

July 7, 2010

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

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION (NRC) APRIL 19, 2010 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 April 19, 2010, 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 (Section 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 two of the four performance objectives: (i) protection of the general population from releases of radioactivity (10 CFR 61.41) and (ii) protection of individuals during operations (10 CFR 61.43). Meeting these two performance objectives is predicated in part on the performance of the disposal cells within the period of compliance.

NRC continues to conclude that there is reasonable assurance that the applicable criteria of Section 3116 can be met if key assumptions made in DOE's waste determination analyses prove to be correct. In accordance with the requirements of Section 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 (the term "open issues" is defined in the NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations, dated August 2007), 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/

David L. Skeen, 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 (NRC) APRIL 19, 2010 ONSITE
OBSERVATION REPORT FOR THE SAVANNAH RIVER SITE SALTSTONE FACILITY**

EXECUTIVE SUMMARY:

The U.S. Nuclear Regulatory Commission (NRC) staff conducted its eighth onsite observation visit to the U.S. Department of Energy (DOE) Saltstone Facility at the Savannah River Site (SRS) on April 19, 2010. The staff's visit was prompted initially by an interest in observing the hydrostatic test of disposal cell 2B, however, shortly before DOE began the test, multiple damp or wet spots were evident at points around the base of the cell. Since the hydrostatic test procedure (CROM, 2009) states that no damp spots may be evident prior to beginning the test, SRR staff did not proceed with the hydro-test. The NRC staff was given a tour of the disposal cell 2B to observe the damp spots and the actions being taken by SRR to investigate the root cause of the spots.

Although the agenda items of the observation changed, the intention remained the same, to focus on compliance with two of the four performance objectives: (i) protection of the general population from releases of radioactivity (10 CFR 61.41) and (ii) protection of individuals during operations (10 CFR 61.43) by observing activities related to new disposal cell construction. This report provides a description of NRC onsite observation activities and identifies NRC observations from the visit. DOE is currently assessing the root cause of the wet spots and the NRC continues to monitor the situation closely. Based on the preliminary information received to date, 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, however, the NRC staff will continue to monitor the path forward and corrective actions considered and taken by DOE and its contractors regarding the damp spots found on cell 2B prior to the hydrostatic test. NRC staff also will monitor the outcome of the hydrostatic test performed for cell 2A following the test performed for cell 2B.

A summary of the staff's observations and conclusions is provided below:

Disposal Cell Construction:

- Due to the presence of damp spots on cell 2B, the hydrostatic test of cell 2B was postponed. The NRC staff visited the site to observe the progress of examining the root cause of the damp spots. Photos taken during the observation are available via NRC's document repository, the Agencywide Document Access and Management System (ADAMS), at ADAMS accession number ML101460045.
- The NRC staff will continue to monitor actions being taken to investigate the cause of the spots.

Enclosure

1.0 BACKGROUND:

Section 3116 of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (Section 3116) authorizes the Department of Energy (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 Section 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 Section 3116 could 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 Section 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 salt waste disposal at SRS (NRC, 2007). Technical reviews generally will focus on obtaining additional model support for assumptions DOE made in its PA 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.

2.0 NRC ONSITE OBSERVATION ACTIVITIES:

2.1 DISPOSAL CELL CONSTRUCTION:

2.1.1 Observation Scope:

The staff's interest in observing construction relates to ensuring the integrity of the disposal units and identifying the potential mechanisms of contaminant release from the facility. Section 3.1.3, "Hydraulic Isolation of Saltstone," of the May 2007 monitoring plan provides details of the basis for the staff's intended review areas.

The staff's visit was prompted initially by an interest in observing the hydrostatic test of disposal cell 2B, however, shortly before SRR began the test, multiple damp spots were evident at points

around the base of the cell (Figure 1). Due to the presence of damp spots on cell 2B, the hydrostatic test of cell 2B was postponed and investigations were performed to determine the source of the spots.

2.1.2 Observation Results:

The NRC staff visited the site to observe the progress of examining the root cause of the damp spots. At the time of the observation, the vendor CROM was in the process of removing the outer layer of shotcrete on the outside base of the cell at the points exhibiting damp spots. In addition, spots noticed at a lower point (between the upper mud mat and the cell floor, note Figure 1) provided sufficient evidence for portions of the upper mud mat to be removed enough to see the circumference of the cell floor under the base of the cell. SRR staff walked NRC staff around the circumference of the cell and requested multiple photos be taken at various points during this portion of the tour (available at ADAMS accession number ML101460045). In all, 33 damp spots were identified at various spaces around the circumference of the cell. These spots were slightly damp to the touch, but were mostly evident by sight. NRC staff asked various questions pertaining to the timing of the damp spots and any correlations the location of the spots had with construction materials, components, etc. that might have been noticed by SRR or CROM staff. A question of note asked by NRC staff was what effect the presence of damp spots will have on the hydro-test procedures, specifically, will any chemical or visual tracers be used in future hydro-tests (e.g. cell 2A hydro-test). SRR staff responded to the question by saying that insertion of a tracer will be considered for the hydro-test of cell 2A. Damp spots are of interest to the NRC staff because their unexpected presence and the corrective actions to repair them could each have some effect on assumptions made in the performance assessment pertaining to vault performance.

A red dye tracer was then added to the water to distinguish between water inside the cell and water from the surrounding environment, outside the cell.

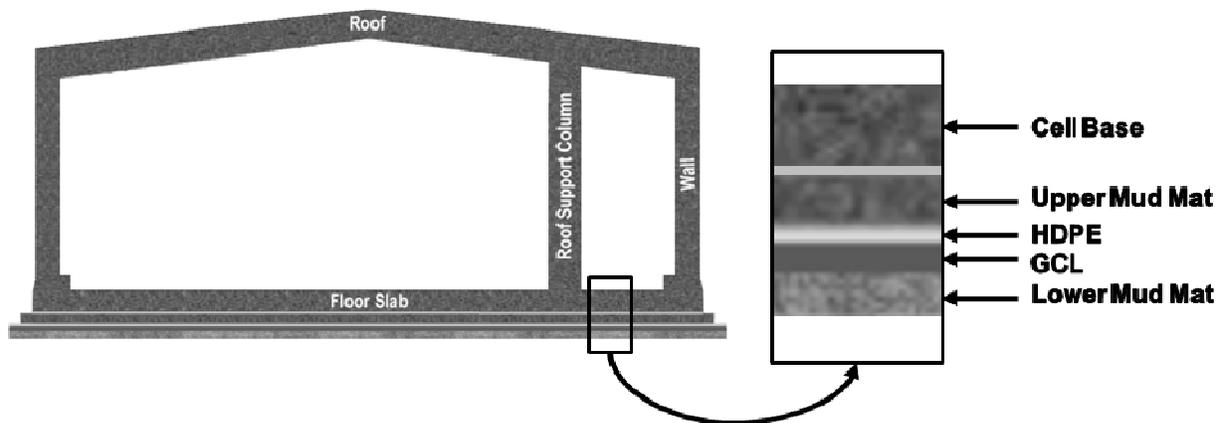


Figure 1: Disposal Cell Depiction (not to scale)

The NRC staff will continue to monitor actions being taken to investigate the cause of the spots.

2.1.3 Conclusions and Follow-up Actions:

Based on the results of the visit and the preliminary results provided by DOE (ML101660516), the NRC continues to have reasonable assurance that the performance objectives of 10 CFR 61 can be met but continues to monitor the situation closely. The NRC staff will monitor the path forward and corrective actions considered and taken by DOE and its contractors regarding the damp spots found on cell 2B prior to the hydrostatic test. Prior to the observation, DOE provided the vendors hydro-test procedure (CROM, 2009). Photos of the tour of the facility that took place in lieu of observing the hydro-test are available in NRC's document repository, the Agencywide Documents Access and Management System (ADAMS), at ADAMS accession number ML100550095.

Shortly after this observation, SRR inserted a fluorescent red dye into the cell water as a visual tracer. After mixing the dye throughout the cell, pink stains were evident at the interface between the cell base and the upper mud mat. Since that time, SRR has been working to identify the mechanisms causing these potential flow paths and furthermore to identify corrective actions should they actually be flow paths. NRC staff will ensure that actions are taken during investigation or corrective action (e.g. construction repairs) will not substantially change the assumptions made in the PA (SRR, 2009) or that any change in the assumptions supporting the PA are accounted for in the NRC staff's review.

3.0 PARTICIPANTS:

U.S. NRC
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Gregory Suber

SRR
F. Malcolm Smith
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SC DHEC
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CROM Corporation, Water Tank Tightness Test Procedure, Job No. 2008-M-084, Aiken, SC, November 23, 2009.

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.

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