



MINUTES

January 25, 2023

Commission Members in Attendance:	
Scott Bedke	Scott Snyder
John Wagner	James Ruchti
Nancy Glenn	Philip Reppert
Brian Wonderlich	Rebecca Casper
Tom Kealey	Hootie Langseth
James Petzke	Raul Labrador
Richard Stover	Doug Sayer
Ty Blackford	Jim Woodward
Brady Hall	Chris Nomura
Wendy Horman	Mark Peters

9:02 am Co-Chair John Wagner called the meeting to order.

Jess Byrne moved to approve minutes from October 12, 2022. Seconded by Hootie Langseth. Motion approved.

Connie Flohr, Idaho Cleanup Project Manager, provided an Idaho Cleanup Project Update. See PowerPoint.

Q: Hall – As to IWTU, how long does it need to process 900,000 gallons of sodium bearing waste?

A: 3–6-year window. I believe we have processed 400,000 gallons of simulant and we ran about 400 days. If you do the math on that, we’ve run simulant of about half of the waste. If the plant runs 24/7 and runs swiftly and didn’t have to stop for maintenance, the math works out to 2.5-3 years. That is not likely, we will likely need to do maintenance. I’m thinking 4-5 years realistically. Right now, the plant likes to operate about 2,000 gallons a day. The plan is to have 2 cannisters a day.

Q: Bedke – When we say simulant, what does that mean? Is it bad if simulant leaks?

A: We’ve been functioning and running this plant as if the simulant is already radioactive material. It’s as close to constituent as actual waste. Simulant is the same stuff minus radionucleotides.

Q: Wagner – What does completion of dry spent nuclear fuel transfers mean?

A: This has been a decades-long effort. CPP66 is the fast facility which has a large water pool that when rods were brought here, they were stored in encasements in the water. The Settlement Agreement said we would move them out of there into a dry storage facility, CCPP603. It would remain there until it could be removed, packaged, and shipped to a repository. We are currently down to the last six transfers of ETBR fuel.

Co-Chair Wagner explains the intention of the LINE Commission. The LINE Commission will advise the Governor on policies and actions of the State of Idaho to support and enhance the long-term viability and mission of the Idaho National Laboratory and other nuclear industries in Idaho.

Jess Byrne, DEQ Director, and Mark Clough, Settlement Agreement Coordinator, DEQ's INL Oversight Roles. See PowerPoint.

Q: Labrador – We heard from the DOE that we hit a snag last month. Are you concerned about that? Are we going to be able to fix that quickly? What are your thoughts?

A: Understand that there are a lot of problems with bringing a plan this complex to life. Feels the response was satisfactory. [Byrne] From our perspective I feel like the DOE is doing everything they can to get the facility operating, but I also understand they are valuing safety, which is also just as important to us.

Q: Brian Wonderlich – Concerns about contamination from bearing waste and it going toward the Snake River Plain aquifer and agricultural areas. Do you feel like monitoring is sufficient and that the cleanup is working and protecting that area of Idaho?

A: I do believe that the level of monitoring we are currently undertaking is sufficient. Our biggest challenge is maintaining staff. It takes specialized staff that are in very high demand as nuclear energy gains traction. Main concern is internal capacity to maintain the work.

Q: Labrador – You spoke a lot about the original intent of the Agreement. The potential storage facility plans, and technology have changed...

A: We are implementing the original intent and the amendments. It would require looking at agreements and modifying if a different path were to be taken. Settlement Agreement has served different purposes, but I [Byrne] have observed that it is giving Idaho leverage on the national cleanup stage. By having our Agreement, we are elevated in the priorities, so there have been very tangible benefits for us on the national level.

Q: Woodward – I have seen progress. If the IWTU doesn't work and we have 900,000 gallons of sodium bearing waste, what do we do?

A: Evaluated many options when steam reforming was chosen. If it didn't work, which we have no reason to believe it wouldn't, we would go back to original list of technologies and see if any have matured and are more appropriate at this point. We have a technical group look at many aspects of this plan which has contributed to the success we've had in recent years. We feel confident that our chosen solution is appropriate to treat this waste.

Q: Scott Snyder – What levels of health physicists are you looking for?

A: Typically, they have masters degrees. We will hire them out of college and train them, then they often go to INL where they get paid more. State is working on addressing retention. Additionally, there aren't as many health physicists out there.

John Wager, Director of Idaho National Lab, Introduction to INL's 5 directives. INL is focused on clean energy, focused on nuclear energy, and security. Research and development is focused around five directives three of which are nuclear directives.

Jess Gehin:

- Maintain existing fleet of reactors (93 light reactors)
- Look at next generation of nuclear reactors such as advanced nuclear reactors and small modular reactors
- R&D on nuclear fuel cycle, including work on the back end of the fuel cycle such as recycling
- Key area is in fuels and materials
- Modeling and simulation such as AI

Todd Combs: Works on non-nuclear energy that does not involve security.

- Transportation. Significant research in batteries. Safety work on EV batteries. Charging infrastructure work. Cybersecurity
- Biomass. INL is the feedstock laboratory that looks into how to turn feedstock into fuels
- Municipal solid waste

- Power grid. Work on how to build efficient renewable microgrids. Did a hydropower microgrid demonstration with Idaho Falls Power
- Advanced manufacturing. Has the world's largest centering field which allows manufacturing at scale and with lower energy use at a faster speed
- Critical minerals and materials. Lead research on recycling and reuse of minerals. Developed a way to capture rare earth minerals out of potato waste water
- Renewable energy integration with nuclear
- Hydrogen. Is the nation's high temperature electrolysis laboratory which can be used to create hydrogen

Ron Crone:

- Advanced reactors
- Test beds
- Materials
- Nuclear fuels and materials research
- Build for NASA
- Intech facilities. Office of Nuclear Energy

Zach Tudor: National homeland security.

- Cybersecurity
- Control systems operations. How to operate safely and securely
- The state can leverage the national capabilities of the lab. Cyber-informed engineering was signed off as a national strategy by the Secretary of Energy. Idaho universities are partnering with INL and collaborate closely on workforce and curriculum development
- Working with Idaho National Guard
- Hazards analysis IOEM that adopted
- Work industry such as Micron and Idaho Power

Sean O'Kelly:

- Advanced test reactor
- Support US Nuclear Navy. Also support other countries' Navies
- Support the DOE in doing nuclear testing
- Produce cobalt 60 for medical uses in the Advanced Test Reactor
- Create plutonium 248 to support NASA space missions

Q: What is a microreactor?

A: 10-20 MW. Are completely factory fabricated. Can deploy them and then take them down. Can be collocated in rural areas, at an industrial location. Apply to other missions.

Q: What is an SMR?

A: Generally, 300 MW (1/3 size). Can be partially factory fabricated.

Q: What is RPS?

A: RPS units aren't a fission source. Thermal electric. Can be used on spaceships, space rovers. Is Matt Damon's heat source in the Martian.

Q: How are reactor demonstration projects going?

A: The test beds are places where governments or educational institutions can test projects. Idea was to have the entire fuel cycle closed on INL's site. Guttled the EBR2 dome and ZPFR and put in enough utility to come in and test... It's going well. There are technical challenges with the reactors, which is why they are doing testing. As a laboratory, there has been a tremendous amount of growth. Quadrupled the amount of material handling. If you have a reactor, you need a place to start it up and operate it.

- MARVEL (being designed at INL, funded by Office of Nuclear Energy program, with a goal to get 100 kW reactor up and running and learn, research opportunities for integrated energy systems) going well. Supply chain issues. Proceeding as expected and is on track to hit milestone by next year.
- Pele: Department of Defense mobile and deployable microreactor. Funded by Department of Defense. Processes are moving along well.
- Molten Chloride Reactor Experiment: Advanced Reactor Demonstration Program. Utilized liquid fuels. Intended to address data on this type of reactor.

Q: Can you speak to how INL is incorporating security into Department of Defense processes?

A: Working hand in hand with MARVEL and Pele teams. The Sec. of Energy signed INL's cyber-informed engineering. Cybersecurity is at the forefront of what is being developed at INL. Need to think about cybersecurity up front instead of tacking it on as an afterthought later on.

Q: What is cybersecurity?

A: We look at physical capabilities and how cyber systems will impact those operations and could potentially cause physical destruction. Engineer vulnerabilities out of the system from the beginning.

Q: Have not operated a new reactor since the 70's at INL. Why is that?

A: Starting in the 70s, interest in nuclear energy waned. In the last decade this has changed as the country becomes more interested in clean energy. Nuclear operates 24/7 and is not weather dependent which can support renewable energy integration. Growth in the first decades beginning in the 1950s was very successful. Still does a lot of work for nuclear reactors that are already operating, support the growth of advanced reactors by demonstrating that it works. Many non-traditional uses of nuclear energy as well in things like hydrogen, integrated energy systems.

Q: What is INL doing on hydrogen?

A: Doing research on how to improve hydrogen production through different processes such as high temperature steam electrolysis. Third party validation to prove to investors that technologies are working. Identify end users to decarbonize operations (seeing local interest from Intermountain Gas, Anheuser Busch, Idaho Power)

Q: Casper – Can you talk about the reality of why all of this is worth doing and why each type of technology is worth investing in?

A: Nuclear is compelling as an energy source because it has fewer byproducts. Existing fleet is providing 25% of the nation's power, even with some plants being shut down, the existing fleet will continue to operate. Still a huge interest in SMRs. Advanced reactors are reliable safe and clean, small. Nuclear comes in different sizes and shapes and there is still interest in all. Fusion is being considered a breakthrough, commercial and engineering challenges to bring fusion to scale. Think not as a progression, but a variety of options. More about the application, fusion will not discard the innovation in fission. There are different products for different end uses.

Q: Woodward – Are SMRs and advanced nuclear being created to provide baseload and follow load?

A: Modular designs are able to follow load. Advanced nuclear absolutely.

Q: Glenn – What are research needs on hydrogen?

A: The hydrogen team is small (handful to a dozen people). Going to need a variety of roles filled across the spectrum of skills and qualifications.

Q: Weismann: Production of hydrogen.

A: Don't think there is an issue of producing the hydrogen. Most of the struggles are on the demand side. \$8 billion DOE investment in hydrogen hubs will help create strides to have industry create change.

Q: What's the future of the Advanced Test Reactor? What is core internal change out?

A: The ATR is meant to damage and test materials for fuels. While the ATR is doing testing, we are also managing its own internals that need to be replaced due to usage. Just completed core internal change out last year, which are now brand new to continue to operate. Next one is scheduled for the early 2030s. Might continue to operate for much longer or will determine a replacement, DOE and Navy is discussing this right now. The need for a test reactor is an enduring mission that the Navy want to continue.

Q: Sayer – When we look at new technology, they use a different fuel. Where is that coming from and what is the plan for that?

A: Enrichment of uranium. Another aspect is fabricating uranium into fuel.

Q: What opportunities are there to work together with state partners and industry?

A: Once you have an operating reactor, you need to operate, maintain, and scale it. Reactors will need suppliers, materials manufacturing, training. A whole infrastructure needs to be set up. Huge opportunities for companies to support. Look at where you might fit into the nuclear supply chain, there is opportunity to create more. Idaho can help with nuclear workforce.

Robert Boston, Idaho Operations Office Manager, Office of Nuclear Energy, DOE NE Update. See PowerPoint.

Front End of the Nuclear Fuel Cycle – Panel (INL: Monica Regalbuto, DOE NE: Mike Goff, Centrus Technical Solutions: Ben Jordan, Peninsula Energy Limited: Wayne Heili, Moderator: Mark Peters)

Regalbuto. See PowerPoint.

Goff: Office of Nuclear Energy priorities include keeping the existing fleet of reactors operating, building new reactors, expanding international cooperation. The only commercial source of HALEU is in Russia. The DOE is issuing reports on supply chain issues which uncovered that there is a fuel supply issue for advanced reactors. 20% of enriched uranium for current fleet comes from Russia, as is the case for much of Europe as well. Looking into adding capacity and enrichment in the United States. The IRA provides \$700M for HALEU production. Putting out RFP under the IRA to spur new development of HALEU.

Jordan. See PowerPoint.

Heili. See PowerPoint

Q: Weismann. Are we doing ourselves more harm than good if we ban imports from Russia?

A: We have the inventories that show that we won't be shutting anything down in the short term. Fuel fabrication takes over two years, so we have 2 or more years of fuel stored. U.S. mines are restarting – for example, Wyoming will begin producing uranium this year. Capacity for enrichment is the main issue. It may take 4-5 years to build new capacity.

Q: Byrne – Why did US enrichment drop off?

A: Laser enrichment. Started focusing on centrifuge in 2003. Since then, we have been trying to bring centrifuge enrichment back. It was an economic decision that forced us to close our last gaseous diffusion.

Q: Scott Snyder – Can you discuss the material that is leftover from EBR2 that can be converted in HALEU? Can this be any kind of stopgap to help in this shortage?

A: You can make HALEU in multiple ways. You can take material from gaseous diffusion and down blend that to 20%, but this has been set aside for the Department of Defense and Department of Energy use. For commercial purposes, you can recover materials through down blending at INL. This is also done for medical isotopes. Yes, this can be part of the solution.

Q: Casper – Can you clarify what SMR require? What are the processes for identifying new sites? Is that worrisome that there is not much exploration?

A: SMR can require either LEU or HALEU. It is not a big concern right now since we have already identified sites, it's that we need to start mining the resources. Eventually, we need to invest in exploration because the resources will eventually be depleted.

Richard Stover, Administrator of the Idaho Office of Energy and Mineral Resources, Update on the State Nuclear Policy Working Group. See presentation.

Q: Snyder: What's the definition of in-demand career?

A: This is not explicitly defined in the bill because we recognize that this can change over time. The Workforce Development Council is figuring out what careers Idaho needs currently.

Q: Nomura – Is this a one-time investment?

A: This is a one-time \$8,500 for students. Excess money may be used to support and match for particularly in-demand careers.

Hope Morrow, INL Resident Labor Economist, and Dana Kirkham, IEC Director Strategic Initiatives, Idaho Advanced Energy Consortium. See Presentation.

Q: Snyder -- Where does higher education fit into this?

A: Higher education and K-12 is included in the Workforce Development Working Group.

Q: Kealey – How many full-time employees? I would love to see the organizational chart built out.

A: At the moment, it is 1 full time employee and two loaned executives until the funding is expanded. A lot of the work is to consolidate information and have it in a central place.

Q: Casper – I think this can launch with volunteered talent. Is there a lot of participation from those involved in the nuclear group?

A: Yes. This expands beyond nuclear to advanced energy as a whole.

Q: Wagner -- What is the structure?

A: We are seeking 501c6.

Q: Wagner – Will you help navigate grant processes and get resources?

A: This is certainly the point and is something we will build up to.

Q: Wagner – Not always a clear place for companies to know where to go for information on workforce. Can I direct private entities to this group?

A: Yes, for the advanced energy sector.

Q: Weissman – What direction do you see yourself going as far as funding profile 5-10 years?

A: Grant funding, private industry, all except DOE funding. This will be the executive team's call and they have yet to decide that.

Marianne Walck, Philip Reppert, Eleanor Taylor, Eric Whiting. INL/State Collaborations: CAES, Cybercore Integration Center, Collaborative Computing Center. See presentations.

Q: Wagner – Can industry come in?

A: We are just figuring out where to go with it. Our initial thoughts are to fund faculty.

Q: Wagner – Put a computer in that is architected for AI and machine learning

A: The Sawtooth computer has a part that is specifically tuned for AI. Another half rack dedicated for machine learning. Have been doing quarterly meetings on AI machine learning.

Q: Glenn – Comments on appreciation for the work of the group. 5-10 years for C3 and Cybercore, how can universities support?

A: Hoping to have bigger machines. Need people, grand challenges to support advanced nuclear so partnership with universities is important. Work on growing and expanding synergies.

Kealey – Thank you INL for the cybersecurity taskforce.

Commission Discussion

Casper: I have been thinking about what impressed me today. We should probably keep a few things on our watch list.

Connie Flohr – I would like to learn about the outcome of the workshop. When the Idaho Settlement Agreement was crafted, INL's mission did not exist. The Settlement Agreement doesn't factor in INL's mission. If there were a way to make sure the current mission dovetails better than they do. If our only bargaining chip is to give up our 55%, then that is not worth doing for a while since it is incredibly valuable.

- Wagner: I do think there will be efforts between the DOE and the Governor's Office on what this will look like moving forward. In 1992-1994, a number of reactors were shut down. The mission changed from nuclear energy to cleanup, which triggered the Settlement Agreement. In 2005 INL was formed with the charter that it would be the nation's leader on nuclear energy.

Snyder: If Idaho is truly to be a long-term national player in the advanced energy space, workforce is crucial. Industry won't come into the state without knowing a workforce is there. I suggest at the next meeting that the commissioners have a discussion on workforce and any suggestions we might want to make to the Governor.

Public Comments

No public comment.

Closing Comments

Next meeting is May 3rd in Idaho Falls. Tours will be arranged for May 4th.

Meeting adjourns at 4:18