



Department of Energy
Under Secretary for Nuclear Security
Administrator, National Nuclear Security Administration
Washington, DC 20585



May 5, 2025

The Honorable Thomas A. Summers
Acting Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Ave NW, Suite 700
Washington, DC 20004

Dear Mr. Summers:

This letter is provided on behalf of the Secretary of Energy in response to the Defense Nuclear Facilities Safety Board's (DNFSB or Board) October 4, 2023, letter regarding ongoing safety improvements at the Savannah River Tritium Enterprise (SRTE). The letter requested the Department of Energy (DOE) provide an annual report on the Department's progress regarding safety improvements at SRTE, including a prioritized list of safety risk reduction efforts, allocated resources, and a schedule of completion for: (1) SRTE safety basis; (2) Co-located Worker Dose Reduction Strategy; (3) Tritium Finishing Facility; and (4) SRTE Emergency Preparedness. The enclosed report provides updates on these topics.

As previously noted, DOE's National Nuclear Security Administration (NNSA) is pursuing a multi-pronged approach to improving the SRTE safety posture by updating the safety basis, reducing potential doses to co-located workers, enhancing the SRTE Emergency Preparedness Program, and constructing the Tritium Finishing Facility while maintaining safe operations at H-Area Old Manufacturing. Collectively, the modifications, upgrades, and programmatic improvements in these areas provide a systematic approach to improving safety at SRTE.

Pursuant to the October 4, 2023, letter, NNSA will schedule a briefing with the Board to provide additional details on this approach by May 30, 2025. If you have any questions, please contact Mr. Ahmad M. Al-Daouk, Associate Administrator for Environment, Safety, and Health, at (202) 586-4096.

Sincerely

Teresa M. Robbins
Acting Under Secretary for Nuclear Security
and Administrator, NNSA

Enclosure

Annual Report on Ongoing Initiatives to Address the Progress and Status of the Savannah River Tritium Enterprise

Introduction

On October 4, 2023, the Secretary of Energy received a letter from the Defense Nuclear Facilities Safety Board (DNFSB or Board) requesting the Department of Energy (DOE) provide a report and briefing within six months of receipt of the letter on DOE's progress on safety improvements at the Savannah River Tritium Enterprise (SRTE) and an annual report and briefing to follow thereafter, on progress of the facility and system upgrades, decisions made for proposed upgrades and analytical initiatives, and the impacts of safety risk reduction efforts. The Board requested that DOE provide information regarding the SRTE safety basis; the Co-located Worker Dose Reduction (CLWDR) Strategy; the Tritium Finishing Facility (TFF); and SRTE Emergency Preparedness. The Board's letter stated that the "annual report and briefing should include any changes and justification for those changes regarding prioritization, resource allocation, and schedule for safety risk reduction efforts since the previous report and briefing."

This report provides an update to the Board since the National Nuclear Security Administration's (NNSA) March 2024 response. NNSA and Savannah River Nuclear Solutions (SRNS), the management and operating contractor at Savannah River Site, remain committed to providing continued improvements to the safety posture of the SRTE Tritium Facilities. As noted in NNSA's March 2024 response, due to funding cycles, the resource allocations and scheduling of projects and activities is an ongoing effort. Activities in the analysis and evaluation stage are funded under the existing contract and specific project resources will be included in future reports as they are identified. Outlined below are a list of NNSA's current prioritized efforts. As funding allocations are authorized, NNSA will re-evaluate the approach to prioritize activities with the highest safety impact.

1. SRTE Safety Basis

SRTE successfully implemented the Combined Tritium Facilities (CTF) safety basis in October 2024, combining the existing safety basis documents into a single Documented Safety Analysis (DSA) and Technical Safety Requirement (TSR). The CTF DSA and TSR represent an improvement to the overall SRTE safety posture by adding new credited controls and elevating elements of safety management programs and administrative controls to specific administrative controls (SAC). The new credited controls in the DSA and TSR are Safety Class 217-H Vault Fire Damper, 217-H Vault Transient Combustible Material Control SAC, Vehicle Barrier Movement SAC, Critical Lift SAC, and Passive Fire Barriers. These controls improve the safety posture for certain events analyzed in the consolidated hazard analysis involving fires, critical lifts, and/or vehicle impacts.

Two planned improvements identified in the safety basis, and cited in the Board's letter, provide an enhanced SRTE safety posture: the 233-H Fire Barrier and investigation of 296-H stack collapse mitigation/prevention. These improvements continue to make progress as described below.

233-H Safety Class (SC) Fire Barrier

The CTF safety basis was implemented in October 2024. The 233-H SC Fire Barrier is not credited in the CTF DSA and TSR until the project is completed and released to operations. Once complete, the 233-H SC Fire Barrier will be credited to prevent the propagation of fires in or out of H-Area New Manufacturing (HANM). To accomplish this, a backfit analysis of the 233-H SC Fire Barrier identified several structures, systems, and components (SSCs) that require modification to enable crediting the fire barrier in the DSA to further reduce the postulated consequences. These upgrades have been documented as design input for a project to upgrade all SSCs necessary to credit the 233-H SC Fire Barrier. The initial design of the 233-H SC Fire Barrier modifications was completed in April 2024. Due to the calendar year 2025 Hot Cold Nitrogen Maintenance Outage, the project's target date has slipped to early fiscal year (FY) 2027, with the forecasted completion date remaining in FY 2026 and project closure in FY 2027.

296-H Stack Collapse Mitigation

An engineering control does not readily exist to address the reported material at risk (MAR) release postulated in the post seismic event followed by a full facility fire due to the assumed 296-H Stack collapse and subsequent impact to the 217-H Vault. Efforts continue to identify possible solutions focused on potential modifications to the 296-H Stack or 217-H Vault and to protect the MAR within 217-H from fire propagation in the event the 296-H Stack collapses on the 217-H Vault during/after a design basis earthquake. Initially, NNSA and SRNS collaborated to identify 12 possible solutions to protect the MAR in 217-H in the postulated post-seismic fire scenario and prioritized the selection by narrowing down the modifications based on preliminary feasibility and their potential impact to safety and operations. SRNS has identified possible engineered solutions, while also pursuing additional internal stack inspections. The internal stack inspection is scheduled for November 2025. After internal inspection results are obtained, a decision will be made regarding whether an engineered control is merited.

2. CLWDR Strategy

In 2017, NNSA directed SRNS to formulate a strategy to reduce the high consequences to the co-located worker (CW) at SRTE. The CLWDR strategy is focused on the development of multiple SSCs and analytical assumptions that could reduce the postulated high residual doses to CWs documented in the SRTE Consolidated Hazards Analysis. CLWDR is working to minimize the dose consequence to the CW through initiatives which provide credited SSCs that are not currently credited in the DSA. The CLWDR strategy started with 19 deliverables in pursuit of 9 initiatives, aiming to improve the safety posture and reduce postulated high consequences to CWs. The following initiatives continue to be pursued:

1. HANM Fire Suppression: This is anticipated to be a line-item project with a notional critical decision (CD)-4 date of 2037. This system will involve natural phenomena hazard design category 3 (NDC-3) qualified fire water supply and fire sprinkler system.

Fire suppression system evaluations for HANM continue to progress. SRNS issued preliminary isometric drawings to document control in September 2024 for use in the

modeling of the HANM fire suppression system for seismic performance. This evaluation is currently underway and is scheduled to be completed in FY 2025.

2. TEF Fire Suppression: This is anticipated to be a line-item project with a notional CD-4 date of 2037. This system will involve NDC-3 qualified fire water supply and fire sprinkler system.

Fire suppression system evaluations for TEF continue to progress. SRNS completed their revision of the TEF initial evaluation to address the open items. This revision changed the methodology based on feedback from oversight reviews and derived and implemented a building specific roof response spectra. SRNS plans to address remaining open items regarding structural capacity of certain supports in FY 2025. SRNS will also begin writing a preliminary backfit analysis for the TEF fire suppression system in FY 2025 to define the scope to install/upgrade a seismic design category 3 fire suppression system.

3. HANM Seismic Tritium Confinements System (STCS) Upgrade: This is anticipated to be a General Plant Project (GPP) and will notionally become operational in 2033. This system will involve seismically qualified glovebox structural supports, process vessels, valves, seismic triggers, and relay cabinet.

The conceptual design package for HANM STCS upgrade to incorporate the changes identified by the preliminary backfit analysis of the existing confinement system is now being worked, and the conceptual design packages are scheduled for completion in FY 2026.

4. HANM Hydrogen-Tritium Thermal Cycling Absorption Process (HT-TCAP) STCS: This is anticipated to be a GPP and will notionally become operational in 2035. This system will involve seismically qualified glovebox structural supports, process vessels, valves, seismic triggers, and relay cabinet.
5. Tritium Oxidation Study: These analyses will notionally be complete in 2030 and involve analyzing the release of tritium during fire events and the percent conversion of elemental tritium to tritium oxide in fires. Of importance to note, it may be difficult for the vested parties to reach a consensus on the use of a percent conversion less than 100 percent.

Currently, NNSA concurs on the CLWDR strategy path forward, to include:

- Descoping the 233-H Stack, since this initiative does not reduce worker dose in a seismic event that results in a full facility fire;
- Descoping the TEF STCS initiative, since it does not contribute to a considerable worker dose reduction given the facility MAR limits;
- Pausing work on the HT-TCAP STCS initiative while 233-H STCS upgrade continues. This way, cost-effective results and lessons learned from 233-H STCS upgrade can be utilized to improve the 233-H HT-TCAP initiative process.

The Savannah River Field Office (SRFO) provides the DNFSB monthly updates on the schedule of ongoing and forecasted work in the CLWDR strategy.

3. Tritium Finishing Facility (TFF)

TFF, which is planned to replace activities currently being performed in the H-Area Old Manufacturing (HAOM) facility, is currently estimated to start up in FY 2035. The TFF project was one of three projects paused to redirect funding and personnel to higher-priority projects in the DOE/NNSA complex, including the Savannah River Plutonium Processing Facility (SRPPF), the Los Alamos Plutonium Pit Production Project (LAP4), and the Uranium Processing Facility (UPF), all of which require increased funding to remain on schedule. While TFF has been delayed, many aspects of the enterprise are simultaneously being modernized. NNSA intends to incorporate lessons learned from SRPPF, LAP4, and UPF to modify, upgrade, and improve future safety conditions at TFF.

Using existing/available project funding for TFF, site preparation activities have been completed including demolition of the existing warehouse, construction of one new warehouse, and installation of a new 13.8 kilovolt power supply to the HANM facility. SRNS declared the Site preparation and warehouse subproject complete in December 2024. The NNSA CD-4 package was approved on March 10, 2025. Limited design scope is ongoing, including a draft Preliminary DSA for the preliminary safety and design results and design of selected process systems. The HAOM facility will remain operational until completion of the TFF project.

HAOM Bridging Strategy

The HAOM Bridging Strategy was developed to help maintain continued operations in the HAOM facility until TFF is constructed, periodically assessed, and revised as necessary to ensure continued operations in HAOM based on facility/equipment conditions, production requirements, and programmatic changes. Revision 3 of the HAOM Bridging Strategy was completed in December 2024. The following items have been updated to reflect the changes since the last revision:

- Kanne System Replacement – This is anticipated to be a recapitalization project, and conceptual design is tentatively scheduled to start in FY 2027.
- Stack Monitor Replacement – This is anticipated to be captured as a maintenance scope with conceptual design tentatively scheduled to start in FY 2028-2029.
- Fire System Installation in Active Hoods – This is anticipated to be a recapitalization project, and conceptual design is tentatively scheduled to start in FY 2028.
- Fire System Sprinkler Head Replacement – This is anticipated to be captured as a maintenance scope with execution to start in FY 2025 and continue until FY 2030. The plan is to replace approximately 250 sprinkler heads each year through 2029 and 150 sprinkler heads in 2030.

The HAOM Bridging Strategy Revision 3 is the last revision of the document. SRTE is transitioning to an HAOM Enduring Mission Strategy. The purpose of this new strategy is to analyze necessary investments to sustain Tritium Operations within HAOM. This analysis will be risk informed, data driven, and will identify key investments and recapitalizations needed to

meet mission requirements. An initial report is tentatively scheduled to be completed by the end of 2025.

4. SRTE Emergency Preparedness (EP)

SRNS initiated an SRTE EP Improvement Plan (originally titled the *SRTE Emergency Preparedness Drill Improvement Plan*) in August 2022 to further align the SRTE program within the framework of DOE Order 151.1D, *Comprehensive Emergency Management System*.

Although SRNS completed most of the SRTE EP commitments from the August 2023 NNSA-SRFO letter of concern – to include staffing stabilization and qualifications, drill improvement, training, organizational restructure, and integration of SRTE EP into full site SRNS EP – there are some areas that still need further attention. These open actions involve communications system upgrades (radios) and preparation for a mass casualty exercise that exceeds on site response capacity. SRTE has communicated their intent to address these areas.

Additional actions to strengthen SRTE’s EP program included the incorporation of the SRTE EP organization into the operations organization while remaining connected to matrixed support from both Site EP and the Site Drill Team. SRNS also revitalized their conduct of operations drill program and ran postulated abnormal event scenarios on both day shifts and backshifts, lessening administrative burdens in favor of increased drill/practice time. Additionally, SRTE completed 27 2S Drills (operations drill program) on the backshift in FY 2024 and completed a cyber-attack drill in TEF with bioassay in July 2024.

Improvements to the SRTE EP program include:

- Increasing fulltime EP staff, including experienced personnel – NNSA-SRFO has observed improvement not just with increased staffing, but with stability in the program throughout FY 2024. The SRTE EM organization is now fully staffed. All vacancies have been filled and very little turnover has occurred.
- Addressing a gap analysis to develop EP drill scenarios that satisfy all Emergency Action Levels and Site Area Emergencies identified – NNSA-SRFO has reviewed the gap analysis for EP drill scenarios and concurs with identified scenarios listed.
- Addition of Senior Management drill observers to help identify areas of growth – NNSA-SRFO has observed SRTE senior management at drills, who have provided feedback to each drill at hot washes and after-action reviews. It was also observed that the presence of senior management is having a positive effect at the operator level, allowing operators to understand the importance of self-evaluation in drills and exercises.
- Communications improvements – NNSA-SRFO approved the use of certain cell phone types (i.e., wireless or non-smart phones without Bluetooth capabilities) for EP drills/exercises and real-world events. Cell phone use was observed in multiple drills. New analysis of an updated radio system originally targeted for completion in FY 2024 is expected to be completed in FY 2025.

- Comprehensive hot washes immediately following the drill play – NNSA-SRFO observed improvement of hot washes after drills, which included increased self-critical analysis of role players. This continues to be emphasized by SRTE senior leadership.
- Improved and standardized drill and exercise reporting – NNSA-SRFO concurs that SRTE is improving their drill and exercise reporting through review and concurrence of reports.
- Standardization and strengthening of matrixing to sitewide EP organizations – SRTE has fully integrated their EP program into the SRNS program by reorganizing SRTE EP, which is no longer independent of SRNS EP. Senior leadership has fully committed to the success of a central program.
- Preparation for a postulated mass casualty drill – SRTE executed a postulated mass casualty drill in May 2024; however, the response capacity did not exceed medical response. The Fire Battalion Chief assessed that the fire department still had enough resources to continue site-wide response ability. This is an area that SRTE EP, SRNS Emergency Services, and SRS Fire Department will have to analyze to ensure the design of the drill will meet the intent. Future exercises are in the process of being designed to ensure mutual aid response is required.