

Tank Waste Committee Draft Advice

Topic: Double-Shell Tank Failures

Authors: Bob Suyama, Jeff Burright, Shelley Cimon

Originating Committee: TWC

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The Hanford Advisory Board (Board) is concerned that there are no scenarios contained within Revision 8 of the River Protection Project System Plan¹ (System Plan) that evaluate the specific systemic effects of additional Double-Shell Tank (DST) failures. A reduction in total DST capacity due to DST failures would have a significant effect on the rate of Single-Shell Tank retrieval, future Waste Treatment Plant (WTP) operations, potential environmental damage, as well as, diverting critical mission resources to address the DST failure; e.g. the retrieval of AY-102 alone cost \$107 million and took nearly a year to complete.

The first DST (AY-102) has already failed, and investigations are ongoing to determine whether the outer liner of another DST (AP-102) has also failed. Meanwhile, the Baseline Scenario of System Plan 8 appears to discount the likelihood of additional DST failures occurring between now and 2063, while other scenarios could extend the tank mission to as late as 2126. Without addition of a planning assumption that analyses the potential of multiple future DST failures throughout the life of the tank mission, it brings into question, for the HAB and the public, any confidence, in total, of all System Plan 8 assumptions.

Furthermore, there is variability in the degree of overall impact specific to the tank waste management system from DST failures. For example, failure of one of the three West Area DSTs would be challenging to respond to because the West-East waste transfer system is currently not operational due to hydrogen gas buildup concerns in the 200 East Area receiving tank (AN-104) and the current inoperability of the cross-site transfer line system. Under the System Plan Baseline Scenario, this situation would not be remedied until at least 2025. In the event of a DST failure with no method of rapid retrieval and no place to put waste, the Board is concerned that the result could be a massive uncontrolled release of highly radioactive and highly mobile waste into the environment and ultimately the Columbia River.

In the Board's Consensus Advice #263², #271³ and #275⁴, the Board has repeatedly advised the Department of Energy (DOE) and the Washington State Department of Ecology (Ecology) to construct additional waste storage tank capacity.

While Scenarios 5, 6, and 10 of the System Plan do consider the construction of additional DST capacity, the System Plan makes it clear that such a decision is driven by retrieval capacity and feed limitations rather than as a response to the reduction of the existing DST capacity due to tank failures. This means that these scenarios may be underestimating the total number of DSTs that would need to be built and the timing of when they may be needed should DST failures occur.

It is worth noting that in Scenario 6, of the System Plan revision 6, dated October 2011, the consequences of a delayed WTP startup from the baseline case of 2019 to 2023 was considered.

¹ [River Protection Project System Plan, Revision 8](#), ORP-11242, October 31, 2017

² HAB Consensus Advice #263, Double-Shell Tank Integrity, November 2, 2012

³ HAB Consensus Advice #271, Leaking Tanks, September 6, 2013

⁴ HAB Consensus Advice #275 Path Forward on Tank Waste, March 7, 2014

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Under this scenario, it was determined that to construct eight additional DSTs was appropriate. The System Plan 8 baseline scenario now assumes WTP startup not occurring until 2036 (an additional 13-year delay), with no additional DST construction. As it stands, DOE's Baseline Scenario is proposing to conduct a mission that will depend on the continued usability of the DSTs for 27 to 68 years past their respective design lives, depending on the specific DST, GAO-15-40⁵. The Board believes that it would be wise for Ecology and DOE to consider, in future new tank waste treatment milestones, the growing risk of multiple DST failures, given that the tank waste mission is now expected to span beyond 45+ years.

The Board advises that:

- DOE and Ecology acknowledge the growing risk of multiple DST failures over the next 45+ years of the tank waste mission, by evaluating the mission impacts, system vulnerabilities, and response capabilities should additional DST failures occur.
- Given that the System Plan estimates an 8-year time span between the decision to build new tank capacity and the completion of tank construction, the Tri-Party Agencies must adopt a proactive approach to DST failure risks rather than be caught in an unplanned scenario, forcing reaction. DOE should immediately initiate the siting, design, regulatory approval, and preliminary procurement actions necessary to obtain additional waste tank storage capacity to reduce the response time if DST storage capacity becomes limited or overwhelmed by future DST failures.
- Any preferred scenario for the waste treatment mission should be "stress tested" for its resilience to unexpected conditions, such as additional tank failures during the mission or the most inconvenient tank failure.
- DOE and Ecology should ensure that the success of any single step in the tank retrieval process is not dependent on a single point failure, such as is the case with plans to rely on tank AN-104 for cross-site waste transfers.
- The Board requests a briefing by DOE on its existing plans and procedures for retrieving future failed DSTs, including a hypothetical waste retrieval plan for Tank AP-102 if it is found to have failed within the next two years.

⁵ United States Government Accountability Office GAO-15-40, Hanford Cleanup, Condition of Tanks May Further Limit DOE's Ability to Respond to Leaks and Intrusions, November 2014