

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

TO: Steven Stokes, Technical Director  
FROM: William Linzau and Rory Rauch, Site Representatives  
SUBJECT: Oak Ridge Activity Report for Week Ending April 11, 2014

**Oxide Conversion Facility (OCF):** This week, a small hydrogen fluoride (HF) leak occurred while operators were preparing to connect the vendor-supplied HF cylinder to the OCF system. The operators had just loosened the bonnet covering the cylinder's isolation valves when one operator's personal HF detector alarmed. The operators on the HF cylinder loading dock, who were wearing supplied air respirators, immediately evacuated. After consulting with industrial hygiene (IH) personnel and Enriched Uranium Production (EUP) management, the shift manager authorized the operators (still wearing supplied air respirators) to return to the dock with a new detector to evaluate whether the HF had dissipated. The detector alarmed at its maximum set point concentration (30 ppm) and the operators evacuated the dock once again. Subsequently, the shift manager directed the operators to return to the dock, tighten the cylinder bonnet, and place the cylinder in its secondary confinement enclosure. There was no HF detected inside the cylinder enclosure subsequent to completion of these actions. It should also be noted that none of the HF detectors on the dock alarmed during this event. As a conservative measure, EUP personnel ran the OCF scrubber overnight to neutralize any residual HF in the system.

EUP management believes this leak could be caused by a cylinder isolation valve that was not fully tightened by the vendor. The responsible process engineer is drafting a procedure that would allow the operators to attempt to tighten both cylinder valves. If this course of action is not successful, then the cylinder would likely need to be returned to the vendor. At that time, B&W may have to take additional measures to prepare the cylinder for offsite shipment if its condition is deemed non-compliant with Department of Transportation requirements.

**Building 9212/ Nuclear Criticality Safety (NCS):** The primary waste product from wet chemistry operations is the raffinate stream from the Primary Extraction (PX) process. The PX criticality safety evaluation (CSE) identifies two primary controls to ensure that the concentration of  $^{235}\text{U}$  in this waste stream is sufficiently low for safe transfer to non-NCS safe geometry tanks. The first control requires dual independent sampling of the uranium content in the NCS-safe geometry raffinate storage tanks prior to transfer. This control has been elevated to the Building 9212 technical safety requirements due to the degree to which it is relied upon in the safety analysis to reduce the frequency of an NCS accident. The second control is a gamma radiation monitoring system (gamma monitor), which is credited in the PX CSE to monitor the raffinate stream and automatically stop transfers upon detection of a high  $^{235}\text{U}$  concentration.

Several months ago, EUP operators found the gamma monitor in a fault condition. After several attempts to troubleshoot the issue, system engineers believe they have narrowed the problem to the detection system. They are currently working on an agreement for the vendor to evaluate and repair or replace the failed components of the system. The vendor estimates that this service could take several months. With an inoperable gamma monitor, operators have been unable to transfer raffinate to the non-NCS safe geometry tanks outside the facility. Therefore, as of last month, the raffinate storage tanks had accumulated sufficient solution to render the PX process inoperable. To facilitate the near-term resumption of PX operations, NCS engineers are developing a technical basis to support the implementation of a temporary alternate control until gamma monitor operability can be restored. The control would involve a protocol for performing non-destructive assay sampling of the raffinate in the storage tanks prior to transfer. EUP management estimates that this issue will have a cascading effect that leads to the shutdown of other wet chemistry processes if it is not addressed in the next two to four weeks.