February 20, 2009

MEMORANDUM TO: Patrice M. 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

THRU: Gregory Suber, Chief/**RA**/
Low-Level Waste Branch
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FROM: David D. Brown, Sr. Project Manager/**RA**/
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Division of Waste Management
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SUBJECT: ONSITE OBSERVATION GUIDANCE FOR MARCH 25-26, 2009, WASTE MONITORING VISIT AT THE SAVANNAH RIVER SITE, SALTSTONE FACILITY

Nuclear Regulatory Commission (NRC) staff is planning an onsite observation visit on March 25-26, 2009, to the U.S. Department of Energy's Savannah River Site, Saltstone Facility to monitor activities related to the disposal of non-high-level waste, per NRC's responsibilities under the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005. The onsite observation guidance is attached for your information.

Enclosure:
As stated

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ONSITE OBSERVATION GUIDANCE FOR MARCH 25-26, 2009, MONITORING VISIT AT THE SAVANNAH RIVER SITE SALTSTONE FACILITY

PURPOSE

To provide onsite observation guidance for a planned visit on March 25-26, 2009, to the U.S. Department of Energy's (DOE's) Savannah River Site (SRS) Saltstone Facility to monitor activities related to the disposal of non-high-level waste, per the U.S. Nuclear Regulatory Commission's (NRC's) responsibilities under Section 3116(b) of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA).

OBJECTIVES

1. To observe ongoing construction of new disposal cells at the Saltstone Disposal Facility (SDF);

2. To follow up on open issues in the NRC's monitoring program, and to discuss NRC staff questions following its review of technical reports provided by DOE on November 25, 2008, January 8, 2009, and January 9, 2009;

3. To review operational experience and available lab-scale and full-scale testing data for the Actinide Removal Process (ARP) and the Modular Caustic Side Solvent Extraction Unit (MCU) processes, including DOE procedures for tracking disposal of key radionuclides at the SDF against the radionuclide inventory assumed in the 2005 performance assessment.

BACKGROUND

Section 3116(a) of the NDAA authorizes DOE, in consultation with the NRC, to determine whether certain radioactive waste related to the reprocessing of spent nuclear fuel is not high-level waste, provided certain criteria are met. Section 3116(b) of the NDAA requires NRC to monitor DOE disposal actions to assess compliance with Title 10 of the Code of Federal Regulations (10 CFR), Part 61, Subpart C, performance objectives for low-level waste.

On March 31, 2005, DOE submitted to the NRC a draft waste determination titled, "Draft Section 3116 Determination, Salt Waste Disposal, Savannah River Site." The purpose of the draft waste determination was to demonstrate compliance with the criteria in Section 3116(a) of the NDAA, including compliance with the performance objectives in 10 CFR Part 61, Subpart C. In its consultation role, the NRC staff reviewed the draft waste determination and concluded that there was reasonable assurance that the applicable criteria of the NDAA could be met, provided certain assumptions made in DOE's analyses were verified via monitoring. In December 2005, NRC staff documented the results of its review in a technical evaluation report (TER). DOE issued a final waste determination in January 2006 taking into consideration the assumptions, conclusions, and recommendations documented in NRC's TER. On May 3, 2007, NRC staff, pursuant to its monitoring responsibility under the NDAA, completed a monitoring plan for the SRS Saltstone Facility. This onsite observation guidance has been developed in accordance with the May 2007 monitoring plan to ensure consistency in NRC staff's monitoring activities. The May 2007 monitoring plan is available in NRC's Agencywide Document Access and Management System (ADAMS) at accession number ML070730363.

On March 24-28, 2008, NRC staff visited SRS to observe DOE's salt waste disposal activities. NRC staff observations during that visit were documented in NRC staff's report dated June 5, 2008 (ADAMS accession number ML081290367). During the March 24-28, 2008, visit, NRC staff observed that DOE had developed a saltstone product quality assurance strategy. This strategy includes experiments that were to have been performed through the remainder of fiscal year FY 2008 and into FY 2009 that are designed to obtain information that would support assumptions DOE has made in its waste determination regarding the characteristics of the saltstone grout and SDF vault.

The NRC staff observed ongoing experiments during a visit on July 31, 2008. NRC staff observations during the July 31, 2008, visit are documented in NRC staff's observation report dated September 24, 2008 (ADAMS accession number ML082530057).

OBSERVATION REQUIREMENTS

NRC's onsite observation of the disposal actions taken by DOE focuses on the performance objectives set out in 10 CFR Part 61, Subpart C. These performance objectives are, (i) protection of the general population from releases of radioactivity (10 CFR 61.41), (ii) protection of individuals against inadvertent intrusion (10 CFR 61.42), (iii) protection of individuals during operations (10 CFR 61.43), and (iv) stability of the disposal site after closure (10 CFR 61.44).

This onsite observation will be primarily focused on the performance objective set forth in 10 CFR 61.41. Since the salt waste processing operations will impact the long-term stability of the SDF after its closure, this observation will also partially assess the performance objective in 10 CFR 61.44. The following topics will be used to guide the NRC staff's observations and actions while visiting the SRS facility.

Construction of the New SDF Disposal Cell

The NRC staff plans to visit the construction site of the new disposal cell (Vault 2). At the time of the observation, staff anticipates that placement of the base mud mat, geosynthetic clay and high-density polyethylene liners, and Type V mud mat will be complete, and the floor of the new cells may have been poured. These construction milestones are listed in a schedule provided by DOE (ADAMS accession number ML090150170). As noted in Section 3.2.3, "Vault Construction," of the May 2007 monitoring plan, NRC staff will be focused on penetrations and joints through which water could infiltrate, and any changes to the conceptual design discussed with DOE on May 15, 2008 (See Meeting Summary at ADAMS accession number ML081540288).

Open Issues and Ongoing Technical Reviews

The NRC staff plan to discuss with DOE its review of several reports provided to NRC staff since November 2008 that address open issues that staff identified during an onsite observation in October 2007, and other monitoring activities identified in the staff's May 2007 monitoring plan. A list of reports provided to NRC staff is listed in the Attachment.

The specific technical topics that NRC staff are prepared to discuss are listed below. Specific report numbers used in the Attachment are cited in parentheses:

1. Results of soil contamination sampling results for Vault 4 (report numbers 1-5);

2. The report by Kaplan et al. on “Saltstone and Concrete Interactions with Radionuclides” (report number 6);

3. The report by Dixon et al. on “Hydraulic and Physical Properties of Saltstone Grouts and Vault Concretes” (report number 7);

4. The reports by Langton on “Evaluation of Sulfate Attack on Saltstone Vault Concrete and Saltstone” (reports 8 and 9); and

5. The video survey of Vault 4, Cell G (report number 14). Staff also plans to view the video during this onsite observation.

Operational Experience with ARP/MCU and Saltstone Inventory

The NRC staff plan to discuss DOE’s operational experience with startup and commissioning of the ARP and MCU processes (i.e., interim salt waste processing), with particular focus on the amount of key radionuclides being transferred to the SDF, and DOE’s procedures for tracking disposal of key radionuclides at the SDF against the radionuclide inventory assumed in the 2005 performance assessment.

Attachment: DOE-SR reports provided for NRC technical review November 25, 2008 – January 9, 2009

DOE-SR reports provided for NRC technical review November 25, 2008 – January 9, 2009

No.	Description	ADAMS Accession No.
1	Rosenberger, K. H., *Comparison of Vault 4 Soil Sampling Results to Existing Unreviewed Disposal Question Evaluation SRS-REG-2007-00041*, SRNS-J2100-2008-00013, Savannah River Nuclear Solutions. December 3, 2008	ML090120429
2	Kubilius, W., *Z-area Vault 4 Phase 2 Soil Sample Analytical Data Report*, ERD-EN-2008-0083, Savannah River Site, December 2008.	ML090120404
3	Rosenberger, K. H., *Unreviewed Disposal Question Evaluation: Evaluation of Liquid Weeping from Saltstone Vault 4 Exterior Walls*, SRS-REG-2007-00041, Revision 1, Westinghouse Savannah River Company, Aiken, South Carolina, April 2008.	ML090120475
4	Kent, E., Letter to J. Buczek, WSRC, re: Samples received on February 14, 2008, GEL Laboratories, March 13, 2008.	ML090120546
5	Kent, E., Letter to J. Buczek, WSRC, re: Samples received on July 16, 2008, GEL Laboratories, September 16, 2008.	ML090120539
6	Kaplan, D. I., K. Roberts, J. Coates, M. Siegfried, S. Serkiz, *Saltstone and Concrete Interactions with Radionuclides: Sorption (Kd), Desorption, and Reduction Capacity Measurements*, SRNS-STI-2008-00045, Savannah River National Laboratory, WSRC. October 2008	ML090150234
7	Dixon, K., J. Harbour, and M. Phifer, *Hydraulic and Physical Properties of Saltstone Grouts and Vault Concretes*, SRNL-STI-2008-00421, Revision 0, Savannah River National Laboratory, WSRC. November 2008	ML090150298
8	Langton, C., *Evaluation of Sulfate Attack on Saltstone Vault Concrete and Saltstone, Part I: Final Report*, SRNS-STI-2008-00050, Revision 0, Savannah River National Laboratory, SRNS. August 19, 2008	ML090150306
9	Langton, C., *Evaluation of Sulfate Attack on Saltstone Vault Concrete and Saltstone, Part II: Test Methods to Support Moisture and Ionic Transport Modeling using the STADIUM® Code*, SRNS-STI-2008-00052, Revision 0, Savannah River National Laboratory, SRNS. August 19, 2008	ML090150312
10	Denham, Miles, *Thermodynamic and Mass Balance Analysis of Expansive Phase Precipitation in Saltstone*, WSRC-STI-2008-00236, Savannah River National Laboratory, WSRC. May 2008	ML083400055
11	Skidmore, T. E. and K. D. Billings, *Saltstone Vault #2 Interior Lining Review (U)*, WSRC-TR-2008-00090, Rev. 0, Savannah River National Laboratory, WSRC. May 2008.	ML083400060
12	Jones, W. E. and M. A. Phifer, *Saltstone Disposal Facility Closure Cap Concept and Infiltration Estimates*, WSRC-STI-2008-00244, Savannah River National Laboratory, WSRC. May 2008	ML083400069
13	Bagwell, L.A. and M.R. Millings, *Review of the Tan Clay Confining Zone Beneath Z Area*, SED-GTE-2008-002, WSRC, February 29, 2008	ML083400065
14	Dixon, K., J., *Video Survey of Saltstone Vault 4, Cell G*, SRNL-ESB-2008-00017, Savannah River National Laboratory, WSRC. April 25, 2008	ML090150154

Attachment