

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 9, 2024

TO: Timothy J. Dwyer, Technical Director
FROM: A. Holloway and C. Stott, Resident Inspectors
SUBJECT: Pantex Plant Activity Report for Week Ending August 9, 2024

Special Tooling: In late June, CNS production technicians discovered a nuclear explosive-like assembly (NELA) had failed to maintain vacuum pressure during special purpose facility operations, which may indicate leak(s) in the unit or vacuum system. After making the appropriate notifications, the production technicians located the leak point, which coincided with a certain cover on the NELA, and informed CNS process engineering. CNS concluded, after further discussions with the relevant design agencies, that the cover itself may have been punctured during special tooling installation. Last month, CNS process engineering created a single-use nuclear explosive engineering procedure (NEEP) to allow technicians to disassemble the unit to confirm the cause of the leak. After disassembling the unit, production technicians discovered cracking of the cover that matched the positions of certain bolts used to affix the special tooling to the unit. CNS tagged out this special tooling fixture (i.e., lifting and rotating fixture, copy 2), along with other fixture copies, to prohibit further use until resolution of the issue. Of note, this special tooling is used for both NELA and nuclear explosive operations in this special purpose facility.

The special tooling fixture bolts are standard commercial items; however, modification—specifically shortening of the bolts—is required prior to installing them in the fixture. As documented in an engineering evaluation, the design requirement to shorten the fixture bolts was added in 2017 after production technicians noticed that the bolts used to secure the units into the fixtures would not fully seat. It was subsequently determined that, due to tolerance stack-up, the threaded hole depth in the unit cover could be slightly smaller than the threaded bolt length, which caused the bolts to ‘bottom out’ prior to being fully tight. In this most recent instance, CNS used unmodified, standard-length bolts in the fixture. As a result, when the technicians utilized copy 2 of the fixture with the NELA, the unmodified bolts protruded too far, which imparted stress to the cover and caused subsequent cracking. CNS discovered that, during the most recent preventive maintenance for this fixture copy, special tooling program personnel replaced the bolts with unmodified ones. Upon further investigation, CNS identified that the preventive maintenance work order did not include modifying the bolts or indicate that modified bolts are required besides on the special tooling drawing. Further CNS inspections revealed that all copies of the fixture were supplied with unmodified bolts.

Last week, during the critique, when asked how the modified bolts are identified and differentiated from the standard commercial bolts, CNS stated that there are no formal processes in place for identification and/or segregation of modified bolts from standard commercial items. During initial fixture assembly and subsequent maintenance, to ensure that only properly modified bolts are used, CNS would need to measure each bolt immediately prior to installing it in the fixture. CNS plans to conduct a causal analysis for the event and develop corrective actions to prevent recurrence, including potential process enhancements for special tooling preventive maintenance where modified commercial items may be used.