INL Site Environmental Management

CITIZENS ADVISORY BOARD

# Meeting Minutes

January 20, 2010

The Idaho National Laboratory (INL) Site Environmental Management (EM) Citizens Advisory Board (CAB) held its bi-monthly meeting on Wednesday, January 20, 2009, at the Hilton Garden Inn, Idaho Falls, Idaho. An audio recording of the meeting was created and may be reviewed by phoning Support Services at 208-419-4158.

**Members Present**

R. D. Maynard, Chair
Richard Buxton
Doc DeTonancour
Harrison Gerstlauer
Fred Sica
Nicki Karst
Seth Beal
Tami Sherwood
Bruce Wendle
Robert Rodriguez
Teri Tyler

**Members Absent**

April Mariska (excused)
Willie Preacher (excused)
Damond Watkins

**Deputy Designated Federal Officer, Federal Coordinator, and Liaisons Present**

Rick Provencher, Deputy Designated Federal Officer, U.S. Department of Energy Idaho Operations Office (DOE-ID)
Bob Pence, Federal Coordinator, DOE-ID
Dennis Faulk, U.S. Environmental Protection Agency (EPA), Region 10
Susan Burke, State of Idaho Department of Environmental Quality (DEQ)
Daryl Koch, DEQ
Brent Rankin, CWI

**Others Present**

Lisa Aldrich, Project Manager
Ceri Chapple, Support Services
Lori Isenberg, Support Services Facilitator
Natalie Packer, ICP
Ben Roberts, DOE
Carl Lovell, ICP
Danielle Miller, DOE
Bruce Culp, ICP
Scott Reno, ICP
Jeff Perry, DOE
Dave Sanderlin, Naval Reactors Facility (NRF)
Bruce LaRue, DEQ
Colin Ramsey, Public
Erick Neher, DEQ
Kirk McKinley, ICP
Joe Nenni, ICP
Bob Homes, CS
Bruce Begg, INL
Sam Moricca, ANSTO
Curtis Roth, DOE
Matthew Wilkening, EPA
Kliss McNeel, ICP
Mark Hutchinson, NRF
Jim Floerke, ICP
Mary Wollen, Keep Yellowstone Nuclear Free
Jean Holdren, ICP
David Hutchison, ICP
Jason Casper, ICP
Jeff Perry, DOE
Ron Ramsey, DOE
Mark Arenez, DOE
Marcus Pinzel, DOE
Ed Ziemianski, DOE
Brant Meagher, ICP
Robin Paul, EPA
Don Rasch, DOE

## Opening Remarks

Chairman R. D. Maynard welcomed everyone to the meeting. Mr. Provencher welcomed everyone, thanked the CAB for their efforts, and provided brief updates. Additionally, the liaisons provided brief updates.

## Recent Public Involvement

Mr. Provencher provided an overview of public involvement since the last meeting.

## Progress to Cleanup

Mr. Provencher provided a status of the cleanup progress with active discussion among the CAB. The status included safety performance (CWI and Advanced Mixed Waste Treatment Project [AMWTP]), transuranic (TRU) waste disposition and the AMWTP. Mr. Provencher discussed the Waste Area Group (WAG) 7. In regard to WAG 7, Mr. Provencher outlined the Subsurface Disposal Area (SDA) Record of Decision and the Accelerated Retrieval Project interim actions. Mr. Provencher discussed the status of the Idaho Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Disposal Facility and CERCLA Remediation Projects: WAG 1 –Test Area North (TAN), WAG 3 – Idaho Nuclear Technology and Engineering Center (INTEC), and WAG 10 – Site wide Miscellaneous Sites/Snake River Plain Aquifer. He continued, discussing other CERCLA remediation projects. Mr. Provencher outlined the accomplishments and upcoming activities of the Idaho CERCLA Disposal Facility, INTEC CERCLA, and the Site-wide- Waste Area Group 10. Mr. Provencher outlined the Decontamination and Decommissioning (D& D) objectives and accomplishments. They plan to D&D 7 high risk facilities (6 completed) and 162 excess facilities (132 completed) under the baseline program. Additionally, they plan to D&D 89 facilities with the American Reinvestment and Recovery Act (ARRA) funding. Mr. Provencher discussed in detail the ARRA funded projects' objectives and accomplishments: Advanced Test Reactor (ATR) Complex, INTEC, and the Material and Fuels Complex (MFC). Mr. Provencher outlined the Integrated Waste Treatment Unit (IWTU) (Sodium-Bearing Waste) Project objectives, the Integrated Waste Treatment Unit Project (IWTU), INTEC Liquid Waste Facility (Tank Farm) Closure Project, the Spent Nuclear Fuel Disposition Project objectives, and the Calcine Disposition Project. Mr. Provencher summarized to the CAB key activities and completion dates on the aforementioned projects. Additionally, Mr. Provencher outlined where the six billion dollars of ARRA money is going and broke down the Idaho DOE Operations Office Recovery Act projects. He also briefed the CAB on how many jobs will be saved and created here in Idaho. Mr. Provencher provided a graph of the ARRA performance measures through December 2009. He also provided a timeline of key activities and completion dates.

Mr. Provencher notified the CAB of upcoming items of potential interest: the draft Mercury EIS, $19.5 million in Fiscal Year 2010 funds provided to BEA to process the Fast Flux Test Facility Fuel (FFTF) from Hanford, and the Idaho Operations Office manager position has been posted.

### Discussion

Robert Rodriquez asked if steam will just be used in the process at INTEC or if it is also used to heat the building. Brent Rankin responded that they are currently using electrical heat. The steam is not quite ready for use, but the goal is to use the steam to try and heat the facility first and then use it the treatment process.

Teri Tyler wondered how the NRF treatment facility was coming along and if the Navy is sending any of their waste to the facility to be transformed from wet to dry. David Sanderlin responded yes, the Navy is taking their fuel from their storage as well as from INTEC and processing it from wet to dry.

Tami Sherwood commented that with Yucca Mountain at a standstill, Idaho hasn't any end result for its High Level Waste and we are just 25 years from the Settlement Agreement deadline. Mr. Provencher explained that the CASB needs to consider what it would like to communicate to the Blue Ribbon Panel. There isn't a re-use possibility for Calcine. There may be a solution for Calcine that stands apart from other High level waste, possibly its own repository.

Richard Buxton asked if the Hot Isostaic Pressing (HIP) had been tested. Mr. Provencher responded that the process has been used since the 1950's and testing has been performed on calcine surrogate waste. The next step will be to run the calcine through a HIP unit.

Seth Beal asked if there was anything disqualifying the Calcine to go to WIPP. Mr. Provencher explained that WIPP is not licensed nor permitted to accept High Level Waste (HLW).

Susan Burke commented that the state recognizes that Calcine is different from other HLW at other sites. The other sites have liquid waste whereas Idaho's waste is solid. The state of Idaho did not want DOE to have to apply the vitrification process to all of the waste. The final product from HIP is better than the Boracilic glass produced from the vitrification process. Ms. Burke suggests that the CAB provide a recommendation to the Blue Ribbon Panel needs expressing a possible separate repository for the end product from HIP, emphasizing not all HLW waste should be lumped together.

Ms. Sherwood inquired is the sodium bearing waste would be treated through HIP. Mr. Provencher indicated that yes it is one option for the sodium bearing waste.

Richard Buxton asked what the estimated cost will be for the Hot Isostatic Press. Mr. Provencher explained that the construction will cost $1 billion and the lifecycle costs will be between $4-$5 billion. The vitrification process would cost around $16 billion.

Bruce Wendle asked if the end product from the HIP will still be considered HLW. Mr. Provencher said yes, it will still be HLW.

Teri Tyler asked where the interim storage would be. Mr. Provencher explained it will probably be similar to the sodium bearing waste storage facility.

Fred Sica commented that $6 billion seems like a lot spend for waste that doesn't have a repository to go to. Mr. Provencher emphasized that they are going spend $1 billion to treat the waste in order to get it "road ready" in compliance with the Idaho Settlement Agreement.

### Decisions/Disposition

The report satisfied the informational need for the CAB.

## *Waste Area Group 7 (OU 7-13/14), Phase 2 Remedial Design/Remedial Action Work Plan Status Update to CAB*

Markus Pinzel began by providing a brief background and history of the Subsurface Disposal Area and Buried Waste. He showed a photo of the Subsurface Disposal area (SDA) at the Radioactive Waste Management Complex (RWMC). Mr. Pinzel continued by providing a little background information. The WAG 7 Record of Decision (ROD)was signed September 2008.The ROD specifies In Situ Grouting (ISG) of buried waste containing Tc-99 and I-129 in trenches totaling approximately 0.2 acres as one of the remedies. The ISG is meant to reduce mobility of Tc-99 and I-129 in the interim until the surface barrier is constructed. The RD/RA Scope of Work

(DOE/ID-11377) describes ISG as "Phase 2" of the RWMC remediation and requires a Remedial Design/Remedial Action Work Plan. The Draft Phase of 2 RD/RA WP was transmitted to agencies for review on 12/16/09. Mr. Pinzel provided an example of Trench Disposal. He explained the ISG Operations in the Subsurface Disposal Area and displayed a diagram of the Jet Grouting Method. He displayed a conceptual view of an in situ grouting site after treatment. Mr. Pinzel explained the Non-Replacement Jet Grouting. The location of the waste disposal for grouting is mapped and each insertion point is identified. The Jet grouting is started as the drill stem is withdrawn in precise increments while rotating and injecting grout through nozzles located near the bottom of the drill stem. Parameters can be adjusted to minimize grout returns. The pressure is rated at 7,200 psi. These pressures are only achieved while drill is 4-5 feet below the surface. Pressure, rotational speed, and step rate parameters can be adjusted. The grout design and selection is a single-phase, non-displacement jet grouting with a low-water, high-plasticizer, Type 1S (50) blended hydraulic cement. Mr. Pinzel briefed the CAB on ISG operations. Grouting operations are scheduled for two field seasons, but efforts will be made to complete in one. Grout application will be discontinued approximately 4 ft from the surface. In trench areas, drilling and grouting will penetrate to a maximum depth of 17 ft from local grade or to refusal, whichever comes first. In the soil vault location, drilling and grouting will penetrate to a maximum depth of 25 ft from local grade. Drilling and grout injection will be applied on a 20-in. triangular pattern using specified operational parameters to achieve overlapping grout columns to treat the waste. Primary and secondary waste will meet waste acceptance criteria and be disposed of in the Idaho CERCLA Disposal Facility (ICDF). Grout returns will be left in place and covered with soil, each ISG site will be contoured to promote drainage after treatment is complete. Modifications to the existing monitoring network will not be required to accommodate ISG (i.e., probes and wells will not be abandoned, closed, or otherwise modified Rinse water will be characterized by process knowledge or sampling and compared to release levels in identified in procedures. If appropriate, based on characterization, rinse water will be discharged directly without intermediate tank storage or at another acceptable off-INL Site facility. Decontamination water will be sampled and disposed of appropriately. Mr. Pinzel explained the process of grout selection. Site-specific treatability studies have demonstrated that the grout mixtures identified in the Work Plan will work best for ISG. He provided a map of the In-Situ Grouting locations. Mr. Pinzel concluded by identifying the contractors who will be involved with the In-Situ Grouting project. CWI was awarded as the ISG Subcontractor.; CWI awarded the contract to Hayward Baker. Hayward Baker has specialized in geotechnical construction projects for over 30 years, and they are a member of the international Keller Group.

## Discussion

Susan Burke inquired as to what makes the grout stay in its cylinder form. Mr. Pinzel responded that the grout is like a type of wet cement a 50/50 mixture. It will maintain its solidified form, and there isn't any avenue for it to move around.

Tami Sherwood inquired if any contamination could come out of the overflow holes. Mr. Pinzel explained that they will punch the drill stem and grout in steps, about one foot at a time. The grout pressure will be adjusted four feet from the top, allowing the grout to just fill the remaining space. The waste is not in liquid form either; the trenches are filled with boxes and drums.

Richard Buxton asked what was contained in the boxes and drums. Mr. Pinzel said that most of it was PPE, trash and contaminated items from reactor activities.

R.D. Maynard wondered how they would know if they got the grout underneath the waste. Mr. Pinzel explained that there isn't any waste beyond 17 ft. There isn't a possibility of water to enter the waste area to create mobility once the grout is in place.

Doc DeTonancour asked if this type of grouting has been done before. Mr. Pinzel said that the beryllium block project was similar and some testing studies have been performed at RWMC.

Mr. DeTonancour asked how long the project is scheduled for. Mr. Pinzel said the project should only take one season, it has been accelerated with the ARRA money.

Seth Beal expressed some major reservations. He explained that he wasn't sold on this technology and feels like the project is just being pushed through quickly because of the extra ARRA money. He expressed that he would like to see a map of exactly where the trenches are located on the site. He said he had some concerns about leaching, saying that the presentation just raised more questions than answers. Mr. Pinzel said that he would get a map of the trenches. He explained that they are creating a concrete monolith with the pressurized grout. This however is not the end state for these trenches; it is an interim solution to prevent mobility of the waste until a cap can put in place. Dennis Faulk concurred. He explained that the risk assessment data indicate that something needed to be done immediately to reduce uncertainty over time: 1) to make sure there are no releases and 2) a more stable waste steam is created over time. Mr. Beal explained that his concern is with the pressure of the grout possibly disturbing the waste and causing it to accelerate in mobility. Mr. Pinzel explained that they are encapsulating the waste in a concrete monolith making sure not to mobilize the contaminants.

Harrison Gerstlauer asked why not remediate the waste. Mr. Pinzel explained because of the type of waste, TC-99, they have decided to leave it in place.

Fred Sica expressed a concern with the waste possibly leaching into the acquifer, he wonders if the movement of the grout and its moisture could accelerate the waste. Daryl Koch explained that the grout prevents future moisture from coming in. Mr. Pinzel explained that there is a buffer zone with the soil and that buffer zone will be grouted. Brant Meagher explained that this technology has been tested since the early 1990's and they have never seen an instance where the waste was pushed by the grout. The grout mixes with the waste.

Mr. Wendle asked expressed that he confused as to the purpose of grouting the trenches. Mr. Pinzel explained that it is to keep the waste from mobilizing until a cap is put in place.

Lori Isenberg summarized many of the CAB's ongoing concerns:

- Risk of Drilling- Possible Combustibles
- Unease with the entire process/ Diagrams are not sufficient
- Feelings that the project is being rushed.

### Decisions/Disposition

A follow-up conference call is recommended to answer further questions.

## *EBR II D&D EE/CA Overview*

Mr. Perry began by briefing the CAB on alternatives being considered. Four alternatives are proposed for evaluation in the Engineering Evaluation/Cost Analysis (EE/CA) for the EBR-II Final End-State: Alternative 1-No Action, Alternative 2-No Action: Continued Surveillance and Maintenance, Alternative 3-Grouting the EBR-II Reactor Vessel in place and Demolition of the Containment Building, and Alternative4-Removal of the EBR-II Reactor Vessel and Demolition of the Containment Building. Alternative 1-No action at EBR-II entails no further surveillance and maintenance at the facility. The No Action alternative offers no reduction in toxicity, mobility, or volume of contaminants. Assuming that the EBR-II containment building degrades over the next 85 years, building crumbles to the ground and contamination becomes available for uptake for the hypothetical future resident. Alternative 1 impacts examine human health risk. Impacts to the public do not meet remedial action objectives. Worker Risk impacts to the workers could be significant based on safety and health issues associated with a deteriorating building. Ecological Risk: impacts to the environment meet remedial action objectives, not as

protective as either Alternatives 3 or 4, ability to Meet ARARs: not compliant with ARARs. Mr. Perry provided a diagram of the proposed Alternative 1 end state.Alternative2-No Action involves continued surveillance and maintenance. There will be no reduction in toxicity or volume of contaminants, but it does provide more protection from mobilization of the contaminants to the environment than Alternative 1. This alternative includes maintaining MFC-767 EBR-II containment building and systems that provide power and ventilation. Surveillance would prevent release of radiological or chemical constituents to the environment causing an unacceptable risk to nearby workers. Mr. Perry provided a diagram of the proposed Alternative 2 end state. Alternative3, grouting the EBR-II reactor vessel in place, is the recommended alternative. Most above ground level structures would be demolished and the remaining structures would be grouted in place. End state is a concrete monolith that will extend approximately 8 feet above grade and will be finished to facilitate drainage away from the site. Residual radioactive materials would stay in place and be managed under the Site-wide Institutional Control Program. Alternative 3 impacts Human Health Risk: impacts to the public meet remedial action objectives. Worker Risk: industrial and radiological hazards are relatively routine for D&D work. Ecological Risk: impacts to the environment meet remedial action objectives. Ability to Meet ARARs: Compliant with ARARs. Mr. Perry provided a diagram of the proposed Alternative 3 end state. Alternative4 proposes the removal of the EBR-II reactor vessel. Alternative 4 includes removal and disposal of the EBR-II reactor vessel at ICDF. To allow removal of the reactor vessel, the primary coolant tank and all internal structures will have to be removed. The containment building would be demolished to ground level or below. All radioactive waste would be disposed at ICDF. Void spaces would be grouted as practicable, including the void left by removal of the primary coolant tank. Residual radioactive materials would be managed under the Site-wide Institutional Control Program. Alternative 4 impacts Human Health Risk: impacts to the public meet remedial action objectives. Worker Risk: industrial and radiological hazards are much greater than other Alternatives. Ecological Risk: impacts to the environment meet remedial action objectives. Ability to Meet ARARs: compliant with ARARs. Mr. Perry provided a diagram of the proposed Alternative 4 end state. He continued by outlining the implement ability of Alternative 3, explaining that it is technically feasible, and Alternative 4, explaining that it would be technically challenging, questioning if it can be taken apart. Mr. Perry provided photos of the construction details. He posed the question if the reactor could be taken apart. The reactor was not made to come apart; it is bolted and welded in place. There are radiological issues; there are high and very high radiation areas. Cutting would potentially exposes workers to highly radioactive particles and robotics have been shown to not work effectively in high radiation environments. He then posed the question if the reactor can be lifted. They would pour a light weight grout in the reactor vessel (to 16 feet) to reduce radiological fields from 2 Rem/hr to slightly greater than background levels. Without any grout, the reactor vessel is approx. 800 tons. The overall package with grout would weigh approx. 1,500 tons. The use of Strand jacks would be needed to lift the primary coolant tank nearly 45 feet in the air to allow placement on the transport vehicle. The contractor would prepare pads for the strand jacks towers to sit on. A series of 4 to 6 towers would be needed and a highly compacted level area would have to be created for each tower. The Strand jack towers and support equipment would be transported to the MFC. Transporting the equipment to MFC would require an estimated 100 semi-truck flatbed loads. Mr. Perry continued by explaining how it would be transported. A load of 1,500 tons would require a transport trailer 30 ft wide and 100 ft in length to carry the load. A significant construction effort would be needed to get the load from the lift site to the paved road leading from MFC. Hundreds of loads of road base material would have to be hauled, placed and compacted to make a road that would be suitable for a load of this size and weight. The MFC security gate (North Side MFC) would need to be widened. A transport trailer 30 ft wide and 100 ft long exceeds the current design of the highway. Road way modifications would be necessary. The load that would need to be transported would rise to approximately 45 feet in the air requiring electrical transmission lines and communication lines in CFA area to be disconnected and dropped so the load could pass through. Once the load has arrived at ICDF, the road into the disposal cell would have to be widened and made less steep. He then explained how it would be disposed of. First, disassemble, transport, and reassemble the strand jacks from MFC to the ICDF. Prior to placing the 1,500 ton load into the disposal cell, a large load bearing structure would need to be placed on the cell surface to spread the load to prevent damage to the underlying disposal cell liners. Since the load stands 38.5 feet tall, it would exceed the design height of the waste level in the disposal cell. Either another disposal cell, including leachate collection and monitoring, would have to be constructed or the current disposal cell cap would need to be raised approximately 12.5 feet in height. The Cost

Analysis of Alternatives 2, 3, & 4 are as follows: Alternative 2 is estimated to cost $5.3 million based on an annual average of $62.5; Alternative 3 will cost $15.4 million in D&D and $0.06 million in surveillance and maintenance, totaling $15.46 million; Alternative 4 will cost $45.4 million in D&D without any surveillance and monitoring. Mr. Perry explained that EBR-II reactor is different than the reactor vessels for MTR and ETR, there are source term (long-term hazards) and the reactor vessel size and construction to consider. He displayed a photo of existing facility and provided a visual of the conceptual end-state for Alternative 3. Mr. Perry explained the process of the sodium treatment. Most sodium will have been reacted with moist carbon dioxide (i.e., passivated) to form sodium bicarbonate, a much more stable compound than elemental sodium. Non-passivated sodium still exists; it resides mostly in the secondary sodium drain tank and associated piping in the west basement of MFC-766. Estimated Quantities of Sodium Remaining in EBR-II are as follows: the primary sodium tank has less than 500 gallons, the primary sodium tank ancillary equipment has less than 350 gallons, the secondary system (including the auxiliary systems) has less than 780 gallons, the intermediate heat exchanger has less than 150 gallons, and the container storage areas have less than 50 gallons. The total sodium residuals are less than 1830 gallons. The estimated Quantities of NaK in EBR-II are as follows: the pressure transmitters (primary and secondary systems) are less than 0.3 gallons and the shutdown cooler bayonets (includes captive gallons) are less than 50 gallons. The total NaK is less than 50 gallons. Mr. Perry provided numerous pipe, vent, and well photos. Mr. Perry spoke for a few minutes on sodium research and development. Bench-scale testing is being performed at Creative Engineers. They are testing what does work and what doesn't work. Laboratory tests are being performed on sodium chemistry. Mock-ups of sodium treatment are being designed. Mr. Perry provided some background info on EBR-II. EBR-II was built from 1957 to 1961 and achieved initial startup on November 11, 1963. The EBR-II was designed to demonstrate the feasibility of operating a sodium-cooled fast breeder reactor plant with onsite reprocessing of metallic fuel; demonstrations were successfully carried out from 1964 to 1969. The EBR-II facility provided as much as 19.5 megawatts of electrical power for ANL-W and INL sites. The EBR-II reactor is a sodium-cooled, fast breeder reactor with a designed capability of 62.6 MW of heat output. Sodium's melting point is 208 degrees F. The reactor operated between 700 degrees F and 883 degrees F. Sodium was as a coolant because of its excellent heat transfer ability and its non moderating effect on neutrons. Liquid sodium flows like water. EBR-II could "breed" more nuclear fuel than consumed. This was achieved by including a layer or blanket of U-238 subassemblies around the active core of U-235. Fast neutron activation of the U-238 resulted in Pu-239. The Pu-239 could be extracted from the subassemblies and used to fabricate additional reactor fuel elements. The reactor building is a pressure tight steel shell with an 80 ft. inside diameter, a total height of 140 feet about 48 feet of the 140 feet is below ground surface. The reactor, primary coolant system, and heat exchanger were completely submerged in a primary coolant tank filled with approximately 86,000 gallons of molten sodium which served to remove heat from the reactor. The reactor vessel assembly is a stainless steel shell and was not built to be removed since it is bolted and welded in place. Mr. Perry displayed a cut away sketch of the EBR-II Building and Primary Coolant Tank. He described the current State of the Reactor. The reactor is currently defueled and the bulk of the sodium has been removed and treated on site. An estimated 500 gallons of sodium remain in the primary coolant tank and its ancillary piping and vessels. This sodium will be treated in accordance with an approved Resource Conservation and Recovery Act (RCRA) closure plan and is a separate activity from the CERCLA Non Time Critical Removal Action (NTCRA) that will bring EBR-II to the final end state. Residual radioactive dose readings in the primary coolant tank are expected to be in the hundreds of Rem/Hour range.

## Discussion

Fred Sica asked how long it will take to dismantle EBR-II, wondering what the real difference is between Alternative #3 and #4. Mr. Perry explained that with Alternative #4 it would take many years. With Alternative #3 it is scheduled for the fall of 2011. The risk profile is higher with Alternative #3, however there is a much greater risk to the workforce with Alternative #4, not to mention the cost skyrockets and there are many, many engineering issues with a complete remediation.

Tami Sherwood wondered if the sodium in the piping could be left in place. Mr. Perry explained that the residual sodium must be treated before grouting. This treatment will be separately addressed under the Idaho RCRA hazardous waste program.

R.D. Maynard asked what it will take to move the dome. Bruce Culp explained that there will be some major D&D and engineering issues to solve. The dome is approximately 93 ft high, the inside is lined with 1" thick carbon steel and 6" of concrete. The height is close to the maximum reach of their processing equipment. They will most likely remove the concrete from the dome and then take it apart in pieces. They believe they can do the job safely. It will just take some further planning.

Seth Beal asked what the radiation concerns are with the removal of the dome. Bruce Culp responded that most of the above floor structures have little or no contamination. It should be a fairly clean demolition.

Mr. Beal inquired if there is any other possible mission for EBR-II. Jeff Perry explained that although it is a massive structure, there is very little usable floor space. They have explored all possible future missions and none were found.

Nicki Karst asked what the plans for the surrounding area will be if Alternative #3 is chosen. Mr. Perry explained that many of the surrounding building are scheduled for D&D as well. Dennis Faulk added that it was difficult from a regulator point of view to recommend Alternative #3; however, EPA supports this alternative because Alternative #4 is so much more difficult and dangerous to the workforce. The facility is in a location with long-term controls well into the future.

Daryl Koch added that EBR-II has been compare to the NTR and ATR reactors. The position has long been to that all CERCLA is supposed to go to the ICDF, however things change. The ICDF was built to deal with soils, not everything fits into the footprint reduction model. He emphasized the great risk to the worker, the huge D&D challenges, and the great expense of Alternative #4, as all factors in the state's decision to recommend Alternative #3.

Teri Tyler wondered what the radiation levels will be after it is capped. Mr. Perry explained that the radiation levels should be at background after grouting without the cap.

### Decisions / Disposition

A follow-up conference call is recommended to answer further questions and possible recommendation.

## *Basic Radiation Protection Concepts*

Richard Dickson demonstrated radiation protection through the example of making cookies. He provided the average dose to a person in the United States. He compared dose rates from the early 1980's with those of 2006. On average a person was exposed to 200 mrem of background radon in the early 1980's and compare to 230 mrem in 2006. A person was exposed to 100 mrem of terrestrial, cosmic, and internal radiation compared with 80 mrem in 2006. On average a person was exposed to 53 mrem of medical radiation in the early 1980's compared with 300 mrem in 2006. An average dose of radiation from consumer items in the early 1980's would be between 5-13 mrem, and 13 mrem in 2006. An average dose of industrial, security, educational or research radiation would have been 0.1 mrem in the early 1980's and 0.3 mrem in 2006. Occupational exposure would have been 0.5 mrem in 2006 and 0.9 mrem in the early 1980's. Total exposure for 2006 would be 620 mrem compared with 360 mrem in the early 1980's.

### Decisions / Disposition

The report satisfied the informational need for the CAB.

## *Calcine Disposition Project*

On December 23, 2009 the Department of Energy's Office of Environmental Management issued an amended Record of Decision (ROD). This amended ROD was prepared in cooperation with the State of Idaho and signed by the Assistant Secretary for Environmental Management (EM-1), selected hot isostatic pressing (HIP) as the treatment technology for the high-level waste (HLW) form known as calcine managed at the Idaho National Laboratory (INL). This action is pursuant to: the Idaho Settlement Agreement (Settlement Agreement) and the associated Consent Order "US District Court of Idaho, Settlement Agreement of October 17, 1995, Civil No. 91-0035-S-EJL, Civil No. 91-0054-S-EJL, Phillip E. Batt and the State of Idaho vs. the Public Service Company of Colorado and the US Government", the HLW EIS "The Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement (EIS) (DOE/EIS-0287, September 2002)", and the original HLW EIS ROD "The Office of Environmental Management Record of Decision for Idaho High-Level Waste and Facilities Disposition Final Environmental Impact Statement (70 FR 75165; 12/19/2005)". On December 29, 2009

The Department made the amended ROD available on its publicly accessible web site: http://www.gc.energy.gov/NEPA. On January 4, 2010 it was published in the Federal Register: 75 FR 137; 01/04/2010.

Mr. Ramsey explained the Alternative Analysis. The Department employed a phased analysis for the disposition of HLW/Calcine. The FEIS evaluated six alternatives with 12 total options: 1. No Action Alternative, 2. Continued Current Operations Alternative, 3) Separations Alternative (with three treatment options): a)The Full Separations Option, b) The Planning Basis Option, c) The Transuranic Separations Option, 4. Non-Separations Alternative (with four treatment options):a)The Hot Isostatic Pressed Waste Option*, b) The Direct Cement Waste Option*, c) The Early Vitrification Option*, d) The Steam Reforming Option, 5. Minimum INEEL (now INL) Processing Alternative, 6) Direct Vitrification Alternative (with two treatment options): a) Vitrification without Calcine Separations, b) Vitrification with Calcine Separations*(*surviving options). The analysis was subsequently reduced to three alternatives with five total options: 1. Direct disposal [4.b modified], 2. Vitrification: a) Vitrification without separations [4.c], b)Vitrification with separations [6.b], 3) Hot Isostatic Pressing (HIP), a) HIPing without RCRA Treatment [4.a modified], b)HIPing with RCRA Treatment [4.a].

Mr. Ramsey described the Alternative selection. The Department has decided to select HIP as the technology to cost-effectively treat calcine to provide a volume reduced monolithic waste form that is suitable for transport outside Idaho, with completion of treatment and road ready by a target date of December 31, 2035. He outlined the selection impact. Should calcine be dispositioned at a non-RCRA-permitted site, HIP technology has been successfully demonstrated on surrogates to meet the performance of single-phase borosilicate glass for Savannah River Site and Hanford Site. (This will suffice with an approved EPA "Listed Waste" Delisting Petition.). Should the final HLW repository be a RCRA-permitted site, treatment additives will not be required, thereby reducing the final volume of the waste form and achieving further economies. (This will suffice with an approved EPA modification to the HLW-LDR Standard.) This option also presents the flexibility to further treat the SBW steam-reformed carbonate waste form, should such treatment be necessary in order for this waste to be ready to leave Idaho by 2035. Mr. Ramsey explained the selection value with regard to the environment. Under normal operations, none of the waste processing action alternatives analyzed in the EIS would result in large short-term or long-term impacts to human health or the environment. None of the action alternatives result in appreciably different impacts on historic, cultural and natural resources. Any of the waste treatment alternatives that place the calcine in a waste form suitable for disposition outside of the State of Idaho would be environmentally preferable compared to the "No Action" and "Continued Current Operations Alternatives". He continued to explore the

selection value with regard to cost. Life-cycle cost estimates are developed for comparative purposes and to accommodate the range of associated risks rather than to moderate the risk. Detailed cost estimates for construction have not been completed. The evaluation of costs was performed on a life-cycle basis. This included costs associated with: 1) Finalization of the proof of concept for the treatment technology; 2) Obtaining waste package characterization and acceptance from the planned repository; 3) Design, modification, permitting, and construction of the facility; 4) Startup testing; 5) Operations; 6) Transportation of the finished product to the repository; 7) Disposal within the repository; and 8) RCRA closure of the facility.

Mr. Ramsey described the next steps in the process. With the publication of the amended ROD, DOE has initiated development of: 1) Calcine Disposition Project Critical Decision-1 (CD-1) package for submittal to DOE/HQ for review and approval by 12/31/2010; and 2) RCRA Part B Permit Modification Request for submittal to the State for review by 12/01/2012. The actions are deliverable milestones required under the INL Site Treatment Plan and the Settlement Agreement.CD-1 is the DOE approval process for the selected alternative. It provides for project engineering and design funds to develop the conceptual design. During this period, DOE will: Continue proof of concept process for the technology to be employed in the treating of calcine; Finalize document packages associated with the CD-1 process (e.g., conceptual design report); and Develop a final disposition strategy for calcine commensurate with the Blue Ribbon Panel recommendation.

Permit Modification is associated with the Integrated Waste Treatment Unit (IWTU). The IWTU facility is to be employed by DOE at the INL in two phases. Phase I–In the original HLW ROD, DOE determined to close the INTEC Tank Farm and to treat the remaining liquid SBW using steam reforming technology. DOE is building the IWTU to treat and package the SBW by 12/31/2012 under a RCRA Part B Permit. Phase II–Upon completion of Phase I, the mission for the IWTU will change to treating calcine, and the RCRA Part B Permit will require a permit modification. With regard to facility readiness, IWTU is designed to meet: seismic criteria, Calcine hazard inventory, and receive treatment mission. Mr. Ramsey provided a graph exhibiting the critical path for Calcine disposition. He also provided a cut away diagram of a HIP schematic as well as a HIP demonstration. He conclude by listing future presentation topics: The completion and approval of CDP CD-1 package, 1st quarter of FY 2011; Hot calcine treatability studies, Part 1 results, 2nd quarter of FY2011; Hot calcine treatability studies, final results, 1st quarter of FY2013; Submittal of RCRA Part B Permit Modification, 1st quarter of FY 2013.

## Discussion

Seth Beal asked if the decision to ship the calcine to a non-RCRA site or to a RCRA site will influence the decision to treat it with the additives. Mr. Ramsey explained that calcine will be treated with RCRA requirements in mind, therefore they plan to treat it with the additives.

Teri Tyler asked what the additives are. Mr. Ramsey explained that the additive s will create a ceramic glass that will capture the elements of the calcine. Treatability studies have shown that it meets the TCLP as well as the PCT which tells the value and consistency of the glass. Test to date are very promising, they have treatability studies yet to complete, ensuring they have a case to present to the EPA for the delisting petition.

Harrison Gerstlauer asked what the HIP schematic compression was. Mr. Ramsey responded that the pressure is 5,500-7,200 ppsi and the heat reached 1,000-1,200°.

Susan Burke explained that that there is a statement in the ROD by the state which expresses their position in preference of the HIP technology with the addition of the treatment additives because it is the most likely form to meet current regulatory requirements allowing for disposal outside the state of Idaho for storage or disposition. The overall focus is to have the treatment additives put in because it gives us the best option for disposal location. Weighing the difference in compression there isn't that much of an increase in volume, plus it is a huge decrease in what the canisters are now as well as with vitrification.

Nicki Karst asked how big the storage building will need to be. Rick Provencher said that a sizable facility will most likely need to be constructed. Mr. Ramsey said that modular units will most likely be built, that way they can add on as needed.

### Decisions / Disposition

The report satisfied the informational need for the CAB.

## *Public Comment*

No public comment was provided.

## *Announcements and Other Board Business*

The next meeting will be held March 16, 2010, in Idaho Falls, Idaho at the Hilton Garden Inn.

## *CAB Work Session*

The CAB restructured its committee system.

Conference calls regarding In-Situ Grouting and EBR-II will be scheduled.

The CAB discussed a possible tour of EBR-II in May.

The CAB developed an agenda for topics of the March meeting:

In Situ Grouting - Presentation
EBR-II Report
FY2011 Budget
Mercury EIS
Calcine

The CAB reviewed further developed the Annual Work Plan based around the new two committee structure.

### Action Items:

1. Lisa Aldrich will schedule conference calls for regarding In-Situ grouting and EBR-II.
2. Support staff will coordinate and distribute travel information to CAB members attending the March meeting in Idaho Falls, Idaho.

Members provided written feedback forms to support services at the conclusion of the meeting.
Attachments (8) to these minutes are available on request from the INL Site EM CAB support office.

I certify that these minutes are an accurate account of the January 20, 2010, meeting of the Idaho National Laboratory Site Environmental Management Citizens Advisory Board.

R D Maynard

R. D. Maynard, Co-Chair 3/8/2010

Idaho National Laboratory Site Environmental Management Citizens Advisory Board
RDM/cc