

October 1, 2009

Thomas Gutmann, Director  
Waste Disposition Programs Division  
U.S. Department of Energy  
Savannah River Operations Office  
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Aiken, SC 29802

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION AUGUST 10-14, 2009 ONSITE  
OBSERVATION REPORT FOR THE SAVANNAH RIVER SITE SALTSTONE  
FACILITY

Dear Mr. Gutmann:

The enclosed report describes the U.S. Nuclear Regulatory Commission's (NRC's) onsite observation activities on August 10-14, 2009, at the Savannah River Site (SRS) Saltstone Facility. This onsite observation was conducted in accordance with Section 3116 of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (Sect. 3116), which requires NRC to monitor disposal actions taken by the U.S. Department of Energy (DOE) for the purpose of assessing compliance with the performance objectives set out in 10 CFR Part 61, Subpart C. The activities conducted during the site visit were consistent with those described in the NRC's monitoring plan for salt waste disposal at SRS (dated May 3, 2007) and NRC's staff guidance for activities related to waste determinations (NUREG-1854, dated August, 2007).

This onsite observation at SRS was focused on assessing compliance with all four of the performance objectives in 10 CFR Part 61, by observing DOE's review process of the performance assessment for the Saltstone Disposal Facility at the SRS.

NRC continues to conclude that there is reasonable assurance that the applicable criteria of Sect. 3116 can be met if key assumptions made in DOE's waste determination analyses prove to be correct. In accordance with the requirements of Sect. 3116 and consistent with NRC's monitoring plan for the Saltstone Disposal Facility, NRC will continue to monitor DOE's disposal actions at SRS. The monitoring activities are expected to be an iterative process. Several onsite observation visits and technical reviews may be necessary in order to obtain the information needed to close all of the current open issues, as well as issues that may be opened in the future.

T. Gutmann

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If you have any questions or need additional information regarding this report, please contact Nishka Devaser of my staff at (301) 415-5196.

Sincerely,

**/RA/**

Patrice Bubar, Deputy Director  
Environmental Protection  
and Performance Assessment Directorate  
Division of Waste Management  
and Environmental Protection  
Office of Federal and State Materials  
and Environmental Management Programs

Enclosure:  
NRC Observation Report

cc w /encl:  
S. Wilson  
Federal Facilities Liaison  
Environmental Quality Control Administration  
South Carolina Department of Health  
and Environmental Control  
2600 Bull Street  
Columbia, SC 29201-1708

T. Gutmann

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**U.S. NUCLEAR REGULATORY COMMISSION AUGUST 10 - 14, 2009 ONSITE  
OBSERVATION REPORT FOR THE SAVANNAH RIVER SITE SALTSTONE FACILITY**

**EXECUTIVE SUMMARY**

The U.S. Nuclear Regulatory Commission (NRC) staff conducted its sixth onsite observation visit to the Saltstone Facility at the Savannah River Site (SRS) on August 10-14, 2009. The intention of this visit was to focus on all four performance objectives by observing the onsite portion of the Low-Level Waste Disposal Facility Federal Review Group (LFRG). The LFRG performs an extensive review of each performance assessment (PA) prepared by a U.S. Department of Energy (DOE) facility and as such is a critical step in the process of preparing the PA. This report provides a description of NRC onsite observation activities and identifies NRC observations from the visit. Based on the results of the visit, the NRC continues to have reasonable assurance that the performance objectives of 10 CFR 61 can be met in the areas reviewed.

There are no new open issues resulting from this observation. A summary of the staff's observations and conclusions is provided below:

**Performance Assessment Process Review**

- The staff observed the LFRG review of the revised performance assessment for the Saltstone Disposal Facility. The review team consisted of relevant subject matter experts employed by DOE, either as federal employees at DOE (Headquarters or another DOE facility) or as technical experts, contractors, or academics associated with one of these locations. The team reviewed the draft PA and associated documents for 30 days prior to the start of the onsite review, which consisted of four days of additional review, in which team members conducted interviews with involved subject matter experts and began preparing their respective parts of the LFRG final report.
- The process observed by the staff seemed thorough and comprehensive. The LFRG vetting process provided the NRC staff assurance that public health and safety were appropriately considered during the review. The NRC staff, however, will have a better understanding of the effectiveness of the LFRG review process once the revised PA has been released and provided to NRC.

**1.0 BACKGROUND**

Section 3116 of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (Section 3116) authorizes the DOE, in consultation with the NRC, to determine that certain radioactive waste related to the reprocessing of spent nuclear fuel is not high-level waste, provided certain criteria are met. Section 3116 also requires NRC to monitor DOE disposal actions to assess compliance with the performance objectives in 10 CFR Part 61, Subpart C.

On March 31, 2005, DOE submitted a "Draft Section 3116 Determination, Salt Waste Disposal Savannah River Site" to demonstrate compliance with the Sect. 3116 criteria including demonstration of compliance with the performance objectives in 10 CFR Part 61, Subpart C (DOE, 2005a). In its consultation role, the NRC staff reviewed the draft waste determination and concluded that there was reasonable assurance that the applicable criteria of Sect. 3116 could

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be met, provided certain assumptions made in DOE's analyses are verified via monitoring. NRC documented the results of its review in a technical evaluation report issued in December 2005 (NRC, 2005). DOE issued a final waste determination in January 2006 taking into consideration the assumptions, conclusions, and recommendations documented in NRC's Technical Evaluation Report (DOE, 2006).

To carry out its monitoring responsibility under Sect. 3116, NRC plans to perform three types of activities: (i) technical reviews, (ii) onsite observations, and (iii) data reviews. These activities will focus on key assumptions—called “factors”—identified in the NRC monitoring plan for saltwaste disposal at SRS (NRC, 2007). Technical reviews generally will focus on obtaining additional model support for assumptions DOE made in its performance assessment that are considered important to DOE's compliance demonstration. Onsite observations generally will be performed to (i) observe the collection of data (e.g., observation of waste sampling used to generate radionuclide inventory data) and review the data to assess consistency with assumptions made in the waste determination, or (ii) observe key disposal (or closure) activities related to technical review areas (e.g., slag and other material storage, grout formulation and preparation, and grout placements). Data reviews will supplement technical reviews by focusing on monitoring data that may also indicate future system performance or by reviewing records or reports that can be used to directly assess compliance with performance objectives.

### 1.1 LFRG PA Review Process

During the week of August 10-14, 2009, the NRC staff onsite observation visit at SRS focused on all four of the performance objectives. The staff attended the Low-Level Waste Disposal Facility Federal Review Group (LFRG) Review Team site visit for the review of the *Performance Assessment (PA) for the Saltstone Disposal Facility at the Savannah River Site (LWP-RIP-2009-00011)*. The LFRG consists of Federal employees from DOE Headquarters and DOE field organizations and typically includes technical experts subcontracted from other DOE sites. The group performs a review of all DOE LLW disposal facilities PAs and composite analyses and supports the process of granting Disposal Authorization Statements. DOE Office of Environmental Management tasks the LFRG with providing the information necessary to determine whether the design, construction, operation, maintenance, and closure of DOE's LLW disposal facilities sufficiently protect public health and safety.

## 2.0 NRC ONSITE OBSERVATION ACTIVITIES

### 2.1 Performance Assessment Process Review

NRC staff monitors ongoing revision of the PA for the Saltstone Disposal Facility at the SRS, as described in Section 3.1.9, “Performance Assessment Process Review,” of the staff's monitoring plan (NRC, 2007).

#### 2.1.1 Observation Scope

The observation of the LFRG PA review is related to the Technical Review Factors identified in the NRC monitoring plan for the SRS Saltstone Disposal Facility (NRC, 2007). The monitoring plan states the importance of NRC staff evaluating revisions and updates made to the PA to

determine if the PA continues to provide reasonable assurance that the long-term performance of the wasteform and its surrounding system will maintain public health and safety.

The general purpose of NRC staff review of the Saltstone Disposal Facility PA revision is to continue to verify compliance with the performance objectives listed in 10 CFR Part 61, Subpart C.

## 2.1.2 Observation Results

During this review, the LFRG review team evaluated the PA and supporting documentation to confirm that the PA is complete, thorough, and technically supported, and the conclusions are valid and acceptable. The review team members included technical experts from other DOE sites with various areas of relevant technical expertise. Team members were given 30 days to review the PA and associated documents prior to the onsite portion of the review.

At the beginning of the week, prior to start of the review, SRS staff gave the LFRG review team a tour of the Saltstone Disposal Facility, including the existing vaults as well as the new vaults currently under construction. Site staff also gave an overview presentation describing their performance assessment methodology and results. Members of the review team also had an opportunity to discuss the PA with the subject matter experts who were involved in the development of the PA or research that supported the PA. These technical experts provided the review team with additional information on the methodology used in the performance assessment and the technical basis for assumptions made in the PA. The technical areas discussed included topics such as the methodology used in the PORFLOW and GoldSim computer modeling codes, the possible degradation mechanisms of the saltstone, the potential for oxidation of Tc in saltstone, the development of the inventory included in the performance assessment, and the uncertainty and sensitivity analyses performed.

The review team used the information presented in the PA and supporting documents and the information gathered in discussions with site staff to evaluate if the PA met the criteria identified in the respective LFRG Review Plan. In cases where the criteria were not met, the review team identified causality. Issues identified were then categorized into key issues and secondary issues. Key issues require resolution as a condition of acceptance of the PA. Secondary issues are important, but not critical to PA acceptance, and describe areas for improvement that should be tracked and resolved through the site maintenance plan (DOE, 2005b).

The review team discussed the potential issues identified and reached a consensus on the lists of key and secondary issues. The LFRG Review Team developed a report documenting the team's consensus opinion. Individual review team members were also provided an opportunity to submit a separate description of their review that provides additional details about their evaluation of the performance assessment.

At the conclusion of the review, the LFRG Review Team briefed the SRS site staff and management on conclusions reached during the review. The LFRG Review Team is also providing a copy of the draft Review Team report to the SRS staff for a review of factual accuracy. Once finalized, the report will be submitted to the LFRG.

NRC staff appreciated the invitation and the opportunity to observe the process and was impressed at the rigorousness of the review. The team was both technically diverse and consisted of members highly regarded in their respective fields. Points of interest, concerns, and conclusions identified by the team were typically consistent with those identified in NRCs review(s) of similar subject matter. The NRC staff must acknowledge, however, that a comprehensive assessment of the process must include analysis of process output as well as input. The LFRG Final Report and the PA will be the outputs to this process, with greater emphasis put on the PA.

### 2.1.3 Conclusions and Follow-up Actions

No NRC issues were identified during the observation of LFRG review. The NRC staff still has reasonable assurance that the performance objectives are currently being met. However, the staff recognizes that the evaluation of the effectiveness of the LFRG process review can only be fully complete at the release of the revised PA.

## 3.0 PARTICIPANTS

<u>U.S. NRC</u>	<u>LFRG Review Team</u>	<u>SRR</u>
Nishka Devaser	Bob Andrews, (Jason Assoc.)	Ginger Dickert
Karen Pinkston	Eric Pierce, (PNNL)	Keith Liner
Gregory Suber	John Walton, (Univ. of Texas)	Bruce Long
	Vefa Yucel, (NTS)	Dave Olson
<u>U.S. DOE</u>		<u>SRNL</u>
Jeff Bentley	Amanda Anderson, (U.S. DOE)	Larry Romanowski
Jim Folk	Jhon Carilli, (U.S. DOE)	F. Malcolm Smith
Tom Gutmann	Joel Case, (U.S. DOE)	Kent Rosenberger
Maureen O'Dell	Martin Letourneau, (U.S. DOE)	
Chun Pang	Joe Rustick, (U.S. DOE)	Dan Kaplan
Sherri Ross	Linda Suttoro, (U.S. DOE)	Christine Langton
	Marc Wood, (CH2MHill)	Miles Denham
	Howard Pope, (PEC)	Greg Flach
		Mark Phifer

#### 4.0 REFERENCES

U.S. Department of Energy (DOE). DOE-WD-2005-001, "Basis for Section 3116 Determination Salt Waste Disposal at the Savannah River Site." Washington, DC: DOE. March 2005a.

\_\_\_\_\_. CBU-PIT-2005-0146, "Saltstone Performance Objective Demonstration Document." Westinghouse Savannah River Company. June 2005b.

\_\_\_\_\_. DOE-WD-2005-001, "Basis for Section 3116 Determination Salt Waste Disposal at the Savannah River Site." Washington, DC: DOE. January 2006.

U.S. Nuclear Regulatory Commission (NRC). "Technical Evaluation Report for Draft Waste Determination for Salt Waste Disposal." Letter from L. Camper to C. Anderson, DOE. December 28, 2005. (Agencywide Documents Access and Management System (ADAMS) Accession No. ML053010225)

\_\_\_\_\_. "U.S. Nuclear Regulatory Commission Plan for Monitoring the U.S. Department of Energy Salt Waste Disposal at the Savannah River Site in Accordance with the National Defense Authorization Act for Fiscal Year 2005." Washington, DC: NRC. May 3, 2007. (ADAMS Accession No. ML070730363)