

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

November 4, 2016

**TO:** S. A. Stokes, Technical Director  
**FROM:** M. T. Sautman and Z. C. McCabe, Site Representatives  
**SUBJECT:** Savannah River Site Weekly Report for Week Ending November 4, 2016

**Tritium Extraction Facility:** An interlock shuts down the chiller plant if two of three chill water pumps are not operating. During the installation of a lockout, an operator tripped this interlock when he shut down one of the two operating pumps (A operating, B out-of-service, C operating and then shut down). Although the safety impact of this interlock trip was minor, this event illustrates multiple instances where the configuration of equipment was not accurately known because of weak conduct of operations practices and control system vulnerabilities. The lockout order was written assuming that pumps A and B would operate when pump C was shut down. However, this lockout was added to the schedule without completing a separate work package to return pump B to service. The oncoming shift manager then authorized the installation of this lockout believing that pump B (out of service for months) had been returned to service when he misread a logbook entry without confirming the actual status with the status board. The reason for the lockout was to fix a failed modular motor control system (MMCS). This MMCS failure caused the industrial control system (ICS) to incorrectly indicate that pump C, which was in manual mode, was “stopped/failed” when it was actually operating. Although an engineer knew the ICS would not accurately display the correct status of pumps in manual mode, the shift orders for the control room staff did not warn operators to rely on the status board vice the ICS to check equipment status. As a result, the operator checked the status of pump C on ICS (as they usually do), which indicated that it was stopped, when he should have checked the pump’s status on the status board. Believing pump C to be off, he then turned off the motor control center to pump C without realizing this left only pump A operating since pump B was still out of service (and which was reflected on the status board). This caused a low flow that tripped the interlock. Meanwhile, earlier maintenance on a programmable logic controller (PLC) had unknowingly caused a problem requiring the PLC to be reloaded and this problem caused the ICS to indicate that the two chillers were operating, when the interlock had actually turned them off. This added to the confusion of what the actual equipment configuration was when the interlock tripped.

**Solid Waste Management Facility (SWMF):** At the end of October, SWMF personnel performed a periodic review of the low-level waste (LLW) inventories and identified a discrepancy. Although there were no changes to the waste contents since the previous review, the radiological inventory for three containers increased in the database. Discussions with other SWMF personnel revealed that the issue was caused by an error in the safety software code used to track and record the LLW inventory. SWMF personnel originally identified and documented this error in April 2008. However, the software was never corrected because the modification was a low priority due to the conservative nature of the error and the rarity of the specific conditions required for the error to manifest. When the error was originally identified, an engineer was informally directed to manually adjust the database whenever the error occurred and he has continued to adjust the database accordingly for the past eight years. However, the engineer had not adjusted the data before the October periodic review began. In addition to manually adjusting the most recent erroneous data, SWMF personnel identified multiple corrective actions including formalizing the process for manually adjusting the data until the error can be fixed and to programmatically formalize requirements for documenting interim measures to avoid similar issues in the future. Additionally, SWMF personnel plan to develop a prioritization and periodic review process for other outstanding and future software modifications, as well as distribute a lessons learned to other facilities onsite that use this software.