

November 14, 2024

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

Dear Chair Connery:

On behalf of Secretary Granholm, and as follow-up to her July 3, 2024, letter, enclosed is the Department of Energy's (DOE) response to your letter dated May 15, 2024, regarding the final design of the continuous air monitor (CAM) system for the Waste Isolation Pilot Plant (WIPP) Safety Significant Confinement Ventilation System (SSCVS). Your letter requested a written response and briefing to address the following two primary concerns identified in the attachment to your letter:

1. The current WIPP management and operating contractor has not demonstrated that the CAM system will perform its safety function in an environment with airborne combustion products from fire and salt particles from mining activities.
2. For the subset of accident scenarios involving the waste shaft station in the hazard analysis, the SSCVS safety analysis credits initial conditions and administrative controls to reduce the risk but does not credit the engineered control offered by SSCVS, contrary to the DOE's published hierarchy for control selection.

The enclosed report provides details of DOE's planned phased approach to SSCVS startup to provide for the testing of the CAM system in the salt environment of the WIPP underground. During the initial operating phase, all exhaust from the underground will be continuously filtered by the SSCVS and the CAM system will not be required to perform its safety function. DOE has reviewed all postulated accident scenarios at the waste shaft station and found that engineered preventive controls, such as vehicle fire suppression, are credited and follow the hierarchy of controls, with preventive measures taking precedence over mitigative controls. DOE and Salado Isolation Mining Contractors, LLC identified that continuous filtration will be credited for postulated deflagrations at the Waste Shaft Station and the waste transfer route during the initial operating phase. Prior to transitioning out of continuous filtration, the Documented Safety Analysis will be updated to address changes in postulated accident scenarios.

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In accordance with your request, DOE held a briefing with the Board on September 6, 2024. We appreciate the Board's perspectives and look forward to our interactions with you and your staff. If you have any questions, please contact me or Mr. Mark Bollinger, Manager, Carlsbad Field Office, at (575) 234-7303.

Sincerely,



Candice Trummell
Senior Advisor for Environmental Management

Enclosure

cc: Mark Bollinger, CBFO

Received by the Board 11.14.24

This report provides responses to the Defense Nuclear Facilities Safety Board's (Board) letter dated May 15, 2024, regarding the final design of the continuous air monitor (CAM) system that will support the new Safety-Significant Confinement Ventilation System (SSCVS) at the Waste Isolation Pilot Plant (WIPP). The SSCVS will provide higher airflow through the underground repository to improve air quality for facility workers, and it will filter exhaust to prevent a radiological release at the surface. We are committed to ensuring that the integration of SSCVS into WIPP operations will provide for the utmost safety of the workers, the public, and environment while also allowing for WIPP to continue safely disposing of transuranic waste generated by atomic energy defense activities.

Item 1: The current WIPP management and operating contractor, Salado Isolation Mining Contractors, LLC (SIMCO) has not demonstrated that the CAM system will perform its safety function in an environment with airborne combustion products from fire and salt particles from mining activities.

Response: The Department of Energy (DOE) understands the Board's concerns with the utilization of the CAMS to actuate the SSCVS exhaust filtration and accordingly is planning to utilize a phased approach to SSCVS startup. In the first phase, SSCVS will operate only in direct filtration mode. This is the safest mode in which SSCVS would operate and will ensure that, in the unlikely event of a radiological release, all exhaust will be filtered. No credit will be taken for the safety function of the CAMs during this first phase of SSCVS operation. This phased approach aligns with industry accepted consensus standards, including the American National Standards Institute /International Society of Automation 84.00.01-2004 – Part 1 that provides for the testing of the safety-significant CAM system in the salt environment of the WIPP underground.

During Phase 1 of the SSCVS startup plan, the WIPP operating contractor, SIMCO, will collect CAM reliability data on environmental impacts, such as salt loading. Airflow data around the CAMs will also be collected to inform future Technical Safety Requirements (TSRs) to govern CAM placement within drifts and surveillance frequencies. Phase 1 allows operations to complete mine ventilation balancing and any outstanding testing needed from commissioning, in addition to completing final procedure validation with systems connected. SIMCO anticipates Phase 1 may last 6-12 months. Phase 2 of the startup plan will be to bring the construction ventilation flow path and utility safety (Shaft 5) on-line. Phase 3 of the SSCVS startup will bring the Salt Reduction Building (SRB) online, which will require the CAMs to perform their credited safety function of detection and signaling dampers to close to the SRB. Phases 2 and 3 will require a change to the WIPP safety basis documentation to detail any needed controls for Shaft 5 and the construction ventilation path and detail the TSRs for the CAMs.

Regarding the Board's concern about soot loading on the CAMs due to a postulated fire, which is an off-normal condition, we are confident that this will result in a safe system response. In this scenario, the CAMs will signal isolation of the SRB on either detection of radiological release, a fault due to excessive soot particulate loading, or a loss of detectable background radiation. The fault detection is a fail-safe feature designed into the CAM system. This fail-safe feature meets DOE Order 420.1C, Change 3, *Facility Safety*, Attachment 3, requirements. Additionally, the personnel monitoring the CAMS will be notified by alarms in this situation, and appropriate actions can be taken to ensure the safety of workers. Regarding the effect of salt loading on CAMs due to mining activities, it is an expected condition during normal WIPP operations. Phase 1 test data will inform the placement and frequency of surveillance of the CAMs to ensure operability under these normal conditions. Additionally, it is expected that the amount of salt dust passing by the CAMs will be reduced due to planned changes in the ventilation path.

Item 2: For the subset of accident scenarios involving the waste shaft station in the hazard analysis, the SSCVS safety analysis credits initial conditions and administrative controls to reduce the risk but does not credit the engineered control offered by SSCVS, contrary to the DOE's published hierarchy for control selection.

Response: The Board's letter also discusses the hierarchy of controls for postulated accidents that may occur in the WIPP waste shaft station. DOE staff discussed this topic with DNFSB staff on July 12, 2024, to improve our mutual understanding. Most of the postulated accident scenarios in the waste shaft station are large pool fires that do credit engineered preventive controls, such as the safety-significant vehicle fire suppression systems. This follows the hierarchy of controls of passive over mitigate active engineered control. In reviewing waste shaft station accident scenarios, DOE and SIMCO have realized that some other postulated scenarios, such as deflagrations, need further analysis and explanation of their controls. However, the postulated scenarios are unrelated to the initial startup of SSCVS. The primary functions of the SSCVS are increased mine airflow and filtration of air from the mine disposal circuit; it was never intended to serve as a mitigating control for postulated accidents at the waste shaft station. When SSCVS starts Phase 1 operations, there will be direct filtration of all exhaust air and SSCVS will provide the necessary protection at the Waste Shaft Station. Prior to the SSCVS operation proceeding to further phases of operation (i.e. operating with the SRB and not direct filtration), the safety basis will be updated, and all postulated scenarios will be reviewed for appropriate controls and documented in a revised Documented Safety Analyses (DSA)/TSR. DOE will continue to analyze all possible accident scenarios at WIPP and will make appropriate changes to the safety basis documentation when new or updated information is discovered. The DNFSB staff will be kept informed of all changes in operation conditions and of developing safety basis analysis.

Summary Conclusions

The Board's concerns identified in Items 1 and 2 are being addressed and DOE will continue to ensure compliance with applicable DOE Orders and Technical Standards for

the safe startup and operation of SSCVS. During the initial SSCVS operating phase all exhaust from the underground will be continuously filtered by the SSCVS, and the CAM system will not be required to perform a safety function. Additionally, DOE has reviewed all postulated accident scenarios at the waste shaft station and found that engineered preventive controls, such as vehicle fire suppression, are credited and follow the hierarchy of controls, and giving priority to preventive over mitigative controls. However, DOE and SIMCO have realized that some other postulated scenarios, such as deflagrations, need further analysis and explanation of their controls within the safety basis documentation prior to the CAM system being credited to perform a safety function. We commit to engage early with you and your staff on changes in facility conditions, safety basis analysis, and results of the CAM system testing as we work toward safe startup of the SSCVS.