

## DEFENSE NUCLEAR FACILITIES SAFETY BOARD

December 28, 2018

**TO:** Christopher J. Roscetti, Technical Director  
**FROM:** B. Caleca and P. Fox, Hanford Resident Inspectors  
**SUBJECT:** Hanford Activity Report for the Week Ending December 28, 2018

**Tank Farms:** DOE ORP approved a revised River Protection Project Authorization Agreement. The revisions are minor and the documents which define the safety and requirements bases in the new agreement remain unchanged from the previous agreement. Additionally, the agreement still precludes addition of waste to Waste Group A tanks and states that the contractor may not create any additional Waste Group A tanks without specific, prior approval from ORP. Waste Group A tanks are those tanks that have a potential spontaneous buoyant displacement gas release event (BDGRE) flammable gas hazard in addition to a potential induced gas release event flammable gas hazard. There are currently five double-shell tanks (DST) that are categorized as Waste Group A meaning that they are conservatively estimated to achieve a flammable gas concentration of 100% of the lower flammability limit in the tank headspace if all of the retained flammable gas that is contained in the waste is released by a spontaneous BDGRE. The current documented safety analysis (DSA) states that, despite the amount of retained gas, there is low likelihood for a flammable gas release that establishes a detonable atmosphere prior to a deflagration. This along with other factors is evaluated to make the potential for a DST headspace detonation beyond extremely unlikely. The tank farm contractor prevents establishment of additional Waste Group A tanks by evaluating operations such as waste transfers, chemical additions, and large water additions that could cause conditions to change in a tank such that it becomes a new Waste Group A tank. If a conservative analysis determines that the operation can cause Waste Group A conditions in the affected tank, the operation is precluded, or is modified before it occurs.

DOE ORP approved a change to the Tank Farm DSA that incorporates the Safety-Significant Instrument (SSI) concept (see 10/12/2018 report) into the safety basis. ORP's safety evaluation report states that the change allows the use of SSIs which are not part of either a safety instrumented system or a safety instrumented alarm, as currently defined in the DSA. Under the concept, the SSI does not include a logic solver or safety alarm, and does not require an immediate operator response to fully implement a safety function. Consequently, only the sensor of the instrument is classified as a safety system, structure, and component (SSC). The contractor intends to initially use this concept for applications related to the tank-side cesium removal project to inform specific administrative control actions that are not time critical. For example, the contractor may use an SSI to provide indication of airflow through an ion exchange column where the operator reads the airflow and determines whether it meets the requirements for a specific administrative control that governs access to the room where the ion exchange column is located. If the airflow is not sufficient, the operator would not enter the room. Use of the SSI as an SSC will be supported by a qualitative assessment that assures that the design sufficiently addresses the potential failure modes through redundancy, diagnostics, and periodic testing to be considered sufficiently reliable for its intended application. The results of the evaluation will be documented per Tank Farm Contractor procedures.