DEFENSE NUCLEAR FACILITIES SAFETY BOARD

October 30, 2020

TO: Christopher J. Roscetti, Technical Director
FROM: Matthew Duncan and Brandon Weathers, Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending October 30, 2020

Transuranic Waste Processing Center (TWPC): On Monday, TWPC personnel attempted to perform a smoke test in a glovebox line. The purpose of the test was to characterize the airflow in the event of a failed/open glove port. Radiological control technicians had cleaned out and decontaminated the glovebox line prior to the test. Personnel used a smoke generator that was designed to generate smoke via a chemical reaction that does not produce a flame. However, the smoke generating material ignited and created a flame when the reaction began. The glovebox sprinkler system activated and extinguished the fire. Personnel evacuated the process building without suffering any injuries or personnel contaminations. No radiological material was released to the environment. Personnel have started recovery activities to clean up and decontaminate the area, which was posted as a high contamination area.

Nuclear Criticality Safety: CNS documented a potential nuclear criticality safety issue due to fissile material that was unable to be removed from the bottom of chip cylinders after cleaning them. The chip cylinders are required to be cleaned out after five uses to limit the amount of residual material that accumulates in the base and drain pipes. Nuclear criticality safety personnel identified the issue during a recent annual operational review. CNS performed non-destructive assay measurements of the fixed material and found masses that ranged from 3 to 135 grams U-235 per cylinder. Nuclear criticality safety personnel are in the process of determining if the existing criticality safety analysis accounts for or bounds the mass of residual material in the chip cylinders. Until the issue is resolved, CNS implemented a set of compensatory measures to restrict the chip cylinder maximum loading, suspend intra-site shipment of chip dollies, and clean chip cylinders after each use. CNS plans to obtain additional data from chip cylinder cleanouts to disposition the issue. The chip cylinders had been in storage longer than usual due to the ultrasonic chip cleaning system not operating for two years and restrictions on chip processing operations. CNS considered the prolonged storage time of uranium chips in chip cylinders as contributing to a pyrophoric briquette issue in November 2018 and several instances of finding small amounts of liquid at the base of chip dollies (see 12/7/18, 4/10/20, and 7/24/20 reports). CNS resumed operating the ultrasonic chip cleaning system in August and is now able to process the backlog of loaded chip cylinders (see 8/14/20 report).

Highly Enriched Uranium Materials Facility (HEUMF): NPO issued a safety evaluation report to approve changes to the HEUMF safety basis related to the criticality accident alarm system (CAAS) extension project. CNS split the project into two safety basis submittals. NPO approved the first submittal which was limited to increasing the number of CAAS detectors in the facility and a few other minor changes. CNS plans to credit the additional detectors to increase the CAAS detection capability in the second submittal. The goal of the CAAS extension project is to expand the functional capabilities of the system and decrease operational restrictions. CNS intends to use the updated CAAS configuration to allow new types and forms of materials to be stored in HEUMF.