

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 12, 2024

TO: Timothy J. Dwyer, Technical Director
FROM: A. Holloway and C. Stott, Resident Inspectors
SUBJECT: Pantex Plant Activity Report for Week Ending April 12, 2024

Flame Detectors: CNS performs routine surveillance tests to confirm proper alignment of flame detectors in nuclear explosive facilities to ensure operability of the associated safety class deluge fire suppression system. In order to verify proper alignment of the detectors, CNS installs torque seals across portions of the device that rotate in different planes. These seals are designed to break when the detector is moved from its required position. Last month, CNS special mechanical inspectors (SMI) discovered two flame detectors with suspect alignment, one with a broken torque seal and another with the torque seal missing. CNS fire protection engineering concluded that the broken torque seal on the one detector had not shifted, which provided reasonable assurance of proper alignment. CNS could not make the same determination for the other detector with the missing torque seal. With only one detector assumed to be misaligned, CNS safety analysis engineering prepared a safety basis supplement (SBS) that would allow nuclear explosive operations to resume in the facility with only one inoperable detector. In its memorandum in response to the SBS, PFO stated that the detector with a broken torque seal was “deemed to be properly aligned upon a subsequent closer inspection” and approved the SBS for continuing operations with only one inoperable flame detector. Of note, due to restrictions resulting from material of concern being present in the facility, CNS could not immediately perform a full detector alignment test before the SBS was approved. After operations were complete and the facility was de-inventoried, CNS fire protection engineering performed the full alignment test and determined that neither of the detectors were properly positioned. During the event investigation, CNS claimed that the facility was not in a mode requiring application of the associated deluge system limiting conditions for operations since no material of concern was present when both detector heads were confirmed to be misaligned.

Deluge Fire Suppression System: During a required full-flow deluge test in a nuclear explosive bay, CNS SMIs discovered water spraying in the equipment interlock from a loose union fitting located on the normally dry side of the deluge system (i.e., on trim piping that is only exposed to water during activation of the system). In order to conduct the test, CNS operations personnel previously cleared the bay of all equipment, but moved some of the items—including an electrical tester and two gas detectors—into the equipment interlock. The SMIs quickly stopped the water leak by tightening the fitting and completed the surveillance activity; subsequently, they identified that the tester and detectors had been exposed to the leak. CNS focused their event investigation on the electrical tester—a piece of high demand category one electrical equipment that directly connects to nuclear explosive circuitry—noting it is likely irreparable along with the two detectors. The resident inspectors note that discussion during the investigation centered around the costly replacement of the equipment and preventing event recurrence by moving such items out of the interlock. The resident inspectors questioned the cause and safety ramifications of the leaking union fitting within the safety class deluge system. CNS personnel responded that they do not currently know the cause nor rate of the leak, but that the loss of water from this trim piping is not expected to prevent the fire suppression system from fulfilling its safety function.