

FINAL MEETING SUMMARY

**HANFORD ADVISORY BOARD
TANK WASTE COMMITTEE**

February 13, 2014

Richland, WA

Topics in this Meeting Summary

Opening..... 1
DOE Framework Topic Briefing: Direct Feed Low-Activity Waste..... 1
System Plan 7..... 6
Advice Development for the DOE Framework 8
Attachments 10
Attendees 10

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

Opening

Dirk Dunning, Tank Waste Committee (TWC) chair, welcomed the committee and introductions were made. The committee approved the January meeting summary as distributed.

DOE Framework Topic Briefing: Direct Feed Low-Activity Waste*

Steve Pfaff, U.S. Department of Energy – Office of River Protection (DOE-ORP) provided a briefing on direct feed low-activity waste (LAW) as described in DOE’s Framework document (Attachment 2). In his presentation, Steve noted the following points:

- DOE’s Framework divides the treatment mission into three phases. The first phase involves beginning LAW vitrification treatment as soon as possible, which would occur in advance of Waste Treatment Plant (WTP) completion.
- Interim pretreatment has been discussed periodically since the early 2000s. As DOE faces a number of technical challenges with WTP that will delay start of operations, interim pretreatment

* Please see Attachment 1 – Transcribed Flip Chart Notes for key points/follow up actions recorded during the committee discussion.

is being considered again as a way to advance waste treatment while the technical WTP design issues are being resolved.

- The technical issues faced at WTP do not apply for the LAW facility. Substantial progress has been made through earlier efforts and progress is continuing again, although the effort has been delayed several times over the last several years. Completion of the interim pretreatment system is major part of the Framework document. DOE-ORP has directed Washington River Protection Services (WRPS) to prepare a certified cost and technical proposal for design activities.
- Steve reviewed a flow diagram of Phase 1 processes showing the interim pretreatment system that incorporates the use of two melters.
- The cost and schedule for interim pretreatment is still being estimated with the contractors. The entire process from Critical Design (CD)-0 through CD-4 and start of operations typically requires approximately seven years.
- Pretreatment is more expensive and funding is always limited so DOE-ORP may face some trade-offs when determining where the budget should be spent. There are challenging regulatory commitments that must be considered along with consideration of longer-term treatment plans. Beginning successful operation of WTP is a top priority for DOE. Pretreatment does offer a number of benefits in addition to the beginning of waste treatment, such as acting as a way to obtain some operating experience and train workers on the processes before operations begin at WTP.

Regulator perspective

Dan McDonald, Washington State Department of Ecology (Ecology), said Ecology appreciates DOE's willingness to begin sharing some of their thoughts through the Framework. The Framework does appear to have some merit in the approach being described but Ecology does not have enough detail to offer an opinion on the adequacy of the proposal. Ecology has asked for more technical information and DOE has been somewhat responsive. The agencies are involved in continuing discussions. DOE has stated that they will issue a proposal to Ecology in late February 2014; Ecology hopes that proposal will be comprehensive and speak to the out-year cost and schedule of the system. Ecology will fully review the proposal at that time.

Committee Questions and Responses

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

Q. What was the 2011 cost estimate for the interim pretreatment system?

R. [DOE] The cost estimated in 2011 was between approximately \$150-300 million, depending on the option chosen. This 2011 estimate was only for interim pretreatment; that estimate is currently being re-examined in the context of what pretreatment may mean for the larger systems and considerations of needed pretreatment support systems, such as the number of evaporator campaigns that might be needed. The overall cost and schedule estimate currently under development will be more robust than earlier estimates.

Q. TWC was told during a previous meeting that funds must be used in order to build critical spheres. The evaporator is a critical component to the process, yet it only has a design life of 25 years. Does DOE have the critical spheres necessary to complete the work?

R. [DOE] DOE completed some updates to the evaporator infrastructure using American Recovery and Reinvestment Act (ARRA) funds in order to extend the evaporator design life. Additional upgrades will be required over time.

C. The Board would like to understand what DOE's intentions are since the evaporator is expected to be in operation for so much longer than the design life, especially if material is going to remain in the tanks.

Q. How long would it take to get the entire pretreatment system running from construction through start of operations?

R. [DOE] There is typically a seven year cycle for project completion. DOE already completed some of the conceptual design work for pretreatment in 2011, although documents would need to be updated. The first step is to obtain justification from DOE-Headquarters, at which point the conceptual design will be drafted. DOE is expecting to refine decisions in 2016 when the real costs and schedule are better known.

Q. How will the vitrification plant meet waste stabilization goals? What is being done to verify that when plans are implemented, wastes will be properly mixed and the facility will operate as intended?

R. [DOE] DOE undergoes a strict and lengthy process to ensure waste is suitable for vitrification. Savannah River provides a good example of what is required to prepare a batch for waste feed, including the types of sampling and verification that is required. Waste is first processed in the laboratory in order to understand the chemistry and then a smaller-scale process is completed to ensure the final waste form will meet durability requirements. DOE has already completed a great deal of testing over the years and research continues. The Performance Assessment (PA) will include more detailed analysis of the practical issues involving LAW glass. Nuclear safety design standards are also considered at every step to ensure the system operates safely. The plans will be evaluated by DOE-Headquarters as well as local offices and outside experts.

Q. What level of independent review will be involved?

R. [DOE] There are several steps that involve outside oversight. These outside teams often involve DOE or DOE contractors looking at the technical readiness. DOE will not receive CD-2 approval without approval of outside experts. It is important to balance knowledgeable review from people familiar with these types of technologies with involving those who are truly independent of the efforts under review and may require more time to familiarize themselves with the issues.

Q. What is the benefit in the phased approach proposed by DOE?

R. [DOE] The original WTP plan was for all facilities to become operational at the same time, but because of the technical issues with pretreatment and the high-level waste (HLW) treatment facility, DOE would like to begin pretreatment earlier in order to move forward with cleanup efforts. DOE believes that some work can begin earlier while the technical issues with WTP are being resolved.

C. Secondary LAW treatment will be required to treat some of these contaminants, which could require another treatment facility or some way to move material through secondary treatment. Is there a possibility to include technetium removal through the waste pretreatment process?

R. [DOE] DOE has thought about the possibility for technetium removal at a number of points in the treatment process. There is some funding to further examine the question and DOE is conducting tests on the feasibility of technetium treatment. Improvements are being made in glass form development in the ability to retain technetium.

Q. Why is cesium proposed to be returned to the tanks? This contaminant may mobilize in the environment.

R. [DOE] DOE has been discussing use of a resin that would flush out cesium or the use of other filtered media that can grab cesium. Savannah River has also been experimenting with cesium removal. A number of options are currently under consideration for cesium treatment. There are tradeoffs in cesium treatment; it can be expensive and any cesium treated during pretreatment would need to be stored somewhere until the HLW facility is operational. DOE does not want to create orphan waste forms.

Q. Will there be a process involving Ecology or other regulators in the design phase to address design philosophy or criteria development? It is important that DOE determine that the facility being designed truly accomplish the goals for the Hanford Site.

R. [DOE] These kinds of projects are often contracted with an engineering firm to create the design. There are a number of industry standards that dictate how tanks, piping systems, and other elements are designed. The design itself must be approved by an independently qualified professional engineer, likely several engineers for large projects. DOE ranks alternatives according to how well they meet objectives, often using outside teams and the regulators. Requirements and system standards do need to be determined before design can be completed.

C. The design of the facility and process developed for waste treatment should lead to the desired end result. The Board is also concerned about creating orphan waste streams at the Hanford Site. DOE should be conscious about the amount of material that Integrated Disposal Facility (IDF) can accommodate.

R. [DOE] DOE will be considering all these types of questions through the PA and what Ecology has referred to as the “risk budget tool” in order to understand public impacts and cumulative effects of waste treatment. The IDF is designed with the capability to expand but there are limitations to the amount of material that facilities will be able to process within a certain amount of time.

Q. LAW treatment is planned to become operational in 2019 or 2021, which would be past the design life of the current double-shell tanks (DSTs). Will DOE be able to legally put waste back into these tanks, considering Resource Conservation and Recovery Act (RCRA) regulations?

R. [DOE] The design life is a number created during design that takes into consideration elements such as corrosion rate, structural integrity and other factors. Design life is not a legal requirement; there will be constant testing throughout the operating life to ensure the DSTs continue operating as intended without leaks. DSTs are permitted and regulatory compliant as long as the integrity remains. Waste cannot be added to the single-shell tanks (SSTs).

R. [Ecology] Ecology will check on the accuracy of this information.

Dick Smith shared a suggested path forward for WTP (Attachment 3). He noted that DOE’s plan for direct-feed LAW will be unlikely to vitrify waste in 2016 and will require building additional facilities; the current glass matrix would require an additional six LAW melters. Dick proposed a system that would not require additional capital projects or cesium removal through using an iron phosphate glass matrix. This would produce nominally HLW glass that could use near-surface retrievable storage. Dick said the second phase under his approach would repurpose pretreatment tanks to support waste blending. Retrieved salt-cake solutions could be added to DST sludge and mixed for transport to the pretreatment tanks. The waste stream would be vitrified until the mission is complete and drywell storage could be used until a disposal decision is made. Dick said this alternative path would require less than three years to complete plumbing modifications in Phase 1, produce vitrified waste by late 2016, and operate under current Tri-Party Agreement (TPA) milestones. Completion of treatment would depend on plant efficiency.

R. [DOE] There are some very interesting points being brought forward in this proposal. The waste treatment approach at the Hanford Site has been under development for years and that cannot be simply discounted in favor of a completely different approach. This proposal also includes concepts that were not part of the Environmental Impact Statement (EIS) that was written years ago, and went through extensive public involvement. This cannot be discounted either.

C. The length of time an approach has been ongoing is not sufficient justification to continue that approach, especially if better alternatives may be available. The Board would like a solid proposal in how waste will be treated but also wants to ensure that the path forward is the best approach possible. DOE should at least consider alternatives that may prove valuable for waste treatment.

C. DOE has spent billions of dollars and years on development of a waste treatment plan and are entrenched in the current process. There are political implications for waste treatment decisions. If DOE completely abandons the previous approach and proposes something completely different, the agency may lose credibility with Congress and the public. Credibility is very important to receive continued funding. The Board should consider these types of implications when discussing whether to tell DOE to follow a new course.

TWC did not identify immediate next steps for this topic. It is part of a series of topic briefings from the Framework document. The committee appreciated DOE's presentation, thanked DOE for the frank and open discussion, and would like DOE and Ecology to provide updates on progress to the extent possible. Hillary Johnson, EnviroIssues, will put Dick's handout on SharePoint.

System Plan 7*

Dan McDonald, Ecology, provided a presentation on Ecology's scenarios for System Plan 7 (Attachment 4). In his presentation, Dan noted the following points:

- The scenarios in System Plan 7 have all been proposed by Ecology; DOE did not submit any scenarios.
- Ecology has proposed five cases for the scenarios, two are oriented towards WTP and the other three are related to the tank farms. The scenarios are all fairly high-level.
- One of the scenarios is compliant with the Consent Decree, which was directed by Ecology's upper management.
- System Plan 7 scenarios are based on assumptions from System Plan 6, although Ecology is still discussing which of those assumptions should be used or updated and which are still valid. Once assumptions have been determined for all scenarios, the modeling can be completed.
- The dates outlined in the scenarios are all speculative and could be inaccurate. This schedule is based on information included in DOE's Framework, which did not contain a lot of detail that could be used to better inform the models.

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- The estimated efficiency for treatment is estimated at 25% in the scenarios, which is what Ecology believes will be the maximum efficiency level. Operations of tank retrieval are currently approximately 9-10%.

Agency perspectives

DaBrisha Smith, DOE-ORP, said DOE did not select System Plan 7 scenarios because it did not believe there was enough guidance in the Framework to determine definitive scenarios. DOE-ORP would like to wait for a more definitive path forward before selecting any scenarios for the system planning process. System Plan 7 will be led entirely by Ecology and DOE-ORP will offer a supporting role in the project.

Committee Questions and Responses

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

Q. What is Ecology's reasoning behind the DST failure rate in the scenarios?

R. [Ecology] The SSTs are beyond their design life and the DSTs are close to the end of their design life. Ecology decided to use a repeat failure rate for the DSTs but no one is sure what an actual failure rate might be. AY-102 was a warning and Ecology would like to determine the potential impacts of repeated DST leaks.

Q. What would be required to achieve 25% retrieval efficiency?

R. [Ecology] The efficiency estimates are somewhat arbitrary numbers. Retrieval values were approximated for every tank in System Plan 6 that were optimistically conservative. In the case of System Plan 7, the estimates are that the retrieval efficiency will have an operational maximum of 25% efficiency through increased rates of waste feed plus having more melters in operation among other system improvements.

Q. The Board has offered advice that DOE should increase tank capacity and did not receive a definitive answer. There likely is not an answer at this point. The scenarios chosen for System Plan 7 are excellent and reflect the issues that the Board would like answered. When will the System Plan 7 document be issued?

R. [Ecology] System Plan 7 will be issued in October 2014.

R. [DOE] System Plans are usually issued by October 31 each year. There are five cases for System Plan 7 that will be reviewed in different phases. The core teams will review each case as the modeling is completed. Assumptions are still under discussion for some scenarios and will need to be resolved before the models can be run.

C. It is very concerning that DOE has abdicated their ability to provide scenarios. DOE is showing a lack of information-sharing with the public, which will decrease DOE's credibility. System plan scenarios can help the Board understand the rationale behind decisions. The delayed cleanup schedule in the scenarios is a timeline that would be completely unacceptable. The Board would like waste treatment to succeed and for the agencies to be transparent about the process.

C. System plans are possibly the cheapest and easiest place to experiment with ideas; the process involves making adjustments in computer programs to consider what happens under changing parameters. It is surprising that DOE is not choosing to include some of the options from the Framework in System Plan 7.

R. [DOE] DOE will bring these concerns to the appropriate management.

C. System plan studies are supposed to consider alternatives to the system and how to optimize performance. Efforts can never move forward if systems are assumed to be suboptimal from the outset and no one is considering changes to improve performance.

Board advice at this point would not have an impact on System Plan 7; the scenarios have been selected and will not change. TWC did not identify any committee actions and requested to receive another briefing once the models have been run and the report is ready.

Advice Development for the DOE Framework*

Introduction

Liz Mattson said the Framework advice has been under development by a large issue manager team. Comments have been incorporated into the draft that the committee will be reviewing today to hopefully reach committee consensus (Attachment 5). There are additional wording edits from several issue managers that have not been incorporated into the draft.

Committee Questions and Responses

Note: This section reflects individual questions, comments, and agency responses, as well as a synthesis where there were similar questions or comments.

The committee reviewed the advice onscreen. Edits were made to clarify the intention of certain advice points and remove points of concern. Major discussion points from the conversation are summarized below.

C. There is a statement in the advice about the Board's expectations for the Framework document. The Board should be clear about why it had these expectations. There were some who did not believe the

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referenced expectations were ever intended by DOE while others noted that Secretary Moniz made a statement promising a definite path forward on waste treatment by the end of summer, which is why the Board was expecting a more detailed path forward through the Framework. The advice could include Secretary Moniz's quote to substantiate the Board's expectations.

C. The Board should be clear on whether anything is being asked for when referring to unmet expectations with the Framework. The Board does not want DOE to re-write the Framework; the Board is requesting that DOE consider and provide the requested information going forward.

C. The Board should be cautious about advice points that refer back to previous Board advice. Some committee members felt that the reference to past advice should be put in a background section or footnoted. Others felt that DOE should revisit past Board advice and that there is value in repeating the Board's concerns by listing applicable past advice.

R. [DOE] The Board has issued many pieces of advice and it is unlikely that someone will have the capacity to read through each piece of advice individually. The Board could synthesize major advice points into a one page document that describe the Board's principle concerns.

C. The Board does have a HAB Values white paper that captures many of the Board's principle concerns. This could be referenced in the advice instead of referring back to specific past advice. Another option would be to reference past advice related to vitrification without restating other advice that does not directly apply to concerns about the Framework. TWC decided to remove the advice point listing past advice.

C. TWC discussed the level of detail the Board is expecting and how that information would serve the Board's charter. The advice appears to be requesting much more detail than DOE may be able to provide and more detail than would be useful for the Board's needs. However, the Board does need some level of technical information in order to develop policy-level advice.

C. Some of the advice points include a request for DOE to undertake something that is already being planned or is already under development; this type of advice may be unnecessary.

Q. Is it possible for DOE to diagram resolution to an issue that has not been fully identified?

R. [DOE] There is a lot of guidance on how projects should be run. DOE should be able to effectively communicate with the Board about ongoing activities and decisions for a given project. The Board should also be clear about what information it is requesting from the agencies.

C. It has been difficult for TWC members to locate information. Even if the information has been issued, if it is difficult to find it is not useful. It would be helpful for the issue managers to understand the details of waste treatment planning in order to help frame the issues for policy-level Board discussion.

C. DOE asked whether the Board still supports the use of iron phosphate. The Board has mentioned use of iron phosphate numerous times but the idea is not widely supported by others and is not used in the rest of the world. The Board may want to re-evaluate their stance on use of the technology. DOE disagrees with iron phosphate glass and is making good progress in the use of borosilicate glass.

R. The Hanford Site is unique in the mix of waste in tanks and many other factors that are not seen at other sites around the world. The Board has only been asking that iron phosphate glass be reconsidered, not necessarily that it should be used. The Board would like a reasonable discussion on why DOE believes the technology will not work.

C. TWC will be receiving a tutorial on glass technology during an upcoming meeting and may receive some information that would cause the Board to reconsider its stance on iron phosphate glass. The Board has not been given enough information to make a definitive decision on whether to recommend use of iron phosphate glass or another alternative. TWC decided to remove the reference to iron phosphate glass from the Framework advice and may consider offering separate advice on glass forms after receiving the glass tutorial.

The committee reached conceptual approval on the advice. Liz and Dirk will review the edits and send the advice to TWC for final approval before the advice is brought forward to the full Board during the March meeting.

Committee Business

The committee decided to spend the time allocated for committee business on the advice discussion and elected to have a February call to review the three month work plan and develop the March meeting topics table.

Attachments

- Attachment 1: Transcribed flipcharts
- Attachment 2: DOE-ORP presentation on the Interim Pretreatment System
- Attachment 3: Dick Smith and Al Boldt’s New Path Forward for WTP proposal
- Attachment 4: Ecology presentation on System Plan 7 Scenarios
- Attachment 5: Draft Advice re: Path Forward for Tank Waste

Attendees

Board Members and Alternates

| | | |
|---------------------|------------------------|-------------------|
| David Bernhard | Pam Larsen | Maynard Plahuta |
| Al Boldt | Susan Leckband | Mecal Seppalainen |
| Tom Carpenter | Liz Mattson | Dick Smith |
| Shelley Cimon | Melanie Myers-Magnasun | Bob Suyama |
| Shannon Cram, phone | Kristen McNall | Jean Vanni |

| | | |
|-----------------|------------------|--|
| Rebecca Holland | Ken Niles, phone | |
| Steve Hudson | Jerry Peltier | |

Others

| | | |
|-------------------------|-------------------------|--------------------------------|
| Jim Lynch, DOE-ORP | Jane Alzheimer, Ecology | Hillary Johnson, EnviroIssues |
| Steve Pfaff, DOE-ORP | Dan McDonald, Ecology | Nicole Addington, EnviroIssues |
| DaBrisha Smith, DOE-ORP | Ginger Wireman, Ecology | Sharon Braswell, MSA |
| Kim Ballinger, DOE-RL | | Annette Carey, Tri-City Herald |
| | | Tom Rogers, W-DOH |