DEFENSE NUCLEAR FACILITIES SAFETY BOARD

May 3, 2024

TO: Timothy J. Dwyer, Technical Director
FROM: Clinton Jones, Resident Inspector
SUBJECT: Oak Ridge Activity Report for Week Ending May 3, 2024

Building 9212: During an operation involving the wiped film evaporator (WFE), a shift technical advisor observed and questioned a cloudy material that was present in a sight glass for the WFE. The WFE takes product from a secondary extraction process and concentrates it into a suitable form for denitration.

Prior to the start of the WFE stage of the process, the feed product is sampled for organics and adjusted to predetermined specific gravity requirements that are bounded in the technical safety requirements (TSR) and the documented safety analysis (DSA). Although the feed was adjusted to within the TSR limits the day prior to operation of the WFE, a large amount of suspected heavy organic material had settled out at the bottom of the WFE. A specific administrative control (SAC) in the TSR requires the WFE phase separator to be monitored during operation for the presence of an organic layer. In addition to the monitoring requirement, the SAC also specifies that bulk organic material should be removed. This is to reduce the frequency of explosions due to fume-off and red oil reactions by ensuring that consequential amounts of organics are not transferred to downstream components. The WFE phase separator is designed for the ability to remove a light organic phase layer from the top of the feed product and not to remove heavy organic phase layers from the bottom of the tank.

CNS entered the potential inadequacy of the documented safety analysis process for the discovery of suspected heavy organics in the bottom of the WFE phase separator. Also due to this abnormality, CNS declared a TSR violation due to non-compliance with the SAC. CNS filed an occurrence report based on the violation of the SAC. The resident inspector attended the critique of the issue and will follow up on the results of the sampling that CNS plans to perform on the suspected heavy organics as well as the cause of the event. CNS stopped the process upon discovery of the abnormal condition and ensured that the appropriate technical experts were involved. Afterwards, CNS drained the system and stored the material in a safe and secure manner prior to the end of the shift that day.