DEFENSE NUCLEAR FACILITIES SAFETY BOARD

July 5, 2019

TO: Christopher J. Roscetti, Technical Director
FROM: Matthew Duncan and Brandon Weathers, Resident Inspectors
SUBJECT: Oak Ridge Activity Report for Week Ending July 5, 2019

DNFSB Staff Activity: A staff review team conducted a teleconference with DOE Oak Ridge Office of Environmental Management and Isotek Systems, LLC personnel to discuss the staff's review agenda for the Oak Ridge Oxide Processing campaign (see 6/28/19 report).

Calciner Project: NPO issued a safety review letter last week approving a revision to the safety design strategy for the Building 9212 calciner project. The NNSA Chief of Defense Nuclear Safety also provided an advice memorandum to NPO supporting the approval. The revision changed the off-gas processing equipment design due to performance issues with the previous design (see 4/19/19 report). The strategy to limit transfers of off-gas process condensate, which can contain fissile material under abnormal conditions, has changed twice over the course of the project. The initial design relied on an active control (gamma monitor) to alarm and close valves to prevent the transfer of process condensate to downstream tanks that are an unfavorable geometry with respect to nuclear criticality safety. This approach was changed, primarily for project cost savings, to a passive control strategy that relied on two cyclone separators and a sintered metal filter that are part of the off-gas particulate removal equipment. However, performance issues with the sintered metal filter made it operationally infeasible due to plugging. The current design uses a third cyclone separator in place of the sintered metal filter. Since the cyclone separators would be subject to the same degradation mechanism that results in reduced particle removal efficiency, the size of one of the cyclone separators was changed to reduce this impact. An additional administrative control for sampling the condensate is planned.

Mobile Facility Operation: DOE Standard 1027, *Hazard Categorization of DOE Nuclear Facilities*, establishes the requirements and guidance for determining the hazard category of a nuclear facility based on the quantity of radionuclides the facility is designed to accommodate. The hazard categories, in descending order of significance, are Hazard Category 1, 2, 3, and Below Hazard Category 3. If the ANSI/ANS-8.1-2014, *Nuclear Criticality Safety in Operations with Fissionable Material Outside Reactors*, single-parameter mass limit is exceeded for fissile nuclides and the potential for a nuclear criticality is not precluded by the nature of the process or facility segmentation, then the facility is designated as Hazard Category 2.

CNS has been conducting burn tests to gather data to evaluate if a nuclear criticality is precluded during a fire for a component that exceeds the ANSI/ANS-8.1-2014 single-parameter mass limit. CNS is pursuing this testing because it wants to perform a portion of the operation in a mobile facility that CNS would characterize as Below Hazard Category 3 in order to meet desired cost and schedule requirements. This approach would allow the operation to be performed without being subject to Subpart B – Safety Basis Requirements of 10 CFR 830, *Nuclear Safety Management*, and would not require NPO approval of the safety basis for this operation.