

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

August 7, 2020

TO: Christopher J. Roscetti, Technical Director
FROM: M. T. Sautman and Z. C. McCabe, Resident Inspectors
SUBJECT: Savannah River Site Activity Report for Week Ending August 7, 2020

H-Canyon: In order to support a valve replacement, operations staff placed the Acid Recovery Unit (ARU) in Standby Mode. Per their mode change procedure, H-Canyon personnel isolated steam from the ARU reboiler with a lockout and administratively controlled (tags) the 601 feed tank pumps. These pumps feed the ARU evaporator. A couple hours later, H-Canyon personnel transferred solution from a basin tank to the 601 feed tank. The transfer procedure did not discuss modes. Five days later, an engineer questioned whether this transfer of non-fissile, organic-bearing solution should have been subject to the ARU or tank requirements for Standby Mode. In Standby Mode, transfers of fissile materials greater than a single parameter mass are prohibited for tanks, but for ARU the restriction goes further and prohibits transfers of organic-bearing solution too. (The accident scenario of concern is a red oil explosion in the ARU evaporator. Two of the requirements for a red oil explosion are the organic tri-*n*-butyl phosphate and temperatures above 130° C). While there are some inconsistencies in various documents whether the 601 feed tank is officially part of the ARU system or not, H-Canyon personnel later concluded that the 601 feed tank was part of ARU. Thus transfers of organic-bearing solution would have been prohibited in Standby Mode and SRNS declared a Technical Safety Requirement (TSR) violation. SRNS stopped further transfers in the interim and is pursuing procedure changes, improved status control, and additional training.

Salt Waste Processing Facility (SWPF): The Deputy Secretary of Energy is the Startup Authorization Authority. DOE-SR completed their review and recommended approval to start.

The Resident Inspector observed portions of the three batch run with simulant. The run had to be terminated due to several equipment issues. First, six extraction contactor exhibited high vibration, two of these were extremely high, and all six will need to be rebuilt. The first salt solution pump used failed a post-maintenance test when it experienced a mechanical seal failure. Engineers shut down the alternate pump when they observed indications of cavitation. Engineers will need to tune the second pump because it had been rebuilt recently and the desired operating parameters have changed. The first pump will be rebuilt once the run has been completed. Engineers are also investigating why the Decontaminated Salt Solution Stilling tank had a hi-hi level alarm at the same time. The procedure being used was a procedure intended to be used once due to the atypical starting configuration. Earlier, the control room operator identified four steps that needed to be modified because the equipment text description or number was incorrect. A procedure note also prompted an extended discussion between operations and engineering staff when it stated that three steps shall be performed concurrently, but it was not clear whether that was before or after waiting the 120 minutes mentioned in the first step.

TSR Minimum Staffing: Two of the three qualified shift operations managers at a defense nuclear facility are unavailable. At this facility, the TSRs require a qualified SOM to be responsible for the facility command function during certain activities. A second facility will be operated for one shift a day because of availability issues with four of the six qualified SOMs.