



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 27, 2019

Mr. Aaron White
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 SEPTEMBER 17, 2019, ONSITE
OBSERVATION VISIT REPORT FOR THE SAVANNAH RIVER SITE
SALTSTONE DISPOSAL FACILITY

Dear Mr. White:

The enclosed Onsite Observation Visit (OOV) Report describes the U.S. Nuclear Regulatory Commission (NRC) OOV on September 17, 2019, at the Savannah River Site (SRS) Saltstone Disposal Facility (SDF). The OOV was conducted in accordance with Section 3116(b) of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (NDAA), which requires the NRC, in coordination with the NDAA-Covered State, to monitor certain disposal actions taken by the U.S. Department of Energy (DOE) for assessing compliance with the performance objectives set out in Title 10 of the *Code of Federal Regulations* (CFR) Part 61, Subpart C. The five 10 CFR Part 61 Subpart C performance objectives are: §61.40 (General Requirements); §61.41 (Protection of the General Population from Releases of Radioactivity); §61.42 (Protection of Individuals from Inadvertent Intrusion); §61.43 (Protection of Individuals during Operations); and §61.44 (Stability of the Disposal Site after Closure). This is the 21st SDF OOV since the NRC began monitoring the DOE SDF disposal actions under NDAA Section 3116(b) in October 2007.

The main activities conducted during the September 2019 SDF OOV were: (1) discuss operating and disposal structure status; and (2) tour the partial construction of Saltstone Disposal Structure 7.

Those OOV activities were consistent with the activities described in the NRC Guidance Memorandum for the September 2019 SDF OOV dated August 7, 2019 [available via the NRC Agencywide Documents Access and Management System (ADAMS) at Accession No. ML19219A043]. That Guidance Memorandum was developed using the SDF Monitoring Plan, Rev. 1, dated September 2013 [ADAMS Accession No. ML13100A113] and five NRC letters to the DOE that supplemented the 2013 SDF Monitoring Plan [ADAMS Accession Nos. ML17097A351, ML18033A071, ML18107A161, ML18219B035, and ML19150A295]. The NRC 2013 SDF Monitoring Plan, as supplemented, contains the monitoring areas and monitoring factors established to evaluate performance of the SDF.

The September 2019 SDF OOV did not result in any changes from the 2013 SDF Monitoring Plan, as supplemented.

If you have any questions, or need additional information, regarding this OOV Report, please contact Mr. Harry Felsher of my staff at Harry.Felsher@nrc.gov or at (301) 415-6559.

In accordance with Title 10 *Code of Federal Regulations* 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

/RA/

Patricia K. Holahan, Director
Division of Decommissioning, Uranium Recovery
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Docket No. PROJ0734

Enclosure:
NRC Onsite Observation Visit Report

cc: w/ Enclosure:
WIR Service List
WIR ListServ

A. White

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OBSERVATION VISIT REPORT FOR THE SAVANNAH RIVER SITE
SALTSTONE DISPOSAL FACILITY **DATE November 27, 2019**

DISTRIBUTION: RLGladney LDesotell KPinkston GAlexander HArIt

ADAMS Accession No.: ML19289A525

*** via email**

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**U.S. NUCLEAR REGULATORY COMMISSION
SEPTEMBER 17, 2019, ONSITE OBSERVATION VISIT REPORT FOR
THE SAVANNAH RIVER SITE SALTSTONE DISPOSAL FACILITY**

EXECUTIVE SUMMARY:

The U.S. Nuclear Regulatory Commission (NRC) staff conducted its 21st Onsite Observation Visit (OOV) to the Saltstone Disposal Facility (SDF) at the Savannah River Site (SRS) on September 17, 2019 (SDF Observation 2019-01). This was the only SDF OOV in Calendar Year (CY) 2019. On every OOV to SRS the NRC is focused on assessing the U.S. Department of Energy (DOE) compliance with four performance objectives in Title 10 of the *Code of Federal Regulations* Part 61, Subpart C: Protection of the General Population from Releases of Radioactivity, Protection of Individuals from Inadvertent Intrusion, Protection of Individuals during Operations, and Stability of the Disposal Site after Closure. If the NRC concludes with reasonable assurance that the DOE complies with those four performance objectives, then the NRC will also conclude with reasonable assurance that the DOE complies with the general requirements of §61.40.

For this OOV, the NRC focused on the monitoring areas and monitoring factors in the NRC SDF Monitoring Plan, Rev. 1 dated September 2013 [available via the NRC Agencywide Documents Access and Management System (ADAMS) at Accession No. ML13100A113], as supplemented by the five NRC letters to the DOE [ADAMS Accession Nos. ML17097A351, ML18033A071, ML18107A161, ML18219B035, and ML19150A295]. This is the seventh SDF OOV under the 2013 SDF Monitoring Plan. The South Carolina Department of Health and Environmental Control staff also participated in this OOV.

Consistent with the NRC Guidance Memorandum for this OOV dated August 7, 2019, [ADAMS Accession No. ML19219A043], the main activities conducted during this OOV were: (1) discuss operating and disposal structure status; and (2) tour the partial construction of Saltstone Disposal Structure 7.

The NRC did not close any of the SDF monitoring factors or change the overall conclusions from the NRC Technical Evaluation Report for the SDF dated April 2012 [ADAMS Accession No. ML121020140] as a result of this OOV. The NRC and the DOE continue to work in the NDAA monitoring process to resolve all outstanding concerns that led to issuance of the NRC Type-IV Letter of Concern.

1.0 ONSITE OBSERVATION VISIT ACTIVITIES:

On August 7, 2019, the NRC issued the Onsite Observation Visit (OOV) Guidance Memorandum [ADAMS Accession No. ML19219A043] for the September 2019 SDF OOV, Saltstone Disposal Facility (SDF) Observation 2019-01. An OOV Guidance Memorandum is a plan for what the NRC expects to cover during an OOV, which may be changed based on what happens during the OOV.

Enclosure

The OOV began with a short briefing on the agenda that was attended by representatives from the DOE (including the DOE contractors), the NRC, and the South Carolina Department of Health and Environmental Control (SCDHEC) (i.e., South Carolina regulator of DOE Savannah River Site). Afterwards, there were welcoming remarks and introductions. The rest of the OOV consisted of a technical discussion and a tour. The technical discussion was focused on the operating and disposal structure status. The tour was focused on the partial construction of Saltstone Disposal Structure (SDS) 7.

1.1 Technical Discussion – Operating and Disposal Structure Status:

1.1.1 Observation Scope:

The technical discussion supported the NRC monitoring of the DOE disposal actions to assess compliance with 10 *Code of Federal Regulations* (CFR) 61.41, §61.42 and §61.43. The technical discussion was most relevant to the following monitoring areas and monitoring factors in the SDF Monitoring Plan, Rev. 1, as supplemented by the NRC letters to the DOE:

- Monitoring Area (MA) 1 (Inventory):
 - Monitoring Factor (MF) 1.01 (Inventory in Disposal Structures)
 - MF 1.02 (Methods Used to Assess Inventory)
- MA 8 (Environmental Monitoring):
 - MF 8.01 (Leak Detection)
- MA 11 (Radiation Protection Program):
 - MF 11.01 (Dose to Individuals During Operations)

1.1.2 Observation Results:

The DOE presented an overview of the recent SDF operating and disposal structure status in the DOE presentation (SRR-CWDA-2019-00079, Rev. 1) [ADAMS Accession No. ML19281C983]. The key points from the technical discussion were:

- Regarding the SDF worker doses:
 - SDF worker doses continue to meet the §61.43 performance objective
- Regarding the status of SDS 6:
 - the DOE began filling SDS 6 in August 2018
 - since August 2018, all saltstone that was produced was placed in SDS 6
- Regarding construction of future disposal structures:
 - SDS 7: construction in-progress
 - SDS 8: excavation complete and pouring of Lower Mud Mat in-progress
 - SDS 9: excavation in-progress

- Regarding Actinide Removal Process/Modular Caustic Side Solvent Extraction Unit (AAP/MCU):
 - the DOE discontinued ARP/MCU operations in May 2019 in anticipation of starting up the new Salt Waste Processing Facility (SWPF)
 - ARP/MCU was isolated and flushed; but, the associated buildings were not removed from service or dismantled, as a contingency to address start up issues with the new SWPF

1.1.3 Conclusions and Follow-Up Action Items:

The NRC staff will continue to monitor the DOE SDF activities. The following Follow-Up Action Item resulted from the technical discussion:

- The DOE to provide the NRC with *Future Saltstone Disposal Units Siting Systems Engineering Evaluation* [G-AES-S-00004

1.2 Tour – Partial Construction of SDS 7:

1.2.1 Observation Scope:

The tour supported the NRC monitoring of the DOE disposal actions to assess compliance with §61.41 and §61.42. The tour was most relevant to the following monitoring areas and monitoring factors in the SDF Monitoring Plan, Rev. 1, as supplemented by the NRC letters to the DOE:

- MA 6 (Disposal Structure Performance):
 - MF 6.03 (Performance of Disposal Structure Roofs and High Density Polyethylene/Geosynthetic Clay Liner (HDPE/GCL) Layers)
 - MF 6.04 (Disposal Structure Concrete Fracturing):
 - MF 6.05 (Integrity of Non-Cementitious Materials)
- MA 8 (Environmental Monitoring):
 - MF 8.02 (Groundwater Monitoring)

1.2.2 Observation Results:

The tour consisted of observing the partial construction of SDS 7. The NRC staff also viewed that the Lower Mud Mat in SDS 8 existed and that the excavation of SDS 9 was in progress. The key points from the tour were:

- The NRC staff observed many features of the ongoing construction at SDS 7, and, as requested by the NRC staff, the DOE took pictures of key features of SDS 7 being constructed
- During the tour, a construction manager provided information on the various phases of the construction and construction features, including answering the NRC staff questions

1.2.3 Conclusions and Follow-Up Action Items:

The NRC staff will continue to monitor the DOE SDF activities. The following Follow-Up Action items resulted from the tour:

- The DOE to provide the NRC with the photographs taken during the tour of construction of Saltstone Disposal Structure 7
- The DOE to provide the NRC with future photographs of the process for welding the HDPE (High Density Polyethylene) layer located between the mud mats to the HDPE strip embedded in the floor slab of Saltstone Disposal Structure 7

2.0 **OVERALL CONCLUSIONS, STATUS OF MONITORING FACTORS, OPEN ISSUES, OPEN FOLLOW-UP ACTION ITEMS; AND ISSUANCE OF NRC TECHNICAL REVIEW REPORTS:**

2.1 Overall Conclusions:

The information gathered during SDF Observation 2019-01 will be used for multiple NRC Technical Review Reports (TRRs) and future OOVs, based on the topics discussed. There is no change to the overall conclusions from the NRC 2012 SDF Technical Evaluation Report regarding compliance of DOE disposal actions with the 10 CFR Part 61 performance objectives. Background information can be found in the most recent NRC-issued Waste Incidental to Reprocessing Periodic Monitoring Report (ADAMS Accession No. ML19058A272) dated October 21, 2019.

The NRC expects that that the DOE will take into consideration the NRC staff information that was provided during the OOV.

2.2 Status of Monitoring Factors in SDF Monitoring Plan, Rev.1

SDF Observation 2019-01 is the seventh OOV under the SDF Monitoring Plan, Rev.1, as supplemented by the NRC letters to the DOE. The NRC staff did not close any monitoring factors based on this OOV. Therefore, there are 37 open SDF monitoring factors.

2.3 Status of Open Issues for SDF Monitoring:

All previous NRC concerns were rolled into the monitoring factors in the 2013 SDF Monitoring Plan, Rev. 1. There were no SDF Open Issues at the beginning of SDF Observation 2019-01. The NRC staff did not open any new Open Issues during this OOV.

2.4 Status of Open Follow-Up Action Items from Previous SDF OOV Reports:

All but two Follow-Up Action Items (FUAs) from previous SDF OOVs were closed prior to SDF Observation 2019-01 and they were not closed during SDF Observation 2019-01.

2.5 Status of Open Follow-Up Action Items from Clarifying Teleconference Calls and Technical Teleconference Calls:

All FUAIs from previous clarification teleconference calls and technical teleconference calls were closed prior to SDF Observation 2019-01.

2.6 Summary of Follow-Up Action Items Opened During this Onsite Observation Visit:

After the OOV, the NRC received the updated DOE OOV presentation (SRR-CWDA-2019-00079, Rev. 1) [ADAMS Accession No. ML19281C983] pertaining to the activities during this OOV. The table below contains the three FUAIs that were opened during SDF Observation 2019-01, including a unique NRC identifier for each FUI:

Unique Identifier	FUI
SDF-CY19-01-001	The DOE to provide the NRC with <i>Future Saltstone Disposal Units Siting Systems Engineering Evaluation</i> [G-AES-S-00004]
SDF-CY19-01-002	The DOE to provide the NRC with the photographs taken during the tour of construction of Saltstone Disposal Structure 7
SDF-CY19-01-003	The DOE to provide the NRC with future photographs of the process for welding the High Density Polyethylene (HDPE) layer located between the mud mats to the HDPE strip embedded in the floor slab of Saltstone Disposal Structure 7

2.7 Issuance of NRC Technical Review Reports:

Between the previous SDF OOV in 2018 and SDF Observation 2019-01, the NRC issued the following one TRR related to the SDF:

Unique Identifier	Title	Date / Accession No.	No. of FUAIs
SDF-TRR-011	<i>Technical Review: Saltstone Waste Form Physical Degradation</i>	05/28/19 / ML19031B221	0

3.0 PARTICIPANTS:

U.S. NRC	SCDHEC	U.S. DOE	DOE Contractors
Hans Arlt	Barbara Harris	Aaron White	Greg Flach
Harry Felsher	Justin Koon		Steve Hommel
A. Christianne Ridge			Larry Romanowski
			F.M. Smith
			Steve Thomas

4.0 REFERENCES:

U.S. Congress, Public Law 108-375, "Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005, Section 3116, Defense Site Acceleration Completion," October 2004

U.S. Department of Energy (DOE), DOE Manual 435.1-1, Change 1, "Radioactive Waste Management Manual," June 2001. ML15022A083

____ DOE Order 435.1, Change 1, "Radioactive Waste Management," August 2001. ML15022A088

____ DOE-WD-2005-001, Rev. 0, "DOE Draft Basis for Section 3116 Determination Salt Waste Disposal at the Savannah River Site," February 2005. ML051020072

____ DOE-WD-2005-001, Rev. 1, "DOE Basis for Section 3116 Determination Salt Waste Disposal at the Savannah River Site," January 2006. ML102850319

____ SRR-CWDA-2009-00017, Rev. 0, "Performance Assessment for the Saltstone Disposal Facility at the Savannah River Site," October 2009. ML101590008

____ "Response to NRC Letter of Concern (Type-IV) Regarding DOE Disposal Activities at the Savannah River Site Saltstone Disposal Facility," July 2012. ML12198A258

____ "Additional Response to NRC Technical Evaluation Report for Revised Performance Assessment for the Saltstone Disposal Facility at the Savannah River Site, South Carolina and the Letter of Concern," July 2012. ML12215A081

____ SRR-CWDA-2013-00062, Rev. 2, "Fiscal Year 2013 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site," October 2013. ML14002A069

____ SRR-CWDA-2014-00006, Rev. 2, "Fiscal Year 2014 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site," September 2014. ML15097A366

____ SRR-CWDA-2014-00999, Rev. 1, "Comment Response Matrix for the U.S. NRC Staff Request for Additional Information on the Fiscal Year 2013 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site," January 2015. ML15020A672

____ SRR-CWDA-2016-00004, Rev. 1, "Comment Response Matrix for the U.S. NRC Staff Request for Additional Information on the Fiscal Year 2014 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site," March 2016. ML16105A043

____ SRR-CWDA-2019-00079, Rev. 1, "Presentation for NRC Saltstone Disposal Facility Onsite Observation Visit on September 17, 2019," September 2019. ML19281C983

U.S. Nuclear Regulatory Commission (NRC), "Technical Evaluation Report for Draft Waste Determination for Salt Waste Disposal," December 2005. ML053010225

_____ "NRC Plan for Monitoring Disposal Actions Taken by DOE at the Savannah River Site Saltstone Disposal Facility in Accordance with the National Defense Authorization Act for Fiscal Year 2005," Rev. 0, May 2007. ML070730363

_____ "Technical Evaluation Report for the Revised Performance Assessment for the Saltstone Disposal Facility at the Savannah River Site, South Carolina," April 2012. ML121020140

_____ "Letter of Concern (Type-IV) Regarding DOE Disposal Activities at the Savannah River Site Saltstone Disposal Facility," April 2012. ML120650576

_____ "Letter to Terrel Spears of DOE, Acknowledging Receipt of July 12, 2012, Letter Regarding NRC's Letter of Concern (Type-IV) Regarding Disposal at the Savannah River Site," August 29, 2012. ML12213A447

_____ "NRC Plan for Monitoring Disposal Actions Taken by DOE at the Savannah River Site Saltstone Disposal Facility in Accordance with the National Defense Authorization Act for Fiscal Year 2005," Rev. 1, September 2013. ML13100A113

_____ "NRC Comments and Requests for Additional Information on the 'DOE Fiscal Year 2013 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site, SRR-CWDA-2013-00062, Rev. 2,'" June 2014. ML14148A153

_____ NUREG-2175, "Guidance for Conducting Technical Analyses for 10 CFR Part 61 – Draft Report for Comment," March 2015. ML15056A516

_____ "NRC Request for Additional Information Questions on the 'DOE Fiscal Year 2014 Special Analysis for the Saltstone Disposal Facility at the Savannah River Site, SRR-CWDA-2014-00006, Rev. 2,'" June 2015. ML15161A541

_____ "Closure of Monitoring Factors in the 2013 NRC Saltstone Disposal Facility Monitoring Plan," June 2017. ML17097A351

_____ "Clarification of the Number of Monitoring Factors in Both the NRC's 2013 SDF Monitoring Plan and the 2015 TFs Monitoring Plan," March 2018. ML18033A071

_____ "Supplement to the 2013 NRC SDF Monitoring Plan Based on Recommendations in the Technical Review Report Issued on January 31, 2018," June 2018. ML18107A161

_____ "Supplement to the 2013 NRC SDF Monitoring Plan," October 2018. ML18219B035

_____ "Guidance for the September 17, 2019, Monitoring Onsite Observation Visit to the Savannah River Site, Saltstone Disposal Facility," August 2019. ML18155A389

_____ "Periodic Monitoring Report for the DOE Non-High-Level Waste Disposal Actions for Calendar Year 2014 through Calendar Year 2018 (Revision 6)," October 2019. ML19058A272