





#### **NRC – DOE Joint Public Meeting**

#### NDAA Section 3116 Activities at the Savannah River Site

February 12, 2019

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## **Acronyms in this Presentation**

ARP Actinide Removal Process CFR **Code of Federal Regulations** DSS **Decontaminated Salt Solution** DOE **US** Department of Energy DWPF **Defense Waste Processing Facility GWSB Glass Waste Storage Building** MCi million curies MCU Modular Caustic Side Solvent **Extraction Unit** Mgals million gallons **National Defense Authorization Act** NDAA for Fiscal Year 2005 NRC **Nuclear Regulatory Commission** RAIs **Request for Additional Information** Section § SRS Savannah River Site SWD salt waste disposal

SWPF	Salt Waste Processing Facility
TBD	to be determined
TCCR	Tank Closure Cesium Removal
TER	<b>Technical Evaluation Report</b>
WD	NDAA §3116 Waste Determination

The Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA), Section 3116, reads in part:

... the term "high-level radioactive waste" does not include radioactive waste resulting from the reprocessing of spent nuclear fuel that the Secretary of Energy, in consultation with the Nuclear Regulatory Commission, determines -

- 1. Does not require permanent isolation in a deep geologic repository
- 2. Had highly radioactive radionuclides removed to the maximum extent practical
- 3. (A) Does not exceed concentration limits for Class C low-level waste and will be disposed of:
  - a) In compliance with the performance objectives set out in Subpart C of 10 CFR 61
  - b) Pursuant to a State-approved closure plan or a State-approved permit
- 4. (B) Exceeds concentration limits for Class C low-level Waste and will be disposed of:
  - a) In compliance with the performance objectives set out in Subpart C of 10 CFR 61
  - b) Pursuant to a State-approved closure plan or a State-approved permit
  - c) Pursuant to plans developed by the Secretary in consultation with the NRC

# **Additional NDAA §3116 provisions**

- Section 3116(b) establishes specific *monitoring* responsibilities for the NRC
  - Monitoring is in coordination with the affected State, e.g., South Carolina Department of Health and Environmental Control (SCDHEC)
  - Monitoring restricted to ensuring disposal actions are in compliance with the 10 CFR 61, Subpart C performance objectives
  - Upon discovery of "non-compliant conditions," NRC is to notify: DOE, the Affected State and Two congressional committees
- Section 3116 (c) establishes that the legislation does NOT apply to any waste transported out of the covered state
- Section 3116 (d) defines the covered states as South Carolina and Idaho
- Section 3116 (e) cites the legislation that is NOT superseded and states that it does NOT establish precedent in other states
- Section 3116 (f) provides judicial review criteria:
  - DOE legally accountable for determinations
  - NRC legally accountable for monitoring actions

- The State of South Carolina through the South Carolina Department of Health and Environmental Control was a critical force in the negotiations of the Section 3116 legislation
- In return, States given specified role
  - In Section 3116 (a):

... will be disposed of ... pursuant to State-approved closure plan or Stateissued permit ..

- In Section 3116 (b):

[NRC] shall, in coordination with the covered state, monitor disposal actions taken by DOE ... for the purpose of assessing compliance with the performance objectives set out in [10CFR61]

# **Summary of NDAA §3116 Process**



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#### **Liquid Waste System**



#### Salt Waste Disposal at the Saltstone Disposal Facility



- The Saltstone Disposal Facility is a low-level waste disposal facility that exclusively is used to dispose of treated salt waste from the SRS tanks
- Saltstone is produced by mixing the treated salt solution with dry cementitious materials (mixture of cement, flyash and slag)
- Saltstone cures to a non-hazardous waste form

#### Salt Waste Disposal §3116 Activity Highlights



- NDAA §Section 3116(a) *consultation* concluded on January 6, 2006 with the issuance of the Waste Determination
- Significant and routine interactions have continued since that time between the NRC and SCDHEC per the requirements of NDAA §3116(b) *monitoring*

# **Disposal of Treated Salt Waste – NDAA §3116 Highlights**

- DOE entered consultation with the NRC on February 28, 2005
- The Secretary of Energy signed the Salt Waste Disposal Waste Determination (WD) on January 6, 2006
- A revised SDF Performance Assessment was provided to NRC on November 23, 2009
- A series of NRC Requests of Additional Information (RAIs) and associated DOE responses were executed
- NRC issued a Technical Evaluation Report and a Type IV Letter of Concern on April 30, 2012
- DOE has actively worked to address NRC's questions and concerns, investing over \$10,000,000 in new applied research
- To date, DOE has disposed of over 12.5 million gallons of decontaminated salt solution at the Saltstone Disposal Facility (SDF) consistent with the WD

## **Applied Research Associated with Salt Waste Disposal**

Extensive research has been conducted since issuance of the 2009 SDF Performance Assessment including:

- Extraction and analysis of field-emplaced saltstone
- Development of Dynamic Leaching Method to evaluate contaminant release rates and hydraulic properties of saltstone
- Recalculation of closure cap infiltration rates
- Advancement of understanding of saltstone physical properties over operating parameter ranges
- Advanced understanding of cementitious material degradation mechanisms and rates
- Maturing the flow and transport modeling to keep pace with SDU design changes
- Reduction of inventory uncertainty for Tc-99 and I-129

## **Organizations Contracted to Perform this Applied Research**

Utilized a variety of service providers to tap into best subject matter experts in government, academia and commercial areas:

- Savannah River National Laboratory
- Savannah River Ecology Laboratory
- Vitreous State Laboratory / Atkins (formerly EnergySolutions)
- Vanderbilt University
- Clemson University
- University of Virginia
- Pacific Northwest National Laboratory
- Lawrence Berkeley National Laboratory
- Purdue University
- SIMCO Technologies

# **Emplaced Saltstone Core Sampling**

- To address concerns of use of laboratory prepared samples for historical research and conditions of field-emplaced saltstone, samples were extracted from SDU 2A
- Extensive mockup activities were performed over a year period
- Core-drilling took placed between April 16 and May 6, 2015
- 2.7 man-rem of cumulative exposure was received by SRR workers in obtaining these samples
  - Three individuals received over 200 mrem each
- Initial analyses completed and demonstrated correlation between field-emplaced and laboratory samples
- Additional analyses of the cores is on-going





#### **Operational Closure of Waste Tanks**







# **Tank Closure §3116 Activity Highlights**



- Consultation concluded for the F-Area Tank Farm (FTF) on March 27, 2012 with the issuance of the Waste Determination
- Consultation concluded for the H-Area Tank Farm (FTF) on December 19, 2014 with the issuance of the Waste Determination
- Significant and routine interactions have continued since that time with the NRC per the requirements of NDAA §3116(b) *monitoring*

#### Tank Closure – NDAA §3116 Highlights

- DOE completed the tank closure consultation phase with the NRC in December 2014
- Six tanks have been grouted and operationally closed consistent with §3116



 NRC On-site Observation Visits typically have been timed to coincide with the grouting of the waste tanks

# Conclusion

- Since the NDAA Section 3116 legislation was enacted in 2004 ...
  - More than 12,500,000 gallons of decontaminated salt solution has been treated and disposed of in the Saltstone Disposal Facility
  - Six waste tanks have been cleaned and operationally closed
    - Tanks 5, 6, 18 and 19 in the F-Area Tank Farm
    - Tanks 12 and 16 in the H-Area Tank Farm
      - Tanks 12 and 16 were totally submerged or partially submerged, respectively, in the water table
- DOE has been very responsive to the questions and concerns of the NRC
  - Have hosted numerous on-site visits, providing access to NRC to observe all elements of requested operations and research activities
  - Have provided timely and comprehensive written responses to NRC's requests for information
  - Have invested over \$10,000,000 in operating funds to support applied research to address NRC questions and concerns