

FINAL MEETING SUMMARY

**HANFORD ADVISORY BOARD
TANK WASTE COMMITTEE**

*April 15, 2015
Richland, WA*

Topics in this Meeting Summary

Opening..... 1
C-Farm Closure Swim Lanes..... 2
PHOENIX Tank Farms Application..... 7
Cesium Storage Update (Fukushima) 9
Cesium Treatment and Disposition Issue Manager Update..... 12
Waste Treatment Plant Issue Manager Update..... 14
Committee Business..... 15
Attachments 17
Attendees 18

This is only a summary of issues and actions discussed at this meeting. It may not represent the fullness of represented ideas or opinions. 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, Tank Waste Committee (TWC) chair, welcomed the committee and introductions were made. The committee adopted the March 2015 meeting summary with minor revisions.

Ryan Orth, EnviroIssues, reminded TWC members that the Hanford Advisory Board’s (HAB or Board) Budgets and Contracts Committee (BCC) requested that HAB members attend the upcoming U.S. Department of Energy (DOE) public budget workshop on April 28. Ryan noted that BCC leadership would be gather member feedback on the proposed Fiscal Year (FY) 2017 budget, and that the committee would work in May to craft budget advice for presentation at the June 2015 Board meeting. Susan Leckband, HAB vice chair, directed committee members to submit any budget comments, questions, or concerns to HAB committee chairs.

C-Farm Closure Swim Lanes

*Introduction*¹

Vince Panesko, issue manager, provided an overview of the challenges related to tank farm closure, focusing on the single shell tanks (SST) of C-Farm. Vince noted that, from a regulatory perspective, the transuranic (TRU) tank waste needs to be moved to WIPP and the high-level waste (HLW) present in tanks needs to be transported to a deep geological repository. All remaining tank wastes may be disposed of on-site. DOE Order 435.1 stipulates that site-specific radiological Performance Assessments need to be prepared and maintained for this remaining low-level waste. At C-Farm, this 435.1 Performance Assessment works in conjunction with the Resource Conservation and Recovery Act (RCRA) decision to conduct a landfill closure of tanks (e.g. leave the tanks in place, fill them with grout, and cap them). The Performance Assessment demonstrates expected discharge levels of residual contaminants over an extended period. Vince noted that the 2009 Tank Closure and Waste Management Environmental Impact Statement (EIS) provides additional documentation on the subject of Hanford Site tank farm closure and that the numbers included within the EIS assume a 99% recovery of tank wastes. Dirk Dunning, issue manager, detailed both the substantive and the regulatory complexity of this topic and the need for DOE to simultaneously meet the requirements of multiple standards not just DOE's Order 435.1, including those for high-level waste, transuranic waste, low-level waste, greater than class 3 low-level waste and hazardous waste both for wastes and residual wastes in the tanks and for wastes which have leaked or released from the tanks.

Agency Presentation

Chris Kemp, U.S. Department of Energy—Office of River Protection (DOE-ORP), thanked committee members for their continued interest in the C-Farm Performance Assessment. Chris noted that DOE-ORP has held 11 working and planning sessions to inform the Performance Assessment and that recent sessions had focused on tank residuals modelling. Chris expected that a draft of the tank residuals Performance Assessment would be finished in September 2015. Chris noted that this draft will go through an initial expert review process, and it will then be shared with the Washington Department of Ecology (Ecology). Federal agency review of the residuals Performance Assessment will begin Low-Level Waste Disposal Facility Federal Review Group (LFRG) review in January 2016, and the LFRG review should be finalized in mid-2016. Chris stated that DOE-ORP will incorporate soil information from C-Farm into the results included in the residuals Performance Assessment as these reviews are ongoing. This document should be drafted and ready for Ecology review following the LFRG assessment.

Key ideas presented during Chris' presentation² include:

- C-Farm ceased active operation in 1980. DOE-ORP estimates that a total of 100,000 gallons of tank waste was discharged into soil throughout the operating life of C-Farm.

Attachment 1: C-Farm Closure Handouts (Vince Panesko)

Attachment 2: C-Farm Closure (DOE-ORP presentation)

- From a policy perspective, the Consent Decree governs the removal of tank wastes, but there are also RCRA and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) components to tank farm closure. DOE Order 435.1 also needs to be taken into account as closure strategies are finalized.
- DOE-ORP has conducted many studies over the years relating to tank farm closure. Several years ago, DOE-ORP authored RCRA and CERCLA whitepapers, as well as studies on the cost and impacts of tank removal and Milestones M-45-80 and M-45-81.
- There have been over 100 investigative pushes into the tank farm waste management area, and dry wells going down to 170 feet were placed in the 1970s. Groundwater depth at C-Farm is approximately 270 feet below the surface. DOE-ORP has intentionally not conducted additional monitoring studies of the deep vadose zone to avoid the potential for creating unintentional pathways for groundwater contamination. Outside of C-Farm, there are 12 RCRA monitoring wells and a radionuclide monitoring well. There is still some uncertainty as to what contaminants exist in Waste Management Area (WMA) C, but DOE-ORP has studied the area extensively.
- The Tri-Party Agreement (TPA) stipulates that a separate Performance Assessment must be conducted for each WMA. These Performance Assessments supplement the Tank Closure and Waste Management EIS.
- To close C-Farm, all equipment, transfer, and retrieval lines must be removed. All of the tanks also have gravity-fed transfer lines, and some of the diversion boxes are recognized to have leaks. The Performance Assessment takes all of this equipment into account.
- Page 3 of the DOE-ORP presentation demonstrates Figure I-1 from the TPA, Appendix I. This is referred to as the “swim lane chart,” and it covers all of the SST waste retrieval and closure process, including tank waste retrieval, SST system component and WMA closure, WMA corrective actions, and groundwater actions. At the moment, DOE-ORP is well down the tank waste retrieval pathway.

Chris closed his presentation by noting that the planned closure for C-Farm (governed by TPA milestone M-045-83) is the end of June 2019.

Regulator Perspectives

Jeff Lyon, Ecology, highlighted the complexity of the swim lane chart, and noted difficulty in communicating the process to the public. Jeff noted that, while the swim lanes provides important procedural information, the product of the tank farm closure process is difficult to conceptualize until the process itself is completed. Jeff recognized that the expected environmental impacts resulting from residual contamination need to be carefully considered. All of the available information surrounding tank farm closure decisions will need to be presented to the public in order to gather stakeholder input and ensure that closure decisions are supported.

Jeff also noted that the curies held within tank farms may mean different things. He stated that there is technetium, cesium, and strontium within tanks, and each isotope has distinct mobility and half-life characteristics.

Jeff recognized that there are several major remediation decisions that DOE-ORP still needs to make regarding the closure of WMA C, including plans for the management of catch tanks (the CR vault still needs to be sampled and potentially retrieved), buildings and surface equipment, and in-tank retrieval equipment. Jeff recognized that the Performance Assessment will help to inform these decisions.

Committee Questions and Responses ³

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

C. As the TWC considers the closure of WMA C, it is important that members consider the regulatory framework that is in place governing tanks. Under the RCRA definition, all tank farm catch tanks, diversion boxes, and vaults are considered to be tanks. Also, HLW is governed under the Nuclear Policy Act, and HLW is defined by where the waste comes from as opposed to its composition. HLW is still HLW, even if it has migrated into the soil.

C. Current models do a poor job of accurately predicting waste movement in soils. It is important that DOE-ORP continue to gather additional information and refine models to more accurately reflect reality. The largest risk at many of the Hanford Site tank farms is the waste that has already been released from tanks through either leaks or overflows.

Q. Do the numbers included within the Performance Assessment and the EIS take into account the contaminants that are already in the soils because of historic tank overflows?

R. [WRPS] The numbers included in the documents only account for the contaminants that are present within the tanks. Contaminants found in soils will reach groundwater much sooner. Therefore, the long-term would remain relatively unchanged if soil concentrations were to be incorporated into calculations.

Q. What is an “investigative push?”

R. [DOE-ORP] A 1.5- to 2-inch hollow tube with a hardened cone at the tip is pushed downward into soils. Workers can lower narrow instruments into the tube to measure things like gamma emitters and moisture or to pull soil samples from select depths. This strategy is a fast, effective, low-dose tool for characterizing soils; however, the sampling can take quite a bit of time, so DOE-ORP selects sampling locations where contamination is expected to exist.

Q. Does DOE-ORP have a solid understanding of the pipelines that already exist? Is there an understanding of what contaminants exist within them?

Attachment 3: Transcribed flipchart notes

R. [DOE-ORP] There is a document that contains information about all seven miles of existing pipelines. In the past, it was customary to run acid through plugged pipes to keep them open; however, some piping became plugged regardless. The Tank Closure and Waste Management EIS assumed a volume void—if the entire length of the seven miles of piping were clogged, that would amount to an approximate 3% residual of tank waste. This was a part of the Performance Assessment. The Performance Assessment may demonstrate that existing pipelines are not a substantial source of residual contamination; however, the regulatory review may guide DOE-ORP to take more samples.

R. The last page of the provided issue manager handout demonstrates anticipated curies of technetium-99 in pipelines within WMA C. The graph demonstrates that the expected curies held within pipelines is very small in comparison to the curies held within some tanks.

C. While the amount of curies in pipelines may be small, it is important that the radionuclides held within the piping is not written away. The Board and DOE-ORP need to continue to track this contamination.

Q. Where do WMA C pipelines fall under Figure I-1?

R. [DOE-ORP] The pipelines will fall under the tank waste retrieval plan. If DOE-ORP needs to ameliorate any pipelines, the action would fall under a corrective measures study. Currently, DOE-ORP is not planning to retrieve the legacy pipelines, as that would serve to drive contamination into soils.

Q. At the April 2015 Board meeting, there was a robust discussion about cleanup guidelines for the Central Plateau. One point of the conversation centered on the depth point of compliance. How far beneath the surface are the pipelines? Are they lower than the DOE-proposed ten-foot point of compliance? The piping should be retrieved, and the U.S. Department of Energy—Richland Operations Office (DOE-RL) should consider this as cleanup plans and points of compliance for the Central Plateau are finalized.

C. The numbers that are presented in the Tank Closure and Waste Management EIS and the Performance Assessment documents are not very publically accessible. While a curie is a curie, it is an important point to note that not all curies pose the same risk to human health downstream. Millirems may be a more meaningful contamination metric.

Q. When did the C-Farm Performance Assessment begin?

R. [DOE-ORP] The C-Farm Performance Assessment first began in 2009, and DOE-ORP completed three working sessions in that year. Efforts and additional working sessions continued into 2012. There was a two year funding hiatus between 2012 and 2014, and DOE-ORP returned to this task in 2015. DOE-ORP anticipates that the process will receive adequate funding to complete the Performance Assessment.

Q. How have other DOE sites conducted this process?

R. [WRPS] The Performance Assessment at the Hanford Site has been informed by other efforts, and the Hanford Performance Assessment process has been integrated as a result. The integrated process began at Savannah River; the efforts there demonstrated that stakeholders need to be involved early. In terms of DOE Environmental Management (EM) sites, Savannah River is the closest to Hanford in tank wastes and closure strategies. There is coordination that is ongoing between EM sites.

Q. The public is very interested in these studies and the results that they present; however, many of the concepts are technical and difficult for non-experts to understand. When DOE-ORP is taking this information to the public, it would be best to focus on how the information relates to public concerns. It is also important to focus on tangible applications of the information. For example, relating contamination levels to drinking water standards would be helpful to facilitate general understanding.

Q. The Board needs to look into the decisions that need to be made in the coming years and appropriately provide policy advice. What does the TWC need to do right now to ensure that contamination does not reach groundwater in the next 100 years? Where do DOE-ORP's cleanup efforts need to be focused? For example, should DOE-ORP expend effort and funding on emptying a tank that contains a total of 0.1 curies when there are 40-50 curies in the soils around tanks ready to move into the groundwater?

C. [Ecology] The 40-50 curies that are estimated to be in soils are something that Ecology engineers are carefully considering. Ecology has discussed the potential for binding contaminants into soils to slow their migration into groundwater. Digging up tank farms and remediating surrounding soils would take decades. C-Farm is anticipated to be the most straightforward tank farm to close.

C. Tank farms are anticipated to take up to 100 years to close, assuming that the Waste Treatment and Immobilization Plant (WTP) begins on time and vitrifies waste quickly.

C. In terms of groundwater—there are good things that are happening with pump and treat efforts; however, if contaminants are not removed from soils around C-Farm, pump and treat operations will need to operate for many, many years for groundwater to meet drinking water standards. The committee needs to consider this type of information as we look at crafting policy recommendations.

C. [DOE-ORP] In the coming years, DOE-ORP is preparing to look ahead to the WMA that contains AN-Farm and AX-Farm. The Performance Assessment is not only a closure tool but also a retrieval tool. Soil sampling is already underway at AN/AX to characterize potential contamination. As tank retrieval is carried out, it is important that DOE-ORP make the right decisions for the right reasons, and the Performance Assessment is a tool that serves to inform the agency's efforts.

C. There will be a lot of work at C-Farm in the coming years. Given this, and the understanding that additional upcoming work will commence on the integrated disposal facility and the AN/AX Performance Assessment, issue managers for this topic will continue to attend the Performance Assessment working group meetings. The TWC should continue to discuss issues relating to tank farm closure so that the committee can decide how to best recommend policy actions to DOE.

C. As conversations on tank farm closure strategies evolve, TWC should focus on risk. The committee should also consider the predicted movement of soil contaminants. Decision-makers need to have a better idea as to how waste is moving through soils and how that waste should be managed. The committee should also look into technology for retrieving tanks themselves. Tank removal is an unpopular strategy to consider; however, it may be necessary to do this in order to remove contaminants from the soils around tanks.

The committee thanked Chris and Jeff for their contributions to the discussion, and issue managers agreed to continue tracking this topic through any upcoming Performance Assessment working group meetings. The committee planned to revisit the topic as issue managers identify and recommend additional opportunities for committee discussion.

PHOENIX Tank Farms Application

Agency Presentation

Jeremy Johnson, DOE-ORP, provided the TWC with a brief background ⁴ of the Pacific Northwest National Laboratory Hanford Online Environmental Information Exchange (PHOENIX) program and its application to Hanford Site tank farms. Jeremy noted that the overall goal of the PHOENIX program is to improve public and stakeholder access to information and to support decision-making. Jeremy recognized that PHOENIX began approximately five years ago, and the program initially focused on groundwater and DOE-RL activities. Jeremy stated that the application of PHOENIX to Hanford Site tanks began two years ago when DOE-ORP managers realized that they needed a better tool for communicating information.

DJ Watson, Pacific Northwest National Laboratory (PNNL), provided the committee with a live demonstration of the PHOENIX Tank Farm program (<http://phoenix.pnnl.gov>). DJ handed out a PHOENIX Tank Farm Application—Quick Use Guide ⁵ to facilitate understanding of the program interface and uses. Throughout his demonstration, DJ noted that:

- The opening schematic acts as a dashboard, and it presents the 177 Hanford Site tanks organized by tank farm. The dashboard view allows the user to visualize tank attributes. Clicking on a tank opens a pop-up window that provides basic information and graphs about the particular unit.
- The pop-up screen allows further interrogation of data, including the addition of other charts (e.g. atmospheric data) and modifying the scale of the y-axis (time) to illustrate changes more clearly. Notes are incorporated into graphs to provide background on changes in tank surface level, etc.
- Aside from sensor and weather data, PHOENIX also demonstrates the Tank Best-Basis level, which is a measurement of the waste volume within tanks. Tank Best-Basis measurements, presented as both a bar graph and a pie chart, demonstrate the composition of waste that exists

Attachment 4: PHOENIX Tank Farms Application (DOE-ORP presentation)

Attachment 5: PHOENIX Tank Farm Application – Quick Use Guide

within tanks. The Tanks Best-Basis also illustrates the inventory of chemicals and radionuclides within each tank.

- The map view shows environmental data, and notes the locations of weather stations and groundwater monitoring wells.
- The information button in the top-right corner provides the user with detail about the application and a glossary. Also, help files (yellow question marks) are available in multiple locations throughout the program, and they illustrate how to best use information that PHOENIX presents.
- The message icon in the top-right corner allows users to provide feedback on the program. PNNL and DOE-ORP are interested in receiving comments on the interface and the data presented by PHOENIX Tanks.

*Committee Questions and Responses*³

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

Q. There was another program that was developed several years ago for tracking tanks and their associated data. Has information from this program been incorporated into PHOENIX?

R. [PNNL] No. The PHOENIX program is a separate code that was written for use in web browsers.

C. There could be a lot of utility for cross-referencing this data with the other program. There is also the opportunity to correlate tank vapor data with the data that is already presented in PHOENIX. As this data is already available, it seems like it would be relatively easy to incorporate it.

R. [PNNL] PNNL and DOE-ORP have recognized the potential for including tank vapor data into the program.

Q. Have the Savannah River and Idaho Sites been made aware of this program? It would be efficient to have a single information management program across EM sites, as opposed to each site developing their own strategy for communicating data.

R. [PNNL] Other EM sites have map based systems that were developed independently; however, DOE-ORP has been working with DOE headquarters to demonstrate the utility of the PHOENIX program.

Q. The tank data incorporated into the program appears to go back 40 years. Did PNNL incorporate any of the legacy information into PHOENIX?

Attachment 1: Transcribed flipchart notes

R. [PNNL] The transfer data that is incorporated goes back to 2001. The database was completely revamped at that time, and prior data is so fundamentally different that it will take a very long time to migrate the data into a form that is cohesive with the program. PHOENIX Tanks is a relatively new program, and the product version was only just released this year. Future updates may incorporate older data.

Q. Will visual imagery of tank interiors be incorporated into PHOENIX?

R. [PNNL] There were trials done with interior tank imagery on two tanks. Imagery gathered from tank closure and retrieval efforts is difficult to stitch together, and it currently cannot be integrated into PHOENIX.

Q. Does the PHOENIX program demonstrate chemicals of potential concern or contaminants of potential concern?

R. [PNNL] PHOENIX currently demonstrates contaminants of potential concern. Chemicals were not an initial priority, but PNNL and DOE-ORP will explore incorporating these in the future. Chemicals of potential concern would only be demonstrated for the Tanks Best-Basis.

C. There is a problem in the well log. It appears that the surface background values for cesium, strontium, and plutonium isotopes are also used as background values for the vadose zone. There is no background of these isotopes at depth; they are only present at the surface level because of bomb fallout.

The committee thanked the presenters and noted that the PHOENIX program provided important detail on tank status and composition. Committee members noted that the information compiled within the PHOENIX program could be a very important data source for Board members, and the committee believed that a follow-up presentation on the program may be appropriate for a future Board meeting. TWC members noted that timing and framing questions for a Board meeting presentation could be explored at a future Executive Issue Committee meeting.

Cesium Storage Update (Fukushima)

PNNL Presentation

Mark Triplett, PNNL, provided the TWC with a presentation detailing Japan's cesium management strategies following the 2011 reactor damage at the Fukushima Daiichi Nuclear Power Plant. Mark noted that Hanford has hosted many delegations from Japan, and he stated that ongoing remediation efforts at both Hanford and Fukushima present opportunities to share important information.

Key points from Mark's presentation ⁶ include:

Attachment 6: Cesium Removal and Storage – Update on Fukushima Daiichi Status (PNNL presentation)

- Following the March 11, 2011 Japanese earthquake, a tsunami struck the Fukushima Plant and disabled emergency cooling generators. Efforts to cool the reactors following the disaster led to an excess production of contaminated water. The water had high cesium content and a high dose-rate. By June 2011, storage capacity for cooling water was running out and there was the potential for an imminent overflow of contaminated water. Japan recognized that removing cesium would buy time for future waste treatment.
- To facilitate quick removal of cesium, Kurion, Inc. designed, constructed, and shipped a cesium removal system in less than three months. The Kurion method is zeolite-based, using a herschelite-based media. Absorbent columns are one-time use (not elutable), and spent columns must be stored and disposed of.
- In conjunction with the Kurion system, a Toshiba SARRY decontamination system (manufactured by cooperative agreement between Sandia National Labs and Texas A&M) is also in operation. The SARRY ion-exchange system is also zeolite-based, and the media is man-made crystalline silico-titanate. The SARRY system also incorporates one-time use columns that must be stored once they are spent.
- A cesium removal system designed by Areva was also implemented in June 2011, but use was discontinued in August 2011 as the coagulation/sedimentation process produced secondary waste in the form of sludge that Japan had difficulties managing.
- Japan is currently storing approximately 600 spent cesium removal columns (each approximately one-and-a-half meters wide by two meters tall) and totaling approximately 4.6 megacuries. Columns are stored approximately 40 meters above sea level. Containers may produce hydrogen, and temperatures within containers may reach several hundred degrees (maximum temperature ~500° F).
- Japan is currently looking into strategies for storing and managing the waste long term. One option for disposal is vitrification of the zeolite media.

*Committee Questions and Responses*¹

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

Q. How long can a column accept cesium-laden wastewater before it is spent?

R. [PNNL] Initially, storage capsules were filled very quickly—often in days. Now that there is less immediacy, capsules fill more slowly, usually after several weeks.

Q. What is the cost of cleanup at Fukushima?

Attachment 3: Transcribed flipchart notes

R. [PNNL] The entire decommissioning effort is costing Japan approximately \$1 billion per year, and the effort employs approximately 7,000 workers.

Q. What is the timeline for cleanup at Fukushima?

R. [PNNL] Current cleanup plans look ahead for at least 40 years. The Fukushima reactors will need to stay covered, and that is going to continually generate waste. Currently, the Japanese government is funding cleanup costs, as the Tokyo Electric Power Company is largely bankrupt.

Q. What is Japan's long-term plan for cesium storage?

R. [PNNL] The herschelite media makes a very good glass-former. At the moment, Japan is okay with storing the spent columns. Japan is also looking at decay time and considering how long it will take before the columns degrade to class C standards.

Q. How is the Japanese government moving forward with public involvement?

R. [PNNL] Japanese delegations coming to the Hanford site are very interested in how the HAB functions and how it provides advice to the TPA agencies. There is now a Fukushima Advisory Board; however, the government runs the council and supplies the agenda.

Q. Is Japan still looking for alternative systems for waste treatment?

R. [PNNL] No. Japan is very pleased with how the Kurion and Toshiba systems are functioning. Currently, the Japanese government is more interested in disposal options, as the high-integrity containers are building up on site.

Q. What is the volume of remaining waste? Is tritiated water migrating out of the Fukushima site?

R. [PNNL] No, not yet. There is a total of 130 million gallons of wastewater on site; this is roughly twice the amount of Hanford tank wastes. The waste has all of the cesium and strontium removed, so the most potent contaminants are no longer present. The Japanese government has funded seven tritium removal projects, and these projects should be completed by next March.

Q. What are the international perspectives on the Fukushima cleanup? Has the International Atomic Energy Association (IAEA) weighed-in?

R. [PNNL] The IAEA has a presence on-site all the time. There are also many British government and Sellafield representatives present, looking to garner lessons from the cleanup and decommissioning efforts. The IAEA just finished a large review of cleanup efforts in February 2015, and the Japanese Atomic Energy Association recently published a technology report on cleanup strategies.

Q. What lessons can Fukushima provide for Hanford cleanup?

R. [PNNL] The Japanese have had tremendous success removing cesium and strontium. They are also using innovative robotic technologies for tank waste retrieval.

Q. How long would it take to set up cesium removal systems in the United States?

R. [PNNL] If the United States were to have an emergency situation, cesium removal technology could be put into place with the same degree of agility. However, if there is not intense pressure, policy implications of using a non-elutable cesium removal media should be carefully considered. Storage and disposal of spent columns is a major consideration. There has been a renewed interest in borehole disposition; however, cesium canisters would be third in line for disposal following the cesium and strontium capsules already present at Hanford's Waste Encapsulation and Storage Facility and the calcine waste from the Idaho Site.

The committee thanked Mark for sharing his experiences, and issue managers for the cesium storage topic noted that the information would inform their ongoing discussion and efforts.

Cesium Treatment and Disposition Issue Manager Update

David Bernhard, issue manager, provided the TWC with an update on cesium storage, treatment, and disposition at the Hanford Site as it relates to the Low-Activity Waste Pretreatment System (LAWPS). David noted that he had been in contact with DOE regarding additional alternative pathways for cesium disposition (current plans for the LAWPS facility involve removing cesium from tank supernatant and then sending it back to tanks). David recognized that LAW off-gas is anticipated to generate approximately 30,000 gallons of condensed liquid throughout the life of the system after evaporation. He noted that the volume of the off-gas is not a tremendous amount; however, the liquid will contain high concentrations of technetium, iodine, sulfate, and chloride. David noted that this waste stream could be captured on a different ion-exchange resin and sent to the same location as the captured cesium.

David highlighted a new alternative for cesium disposition that involves combining the removed cesium with the condensed off-gas liquids from LAWPS operation. This mixture, David stated, could potentially be grouted and buried at a waste repository, and DOE is discussing disposal with a repository that is willing to accept this form of waste. David highlighted the strengths of this strategy noting that the removed cesium would stay free of the tanks, it would lessen the heat load within double-shell tanks, and it would reduce worker exposure.

*Committee Questions and Responses*³

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

C. [DOE-ORP] DOE-ORP appreciates the Board's consideration of creative alternatives for cesium disposition. In addition to the alternative disposal pathways, the Board should also look into policy considerations and illustrate required regulatory actions. For example—what would Ecology need to do to permit combining cesium with the condensed off-gas liquid? How would this waste be treated? How

Attachment 3: Transcribed flipchart notes

would it be transported out of the state? What needs to happen from an EIS perspective? DOE-ORP would appreciate details such as these in addition to disposal alternatives.

Q. The Board will likely have a difficult time locating and compiling information relating to the regulatory framework for cesium disposition, as the regulatory process is incredibly complex.

R. [DOE-ORP] Board members have a wide-variety of experiences. Within the group, there are many individuals with a clear understanding of the regulatory process.

Q. [DOE-ORP] Where did the referenced figure of 30,000 gallons of condensed off-gas liquid come from?

R. 30,000 gallons was noted by Dr. Albert Kruger as the distilled minimum volume of evaporated off-gas.

C. An additional disposal pathway that could be noted for cesium is the zeolite medium and the Kurion graphite melter that the Japanese government is exploring for cesium collected from Fukushima Daiichi wastewater.

C. Boreholes are being talked about more and more, likely because DOE needs an alternative to the Yucca Mountain Deep Geological Repository. Boreholes are several miles deep, and funding for exploring potential sites for borehole disposition is coming from the Nuclear Energy Program. If Hanford cesium is willing to be accepted by an existing facility and boreholes do not need to be used, that would be the ideal alternative to returning the cesium to Hanford Site tanks.

Q. Does the Waste Isolation Pilot Plant (WIPP) have the potential to accept this waste?

R. No, WIPP only accepts transuranic waste. However, there is a HLW bill that has been introduced by a bipartisan coalition of four U.S. Senators, and the definition of HLW is an aspect of that bill. These Senators are looking to define HLW based on what it is, not where it came from. The bipartisan coalition is coming to the Hanford Site during the last week of April.

Q. DOE-ORP's current plans involve the use of an elutable resin for cesium capture. How much of this resin will be needed every year.

R. [DOE-ORP] DOE-ORP will look into calculating the volume of resin needed and the anticipated cost.

David noted that he would add additional information to the Low Activity Waste Flow Chart that topic issue managers have been composing. Bob noted that existing flow chart may evolve into multiple flow charts, each including a disposal option and needed regulatory processes and policy implications. The committee agreed to follow up on the topic in May 2015, and issue managers agreed to continue gathering information and clarifying draft products in preparation for future committee conversations.

Waste Treatment Plant Issue Manager Update

Bob Suyama, issue manager, provided the committee with an update on the WTP Communication Plan, noting that additional framing work on the document was conducted during the April 2015 Public Involvement and Communication Committee (PIC) meeting. Bob clarified that, moving forward, PIC would focus on how WTP information would be disseminated, while the TWC would focus on the messages that would be conveyed.

Bob noted that discussions identified Consent Decree arbitration as a key component of future WTP communication strategies, as the public will need to understand the functional impacts of changes to the TPA governing documents.

Bob also identified that joint discussions with PIC identified workers as an important audience that need to be kept apprised of the overall project. Bob noted that workers are an important resource for communicating WTP progress, but, oftentimes, they only see a small facet of the overall work occurring at the Hanford Site.

*Committee Questions and Responses*³

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

C. Indirectly, DOE-ORP has made it clear that waste pretreatment has been placed on the backburner in favor of LAWPS. Both the Board and the public need to officially hear this, as it is a huge shift in the agency's overall approach to Hanford Site waste management. In addition, DOE-ORP also needs to release an official statement on the agency's intended approach to new tank infrastructure. Permitting new tanks is an extended process, and that will need to be communicated to the public appropriately.

C. DOE-ORP noted that low-activity waste is considered to be the most important waste to treat in the coming years. Topic issue managers should schedule a call to discuss the steps needed to begin working on this initial phase of the WTP Communication Plan.

Bob thanked the committee for the discussion, and he noted that he would work with PIC to set up an issue manager call to further identify needs for the WTP Communication Plan. The committee agreed to discuss the topic further in May 2015.

Attachment 3: Transcribed flipchart notes

Committee Business

*6-Month TWC Accomplishments and Preparation for the 2015 HAB Leadership Workshop*³⁷⁸

TWC members reviewed the 2015 HAB Work Plan and detailed Board work and accomplishments for each of the TWC-lead topics. Board leadership will discuss midyear accomplishments at the upcoming 2015 HAB Leadership Workshop.

Also in preparation for the upcoming 2015 HAB Leadership Workshop, committee members identified potential additions to the HAB's 2016 Work Plan. Potential Work Plan topic additions include:

- Updates on waste disposition pathways from DOE headquarters
- Updates on risk-based retrieval performance assessment
- System Plan
- Hanford Site secondary waste
- WIPP regulatory update and resulting impacts on Hanford Site waste disposal

In addition, the committee discussed the potential for retooling the HAB's Safety Culture topic to place the onus of safety on program and design as opposed to the worker. Committee members discussed changing the topic name to Safe by Design or Safety Ethics to better convey this shift.

TWC 3-Month Work Plan

The committee requested a full-day meeting in May 2015 that would tentatively include the following topics:

- Discuss TWC input and concerns for the FY 2017 budget (Following DOE's April 28th public budget workshop)
- Receive an update on WIPP from HAB leadership following the U.S. Department of Energy Office of Environmental Management Site Specific Advisory Board Chairs' Meeting (joint w/ TWC)
- Receive an update on the results of pulse jet mixer testing (tentative)
- Receive issue manager updates on risk-based retrieval, LAWPS/cesium storage, and the WTP Communication Plan

In June 2015, TWC tentatively plans to meet and receive further issue manager updates on risk-based retrieval, LAWPS/cesium storage, and the WTP Communication Plan.

Attachment 7: Hanford Advisory Board Fiscal Year 2015 Work Plan – Facilitator Notes on Midyear Status for TWC-lead topics (4/10/2015)

Attachment 8: TWC 3-Month Work Plan

Additional topics that the committee agreed to follow up on in the coming quarters include the Washington River Protection Solution Tank Farm Vapor Implementation Plan and safe by design/safety ethics (safety culture).

Attachments

Attachment 1: C-Farm Closure Handouts (Vince Panesko)

Attachment 2: C-Farm Closure (DOE-ORP presentation)

Attachment 3: Transcribed flipchart notes

Attachment 4: PHOENIX Tank Farms Application (DOE-ORP presentation)

Attachment 5: PHOENIX Tank Farm Application – Quick Use Guide

Attachment 6: Cesium Removal and Storage – Update on Fukushima Daiichi Status (PNNL presentation)

Attachment 7: Hanford Advisory Board Fiscal Year 2015 Work Plan – Facilitator Notes on Midyear Status for TWC-lead topics (4/10/2015)

Attachment 8: TWC 3-Month Work Plan

Attendees

Board members and alternates:

David Bernhard (phone)	Pam Larsen	Ken Niles
Don Bouchey	Susan Leckband	Vince Panesko
Shelley Cimon	Larry Lockrem	Mimi Seppalainen (phone)
Dirk Dunning (phone)	Liz Mattson (phone)	Richard Smith
Becky Holland	Melanie Myers	Bob Suyama

Others:

Kris Skopeck, DOR-RL	Jim Alzheimer, Ecology	Ryan Orth, EnviroIssues
Steve Beeler, DOE-ORP	Robbie Biyani, Ecology	Brett Watson, EnviroIssues
Rosaire Bushey, DOE-ORP	Heather John, Ecology	Jen Copeland, MSA
Joni Grindstaff, DOE-ORP	Jeff Lyon, Ecology	Rich Marshall, North Wind/DOE-ORP
Jeremy Johnson, DOE-ORP	Dan McDonald, Ecology	Sharon Braswell, North Wind/DOE-ORP
Chris Kemp, DOE-ORP	Mign Walmsley, Ecology	Alicia Gorton, PNNL
Steve Pfaff, DOE-ORP	Ginger Wireman, Ecology	Mark Triplett, PNNL
	Ben Conroy, WDOH	David Watson, PNNL
	Tom Frazier, WDOH	Kelsey Bondelid, SN3
	Gail Laws, WDOH	Annette Cary, Tri-City Herald
	John Martell, WDOH	Doug Deford, WRPS
	Tom Rodgers, WDOH	Susan Eberlein, WRPS
		Mark McKenna, WRPS
		Becky Wiegman, WRPS