

**FINAL MEETING SUMMARY**

**HANFORD ADVISORY BOARD  
TANK WASTE COMMITTEE MEETING  
September 16, 2010  
Richland, WA**

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

**Welcome and introductions**

Dirk Dunning, Tank Waste Committee (TWC) chair, welcomed everyone and introductions were made. He then went over the topics of discussion for the meeting. The August meeting minutes were adopted by the TWC members.

**Pulse Jet Mixer Facility**

Rob Gilbert, Department of Energy-Office of River Protection (DOE-ORP), presented on the Pulse Jet Mixer (PJM) facility. He said that there were some issues identified with the design of the PJM system. He said there was a problem with not having enough power to properly mix which was based on the particle size of the material. Rob said these issues have been addressed by detailed analysis and prototypic testing of the designs in question by the External Flowsheet Review Team (ERFT). He said the ERFT has addressed this issue over the years with modeling, and the mixing testing platform (M3).

Rob said there are 38 Waste Treatment Plant (WTP) vessels mixed with PJMs and the mixing issues were closed on August 20, 2010. He said the remaining risks after the closure of M3 will be addressed through scaled testing of a non-Newtonian vessel configuration to generate a benchmark for the Low Order Accumulation Model. He also indicated there will be near scale integrated testing prior to WTP commissioning. He said it will be a couple of years before this testing is underway.

Rob showed a picture of a M3 mixing test platform and said data collected from testing was used to benchmark models and predicts full scale mixing system performance. He said compressed air and vacuums are used for test operations.

Rob said the M3 includes prototypic PJM arrays, feed stimulant, test vessels and pump suction systems. He said each WTP vessel simulated at the platform has its own testing configuration including PJM array, stimulant and operating parameters.

Rob next discussed vessel HLP-22, and the delta based on testing between the baseline and modified design. He said the baseline design had 12 PJMs and in the final design 18 PJMs were used since not enough power was going into the vessels. He said due to the curves at the side of the vessel, the nozzles were re-angled. He said the solids were problematic with this vessel as DOE could not clean the bottoms as well as they would have liked, and thus increased the particulate size. He said the modeling showed that there was no impact on throughput. Ivan Bolanos, DOE-ORP, then showed a video of the HLP-22 PJM test. Rob said the black particles are representative of what is on the bottom of the vessel.

Rob said DOE tested vessel FEP-17 and found no modification needed in the PJM arrangement, but the outer nozzles were slightly angled so the jets are perpendicular to the bottom of the vessel. He said the PJM velocity was increased and the solids concentration was slightly decreased from the baseline design. Ivan showed the video of the FEP-17 vessel and said there is complete mobilization of the particulate.

Rob reviewed the UFP-1 vessel tests. He said the number of PJMs was increased from 8 to 12 from the baseline design since it was initially underpowered and the outer nozzles were angled to the bottom of the vessel. He said a slight increase was made in velocity and there was no change in solids concentration. Ivan showed the PJM test video for UFP-1 and said all the particulate is mobilized and meets the mixing requirements.

Rob also discussed vessel FRP-2 and noted there was no change in the PJM arrangement. He did say there is a dedicated transfer line to stage and let the tank settle. Also this ensures the lines do not come in line with the streams, and there is extra care when delivering material to the vessels. Ivan showed the video of the FRP-2 vessel PJM testing.

Last, Rob showed a picture of the non-Newtonian vessel configuration and explained the vessel. He indicated that they will do a test in November to benchmark the model.

### **Regulator Perspective**

- Dan McDonald, Washington State Department of Ecology (Ecology), said there are transfers of slurry with the proper particle size going to WTP. He said there will be samples taken and until these are confirmed, the process will not move forward because WTP needs this characterization information.
- Dan said DOE has worked closely with Ecology and Ecology has been aware of these tests for months and have been kept in the loop. He has seen the closure packages, and he is confident that the risks will be closed appropriately. He said a

first cut of a forecast update schedule is due in October and it should have enough information on the vessels to meet expectations of a better assessment. He said more information on the design, technical and testing changes will be known in the December timeframe. He said two years out is a good estimate based on timely information, and Ecology is pleased with the proposed date in critical decision zero in the closure packages even though it is not in force yet.

### *Committee Discussion*

- Dick Smith asked what was used to mix the vessels for the PJM testing. Rob said water was used.
- Dirk asked if these tests help predict what will happen with a full size tank. Ivan said it is difficult to say with the difference in scale.
- Pam Larsen asked how the size of the particles was determined for testing. Rob said a size was chosen that was representative of real tank waste and said there are mixing studies based on retrieval.
- Dirk asked what the function of the mixing is. Rob said the mixing makes it possible to vacuum the material out and look at the particle concentration and size.
- Maynard Plahuta asked how the pumping works. Rob said pumping is done every two to three minutes between pulses when the particles are suspended.
- Pam asked if the PJMs are located at the top of the tanks. Rob said the PJMs are six inches from the bottom of the tanks.
- Pam asked how the new PJMs are installed. Rob said there is work and collaboration to make sure tanks are only entered once to make PJM modifications.
- Dick asked how the data from the vessels in the plant are extrapolated to apply to the 40 foot diameter tanks. Rob said DOE uses the data collected to bench mark and model with fluid dynamics to make predictions. He said there will be testing done on larger vessels for more accurate simulations. Gary Brunson, DOE-ORP, said there were discussions on this and it was insisted that the risk with scaling up the data from these tests is taken into consideration. He said the closure packages recommended that a larger scale test be done.
- Dick said it is important to know what modifications are appropriate. Gary said there is a commitment to do a large scale test in two years.
- Al Boldt asked how much bigger the tank is compared to the vessel. Rob said the tanks are a lot bigger.
- Al asked if there is an impact on the entire plant from all the tanks with expansion of compressors and PJMs. Rob said there were some sequencing modifications made; however, there was not a need for additional compressors. Ivan said Bechtel did a study on the ventilation and sequencing of firing the PJMs. The

study concluded there is not a need for more generators or compressors just modifications to the headers and piping.

- Al asked if there is an impact to the air supply system with these expansions. Rob said that air supply system strategy needs development. Right now they have enough information that the strategy will work. Al questioned if there will be impact on the supply system to the plant or operational throughput. Rob answered that there will be no changes to throughput. Ivan added that the expansions will not have a large impact on the plant for budget and schedule.
- Dick said it sounds as if the testing system has become more complex due to modifications. Gary said the principal driver was that DOE did not know what the power requirements were, and there was testing done to determine any increase in demands. He said there were some changes but not regarding demand. There is complexity to the system but DOE determined that there was no additional power requirements needed.
- Al asked how the impacts of cost will affect the schedule. Gary said the schedule will be out in the December timeframe, and he does not know the exact cost. Dan said it will be November before this information will be known.
- Al asked if the model is attempting to get equilibrium of solids. Rob said that the solids come out early in removal. He said the issue became getting the bottom moving and clearing the material so they can pump the system. He said solids will be dealt with in another facility; these tests are for tanks receiving liquid. Rob said there will be solids in the tanks that cannot be pumped and that WTP cannot handle.
- Dirk suggested the remaining solids issue should be discussed with issue managers at a different time. Vince Panesko agreed with Dirk and hopes there can be another discussion on solids in the tanks. Dan said it will be early October or November before there is enough information for a presentation for the discussion on solids. The TWC discussed having a meeting at the Richland library meeting for issue managers on solids in the tanks.

### **Waste Treatment Plant (WTP)**

Dirk said the technical issues involved with WTP operations are of interest to the HAB. He said there are a few groups doing investigations and looking at the issues being tracked in the WTP. He said the technical staff has identified some potential issues and there will be disagreement on some of these. Dirk added that some issues have to do with M3 regarding mixing tanks, pumping power and how to control the processes. There have been concerns over the mixing solutions, how they behave chemically and if it is adequate information. Last, he said there was a concern about scrubbers being replaced.

### **Agency Perspective**

- Rob said many issues are being tracked at WTP, and DOE is trying to do the best work possible.

### **Regulator Perspective**

- Dan said there were early on inquiries about what is going on at M3. He said none of the issues are a surprise but the magnitude was. He said DOE and Ecology are working on the issues. Dan added that he cannot speak to the scrubbers issue that was raised, but he can find someone at Ecology who can.

### **Committee Discussion**

- Al said he would like clarification on if the scrubbers have been removed due to the potential of increase in waste. Suzanne Dahl, Ecology, replied that with the rearrangement of the Low Activity Waste from a positive to negative pressure, the scrubbers will be re-arranged including the addition of a High Efficiency Particulate Air filter.
- Dirk said the priority for the TWC is to examine the WTP at a policy level to discuss plant operations and how it effects other operations in the complex.
- Gary remarked that there was a process to get technical issues from engineers working on the plant and some of these issues have already been resolved. He said he is not aware of the scrubbers being removed.
- Dirk said TWC wants to look how the WTP open issues are tracked. Dan said there is an issues log.
- Rob Davis recommended the TWC should investigate how the Defense Nuclear Safety Board looked at the WTP reviews.

### **Closure Plan Preliminary Planning**

Harold Heacock, issue manager, said there has been a lot of dialogue on tank closure. He said in the Hanford Site cleanup framework document there is one page dedicated to tank closure and it essentially states that the tank farms are going to be closed. He said the focus is on the vitrification plant, but closing tanks is a big issue. Harold noted at other sites waste tanks are different and there is the option to clean and leave them. He said others pump grout into the tanks to close them. He said the Tri-Party Agreement (TPA) gives milestones but there should be more action and a potential workshop to further discuss tank closure issues.

Vince, issue manager, said he reviewed prior HAB advice and came to the conclusion that the HAB does not have a position on tank closure. He also mentioned that he is the issue manager for the Waste Management Area C Farm Performance Assessment (PA) and he is supposed to represent the HAB's values but there are none defined.

### Agency Perspective

- Chris Kemp, DOE-ORP, said the PA will help bring understanding to what tank closure looks like. He said Appendix I in the TPA states that there has to be a closure plan for tanks. He said the first step is a PA as well as a state permit. He said DOE is trying to come up with a closure plan that takes everything into account including soil, pipes, etc. He said there has been internal discussion on having a tank closure workshop on October 14<sup>th</sup> if there is an interest.
- Lori Gamache, DOE-ORP, reminded everyone that there is a 30 day public notice that is required for a public meeting. She suggested that the TWC work with the Public Involvement and Communications (PIC) committee to help frame the workshops.

### Regulator Perspective

- Jeff Lyon, Ecology, said the TPA milestones state that the tank farms should be closed by 2053. He said in the recent PA workshop, a panel was invited and they discussed how to close a tank farm and recommended informing participants on further closure actions. Jeff provided his vision for the workshop which would be a round table concept to resolve some issues surrounding tank closure and to make it an ongoing process to further define tank closure. He said he drafted a closure communication plan for people to comment on and it was sent to the contractor who sent some comments back.

Jeff said he looked at the closure process and how to get together and discuss concepts in a controlled method. Based on this, he said he has a list of topics that would be good for potential meetings. He said he hopes there can be workshops to include discussing the Tank Closure and Waste Management Environmental Impact Statement (TC&WM EIS). He also suggested having routine closure basic and retrieval basic documents to provide updates on closure from Ecology's perspective once a quarter. He said in the updates, Ecology will talk about progress to date and have their publications available to assist in answering questions raised in the workshops. This process will enable further understanding for what is being done.

### Committee Discussion

- Dirk said this is an issue that has been coming for some time and suggested that the TWC talk about tank closure at the October meeting.
- Jerry Peltier said most are familiar that tank closure issues needs to be resolved. He said there are two schools of thought; removal, and leaving the tanks in place. Dirk said there is also a third position from Oregon which is a mix of removal and leaving the tanks in place.

- Pam said with the mobile arm retrieval technology, the tanks will be better removed than thought, and changes in technology makes closure a moving target.
- Jerry said it would be good if the HAB could find consensus on their position regarding tank closure. Dick said there may not be enough information to get consensus.
- Maynard said using a Committee of the Whole (COTW) meeting for past issues has been a good way to come to consensus on issues early.
- Dirk suggested working with PIC to develop the format of the meeting to best suit its needs.
- Jerry said there are many definitions of closure which he recommended discussing at a workshop. Harold said other sites have different definitions and criteria as well.
- Al said he thinks closure should be a topic covered by the RAP committee since it encompasses the soil underneath the tanks. Pam said the RAP committee is very busy. The committee recommended it being a joint topic with the TWC as the lead.
- Vince said tank closure has to be holistic because of the other issues such as cribs and trenches which are associated.
- Keith Quigley, Washington River Protection Solutions (WRPS), said Hanford is using the same criteria and incorporating lessons learned from other sites. He said closure is important and there is a good path forward for 2019.
- Dirk said the State of Oregon feels that closure is far down on the list of issues at Hanford and there are other substantial issues that are not agreed upon by everybody. He said the State of Oregon has a different view on some of these topics and proposed a couple of hours on next month's agenda to talk about varying concepts, structuring the workshops and requesting technical presentations.
- Chris said he feels passionate about the PA and hopes there can be civil discussion on tank closure. He said the HAB is taking on important topics and DOE realizes what was done in the past is not going to work.
- Jeff said tank closure is related to tank waste and TWC should cover the topic. Dirk said there are separate operable units and the integration can be a problem yet the crosscutting issues are important.
- Jeff said the HAB is a great place to tackle these issues on tank closure.
- Harold said the degree of tank retrieval could have an effect on requirements.
- Jerry said in the October TWC meeting, members can begin framing the workshop. Dirk suggested forwarding thoughts to Harold and Vince as they are the issue managers. Jerry said after the workshop it should be clear what types of topics to pursue for advice.

### **System Plan Rev 5**

Harold said System Plan Revision (Rev) 5 has been a long standing activity and has been analyzed for processing capability and disposal requirements. He said identifying waste streams and capacity in a comprehensive cleanup overview for the tank farms is important. He said in June, the Board adopted Advice #233 on the System Plan and the bottom line was to see annual revisions, address key risks with the priority of long term health and safety issues, and be consistent with the lifecycle cost and schedule report

### **Regulator Perspective**

- Dan said the timing of the System Plan is problematic. He said both the TPA and the contractor have a part in the modeling and there are constraints. He said the aluminum removal facility (ARF) was included in Rev 5 even though there is an understanding that ARF is not an option, and it will not be included in Rev 6. He suggested the HAB provide input to Ecology when the alternatives for Rev 6 are being generated. He thought advice should be created in the same time frame each year for the HAB to provide input.
- Dan also mentioned that Ecology will be meeting on September 27 to develop the Ecology cases to be evaluated in Rev 6 and to run modeling cases which will take weeks, maybe months to run. He will check to see if he can brief the committee on the outcomes of this meeting including Ecology's perspective on the proposed alternatives.

### **Committee Discussion**

- Dick said a point of contention has been the limited scope with only two to three alternatives.
- Harold said it is important to see Rev 5 to find out if previous comments have been incorporated.
- Larry Lockrem said he thought Rev 6 was already being worked on. Dirk said each revision is based on that year and planning for Rev 6 with regards to alternatives has already started.
- Kitty Bryan, Mission Support Alliance (MSA), said DOE has not received Rev 5 from the contractor. The TPA gives Ecology the opportunity to specify a minimum of three modeling cases. DOE and Ecology have begun discussing the modeling and DOE has a deliverable of October 31 for establishing these alternatives.
- Larry expressed concern a new revision of the System Plan is out each year without an opportunity to revise them. Dirk said there are two issues; one is the



problem access to what needs to be seen for input, and second is the potential for advice on this year's plan.

- Meme Samkow said there are some issues that she has found with Rev 4 and asked if there would be a chance for her comments to be incorporated. Dan said Ecology is moving forward with Rev 5 and then to Rev 6. He said Rev 6 is the first proactive time to provide input.
- Meme asked if there is an option to view the System Plans in the draft form. Tom Crawford, WRPS, said it is up to DOE and Ecology. Kitty said the document is not written until the results are seen. She said the System Plan needs to be accurate before it reaches the public.
- Lori said DOE can share the assumptions from Rev 5 with the issue managers and then once the document is finalized it can be shared.
- Dan said once the assumptions are available, then discussions can occur on changes to Rev 6. Dan said HAB input is critical and there will be a chance to provide input on Rev 6.
- Harold commented that this is not the most ideal process to receive public comment on a document. Dirk said it is a tight timeline for DOE as well.
- Kitty said it might be useful for the TWC to get more clarification on the modeling process from DOE and Ecology.
- Dick said establishing cost and schedule considerations for the approaches to these decisions should be seen early.
- Al said TWC is already behind the curve for commenting on Rev 6, and opinions need to be provided to Ecology in the next few weeks.
- Dan said there are sets of alternatives created, and then there will be technical meetings to see if these assumptions are viable. He said if input is desired, the TWC should look at Rev 5 alternative sets. He noted that the changes can make the model unwieldy; however, there is an opportunity for the HAB to weigh in.
- Al asked if the meeting information from the September 27 meeting on alternatives will be shared with HAB. Dan said he thinks this can be done, and will check with management to make sure.
- Maynard suggested drafting advice on providing more opportunity for the HAB to get involved in the System Plan process. Al said the advice could ask for a timeframe to consider and influence the creation of the alternatives. He said for this particular year, suggestions would have to be given before the end of October. Maynard said the TWC can issue advice and focus on the future development of System Plans. Dan agreed and reminded everyone that there is still a chance to have input this year.
- Meme asked if there is an opportunity to view the model. Tom said yes. Meme said according to the May 13 presentation, it looks like Rev 5 has similarities to

Rev 4. She said her comments might still be applicable. Dirk said the comments would have to be applicable to System Plan Rev 6.

- Dirk asked how much of the Rev 6 model is computer programs and how much is physical work. Tom said it is a large model with a lot of code based on a G2 platform and there is a lot of engineering information going into the model.
- Dick said the largest part of the effort seems to be checking the results of the model. Tom said this does take time, but this particular year it took nine months to build the model and verification only took one month.

### **Single-Shell Tank Analysis of Record**

Dirk provided a quick review of the recent meeting on the Single Shell Tank (SST) analysis of record which was an independent investigation of the structure of the tanks.

Dave Bernhard, Nez Perce Tribe, also attended the meeting and said the independent review did an analysis on if the tank had a chance of collapsing with studies of the concrete and rebar. He said the most structurally unstable tanks are the A and B tanks since they are flat bottom tanks making them the most unstable. He said thermal modeling was done showing that many tanks cracked under heat. Dave also noted there was an earthquake analysis conducted as well which showed fractures happening at the corners.

Dirk said there was an analysis of time temperature testing which showed much fracturing occurring in the concrete base of the tanks and the concrete in general fractured with the application of heat. He said this was compared to the actual temperature in the tanks to derive what that means for concrete integrity and it seemed it was not an issue. Dirk also said he noticed that the seismic analysis only analyzed one type of earthquake and not others. He said it seems that the structural issues will not be a huge problem, but it still needs to be discussed.

### **Committee Discussion**

- Al asked if the earthquake analyses takes buoyancy into account. Dirk said he does not think buoyancy was considered.
- Dave said temperature was the main issue, and is for structural integrity as well as potential future use for liquid waste storage.
- Dick asked how well the models have been validated with tanks cracking. Dirk said there are good concrete people involved in these tests and it seems that standard codes are used.
- Pam asked if the TWC will follow up on the SST tank analysis of record. Dirk said yes.
- Dick said you cannot say anything about future use until the liner is tested. Dave said he assumes the liner will hold up to testing. He thinks the flat bottom tanks will not be used and the rounded bottom with exposure to low heat will be used.

- Rebecca Holland, Hanford Atomic Metal Trades Council (HAMTC), asked if historical information will be used to help these analyses. Dirk said yes, and it will also be a tracking system for seeing what the tanks are doing over time.

### Committee Business

Dirk said the TWC thought about the main issues for the upcoming year and he thinks the Board and agency priorities are aligned with what the TWC is discussing.

Larry said he would like to go back and check to see if there is full closure on topics from last year. He will follow up on this task.

Maynard asked if the aligned priorities include the Board's overarching issues. Dirk said yes and they are specifically called out as overarching issues on the Board's priorities letter.

Larry said when each committee gives a report there is not consistency in style which should be considered. He suggested that TWC can propose a template. Cathy McCague, EnviroIssues said Susan Hayman, EnviroIssues, has this issue noted and that the Executive Issues Committee is discussing this. Dirk said there was a shift to a longer report due to the year scale of thinking.

*The TWC reviewed the meeting topics for October.*

Dirk recommended determining workshop topics and timeframes for Closure Plan Planning as well as asking Ecology and EPA for their perspectives. He thought there will be a series of meetings held on this topic. Maynard suggested seeing the plan the TPA has for tank closure at the first meeting. Jerry suggested flip charting the issues at the meeting to see if there are common issues and then developing an agenda.

Al said future supplemental treatment is an upcoming issue. He said steam reforming needs attention too. He said he does not know if there has been a formal presentation on steam reforming to date. Dirk said he fears that the final TC&WM EIS has to be out first. Pam said there is testing going on with steam reforming at Savannah River.

Dick said he does not know the status of the Hanford Storage Facility, and the associated concepts of eliminating the shipping and handling facilities. He is unsure if it is cost effective. Madeleine Brown, Ecology, said values on how to store waste would incorporate this. Dick said there should be a feasibility study on waste storage. Dick recommended getting an update from DOE-ORP in October on the Hanford Storage Facility.

Madeleine mentioned a permit change for the WTP with a comment period beginning on September 27. She asked committee members if they would like to discuss this. Dirk suggested that the TWC look at the notice and email him if it seems like something to discuss.

Dirk said secondary waste should be discussed in the November timeframe.

The TWC placeholder is October 14. Dirk will request a half-day meeting on the Executive Issues Committee call.

### **Action Items / Commitments**

- Cathy will update the committee's six-month work plan and the meeting topics table and forward it to committee leadership.

### **Handouts**

*NOTE: Copies of meeting handouts can be obtained through the Hanford Advisory Board Administrator at (509) 942-1906, or [tgilley@enviroissues.com](mailto:tgilley@enviroissues.com)*

- Major Areas for Consideration by the Hanford Advisory Board for 2010-11, HAB, September 3, 2010.
- Vessel Mixing Issues (M3) Overview, DOE-ORP, September 16, 2010.

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### **Attendees**

#### **HAB Members and Alternates**

Al Boldt	Harold Heacock	Vince Panesko
Rob Davis	Rebecca Holland	Jerry Pelteir
Dirk Dunning	Pam Larson	Maynard Plahuta
Liz Mattson (on phone)	Larry Lockrem	Meme Samkow (on phone)

#### **Others**

Ivan Bolanos, DOE-ORP	Madeleine Brown, Ecology	Cathy McCague, EnviroIssues
Gary Brunson, DOE-ORP	Jeff Lyon, Ecology	Blair Scott, EnviroIssues
Lori Gamache, DOE-ORP	Dan McDonald, Ecology	Sharon Braswell, MSA
Rob Gilbert, DOE-ORP		Kitty Bryan, MSA
Chris Kemp, DOE-ORP		David Bernhard, Nez Perce Tribe
		Tom Crawford, WRPS
		Keith Quigly, WRPS
		Michele Wells, WRPS
		Bob French, URS WTP