

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 14, 2017

MEMO TO: Steven Stokes, Technical Director
FROM: Ramsey Arnold and Zachery Beauvais, Pantex Plant Resident Inspectors
SUBJECT: Pantex Plant Report for Week Ending December 15, 2017

DNFSB Activity: Board Member Daniel Santos and staff members T. Dwyer, C. Berg and T. Hunt were on-site to review the Pantex cognizant system engineering program and maintenance operations and practices. Additionally, Messrs. Santos and Dwyer observed nuclear explosive operations, walked down nuclear material surveillance facilities, and discussed the status of corrective actions underway to validate the configuration of the fire barrier system (see 12/9/16 report). P. Foster observed a nuclear explosive safety (NES) change evaluation (NCE) to authorize the use of a new electrical tester on a specific weapon program. This NCE follows a broader evaluation of the tester in 2016 (see 7/15/16 report).

High Pressure Fire Loop (HPFL): On Saturday, a section of the safety class HPFL ruptured. Upon detection of the loss of system pressure, all four diesel fire pumps started delivering make-up water to the HPFL. Facilities personnel entered the limiting conditions of operability for the HPFL and facility fire suppression systems, and fire department personnel isolated the impacted section of the HPFL within approximately 30 minutes of the rupture. The resident inspectors walked down the affected area with CNS engineering personnel. Following further evaluation, fire protection engineering determined that the rupture occurred at an electrofusion coupling (EFC) joint in high density polyethylene (HDPE) piping. This section of the HPFL was installed as part of ongoing upgrades to the system to replace ductile iron piping, which is subject to corrosion, with HDPE. This is the fifth HDPE section of HPFL piping to fail at an EFC joint. Based on the results of a deep dive evaluation performed by CNS (see 7/7/17 report), numerous other sections of the replaced HDPE piping are suspect and subject to future premature failures. The latest HPFL failure is one of five sections in the grid that connect and deliver water between pump houses to the nuclear facilities. Pantex is currently developing a justification for continued operations that will rely on a minimum set of HPFL pump/tank configurations and interconnects to be operable to assure water can be delivered to any facility on-demand (see 10/27/17 report). Current operational restrictions remain in place for engineering to verify that facility water demand can be met after an HPFL failure or prior to authorizing additional valve closures.

Qualified Containers: Last week, the resident inspectors met with representatives from CNS special nuclear materials technology and programs integration to discuss the ongoing review to identify the causes and extent of condition for corrosion discovered on AL-R8 containers (see 5/19/17 report). CNS completed an analytical evaluation of samples taken from a degraded container. The evaluation involved various destructive and non-destructive evaluation techniques including scanning electron microscopy, metallography, and chemical sampling. Visual inspections and metallography results demonstrated that the corrosion generally formed in areas where the epoxy coating of the AL-R8 was otherwise degraded or separated from the carbon steel drum. The evaluation identified the presence of trace amounts of several corrosive chemicals, but none in quantities that showed a conclusive causal mechanism linked to their presence. Alongside the analytical evaluation, CNS continues their extent of condition sampling effort. Through this, CNS has identified corrosion on additional containers that held items in the second highest thermal code, though not as extensive as that identified in the highest thermal code items that initiated this review.