

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

June 7, 2019

**TO:** Christopher J. Roscetti, Technical Director  
**FROM:** Matthew Duncan and Brandon Weathers, Resident Inspectors  
**SUBJECT:** Oak Ridge Activity Report for Week Ending June 7, 2019

**Building 9995:** On May 30, an unexpected violent reaction in an analytical chemistry laboratory resulted in damage to a muffle furnace while it was heating samples. The door of the muffle furnace door blew open. The glass vials containing the samples shattered and some were expelled from the muffle furnace into the work area. The muffle furnace contained 18 samples that were of several material types including uranium, laboratory waste containing organic epoxies and sealants, and lithium compounds. One of the laboratory waste samples was also thought to contain a piece of cloth. The muffle furnace is used to heat samples to high temperatures. No one was in the immediate vicinity of the muffle furnace when the event occurred, but a chemist was in an adjacent work bay of the same room. The chemist was not injured, but a 10-2 occurrence for this event was declared due to a near miss to an injury.

**Criticality Safety:** CNS declared a 3C-4 occurrence related to an inadequate nuclear criticality safety analysis for the tray dissolver system in Building 9212. The condition of mistakenly pouring concentrated uranyl nitrate into the tray dissolver scrubber instead of hydrogen peroxide was not evaluated for the system even though the hydrogen peroxide storage bottles were stored near fissile solutions in the same type of storage bottle. After the issue was identified, a new method for adding hydrogen peroxide to the scrubber was instituted to mitigate the possibility of using the wrong solution.

The minor-noncompliance and deficiency noted in last week's report regarding the Building 9204-2E storage array issues were canceled by CNS on Monday (see 5/31/19 report). Further investigation by CNS personnel led them to determine that a criticality control violation did not occur. CNS based the cancellations on the criticality safety evaluation spacing requirement between fissile materials being met when the condition was identified. However, the operating procedure requirement for containers to not overlap in the storage array was still violated twice. Given that CNS conservatively responded by initially treating this as a nuclear criticality safety control violation and that the facility personnel were made aware of the issue that day under this assumption, it is still problematic that the same portable work table in the same storage array was inappropriately positioned again later that day.

NPO communicated a concern to CNS earlier this year related to the increase in minor non-compliance and deficiency infractions from 2017 to 2018 and the extent to which personnel error was the cause. At the time, NPO stated this implied emerging issues with operator training, procedures, and conduct of operations. The cumulative number of minor non-compliance and deficiency infractions in 2019 is lower than 2018 thus far. Several lower tier criticality safety events, referred to as field correctable, have occurred in Building 9204-2E due to personnel error since late 2018. By canceling the infractions for the recent Building 9204-2E event, it will not be included in trending and analysis of personnel errors involving criticality safety even though it exposed such issues.