

Oregon Hanford Cleanup Board

The Columbia River Discovery Center and Museum

The Dalles, Oregon

Monday, November 27, 2017

Members in Attendance

Kristen McNall, Chair
Ted Taylor, Vice-Chair
Mecal Seppalainen
Lori Brogoitti
Steve March
John Howieson
Dave Ripma
Brian Wolfe
Thomas Roberts
Justin Iverson (Oregon Water Resources Dept.)
Ken Niles (OR Department of Energy)
Representative Greg Baretto
Representative Tawna Sanchez

Tri-Party Agencies and contractors

Tom Teynor, U.S. Department of Energy,
Richland Office
Rich Buel, U.S. Department of Energy, Richland
Office
Jennifer Copeland, CH2M Hill
John Price, Washington Department of Ecology
Craig Cameron, U.S. Environmental Protection
Agency

Public

Sharon Monteiro
Aram Soghikia

Oregon Department of Energy Staff

Mark Reese
Jeff Burrigh
Dale Engstrom
Sara Lovtang

Administrative

Chair Kristen McNall opened the meeting at 1:02 p.m. and welcomed Board members, guests and public.

She recognized new members in attendance including Representative Tawna Sanchez and Umatilla County Emergency Manager Thomas Roberts, who fills the public safety representative seat on the Board. Oregon Department of Energy (ODOE) staff member Jeff Burrigh was also attending his first Board meeting. Jeff replaces Dirk Dunning as the new Hanford Tank Waste Specialist. Jeff gave the Board information about his background and experience. Thomas and Rep. Sanchez also introduced themselves and gave some information about their background.

After introductions, the August Board meeting minutes were approved with minor changes suggested by Ted Taylor and Dan Solitz.

In August, Representative Sanchez and Thomas attended ODOE's annual Hanford tour. Each spoke for a few minutes about that experience.

Kristen informed the Board that the U.S. Department of Energy (DOE) would no longer approve travel expenses for more than one person for each seat on the Hanford Advisory Board (HAB). That means that Kristen and Dan will be unable to attend Board meetings together. John Howieson asked Kristen if this also effected committee work and Kristen said it did.

Plutonium Finishing Plant Status

Tom Teynor, DOE-Richland Office (DOE-RL), provided the Board with an update and overview of the progress of demolition of the Plutonium Finishing Plant (PFP).

The Americium Recovery Facility, Ventilation Stack, and Fan House have all been demolished. The Plutonium Reclamation Facility is 64 percent demolished and the main canyon facility is 42 percent demolished.

Three more glove boxes were removed and sent to Perma-Fix Northwest for size reduction. Only two remain to be removed out of 238 that were originally in these facilities.

Following a spread of contamination from the demolition work in June, a stop work in August and radiological uptake by some workers, Tom said there have been a number of 'fixes' done to prevent future releases, including establishing new safety perimeters and increased fogging to keep airborne contamination from spreading. Of 300 workers that agreed to be sampled, 31 had uptake in fecal samples.

John said he had just read about how internal radioactive exposure is much worse. The 10 milliRem alpha internal dose discovered here was considerable. The National Institute for Occupational Safety and Health was asked to come and evaluate the release and exposure event and to explain the event to those who were exposed.

Tom said demolition was restarted in September and is now expected to be done by December or January. Below-slab characterization will then be conducted. That work should be done by early 2018.

Representative Barreto asked if horizontal drilling will be done under PFP. Tom replied that DOE intends to drill through the slabs to have holes big enough for radiological surveying. That information is needed to plan the next phase of the cleanup.

Sharon Monteiro, public, asked Tom why all workers at the site wouldn't be automatically tested after a release. Tom responded that DOE can't force the workers to submit to testing, but that option is available for those workers who are concerned. Personnel dosimeters are read daily to try to make sure that no one gets exposed.

Hanford Richland Office Update

Tom also provided the Board with an update on several projects being managed by the DOE-RL office.

Work is progressing at the 324 Building, in preparation for removing highly concentrated waste beneath a hot cell. Workers are testing tools and procedures in a mock-up of the facility.

All remediation has been completed at the 618-10 burial ground and two nearby waste sites. They are looking to complete backfill in March of 2018.

Workers are nearing the start of removing highly contaminated sludge from the K-West basin. Tom said pre-operational testing could be complete in December and processing of the sludge could begin in February or March.

PUREX tunnel 1 has been stabilized by filling it with grout. Tom shared a short video from inside the tunnel that showed the grout flowing. He said they are fairly certain that have a complete fill and the waste inside has been safely encased with the grout.

Justin Iverson, Board, asked how the grouted material will be removed in the future. Tom said Hanford has considerable experience with cutting large monoliths of grout.

Kristen asked for an update on plans to move Hanford's cesium and strontium capsules to dry storage.

Jennifer Copeland, CH2M-Hill Hanford Group, said there will be two permit modification comment periods coming soon related to this project. She passed out fact sheets that announced the proposed changes. A public meeting is also scheduled for December 13 at the Richland Public Library.

Update from U.S. Environmental Protection Agency

Craig Cameron, of Hanford's U.S. Environmental Protection Agency (EPA) Project Office, provided the Board with updates on several topics.

The hiring process is underway to replace Dennis Faulk as the program manager for the Hanford project office. Dennis retired earlier this year. Dr. Laura Buelow is acting program manager until January, and she will be followed by Dave Einan until the permanent position is filled. EPA has advertised that the position for Hanford may be located in Seattle or Richland. The HAB and others have advocated in favor of basing the position in Richland.

Craig said the Hanford office has continued to shrink for the past 10 years and is currently down from eight staff to four. This constrains EPA's ability to manage cleanup at Hanford and at other federal and commercial sites around the region.

Several Board members expressed concern about the reduction in EPA staff and it resulting in less oversight. Craig said offers for early retirements have been occurring for a while to reduce the ranks at EPA across the country. Some of these early retirements occurred before the new administration, some after.

Ken Niles, ODOE staff, said the addition of other responsibilities for the Hanford office has occurred in part because after the initial 15-20 years of cleanup, work has focused at Hanford on a few very expensive projects and the pace for EPA staff had slowed.

Craig agreed that the pace of work at Hanford is not necessarily conducive to sustaining a large presence. He mentioned that EPA is looking to assist Ecology on projects in which they are the lead regulator, which could further strain EPA staff load.

Another change that involves EPA is a requirement that all Records of Decision (RODs) that cost more than \$50 million have to have the personal approval of the EPA Administrator. In past years, RODs would be signed at the regional administrator level, but since Hanford RODs will all likely exceed \$50 million, they must be signed by EPA Administrator Scott Pruitt. That adds an additional level of scrutiny and paperwork, which has led to an increase in the time required to implement actions. EPA's justification for this change is that it provides a level of consistency across projects. Craig noted that Headquarters already reviews institutional controls and some other issues.

EPA and the State of Washington have agreed to a six month pause on decision documents for the 100-D and H Areas to address concerns that were raised by the Yakama Nation related to compliance with the National Historic Preservation Act. This ROD will not affect the groundwater pump and treat work currently underway in the area, and specific waste sites have been addressed under interim RODs.

Review of Activities/Events Since September Meeting

Ken provided a review of relevant Hanford and Board related activities since the Board's last meeting in September.

Ken said he was late to the board meeting because he was attending Russell Jim's retirement celebration in Toppenish earlier in the day. Russell has been active with Hanford issues on behalf of the Yakama Indian Nation since the early 1980s. Ken said he had been tremendously influential on behalf of the tribe and all Northwest citizens. Russell turned 82 yesterday, and officially retired in September.

DOE's Office of River Protection (DOE-ORP) has a new manager. Brian Vance replaces Kevin Smith, who retired after nearly five years on the job. Brian has been with CH2M Hill Plateau Remediation Company since June 2016, and previously held project management roles in major commercial nuclear projects

with Westinghouse and AREVA. He is a retired Captain from the U.S. Navy. Ken and Jeff had the opportunity to meet with him on his second day of work in early November. He is planning to visit with the Cleanup Board at tomorrow's meeting.

Energy Secretary Rick Perry and Deputy Secretary Dan Brouillette both visited Hanford during the late summer. Sen. Maria Cantwell also accompanied Secretary Perry on the tour. Secretary Perry toured several Hanford projects and met with leaders of the Confederated Tribes and Bands of the Yakama Nation, Wanapum Band of Indians, Confederated Tribes of the Umatilla Indian Reservation, and Nez Perce Tribe.

Ken said there is a growing call from Secretary Perry and others that perhaps substantive fundamental changes need to be made in terms of the Hanford tank waste treatment program.

In a recent cover letter to Washington Governor Jay Inslee, Secretary Perry called the results of the Hanford System Plan 8 modeling exercise "disappointing," and pledged his commitment to "find a more feasible and robust approach" for Hanford tank waste treatment.

The Acting head of DOE's cleanup program, Jim Owendoff, has been offering some suggested changes as well to the State of Washington since Secretary Perry's visit to Hanford.

He has so far floated these ideas:

- Pausing work on the Waste Treatment Plant's (WTP) Pretreatment facility and High-Level Waste (HLW) vitrification facility to focus on Direct-Feed Low-Activity Waste treatment (DF-LAW).
- Sending some Hanford tank waste for disposal to the Waste Isolation Pilot Plant in New Mexico – if it can be demonstrated to be transuranic waste and if New Mexico can be persuaded to change its permit to allow Hanford tank waste.
- Move forward with closure of the C Tank farm.

Ken said there are concerns with each of these concepts. For example, how long would the "pause" last and what would be the risk that work on the Pretreatment facility would never resume? While some of Hanford's tank waste may meet the definition of transuranic, the specific tanks involved are not among the State of Washington's priorities. If those tanks are elevated above others, something more important may not get done.

As far as closing C Tank farm, Oregon's perspective is that there is little immediate risk right now and it shouldn't be elevated above other more urgent risk projects simply for DOE to be able to say they have closed a tank farm.

The Energy Communities Alliance (ECA), a group that is composed of local government officials from around the entire DOE complex including the Hanford site. The ECA recently put out a white paper touting advocating some fundamental changes in how Hanford high-level waste is handled. It focuses on clarifying the existing definition of high-level waste and revising DOE's radioactive waste management policy. While Ken said that isn't necessarily a bad thing, ECA is also advocating immobilizing much of

Hanford's tank waste using grout rather than vitrifying it in glass. It has previously been shown that grout would not effectively contain some of the more mobile, long-lived radioactive isotopes. However, ECA touts some technology breakthroughs with grout, though they don't provide any documentation.

Ken said an overriding concept in the ECA document is the assumption that by doing less treatment, that it all becomes easier and cheaper and faster – and that's really not the case. They tout \$40 billion in savings though they do not provide any data to support that claim.

The U.S. Defense Nuclear Facilities Safety Board (DNSFB) is an independent federal agency that provides oversight of the DOE cleanup. Ken said they have been particularly focused on Hanford's tank waste treatment program. Recently, it was discovered in June that the DNSFB Chair urged the Trump Administration to eliminate the safety board. He referred to it as a "relic" of the Cold War.

More recently, the Administrator of DOE's National Nuclear Security Administration urged DNFSB members to end public access to key safety reports. Ken said this was mainly tied to embarrassing safety findings at Los Alamos.

In August, the Washington Department of Ecology expressed concern in writing to DOE that the secondary tank bottom for double shell tank AP-102 "has likely failed." This was the tank that received the high-heat waste from AY-102, which had leaked and had to be pumped. Ecology directed DOE to provide a plan to assess the tank's integrity by March 2018.

John Price, Washington Department of Ecology, said regulating Hanford is frustrating and completely unique. Money and budget is a factor in DOE's ability to comply with Ecology orders. Ecology can have a federal judge order DOE to do something, but the judge can't order Congress to give DOE money to do these things.

The September HAB meeting scheduled to take place in Hood River was cancelled because DOE Headquarters did not approve the HAB membership package in time for the meeting to occur. A HAB meeting was held in November in Richland.

Public Comment/Adjourn

There was no public comment and Kristen adjourned the meeting for the day at 4:05 p.m.

FENVAL

Oregon Hanford Cleanup Board

The Columbia River Discovery Center and Museum
The Dalles, Oregon

Tuesday, November 28, 2017

Members In Attendance:

Kristen McNall, Chair
Ted Taylor, Vice-Chair
Mecal Seppalainen
Lori Brogoitti
Steve March
John Howieson
Dave Ripma
Brian Wolfe
Thomas Roberts
Justin Iverson (OR Water Resources Dept.)
Ken Niles (OR Department of Energy)
Rep. Tawna Sanchez
Sen. Richard Devlin
Sen. Bill Hansel

ODOE Staff:

Mark Reese
Jeff Burrigh
Dale Engstrom
Sara Lovtang

Tri-Party Agencies:

Brian Vance, U.S. DOE-ORP
Delmar Noyes, U.S. DOE-ORP
Al Kruger, U.S. DOE-ORP
Dieter Bohrman, Northwind
Craig Cameron, EPA
John Price, WA Department of Ecology

Public

Sharon Monteiro
Aram Soghikia
Morgan Gratz-Weiser, Sen. Devlin's Aide

Administrative

Kristen called the meeting to order at 9:02 a.m.

Brian Vance, the new DOE-ORP manager, introduced himself to the Board. He explained his professional background and told the Board he was looking forward to working with them going forward.

DOE-ORP Update

Delmar Noyes, DOE-ORP Assistant Manager, provided the Board with an update on tank waste issues.

Washington River Protection Solutions (WRPS) has completed retrieval of the last of the C-Farm tanks. It is the first tank farm where retrievals have been completed. C-105 was the last to be completed. About 4,500 gallons of waste remain in the tank, but that was all that could be accomplished using three different retrieval technologies.

WRPS has shifted work to the A and AX farms, which are next in line for retrieval. Six pieces of long-length equipment have been removed from tanks AX-102 and AX-104 – the first tanks set for retrieval.

Delmar said two evaporator campaigns completed in the past year created about 525,000 gallons of double-shell tank space.

Visual examination of AY-102 has identified at least seven holes in the tank floor. Retrieval operations were completed in February, and multiple visual inspections were conducted in the following seven months. An inspection report will help determine whether to repair or close the tank. Delmar suggested that repair is unlikely.

Progress continues on the LAW vitrification facility, as work is underway to support the DF-LAW glass making program. Both of the 300-ton melters have been assembled in the LAW facility. LAW facility construction is expected to be completed in June 2018. The WTP Analytical Laboratory facility is also close to completion.

The new LAW Pretreatment system is behind schedule and exceeds cost estimates. As a result, DOE is looking at instead using a tank-side cesium removal technology. Savannah River will demonstrate that technology this year. Delmar said moving forward with the original plan – even if they received more money from Congress – would cause unacceptable delays. He said the tank-side pretreatment process seems like the best alternative to getting tank feed available in 2021.

A Preliminary Documented Safety Analysis for the HLW Vitrification Facility was approved in September. Because of the current focus on getting DF-LAW operational, Delmar said DOE is considering its options as far as how and when to move forward with the HLW facility.

Technical issues for the Pretreatment facility are still being worked. Final testing of full-scale Pulse Jet Mixing vessels and control systems was done in September. DOE anticipates the remaining technical issues will be resolved in 2018.

Delmar was asked about a recent letter from Ecology to DOE, expressing concerns about the integrity of AP-102. Delmar said that ORP spends a lot of time looking at the tanks to evaluate their integrity. They are particularly concerned about the AP Farm because these tanks are intended to be used to transfer waste directly to the WTP.

In response to a Board question, Delmar said that DOE anticipates they would have sufficient waste feed using supernate from the double-shell tanks (DSTs) to support DF-LAW for at least ten years.

Jeff asked what is left as a hazard in the LAW waste feed once the cesium and solids have been removed. Delmar said those processes should remove most of the cesium and the strontium from the waste feed. What remains is a liquid with dissolved chemicals, metals and trace amounts of radioactivity. That radioactivity would include very small amounts of technetium and iodine, which are considered among the primary long-term hazards due to their long half-lives.

System Plan 8

Delmar also provided the Board with an overview of System Plan 8, which is a document used to assess a group of possible technical solutions to complete the tank waste treatment mission. The first system plan was issued in 2002 and the Tri-Party Agreement now requires a new System Plan to be completed every three years.

The System Plan projects a baseline case that uses the known assumptions and plans to project what is expected to happen. It also analyzes other “what if” scenarios to assist in decision making. It provides rough cost-and-schedule estimates for each of the scenarios. It helps define which factors are most –and least – influential. Delmar said that eleven scenarios were evaluated.

Some of the “what if” scenarios include an early Direct-Feed HLW treatment system with an earlier start than the full WTP; what happens if the Pretreatment Facility never comes on line; and risk-informed retrievals of the single-shell tanks (not retrieving many tanks if their radioactive content is less than the remaining C Farm tanks).

System Plan 8 will help inform DOE and the State of Washington as they begin new Tri-Party Agreement negotiations to set a number of new milestones.

System Plan 8 results project a cost increase of approximately \$62 billion (unescalated) and a schedule increase of approximately 19 years. Delmar said that DOE believes further analyses is needed to better understand the major factors that could impact cost and schedule.

This System Plan incorporated DE-LAW as part of the base case. All of the start dates are consistent with the existing Amended Consent Decree. And, for the first time, there were no constraints placed on the completion dates. Previous versions used Tri-Party Agreement milestone dates of 2040 for completion of retrieval from all single-shell tanks, and 2047 for completion of waste treatment. This time, DOE and Ecology wanted to see what the results would be without defining artificial deadlines.

Delmar said that Scenario 6, the “TPA-compliant” scenario, is simply no longer possible, given the Amended Consent Decree does not have the full WTP on line until 2036.

Previous versions of the System Plan did not include cost estimates. The current System Plan does include cost estimates, but Delmar said these are not intended to be accurate cost analysis but rather a basis for broad comparison.

Under the current Baseline case, the System Plan concludes that single-shell tank retrievals would not be completed until 2056, and waste treatment would be completed in 2063.

The System Plan assumes that some kind of supplemental LAW treatment will be constructed and operated to coincide the completion of the LAW treatment with the completion of HLW treatment. HLW “sets the pace” for completing the tank treatment mission.

The common results from all scenarios were that the mission duration is driven by WTP pretreatment and HLW vitrification throughput; escalations in lifecycle costs are primarily driven by treatment mission duration; and all scenarios exceed an escalated annual cost of \$2 billion by 2030.

Justin asked if it is possible to do better than the various scenarios. Delmar said DOE's job is to make the Baseline the worst case and look for ways to improve it. Ultimately if you want to shorten duration you have to increase the HLW treatment capability.

Board members noted that there has long been an assumption that pretreatment of the tank waste was an essential step, yet two of the scenarios eliminate that step.

Delmar said pretreatment is designed to minimize the number of HLW canisters produced. DOE will have the ability to direct-feed waste to the HLW facility, and DOE has been doing work to minimize the overall glass volume by increasing the waste loading in the glass and getting more waste into each canister. These glass recipe efforts might offer some opportunities to reduce or eliminate some pretreatment. The scenarios mentioned basically acknowledge that the HLW treatment capability is ahead of the PT facility schedule, so it was worthwhile to look at how direct-feed HLW would affect the mission.

Ken then then said that his takeaway from the System Plan so far was that DF-HLW is a good idea in the near-term, but pretreatment is essential to prevent treating waste into the 2100s. He also expressed that Oregon gets nervous whenever administrations change and DOE Headquarters inevitably says there must be a faster, cheaper way to complete the Hanford mission. History has demonstrated there is not.

Ecology Perspective on System Plan 8

John Price, Washington Department of Ecology, told the Board that Ecology was pleased with the cooperative nature in developing System Plan 8. Ecology believes it is a lot more realistic than previous versions. John said it contained no big surprises – previous calculations by Ecology staff came up with similar numbers for completion dates.

The System Plan is intended to inform Tri-Party Agreement negotiations every six years so that milestones accurately reflect the current state of the program. Those negotiations should begin early next year. John said they are overdue and are a big focus now for Ecology.

One topic that will be addressed is identifying the next tank farm to retrieve following completion of the A and AX farms. They also hope to identify contingencies that might necessitate the construction of new DSTs. John emphasized these would not be to replace existing DSTs that may be failing. Instead, the new tanks would be to support retrievals and treatment of the waste. John said many upgrades to existing infrastructure will be necessary to support retrievals, treatment and storage associated with DF-LAW. Those issues will also be part of the negotiations.

Because the focus now is on DF-LAW, and HLW treatment may not begin for another 15 years or so, John said some milestones that are typically negotiated from the System Plan may not need to be addressed for some time yet. He said milestones related to supplemental waste treatment probably aren't needed right now. The same can be said for interim storage facilities for immobilized HLW.

John said the negotiations will also address end dates for tank retrieval and tank waste treatment – milestones that have not changed for many years, though it has been obvious for some time that they are no longer achievable.

Mecal Seppalainen, Board, asked about Ecology’s position on changing the DF-LAW pretreatment from a stand-alone facility to the tank-side treatment. John replied that it seems reasonable to consider a process that would cost less and begin to make glass earlier. As far as what form supplemental treatment will eventually take, John said it’s appropriate to have it undefined for now.

Making Good Glass

Al Kruger, Glass Scientist for DOE-ORP, next provided a “tutorial” on how to more effectively make good quality vitrified glass. Al has an extensive background in commercial glass making, and has been with the WTP project since 2007. Al is considered a knowledgeable glass scientist at DOE. He has been asked to provide briefings to prior Energy Secretaries including Dr. Chu.

Al reviewed Hanford’s operating history and various assumptions and attempts through the years to deal with Hanford’s tank waste. He said there was no intention in the early production days that tank waste would be retrieved. When the Tri-Party Agreement was signed in 1989, the intent was to focus on waste in the double-shell tanks initially. The high-level waste stream would be vitrified, and the low-activity waste would be grouted and disposed on site. In 1993, the Tri-Party Agreement was changed to acknowledge that all of the tank waste would be treated and it would all be immobilized in glass.

There were several unsuccessful attempts to move forward with design and construction of vitrification facilities, including an attempt at privatization, where private industry would pay for the up-front costs and DOE would only begin to pay the contractor once glass was produced. The collapse of that endeavor left the current contractor with a design for vitrification facilities that had major design problems – some of which have yet to be fully resolved.

Al said the good news is that Hanford’s tank waste will be treated in a melter design that has been around for at least 400 years

The waste in Hanford’s tanks is in three primary forms:

- 23 million gallons of **Saltcake**
- 21 million gallons of **Supernate** (pumpable liquid), which contains the bulk of the cesium
- 12 million gallons of **Sludge** – which contains the bulk of the strontium

In the 1970s, cesium and strontium was removed from some of the tanks to reduce the heat that was generated. The cesium and strontium is contained in 1,936 capsules. Al said there have been suggestions that the cesium and strontium capsules could be fed directly into the WTP. He said it is not

designed to do that. There are some pipes in the wall in the Pretreatment facility that could potentially connect with a future facility, if it was decided to chop up the capsules and feed them to WTP. Al suggested it might be a good idea to find a separate disposal path other than the WTP as the halide salts of the cesium and strontium are bad in glassmaking. They introduce corrosion problems and nasty off-gas problems.

Al said that there are hundreds of millions of curies of cesium in the waste, yet the entire disposal for LAW is largely driven by 29,000 curies of technetium. The cesium can be easily directed into the HLW glass stream where it will be contained in the glass. The technetium is more difficult to isolate and it is very mobile in the environment. It is one of the primary long-term risk factors.

During Hanford's operating years, they used four different "flow sheets" for processing fuel to extract the plutonium. Earlier processes generated very diverse waste. Al said it contained everything on the periodic table with the exception of lithium and borium.

Al said it is the chemicals that mostly affects the ability to make good durable glass. Cesium does have some impact as well. Sulphur, chromium and aluminum in the waste are among the biggest factors. The uranium fuel was clad in aluminum at Hanford's eight original reactors. Aluminum oxide salts are abrasive which makes it challenging to the design of the WTP.

Al said they have had good success at 1/3 scale in increasing the waste loading of the aluminum in the glass and increasing the effectiveness of the melters. This would help reduce the amount of glass that would have to be made and would also reduce the mission duration. The presence of Sulphur in the waste is also a limiting factor.

Once you remove the cesium and the solids from the LAW stream, Al said you're left with basically lawn fertilizer with a little bit of radioactive material. There would be sodium nitrate, sodium sulfate, some cobalt 60, a small residual of cesium, technetium, iodine and chromium. He said aluminum mixed with silica and boron makes the basis of pyrex glass – which is a very durable glass.

Technetium is largely contained in the supernate and will not be captured through the pretreatment processes so it will end up in the LAW feed. Al said that becomes the basis for glass being a better waste form. He said if you figure out a way to get the technetium into the glass, it stays there.

One of the challenges for the WTP will be to ensure that both the HLW and LAW melters have sufficient feed to operate, and that both finish up the mission at about the same time.

The baseline expectation of 145,000 canisters of LAW, being generated at five per day, is what leads to the expectation that some type of supplemental treatment – perhaps a second LAW facility – will be necessary to complete the mission in less than 40 years. Al said that more efficient waste loading and increased capacity of the basic design may yet eliminate that need.

Glasses produced in tests today are being compared against 1,500 year old hillfort glasses from Sweden to validate durability. An accelerated aging test is being developed.

Board Business

The Board set meeting dates for its next two meetings. The first will be March 19-20, 2018 in either Mosier or Hood River. The second will be July 16-17, 2018 in Pendleton or Hermiston.

Kristen said it was time for Chair elections at the March meeting. She said she was more than willing to step down if there is someone interested in leading the Board.

Public Comment/Adjourn

Sharon thanked the Board for keeping an eye on these important topics. She said the citizens of Oregon need to be heard. The EPA has been diminished. The current administration doesn't value the work they do at Hanford. We need to be ready to respond when needed. Here we are today re-looking at the need for "solidifying" the wastes in the tanks. The same topic was addressed in 1970s. To build one tank is less than the cost of one military jet at \$550 million. There is not enough room in the current system for the volume of one tank. We need some new capacity, and not tanks built from carbon steel. She also urged the Board to write a letter to support full funding for the Natural Resource Damage process.

Kristen adjourned the meeting at 1:22 p.m.