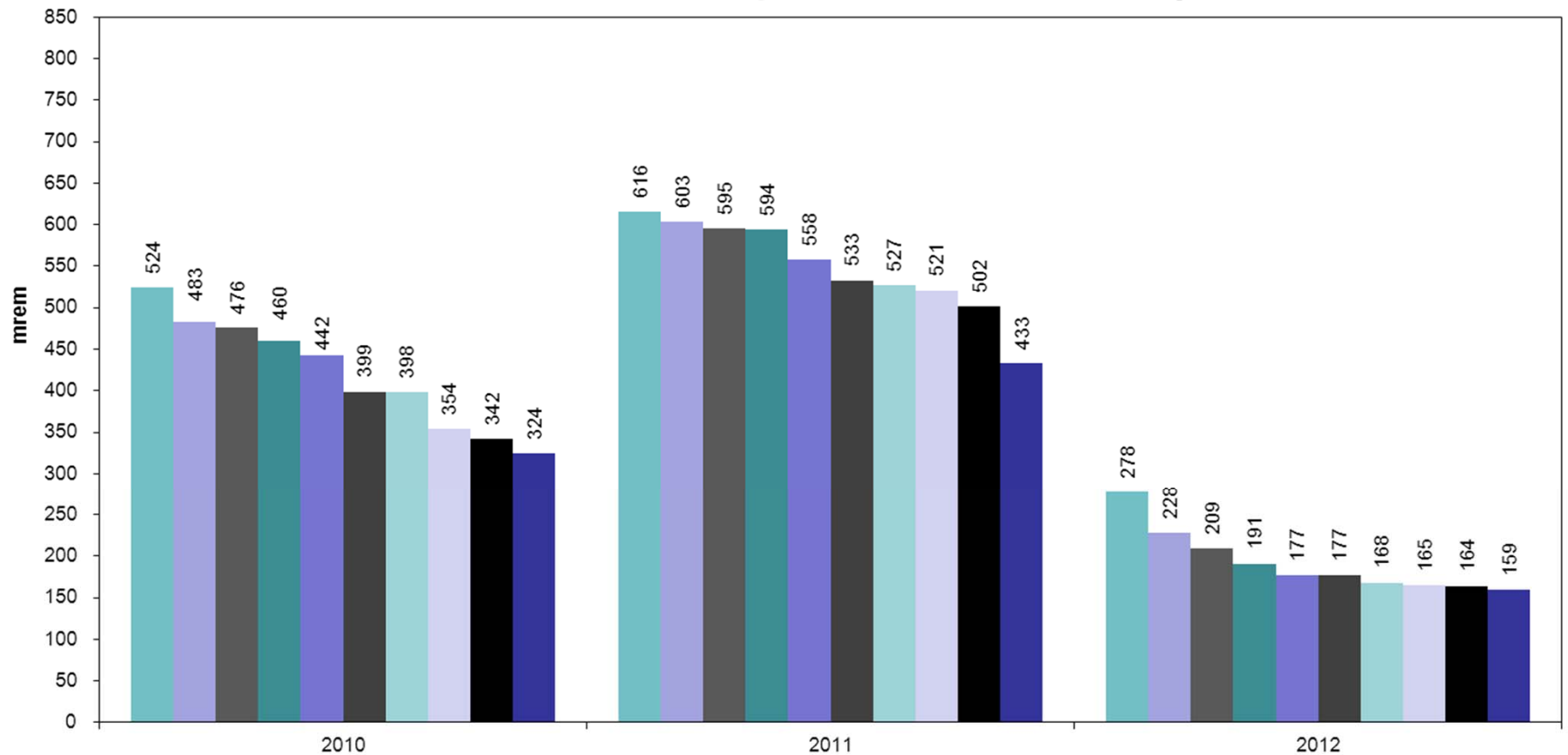
NOTE: Significant salt processing runs only denoted in green text boxes

- SPF FY 13 Production Goals
 - Process approximately 1.2 M gallons of salt solution by
 - Completing
 - Existing Tank 50 material
 - Salt Batch 5
 - Future processing
 - Salt Batch 6
 - Salt Batch 7

- Defined DOE and SRS Administrative Control Levels (ACLs) for Whole Body:
 - DOE annual limit - whole body 5,000 mrem/yr
 - DOE ACL - whole body 2,000 mrem/yr
 - SRS ACL - whole body 500 mrem/yr

- No Unexpected Exposures
- No Individual Exposures above Regulatory Limits

Saltstone - Top 10 Individual Whole Body



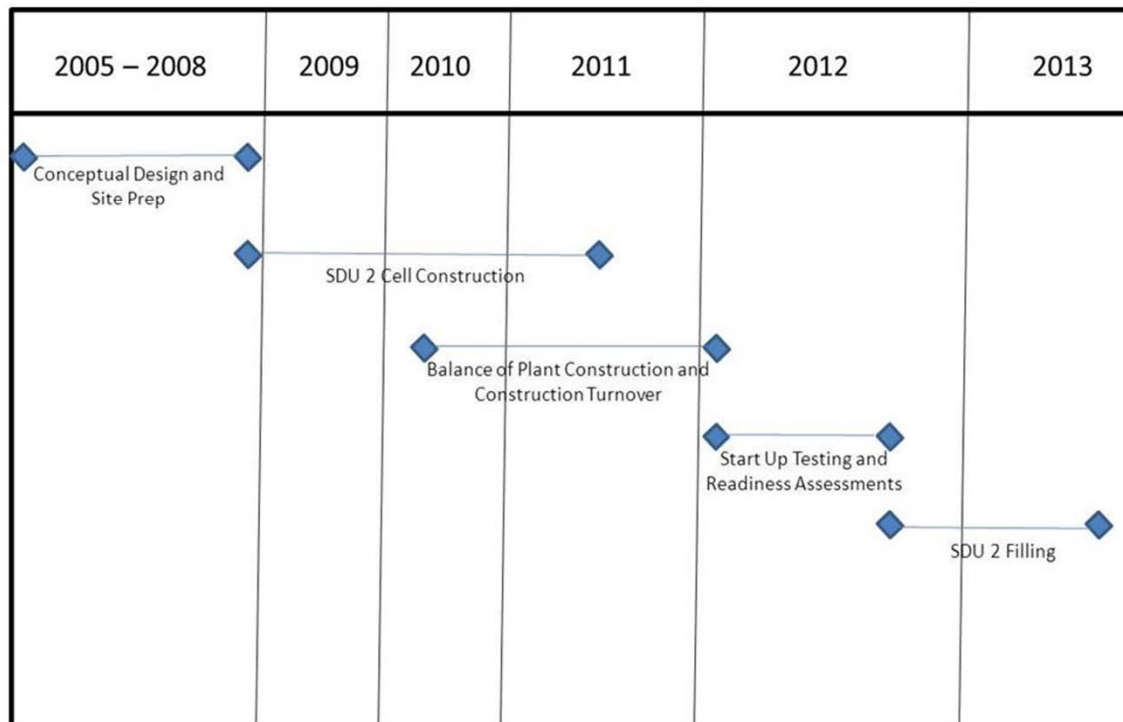
Disposal Facility Status

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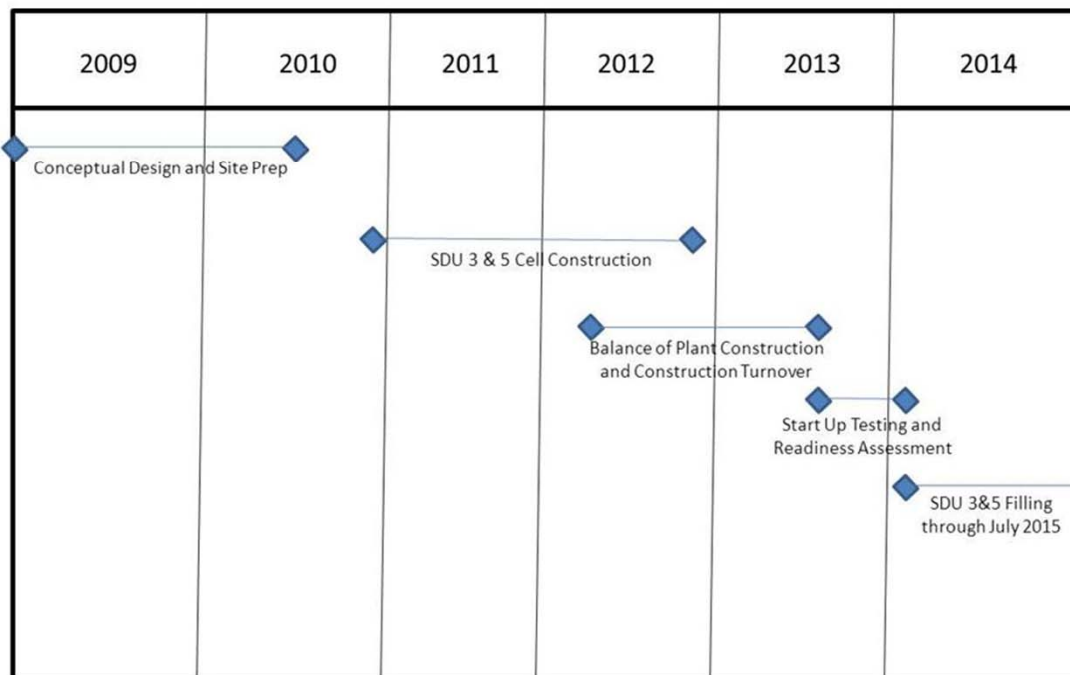


SDU 2 Timeline



- Construction turnover (CTO) complete November 2011
- Readiness assessment is underway with the DOE-RA scheduled to start on 08/13/2012
- Introduction of grout is expected early September 2012

SDU 3&5 Timeline



- SDUs 3 A/B & 5 A/B under construction
- Current LWSP R17 need date is July 2014

- Provide estimate of volume of water from environmental sources intruding into Vault 4.
- What is the expected surveillance and maintenance program for cell penetrations after operations and prior to final site closure?
- What are the plans to maintain or close the drain water removal system after operations and prior to final closure (e.g. maintenance of instrumentation for liquid detection)?

- What is the distance of the groundwater monitoring wells from SDU 2A/B? To what aquifer does water shed from these units?
- Provide field cured saltstone cure temperature profiles.
- Provide SDU 3A leak collection construction details. Complete 8/8/12

- Inventory Discussions
 - Provide analytical documents referenced in Table 1 from SRR-CWDA-2012-00095.
 - SRNL-I3100-2012-00062
 - X-ESR-H-00377
 - SRR-LWE-2012-00130
 - Provide information related to Tc-99 concentrations beyond Batch 7 and anticipated through 2015.

Participants 8/7

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SRR-CWDA-2012-00108

NRC Salt Waste Processing Monitoring
Date: 8/7/12

Topic: INBRIEF/
PROCESSING
UPDATE &
FACILITY STATUS

Name	Affiliation
Nishka Devases	NRC
George Alexander	NRC
HARRY FELSON	NRC
A. Christianne Ridge	NRC
Karen Pinkston	NRC
GREGORY SUBER	NRC
Kent Rosenberger	SRR
F. MALCOLM SMITH	SRR
Rebecca Freeman	SRR
STEVE THOMAS	SRR
GINGER DICKERT	SRR
Kim Hauge	SRR
Sherri R. Ross	DOE-SR
Mark A. Schmitz	SRR
Dara B. Dixon	SRR
Armanda Watson	DOE-SR
John Gail	SRR
BRUCE DRAGON	SRR
Justin Koon	DHEC
Scott H. Simons	SCDHEC

Participants 8/7

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SRR-CWDA-2012-00108

NRC Salt Waste Processing Monitoring
Date: 8/1/12

ACTION ITEMS /
Topic: INVENTORY

Name	Affiliation
F. MALCOLM SMITH	SRR
Nishka Deviser	NRC
George Alexander	NRC
MARY FELSHEL	NRC
A. Christianne Ridge	NRC
Karen Pinkston	NRC
GREGORY SUBER	NRC
Kim Hauzer	SRR
Kent Rosenberger	SRR
Rebecca Freeman	SRR
Armanda Watson	DOE-SR
Justin Koon	DHEC
Scott L. Simons	SC DHEC
Sherril Ross	DOE-SR
Steve Thomas	SRR
Dara Dixon	SRR

Participants 8/7

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SRR-CWDA-2012-00108

NRC Salt Waste Processing Monitoring
Date: 8/4/12

Topic: NRC EXIT
BRIEF FOR
8/7

Name	Affiliation
F. M. SMITH	SRR
Nishita Davaler	NRC
George Alexander	NRC
HARVEY FELSNER	NRC
A. Christianne Ridge	NRC
Karen Pinkston	NRC
GREGORY SUBER	NRC
Kim Hauger	SRR
GINGER DICKERT	SRR
Armanda Watson	DOE-SR
Justin Koon	DHEC
Scott L. Simmons	SC DHEC
Sherri R. Ross	DOE-SR
Kent Rosenberger	SRR
STEVE THOMAS	SRR
Rebecca Freeman	SRR



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NRC Salt Waste Monitoring Updates

August 8, 2012

SRR-CWDA-2012-00108

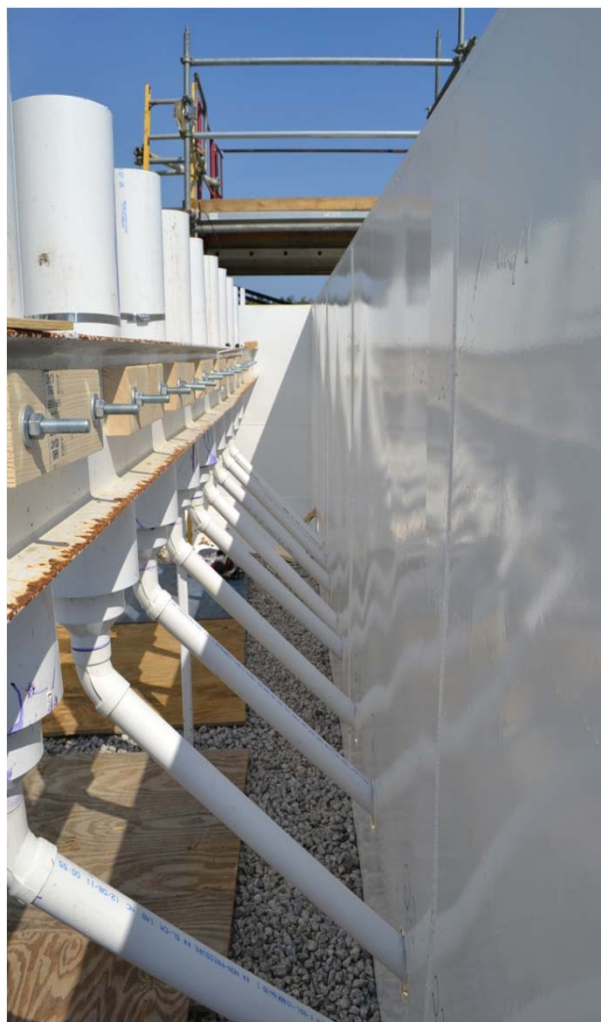
- 48 lysimeters:
 - 14 Cementitious
 - 25 Sediment
 - 4 Controls
 - 5 Empty
- Sediment Sources: Cs^+ , Ba^{2+} , Co^{2+} , Eu^{3+} , Np(IV) , Np(V) , Pu(III) , Pu(IV) , Pu(VI) , & Pu (colloids)
- MCU-Saltstone/Cement Sources: Cs^+ , Ba^{2+} , Co^{2+} , Eu^{3+} , Tc , & I
- Terminate Experiment 2, 4, & 10 years
- Leachate Aqueous Chemistry:
 - Quarterly
 - Ultrafiltration/Colloid

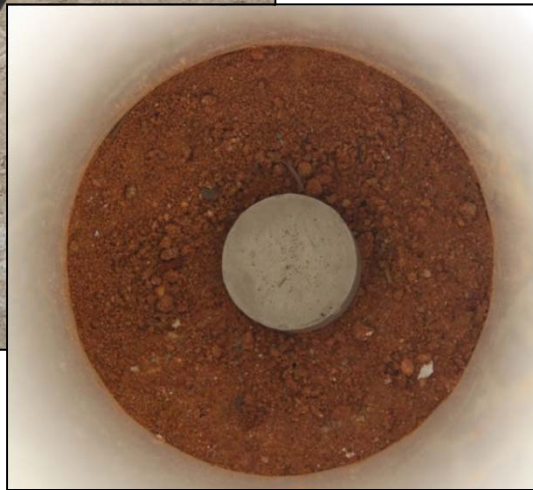


R&D: Lysimeter Program Construction Activities

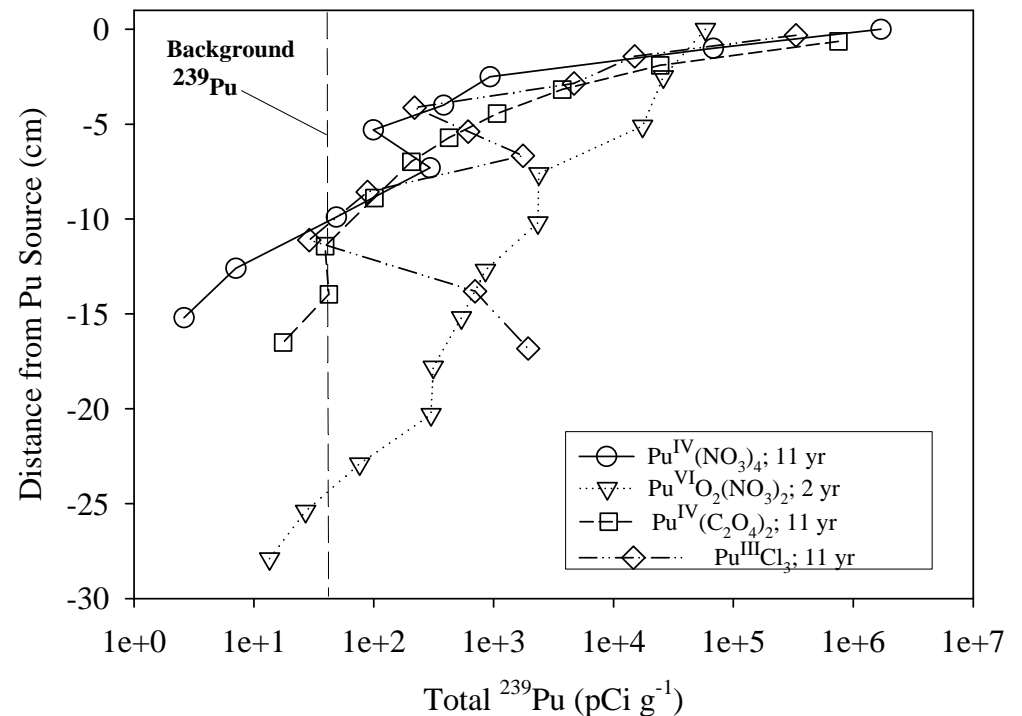
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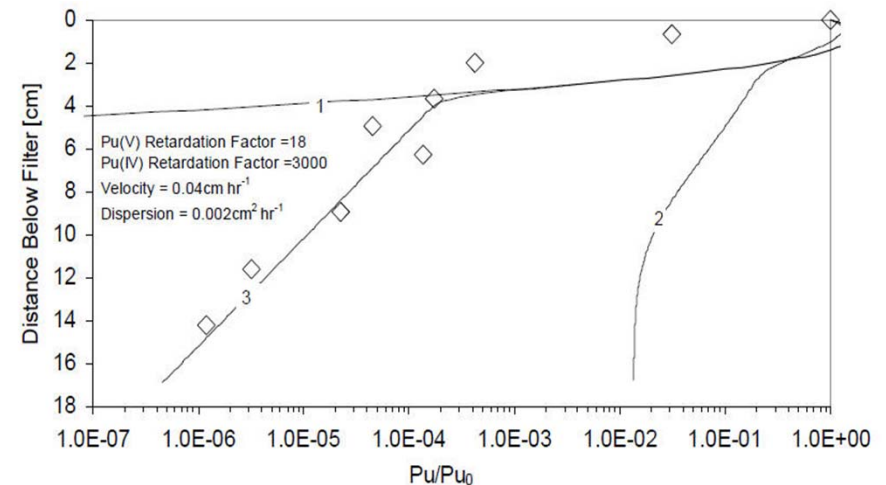




- Sediment & Source Term (Cement/Sediment) will be Recovered 2, 4, & 10 Years
- Sediment: Rad Concentration Depth Profiles
- Spectroscopy: Source & Sediment
- Leachate: Quarterly Sampling, Pu & Np Ultrafiltration for Mobile Colloids



- Quantify Transport Phenomena Under Long-term, Field Vadose Zone Conditions
- Evaluate Sediment/Cement Source Term: Leach Rate, Oxidation Rate, Rad Speciation

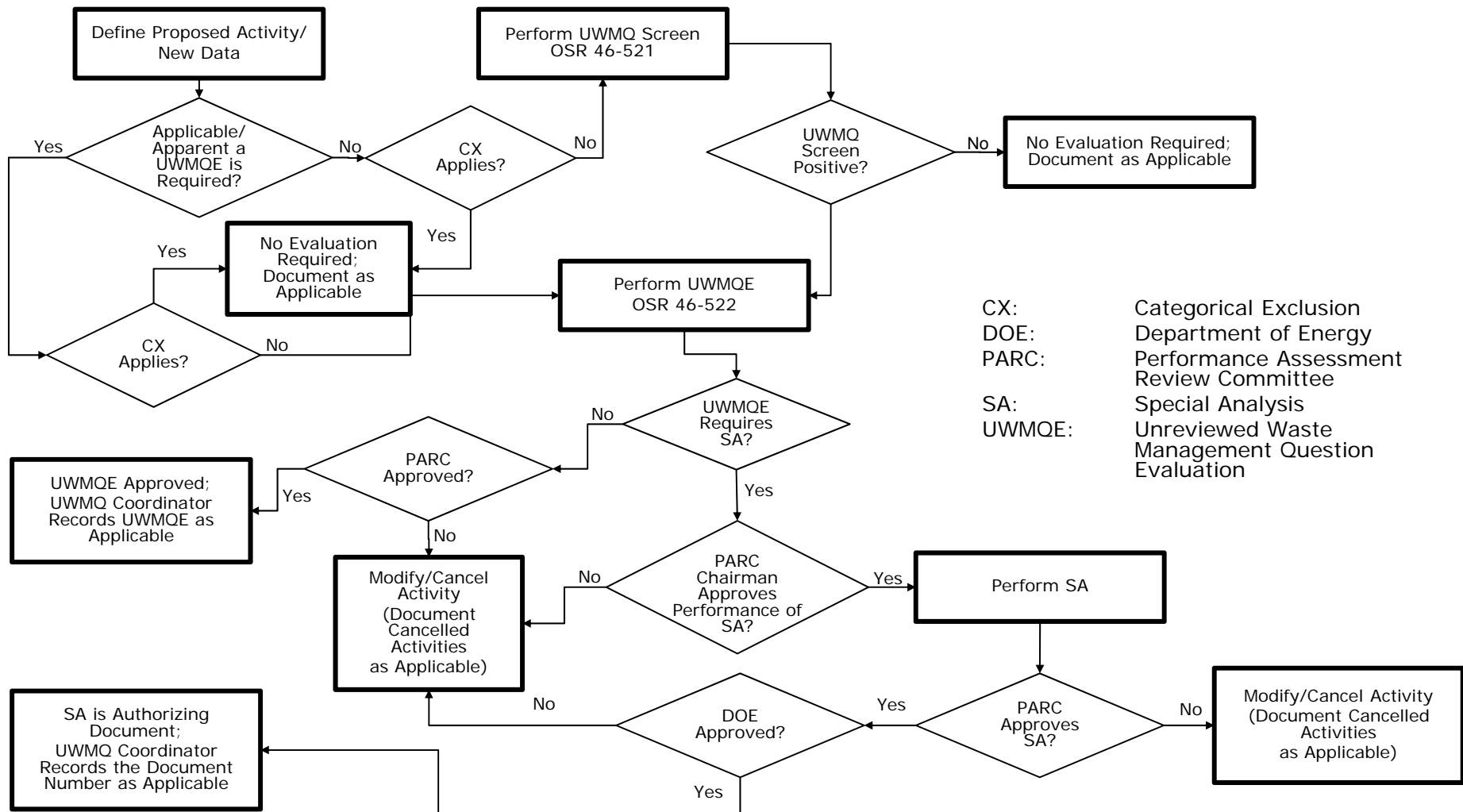


- Reduce uncertainty & improve technical justification for selection of PA geochemical conceptual model
- Identify coupled (interacting) long-term processes not possible with lab batch/column studies

- Research & Development Conducted at SRNL
 - PA Maintenance Plan establishes R&D activities planned to verify assumptions or reduce uncertainties in the PA
 - R&D efforts conducted through SRNL implemented using E7 Manual - Conduct of Engineering, Section 2.0, Nuclear Process Technical Baseline Control, describes requirements for developing technical bases information
 - Technical Task Request (TTR) developed by requestor to describe the task objectives & requirements
 - Manual 1Q, Procedure 2-3 describes requirements for developing Technical Task and Quality Assurance Plans
 - Technical Task Quality Assurance Plan (TTQAP) developed by the implementing organization (SRNL) to how the work scope will be accomplished in accordance with the objectives and requirements contained in the TTR

- Oversight of site forces is in accordance with the SRS Quality program (1Q) and site implementing procedures
 - Contractor has first line inspection responsibilities
- Subcontractor Oversight is accomplished in accordance with the Subcontractor Surveillance and Assessment Plan (SRR-SPT-2011-00081) for verification of specification requirements
 - 3 SRR QC assigned to perform field oversight
 - 1 Quality Engineer for programmatic assessments
- Disposal Cell Constructor's current QA project plan approved by SRR
 - 2 Inspectors assigned to the project
- Disposal Cell Designer provides inspection / oversight as the Design Agency

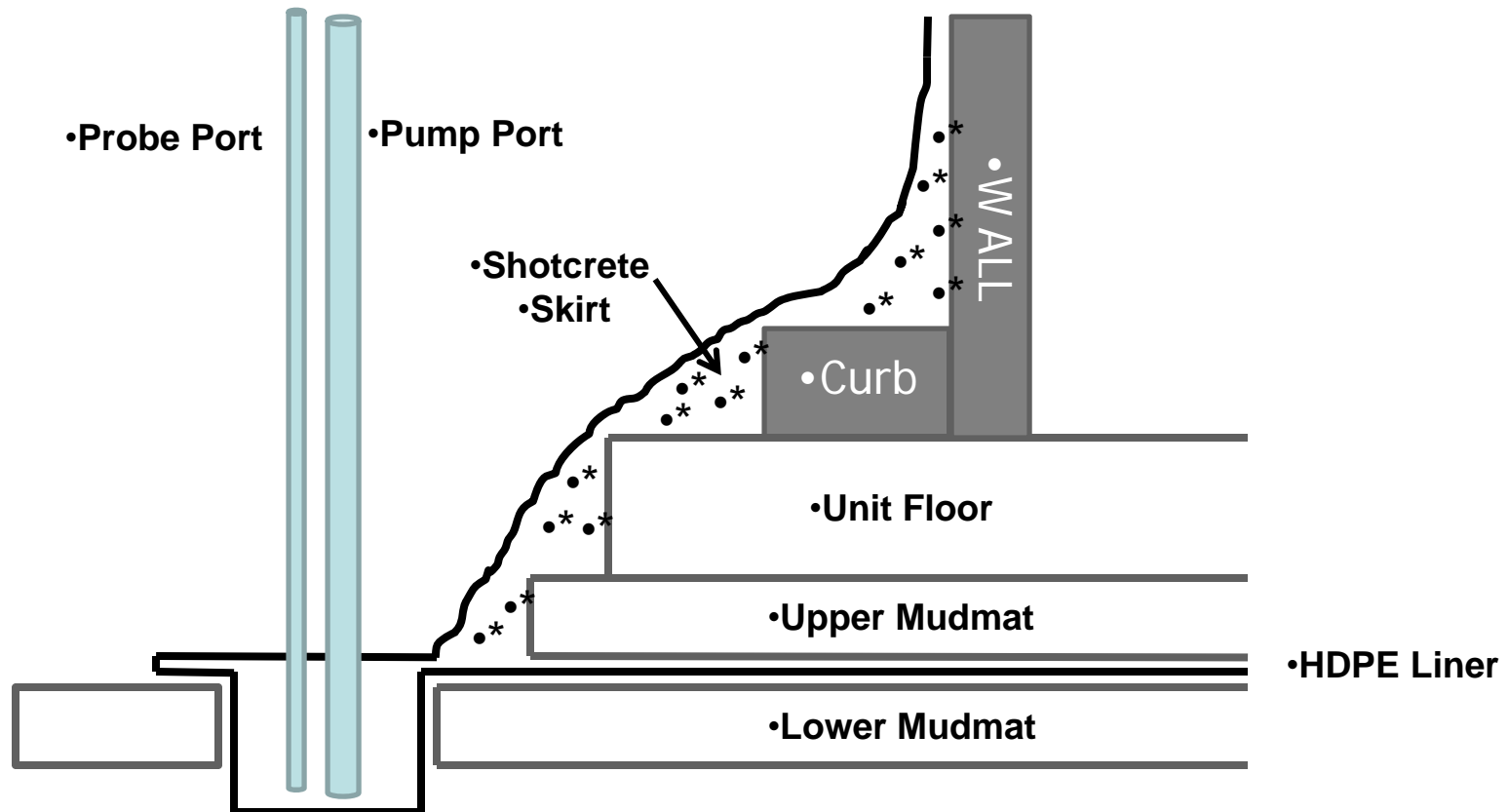
- Unreviewed Waste Management Question (UWMQ) Process
 - DOE M 435.1-1 requires establishment of a baseline configuration control program to ensure that Proposed Activities or New Data are evaluated to ensure the inputs, assumptions, results, & conclusions of the PA, WD, & CA, as well as SA or UWMQEs remain valid
 - SRR implementation
 - S4 Manual, Procedure ENG 46
 - Screening level implemented in the field using screening criteria
 - Positive screenings forwarded to C&WDA for evaluation



SDU 3A: Liquid Collection System Cut Away View

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•Note: Probe / Pump ports follow side wall contour to top of cell.

- HDPE liner is attached to the exterior wall and skirt tying into the liner between the Upper and Lower mud mats
- The sump, which holds ~5 gallons, has two ports which will be run vertically next to the exterior wall outside of the HDPE Liner
- Smaller port is to allow insertion and removal of a conductivity probe
 - Probe will detect liquid build-up and be used to determine if source is from inside the SDU or clean groundwater intrusion
- Larger port is for removing any liquids from the sump via pump

SDU 3A: Liquid Collection System Field Installation of Sump

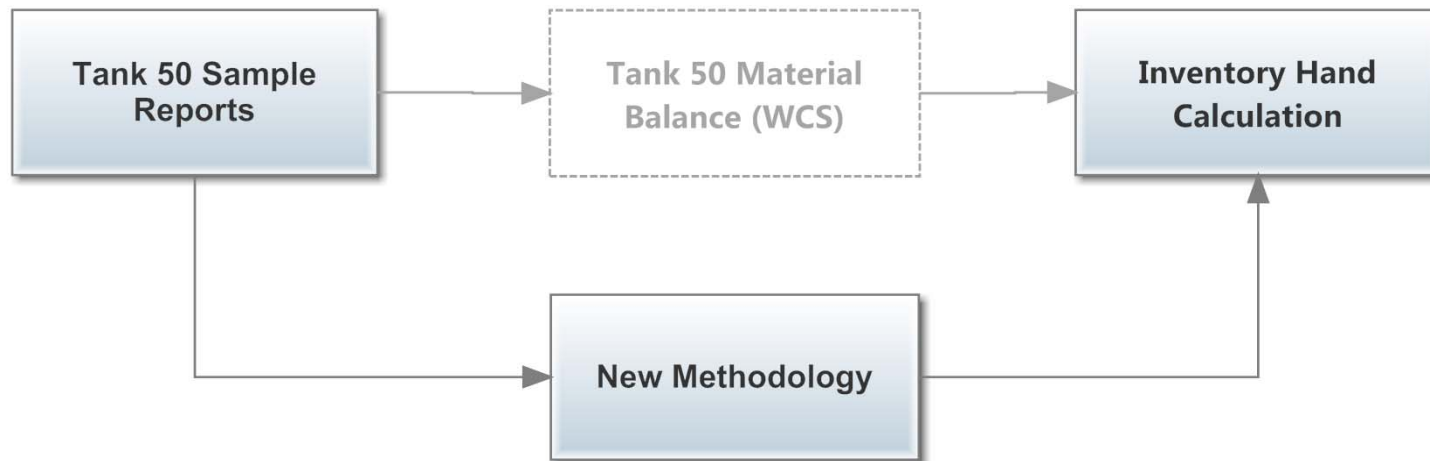
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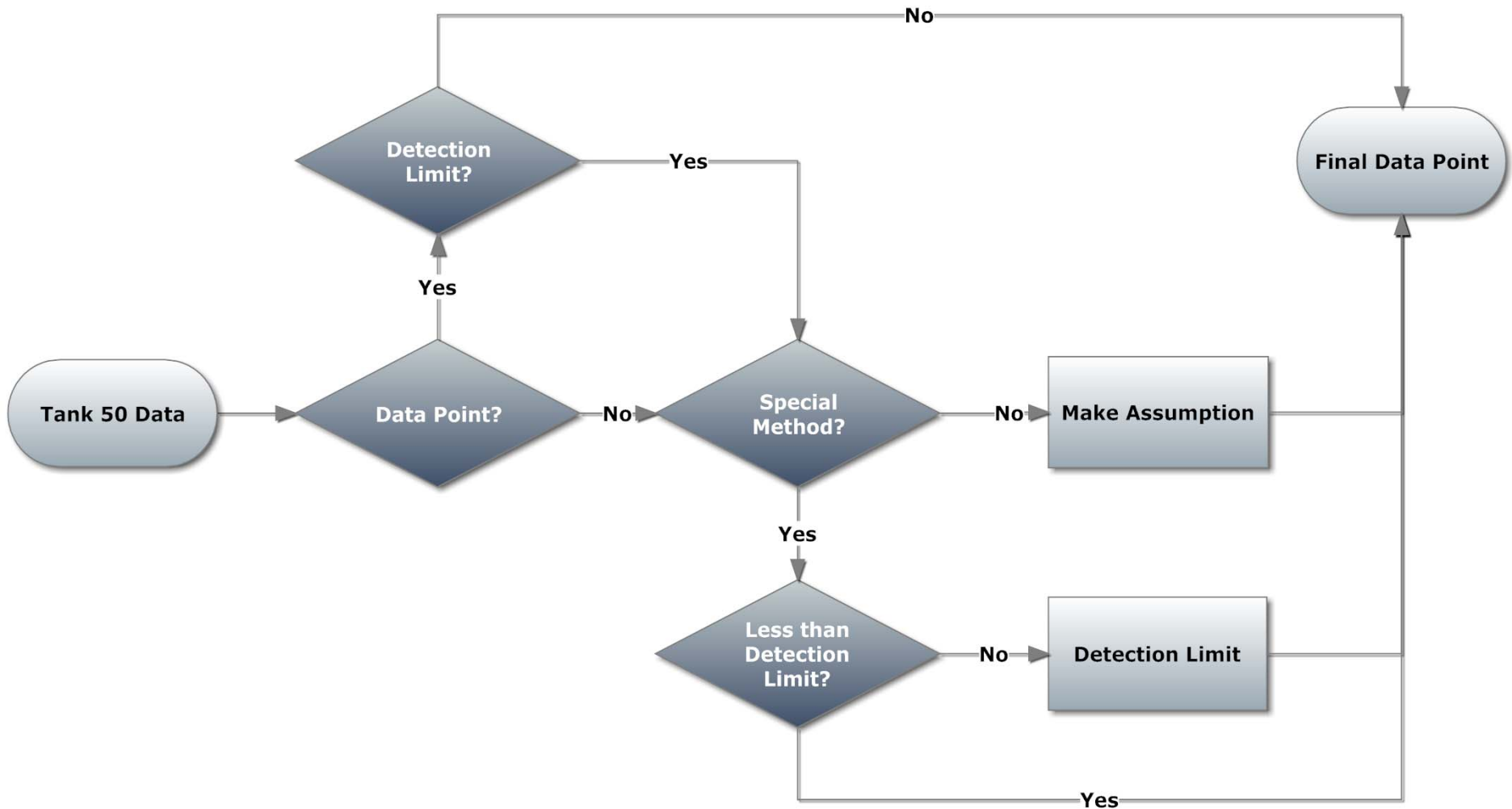


- Historical Inventory Methodology



- New Methodology Basis Document (SRR-CWDA-2012-00002) Provided in 6/13/2012 Transmittal
- New Methodology Applied to Vaults 1 & 4

- Inventory Updates
 - Revised inventory calculation methodology
 - Updated Vaults 1 & 4 inventories using revised methodology
 - Additional processing since methodology update (evaluated in SRR-CWDA-2012-00067)
 - UWMQE on revised inventory with margin (SRR-CWDA-2012-00112, provided at conclusion of 8/8/2012 onsite observation)



- SRR-CWDA-2012-00002
 - Revised inventory methodology
 - Recalculated Vaults 1 & 4 inventories based on updated methodology
 - Used historical Tank 50 sample reports as a starting point
 - Updated inventory through 9/30/2011
 - Transmitted to NRC 6/13/2012

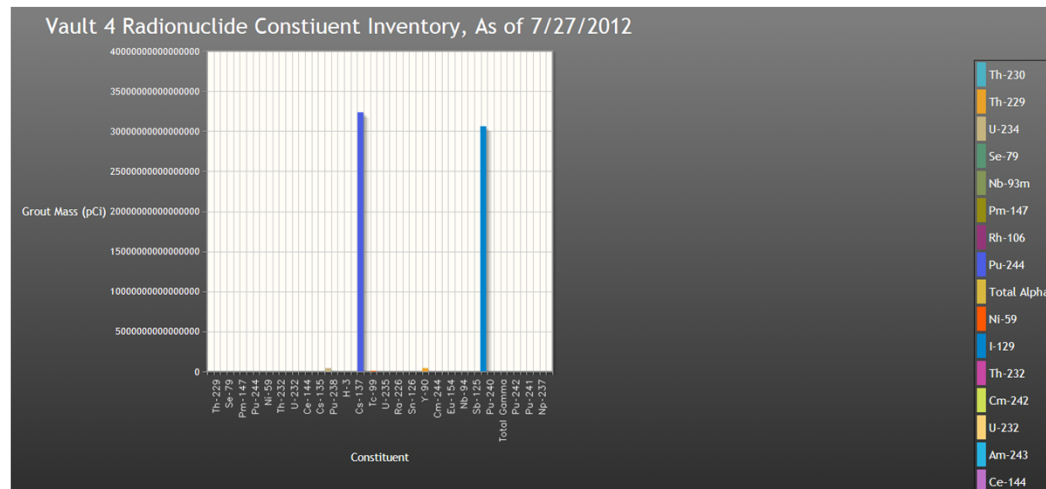
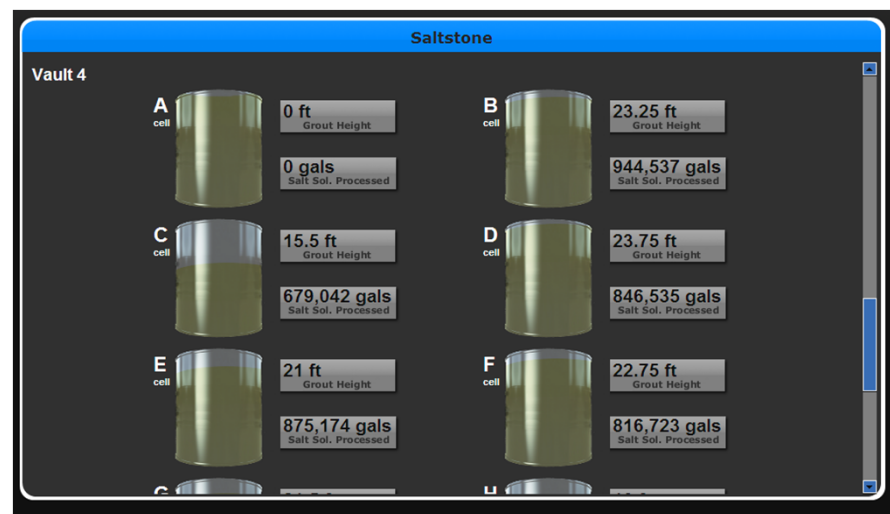
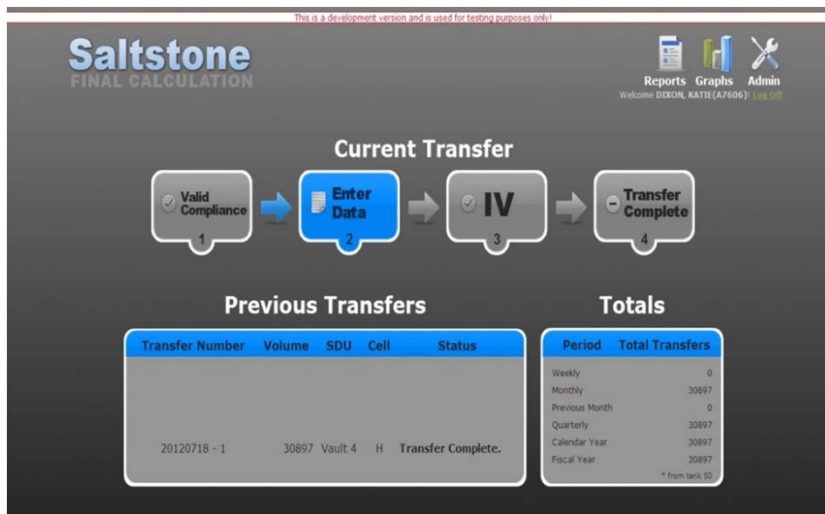
- SRR-CWDA-2012-00067
 - Added 4th quarter CY 2011 inventory
 - Same methods as SRR-CWDA-2012-00002
 - Website updated (X-CLC-Z-00046) in first quarter 2012 with this inventory
 - Updated inventory used in sensitivity analysis (SRR-CWDA-2012-00103 provided in 7/12/2012 transmittal)

- SRR-CWDA-2012-00112
 - Added inventory for remaining volume in Cell H filled with current Tank 50 concentrations
 - Doses less than or similar to results for Case A & Case K

Rad	Vault 4 PA Estimate	Vault 4 Current	Vault 4 UWMQE
Tc-99	580	640	710
I-129	0.28	0.28	0.30
Cs-135	5.4	1.8	1.9
Cs-137	3.0E+05	2.0E+05	2.0E+05
Sr-90	2.4E+05	2.7E+03	2.7E+03
Ra-226	4.1 (1.0E-03) *	2.8E-05	3.1E-05
Th-230	7.5 (1.0E-02) *	2.6E-03	2.9E-03

* Revised values per Case K (RAI PA-8)
All values reported in curies

- **Inventory Calculator Objectives**
 - Provide automated Saltstone Waste Acceptance Criteria (WAC) system for Tank 50 material & SDU inventory compliance.
 - Near real-time inventory updates of constituents in each SDU by cell
 - Track salt solution processed to each SDU cell
- **Inventory Calculator Development**
 - Implementation in August 2012



* Data shown is from a demo program and is not an indication of real processing data

Saltstone R&D Summary Status

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FY 11	FY 12
Lysimeter Construction	Lysimeter Testing Initiation
Formed Core Design Support Studies	PA Property Testing of Samples Developed from Design Support Studies
Tc-99 Reduction Studies	Tc-99 Reduction Studies
	Tc-99 Column Studies
	Oxidation Front Movement Method Development
Saltstone Operating Window Product Quality	Saltstone Operating Window Product Quality
Cementitious Materials Cracking Literature Review	Microbial Degradation Literature Review

- Clarify interpretation of lysimeter concentration data as it relates to evaporation from the collection vessels.
- Clarify the interpretation of data related to water that flows around the lysimeter cementitious samples.
- Provide informal integrated priority list by 8/31
- Provide document list from June 21, 2012 conference call (including PA maintenance plan update).

Participants 8/8

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SRR-CWDA-2012-00108

NRC ONSITE OBSERVATION
8/8/12
TOPIC: LYSIMETER TOUR

NAME	AFFILIATION
F. MALCOLM SMITH	SRR
Karen Pinkston	NRC
Justin Koon	DHEC
A. Christianne Ridge	NRC
Rebecca Freeman	SRR
GREGORY SUBER	NRC
Armando Watson	DOE-SR
George Alexander	NRC
HARRY FELSHER	NRC
Kent Rosenberger	SRR
Nishka Dabber	NRC

Participants 8/8

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SRR-CWDA-2012-00108

NRC Salt Water Processing Monitoring
Date: 8/8/12

Topic: QA OVERVIEW /
3A LIQUID COUNT

Name	Affiliation
F. MALCOLM SMITH	SRR
Nishka Devasar	NRC
George Alexander	NRC
A. Christianne Ridge	NRC
Karen Pinkston	NRC
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STEVE THOMAS	SRR
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Mark A. Schmitz	SRR
Kent Rosenberger	SRR
Rebecca Freeman	SRR

Participants 8/8

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SRR-CWDA-2012-00108

NRC Salt Waste Processing Monitoring
Date: 3/8/12

Topic: PA MAINTENANCE
OVERVIEW

Name	Affiliation
F. MALCOLM SMITH	SRR
Nishka Devaser	NRC
Karen Pinkston	NRC
A. C. Ridge	NRC
George Alexander	NRC
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Rebecca Freeman	SRR
Sherri R. Ross	DOE-SR
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HARLEY FELSNER	NRC
STEVEN A. THOMAS	SRR
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Kent Rosenberger	SRR

Participants 8/8

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SRR-CWDA-2012-00108

NRC Salt Water Processing Monitoring
Date: 8/8/12

Topic: NRC Exit Brief

Name	Affiliation
Rebecca Freeman	SRR
HARRY FELSHER	NRC
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George Alexander	NRC
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GREGORY SUBER	NRC
Sherril R. Ross	DOE-SR
Mark A. Schmitz	SRR
Bruce Dragon	SRR
Victor Franklin	SRR
Nancy Bethurem	SRR
Kent Rosenberger	SRR
T. J. SPENCER	DOE
Armanda Watson	DOE-SR
GINGER DICKERT	SRR
STEVE THOMAS	SRR
F. MALCOLM SMITH	SRR
Kim Hauer	SRR

ADAMS	Agency wide Documents Access and Management System
ARP	Actinide Removal Process
CTO	Construction Turn Over
CX	Categorical Exclusion
DDA	Deliquification, Dissolution, and Adjustment
DOE	United States Department of Energy
DOE-SR	Department of Energy – Savannah River Operations Office
HDPE	High Density Polyethylene
LFRG	Low-Level Waste Disposal Facility Federal Review Group
MCU	Modular Caustic Side Solvent Extraction Unit
NRC	United States Nuclear Regulatory Commission
PA	Performance Assessment
PODD	Performance Objective Demonstration Document
RA	Readiness Assessment
SDF	Saltstone Disposal Facility
SPF	Saltstone Production Facility
SRR	Savannah River Remediation, LLC
SRS	Savannah River Site
SWPF	Salt Waste Processing Facility
UWMQE	Unreviewed Waste Management Question Evaluation
WSRC	Washington Savannah River Company