FINAL MEETING SUMMARY

HANFORD ADVISORY BOARD

COMMITTEE OF THE WHOLE MEETING

February 16-17, 2010

Richland, WA

Topics in This Meeting Summary

This is only a summary of issues and actions in this meeting. It may not fully represent the ideas discussed or opinions given. Examination of this document cannot equal or replace attendance and public participation.

Welcome, introductions and announcements

Susan Leckband welcomed the Committee of the Whole (COTW) to Richland and reviewed the agenda. The purpose of this COTW meeting was to hear a report from the Board's independent expert, K.D. Auclair and Associates, LLC, on the U.S. Department of Energy – Office of River Protection's (DOE-ORP) Draft Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS), and to begin framing draft advice. After further development by issue managers, the draft advice would be considered for adoption at the special Board meeting on March 4. The draft advice or a similar, separate product would also be submitted as part of the public comment record for the TC&WM EIS.

Susan noted that Inés Triay, DOE Environmental Management (EM) assistant secretary, responded immediately to the Board's recent beryllium advice (Advice #228) regarding an independent review of DOE's beryllium program at Hanford. There was a conference call earlier today with Frank Marcinowski, DOE-EM deputy assistant secretary for regulatory compliance, as well as a top manager from the DOE Office of Health, Safety and Security (HSS). HSS came to Hanford to address the Board and affected workers' concern about the beryllium program. Susan said DOE agrees with the advice and plans to follow it. Pam Larsen commented that it was a good response by DOE.

Background and framing: DOE-ORP overview on the draft TC&WM EIS

Mary Beth Burandt, DOE-ORP, commented on the draft TC&WM EIS, its purpose, and what it does and does not address. Since the Board had already heard from DOE-ORP a number of times about this, Mary Beth informally shared information and key highlights of the TC&WM EIS. She said the decisions DOE is making should not be a surprise, given past EISs and outreach with the Board. The TC&WM EIS helps DOE look at retrieval levels and what it might mean if the last 1% of waste is not retrieved from a tank, for example. Mary Beth said it asks questions such as, can impacts be mitigated with a better barrier. DOE found through analysis that a barrier would not be effective.

Mary Beth said the TC&WM EIS also helps DOE look at supplemental treatment for the Waste Treatment and Immobilization Plant (WTP) and addresses a number of questions: Should the plant have a 2 by 2

melter configuration? How long would it take to process waste? What if DOE uses a second low activity waste (LAW) facility? What if DOE uses steam reforming? She said DOE prefers pretreatment which allows waste to be separated into a HLW and LAW stream but had no preference identified for supplemental treatment.

Mary Beth said for closure, the TC&WM EIS helps DOE look at landfill closure, which is DOE's preferred alternative. She said there are four or five issues designated to worker dose, clean closure, and how to dig out waste. She said even when DOE retrieves 99.9% of waste from a tank, the TC&WM EIS shows worker dose levels to be quite large. She said disposal is an issue, too.

The preferred alternative in the TC&WM EIS for the Fast Flux Test Facility (FFTF) is entombment. Mary Beth said the TC&WM EIS did not show significant difference between removing the entire structure, entombment and leaving the structure in place.

Mary Beth said for disposal of FFTF and waste from LAW, the TC&WM EIS shows DOE's preferred alternative is disposal in the Integrated Disposal Facility (IDF) in the 200 East Area. Mary Beth noted that the offsite waste importation moratorium is in place until WTP is operational. The moratorium was expanded to include Greater than Class C (GTCC) waste, too.

Mary Beth said the TC&WM EIS does not make decisions on double-shell tank and WTP closure. Groundwater remediation decisions, such as pump and treat systems, will be made through the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process. Analysis of disposing of six sets of cribs and trenches can be found in the TC&WM EIS alternatives.

For more a more detailed overview of the TC&WM EIS, refer to page 16 of the November 5-6, 2009 HAB meeting summary (http://www.hanford.gov/files.cfm/HAB_FINAL_Nov09_Summary.pdf).

Discussion

Dick Smith commented that in DOE's preferred alternative, they postulate removing tanks and treating all the material as high level waste. He thought that was inconsistent with what is currently occurring. Mary Beth said it would not all be treated as high level waste. She said the bottom of the tank and the first ten feet of soil below a tank are treated as high level waste. The rest of the soil would be dug up and treated and disposed. It could be treated with soil wash in some of the alternatives.

Dick asked if the tanks themselves will be treated as high level waste, and if so, how will DOE dispose of them. Mary Beth said that has not been decided; there are disposal options but they did not want to presuppose any decisions.

Gerry Pollet commented that the depth from the bottom of a tank to groundwater can vary. Mary Beth agreed, it can sometimes be as deep as 50 feet. Gerry asked if DOE will vitrify waste that is in the soil column under the Plutonium Finishing Plant (PFP). Mary Beth believed that soil from PFP would go to the Environmental Restoration and Disposal Facility (ERDF). Larry Gadbois, U.S. Environmental Protection Agency (EPA), noted that all the soil removed so far has gone to ERDF. If it contains chromium or lead, it is mixed with concrete or grout at ERDF. Larry said they decided against soil washing in some cases.

Maynard Plahuta asked if there was flexibility in treating soil below ten feet as high level waste, depending on contamination beneath a particular tank. Mary Beth said there is some flexibility.

Larry Lockrem asked about supplemental treatment. Mary Beth said DOE does not have a preferred alternative. The TC&WM EIS analyzed using the existing LAW facility, building a second LAW facility, steam reform, grout, or bulk vitrification.

Background and framing: Regulator perspectives

Washington State Department of Ecology (Ecology)

Suzanne Dahl, Ecology, shared Ecology's perspective on the draft TC&WM EIS. Her presentation focused on decisions the TC&WM EIS supports, Ecology's cooperating agency role, and what Ecology thinks is important in the TC&WM EIS.

Suzanne said the TC&WM EIS matters for many reasons because it addresses:

- How much waste to retrieve before tanks are closed
- How to close the single-shell tanks
- How to treat tank waste
- Disposal of Hanford waste
- Whether the site can handle any more offsite waste
- How to address secondary waste
- How to dismantle FFTF

As a cooperating agency, Ecology:

- Agreed to alternatives
- Agreed to key modeling assumptions
- Developed detailed inventory cross-walk
- Reviewed groundwater and vadose zone modeling
- Reviewed (pre-decisional) the draft in Washington, D.C.

Suzanne said Ecology came to some conclusions about modeling. The modeling in the TC&WM EIS:

- Meets the standard of practice for the industry
- Adequately represents the known physical processes
- Met Ecology expectations for comparing two flow fields (E and N), and sensitivity analyses

She said that in the future, Ecology will need more detailed modeling to evaluate site-specific conditions for making closure decisions.

Suzanne described Ecology's preliminary findings:

- Ecology wants DOE to vitrify all low activity waste (LAW) using a second LAW plant – Alternative 2B.
- For all glass options, most of the impacts come from secondary waste. Secondary waste causes significant groundwater impacts and needs robust mitigation to below levels of concern.
- The draft TC&WM EIS indicates that greater than 99% retrieval makes a difference.
- Deep vadose zone remediation is needed (at tank farms and elsewhere).
- Using IDF in 200 East is preferred because of fewer impacts to groundwater.
- FFTF entombment is satisfactory.
- Offsite waste disposal causes significant environment impacts.
- Ecology agrees with some of DOE's choices:
    - Disposing of waste in IDF East only.
    - Retrieving at least 99% of waste from the tanks.
- Ecology is pleased that the waste import moratorium is extended.

Suzanne reviewed issues that Ecology believes needs more analysis:

- Secondary waste
- Spent and failed high-level waste melters
- Storage for vitrified high-level waste canisters in a deep geologic repository (when and where)
- Ways to mitigate contamination in the deep vadose zone

Suzanne noted that the State of Washington believes that high level waste needs to go to a deep geological repository facility. She commented that a facility will be needed to temporarily store vitrified high level waste canisters until a repository is selected.

In summary, Ecology:

- Agreed with alternatives developed during scoping.
- Finds input data, quality assurance and modeling acceptable.
- Finds the cumulative analysis acceptable and informative.

- Thinks the data presentation makes it hard to find some answers.
- Believes impacts in the future are significant.
- Believes more work for mitigating impacts is vital.

Ecology published a foreword in the draft TC&WM EIS and created multiple handouts about their perspective and findings. Ecology is developing detailed comments on the draft TC&WM EIS.

Discussion

Susan Leckband asked what points Ecology thinks the Board should include in draft advice. Suzanne said the public should think about values for future generations, and how Hanford should look in 100 years, 1,000 years and 5,000 years. The Board and public should consider acceptable impacts to leave in place, if any. Ecology wants to hear if there are alternatives that drive impacts to a level the Board finds unacceptable.

Dirk Dunning asked why Ecology finds Alternative 2B the best and most preferred option. Suzanne said the treatment standards were the most preferred because Alternative 2B calls for more quickly vitrifying all waste. She noted secondary waste mitigation is still needed. Dirk asked if Ecology will develop its own "mix and match" alternative to analyze. Suzanne said they are discussing that now and have not reached a conclusion.

Gerry said the Board should consider if the assumptions in the TC&WM EIS are conservative enough.

Dick commented that the agencies do not know the risk posed by residual waste left at the bottom of a tank after 99% of the waste is retrieved. He asked if DOE should investigate what kind of residual radioactivity may be left behind, if any. Dick said it was hard to determine if retrieving 99% of waste is good, bad or indifferent. Jeff Lyon, Ecology, said they do not have a lot of data because they have not retrieved many tanks. They will take representative samples of tank heel solids. Suzanne noted that closure plans decide how tanks will be closed, not the TC&WM EIS. If residual waste is found to be a high risk, then the agencies would look at ways to remove it or immobilize in place. Jeff noted that analyses completed to date have found residual waste to be less risky than they thought. Dick said he was not surprised, and described an experiment that found fine aluminum sand was only left behind after retrieval efforts.

Argent Makiani asked why there was a provision for recovering iodine-129, but no discussion of it in the high level waste stream. He thought iodine-129 posed a proportional hazard. Suzanne said all material coming off the off-gas system is recycled many times through melters. One of the potential mitigations is recycling some of the iodine past the high level waste melters. Argent was glad they were not ruling it out.

Keith Smith was encouraged that Ecology believes that a disposal site should not contribute to groundwater contamination. He asked if there are existing technologies that would guarantee such a situation would not occur. Suzanne said vitrified waste does not pose a risk for contributing to groundwater contamination, but secondary waste might. She said DOE is working on some options and looking at different technologies. She thought there was no reason to not put secondary waste into a really good waste form.

Laura Hanses asked if IDF was not engineered to protect groundwater. Suzanne said it is a Resource Conservation and Recovery Act (RCRA) designed landfill, so it uses liners and a standard cap. She said it is commonly assumed that as some point liners will fail, leaving only the waste form to keep waste from infiltrating groundwater. She said in this case, secondary waste was modeled as regular grout, which eventually leaches and is not protective of groundwater.

Jean Vanni asked if the risk assessment considered impacts for not making closure decisions for WTP, double-shell tanks, cribs and trenches. She asked what kind of site specific modeling will be done for closure, and how will DOE deal with corrective action for tanks that are leaking. Jean questioned how the agencies could select an alternative without those answers. Suzanne said from the state's perspective, the TC&WM EIS provides information to use for permitting decisions. The TC&WM EIS provides broad information about tank leaks and corrective actions, but when Ecology goes to permit the closure of single-shell tanks, they will require more specific modeling and specific closure plans.

Jean asked how Ecology could think that landfill closure will be protective. She said more EISs will be needed for closing tanks. Suzanne said there will be a performance risk assessment for each risk area, such as a landfill, and a performance assessment at IDF that will address tank waste acceptance criteria.

Jean said a ROD will support landfill closure, but would not meet RCRA requirements. Suzanne said a ROD is not binding on the State of Washington. Mary Beth described the process as well: A decision is made, in the form of the ROD that includes a mitigation action plan. She said they may not know exactly how secondary waste will be treated, for example, but they may identify a range of what DOE feels would be acceptable. Ecology then would put together a permit with conditions and terms, including additional mitigation plans. Mary Beth said the TC&WM EIS is intended to provide a big picture view of cleanup and its goals. There are many other processes to evaluate specifics.

Shelley Cimon asked if modeling reviewed the transformation of stainless steel. Suzanne said it does not.

Floyd Hodges said the TC&WM EIS looks at cumulative impacts, and even without tank waste, the Hanford Site is out of compliance for landfills. He asked how tank farms can meet standards when cumulatively Hanford is not even close to meeting standards. Suzanne said that is why IDF should be like every other RCRA landfill and not impact groundwater. She added that the TC&WM EIS helps indicate where other parts of the site need different approaches to remediation. Floyd agreed and said no disposal facility should negatively impact groundwater. Jeff Luke thought the Board should be clear when it says no impacts to groundwater; modeling often assumes that barriers break at some point and glass breaks down. He thought if the Board meant no waste should be left on site by saying no impacts to groundwater, it should say that clearly.

Technetium
Argent commented that most technetium comes from IDF and will need to be removed. Suzanne said a small amount more of technetium ending up in secondary waste probably does not make much of a difference. High level waste melters have lower retention rates than low level melters. There are many questions about mass balance and the form of technetium. Suzanne said even with those variables, it makes sense to remove it and send it offsite.

Argent thought Alternative 6B was a better option than Alternative 6A. Larry Lockrem had some information about technetium disposal and will discuss it later with Argent.

Pam said the technical difficulties in separating out technetium-99, how can it be sent to one facility or another? Suzanne said there is enough space for a technetium ion exchange column in the pretreatment facility, but plumbing is difficult. She thought it was more likely to build it in an adjacent facility. Pam thought the Board should include this in its own preferred alternative.

Larry Lockrem recommended that the agencies be specific when using the word "grout" as it can mean different things to different people.

Mike Korenko said the alternatives in the TC&WM EIS should review removal, concentration and isolation of technetium. He said technetium will eventually leach out of glass and grout, and dilution is not the solution. It would be much safer to remove it from the waste stream and figure out what to do with it. Suzanne commented that modeling shows technetium leaching slowly out of glass, keeping within standards. Mike thought there was a technology that can transmute technetium into a nonradioactive material so it is gone forever.

EPA
Larry Gadbois, EPA, shared some of his comments for the Board on the TC&WM EIS. The EPA team is reviewing the TC&WM EIS, but the comments below are not collectively from the team. Larry hoped the following suggestions could serve as prompts for the Board as it develops advice.

General thoughts:

- Do not lose track of the "many trees" – there are many policy issues ripe for advice

- Do not overlook the collective effect of the trees – how does the Board want to influence DOE in determining the decision for cleaning up Hanford?
- Do not lose fact of other trees in the forest – does the board want to remain silent on other issues that are not as big, such as offsite waste?

Larry shared suggestions for the Board to consider when crafting advice:

- Does the Board want to give advice about the use of caps at 200 Area waste sites?
- Does the Board want to give advice on presumptive cleanup planning outside the TPA process? How would the public participate in such a process?
- Does the Board want to revise the draft TC&WM EIS to add an alternative that is protective of groundwater?
- Does the Board want DOE to have the protective alternative be DOE's preferred alternative?
- Does the Board want DOE to select the protective alternative in the NEPA ROD?
- Does the Board want DOE to provide a balanced summary of short-term and long-term risks?
- Does the Board want to give DOE advice on the viability of landfill closure of tanks? What is the future land use control and viability of it?
- Does the Board want to give DOE advice on using risk thresholds that are dirtier than could be allowed under CERCLA?
- Does the board want to give DOE land use planning advice again? If yes, how does the Board want to give DOE advice on the viability of DOE planning to exist and maintain site land use controls for 10,000 years?
- Does the Board want to give DOE advice on playing risks against each other to downplay risks that on their own merit are unacceptable?
- Does the Board want to give DOE advice about presentation of risks and scenarios? How do the risks play against one another?

Discussion

Mary Beth said DOE does not assume institutional controls will work for 10,000 years. She said the TC&WM EIS identifies a 100 year administrative control. At the end of 100 years, DOE assumes there will be no one on site to monitor tanks and material is available for release.

Emmett commented that RODs are not binding. TPA, RCRA and CERCLA regulations and decisions trump a ROD.

Larry Gadbois added that the TC&WM EIS has done a wonderful service to look at cleanup in the piecemeal way that CERCLA does; the TC&WM EIS "pulls it all together." Larry said he was impressed by how well-written and presented the information was.

Barbara Harper said the TC&WM EIS underestimates tribal risk. It was difficult to identify how DOE arrived at its conclusions. Barbara said DOE should use consistent tribal exposure scenarios.

Mike said landfill closure of tanks is not "one size fits all." For example, leaving 1% of waste in tanks can lead to very different levels of impact. He said there should be more detail than a simple yes/no for landfill closure. Larry Gadbois agreed that all tanks and waste sites are different.

Background and framing: HAB stakeholder perspectives

Before the COTW meeting, HAB members were given the opportunity to sign up to provide their organization's perspective on the TC&WM EIS. The following is a summary of their presentations.

Dirk Dunning, Oregon Department of Energy

Dirk said the Oregon Department of Energy has been reviewing the TC&WM EIS and did a review of the various alternatives and a proposal for other alternatives that the Board and other groups have examined.

Dirk said the TC&WM EIS is useful in a number of ways, such as showing different risks and the impact of offsite waste. Dirk shared several comments:

- The draft TC&WM EIS is complex and overwhelming.
- There are no "reasonable" remediation alternatives in the TC&WM EIS.
- The TC&WM EIS is not all-inclusive.
- Currently contaminated groundwater and groundwater yet to be contaminated must not be declared an "irreversible and irretrievable" lost resource.
- The TC&WM EIS should not separate DOE-RL waste from DOE-ORP waste.
- The TC&WM EIS makes it clear that importing waste to Hanford is unacceptable.
- The TC&WM EIS makes it clear that the least amount of waste left in place is probably the only successful alternative.
- The TC&WM EIS proposes secondary waste forms that are unacceptable.
- There are modeling issues in the EIS.
- The TC&WM EIS should include full lifecycle costs in alternative selection.
- The TC&WM EIS should including lifecycle risk analyses in alternative selection.
- Risk is underestimated in the EIS; there is no such thing as "unit-less" risk.

Dirk said the risk of importing offsite waste is unacceptable. The alternatives show offsite waste arriving prior to WTP operations commencing, which indicates that the moratorium on shipping offsite waste to Hanford will end. Dirk said the TC&WM EIS shows that waste will persist for tens of thousands of years, and the risk of resulting impacts is unacceptable. He said the State of Oregon does not believe any of the tank waste alternatives are very good. He said Alternative 6B is the only one that comes close to being acceptable. Dirk commented that there is no practical way to directly compare impacts.

Discussion

Susan thought conceptual advice points so far include: Groundwater is not irretrievably lost; landfill caps are not protective over the long-term; waste should be permanently immobilized; identify lifecycle cost and risk; and do not import offsite waste.

Dick thought the TC&WM EIS should identify the efficacy of groundwater remediation systems. Floyd commented that they could pump and treat forever, but it is a waste of time if the source is not removed. Dick thought that was true, but pump and treat is better than nothing.

Mike asked if recent data from Columbia River sampling was higher than expected, which could be problematic for TC&WM EIS analysis. Larry said there was a sample from the river bottom that was high in chromium, near the 100 BC Reactor Area. They previously did not think there was a chromium groundwater problem in the 100 BC Area.

Dale Engstrom said Oregon was not confident in the groundwater modeling because it did not predict higher contamination levels in the river.

Gerry Pollet, Heart of America Northwest

Gerry shared a modified presentation from Heart of America Northwest that had been given to many different audiences. The following is a summary of his presentation. Gerry showed a number of contamination plume maps to help illustrate his points.

- The preferred alternative in the TC&WM EIS has been presented repeatedly as assuming that the moratorium on importing offsite waste to Hanford will continue. The TC&WM EIS proposes a ROD that the moratorium will be voluntary until WTP is operational, not a binding moratorium similar to the one currently in place until the TC&WM EIS is finalized.
- DOE should withdraw the ROD which designated Hanford as a national waste disposal site for low-level and mixed low-level waste (February 2000).
- There should be a reasonable alternative in the TC&WM EIS that does not include importing offsite waste to Hanford.
- The TC&WM EIS should identify cumulative impacts without adding more waste.
- Do not assume groundwater will be treated again after waste releases occur from landfills.

- The TC&WM EIS should compare peak concentrations found in the soil found today to proposed actions, not peak concentrations from 20 years ago.
- The TC&WM EIS contains helpful plume maps, including a carbon tetrachloride groundwater plume.
- The TC&WM EIS is missing baseline standards and units.
- The public should understand drinking water standards in relation to carbon tetrachloride contamination and future uses of the river shore.
- The TC&WM EIS contains assumptions that call for DOE control for 10,000 years over the core zone, but outside the core zone boundary the site will be zoned for unrestricted use. How will DOE prevent someone from drilling a well in the core zone in the year 2138, for example? DOE is assuming administrative control that will likely be impossible.
- Uranium and groundwater contamination data is inconsistent.
- Iodine-129 recontamination of groundwater will result from releases from IDF.
- The TC&WM EIS will likely not be usable to meet SEPA EIS requirements.
- The amount of waste at Hanford must be limited. Waste streams should be eliminated, including pre-1970s TRU waste.
- The TC&WM EIS should identify/include Washington State cancer risk standards. DOE should use the most recent risk data and state cleanup standards.
- The TC&WM EIS should include analysis of chemical data, including data from the U.S. Ecology Site.

Discussion

Susan thought the potential advice points include: There should be a deeper analysis of chemical data; use existing chemical data and analyze the full suite of data; present MTCA standards; and the public has the right to see an EIS that compares risk to acceptable Washington State risk standards.

Dick asked how offsite waste could be routed to Hanford. Gerry said the TC&WM EIS analysis did not include using Interstate 5. Mary Beth noted that because some sites were identified does not mean the waste meets Hanford's waste acceptance criteria.

Dick said he has never seen any plan for the condition of waste that may be shipped to Hanford. Will it be treated at the previous site? Will it be treated at Hanford before disposal? He said the assumptions are unclear.

Mary Beth said the TC&WM EIS does not assume that waste will be treated at Hanford prior to disposal. It does assume the waste is packaged in drums and there will be no free liquids. Dick thought that was not well-thought out.

Pam thought other sites should not be able to ship waste to Hanford if the TC&WM EIS does not analyze the impacts.

Gerry thought it was a question for the state and if it chooses to fight the importation of waste to Hanford. He was concerned that DOE could say it will analyze offsite waste in a separate EIS [such as for Greater than Class C waste (GTCC)]. He was concerned about inadequate public outreach for such a decision.

Dirk agreed that the February 2000 ROD is invalid given the site-specific analysis that is now available.

Dick thought for the advice, the Board should say that any waste shipped to Hanford should be treated first. He thought the Board should not forbid all waste from coming to Hanford.

David Bernhard, Nez Perce Tribe

David presented comprehensive and detailed comments from the Environmental Restoration and Waste Management (ERWM) Program of the Nez Perce Tribe. His presentation was a summary of the Nez Perce ERWM findings on the TC&WM EIS, and represents ERWM analysis of specific TC&WM EIS comments only, not the official policy of the Nez Perce Tribe. The following is a summary of his presentation. David used numerous technical graphs and chart calculations to illustrate the points.

Overview of ERWM findings:

- Modeling does not agree with current day data.
    - Groundwater modeling does not agree with current data. Uranium, technetium-99 and nitrate activities/concentrations are at higher levels. "Technical guidance document for Tank Closure Environmental Impact Statement vadose zone and groundwater revised analyses" should be revised to address the issues.
    - Use of kilodalton (Kd) is an approximation at best of non-homogenous soils and is not representative of contaminant movements (especially for thousands of years).
    - The credibility of the TC&WM EIS is undermined by DOE's inability to explain the current sources of groundwater contamination at Hanford.
    - Measured and predicted activity for technetium-99 for BY Cribs are not in general agreement, which suggests that the set of values for the vadose zone hydraulic parameters have been underestimated. Technetium-99 is highly mobile – how will DOE be able to predict substances with lower mobility thousands of years in the future?
- Tank heel calculations are low by a factor of 5-6 for heavy elements.
    - Appendix D-16 provides tank heel calculations.
    - Method 1 is not realistic (tank heel calculated as homogenous).
    - Method 2 is based on inventory (tank heel calculated based on sludge remaining in the bottom of the tank).
    - Method 3 is the probably the most useful model (tank heel calculated using the Hanford Tank Waste Operations Simulator Model). It appears that numbers were manipulated to show lower heel totals, however.
- The TC&WM EIS chemical cumulative impact does not take into account 96% of the uranium at Hanford.
- Uranium available to the vadose zone is 24.5 times greater than shown in the TC&WM EIS.
- Total site risk did not take uranium long-term analysis into account (10,000 years versus 30,000 years).
    - Appendix O does not take into account peak exposure to uranium.
    - Appendix O assumes flux in the vadose zone would be complete in 10,000 years for both the 10,000 and 30,000 year analysis. This is true for tank leaks, cribs and trenches. This would not be true for waste sites such as capped solid waste burial ground.
    - The Hanford Site would not be useable for groundwater.
    - Assumes 50% released to mobile vadose in 30,000 years.
    - Assumes 33% reduction in amount of uranium reaching the river in 30,000 years.
    - Even if the local uranium concentrations are much less, the entire Hanford groundwater supply would be contaminated – possibly up to 100,000 years.

Recommendations:

- Generally, the TC&WM EIS will work for tanks, but the site as a whole will fail to meet objectives.
- Remediation should include all risks and focus on risk reduction for the whole site.
- Pump and treat will not be enough. Caps will not help in the long run.
- Cleanup must include solid waste burial grounds and the U.S. Ecology site.
- DOE should find an acceptable glass for iodine (work is in progress; the Board should encourage DOE to fund this).
- DOE should consider alternative cleaning agents for tanks (oxalic acid is technology from the 1940s).
- Technetium-99 removal is preferred.
- TC&WM EIS Alternative 2B (with a higher tank cleaning rate) is preferred.
- TC&WM EIS Alternative 6B for soil washing capability for mostly solid waste burial grounds is needed.

Discussion

Susan asked if the TC&WM EIS misstates the elements left in tank heel. David said as tank waste is retrieved, the tank heel becomes heavy at the bottom of a tank. Two methods are acceptable, and the TC&WM EIS selected the wrong one.

Susan said historically, the Board has not provided advice regarding the U.S. Ecology site. In this case, however, there is potential for it to contribute to the cumulative impact at Hanford. She said the Board might consider advising that the cumulative analysis include all waste, waste streams and chemicals within the boundary of the Hanford Site. That would capture the U.S. Ecology site without explicitly calling it out.

The group debated the impacts of cribs adjacent/associated with a waste site and if they should be removed when the waste site is dug up, or capped and left in place. The group felt that capping should only be used as a last resort.

Barbara said the environmental justice section in the TC&WM EIS should be rewritten. It is conventional, yet irrelevant for tribes. She said it has no relevance to tribes, the groups that bears the greatest impact.

Keith Smith, Public-at-Large

Keith said most of his points had been covered by earlier presentations. He reiterated a few key concepts:

- The TC&WM EIS should take a better look at long-term impacts.
- Capping should be used only as a last resort.
- Imported offsite waste should be treated before disposal.
- One model cannot be used for uranium because of the different forms of uranium.
- Leaving TRU waste in PUREX tunnels poses an unacceptable risk.
- The TC&WM EIS appears to contradict itself in places.
- DOE should engage the workforce to find a way to remediate waste. Worker input results in successful outcomes.

DOE-ORP response to presentations

Mary Beth emphasized that the TC&WM EIS looked at Hanford from a radiological and chemical point of view – atoms and molecules "do not have a CERCLA or RCRA label" on them. She said they wanted to complete the TC&WM EIS before decisions are made about the Central Plateau, and is looking for feedback on what activities should go forward. For example, DOE thinks that work at FFTF can go forward.

Mary Beth asked the Board to think about if there are Central Plateau cleanup activities that the TC&WM EIS shows need greater review. She said DOE often hears about cleanup values, but there may be times where "clean it up quickly" and "clean it up to X level" may not be compatible. She also asked the Board to think about infrastructure – treatment timeframes are affected by tank space.

Discussion

Shelley said the trade-off between cleanup timeframes and tank space should be considered. Blending tank waste may be necessary and should be evaluated in the TC&WM EIS. Gerry said more double-shell tanks may be needed for mixing, staging and retrievals.

Gerry said the TC&WM EIS is based on the assumption that WTP will start operations in 2018. It does not take into account that more single-shell tanks may leak if WTP start-up is delayed. Mary Beth said it does in a roundabout way; DOE assumes 4,000 gallons of material will leak during each retrieval.

Barbara said the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) will want to see another suite of alternatives. The TC&WM EIS contains a huge amount of data and analyses, but the alternatives do not work as currently packaged. Shelley thought that was similar to the "rack and stack" concept at the national level. Mary Beth cautioned that they have to watch the mass balance. For example, retrieving tanks faster without additional tank space can have an impact on infrastructure load.

Harold thought in the advice, the Board could identify issues where it does not agree on, as well as where it has consensus and commonality. Shelley noted that silence on an issue can be mistaken as not caring about the issue. Dirk agreed but thought the Board should focus its time and priorities on issues where it does

have agreement. He did not think they would come up with a "HAB alternative" due to time constraints, but the Board could provide criteria for alternative evaluation and whether or not new ones should be created.

Susan noted that the Board should ensure it understands the consequences of its recommendations and proposed actions.

Al said the vadose zone was inadequately addressed in the TC&WM EIS. He expected the vadose zone and groundwater and the impact of offsite waste to be addressed in an EIS in the future. Al added that the TC&WM EIS should never characterize a resource as "irretrievable" or "irreversible."

Mike thought the Board could tell DOE what is acceptable and what they can move forward with. He also thought that "cutting and pasting" alternative features was needed, even if DOE cautions against it.

Gerry would like the Board to also address public involvement for the TC&WM EIS development and acceptance process. The Board should consider how the TC&WM EIS will be used in the future, and what parts the Board can share with the public. He thought the Board could work with DOE to develop helpful and illustrative graphics that will help the public better understand the issues. Gerry said there are already useful graphics tucked into the document, and the Board can help DOE pull them forward.

Dale was concerned about how DOE constructed the TC&WM EIS, and how suitable solutions were identified to bring the site into compliance. He thought none of the current alternatives get Hanford cleanup where it should be, which is why Oregon attempted to create another alternative. Dale thought the Board should not select an alternative, but identify criteria it expects to see as DOE heads toward creating a new alternative.

New double-shell tanks; use of single-shell tanks
Pam broached the topic of potentially looking at using known non-leaking single-shell tanks as a way to stage tank waste. She acknowledged this is controversial, but it should be considered because it would speed up the retrieval timeframe.

Dirk said RCRA law declared all single-shell tanks are unfit for use. He said if Hanford needs more tank space, it should build new double-shell tanks, as an EIS in 1975 identified. Dirk said using tanks whose strength cannot be guaranteed is unacceptable.

Jeff Luke thought it was up to the State of Washington to decide if is appropriate to use single-shell tanks for staging. He said Hanford made a mistake by not allocating money for double-shell tank construction. Jeff thought staging is the only option to expedite single-shell tank waste retrieval. He said the Board should recommend that DOE consider it. Dirk thought the Board would not be able to reach consensus on such a recommendation.

Keith thought the Board could consider recommending verifying the integrity of each single-shell tank.

Gerry thought the first point the Board had consensus on was an examination to build new double-shell tanks for mixing, staging and retrieval. Floyd agreed and said he has been a longtime advocate for building more double-shell tanks.

Summary of February 16 discussions
Cathy summarized the discussions and presentations heard on the first day (February 16) of the COTW meeting. The bulleted summary was intended to help the group consider its main points and areas of focus for draft advice.

The group did not think the Board should develop its own alternative, but will identify criteria that should be included in a preferred alternative.

Technical contractor review: Introduction and report

Kim Auclair, president and CEO of K.D. Auclair and Associates, the Board's contracted independent reviewer, shared their preliminary findings on the TC&WM EIS with the Board. The following summary is from Kim's presentation. Copies of the preliminary report (dated February 15, 2010) were available at the meeting. The final report will be prepared prior to the March 4 Board meeting for Board review. This preliminary assessment was intended to help the group better understand the intricacies of the EIS as it develops draft advice. The final K.D. Auclair independent report will be available at www.hanford.gov.

Kim briefly described the company and its work, and reviewed the "exculpatory language:" Presentation material and views expressed may not reflect the views of DOE, prime contractors, or regulators. Personal views are based on past experience and "prima facia" review of the TC&WM EIS materials as provided in publicly available documents and resources.

Kim emphasized that their review was not a full and independent technical review of the full TC&WM EIS. He said it would take about five years and $5 million to do so. It was a limited, targeted review of select aspects and perspectives of the TC&WM EIS based upon the statement of work.

The independent review team's efforts focused on:

- Transparency
    - Would a technically competent reviewer easily understand the draft TC&WM EIS without asking for more information from the author?
- Consistency and evenhandedness in applying the results of the technical analyses of contaminant transport in soils and groundwater to the various remediation alternatives considered in the draft TC&WM EIS
    - Was there evidence of undue bias against or for a particular alternative?
    - Was the approach documented and rational?
    - Contaminant transport in soils and groundwater analysis is key
    - QA/QC method rigor is of particular importance
    - Kim's team evaluated the basis, approach, methods, controls, assumptions, and configuration management associated with the modeling and data sampling and analysis efforts documented in the draft EIS
    - These were assessed against industry norms for similar criteria
- Use of a risk-based approach
- Evaluation to determine if evidence exists that the TC&WM EIS provides an adequate analysis of cumulative risk and mass balance
- How well the proposed remediation alternatives comply with the guidance provided by the HAB in past advice and flowcharts for surface, soil, and groundwater remediation, as well as past relevant advice

Kim said the team asked itself the following questions during the review:

- Did the TC&WM EIS analyses adhere to reasonable standards of practice?
- Did the TC&WM EIS analyses adhere to the methodologies and practices as defined in the scope of the TC&WM EIS, inclusive of risk?
- Did the TC&WM EIS analyses address or incorporate recommendations from the HAB?

Kim said the independent review team first evaluated the fundamental reliability of the TC&WM EIS analytical basis. He said the need for a sound underpinning, hinged on a documented quality program, and documented approach to how data is qualified and used, is necessary for a successful evaluation of any alternative. Kim said they then asked themselves if the analysis "engine" or "machine" is not sound, then any results derived from the same are questionable.

Kim identified the following preliminary observations and conclusions.

- The general methodology of the draft TC&WM EIS was consistent with EIS regulatory requirements and served to evaluate the protectiveness of the various closure alternatives at Hanford.
    - However, it was not documented that DOE met its own QA/QC requirements.

- The details of the TC&WM EIS were sufficient to evaluate the protectiveness of the alternatives presented.
- This TC&WM EIS was a result of less than satisfactory QA/QC carried out in the previous Solid Waste EIS. Because of this, it would be expected that QA/QC efforts would be well documented in the TC&WM EIS. It does not appear so.
    - No final QA/QC report seems to have been produced for the TC&WM EIS.
- The modeling for the TC&WM EIS seems to be satisfactory, although some inherent limitations of MODFLOW were noted. The vadose zone models were rigorous, but they used the saturated values from the calibration of MODFLOW as a starting point and coupled their independent calculations through source term boundary conditions to MODFLOW.
- The model did not take advantage of industry standard features, events, or processes (FEPs) for nuclear waste.
- The risk calculations performed were of a deterministic nature.
- The limitations of the modeling prevented a more rigorous probabilistic risk approach taking into account the uncertainties in the modeling. As a result a conservative approach was taken to the risk evaluations.
- The TC&WM EIS did not rigorously quantify uncertainties.
- The Best Basis Inventory (BBI) contains more rigorous evaluations of uncertainty. The level of uncertainty presented in the BBI is sufficient for evaluating source uncertainties.
- The TC&WM EIS is largely consistent with the HAB Advice #197, *Groundwater Values Flowchart*. Five of the six steps in that chart were considered in the groundwater evaluations conducted in the EIS, the exception being the decision (item 6 in the chart) as to whether to launch further technology development.
- The TC&WM EIS is consistent with the HAB Advice #173, *Central Plateau Remedial Action Values Flowchart*. Five of the six steps in the flowchart were considered, but the alternative flow paths involving the development of new technologies were not considered.
- Most of the HAB's advice has been covered in the draft TC&WM EIS. The most outstanding continuing issue is characterization.
    - The TC&WM EIS does not make recommendations about further characterization nor about additional treatment technology.
    - Although the TC&WM EIS could clearly benefit from better characterization, DOE was tasked with providing the best calculations that could be made with the data available during the timeframe of the production of the TC&WM EIS.
    - The TC&WM EIS produced the evaluation based on technologies currently available or anticipated to be available by the time it was needed. DOE did not provide a mechanism for deciding where new technologies needed to be developed.
- The TC&WM EIS does not appear to have updated input data or data sources (except for those from the BBI and MODFLOW models).

Kim summarized preliminary findings related to treatment alternatives.

- Approaches are largely conservative
    - Inventories appear to be stated at the upper bounds
    - Releases in the technical guidance document are also conservative
- Transport mechanisms and modeling are deterministic
    - Vadose zone – "middle-of-the-road" values
    - Groundwater – "middle-of-the-road" values
    - Dose/exposure to the public uses standard numbers but appears to be conservative
- The transport basis for vadose zone and for groundwater are not conservative (between release and contact to receptors)
- A number of uncertainties are identified throughout the TC&WM EIS
- DOE made statements about applying a conservative approach, but there is no documented evidence
- The use of conservative approach may diminish the ability to determine which treatment alternative is most effective

Kim said the final report will be complete on March 2 and he will present it to the Board at the March 4 Board meeting. Susan asked if the Board could receive a copy of the final report before the meeting to help

with advice development. Kim said they would attempt to do so, but contracting his firm took longer than anticipated and they lost some review time.

Discussion

Mary Beth said it is always helpful to hear from someone who has not been involved in the development of the TC&WM EIS. She said DOE would find it useful if Kim could identify where he looked for particular information and did not find it. She wanted to ensure he was looking in the correct sections of the report. Kim said they will document that.

Mary Beth asked if the EIS team was expected to do a factual accuracy review of the report. Susan indicated that was not in the contract. Kim reiterated that the report is not a detailed technical review. The report will focus on process and industry standards. There was neither time nor money to complete a full technical review.

Pam asked if Kim was interacting with the regulators throughout his review. He said no, they are purposefully not to ensure they maintain their neutrality.

Keith asked if Kim could look at mixing and matching different components of the alternatives, while being cautious about mass balance. Jeff Luke thought it would be possible for DOE to mix and match alternatives during the ROD process. Woody Russell, DOE-ORP, said alternatives could be mixed and matched, as long it stays within the scope and reasonable method of operation. He said they cannot mix things that are logically in conflict. Dirk noted that different actions have different consequences.

Dale said DOE should identify their own criteria for selecting a preferred alternative, and should describe it in the summary.

Gerry wanted to make sure the Board reviews areas that the independent review team may not be covering in depth. He asked if Kim was looking at inventory issues and uranium volumes as part of his work. Kim said they are looking at the TC&WM EIS from a process perspective, not a discrete perspective. They will not review waste inventory; they assume the inventory is accurate for the purpose of the TC&WM EIS.

Gerry asked if Kim will examine the question of combined risk for radiological and chemical contaminants. Kim said they will. He said so far it does not look like DOE did as good of a job as they claim to with cumulative risk. It was difficult to find adequate references and citations. Kim said they have to look at cumulative risk, sensitivity and how they are combined, then apply that to a transport model. He added that appropriateness is determined through the public process. Kim noted that it seems there is no agreed upon, defined end state so the "game" is constantly changing. Gerry disagreed and said the issue about risk based remediation versus end states goes to the heart of cleanup. He said Washington State has decided what the end state should be, such as is it appropriate for groundwater contamination to exceed maximum contaminant levels (MCLs).

Kim reiterated that his team is primarily looking at process, tools and standards, and whether or not they pass industry best practices and norms, and if DOE accounts for reasonable data and HAB advice.

Dirk asked if risk paradigms and central value tendency was outside of Kim's scope. Kim said it was outside their scope. Dirk and Kim discussed risk and how clean is clean at a technical level of detail and decided to have an offline discussion.

Kim added that there was probably a significant level of QA/QC, but the draft TC&WM EIS does not document it well enough.

Mike said everyone assumes that vitrified waste will leave Hanford, but there is no established repository at this time. He said no long-term stewardship plan considers that Hanford may become a de facto repository. He said the Board included that in its systems engineering advice. Mike also thought DOE should look at potentially reusing FFTF as a storage facility instead of demolishing and removing it.

Pam said she understood that steam reforming testing at Savannah River has been positive. She thought the TC&WM EIS should include steam reforming in its analysis; the current conclusion is based on old information. The group agreed to the concept of ensuring the TC&WM EIS reviews the most current information available and use steam reforming as an example.

Dirk said GTCC waste disposition should be included in the analysis, as well as the issue of mobile materials driving the risk assessment. He added that whatever the TC&WM EIS analyzes, it should reach a result under the permitted and allowable standard levels. Dirk also said that the alternative criteria for protecting the Columbia River, groundwater and the vadose zone should be viable.

Groundwater modeling, transport basis
Gerry said there is discussion about modeling for groundwater versus modeling for risk assessment, and asked if the team will cover that. Kim said they will. Kim noted it is possible to prove many different cases with the same set of numbers, so they will look at the risk base and if the modeling approach is within the industry norm.

Dale said one of his primary concerns was groundwater and the groundwater model. He asked Kim to speak to the use of MODFLOW modeling and if it worked for the purpose of the TC&WM EIS. Kim said it appears to have reasonably provided the modeling basis for the transport and fate of groundwater. He said there is likely room for improvement given how the TC&WM EIS addressed uncertainty.

Pam said the Board has seen over the years how modeling predicts movements and characterization helps prove or disprove a model. This process lent greater confidence to models. She asked Kim if he felt modeling should be "tested" with characterization. Kim said calibration and technical analysis of a model is outside his scope. He noted that is a standard practice, and he saw evidence DOE is engaged in standard processes. Kim could not comment on if DOE was appropriately adjusting the model. Mary Beth noted that information about calibration is in an appendix to the TC&WM EIS. Kim agreed, but commented that the paper trail was unclear.

Jeff Luke asked what Kim meant by "granularity" of a model. Kim meant how the model is constructed, sieve measures, how old data compares to new data and propagation. The validity of the technical aspects is outside the independent review team's scope. Kim thought the model used is based on an industry standard, inventories were captured.

Mike asked about the transport basis for the vadose zone. Kim said his team will identify in the coming weeks whether or not the transport basis for the vadose zone or groundwater needs to be further investigated.

Jeff Luke asked if it was good or bad that the transport basis for the vadose zone and groundwater was not conservative. Kim said they will clarify that in the final report, including looking at transport mechanisms from the vadose zone to groundwater relative to a receptor. Mary Beth said "transport" would need to be defined as it means different things to different people. Mike added that the receptor is the Columbia River.

Dirk commented that if you use a parameter at the end of the distribution curve, all the alternatives can end up looking identical – or very different.

Jeff Lyon commented that there is a section in the TC&WM EIS that addresses calibration. He hoped Kim's team would review that.

Conservative approach
Mike asked about Kim's comments on conservative versus middle-of-the-road approach. He said he usually assumes that a conservative approach is always better, but maybe that is untrue. Kim said it depends on the objective and where you start. Taking a conservative approach may mask sensitivities, mask costs and drive decisions to a "gold plated Cadillac" when it is unnecessary. He said middle-of-the-road is just another approach to bounding decisions. Kim said risk-based modeling lets you look at data more cleanly than traditional conservative approaches. It helps decision-makers analyze the cost-benefit of different levels of cleanup.

Dirk commented that the word "conservative" is frequently misused. He asked Kim to provide a definition in their report. Kim agreed and said that is one of the problems with the TC&WM EIS; it indicated that "a conservative approach was taken" but lacked references that provide the basis for the statement.

Jeff Lyon asked if Kim had an example where using a conservative approach would diminish the ability to determine which treatment alternative is most effective. Kim said if he took maximum levels in every single case, and each case was close in performance, he could mask what could make more or less of a difference when two scenarios are very close. Jeff understood and asked for an example. Kim said examples will be provided in the final report.

Public involvement, readability
Dick thought a one-page summary was needed to identify the Board's preferred alternative and then discusses why it discards other alternatives. He said the public needs to know the pertinent information, and it should be up front in the advice in plain language. Dick said the Board is buried under the magnitude of the TC&WM EIS.

Gerry said the existing executive summary is impossible to wade through. He added that public notice should be effective and identify public values affected by the TC&WM EIS and its cleanup alternatives. Gerry thought the Board should state that the notice and executive summary are inadequate, and the summary should identify long-term impacts. He said the summary should also have the useful graphics that are buried in the TC&WM EIS.

Meeting regulatory standards at the state and federal levels
Gerry said he was surprised to hear Kim say that regulatory standards seem to be being met. Kim said the TC&WM EIS is a federal document that will then be pushed to the state and local level. He said the TC&WM EIS appears to meet federal standards and can provide references.

Gerry asked if Kim will evaluate if the range of alternatives is sufficient and if Washington State standards were used for health and risk. Kim said they are not evaluating if the TC&WM EIS meets Washington State standards. His team is working under the assumption that the TC&WM EIS will comply with law.

Gerry said there is no alternative that does not import offsite waste to Hanford. DOE should withdraw the February 2000 ROD for waste disposal at Hanford. There should be an alternative for mitigation conditions to achieve cleanup standards. He said the only way to meet the standard is to reduce the total waste burden remaining or disposed of on site. Gerry said the Board should advise the state that the TC&WM EIS is inadequate because it does not discuss specific mitigation conditions to meet state standards. He did not think the state will be able to use the TC&WM EIS to meet SEPA requirements. Gerry said finally, an alternative should be provided that identifies specific waste streams that could be removed from Hanford to an appropriate deep geologic repository or regulated landfills where additional waste will not violate standards.

Jeff Luke thought it was the state's place to determine if the TC&WM EIS is adequate for its purposes. He added that the state will also go through permitting processes on individual bases. Jeff said the TC&WM EIS does not have to meet SEPA requirements. Gerry disagreed and thought this was the time to advise the state that the TC&WM EIS does not meet SEPA requirements for mitigation conditions. Jeff thought the advice should be relevant to NEPA. Emmett thought mitigation must be discussed in an EIS but is not carried out through NEPA.

Dirk said the TC&WM EIS only sets the stage for other processes that do require decisions. He said it is problematic if a NEPA document does not set the stage (similar to the Programmatic EIS).

Dirk commented that DOE and the TC&WM EIS should meet the goals and direction of NEPA. Jeff thought DOE was doing that. Dirk did not. Floyd commented that none of the alternatives are protective of the environment and future generations.

Harold encouraged the Board to think about advice from a policy point of view. He said as a technical document, the EIS does not provide an adequate technical basis for decisions and future actions. It is supposed to provide the basis for RODs on specific actions and/or programs that will impact cleanup.

Dick noted that the purpose of an EIS is to identify consequences of particular alternatives. It does not attempt to identify how to solve the problems.

Maynard thought the Board should identify what actions/concepts it thinks should go forward now, as Mary Beth requested.

Wade Riggsbee asked for a copy of the presentation. Kim will provide an electronic version to EnviroIssues. He reiterated that it is a preliminary draft and subject to change.

Development of advice

The group debated the form its views and opinions on the TC&WM EIS should take: Craft advice to the TPA agencies, develop comments for the TC&WM EIS comment record, create both, or use advice as the comment for the TC&WM EIS comment record in addition to its usual purpose. Mike thought advice was a comment that could be incorporated as public comment into the public comment record. Harold reminded the group that advice is supposed to be at a policy level. He thought comments could be more technical and take a different form.

Pam thought the group should look at how it submitted comments on the Solid Waste EIS and do the same. Susan looked it up and comments on the Solid Waste EIS were submitted in the form of advice, which included overarching comments and background, and 22 specific advice points.

Dale thought the Board should include everything in its comments on the TC&WM EIS, since the agencies must formally respond. He thought advice could be more about policy and values.

Floyd asked to ensure Larry Gadbois' points were incorporated into the advice.

Jeff Luke did not like the idea of the Board moving forward with technical comments on the TC&WM EIS. He thought such comments should come from individual members. Individual seats and groups can submit whatever comments they want. He said the HAB works through consensus and he did not see the Board reaching consensus given the detailed nature of the TC&WM EIS. Jeff also wanted to ensure that the Board provides references for its statements.

Dale thought the Board could agree on alternative criteria and parts of cleanup that DOE can move forward on, such as constructing WTP.

Mike said the TC&WM EIS comment response process is old-fashioned and occurs very late. He said the Board receives answers to advice more quickly.

Dick said a major point would be that if offsite waste comes to Hanford, it should be treated to meet Hanford standards first. Susan suggested that offsite waste coming to Hanford must have no impact to groundwater.

Gerry said the TC&WM EIS already shows the quantity of hazardous waste onsite already exceeds standards. He said there should be analysis of whether specific waste streams need to be reduced on site. Jeff Luke said he was not adverse to saying the Board does not want to accept offsite waste, but did not agree that the Board will not support storing Hanford waste onsite.

Liz said the alternatives in the TC&WM EIS are not protective of the environment for future generations. Jeff Luke said this comment is not appropriate because the TC&WM EIS is not supposed to address that issue. The alternatives only have to paint a picture on a comparable basis. He thought the Board could say it understands the alternatives do not have to do that, but it feels they should. Liz said she would rather go on record as saying that and the agencies can respond accordingly. Dale agreed and said whether or not it is the purpose of the TC&WM EIS, the Board could say it noticed that none of the alternatives work.

Al objected to lumping comments and advice into one product; he thought the advice should be policy level and the comments should be technical. He said there should be a user-friendly summary, that waste coming to Hanford should be treated or it should be banned, the TC&WM EIS meets NEPA requirements, and the TC&WM EIS does not meet SEPA requirements.

Dirk did not think the Board would reach agreement on comments. There was a difference of opinion on the fundamental basis of the TC&WM EIS.

The group agreed that all reasonable alternatives were not presented. The group disagreed about what alternative 6B includes and whether or not is indicates clean closure for all tank farms.

Jeff thought the Board should check with Ecology before stating that the TC&WM EIS will not meet SEPA standards.

Jeff asked if NEPA requires a NEPA document to discuss irretrievable and irreversible actions. Woody said it does.

The group had a difficult time identifying concepts with tentative consensus. Susan encouraged the group to come up with some points of agreement so it could move forward. Mike thought it would be very useful for the group to look at Cathy's summary of the previous day's discussion, as many of the points were already identified. The group agreed this would be the best use of its time and better help them reach agreement on draft advice concepts.

General comments

- *Data in the EIS contradicts itself – how good is the data used in the TC&WM EIS?*
    - Jeff wanted to ensure this is the opinion of the Board. The group will provide specific examples.
- *Cancer standards are not used in the draft TC&WM EIS.*
    - The group thought the EIS should discuss consideration of state cancer risk standards. Risk should be expressed in comparison of units.
- *Chemical inventory is not included; there is a lack of certain chemical analysis.*
    - The group believed the TC&WM EIS is missing chemicals and non-tank inventories. Advice drafters will cite specific examples.
- *Focus on future decisions – what is the maximum contamination?*
    - Reported maximums in the data should come from times after DOE started taking cleanup actions. DOE should not solely rely on old pre-cleanup data. Contamination levels should be presented based on upcoming decisions. The group agreed on the concept and advice drafters will refine.

Tank closure

- *Blending of tank waste requires tanks for blending, which is not currently analyzed in the TC&WM EIS.*
    - Jeff said he only supported building new double-shell tanks if DOE reviews potentially using single-shell tanks for liquid staging. He thought waste receiving facilities discussed in the TC&WM EIS could potentially serve the same purpose as new double-shell tanks.
    - Dick asked if any waste receiving facilities exist now. The group said no, they are only proposed.
    - The group agreed on the concept of needing sufficient capacity for single-shell tank retrieval and tank waste blending. Hanford is "looking at a bottleneck" down the road for tank space.
- *Increase of tank leaks due to delay in WTP startup.*
    - The group agreed on the concept of examining the impact of increasing tank leaks in the time that WTP startup is delayed.
    - Mike noted that if soil washing is required, it could result in greater volume of liquid that would need processing, treatment and storage. DOE should consider this. The group agreed to the concept.
- *Define radioactive assumptions in tanks.*

    - The group decided to hold on the concept on evaluating the level of radioactivity in tank heel on a tank by tank basis.
- *Need more information on what is going on under the tanks (each is different).*
    - The group agreed on this concept.
- The group proposed a new concept: DOE should present an alternative for tank waste that results in compliance with applicable standards.
- The group proposed a new concept: Recommend DOE characterize the area below a tank before making a decision on the extent of vadose zone remediation or capping.

Waste management

- *Offsite waste should be properly treated before it comes to Hanford.*
    - The group did not agree to this concept.
- *No waste should be imported to Hanford; the risk is too high.*
    - The group agreed on this concept.
- *Rescind the February 2000 ROD to import waste to Hanford.*
    - The group agreed on this concept.
- *Caps are not protective.*
    - The group agreed on this concept.
- *Waste mitigation requirements that meet standards should be included in the draft TC&WM EIS.*
    - The group agreed on this concept.
- The group proposed a new concept: DOE should present an alternative for waste management that results in compliance with applicable standards.
- *Groundwater and the vadose zone should not be declared irretrievably lost.*
    - The group agreed on this concept.
- *Cumulative analysis considered for all alternatives should include all wastes, associated waste streams and chemical disposal within the boundaries of the Hanford site.*
    - The group agreed on this concept.
- The group proposed a new concept: DOE should include in its analysis impacts of importation of off-site waste including GTCC waste.
- The group proposed a new concept: DOE should examine an alternative for disposal of waste streams off of the Hanford Site.

Waste disposal

- *Because secondary waste disposal causes significant groundwater impacts and should be mitigated to below levels of concern, the Board favors the technetium removal step as a pretreatment process and no further receipt of technetium or iodine bearing wastes to the Hanford Site from other sites because of their impacts identified in the TC&WM EIS.*
    - The group agreed on this concept.

Other recommendations

- *Recommend having a draft EIS on the vadose zone, groundwater and offsite waste since these issues are inadequately addressed in the TC&WM EIS.*
    - The group agreed on this concept.

Action items/commitments

The group ran out of time to go through the remaining draft concepts in the bulleted summary of the February 16 discussion. Cathy will send out a full bulleted summary of the discussion on February 16 and 17 to the group, and identify what concepts have agreement and what have not yet been vetted. The bulleted summary that was sent out on February 18 is attached to this meeting summary (see Attachment A).

- Section authors:
    - General/overarching comments – Susan
    - Waste management – Gerry and Shelley
    - Tank closure – Dirk and Harold

    - Public involvement – Liz, Gerry, Ken Niles and Steve Hudson
- The group did not think the Board should develop its own alternative, but will identify criteria that should be included in a preferred alternative.
- A conference call will be held on Tuesday, February 23 to review draft advice concepts. Section authors should have their sections drafted and sent to Cathy by Monday, February 22.
- The group tentatively decided that it would produce advice that would also serve as the product to submit as comments on the TC&WM EIS for the public comment record.

Handouts

- *Independent review of the draft Tank Closure and Waste Management Environmental Impact Statement, preliminary assessment.* KD Auclair and Associates, LLC
- *Draft TC&WM EIS Comments*. Oregon Department of Energy
- *Analysis of Draft Tank Closure and Waste Management Environmental Impact Statement for Hanford Site, Richland Washington, DOE/EIS-0391*. David Bernhard, ERWM Program, Nez Perce Tribe
- *Citizen's Guide to USDOE's Tank Closure and Waste Management EIS*. Heart of America Northwest
- *Comments and thoughts about the draft TC&WM EIS*. Richard I. Smith, P.E.
- *Comments on the Draft Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington.* Allyn Boldt
- Synthesis of February 16 flipchart notes, distributed on February 17

Attendees

HAB Members and Alternates

Al Boldt	Mike Korenko	Dick Smith
Shelley Cimon	Pam Larsen	Keith Smith
Sam Dechter	Susan Leckband	Bob Suyama
Dirk Dunning	Liz Mattson	Margery Swint
Dale Engstrom	Emmett Moore	
Laura Hanses	Vince Panesko	
Harold Heacock	Maynard Plahuta	
Floyd Hodges	Gerry Pollet	

Others

Madeleine Brown, Ecology	Mary Beth Burandt, DOE-ORP	Harry Babad, IRT Consultant
Suzanne Dahl, Ecology	Lori Gamache, DOE-ORP	Kim Auclair, K.D. Auclair and Associates
Jeff Lyon, Ecology	Woody Russell, DOE-ORP	Barbara Harper, CTUIR
	Jeff Tyree, DOE	Jean Vanni
Larry Gadbois, EPA		David Bernhard, Nez Perce Tribe
Emy Laija, EPA	Richard Haggen, Heart of America NW (phone)	Mike Priddy, WDOH
	Sharon Braswell, MSA	Hillary Johnson, EnviroIssues
Argent Makiani (phone)		Cathy McCague, EnviroIssues
	Catherine Hayes, Yakama Nation	

ATTACHMENT A
Bulleted summary of discussions – emailed to the committee on February 18 for advice development.

Committee of the Whole TC&WM EIS Draft Meeting Notes

What are the main issues/findings of Board members? *(as captured on flip charts)*

General comments (Susan & Shelley authors)

- The Board recommends DOE not use irretrievable and irreversible language in the document (not categorized as soil, vadose zone or groundwater in soil columns) - YES
- In the Board's opinion, the data appears to contradict itself. This begs the question of how good is the data used in the draft TC&WM EIS? YES (need specific example)
- The Board believes this document should discuss Washington State's cancer risk standards in the draft TC&WM EIS. Risk levels should be expressed in comparison of units. (provide example, cite document) YES
- This Board believes the chemical inventory is not there; certain chemicals are missing from non-tank inventories (list chemicals). There is a lack of certain chemical analysis - YES
- Focus on future decisions – what is the maximum contamination. The Board encourages DOE to review the contamination levels – YES (work on this)

Tanks (Dirk & Harold authors)

- Blending of tank waste from SSTs requires blending tanks which is not currently analyzed in draft TC&WM EIS - NO
- Need sufficient capacity for SST retrievals and tank waste blending (looking at bottleneck down the road when max out DST space and WTP cannot accept more waste) - YES
- Examine impacts associated with increase of tank leaks due to delay in WTP start-up - YES
- If soil washing is required/selected, DOE should keep in mind what to do with increase volume of liquid from soil washing and where to process, treat or store it - YES
- The level of radioactivity in a tank heel should be determined on a tank by tank basis - HOLD
- Need more information on what is going on underneath the tanks as each is different – YES
- Add current baseline alternative for tank waste management that results is compliance with applicable standards – YES
- The Board recommends DOE do below tank characterization before making a decision on vadose zone remediation or capping – YES

Waste Management (Gerry & Shelley authors)

- No waste to be imported, risk is too high – YES & Rescind ROD to import waste to Hanford – YES
- Three reasonable alternatives *Wednesday addition*
    - No alternative off-site waste not added to site
    - Alternatives for mitigation conditions to achieve standards (only way to meet standards if DOE decreases waste burden remaining or disposed of on-site)
    - Alternatives identified specific waste streams removed from Hanford Site to deep geological site or other disposal landfills will not violate standards
- Basis for ROD for DOE and Ecology *Wednesday addition*
    - What are the impacts from the specific programs/actions?
    - What is acceptable or not?
- Caps are not protective long-term - YES

- Waste mitigation requirements to meet standards should be included in the draft TC&WM EIS. - YES
- Add alternative for waste management that results is compliance with applicable standards. - YES
- Cumulative analysis considered for all alternatives should include all wastes, associated waste streams and chemical disposal within the boundaries of the Hanford Site. - YES
- DOE include in the analysis of the impacts of importation of off-site waste including GTCC (prefer not to come to Hanford – see Board Advice #) – YES
- Examine alternative of disposal of waste streams off the Hanford Site e.g. LAW should be GTCC, pre 1970 TRU - YES

Waste Disposal

- Because secondary waste disposal causes significant groundwater impacts and should be mitigated to below levels of concern, the Board favors the technetium removal step as a pretreatment process. YES
- No further receipt of technetium or iodine bearing wastes to the Hanford Site from other sites because of their impacts as reported in the draft TC&WM EIS - YES

Other recommendations

- Recommend having a separate EIS on each the vadose zone and groundwater since the Board believes these issues are inadequately addressed in current draft TC&WM EIS – YES
- What are the criteria for evaluating alternatives in the draft TC&WM EIS (existing and new) - HOLD
    - As an example, State of Oregon used the following 5 criteria in the draft assessment
        1. Long-term protectiveness of the Columbia River
        2. Compliance with the TPA
        3. resource injury liability Permanence of the actions
        4. Minimizing natural
        5. Protectiveness of human health and the environment
    - HAB should state criteria to base alternatives on
    - Identify issues liked in each alternative or other issue areas identified by HAB members
    - State HAB doesn't endorse alternatives

BEGIN HERE FOR REVIEW *(as a reminder the committee did not have time to review the following bullets along with those under Wednesday additions)*

- What is the public participation process and plan for after March 19th? (Ken & Steve authors)
    - Public notice is also inadequate for public to understand *(Wednesday addition)*
- Decrease worker exposure by involving workers in decision making process
- The draft TC&WM EIS does not address Environmental Justice issues well
- The draft TC&WM EIS should include full life cycle cost in alternative selection
- The draft TC&WM EIS should include full life cycle risk analysis in alternative selection
- Option 6b is a good thing except for iodine and technetium
    - It is an improvement over 2b
- Recommend using cementatious material for grout
- Removal of concentration isolation – problem of technicium leaching
- All exposure scenarios – keep consistent to avoid confusion between DOE-RL and DOE-ORP
- Groundwater risks are too high –pump-n-treat systems are not credited for
- Lack of confidence in groundwater modeling

Wednesday Additions

General Comments

- The Board recommends DOE rewrite the executive summary in simple language for public understanding
    - One-two page summary should include why and how DOE chose its preferred path and why they discarded other alternatives.
    - Is there a use for the draft TC&WM EIS summary as a living document for future cleanup decisions?
    - Reiterate previous Board advice on clarity and readability of DOE documents (see Board Advice #202)
- Look at current data for viability of new treatment technology (i.e. steam reforming)
- Background of Board advice should include how the Board arrived at conclusions. Why did the Board do this?

Waste Disposal

- Don't make Hanford the defacto repository for glass logs – waste should to go to a deep geological repository (see Board Advice #215)
    - What is the alternative for having glass logs remain at Hanford?
    - DOE should consider alternative storage options
- Reach a result across all site and all decisions e.g. waste form needing a repository (Dirk to provide further language)
- Off-site waste should meet Hanford Site standards (treat it to be acceptable) or waste does not come here
    - Must meet additional treatment
    - State regulatory standards (waste acceptance criteria)
    - Reduce the total burden of on-site waste

Waste Management

- Draft TC&WM EIS is adequate for ROD as defined path forward
- Draft TC&WM EIS does not meet SEPA requirements (need to verify accuracy of this statement with Ecology)
- Advise Ecology that draft TC&WM EIS is inadequate for mitigation conditions to meet standards (State cannot use under SEPA)
- The proposed action adequately treat waste streams

Other recommendations

- DOE should consider other uses for surplus facility of FMEF in 400 Area

Alternatives

- Iodine and technetium 99 in waste streams
- Technetium leaching – controlling the contaminant, consider option of extraction of technetium storage
- Disposal facilities should not be impacted by groundwater and cumulative impacts to groundwater
    - Ecology would like further clarification on groundwater impacts
- Is it possible to mix and match alternatives? Can the contractor see this? Is it possible to do?
    - Must be within scope, reasonable alternative
- Alternatives within the draft TC&WM EIS are not protective of human, health and the environment

    - The Board believes that an alternative should include this criteria
    - The Board understands that the NEPA process does not have to have this requirement
- No reasonable alternatives within range of alternatives
- What is the viability of alternatives and protectiveness and how to assess that?

What are the main focus areas for the Board to consider/focus on in the draft TC&WM EIS?

Ecology

- Core zone to the Columbia River – what should it look like? What are acceptable impacts to the area?
- Secondary waste issues – what are the Board's current and future values on this? What impact do these issues have on the future of the site?
- Groundwater impacts – Define what these impacts are for the Board.

EPA

General thoughts

- Don't lose track of the many trees – there are many policy issues ripe for advice
- Don't overlook the collective effect of the trees – how does the Board want to influence DOE in determining the decision for cleaning up Hanford?
- Don't lose fact of other trees in the forest – Does the Board want to remain silent on the other issues not as big, such as off-site waste.

10 suggestions when crafting advice

1. Does the Board want to give advice about the use of caps in the 200 Area waste sites?
2. Does the Board want to give advice on presumptive cleanup planning outside of the TPA process? How would the public participate in such a process?
3. Does the Board want to revise the draft TC&WM EIS to add in an alternative which is protective of the groundwater?
4. Does the Board want DOE to have the protective alternative be DOE's preferred alternative?
5. Does the Board want DOE to select the protective alternative in the NEPA ROD?
6. Does the Board want DOE to provide a balanced summary of short term and long term risks?
7. Does the Board want to give DOE advice on the viability of landfill closure of tanks? What is the future land use control and viability of it?
8. Does the Board want to give DOE advice on using risk thresholds which are dirtier than could be allowed under CERCLA?
9. (a) Does the Board want to give DOE land use planning advice again? (b) If yes, how does the Board want to give DOE advice on the viability of DOE planning to exist and maintain site land use controls for 10,000 years?
10. Does the Board want to give DOE advice on playing risks against each other to downplay risks that on their own merit are unacceptable?
11. Does the Board want to give DOE advice about presentation of risks and scenarios? How do the risks play against one another?

DOE

- In reviewing the draft TC&WM EIS on the Central Plateau clean up, which activities are a priority? Is there a prioritization of decisions to be made?
- What is the Board value on time of clean up versus quality of clean up?
- What are the impacts on infrastructure as the mission continues?