

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

April 5, 2019

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

Building 9212: On Thursday, chemical operators were performing routine operations when two anhydrous hydrogen fluoride (HF) detectors alarmed. These detectors are located inside of the HF cylinder enclosure. The chemical operators entered the alarm response procedure and notified their supervisor and the plant shift superintendent, who had also been receiving the alarms. The plant shift superintendent declared an operational emergency, classified it as an alert and dispatched the fire department. Initial protective actions were to evacuate Building 9212 and other nearby buildings and have personnel shelter in place in other downwind buildings. The emergency response organization was activated and staffed various locations, including the technical support center and emergency operations center. The cylinder enclosure is connected to a scrubber which is designed to remove HF from the exhaust gas stream of equipment in the area. The safety basis credits both as design features for safety. The scrubber worked as designed. There are several other HF detectors in the area and none of them alarmed, so there was no indication that any significant amounts of HF leaked from the enclosure. There were no reports of injuries or contaminations due to the event or the evacuations. The emergency was terminated after approximately two hours and unrelated operations in Building 9212 resumed. As of Friday, operators continued to monitor a low concentration of HF in the enclosure. The scrubber will continue to run. The exact location and cause of the leak is unknown at this time.

Building 9212: On Monday, safety analysis and engineering personnel determined that a Potential Inadequacy of the Safety Analysis exists for the Accountable Steam Condensate isolation unit response time associated with the Tray Dissolvers in the Special Processing area of Building 9212. The Accountable Steam Condensate system transfers steam condensate from several steam heat exchangers to the storm drain system of Building 9212. In the event that a heat exchanger tube leak allows fissile material to be discharged from the process side to the steam side of the heat exchanger, the isolation unit senses an increase in conductivity of the steam condensate and closes an isolation valve to stop the flow of steam condensate to the storm drain system. Since the storm drain system is an unfavorable geometry with respect to nuclear criticality safety, the isolation unit is required to close the isolation valve within a short amount of time after the conductivity sensor reaches its threshold. This isolation is relied on to limit the mass of fissile material that could enter the storm drain system. The Accountable Steam Condensate isolation unit is a safety significant system and the maximum response time for closure of the isolation valves is specified in the Technical Safety Requirements.

A Nuclear Criticality Safety engineer was revising a criticality safety evaluation report for the Tray Dissolvers and discovered that the assumed concentration of fissile material in a supporting calculation was not conservative. The concentration of fissile material is used to determine the maximum response time for closure of the Accountable Steam Condensate isolation valves. Special Processing was in warm standby at the time that this issue was discovered and has remained in that mode. CNS personnel are developing compensatory actions that would be implemented prior to resuming operations with the Tray Dissolvers.