

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

March 22, 2019

TO: Christopher J. Roscetti, Technical Director
FROM: Matthew Duncan and Brandon Weathers, Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending March 22, 2019

Building 9212: After determining that a Potential Inadequacy in the Safety Analysis (PISA) exists due to the discovery of a smaller vent path for the wiped film evaporator than credited in the safety basis, CNS subsequently determined that this condition was a positive Unreviewed Safety Question (see 3/1/2019 report). As a compensatory measure, CNS has kept the wiped film evaporator in the warm standby mode until the condition is resolved. CNS evaluated the as-found vent path capability of the two vent lines for the wiped film evaporator and determined that the cross-sectional area was sufficient relative to the recommended venting area derived from DNFSB Technical Report 33, *Control of Red Oil Explosions in Defense Nuclear Facilities*. In the updated venting capability evaluation, CNS assumed a greater density for tributyl phosphate than in previous red oil evaluations for 9212 processes. The increased tributyl phosphate density results in a larger red oil mass and a greater required vent path cross-sectional area to protect against a red oil induced overpressurization event. On March 14, 2019, NPO issued a Safety Evaluation Report approving a change to the Building 9212 safety basis that incorporates the new evaluation of the wiped film evaporator venting capability. The NPO approval letter directed CNS to update the red oil venting capability evaluations for other Building 9212 processes to make those evaluations consistent with the recent, more conservative wiped film evaporator evaluation.

Respiratory Protection: During the past three months, there have been five events associated with the use of powered air purifying respirators (PAPRs) of various types at Y-12. The breathing air hose disconnected while in use three times. A motor blower unit lost power due to an inadvertent disconnection of the battery. And finally, a breathing air hose became pinched, causing the motor to fail. The four most recent events all occurred in Building 9206. In two of the hose disconnect events, carpenters were erecting or dismantling scaffolding in Building 9206 in order to support work activities required to deactivate some furnaces. This work was in a congested, tight space where the carpenters had to crawl and climb while ensuring the breathing air hose did not get caught. In every event, workers responded appropriately upon discovery by exiting the work area and contacting radiological control personnel. CNS collected special bioassay samples from the workers and is awaiting results to confirm that there was no additional radiological exposure as a result of these events. After the first event in December, CNS issued a lessons learned and noted that tape may be used to secure the connection between the breathing tube and motor blower assembly for a certain PAPR model. Though this information would not have prevented all of the events that subsequently occurred, CNS is evaluating how to ensure that when lessons learned are generated, they are shared with the right people and implemented where appropriate, such as in training. CNS held several fact finding meetings and a critique, culminating in a final critique that took a broad look at all of the events and the corrective actions developed for each. The planned corrective actions have not been finalized but appear to be comprehensive. PAPR use in Building 9206 had been suspended but routine operations have resumed. For non-routine work by maintenance or construction personnel, CNS plans to review each work package for proper selection of respiratory protection prior to approval of the work.