

FINAL MEETING SUMMARY

**HANFORD ADVISORY BOARD
TANK WASTE COMMITTEE MEETING
*April 14, 2005
Richland, WA***

Topics in this Meeting Summary

Welcome and Introductions 1
Waste Treatment Plant (WTP) Updates: Seismic report/Update on Estimate at
Completion..... 1
Waste Treatment Plant (WTP) Updates: Black Cell Design 4
Waste Treatment Plant (WTP) Updates: Corrective Action Report..... 5
Best Basis Inventory (BBI) Tutorial 5
Tank Retrieval Update: Retrieval Technologies..... 8
C-106 Appendix H Update 9
Tank Closure Environmental Impact Statement (EIS) Changes..... 9
Bulk Vit Update and Graphic Simulation..... 10
Plans for Immobilized High-Level Waste Storage 11
Committee Business..... 12
Handouts 12
Attendees..... 13

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

Leon Swenson and Paige Knight, Tank Waste Committee (TWC) co-chairs, welcomed committee members and introductions were made. The January meeting summaries from the Tank Waste committee and joint Tank Waste Committee and River and Plateau Committee meetings were adopted.

Waste Treatment Plant (WTP) Updates: Seismic report/Update on Estimate at Completion

Eric Olds, Department of Energy-Office of River Protection (DOE-ORP), updated the committee on the status of the Estimate at Completion. Currently, DOE does not yet have the revised estimate, but Erik committed to presenting data to the committee once it is available.

Jim Henschel, Bechtel National, Inc. (BNI), informed the committee of plans to lay off an additional WTP workers. The official announcement will be made once individuals are notified.

Lew Miller, DOE-ORP, updated the committee on the seismic report for the WTP. He provided the context for seismic concerns, and explained how improvements in computer measuring techniques for measuring how earthquakes in other areas could impact the WTP have created the need for further analysis. The initial seismic study tried to model the 200 East and 200 West areas, using an assumption of 500 feet of sand and gravel beneath the sites. There is actually closer to 600 feet of sand and gravel under the WTP, which has an absorbing effect on earthquake impacts. Underneath the sand and gravel there are layers of basalt bedrock, with interspersed layers of mudstone and siltstone. These bedrock layers have an attenuating effect on earthquake impacts; however, no measurements were taken on seismic wave movements through these layers in the initial study. In 1996, the assumption was that the layers are more like solid bedrock; with the identified layers of mudstone and siltstone, the area of bedrock is now actually believed to attenuate earthquake impacts less. The new seismic report used models that accounted for the layers attenuating less, which amounts to a 40% increase in impacts where buildings are most sensitive.

Lew explained how DOE plans to utilize the new data in the design of the WTP to meet new seismic standards. Depending on what state the design is in determines what type of corrective action needs to be taken. Most design work that has been done is robust enough to account for new seismic data, so few changes need to be made in those areas.

A dynamic analysis will be coming out soon, which will model the entire building to show how an earthquake would impact the entire building. Modeling can also be done component by component to assess seismic impacts.

Regulator Perspectives

Laura Cusack, Washington Department of Ecology (Ecology), said Ecology is concerned about seismic issues associated with the WTP, especially impacts on the cleanup schedule and cost. She explained DOE has been forthright about sharing information with Ecology as it becomes available. Ecology wants to see the WTP built right, not quickly.

Committee Discussion

- *If the seismic study portion of the project could be separated out, how much does it add to schedule?* Jim Henschel explained it is hard to determine the exact impact on scheduling, because all the work is interrelated. Before the new seismic work came up, the original plan was to have fewer engineers at this stage. Now DOE has to retain engineers and decrease the number of workers. Lew said the impact of the new seismic study will be more evident in two weeks, once the Estimate at Completion is finished.
- *Was a geo-tech study done for the WTP?* Lew said the original seismic study was done for the entire area, but it did not go to bedrock level. Wade Riggsbee commented that the WTP design process seems disjointed, and resembles a design-as-

you-go project. Lew said the design process for the WTP is not design-as-you-go; the seismic issue is mostly a matter of new computer power providing new data that needs to be included in the design of the facility. Jim added that the science of predicting earthquakes is still in its infancy, improving existing data and providing new information all the time. DOE is currently looking for better data to drill down to bedrock level. Plans include drilling five holes over two years at a cost of \$2 million per hole. He added that this is one of the most well-instrumented sites for earthquakes, but there is no earthquake data from the area to crosscheck design specifications. Several committee members requested a copy of the seismic study for the site.

- *Regarding the statement that “most” concrete walls have design margins greater than 40%, what does the term “most” mean?* Jim Henschel said there are no concrete walls with less than 40% design margin at this time. DOE has not identified any walls of concern where re-work needs to be done.
- *Are design margins greater than 40% by a small or large percentage?* Lew said buildings are designed with several elements, which factor into a building analysis. Many facilities were designed with a large margin for error, but there are other buildings whose designs are not adequate. In most cases, building elements are well above the 40% design margin.
- With significant work being done on data recalculations, it would be good for the committee to have periodic status updates.
- *When will a tanks analysis be done?* Jim said it is part of the re-evaluation.
- *Does DOE have any interaction with Energy Northwest to share issues and information?* Lew said the seismic analysis for that facility was done using a completely different seismic process.
- *Regarding the recalculation process, who are the independent reviewers of the methodology and calculations?* Jim said DOE has a standard process to review and approve such work. He was not sure an independent process was conducted originally, but if so, it will happen again. Lew said DOE employs a peer review process and has employed independent contractors to review calculations. .
- *Are conservative design margins built into seismic design?* Lew said new seismic data are an additional input into the model’s code and equations. Jim said DOE is not changing the codes. Any decision to change the margins would be discussed with the public.
- *Will seismic monitoring (seismometers) be required for the WTP?* Jim and Lew said they were not aware of any plans to use seismometers and there is no specific requirement for such activity. The Pacific Northwest National Laboratory (PNNL) is putting out seismic data. No information exists about large earthquakes in the Hanford area, so WTP design is based on earthquake information from California.
- *What is the estimate for how long the re-calculation process will take?* Jim said the final calculations would take months to years. However, WTP design and

construction will not be held up. Some aspects of the design are already built, so an effort will be made to move ahead.

Waste Treatment Plant (WTP) Updates: Black Cell Design

Bill Hamel, DOE-ORP, provided the committee with information on black cell design oversight, including an overview of the black cell report, what recommendations were made, key findings, and current status. Black cell vessels are designed so that workers do not have to enter them, but oversight is necessary to know and evaluate the design life of the cells. DOE looked to people with black cell experience and knowledge to compose the black cell oversight team.

Several major recommendations came out of the black cell report:

- Address disconnects regarding the choice of materials for black cells in information received from workers and information gleaned by looking at documents.
- Evaluate assumptions about material erosion wear.
- Maintain some construction openings (“soft patches”) for potential future access.
- Ensure facility documentation needs is uniform

The erosion of black cell vessel materials is a DOE “open item” and is scheduled to be resolved by the end of April. BNI has standardized controls for black cell vessel and piping design requirements.

Regulator Perspectives

Laura Cusack said black cell design is of great importance to Ecology. Access to black cells is very important. There is a good dialogue and conversation between DOE and Ecology on this issue.

Laura said DOE has not resolved issues surrounding vessel erosion and corrosion to Ecology’s satisfaction. In the absence of periodic inspections, it is very important to understand corrosion and erosion rates through testing. Ecology is worried about the pulse-jet mixers: they are designed to operate only at 25%. What are the erosion and corrosion rates if they have to operate at a higher level?

Committee Discussion

- Rob Davis said it is important for the committee to recognize risks associated with the lack of access to black cells for inspections. Facility operations have to follow design and specifications; if the right operating specs are developed, DOE needs to make sure the facility can be operated based on those specs. Rob said he was unaware of any specific defects, but is mainly concerned that the facility be examined holistically.

- *Is ventilation design complete? Vents could serve as access points, so is the design being changed to accommodate that?* Bill said ventilation design is not accounting for vents as potential access points, but ventilation ducts could still be used in the unlikely event they need to be.

Waste Treatment Plant (WTP) Updates: Corrective Action Report

Pat Carrier, DOE-ORP, provided an overview of the Corrective Action Report on worker issues. As a result of 117 interviews, 63 corrective actions were taken in the areas of construction workforce safety, labor relations, construction supervision and leadership, diversity management, and the employee concerns program. DOE-ORP reviewed the corrective actions and determined they adequately addressed concerns raised in DOE's original report. DOE-ORP will continue to monitor corrective actions until they are complete.

Committee Discussion

- Regarding safety issues, Keith Smith commented he has been told that the workers are encouraged something substantial is being done to address worker safety. He said some cultural changes still need to be made, but this represents a step in the right direction.
- *Was DOE's review of the corrective action case actually an independent review?* Pat said the review was independent in the sense that individuals came to the Employee Concerns Program office to express their concerns, and then DOE conducted an independent assessment of the particular concern independent of the contractor. There were some sub-contractors and federal employees on the review team, but no participation from BNI.
- *What do DOE employees with concerns do to voice their concerns?* Pat said they come to him at the Employee Concerns Program office or go to the equivalent office in the Richland Operations Office (DOE-RL). He said he feels this process works, and he has observed a steady decline in the traffic of individuals coming to express their concerns.
- *What was the general flavor of concerns that were expressed in the Concerned Action Report?* Pat said most concerns focused on discriminatory practices, labor relations issues, and potential sexual harassment.
- *Is there a monitoring process that follows-on once employees express concerns?* Pat said there is someone on-site to assess employee climate. In addition, a follow-up survey was conducted with 100% of the field population.

Best Basis Inventory (BBI) Tutorial

Steve Wiegman, DOE-ORP, provided an overview of the process for compiling and updating the BBI. Data are collected based on sampling and historical knowledge, then

developed into a basic characterization framework for decision-making about waste cleanup.

Nick Kirch, CH2M Hill Hanford Group (CHG), explained the BBI is a piece of the overall characterization program. It integrates characterization data, process knowledge, and surveillance data to estimate tank waste inventories for 177 tanks (double and single shell), 25 chemicals and 46 radionuclides. The BBI is updated quarterly based on transfers or new sample data.

Nick provided an overview of BBI inputs and users:

- Sample data is given preference over model data when generating the BBI. For constituents with no sample data, model data is used to estimate constituents for a particular tank.
- Waste Type Templates are used to estimate inventories of tank constituents when there is no sample data, and are based on sample data for tanks with the same waste type, process knowledge, and model data.
- Customers who receive tank inventory data are able to review the inventories before they are made an official document.
- Most chemical constituents are based on sample data. Radionuclides are based on the HDW model data. Most wastes are based on templates with sample data to back them up.

Nick also addressed some of the misconceptions of the BBI, the most common of which is that you can't trust it because it's always changing. Another way of looking at it is that the BBI is updated quarterly with the intent of constantly improving it

Regulator Perspectives

Jeff Lyon, Ecology, said Ecology understands the BBI is the best basis for waste characterization and is not an absolutely accurate number. Ecology is aware and has concerns that there are numbers with high variation, and the accuracy of the data affect risk models. However, Ecology also acknowledges the process is using the available data as best they can be used.

Committee Discussion

- *What has been done regarding the uncertainty surrounding technetium and iodine and how well known the location of this material is?* Nick said losses in some radionuclides were updated from previous versions. New sample data have been the drivers for several revisions.
- *Is there any document that contains a complete mass balance?* Nick said the BBI is an input to the process of developing a composite analysis to account for all waste

sources and locations at the site. DOE is currently working on the next iteration of the composite analysis and will come back to the committee when it is ready.

- *How is the variance in uncertainty factored into the BBI, or is it simply a best guess, with uncertainty being dealt with elsewhere?* Kristine Bowen, CHG, said there is only uncertainty associated with sample-based data. If the data are strictly model-based, there is no uncertainty. If a risk assessment is being done, uncertainty must be dealt with in the planning process. Uncertainty is not quantified in the BBI.
- *How do uncertainty estimates affect workers? Do workers proceed with more caution where risk estimates are more uncertain?* Steve said data is used in a number of ways in the field. Hazards are analyzed from the workers' perspective. Controls are developed based on worst-case scenarios. It is much more effective to use a specific application which is based on the most conservative approach in the field.
- *How much (% by volume) of waste is represented by a sample-based data, and how much waste is based on a best guess from someone off-site collecting model-based data?* Committee members commented that knowing this would help to define the precision of the data. Nick said he would have to look those figures up. The BBI aggregates sample and template based wastes.
- Al Boldt commented that the Board has been waiting more than a year for a system-wide waste balance sheet. Dirk added that an inventory is needed of all contaminants, where they came from, where they went, and the impacts of their transport and disposition. Steve said in the next several months, DOE wants to further the conversation about a system-wide composite analysis on a more focused and detailed level.
- *Was a new template identified for waste in tanks that contains a high amount of sulfate?* Al expressed concern about uncertainty regarding the amount of chloride and sulfate chemicals. Bruce Higley, CHG, said a new template to account for sulfate concentration has not been identified. Al noted existing templates are missing sulfate levels, which will eventually cause problems with waste processing at the WTP.
- *Are tank leaks accounted for in the BBI?* Bruce said the BBI does account for tank leaks.
- *When was sampling started for technetium- 99?* Sampling has occurred off and on since before 1994, but Bruce was unsure about the specific start date.
- *Does the BBI include data of vapor samples?* Nick said vapor data are published in the TWINS database, but are not used to generate BBI data since the BBI focuses on solid and liquid waste.

- *Is the composite analysis still on track for a July draft?* Steve said a composite analysis would not be ready by July, but he would like to have another session for the committee on the composite analysis, since it is being developed more broadly.
- *Does development of the BBI change assumptions made about risk assessment that would impact closure actions?* Steve said all uncertainties are carried throughout the process of developing the BBI by either freezing data, or changing data to maintain evaluation of uncertainty. Delmar Noyes, DOE-ORP, added that DOE would not develop a closure position solely using a BBI value. Moses Jaraysi, CHG, said BBI values are used before removing a tank, after which sample data from the removed material is used.

Tank Retrieval Update: Retrieval Technologies

Delmar Noyes updated the committee on tank retrieval technologies and activities, focusing specifically on the status of retrieval for tanks C-203, S-102, S-112, and S-109. Retrieval is complete for C-203, 95% complete for S-112, 11% complete for S-102, and DOE will begin focusing on S-109, C-200s, C-103, C-102, and C-Farm design. Delmar said DOE believes they have reached the limits of existing tank waste retrieval technology, and he explained that lessons learned are being applied along the way. Some new technology has been demonstrated to work well and will be applied to retrieval work on the remaining tanks. He indicated the retrieval schedule has lasted longer than anticipated, but they have not used more double-shell tank (DST) space than anticipated. So far, they have been accurate with volume estimates for waste in the tanks, but are evaluating whether nozzles currently being used will be able to get at the waste that remains. They are testing new nozzles for this purpose. He also said an improved communication process with Ecology has worked well during the tank waste retrieval process.

Regulator Perspectives

Jeff Lyon said DOE-ORP and CHG have done a good job keeping Ecology in the loop during the retrieval process, including sending regular updates and sharing post-retrieval information. Ecology staff are participating in retrieval activities. He commented that the idea of using supernate is good way of saving DST space.

Laura Cusack added DOE-ORP deserves a lot of credit for their retrieval efforts. They have worked out problems encountered during the process, and Ecology has not seen DOE trying to take the easy way out or claim a success where one has not been achieved. There is a lot of promise in the efforts they are making.

Committee Discussion

- *What is DOE doing to consider using new technology on different tanks to get at the residual waste material?* Delmar said retrieving residual waste is an issue of getting

the base of the vacuum hose close enough to the edge of the tank. Becky Holland noted it is good DOE finally realizes the retrieval hose can be used above grade as long as shielding is in place, which is a lot better for the operators.

- Considering the good progress DOE is making on tank waste retrieval and the collaborative approach between DOE and Ecology, there was general agreement for drafting a letter of commendation to the agencies.

C-106 Appendix H Update

Jeff Lyon updated the committee on the C-106 Appendix H. The Nuclear Regulatory Commission (NRC) sent its review and comments to DOE-ORP in January 2005. DOE-ORP transmitted draft responses to the NRC's comments and is scheduled to meet with them on June 1 to review those draft responses. Following the NRC response, Ecology will respond on whether they will approve the C-106 Appendix H request. Delmar said DOE-ORP continues to have productive meetings with Ecology on the topic.

Tank Closure Environmental Impact Statement (EIS) Changes

Mary Beth Burandt, DOE-ORP, updated the committee on changes to the alternatives in the draft EIS. Recent activities include evaluating modeling assumptions, reviewing cumulative impact analysis, and making necessary changes to alternatives. The number of signatures on the review increased from four to seven, and now includes staff from the DOE Office of Environment, Safety and Health.

DOE-ORP is developing a Technical Guidance Document (TGD) to outline modeling assumptions and models that will be used. DOE is looking at how model assumptions impacted model results. The TGD reflects agreement between DOE field offices, DOE Headquarters (HQ), and Ecology. Mary Beth explained the TGD was written specifically for groundwater, and represents a policy-level approach. The methodology for cumulative impacts will use a similar approach for each resource area. They still have all the other resource areas to get through, but groundwater is the area that will take the longest to do so they chose to focus on it first.

Previous versions of the EIS included a qualitative analysis for cumulative impacts, but no quantitative analysis. The DOE National Environmental Policy Act (NEPA) guidance book indicates a sliding scale, or graded approach, can be used for cumulative analysis. Therefore, DOE-ORP does not have to treat every area in a quantitative way if it can be demonstrated that a quantitative analysis is unnecessary. This is what will be done for groundwater. DOE-ORP has not yet explained to DOE-HQ how they are interpreting sliding scale in the NEPA guidelines.

Since groundwater is one of the most highly impacted resources, the TGD is written specifically for groundwater and does not cover every resource area in the EIS.

Regulator Perspective

Jeff Lyon said Ecology is involved in the EIS review process; Ecology and DOE-ORP have weekly meetings. As a cooperative agency, Ecology still retains the ability to fully comment on the EIS. Jeff said the EIS is a work in progress; there is likely another year's worth of work to do, so now is a good time to discuss critical issues.

Jeff said there is a commitment to keep the public informed of Ecology's concerns with the draft EIS. Ecology is working on getting a list of concerns drafted that will detail potential outstanding issues.

Committee Discussion

- *How does the Tank Closure EIS fit in with the Record of Decision (ROD) for the Solid Waste EIS?* Mary Beth said the Solid Waste EIS focuses on disposal. She suggested the challenge is having three different EISs that outline disposing material in areas at Hanford in the development and revision process. It is important to show tank farm activities, but also to place those activities in the context of other work at Hanford.
- When discussing geographical areas on the Hanford site, Paige Knight said different sites are being talked about individually rather than holistically. This is especially true regarding groundwater, since groundwater represents the coming together of all areas. Mary Beth said a lot of time was spent discussing where cumulative impacts should be shown. With a total of 3,000 waste sites at Hanford, it has been challenging to determine how to explain to the public which areas are most important to deal with and which are of lesser importance. Another challenge is how to handle uncertainty regarding what is known and what is unknown.
- Dirk said DOE needs to demonstrate confidence that their decision-making models match what is happening on the ground. As an example, he said that water moves horizontally, instead of vertically as the conceptual model predicts. He stated it is more important to be right than to be precise.
- *Will there be a good baseline in the TGD for people to understand the assumptions that are being used?* Mary Beth said DOE-ORP makes an effort to document the assumptions being used. Jeff said the TGD defines areas of primary concern to people who signed the document. Al noted the TGD does not have an official document number, cannot be referenced, and should therefore not be considered an official DOE document.

Bulk Vit Update and Graphic Simulation

Billie Mauss, DOE-ORP, and Rick Raymond, CHG, presented a computerized model of the bulk vit facility. The design is 90% completed. A full-scale test was conducted, beginning on March 3 and ending on March 10, during which a breach of the steel liner occurred, leaking roughly 10 kg of material.

Regulator Perspective

Jeff Lyon said Ecology is participating in the review of design packages for the bulk vit facility. Ecology is aware of the leak mechanisms, which must be addressed before construction is allowed to begin.

Committee Discussion

- Some committee members expressed concerns about potential contamination. Rick explained the plant is designed to shut down if there is ever any external contamination. In particular, committee members were concerned about the breach event during the full-scale test. Billie said the breach was caused by glass conducting electricity and becoming hotter than was originally modeled. She said a lot was learned from the breach event, and a leak evaluation/investigation team was created to catalogue all the problems. The investigation team should provide recommendations for re-running the test.

Plans for Immobilized High-Level Waste Storage

Delmar Noyes provided the committee with information on early plans for an Immobilized High-Level Waste storage strategy. Facility design is complete for the Canister Storage Building (CSB) with a capacity of 880 canisters for approximately two years. DOE-ORP is working on obtaining permits and construction is scheduled to begin in Fiscal Year 2007. The amount of funding in the baseline is adequate to fund the CSB facility. A complementary shipping strategy is also being developed to enable “just-in-time” shipping from WTP to Yucca Mountain once the CSB is at capacity. DOE-ORP plans to consider both options in order to make the decision to ship waste or to build the initial storage facility if shipping is not an option. Shipping is scheduled to begin in January of 2013.

Committee Discussion

- *In planning for Yucca Mountain to open, has DOE-ORP incorporated the reality of rail-based transportation into the evaluation for the shipping facility?* Delmar said the shipping facility design includes the ability to load rail and have adequate spurs. Once the volume of material being transported is known, DOE-ORP will also look into the impacts of transporting waste on roads.
- *What if Yucca Mountain never opens?* DOE is required to plan for shipment, but the designs for the storage building include the ability to add space.
- *What is the design life of the facility?* The facility is designed to last as long as it takes for Yucca Mountain to open. However, DOE cannot legally design a long-term storage building. Keith Smith advised incorporating current canister storage lessons learned and worker perspective in the design of the facility.

Committee Business

- Assuming WTP information is available by mid- May, the committee decided to schedule a tentative full-day, joint TWC and Budgets and Contracts Committee meeting on May 12. The committee decided a committee call was unnecessary.
- The committee is interested in having a tanks program update for the Board, but agreed it should wait until June, when the revised WTP estimate information is ready.
- Committee members expressed interest in having more time to discuss the Tank Closure EIS and will put that on the agenda for August. Fundamental issues for the committee to discuss include credibility (i.e., is the model adequate to predict reality on the ground), integration, and cumulative impacts. Issue managers will help DOE-ORP anticipate what information the committee wants to hear. Dirk Dunning will serve as the lead, and will translate technical information into policy-level discussion pieces. Paige Knight and Pam Larsen will also help. The first draft of any advice should be ready in August in preparation for the September Board meeting. There is a need to communicate with the River and Plateau Committee (RAP) to address crossover issues.
- The committee discussed ideas for potential advice for the June Board meeting. Some committee members suggested drafting advice addressing the existence of three different groundwater studies and advising they be integrated. Since each groundwater study is operating with different assumptions, it might be good to produce advice soon to promote consistent and integrated studies.
 - Proposed language for advice: Proposed modeling in the TGD does not appear to match the reality of measurements on-site, and is not consistent with models in other EISs across the site. There is a need for consistency in modeling.
 - There is also a need for a product addressing cumulative impacts.

Handouts

- Waste Treatment and Immobilization Plant (WTP) Project, Lew Miller, DOE-ORP, 4/14/2005.
- WTP Black Cell Design Oversight, W.F. Hamel, DOE-ORP, 4/14/2005.
- Employee Concerns Program, Patrick Carier, DOE-ORP, 4/14/2005.
- Best-Basis Inventory, Steve Wiegman, DOE-ORP, 4/14/2005.
- Waste Retrieval Project Status, Delmar Noyes, DOE-ORP, 4/14/2005.
- Single-Shell Tank C-106 Appendix H Exception Request Update, D. Noyes, T. Sams, S. Richey, and M. Jaraysi, 4/14/2005.
- Tank Waste EIS Discussion, Mary Beth Burandt, DOE-ORP, 4/14/2005.
- Technical Guidance Document for Tank Closure Environmental Impact Statement Vadose Zone and Groundwater Revised Analysis, March 25, 2005.

- Demonstration Bulk Vitrification System Update, Billie Mauss, DOE-ORP, and Rick Raymond, CHG, 4/14/2005.
- Plans for Immobilized High-Level Waste Storage, 4/14/2005.

Attendees

HAB Members and Alternates

Al Boldt	Paige Knight	Keith Smith
Rob Davis	Pam Larsen	John Stanfill
Dirk Dunning	Jeff Luke	Leon Swenson
Harold Heacock	Maynard Plahuta	
Rebecca Holland	Wade Riggsbee	

Agency Staff, Contractors and Others

Mary Beth Burandt, DOE-ORP	Laura Cusack, Ecology	Jeff Daniels, Babcock Services
Pat Carier, DOE-ORP	Ed Fredenburg, Ecology	Jim Henschel, BNI
Thomas Gardner-Clayson, DOE-ORP	Jeff Lyon, Ecology	Kristine Bowen, CHG
Bill Hamel, DOE-ORP		Bruce Higley, CHG
Billie Mauss, DOE-ORP		Jim Honeyman, CHG
Lew Miller, DOE-ORP		Nick Kirch, CHG
Delmar Noyes, DOE-ORP		Nanci Peters, CHG
Erik Olds, DOE-ORP		Mike Thien, CHG
Steve Pfaff, DOE-ORP		Lynn Lefkoff, EnviroIssues
Steve Wiegman, DOE-ORP		Jason Mulvihill-Kuntz, EnviroIssues
		Stan Sobazyk, Nez Perce Tribe
		Sharon Braswell, Nuvotec/ORP
		Gail Laws, WDOH (Rad Air)
		P. John Martell, WDOH
		Mike Sobotta