DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 5, 2023

TO: Christopher J. Roscetti, Technical Director
FROM: Daniel B. Bullen, Ph.D., P.E., Cognizant Engineer
SUBJECT: Lawrence Livermore National Laboratory (LLNL) Report for April 2023

Defense Nuclear Facilities Safety Board (Board) Staff Interaction: On April 18–20, 2023, the Board's cognizant engineer for LLNL and a Board's staff team reviewing the Continuous Air Monitor (iCAM) system networking project in the Plutonium Facility were on site at LLNL. The cognizant engineer conducted walkdowns of the Radiography Facility, Tritium Facility, and the Hardened Engineered Test Facility and completed discussions with Lawrence Livermore National Security, LLC, (LLNS) and Livermore Field Office (LFO) senior management and technical staff. The staff review team discussed lines of inquiry for the iCAM project, walked down the Plutonium Facility radioactive materials area where these iCAMs are installed, and inspected the calibration laboratory where the iCAMs are set to facility-specific parameters.

Building 331 – Tritium Processing Station Glovebox Positive Unreviewed Safety Question Determination (USQD): On April 24, 2023, LLNL issued an Occurrence Report & Processing System (ORPS) report noting a positive USQD for an inadequacy in the Building 331 Documented Safety Analysis (DSA) concerning the Tritium Processing Station glovebox. LLNS staff identified a potential issue on the configuration of the glovebox's uranium-bed closed loop, chilled air lines system. This closed loop system has piping that goes outside of the glovebox. LLNS staff identified a concern in which contamination could exist in the piping and tritium could be released from the glovebox if the piping were somehow breached. LLNS noted that this event was not analyzed in the Building 331 DSA. LLNS personnel are completing further evaluations for potential contamination in the piping and to determine whether such a breach is possible. In consultation with the LLNS Tritium Subject Matter Expert, the Facility Manager does not expect the investigation to find much, if any, contamination in the piping and expects that any piping breach would have a low probability. Therefore, the Facility Manager implemented no immediate operational restrictions.

Building 332 – Room Ventilation System (RVS) Supply and Exhaust System Interlock Failure: On April 14, 2023, LLNS staff notified the Building 332 Facility Manager that verification of the RVS supply and exhaust fan interlocks had failed. During the performance of a surveillance, the Increment 3 exhaust fan low-flow trip is verified by simulating a loss of flow to the lead exhaust fan. When the lead fan trips, the lag fan starts automatically. The current fan configuration had FFE-2000 in the lead and FFE-1000 in the lag positions. Upon loss of flow, FFE-2000 tripped off as designed, however FFE-1000 did not automatically start. Facility Operations personnel entered a Limiting Condition for Operation and initiated troubleshooting. The facility was in maintenance mode and no radiological work was being done at the time. The facility remained in a safe configuration.

Building 332 - Hydride/Dehydride/Casting (HYDEC) Process Federal Readiness Assessment (FRA): On April 20, 2023, the National Nuclear Security Administration FRA team conducted their out brief of the HYDEC FRA. Over the course of the assessment, the FRA team observed several demonstrations, reviewed numerous documents, and conducted numerous interviews. The FRA team noted that four objectives were met and one objective (related to software quality assurance) was not met. The FRA team identified two post-start findings and no prestart findings. The post-start findings address validation and verification of operations using hydrogen gas, which was not allowed during the FRA, and inadequate implementation of the software quality assurance plan. LLNS will develop a corrective action plan to address the findings and observations in the FRA final report.