

Joyce L. Connery, Chair
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**DEFENSE NUCLEAR FACILITIES
SAFETY BOARD**

Washington, DC 20004-2901



August 17, 2022

The Honorable Jennifer M. Granholm
Secretary of Energy
US Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1000

Dear Secretary Granholm:


The Defense Nuclear Facilities Safety Board (Board) has observed the Department of Energy's (DOE) efforts at the Waste Isolation Pilot Plant (WIPP) to restart the unfiltered 700C exhaust fan, an effort to increase underground airflow in advance of completion of the Safety Significant Confinement Ventilation System (SSCVS). The Board's main nuclear safety concern is the ability to reliably detect a radiological release from an active waste panel and transmit a signal to shut down the 700C fan before airborne radiological contamination from the underground can be carried to the surface. This appears to also be DOE's main nuclear safety concern as discussed in the approved safety strategy.

The Board notes that WIPP is relying on a specific administrative control (SAC) to manually shut down the 700C fan upon receipt of an alarm indicating a continuous air monitor (CAM) has detected a radiological release. However, the vulnerabilities associated with structures, systems, and components supporting this SAC have not been fully evaluated. Specifically, there have been many CAM malfunctions and failures due to issues such as corrosion and excessive salt buildup. The Board also notes that the specifications for the safety significant CAMs and required support systems are still not included in the final design requirements for the SSCVS, which will reduce the emphasis and attention afforded to the CAMs to ensure they are maintained to provide an accurate and reliable alarm during a radiological release event.

These operational issues with the CAMs, as well as the design and operation of safety significant instrumentation and control systems, and contractor and federal oversight in general, have been discussed in several previous letters from the Board to DOE dated February 19, 2016; March, 2018; August 27, 2019; and August 13, 2021. The Board advises DOE that the CAMs and their required support systems would benefit from increased management attention as

described in the enclosure. In particular, this subject may warrant specific and timely discussion during management and operating contractor turnover.

Sincerely,


Joyce L. Connery
Chair

Enclosure

c: Mr. Joe Olencz

ENCLOSURE

Considerations for Waste Isolation Pilot Plant Safety-Related Instrumentation & Control Systems

The Department of Energy (DOE) would benefit from an assessment of the reliability of continuous air monitors (CAM), as well as the larger safety significant instrumentation and control system, for the Waste Isolation Pilot Plant's (WIPP) 700C fan and the Safety Significant Confinement Ventilation System (SSCVS). Items to consider should include:

- A common cause failure analysis, as well as other evaluations required to document the safety integrity level in accordance with IEC 61508, *Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems*.
- As indicated in the Defense Nuclear Facilities Safety Board's (Board) letter dated February 19, 2016, design solutions for "ensuring that CAMs can reliably detect airborne radioactive contaminants while operating in a high airborne particulate environment. These airborne particulates could be the result of routine operations or from fire or other accident scenarios."
- As stated in the Board's letter dated March 26, 2018, the final design documentation for the WIPP SSCVS CAMs should have safety design requirements for the full integration of the underground safety significant CAMs.
- As indicated in the Board's letter dated August 27, 2019, "WIPP must consider the long-term effect of the underground salt environment on CAM performance, as well as the effects of a smoke environment that may co-exist with a radiological release event."
- As stated in the Board's letter dated August 13, 2021, "The review team noted potential issues in the [contractor] and [DOE] oversight programs that call into question the ability of the [cognizant system engineers] and [safety system oversight specialists] to foresee and fully comprehend the potential vulnerabilities affecting the operability and reliability of the safety systems to which each are assigned."