



U.S. DEPARTMENT OF
ENERGY



NRC – DOE Joint Public Meeting

NDAA Section 3116 Activities at the Savannah River Site

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Acronyms in this Presentation

ARP	Actinide Removal Process	SWPF	Salt Waste Processing Facility
CFR	Code of Federal Regulations	TBD	to be determined
DSS	Decontaminated Salt Solution	TCCR	Tank Closure Cesium Removal
DOE	US Department of Energy	TER	Technical Evaluation Report
DWPF	Defense Waste Processing Facility	WD	NDAA §3116 Waste Determination
GWSB	Glass Waste Storage Building		
MCi	million curies		
MCU	Modular Caustic Side Solvent Extraction Unit		
Mgals	million gallons		
NDAA	National Defense Authorization Act for Fiscal Year 2005		
NRC	Nuclear Regulatory Commission		
RAIs	Request for Additional Information		
§	Section		
SRS	Savannah River Site		
SWD	salt waste disposal		

NDAA §3116(a)

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

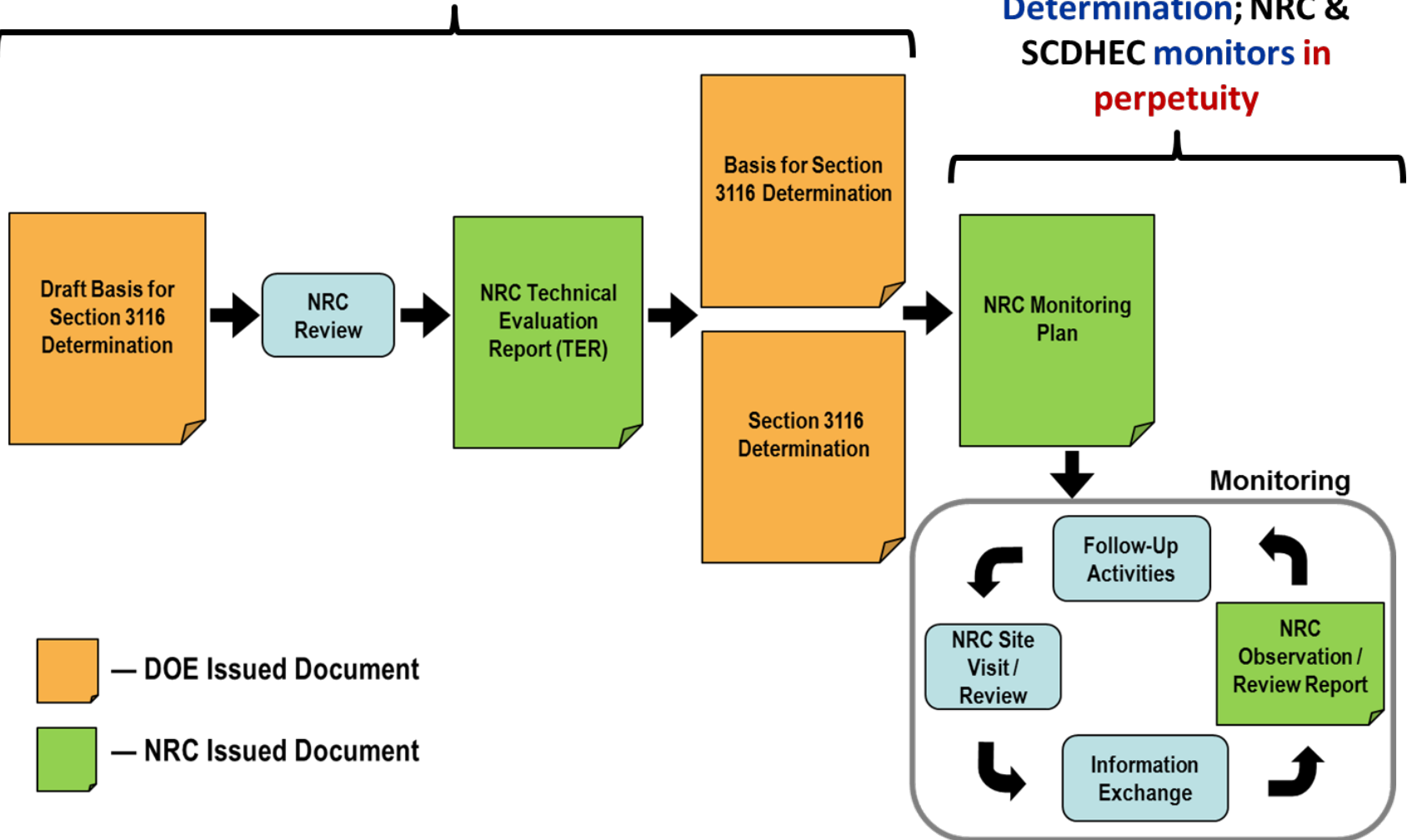
SCDHEC Role

- 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 **State-issued** 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

3116(a) DOE makes **Determination**; NRC **consults**

3116(b) DOE implements **Determination**; NRC & SCDHEC **monitors in perpetuity**

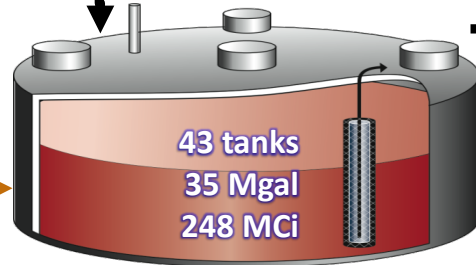


Liquid Waste System

Legend:

ARP	Actinide Removal Process
DWPF	Defense Waste Processing Facility
ISS	Interim Safe Storage
MCU	Modular Caustic Side Solvent Extraction Unit
TCCR	Tank Closure Cesium Removal
SWPF	Salt Waste Processing Facility

Legacy
Liquid
Waste

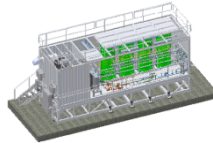
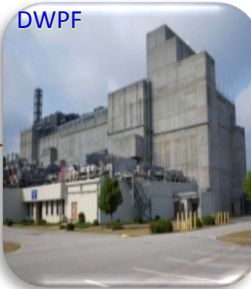


Salt waste

Salt Processing

TCCR

Sludge waste



Spent
Columns

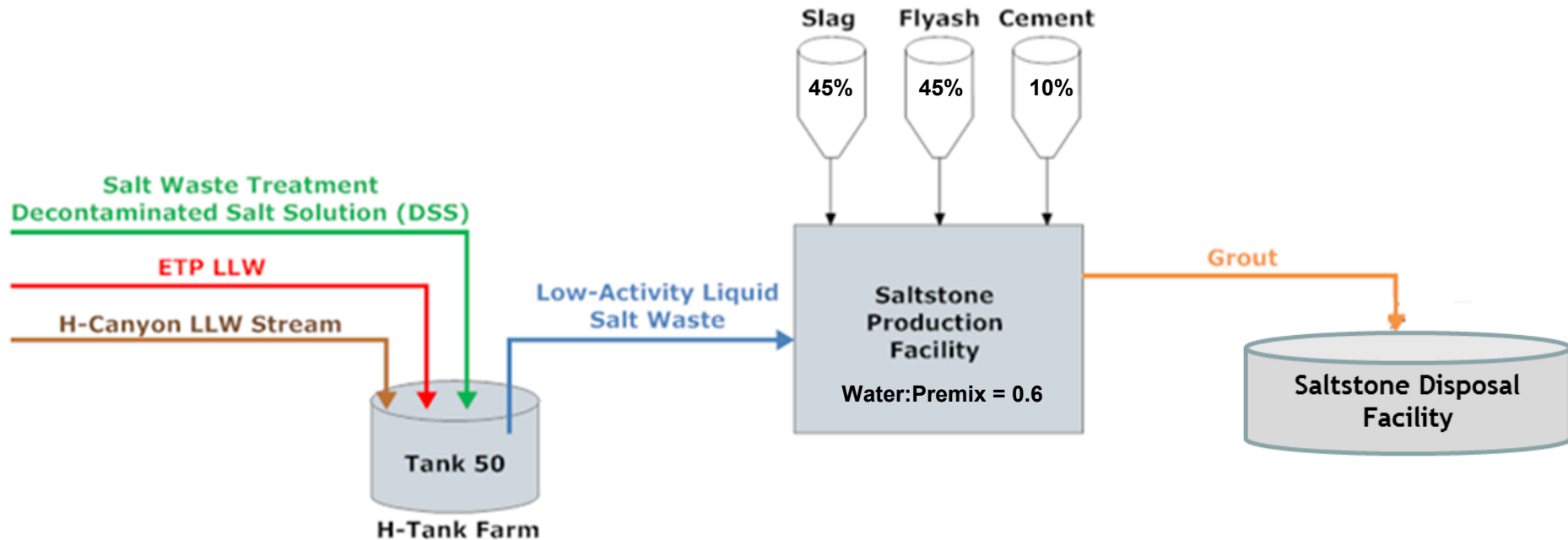
ISS

Glass Waste Storage

Solid, non-hazardous
Waste form
Saltstone Disposal
Facility

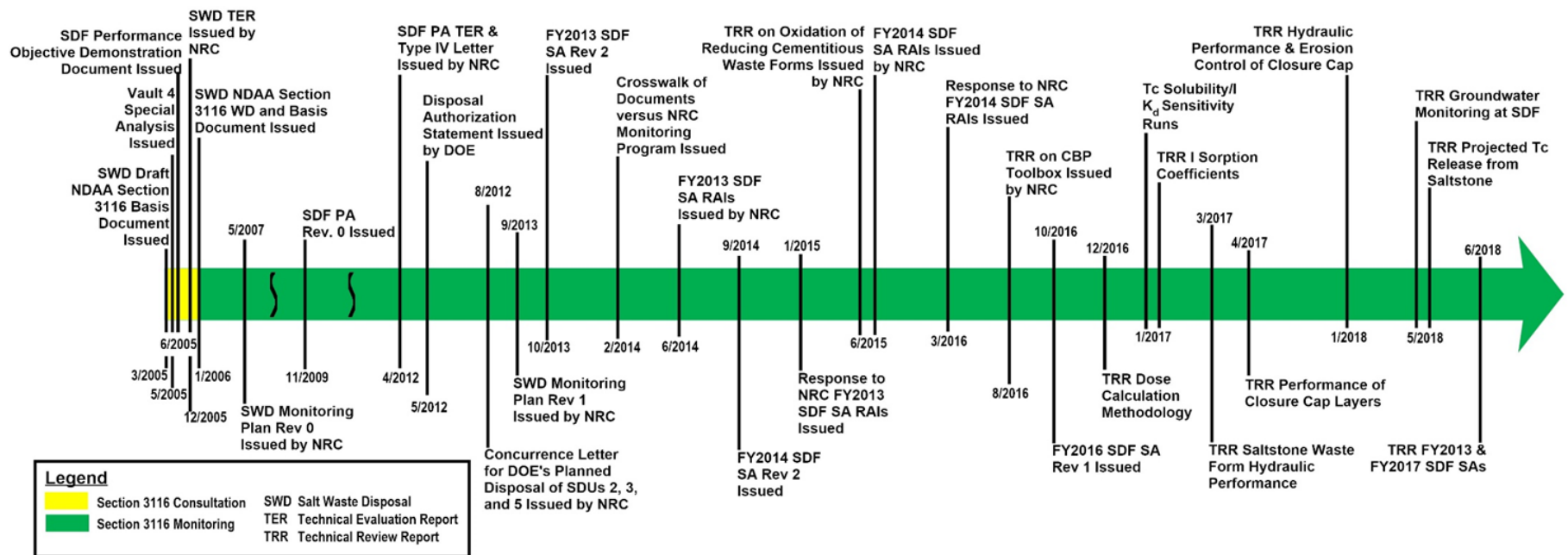
Tanks Cleaned
and Closed

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**

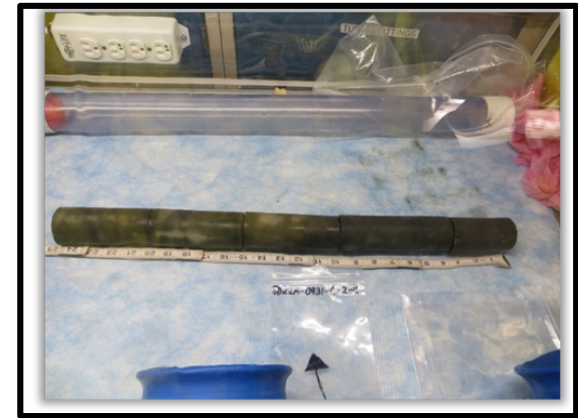
Organizations Contracted to Perform this Applied Research

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

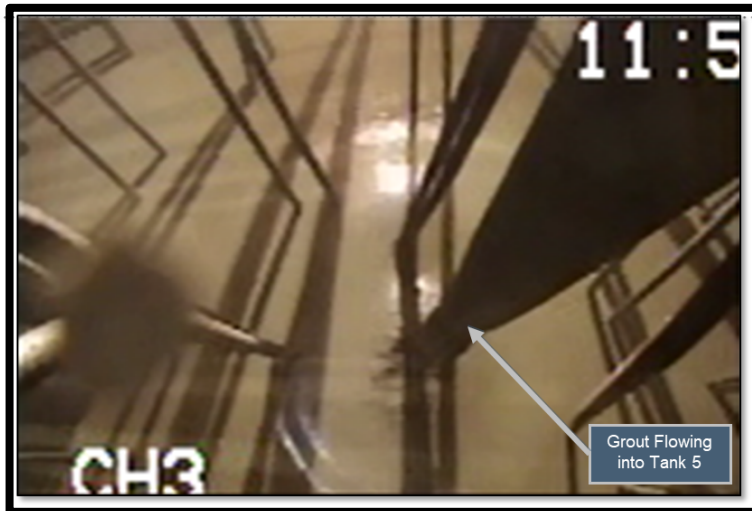
- Savannah River National Laboratory
- Savannah River Ecology Laboratory
- Vitreous State Laboratory / Atkins (formerly *EnergySolutions*)
- Vanderbilt University
- Clemson University
- University of Virginia
- Pacific Northwest National Laboratory
- Lawrence Berkeley National Laboratory
- Purdue University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

Emplaced Saltstone Core Sampling

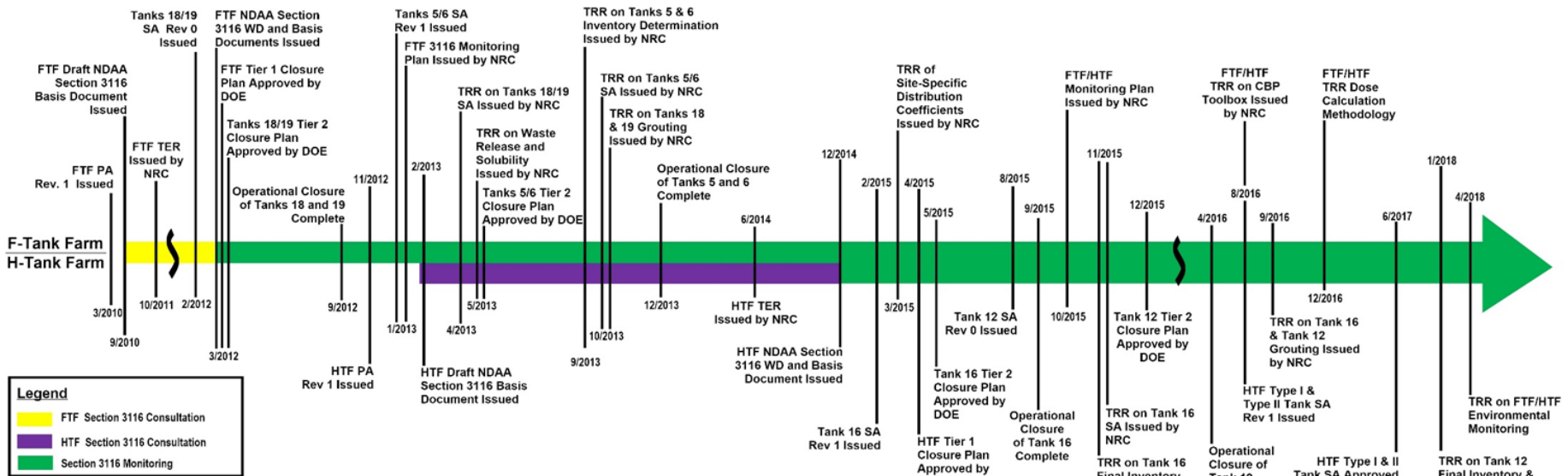
- To address concerns of use of laboratory prepared samples for historical research and conditions of field-emplaced saltstone, samples were extracted from SDU 2A
- Extensive mockup activities were performed over a year period
- Core-drilling took place between April 16 and May 6, 2015
- 2.7 man-rem 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



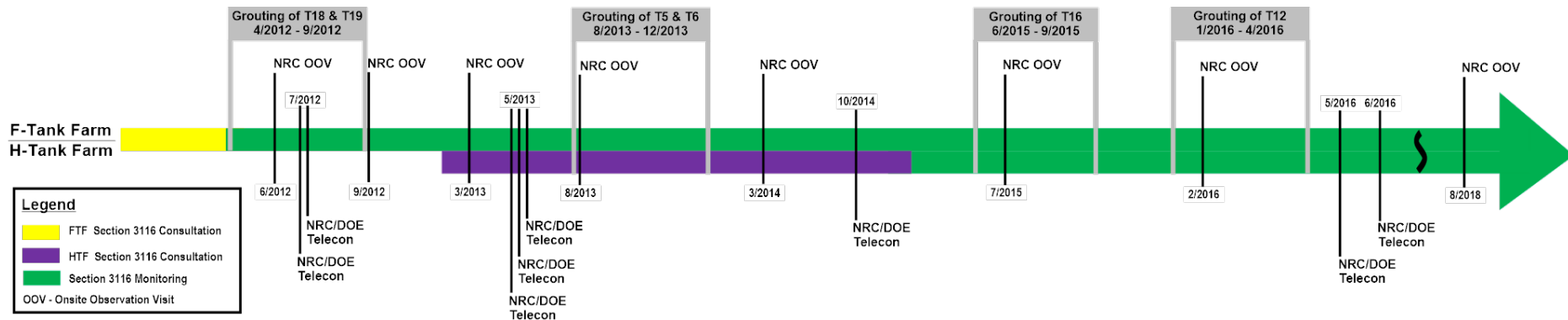
Tank Closure §3116 Activity Highlights



- **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 (HTF) 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**