Savannah River Remediation

We do the right thing.

NRC Salt Waste Monitoring Open Item Status

July 28, 2010

SRR-CWDA-2010-00096

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- **Performance Assessment / Research Activity Status**
- **Open Issues**
  - 2007-1
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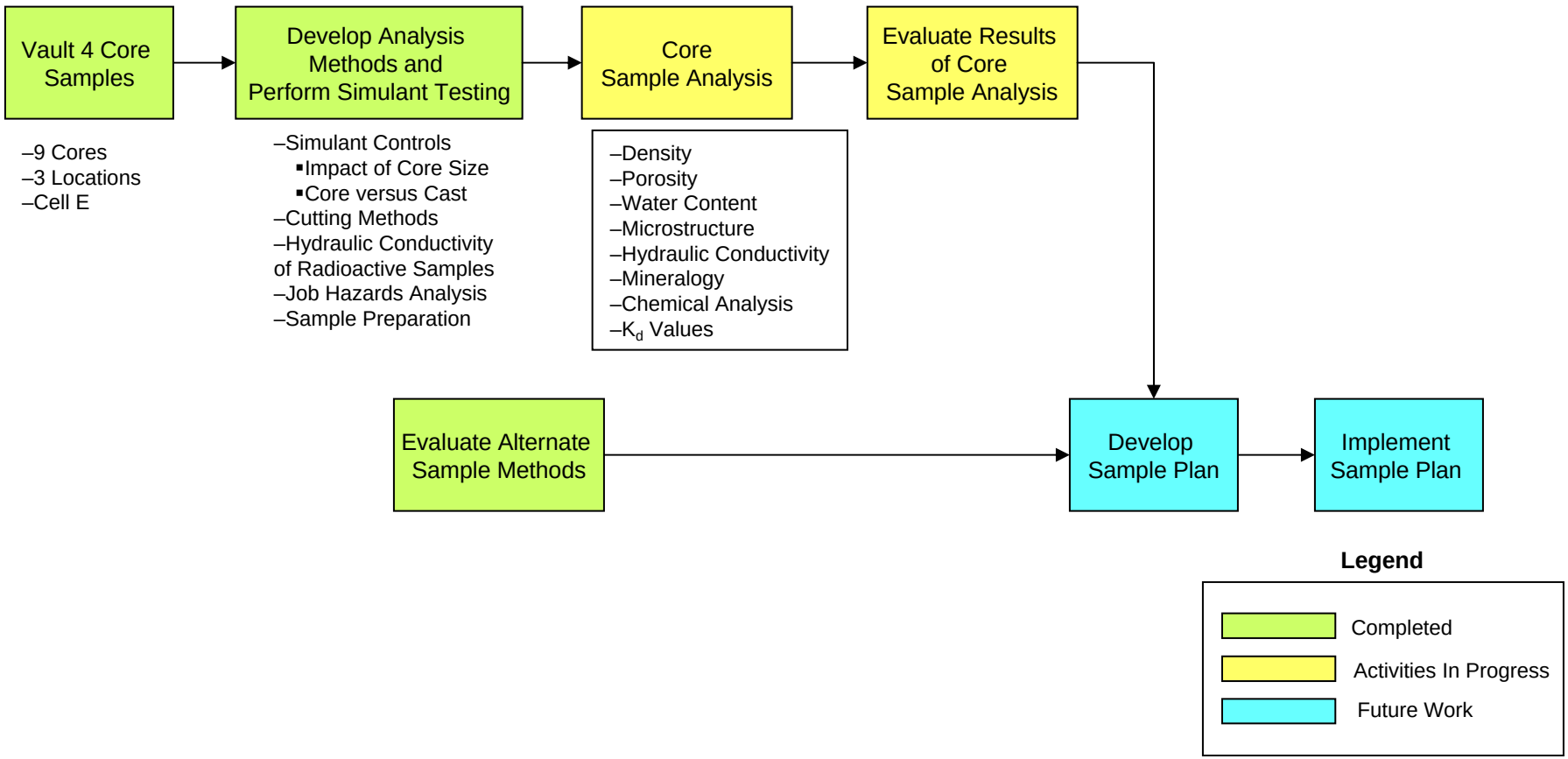
NRC Open Issues

- Documented in NUREG-1911, Revision 1, *NRC Periodic Compliance Monitoring Report for U. S. Department of Energy Non-High Level Waste Disposal Actions – Annual Report for Calendar Year 2008*, dated May 2009

NRC Issue 2007-1

- **Issue**
  - *At the SRS Saltstone Facility, as a result of variations in the composition of saltstone grout actually produced at the SRS SPF, DOE should determine the hydraulic and chemical properties of as-emplaced saltstone grout*
- **Proposed Closure Activity**
  - Complete analysis and evaluation of existing saltstone core samples and prepare and implement sampling plan for on-going verification of hydraulic and chemical properties of as-emplaced saltstone.

NRC Issue 2007-1 (Cont'd)



NRC Issue 2007-1 (Cont'd)

- **SRS Status**
  - In Progress

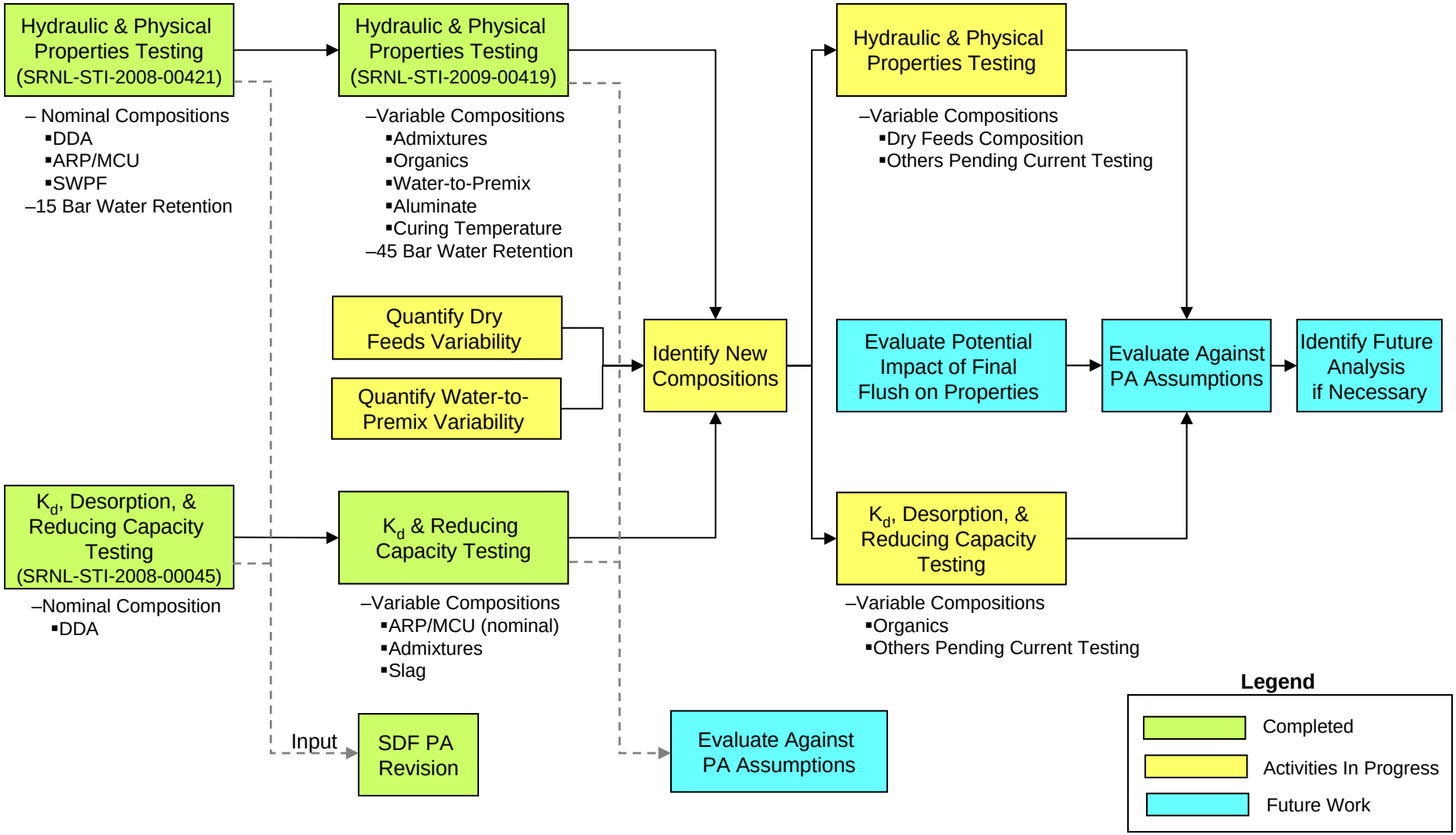
- **Update**
  - Core samples have been extracted from Vault 4 Cell E
  - Laboratory analysis has been completed for density, porosity, x-ray diffraction, and scanning election microscope. Results are consistent with simulants.
  - Evaluation of core sample analysis results anticipated to be completed 3Q CY2010
  - Alternate sampling methods have been tested for future implementation
  - Integrated sampling plan outlining future sampling and correlation of laboratory prepared saltstone to as-emplaced saltstone will be developed and is anticipated to be implemented 4Q CY2010

NRC Issue 2007-2

- **Issue**
  - *At the SRS Saltstone Facility, DOE should demonstrate that intra-batch variability, flush water additions to freshly poured saltstone grout at the end of each production run, and additives used to ensure processability are not adversely affecting the hydraulic and chemical properties of the final saltstone grout. DOE should show that the hydraulic and chemical properties are consistent with the assumptions in the waste determination or show that any deviations are not significant with respect to demonstrating compliance with performance objectives.*

- **Proposed Closure Activity**
  - Perform testing to determine impacts of variability in dry feeds, water to premix ratio and admixtures, as well as impacts of flush water additions, on the hydraulic and chemical properties of saltstone
  - Evaluate results of testing relative to impacts on inputs and assumptions used in the performance assessment

NRC Issue 2007-2 (Cont'd)



NRC Issue 2007-2 (Cont'd)

- **SRS Status**
  - In Progress

- **Update**
  - Initial hydraulic and physical properties testing of nominal saltstone compositions completed
  - Additional saltstone hydraulic and physical properties testing to better understand impacts of process variability are in progress, evaluation of test results is complete and included as part of RAI responses
  - Additional testing for K_d and reducing capacity complete
  - Evaluation of variation in SPF processing parameters on-going
  - Identification of new compositions is underway
  - New hydraulic and physical properties, as well as additional K_d testing underway, expected to complete in CY2011
    - Simulant preparation and curing is ongoing
    - Initial batch of cured simulants will be sent to the lab during the first week of August for testing.

NRC Issue 2009-1

- Documented in *Nuclear Regulatory Commission March 25-26, 2009 Onsite Observation Report For The Savannah River Site Saltstone Facility*, NRC ADAMS accession number ML091320439, dated May 22, 2009

NRC Issue 2009-1

- **Issue**
  - *At the SRS Saltstone Facility, DOE should demonstrate that (1) technetium-99 in salt waste is converted to its reduced chemical form in saltstone grout during the curing of saltstone grout, and is thereby strongly retained in saltstone grout, and (2) the sorption of dissolved technetium-99 onto saltstone grout and vault concrete is consistent with K_d values for technetium-99 that were assumed in the performance assessment*

- **Proposed Closure Activity**
  - Perform additional testing on saltstone reducing capacity and K_d value measurement related to technetium-99

NRC Issue 2009-1 (Cont'd)

- **SRS Status**
  - In Progress

- **Update**
  - Additional K_d and reducing capacity testing has been performed to determine the influence of saltstone formulations on Tc, I, Np, and Pu values as well as the sorption of Tc and I under reducing conditions
  - Evaluation of testing results is now available
  - A Tc-99 spiked simulant has been prepared and is curing.
    - The first sample has been extracted and is being prepared for analysis.
    - Additional samples will be extracted and analyzed over time to verify that reducing conditions are achieved and Tc remains strongly sorbed to the waste matrix.

Acronyms

ADAMS	Agencywide Documents Access and Management System
ARP	Actinide Removal Process
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 Federal Review Group
MCU	Modular Caustic Side Solvent Extraction Unit
NRC	United States Nuclear Regulatory Commission
PA	Performance Assessment
PODD	Performance Objective Demonstration Document
SDF	Saltstone Disposal Facility
SPF	Saltstone Production Facility
SRR	Savannah River Remediation
SRS	Savannah River Site
SWPF	Salt Waste Processing Facility
UDQE	Unreviewed Disposal Question Evaluation
WSRC	Washington Savannah River Company