

DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 19, 2023

TO: Christopher J. Roscetti, Technical Director
FROM: A.Z. Kline, L. Lin, Z.C. McCabe, and E.P. Richardson, Resident Inspectors
SUBJECT: Savannah River Site Activity Report for Week Ending May 19, 2023

Savannah River Tritium Enterprise (SRTE): SRTE entered a limiting condition for operation (LCO) to support replacing a safety significant oxygen monitor in a glovebox. The glovebox oxygen monitors are credited to prevent deflagrations and explosions by preventing formation of a flammable atmosphere. This LCO condition (Condition C) requires verification that the oxygen concentration is below the threshold using alternate oxygen monitoring immediately and every three hours thereafter. SRTE personnel established this alternate monitoring through utilization of a portable oxygen monitor. On the 4th day of alternate monitoring, a control room operator questioned the validity of the recorded readings after reviewing 14 consecutive identical readings. Upon further review, SRTE personnel determined that the display on the general service portable oxygen monitor was frozen, as indicated by the lack of fluctuation of the oxygen level (reported to the thousandths of a percent), the solid (as opposed to flashing) “heartbeat” indication, and the date and time showing three days prior. Upon realizing that the portable monitor had failed, SRTE personnel replaced it with another portable monitor and continued the alternate oxygen monitoring every three hours. The event investigation revealed that operations personnel were not trained nor expected to verify any indications on the oxygen monitor display when they take the readings. Further, it is noteworthy that each three-hour reading was taken by a qualified operator, verified by another qualified operation, and shift supervision reviews the logs every shift. However, SRTE personnel noted that these reviews were intended to examine for trends in the oxygen content. SRTE personnel are developing additional guidance to prevent recurrence of similar issues in addition to the briefing provided to SRTE operations personnel.

The Technical Safety Requirements (TSR) Bases for Condition C state, “[i]f alternate monitoring is lost, then it shall be immediately re-established, and 3-Hour readings continued.” During the event investigation, SRTE personnel stated that they do not believe they failed to complete the LCO required action of verifying the glovebox oxygen content despite not taking a valid reading for over 40 hours because alternate monitoring was re-established when they learned the monitor was not working. Further, SRTE personnel stated that they are not certain when the readout froze despite the date and time being locked in on the monitor display. Therefore, SRTE personnel have concluded that they were never outside of the safety basis requirements per the statement in the TSR Bases despite not having any operable controls in place to alert personnel of an elevated oxygen content inside the glovebox. The subsequent LCO condition, Condition F, provides further actions if the required actions in Condition C are not met within their completion times. Condition F directs the continued oxygen monitoring (if available) in addition to placing the affected glovebox in standby mode immediately. However, SRTE personnel did not enter this condition and place the glovebox in standby mode. This event represents a failure to maintain safety basis compliance in terms of not verifying the absence of oxygen (which could lead to a potentially flammable glovebox atmosphere in conjunction with tritium) in addition to improper administration of entering the appropriate LCOs.