

# **U.S. Nuclear Regulatory Commission Responsibilities under the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 and Recent Implementation at the Savannah River Site: Focusing on Tank Farms**

**Presentation to  
South Carolina Nuclear Advisory Council  
January 14, 2016**

**by**

**Christopher McKenney, Chief  
Performance Assessment Branch,  
Division of Decommissioning,  
Uranium Recovery, and Waste Programs  
U.S. Nuclear Regulatory Commission**

# Overview

- NRC Activities Related to Waste Incidental to Reprocessing (WIR) at Savannah River Site (SRS)
- Accomplishments
- Path Forward

# Ronald Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA)

- **Section 3116**

- Establishes three criteria for Secretary of Energy to determine, *in consultation with NRC*, that certain radioactive waste resulting from reprocessing of spent nuclear fuel is not high-level waste
- Requires *NRC to monitor*, in coordination with the State, DOE disposal actions for the purpose of assessing compliance with the performance objectives

# Three NDAA Section 3116(a) Criteria

1. Does not require permanent isolation in a deep geologic repository
2. Has had highly radioactive radionuclides removed to the maximum extent practical
3. In compliance with the performance objectives in 10 CFR Part 61, Subpart C

# NRC's NDAA Role

- DOE submits its draft basis for Section 3116 Determination (Waste Determination or WD) to NRC for review to fulfill the consultation requirement under the NDAA. Consultation typically includes:
  - Scoping meetings or technical exchanges
  - Requests for Additional Information
  - NRC Technical Evaluation Report (TER)

## Consultation

- Once the Secretary of Energy issues a final waste determination, NRC, in coordination with the State, monitors DOE disposal actions. Monitoring typically includes:
  - Development of a Monitoring Plan
  - On-Site Observation Visits/Reports
  - Technical Reviews/Reports
  - TERs, as needed

## Monitoring

# Implementation of NDAA at SRS

- **Consultations**

- Consultations completed for the Saltstone Disposal Facility (SDF), F-Tank Farm facility (FTF) and H-Tank Farm facility (HTF)
- No additional consultation is expected at SRS

- **Monitoring**

- The tank farms and SDF currently being monitored in accordance with two separate Monitoring Plans: FTF and SDF Monitoring Plans
- The FTF Monitoring Plan was recently revised to include HTF
- Monitoring conducted in coordination with SCDHEC

# SDF Monitoring

- NRC monitoring DOE disposal actions at SRS SDF since 2007
  - NRC issued the original monitoring plan in 2007
- NRC issued a revised TER and Type-IV Letter of Concern in April 2012 to DOE and SCDHEC
  - NRC developed a new SDF Monitoring Plan in 2013
  - NRC and DOE continue to work to resolve all outstanding NRC concerns identified in the 2012 TER and Letter of Concern
- NRC reviewing DOE Fiscal Year 2014 SDF Special Analysis
  - NRC expects to issue a new TER

# Milestones Related to Tank Farm Facilities

## FTF

- DOE issued a draft WD in September 2010
- NRC documented the results of its consultative review in October 2011
- DOE issued a final WD in March 2012

## HTF

- DOE issued a draft WD in February 2013
- NRC documented the results of its consultative review in June 2014
- DOE issued a final WD in December 2014



# FTF Monitoring Plan

- Because tank farm closure is in the early stages, Tank Farm TER comments and recommendations listed types of information needed to have reasonable assurance the Performance Objectives will be met
- Recommendations cross-walked to Monitoring Factors in Appendix A of the FTF Monitoring Plan ([ML12345A322](#))

# FTF Monitoring Plan (cont)

- NRC prioritized Monitoring Factors based on risk-significance and timing
- Action on some Monitoring Factors contingent on results of analyses conducted for other Monitoring Factors
- DOE making progress on addressing key technical issues (e.g., waste release)

# FTF Monitoring Factors

<b>NRC Prioritization of Monitoring Factors That Support 10 CFR 61.41 and 61.42</b>				
<b>MA 1 Inventory</b>	<b>MA 2 Waste Release</b>	<b>MA 3 Cementitious Material Performance</b>	<b>MA 4 Natural System Performance</b>	<b>MA 5 Closure Cap</b>
1.1— Final Inventory and Risk Estimates	2.1— Solubility- Limiting Phases/Limits and Validation	3.1— Hydraulic Performance of Concrete Vault and Annulus (As it Relates to Steel Liner Corrosion and Waste Release)	4.1— Natural Attenuation of Key Radionuclides	5.1— Long-Term Hydraulic Performance
1.2— Residual Waste Sampling	2.2— Chemical Transition Times	3.2— Groundwater Conditioning via Reducing Grout	4.2— Calcareous Zone Characterization	5.2— Long-Term Erosion Protection Design

# FTF Monitoring Factors (cont)

## NRC Prioritization of Monitoring Factors That Support 10 CFR 61.41 and 61.42

MA 1 Inventory	MA 2 Waste Release	MA 3 Cementitious Material Performance	MA 4 Natural System Performance	MA 5 Closure Cap
1.3— Residual Waste Volume		3.3— Shrinkage and Cracking of Reducing Grout	4-3— Environmental Monitoring	5.3— Closure Cap Functions That Maintain Doses ALARA
1.4— Ancillary Equipment Inventory		3.4— Grout Performance*		
1.5— Waste Removal (As It Impacts ALARA)		3.5— Vault and Annulus Sorption		

Medium Priority

High Priority Recommended

High Priority Dependent or More Difficult (*The monitoring factors in orange are risk significant to the DOE performance assessment, but the need for their implementation may be dependent on results of other monitoring factors. Because the monitoring factors in orange are also expected to be more difficult to study or support, work on monitoring factors in red are recommended first.*)

Lower Priority

# FTF Monitoring

- NRC performed six onsite observation visits, since it began monitoring FTF in April 2012
- Onsite observation visits focused on grouting and closure of four tanks (Tanks 18 and 19 in 2012; and Tanks 5 and 6 in 2013)
- NRC issued nine technical review reports on such topics as waste release, tank grouting, and Special Analyses

# HTF Monitoring

- NRC added HTF monitoring to its SRS Tank Farm monitoring responsibilities in January 2015, after DOE issued final HTF WD in December 2014
- Initial monitoring efforts focused on grouting and closure of Tank 16, a partially submerged tank with a significant quantity of waste in its annulus

# SRS Tank Farms Monitoring Plan

- In 2015, NRC updated FTF Monitoring Plan to include HTF in a single SRS Tank Farms Monitoring Plan
- No new monitoring factors identified
- Some monitoring factors broadened

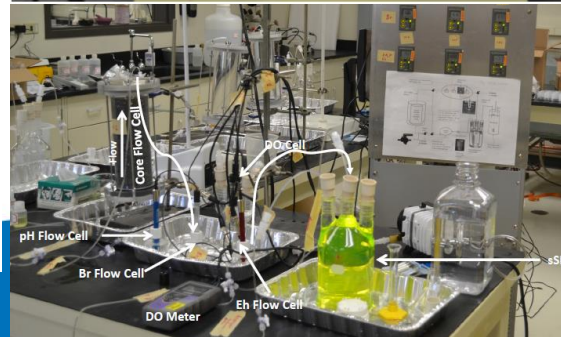
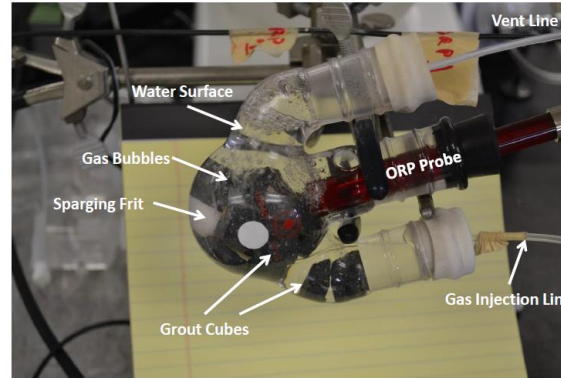
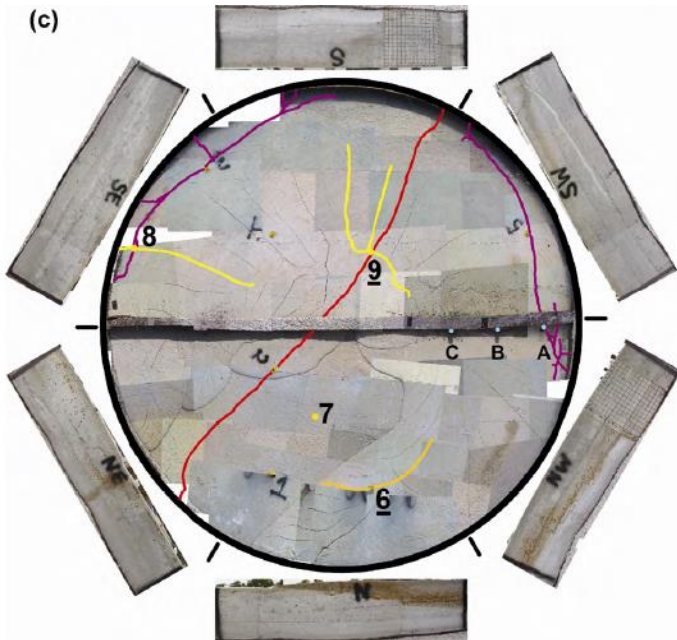
# SRS Tank Farms Monitoring Plan (cont)

- Updated barrier information included consistent with FTF Special Analyses and the more recent HTF Performance Assessment
- The scope of some Monitoring Factors increased to address annular waste, and associated waste release for submerged or partially submerged tanks at HTF



# Center for Nuclear Waste Regulatory Analyses Activities

- Tank grout cracking and groundwater conditioning tests
- Acoustic emission monitoring
- Saltstone waste release



# Accomplishments

- NRC completed three consultative reviews at SRS and does not expect any more
- In fall 2015, NRC issued SRS Tank Farms Monitoring Plan that includes both FTF and HTF
- In monitoring, NRC is focusing on most risk-significant issues facing NDAA Section 3116 facilities at SRS

# Path Forward

- NRC will continue to work with DOE to address key technical issues and share information
- NRC will continue to gain experience and improve efficiency and effectiveness of its monitoring program
- NRC will continue to revise/update monitoring guidance as appropriate

# Closing Thoughts

- NRC has completed consultation at the SRS
- Consultation has added value to the Section 3116 process
- NRC will continue to carry out its monitoring responsibilities in coordination with SCDHEC
- NRC will continue to consolidate and streamline its monitoring activities at SRS
- Relationship between NRC, SC DHEC, and DOE continues to be strong and productive

# QUESTIONS?