



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



September 28, 2021

The Honorable Joyce L. Connery  
Chair  
Defense Nuclear Facilities Safety Board  
625 Indiana Avenue, NW, Suite 700  
Washington, D.C. 20004

Dear Chair Connery:

As a result of a virtual public hearing held July 13, 2021, covering activities at the Savannah River Site, several questions for the record were asked for follow-up. These questions were formally provided in an August 11, 2021, letter to Secretary Granholm from the Defense Nuclear Facilities Safety Board (DNFSB). I am responding on behalf of the Secretary. As requested, please find enclosed the responses to the submitted questions for inclusion in the official record for the public hearing.

My staff and I welcome continued dialog with the DNFSB on safety at the tritium facilities as we continue to identify opportunities to improve collocated worker safety, implement an enhanced consolidated documented safety analysis, and move forward with design and eventual construction of the Tritium Finishing Facility.

If you have any questions, please contact Mr. Jason A. Armstrong, Savannah River Field Office Manager, at (803) 208-3689.

Sincerely,

A handwritten signature in black ink, appearing to read "Jill Hruba", is written over a light blue horizontal line.

Jill Hruba

Enclosures

	TO	FROM	QUESTION
1.	Jason Armstrong (Manager, Savannah River Field Office)	Jesse H. Roberson (Board Member)	The consolidated hazards analysis for the combined tritium facilities recommended that several actions be taken to mitigate explosion events, such as interlocked inline oxygen monitors or a room or building-level stripper or scrubber system. Since the National Nuclear Security Administration (NNSA) decided these were not feasible, what actions will be taken in the near term to address this risk, or will the risk be accepted through a formal process?
2.	Armstrong	Roberson	In July 2018, the management and operating contractor proposed 19 actions to NNSA that could potentially reduce the consequences of several events to the co-located workers. Provide a copy of NNSA's approval of the 19 actions.
3.	Armstrong	Roberson	NNSA has committed to upgrading the fire suppression systems in Buildings 233-H, 234-7H, and the Tritium Extraction Facility. Of these three facilities, which do you expect to be the most challenging to upgrade?
4.	Armstrong	Thomas A. Summers (Vice Chair)	The conceptual safety design report for the Tritium Finishing Facility identifies that 20 percent of the material-at-risk could be impacted and released prior to activation of the fire suppression system for common cause events, such as a seismic event. Given that the Tritium Finishing Facility is a new facility, does the facility design include a strategy for tritium confinement?
5.	Armstrong	Roberson	The preliminary fire hazard analysis for the Tritium Finishing Facility proposed providing only one safety class water supply, with the other supply being the existing general service H-Area water loop. If the safety class water supply is not available, what impacts would it have on safety of Tritium Finishing Facility operations? For example, would operations personnel have to put the facility in standby mode until the safety class water supply is restored, or would they rely on the general service water supply?
6.	Armstrong	Joyce L. Connery (Chair)	Since the approval of the new combined safety basis for the Savannah River Tritium Enterprise in 2019, what new hazard controls has NNSA implemented?
7.	Armstrong	Roberson	Has the management and operating contractor conducted or does it plan to conduct any field drills or exercises involving scenarios in which one or more victims receive greater than 5 rem total effective dose from tritium?

Question	Response
1.	<p>The Consolidated Hazard Analysis Process (CHAP) for the Combined Tritium Facilities (CTF) Documented Safety Analysis (DSA) did not provide any follow-up recommendations for actions to be taken to mitigate explosion events. It however “has identified several candidate controls with potential for use in future improvements,” and lists, among others, “interlocked inline O2 monitors . . . or possibly a room or building level stripper or scrubber system.”</p> <p>CHAP is a comprehensive, cost-effective process hazard analysis program that is applied throughout all phases of a facility, project, modification, or activity life cycle. CHAP consists of multiple elements that utilize specific proven techniques and a team approach. The process is facilitated by a trained CHAP Lead and is consistent and in compliance with all applicable regulations, DOE Orders, and DOE Standards. The CHAP team is comprised of Subject Matter Experts who qualitatively define the process, identify the hazards, and develop a comprehensive list of plausible events and feasible accident progressions. Unmitigated postulated accident frequencies and accident consequences are established for the public, workers, and environment. Candidate controls to protect the public, workers, and environment that have a potential for either preventing the accident, mitigating the consequence of an accident, or reducing the frequency of accidents are discussed and some are documented. From this candidate list, controls are selected for implementation based on the hierarchy of controls, as required by DOE-STD-1189 (e.g., passive, active, administrative, or programmatic), and feasibility of actual implementation. Not all candidate controls are selected or formally documented.</p> <p>Regarding risk acceptance, NNSA has implemented several risk reduction activities since approving the CTF DSA in 2019. Please see NNSA’s response to Question For the Record (QFR) 6 below. NNSA also continues to support risk reduction efforts by pursuing the Co-Located Worker Risk Reduction Strategy. Please see the response to QFR 2.</p> <p>DOE Technical Standard, <i>Review and Approval of Nuclear Facility Safety Basis and Safety Design Basis Documents</i>, DOE-STD-1104-2016, identifies the Safety Basis Approval Authority (SBAA) as responsible for approving all Safety Basis (SB) documents. By approving the SB documents, the SBAA accepts the risks resulting / identified in the analysis for the government. The Savannah River Field Office (SRFO) has ensured all SB documents generated for the Tritium Facilities have been approved by the SRFO SBAA using Safety Evaluation Reports. Pursuant to 10 C.F.R. § 830.207, no other formal approval or risk acceptance document is required.</p>
2.	<p>The Co-located Worker Risk Reduction Strategy is an evolving effort. As analyses and calculations are completed, the deliverables are evaluated as we continue to understand how we can best protect co-located workers. Using this approach, the original 2018 Co-located Worker Risk Reduction Strategy has been expanded from 19 activities to 32. As of May 31, 2021, 16 of the currently identified 32 activities have been completed. Field Office personnel closely monitor the progress of these deliverables on a weekly basis. A copy of NNSA’s approval document has been provided to the Board staff through our standard information request process.</p>

3.	<p>NNSA is committed to performing evaluation(s) of certain facilities and certain Structures, Systems, and Components (SSCs) within those facilities to a Natural Phenomena Hazard (NPH) Design Category 3, and NNSA has engaged an independent Subject Matter Expert to review these evaluations. All the evaluations are equally challenging in that they all involve design and construction to different codes and standards, differ in materials of construction, as well as the age of the facilities. Also, NNSA believes in pursuing modifications to certain facilities and SSCs, if necessary, to be a viable option, provided that the evaluation(s) determine that the upgrades are needed and feasible.</p>
4.	<p>The estimated potential for release of 20 percent of the material-at-risk (MAR) prior to activation of the fire suppression system (FSS), which translates to an 80 percent dose reduction provided by Safety Class (SC) FSS, is based on the Preliminary Hazard Analysis conducted in support of CD-1. The Tritium Finishing Facility (TFF) design strategy, as captured in the Safety Design Strategy (SDS) (U-SDS-H-00003, Revision 2), includes specific risks and opportunities related to the technical basis for the 80 percent dose reduction credited for the FSS. The CHAP, the primary means of integrating safety into the design of TFF, will address these risks/opportunities as we move forward.</p> <p>As it pertains to tritium confinement, M-ESR-H-00575, the TFF Active Confinement Ventilation System (ACVS) Position Paper, cites DOE Order 420.1C, which incorporates the DNFSB recommendation for ACVS' inapplicability to Tritium Processing facilities. Additional information on confinement strategy is provided in the TFF SDS (U-SDS-H-00003, Revision 2).</p>
5.	<p>At this stage in the project it is speculative to discuss possible facility action on a yet-to-be-developed Technical Safety Requirements (TSR) Limiting Condition of Operation (LCO). Currently, two Safety Class (SC) water supplies are proposed for the SC sprinkler system in Building 1. The functional classification of these two water supply systems will be confirmed (or redesignated) during TFF's preliminary design effort utilizing the unmitigated accident consequence assessments. Per DOE-STD-1189-2016, <i>Integration of Safety into the Design Process</i>, the unmitigated accident consequence assessment provides an adequate basis to assign appropriate functional classifications for major SSCs.</p> <p>As a point of clarification, the Conceptual Design Report (CDR) contains two independent / redundant seismically qualified water supply tanks, which are functional classified as SC according to the Preliminary Hazard Analysis (PHA) for the fire suppression system. The Preliminary Fire Hazard Analysis (PFHA) recommended, "that only one of the water supplies be SC with the other water supply being the existing H-Area water loop," is not reflected in the CDR.</p>

6.	<p>NNSA-approved hazard controls implemented to-date include an inventory Specific Administrative Control (SAC). This SAC was originally identified in the Combined Tritium Facility (CTF) Safety Basis (SB) planned for implementation by 2025, and was implemented early for risk reduction purposes into Revision 31 of the TF TSR and Revision 14 of the TEF TSR. This SAC reduces the amount of material that will be available in the various events, therefore directly reducing postulated doses. In addition, NNSA has approved and the Savannah River Tritium Enterprise (SRTE) has implemented the Fire Water Volume Determination SAC. This new SAC provides a higher degree of confidence that an adequate level of firewater is available to address fire scenarios. Identification of the Critical Lift Program and Vehicle Barriers SACs exist today and are Safety Management Programs (SMP) in SRTE's currently implemented safety basis. When the CTF SB is implemented, these SMPs will be moved to SACs, but the overall safety of these controls will remain the same.</p> <p>Prior to implementing the CTF Safety Basis, the following projects have been / are being completed: Safety Class (SC) 217-H Vault Fire Dampers were installed in June 2018 via project Y731; Safety Significant (SS) Fire Suppression in 234-7H hood will be installed via project Y761 in FY22; and SC fire dampers in 233-1H will be installed via project Y819 in FY24. These are expected to be completed by FY 2025, at which time the CTF SB will be implemented. Although these are not being rolled into the current SB, once installation is complete (such as the SC 217-H Fire Dampers), they do provide additional safety functions in advance of implementing the CTF SB.</p> <p>Additionally, SRTE has taken the CTF consolidated hazards analysis (CHA) and continued to improve the safety posture of the existing facilities by evaluating event progressions developed during CTF CHA. Examples include module / furnace explosions, furnace cooling water hydrolysis, tritium producing burnable absorber rod (TPBAR) releases, updates to empty container verification, and some environmental conditioning changes.</p> <p>Overall, these actions take into account what we have learned from the CTF SB and provides an improved safety posture as we translate into the new CTF SB in FY 2025.</p>
7.	<p>We are currently working on a drill involving a scenario that will provide a postulated 5 rem dose to one or more victims. Drill scenario completion and execution may be hampered by COVID-19 protocols. Although we have not previously conducted drills in which a 5 rem Total Effective Dose to a victim in Tritium is postulated, these parameters are quite achievable by assuming the victim is left in the accident area for a few minutes longer, or increasing the dose rate for the accident. These parameters will be captured during the drill development and will be demonstrated during the drill.</p>