



MEETING SUMMARY

HANFORD ADVISORY BOARD

Tank Waste Committee (TWC)

November 18, 2020

Virtual Meeting via Teleconference and GoToMeeting

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This is only a summary of issues and actions discussed at this meeting. It may not represent the fullness of represented ideas or opinions, and it should not be used as a substitute for actual public involvement or public comment on any particular topic unless specifically identified as such.

Opening

Bob Suyama, Benton County and TWC chair, welcomed meeting participants.

The TWC committee adopted the meeting summary for its September 2020 virtual meeting.

Jeff Burreight, Oregon Department of Energy (ODOE), announced that there is an online meeting of the Nuclear Regulatory Commission and the US Department of Energy (DOE) regarding Vitrified Low-Activity Waste Incidental to Reprocessing at 9:00 am on November 19, 2020.

Stan Branch, DOE, announced that this meeting was being held in accordance with the Federal Advisory Committee Act.

Tank Farm Overview

Brian Harkins, DOE, provided the committee with an overview of the Tank Farm program and what is being done to meet the requirements for storage, retrieval, and treatment now and for the future. He began by talking through a photograph showing the major facilities in the Tank Farms. The origin of the Tank Farms was related to the production of plutonium for weapons starting in 1943. Over the next 45 years, Hanford supplied two-thirds of the nation's plutonium used in national defense.

Hanford produced 525 million gallons of tank waste during the production years of 1944-1988.

- 50 million gallons (9.5%) was reprocessed.
- 105 million gallons (20%) was disposed of into the ground.
- 1.4 million gallons (0.3%) leaked into the ground through tank leaks.
- 310 million gallons (59%) was evaporated.
- About 56 million gallons (10.6%) remains in Hanford tanks.

These 56 million gallons of tank waste now await retrieval, treatment, and disposal. The waste is currently in two types of tanks: 149 Single-Shell Tanks (SSTs) constructed between 1943-1964 and 28 Double-Shell Tanks (DSTs) constructed between 1968-1986. Fifty-eight of the 149 SSTs are suspected to have leaked tank waste to the ground.

The waste in the tanks is in three forms. Saltcake is mostly water-soluble salts with some interstitial liquid. Supernate is any non-interstitial liquid in the tanks. Sludge is water-insoluble material with a consistency similar to peanut butter. Conceptually, these three types of waste together would cover a football field 148 feet deep in waste.

A major concern in the Tank Farms is protecting workers from tank vapors. Interim mandatory respiratory protection is required under the 2016 Memorandum of Agreement until engineering controls or other approaches are shown to be effective. Work is ongoing to improve safety processes to transition to risk-based controls. Monitoring for ammonia, evaluation of results, and quality communication are key elements to the success of this program.

Waste has been retrieved from the tanks for decades. Transferring waste from SSTs to DSTs reduces the risk of leaks. Preparing systems to send waste from the Tank Farms to the Waste Treatment Plant (WTP) is a very high site priority. Retrieving waste is complicated because tank waste is highly radioactive, tanks contain three forms of waste, and the tanks are underground with a limited number of small access pipes. The tools used for retrieval include sluicing, dissolving waste with chemicals, and vacuuming. Brian

Harkins showed photographs illustrating an example of the amount and complexity of infrastructure that needs to be built in an underground tank farm in order to begin retrieval operations (slides 13 and 14).

The DST Integrity Program maintains DST structural integrity that can maintain safe tank waste storage and support waste treatment operations. Its four major components are corrosion control, inspections, structural analysis, and development of repair technology. Inspections include examining inner and outer tank walls, under-tank inspections, and ultra-sonic testing. The SST Integrity Program also includes both structural analyses and a leak assessment process, in addition to periodic dome surveys, visual inspections, and waste liquid level evaluations.

One of the highest-priority projects at Hanford is the Direct-Feed Low-Activity Waste (DFLAW) program. Brian Harkins reviewed a graphic of all of the DFLAW components (slide 19) that shows the repurposed AP tank farm that will provide waste feed to the vitrification plant. The vitrified waste is anticipated to be disposed of on the Hanford site. An important part of preparing waste to be turned into glass is the Tank-Side Cesium Removal (TSCR) process that removed cesium from the tank waste. The cesium will be stored on site until it can be further processed.

The WTP will be the world's largest radioactive waste treatment plant that immobilizes waste into glass using a vitrification process.

Regulatory Perspectives

Jim Alzheimer, Washington State Department of Ecology (Ecology) expressed his appreciation for DOE's presentation and commented that the tank farms work is pretty good.

Committee Discussion

In response to a question about sluicing chemicals, Brian Harkins explained that nitric acid is used to help dissolve waste that is stuck to the tanks.

The question was asked about how much low-activity waste is at Hanford. Brian Harkins did not have the information with him and offered to find the answer and get back to the committee.

There were a number of questions about TSCR including:

- Does it have full liquid waste retention? Is there a catch basin?
- Is there a system to prevent airborne release and worker exposure from such a release?

Brian Harkins explained that some of the photos in the presentation were taken at locations not on the Hanford site. The TSCR piping is made with double piping material with leak detection ability. The system also provides secondary containment and filter ventilation. The unit is designed to meet legal permitting requirements.

The question was asked about waste definitions and the processing of different types of waste. Brian Harkins responded that he was not sure how to answer those questions in high-level detail. He invited the questions to be submitted in writing so that a written response could be prepared.

In response to a question about the current status of the high-level vitrification plant, Brian Harkins explained that DOE is analyzing the high-level waste path and should there be a pre-treatment facility. There is not a date for this part of the project yet.

The topic of waste disposal was discussed, partly in light of a public comment period on the Integrated Disposal Facility that ends on November 27. Brian Harkins explained that high-level waste goes to a national repository, low-activity waste will be disposed on site, and waste water goes through a water treatment facility to remove contaminants.

The question was asked if DOE was still considering retrieving transuranic waste from about 12 tanks and sending it to the Waste Isolation Pilot Plant in New Mexico. Brian Harkins invited the committee to send in that question so that DOE can reply with an answer.

TWC members wanted to know what would happen in the event that an SST failed. Brian Harkins responded that DOE has tank space in the event an SST fails. He noted that it is imperative that the tank integrity programs remove waste from tanks before they fail.

System Plan 9

Brian Harkins, DOE, offered a high-level overview of System Plan 9 which evaluates the current approach for Hanford tank waste retrieval, treatment, and disposition in light of a baseline scenario and four alternative scenarios. The Tri-Party Agreement (TPA) requires DOE to submit a system plan to Ecology every three years. System Plan 9 is available in the Hanford Administrative Record at Hanford.gov using search term AR-04287.

Scenario 1 is the baseline case. It uses current baseline plans to project estimated retrieval and treatment completion dates to comply with the Consent Decree and the TPA. It contains a Scenario 1B in which operating efficiency is reduced. The result of this scenario is that retrieval of waste from all SSTs will be completed by 2061 and all tank waste treatment will be completed by 2066 at a life cycle cost of \$107 billion (unescalated).

Scenario 2 modifies Scenario 1 by using DSTs for high-level waste feed to the vitrification plant. It also includes the addition of two new evaporators and prioritizes treating waste over retrieving waste from SSTs.

Scenario 3 modified Scenario 2 by including a larger high-level waste feed preparation facility.

Scenario 4 modifies Scenario 2 by prioritizing SST retrievals over waste treatment and by constructing new DSTs as needed.

Scenario 5 evaluates the impacts of five DSTs that leak and must be removed from service.

None of the Scenarios 2-5 showed substantial improvement on the cost and schedule projections as compared to the baseline case of Scenario 1. System Plan 9 does not restrict costs to current budget levels, and substantial budget increases will be required to achieve the schedules forecasted in all scenarios. Brian Harkins explained that treating low-activity waste using grout is a technically viable option that modeling shows is cost effective and compatible with the baseline schedule.

Brian Harkins concluded his presentation noting four key takeaways:

- System Plan 9 is not a decision document.
- Building new tanks does not offer mission benefits.
- Tank waste treatment is the best approach to tank space management.
- Supplemental treatment, other than vitrification, offers substantial cost and schedule benefits.

Regulatory Perspectives

Dan McDonald, Ecology, observed that the System Plan 9 document is long and complex. He highlighted a handful of specific pages in the Executive Summary to help people orient themselves to the document.

- Key assumptions are on page xviii.
- Page xx identifies a number of key dates related to each of the scenarios that flow out of the application of the assumptions on page xviii.
- Page xxii shows the different results for each of the scenarios.
- The cost profile is shown on a graph on page xxiv.

Committee Discussion

Committee members asked questions about grout as an alternative waste form, budget, and the ability to meet existing milestones.

Dan McDonald explained that the Consent Decree focuses on glass and waste vitrification, and this is reflected in the system plan. The cost numbers in the plan are shown in both unescalated and escalated form. These are not budget numbers. The difference between cost estimates and what Hanford receives in budget could make achieving milestones difficult. It could be complicated by not really knowing if there is enough back up tank space in the event of tank failures from Ecology's perspective. The value of the system plan is confirmation of what the agencies have learned earlier, including the complexity of the program and that things cost more and take longer than the agencies thought they would. A key issue is the ability to pay for a schedule that makes sense. The system plan will continue to be a reference to support future decisions.

In response to questions about the assertion that there is no cost or schedule benefit of building new DSTs, Brian Harkins noted that there have been no DST leaks, and the cost from a failed DST is included in Scenario 5.

Committee members then shared their impressions and reactions to the document, including:

- The difference between onsite grout disposal and offsite grout disposal did not appear to be a huge cost discriminator in the big picture of things.
- System Plan 9 does not give the sense that this work is achievable. There is not a clear path for high-level waste.
- The costs are bothersome.

The discussion wrapped up with the question of when HAB comments or draft advice would be the most valuable on this topic. Dan McDonald replied that timeframe would be about two years from now.

Open Forum

Committee members discussed the ongoing holistic negotiations in light of System Plan 9. Dan McDonald explained that it is too early in the process to talk about that. Committee members considered if TWC should look at what is in System Plan 9 while holistic negotiations are ongoing and if there was value in doing so. Part of the discussion was the impact of the upcoming change in presidential administration. The committee did not come to a conclusion about how to next proceed regarding System Plan 9 because of the number of uncertainties at this time.

Committee Business

Committee members identified topics of interest for future TWC meetings.

- How assumptions are made about institutional controls as compared to engineered controls for facilities like the Integrated Disposal Facility
- Grout
- The outcome of holistic negotiations
- Repairing tanks
- Performance Assessment 101 – what is the context of performance assessments?
- Tank Integrity Program – what kind of model is being used?
- Discussion of Letter 20-NWP-184 from J.Lyons to B.Harkins regarding Waste Management Area A-AX Performance Assessment in terms of the issues of risk, contamination, and boundary zones.
- Technetium and iodine separation. What is the history of it in the WTP?
- DFLAW critical path
- Composite Analysis

The committee decided that it did not need a TWC call in December.

Ruth Nicholson, HAB facilitator, reminded people that elections for HAB chair, HAB vice chair, and national liaison will occur at the full Board meeting in December.

Attachments

Attachment 1: [Agenda](#)

Attachment 2: [Hanford Tank Farms](#)

Attachment 3: [System Plan 9](#)

Attachment 4: [System Plan 9 cover letter and document from Ecology](#)

Attendees

Board Members, both Primary and Alternates:

Steve Anderson, Primary	Steve Wiegman, Primary	Dan Solitz, Alternate
Susan Coleman, Primary	Jeff Burright, Alternate	Daniel Strom, Alternate
Liz Mattson, Primary	Marissa Merker, Alternate	Chris Sutton, Alternate
Bob Suyama, Primary	Vince Panesko, Alternate	

Others:

Stan Branch, DOE	Laura Caulfield	Lindsay Strasser, AttainX
Brian Harkins, DOE	Joan Lucas	Dana Cowley, MSA
Gary Younger, DOE	Kyler Rucker	Carolyn Noonan, MSA
James Alzheimer, Ecology		Tyler Oates, MSA
Dan McDonald, Ecology		Ashley Herring, ProSidian
Ryan Miller, Ecology		Ruth Nicholson, HAB facilitator
Ginger Wireman, Ecology		Karthik Subramanian, WRPS

Note: Participants for this virtual meeting were asked to sign in with their name and affiliation in the chat box of GoToMeeting. Not all attendees shared this information, so the attendance list reflects what information was collected at the meeting.