

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

September 15, 2023

TO: Timothy J. Dwyer, Acting Technical Director
FROM: Clinton Jones, Resident Inspector
SUBJECT: Oak Ridge Activity Report for Week Ending September 15, 2023

Building 9206: On Labor Day, the Operations Center notified the Shift Manager of a non-credited alarm indicating a failure of one of the criticality accident alarm system (CAAS) radiation detectors. The Shift Manager responded to the site, determined the CAAS to be inoperable, and entered the applicable limiting condition for operation (LCO). On the following business day, the resident inspector (RI) asked the acting Operations Manager if an occurrence report would be filed on this issue and was told one would not. DOE Order 232.2A, Occurrence Reporting and Processing of Operations Information, contains criteria to report issues, and for an event categorized as 4A(1)L it states, in part, “Performance degradation of any Safety Significant (SS) Structure, System, or Component (SSC) that is required for safety operation of the SS SSC, which prevents satisfactory performance of its design function when it is required to be operable,” with a note “This subgroup applies even if all actions and completion times of the LCO are met, with no compromise to the authorization basis.” The safety basis credits two radiation detector stations that provide overlapping coverage. Since both detectors in a detector station must detect a criticality for the station to alarm, the loss of one radiation detector renders that station inoperable and overlapping coverage is lost. Furthermore, this is the second failure of a Building 9206 CAAS radiation detector due to an unknown failure mode(s) within three months (see 6/9/2023 report). CNS reported the June failure as a degradation of a SS SSC. The RI discussed the failures with the NPO CAAS safety system oversight engineer (SSOE) and they agreed on the reportability requirement. During a follow-up emerging issues meeting, CNS did not address the CAAS radiation detector failure or the missed occurrence reportability. The NPO CAAS SSOE raised the issue of reportability and the fact that CNS was not meeting the required 98 percent reliability of the CAAS radiation detection equipment. This was similar to the recent digital message recorder failures of the CAAS system where the NPO CAAS SSOE pointed out the questionable reliability of the equipment due to the multiple failures (see 11/18/2022 report) prior to CNS taking action to evaluate the frequency of the surveillance requirement. After the NPO CAAS SSOE brought up the question, CNS re-evaluated the reportability, issued a 4A(1)L occurrence report, and determined there is a potential inadequacy of the safety analysis (PISA) based on the multiple detector failures. No new operational restrictions were implemented as a result of the determination. The RI is following CNS actions to determine the potential cause of CAAS equipment failures.

Criticality Safety: A criticality safety officer (CSO) was performing a field walkdown for a routine review of a criticality safety evaluation (CSE) when they noticed a coiled hose in the wet vacuum system of Building 9212. As a precaution, the CSO initiated an administrative backoff until he could confirm that the coiling of the hose was not a nuclear criticality concern based on an unfavorable geometry. After confirming the coiling of the hose was not an issue, the hose was measured and found to be more than twice as long as the CSE expected. The chief NCSE issued an occurrence report. This determination was based on a deficiency in a criticality safety analysis such that adequate controls were not in place for a credible criticality accident scenario. The field presence and periodic CSE reviews performed by the CSOs are showing to be an effective tool to help CNS to correct criticality safety issues.