



FINAL MEETING SUMMARY

**HANFORD ADVISORY BOARD
TANK WASTE COMMITTEE**

January 10, 2018

Richland, WA

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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

Steve Wiegman, Vice Chair for the Tank Waste Committee (TWC) welcomed committee members and introductions were made. The December meeting minutes were approved by consensus.

Announcements

There were no announcements made.

Enhanced Waste Glass Effort

Agency Presentation

Steve Wiegman introduced the topic of Glass Science and Albert Kruger. Albert Kruger is a Glass Scientist for the U.S. Department of Energy, Office of River Protection (DOE-ORP). Albert provided a detailed presentation on Enhanced Waste Glass Effort.

Key points from Albert Kruger's presentation:

- Historically, the Hanford Site housed reactors that produced plutonium for more than 40 years in the mid-1900s, for the United States Defense Program. During that era, tank waste was created. There were 149 single-shell tanks (SST) and 28 double-shell tanks (DST). 100,000 metric tons of fuel was reprocessed at Hanford and waste was generated from the production of fuel.
- 90-95% of the volume of tank waste is a Low-Activity Waste (LAW) fraction, which contains about 5% of radioactive material. The largest radioactive component of LAW is Cobalt 60. Other components in LAW are niobium and technetium, as well as other isotopes. These components will need to be managed over time to ensure the safety of the environment.
- Glass is recognized as the most durable and highest performing material, in terms of the retention of nuclides. The vitrified glass can be black in color due to iron components in the waste. Once the glass is released from the melter, it will then be stored in either a High-Level Waste (HLW) canister or a LAW container.
- This process started with the understanding of how to make the process of making glass more efficient. The premise for creating glass is mixing raw materials, glass forming materials, and tank waste (liquid), then pouring the mixture into a melter. In a molten glass pool, raw waste and glass formers are dried out from the high temperature of the melt pool, which creates a solid mass. In this solid mass, there are different chemical species that begin to decompose. The most troubling material found is Technetium in LAW disposal. The fate of the technetium is determined by 600 centigrade. The reactions that occur in cold cap layer determines whether the technetium stays with the glass through the melt pool, into the cooled glass and remains in the glass matrix. The baseline of the WTP flowsheet is that the material goes back into the subsequent batches. The inconvenience is that it will extend the mission by 15%. This is the motivation for trying to get all or most of the technetium into the glass, in the first pass through the melter.

- In HLW, all the waste contains aluminum. In some tanks the amount of aluminum exceeds 50%. Aluminum salts are very refractory which means they require a lot of heat and high temperature to melt. It was determined that the waste with aluminum was not melting as fast, so by changing amount of calcium and boron in the aluminum bearing waste, the melting process increased. This advances the process of aluminum bearing waste melting 3 times faster than the expectation for base operations.
- Initially the contractor was to show waste loading at 5% to 20% by weight of alkali in proportion to the amount of Sulphur compounds in the waste feed. Projected across the entire inventory, this corresponded to roughly 15% waste loading. The belief prior to the ORP glass program, was that limit for alkali in the glass would be 24%. By 2013, they were able to show that the bulk of the glass produced would be significantly over 20% waste loading and the limit is 26%, which was accomplished by reformulating the LAW mixture.
- The baseline of WTP models projected the production of 18,400 HLW canisters of glass and 145,000 LAW containers of glass. By 2013, with the elimination of caustic and oxidative leaching, the amount of HLW canisters decreased to 13,534 and the amount of LAW containers decreased to 65,151. The significance of this reduction of the LAW container count is that it is possible to process the inventory of LAW in the WTP LAW facility with no or minimal additional capacity. Certainly, this work allows for the reconsideration of the historical prediction that a second facility twice as large as the one being built would be needed.
- The GLAD & Hillfort Projects have combined objectives for developing an accelerated aging test to measure real glass durability. The Vapor Hydration Test (VHT) that is currently used is the arbiter for glass durability is not representative of glass performance but worse is the lack of reproducibility reported by users. The impact of the inherent uncertainty of the VHT is the magnitude of additional glass added to the treatment mission.
- Mr. Kruger and a team of colleagues visited the Hillfort in Broborg, Sweden to excavate a section of the ramparts of this 1,500 year old structure that used glass to bind the structure. Not only do we hope to determine the long-term durability of the naturally-aged Broborg hillfort glass but to use those results to establish the usefulness of the accelerated aging test we develop to support the Performance Assessment for Hanford LAW glass in the IDF.

Committee Member Questions (Q), Responses (R), and Comments (C):

Note: This section reflects individual questions, comments, and agency responses.

Q: “If you look at the Bechtel contract, there are certain requirement for project that need to be done by certain dates. Is your group tracking those dates to ensure that the work being done can support those dates?”

R: “We are not directing Bechtel to incorporate the new glass work. They are to finish and commission the plant. Their models and glass algorithm meet all the requirements set forth in the contract.”

Q: “Will this be the 2013 glass models?”

R: "As soon as the design and construction contractor turn over to operations, DOE can make the decision to direct the incorporation."

Q: "The work that is being done, does it support the baseline concept and/or Direct Feed Low-Activity Waste (DFLAW)?"

R: "In the very first order, PT was supposed to put a LAW at 8m of sodium. It is highly unlikely that LAWPS can do that and so we've extended the LAW glass program to address feed that might be 5M Na or even less."

Q: "Is it fair to assume that upper and lower control units accommodate everything for DFLAW?"

R: "As long as we impose the performance criteria of the baseline."

Q: "Would it be reasonable in that case for the tank waste characterization or whatever the configuration might look like would essentially approximate what HLW, LAWPS for LAW?"

R: "If I were in charge I would look at functional system requirements study to determine what's needed in the flowsheet to get what's in the tanks into the facilities."

Q: "As I look at this in the context of timing and what is being proposed in startup, shouldn't impact in getting WTP done."

R: "Occasionally, we have had the contractors come back and propose the adoption of some of the processes we have learned to date. It will make the startup easier for them."

Q: "You mentioned the iron being removed from LAW glass. Will that precipitate out in LAWPS?"

R: "No. I still can't find out why they put iron into the LAW formulation in the early days. There is no significant concentration in any LAW feed to cause concern. In the ORP LAW formulations the added iron has been removed from the list of LAW glass formers. The result is a glass that is barely colored and not black. Colorless glass melts so much more easily."

Q: "We are having some challenges with funding for the PT facility, so can you accomplish this work without PT being finished?"

R: "LAW and HLW are transparent to the origin whether it being the LAWPS or PT. The specification on the acceptance of feed has not changed in the contract. The winning Grand Challenge proposal a couple of years ago presented the based for directly feeding HLW with the wastes in the 11 East Area DSTs. The outcome was addressing 55% of the Hanford tank radioactive inventory in about 2,000 canisters."

System Plan 8 Proposed Advice Discussion

Steve Wiegman gave committee members a brief synopsis of the System Plan 8 and proposed advice. Steve noted that the issue manager team (Steve Wiegman, Shelley Cimon, Jeff Burright, Jan Catrell, Melanie Meyers, Pam Larsen, and Vince Panesko) had a meeting yesterday to start drafting the proposed advice.

Jeff Burrigh, Oregon Department of Energy (ODOE) and TWC committee member, put together the advice points and a summary from the outcome of yesterday's meeting, which was distributed to the committee. Jeff talked through the advice points and summary with the committee.

Steve open the discussion for the members to review Jeff's summary and provide additional comments and input.

Dan McDonald, Ecology and Dawn MacDonald, DDFO, DOE Office of River Protection (ORP) were present to answer members questions and provide agency perspective.

Committee Member Questions (Q), Responses (R), and Comments (C):

Note: This section reflects individual questions, comments, and agency responses.

C: "There is an opportunity to utilize the Hanford Advisory Board (HAB or Board) in many different ways. This is a Board that has been convened and can actually help with the negotiations."

C: "So you're not talking about creating some sort of tank waste task force to address this issue, but what you are alluding to is that the role of the HAB and how they interact with the agencies."

C: "We have done this before with M-95. We had a sounding board group that talked with the negotiators."

C: "Due to the limited time we have, we can utilize the ability for the Chair to write a letter and submit to the agencies, if need be."

C: "We should also consider whether or not the agencies want the HAB to have a role in the negotiations."

C: "I think its imperative that we let the agencies know, we would like to be involved in the negotiations otherwise what is the purpose of the Board."

C: "Having spent many years at Hanford, I have noticed that we use the word "react" and I don't mean it in a negative light, but when we get these informative presentations, we tend to react. We should be asking ourselves what our real expectations are and articulate those expectations in simple terms. Time is not on our side right now and we need to be engaged and proactive, not sitting in a room receiving presentations after the fact."

C: "I think it's ridiculous that the Board is expected to plow through this System Plan and understand what the person writing it was thinking. It's convoluted but I am not entirely informed yet."

C: "All of this information is good context for a letter from the Chair."

C: "I'd like point out that in the Code of Federal Regulations and the Washington Administrative Code, there are hold points in which you would have to talk with the public. I'm confused by this discussion but at the same time I believe that this group of people on the HAB have an incredible amount of knowledge source. I have seen in this area that the input from the HAB has made a difference."

C: “I don’t think that the HAB is going to be in those cases where we are talking about involving the HAB, at the very beginning. That isn’t going to happen unless Washington pushes for it. So, I think one of the things we need to talk about is the HAB relationship with the State.”

C: “I can recall in the past during previous System Plans, members of the HAB proposed which scenarios should’ve been analyzed. This is an important part of this process, is that we should be looking at what scenarios should be analyzed.”

C: “We have to figure out how to move forward in the process from after to before the process begins. We need to start figuring out what our values are and start to become involved in the process.”

C: “I’ve been thinking about how we can use the HAB process to ask for something that is familiar and known. This System Plan 8 was brought up as a potential Committee of the Whole (COTW) topic. A way to bring the HAB into the process earlier is to host a COTW as a way to discuss the scenarios and provide input. I feel that because the System Plan itself isn’t necessarily a plan, but is a list of hypothetical scenarios. We will continue to talk about hypothetical scenarios until we get anything that works with the waste treatment plant. We need to figure out how that HAB can be involved in discussing the different scenarios and doesn’t need to be directly linked to the System Plan.”

C: “We have a representative from Ecology here, so I would like to hear from Dan McDonald and what his thoughts are on this topic.”

R (Ecology): “Unfortunately, you will not like my answer, as negotiations have officially started. Myself nor Dawn MacDonald, ORP are not at liberty to discuss much, if at all. What I can tell you is that if you go back into the settlement agreement M-62-040, clearly lays out what is required for creating the System Plan. I would suggest that you consider taking a look at M-62-040 in relation to what you believe you are asking for as part of your decision and going forward. There are several pages in the System Plan that speak to tank treatment, contingencies, supplemental treatment, and other things. That is the framework upon which the System Plan exercises are conducted.”

C: “I think there are two separate topics that we are talking about. Clearly, we can develop technical and philosophical advice on System Plan 8, but as I look at it, I see that the way it was prepared is a symptom of a larger problem we’re trying to fix. That problem is the paradigm of how the HAB isn’t involved in the process of thinking. The HAB in its early days was more involved in the thinking.”

C: “I think that we should take this to the Executive Issues Committee (EIC) on how we can engage and look at developing the framework for expanding this. We could turn this into a sounding board. Since negotiations have started, so we need to weigh in on this. Since negotiations have started, we don’t have time on our side to write advice on that topic, so a letter for the Chair of the HAB is the best appropriate step. The advice we develop for the upcoming board meeting is on the System Plan itself.”

R (Ecology): “Please remember that there was a collective effort in the assumptions set in this System Plan. The assumptions were then given to the modelers for testing. The assumptions were not written by the modelers. These assumptions were written by a technical team and vetted by the management team.”

R (ORP): “I recommend that you keep the idea of being involved with TPA negotiations, as a separate issue from the System Plan 8 advice itself. Those are two separate topics. What about the assumptions?”

The System Plan assumptions are generated through a process of working with numerous experts in their field including those who manage the facilities. Does the board like the various what-if cases? Do you feel like the assumptions related to the risks are accurate in the what-if cases?"

C: "What did we learn from System Plan 6 and the advice we put forth. What was done differently between System Plans 6 and 8? That what we should be asking."

R (Ecology): "There was better integration on the kinds of scenarios to be considered. When you look at System Plans 4 & 5, often time you will find that an arbitrary stop date was inserted and then you would have to go through it and figure out how to do it. When you fast forward to System Plan 8, the technical team made conscious effort no to hard stop anything. What you will see in those scenarios is an assumption driven set with no hard stop date. The technical team also made a decision to not list the scenarios as best-case or worst-case scenarios."

C: "Since the HAB meeting isn't until March, that would be too late to make any comment on the negotiations in this advice so a letter from the Chair would be most appropriate to address the negotiations and the advice should stick to the System Plan 8 itself. What will make this advice useful for the agencies?"

R (ORP): "I believe it would be useful in the advice is to list the areas or scenarios that you feel are of concern and your suggestion on how the agencies can address it. Do you like this version better than what has been done in the past?"

C: "I suggest that we begin the response on a positive note and then address our concerns. We can ask that they tell us how this tool will be used and what is the plan going forward for future System Plans. We can address funding as well. How do these scenarios fit in with funding?"

C: "Another point to bring up is, what are the vulnerabilities that we see when reading this document. I see the longevity and technology of the evaporator; the fact that double-shell tanks are not going to last forever; and single-shell tanks are just going to disappear."

C: "Another point to look is evaluating the path forward or how long it will take for the waste that is being generated."

Lindsay Strasser, ProSidian Consulting and HAB Facilitator, captured a list of "top priorities" for the advice points.

- How is this tool going to be used to improve performance?
- How can the plan be used to further reduce uncertainties & be successful?
- Can the HAB help DOE get funded?
- Do not give away something that is important.
- Does it adequately address double shell tank capacity?
- What are the vulnerabilities when reading the document (SST, transport issues)?

- New Technology (Needed) Tank-side Treatment
- Potential observations that request response
- Have you evaluated the path forward and how long it is going to take?
- Are there additional costs that might matter when making decisions?
- Landfill closure going to be fought in the courts.
- Loss of institutional knowledge
- How will tank side retrieval affect the budget?
- What happens with AY-102? Tanks not being used.
- Final Closure

Next Steps: There will be an issue manager call of Wednesday, January 24, 2018 at 11:00 a.m.

Committee Business

Committee members chose to defer committee business until the next meeting, to continue the System Plan 8 proposed advice discussion.

Attachments

Attachment 1: Enhanced Waste Glass Effort

Attendees

Board Members and Alternates:

Phil Lemley	Steve Wiegman	Helen Wheatley
Jeff Burrignt	Dave Rowland	Amoret Bunn
Shelley Cimon	Paige Knight	Tony Umek
Rebecca Holland	Pam Larsen	Alex Nazerali
Melanie Meyers	Vince Panesko (Phone)	Liz Mattson (Phone)

Others:

Dieter Bohrmann, North Wind/DOE-ORP (phone)	Echo Dahl, North Wind/DOE-ORP	Dan McDonald, Ecology
Jay Decker, Ecology	Albert Kruger, DOE-RL	Mark McKenna, WRPS
Dawn MacDonald, DOE-ORP	Maria Skorska, Ecology	Ginger Wireman, Ecology
Rod Skeen, CTUIR	Lindsay Strasser, ProSidian	Melissa Amaro, ProSidian