

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 29, 2023

TO: Katherine R. Herrera, Acting Technical Director
FROM: L. Lin, Z.C. McCabe, and E.P. Richardson, Resident Inspectors
SUBJECT: Savannah River Site Activity Report for Week Ending December 29, 2023

Defense Waste Processing Facility (DWPF): While attempting to re-perform a DG-200 largest single load rejection surveillance, an electrical fault within a chiller junction box caused an arc flash event when the chiller was started. An operator standing at the chiller control panel (approximately 6 feet to the left of the junction box) described seeing a baseball sized fire ball ejected from the cabinet followed by significant smoke before they were able to evacuate the area. The fire department responded, determined that there was not a fire, and gave the “all clear” to re-enter the room. Heavy charring and a large hole were visible on the right side of the junction box and liquid metal splatter coated nearby piping, which confirmed the occurrence of an arc flash. DWPF personnel inspected the same junction box on the other chiller and found no evidence of a similar issue. This is the second time this month that an energetic electrical event has prevented the DWPF team from completing this bi-annual surveillance (see 12/8/23 report).

A resident inspector (RI) observed the DWPF Electrical and Instrumentation (E&I) group enter the junction box to perform an inspection and prepare the internal wiring for testing that was completed by the vendor the next day. The pre-job brief was thoroughly conducted. Team members exhibited a good questioning attitude about what they may find upon opening the junction box and what actions would be required. They subsequently took appropriate precautions, carefully opened the junction box, and verified it to be electrically safe prior to performing any work. The internals of the box were completely charred and the arc fault source appeared to be a Polaris lug connector which was heavily damaged with the two leads entering it severed from the arc fault. A nearby grounding cable also had a section of wire vaporized during the incident. E&I mechanics successfully cut the wires from the remaining five Polaris lugs and re-labeled them to support further inspections and testing.

Additionally, a valve on a safety related nitrogen tank exhibited a body to bonnet leak which required isolating two of the six storage tanks. Isolating these two tanks caused the available nitrogen inventory to drop below the level required by the Technical Safety Requirements. An operator taking rounds noticed the leak and worked together with the shift operations manager to isolate the valve to prevent the further loss of nitrogen. The team entered the appropriate limiting condition for operation following completion of immediate actions. A subsequent inspection of the valve revealed that the body bolts were only finger tight (about 5 ft-lbs) which DWPF engineering personnel suspects is due to thermal cycling following previous maintenance. The facility plans to conduct a post job review to determine lessons learned from this event.