



Assessment of Radioactive Waste Management at the Savannah River Site

Interim Report

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Office of Enterprise Assessments
U.S. Department of Energy

Assessment of Radioactive Waste Management at the Savannah River Site September 16-20, 2019 Interim Report

Overview

This assessment is in response to the Deputy Secretary of Energy's July 9, 2019, memorandum directing the Office of Enterprise Assessments (EA) to undertake a U.S. Department of Energy (DOE)-wide assessment of the procedures and practices for packaging and shipping radioactive waste. The assessment activities focused on the performance of processes to characterize, package, and ship radioactive waste as implemented at the Savannah River Site (SRS) by the management and operating contractor, Savannah River Nuclear Solutions, LLC (SRNS); the liquid waste contractor, Savannah River Remediation, LLC; and the transuranic (TRU) waste characterization contractor, Nuclear Waste Partnership, LLC. The SRNS solid waste management program serves as the centralized coordinating organization for the dispositioning of all SRS solid radioactive waste, and develops and maintains overarching policies and procedures that guide the generation and characterization processes at each SRS facility. The assessment team, identified in Appendix A, examined a sample of operations at the point of waste origination representing a large majority of the radioactive waste streams managed at SRS. The diverse control strategy (defense-in-depth) used for SRS's radioactive waste management process, from the generator to final packaging, is illustrated in Appendix B.

This report provides the interim results of the assessment of radioactive waste management at SRS, addressing non-compliances and apparent causes contributing to weaknesses. At the conclusion of the enterprise-wide assessment, a final compilation report will include the results of this summary. The perspective gained by conducting this assessment could change as additional information becomes available from subsequent site assessments. The final compilation report will identify best practices, lessons learned, and cross-cutting recommendations.

DOE Order 227.1A, *Independent Oversight Program*, describes and governs the DOE independent oversight program, which EA implements through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. DOE Order 227.1A defines the terms best practices, findings, deficiencies, opportunities for improvement, and recommendations. In accordance with DOE Orders 227.1A and 226.1B, *Implementation of Department of Energy Oversight Policy*, it is expected that the site will analyze the causes of findings and deficiencies identified in this summary, develop corrective action plans for findings, and implement compensatory corrective actions for program and performance deficiencies.

Summary

Overall, SRS's waste management program ensures proper characterization, packaging, and shipping of radioactive waste for disposal, and both the DOE Office of Environmental Management Savannah River Operations Office (DOE-SR) and the National Nuclear Security Administration (NNSA) Savannah River Field Office (NNSA-SRFO) maintain adequate operational awareness of the radioactive waste management activities. This assessment found no findings, no deficiencies, one interim recommendation, and two opportunities for improvement for consideration by DOE Federal and contractor management. In addition, this assessment found that the self-assessments performed by SRNS, as required by NNSA and the DOE Office of Environmental Management (EM) in memoranda issued on July 16, 2019, and July 23, 2019, by the NNSA Chief of Staff and EM Principal Deputy Assistant Secretary, respectively, were

thorough, appropriately critical, and effective. The expected NNSA peer reviews had not started at the time of this assessment and thus are not addressed in this report.

Positive Attributes

General

- The solid waste management program implemented by SRNS creates a centralized structure for radioactive waste management across all SRS facilities. This structure drives the development of consistent radioactive waste generation and characterization processes from facility to facility and provides coordinated subject matter expert support beginning when waste is initially planned to be generated.

Waste Characterization

- SRS-wide implementation of Manual 1S, *Radioactive Waste Requirements Manual*, and the facility-specific procedures to which it flows down supports a comprehensive process for waste generation, characterization, and certification. Interviews with various personnel, review of procedures and work products, and observations at multiple SRS facilities demonstrated that Manual 1S is well-implemented and promotes thorough coordination and effective radioactive waste management. The procedures that prescribe facility-specific requirements detail processes for adequately generating and characterizing radioactive waste at each assessed facility.
- Generator Certification Officials (GCOs) provide an opportunity to plan and coordinate all aspects of radioactive waste management at the facility level in accordance with SRS-wide requirements. The GCO enables collaborative planning of waste generation, characterization, and certification and serves as a single point of contact and readily accessible knowledge base for addressing waste issues. Among other responsibilities, the GCO plays a vital role in the SRS radioactive waste management process by coordinating the development of radioactive waste management plans, collaborating with key stakeholders, troubleshooting and problem-solving, and helping train waste generators.

Quality Assurance

- The waste characterization processes for Naval Reactors (a joint program of DOE and the Department of the Navy) are assessed periodically to verify the compliance of the implemented processes. SRNS periodically assesses Naval Reactors facilities that ship waste to SRS by conducting “compliance visits,” once every 24 months for the Naval Reactors laboratory facilities and once every 36 months for the shipyard facilities.
- Through effective oversight and issues management, SRNS provides assurance that the SRS radioactive waste management program performs successfully. SRNS conducts well-planned audits of each onsite waste generator every 12 to 18 months (24 to 36 months for Naval Reactors generators), depending on the complexity of the generated waste streams. Observations resulting from these audits are effectively entered into corrective action tracking systems and followed up accordingly. SRNS self-identified issues related to the SRS radioactive waste management program and implemented a systematic approach to understand and resolve those issues to prevent recurrence. In many cases, issue resolution also resulted in important program enhancements.
- The contractual process for offsite disposal of de-characterized waste from the Saltstone Disposal Facility provides an added layer of assurance that the acceptance criteria for each receiving disposal site are well-understood and met prior to waste shipment. SRS’s bid and contracting process for offsite disposals involves developing a statement of work, issuing a request for proposals, and having bidders compare the proposed waste profiles to their respective waste acceptance criteria. (Note: 40

CFR 261.4, Subpart D states that hazardous waste material that has been treated to no longer exhibit the characteristics that would cause it to be considered hazardous, such as pH adjustment, qualifies to be managed as de-characterized waste; however, the requirements of 40 CFR 268, *Land Disposal Restrictions*, still apply to de-characterized waste at the point of disposal.)

Federal Oversight

- The management and operating contractor's self-assessment approach, concurred upon by the SRS Federal field elements, following the discovery of the Y-12 National Security Complex (Y-12) issue was rigorous and effective. As a response to the Y-12 event, SRNS's 2019 focused evaluation of site waste generation, characterization, and transportation consisted of 21 management field observations at 10 onsite generators (representing approximately 95% of all SRS waste generation) and resulted in 3 findings, 28 risks, and 13 opportunities for improvement. DOE-SR performed an independent and programmatic review of the records of SRNS's management field observations, as well as six additional assessments, and validated the results. NNSA-SRFO shadowed contractor self-assessment activities performed in the Tritium Facilities and formally documented its observations, along with the results of a self-assessment of NNSA-SRFO oversight of the tritium waste management program. No non-compliances with state or Federal regulations were identified. DOE-SR and NNSA-SRFO further determined that the assessments contained sufficient detail related to their purpose and scope.

Findings

The assessment identified no findings.

Deficiencies

The assessment identified no deficiencies.

Other Areas of Weakness

Other areas of weakness represent potential vulnerabilities that warrant site management's consideration but do not rise to the level of a finding or deficiency as defined in DOE Order 227.1A. The site should review these vulnerabilities and take appropriate actions. These weaknesses will be further reviewed against subsequent enterprise-wide site assessments to determine whether the vulnerability is cross-cutting and warrants an enterprise-wide response.

Waste Characterization

- Decharacterized waste generated at the Saltstone facility must currently be shipped and disposed of offsite to comply with South Carolina Department of Health and Environmental Control requirements. As a result, the inherent risk to workers and the environment posed by the hazards of packaging and shipping radioactive materials is increased. Decharacterized waste does not meet 40 CFR 268 requirements for disposal in the SRS Solid Waste Management Facility (SWMF) of Area-E, and the current Saltstone Disposal Unit (SDU) design does not readily lend itself to emplacement of this waste; consequently, the waste is required to be disposed of offsite.
- The effectiveness of GCOs and Environmental Compliance Authorities (ECAs), in particular, is critical to the success of the SRS radioactive waste management program; however, these roles are vulnerable to the unintended effects of administrative/management actions and unmitigated staff reductions.

- Tritium Facilities GCOs and ECAs were recently relocated to a remote office approximately 1 mile from the facility. Being remotely located inhibits the responsiveness of the GCOs and ECAs when providing input and guidance, and addressing facility needs.
- During many interviews, key radioactive waste management personnel expressed concern that no formal succession plan or knowledge transfer process is in place. Also, based on interviews and observation of work activities, there is a lack of depth in certain key radioactive waste management positions, such as GCOs and ECAs.

Shipping and Transportation

- SWMF radioactive waste receipt processes are systematic and well-defined, and observations of waste receipt and emplacement into SWMF showed generally effective practices. However, processes implemented by E-Area staff for post-waste-emplacement radiation control surveys, waste package hoisting, and waste receipt documentation could be improved. Specifically, improvements should be made to ensure that all items onboard waste conveyances are radiologically surveyed for potential contamination by radiation control technicians before removal and disposal; that appropriate operator aids are provided to support safe equipment operation; and that any inconsistencies or lack of clarity in onsite transfer manifests and other forms are resolved.

Interim Recommendations

Interim recommendations are intended to capture the evolving need for possible DOE management attention based on identified conditions from a single or multiple-site assessment. Interim recommendations should be considered suggestions for improving program or management effectiveness.

- It is recommended that EM share the self-assessment approach implemented at SRS in response to the NNSA Chief of Staff and EM Principal Deputy Assistant Secretary memoranda that followed the discovery of the Y-12 waste shipping issue. When compared across the enterprise, this approach appears to have been unique in its rigor and comprehensiveness.

Opportunities for Improvement

Opportunities for improvement are suggestions that are offered to assist cognizant managers in improving programs and operations.

- **OFI-SRNS-1:** SRNS should consider performing a management review of succession planning and knowledge transfer processes, and instituting policies focused specifically on maintaining the integrity and accessibility of the radioactive waste management staff's knowledge base.
- **OFI-SRNS-2:** SRNS should consider including some additional waste verification processes for incoming shipments to further enhance the radioactive waste management program implemented in the SWMF of Area-E. For example, in addition to the exterior visual inspection already performed, waste quantity verification, intrusive visual inspection, fingerprint analyses, waste quantity verification using weight measurements, and supplemental analyses may be additional options for verification of waste receipt into SWMF.

Appendix A
Supplemental Information

Dates of Office of Enterprise Assessments Onsite Assessment

September 16-20, 2019

Assessment Team

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Appendix B Description of Waste Control Defense-in-Depth as Applied at SRS

This figure shows the various engineering and administrative controls implemented throughout the radioactive waste management process to ensure that waste shipped to a disposal site meets all waste acceptance criteria and that no prohibited items are accidentally introduced into waste streams. Defense in depth is intended to reduce the likelihood of a non-compliant waste package by implementing a diverse defensive control strategy, so that if one layer of defense turns out to be inadequate, another layer of defense will prevent a non-compliance. In this figure, the generator is the point of origin of any waste stream. As waste progresses through the process, it can be accumulated and stored at various locations. Along the way, the waste is characterized and verified to be appropriate for the approved waste stream. Once finally packaged, the waste is certified to have met all requirements and is shipped to its final disposal site.

