

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

January 10, 2020

TO: Christopher J. Roscetti, Technical Director
FROM: Matthew Duncan and Brandon Weathers, Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending January 10, 2020

Building 9212: During casting operations, a casting stack assembly tipped over and spilled the unmelted uranium and graphite contents into the lower furnace bowl. Loading the casting stack assembly into the furnace involves lifting it with a transfer fixture. The transfer fixture makes contact under a pallet that the casting stack assembly sits atop. In this instance, the transfer fixture successfully attached under one side of the pallet, but was attached above the pallet on the other side. The transfer fixture is configured such that the entire cycle of moving the casting stack assembly (lifting, lowering, and detaching) must be completed in series. When the operator noticed that the transfer fixture was not properly attached, he could not have the system execute the detach operation at that point in the cycle. Because of scenarios like this, manual manipulation of the transfer fixture and the casting stack assembly is allowed per the operating procedure. The operator attempted to move the transfer fixture arm from the incorrect location with a pry bar. While attempting to move the transfer fixture arm, the casting stack assembly tipped over. Tip over of a casting stack assembly prior to melting the material charge is an anticipated event that has a specific abnormal operating procedure. The personnel responded appropriately per that abnormal operating procedure and contacted nuclear criticality safety personnel. After all material was recovered from the furnace bowl, administrative control was rescinded and normal operations resumed.

The fact finding identified the inability of the transfer fixture operating cycle to be reversed, after it has started, as a gap. An action was assigned to evaluate the design of the transfer fixture limit switch to determine if it can be configured to allow reversal of the transfer fixture operating cycle.

Nuclear Criticality Safety: As reported previously, a revision to the CNS criticality safety approval procedure included conditions under which equipment containing less than 350 grams of fissile material does not require a nuclear criticality safety approval document (see 8/16/19 report). A standing order has since been issued that modifies and expands the conditions that do not require nuclear criticality safety approval.

The requirement to have at least two feet of physical separation from other fissile equipment has been removed by the standing order. An additional exception condition has been added for equipment that contains larger masses of fissile material (less than 700 grams ²³⁵U) that is secured in place as installed, physically disconnected from all connection lines and sealed, and has had uranium bearing material removed to the extent feasible.

Prior to the standing order, nuclear criticality safety approval was required for all cleanout activities and equipment removal that involved fissile material. The standing order provides a new exception to no longer require nuclear criticality safety approval for isolating or removing equipment that has been verified by non-destructive assay measurements to contain less than 350 grams ²³⁵U.