Safety & Environment Subcommittee

FINAL REPORT & RECOMMENDATIONS

November 1, 2012

Chairmen: Dr. Mark Rudin, Sylvia Medina

Members: Dr. Robert P. Breckrenridge, Dr. Richard R. Brey, Roger Chase, Sharon Dossett, Don Glenn, Jr., Scott Goodwin, Peggy Hinman, Amy Lientz, Brian Olmstead, Willie Preacher, Susan Stiger, Dr. Tom Wood

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Introduction

To support the development of recommendations to Governor Otter, the LINE Commission formed five subcommittees to address key issues. Each subcommittee is chaired by a member of the LINE Commission. Subcommittee membership consists of LINE Commission members as well as non-members. Members of each subcommittee include subject matter experts who add valuable knowledge and expertise. The co-chairs of the Subcommittee on Safety and Environment are Ms. Sylvia Medina, president of North Wind, and Dr. Mark Rudin, vice president of research and economic development at Boise State University. Subcommittee members and support staff are listed in the attachment to this report.

Scope of the Subcommittee on Safety and Environment

The Safety and Environment Subcommittee was asked to make recommendations focused on:

- Steps the State of Idaho could take to mitigate and/or eliminate potential environmental and safety risks that may currently or potentially exist as it relates to continuing nuclear energy research and operations in Idaho;
- Potential public/private partnerships or roles the State of Idaho can play in supporting and strengthening INL's safety capabilities; and,
- Any additional observations important for the State of Idaho to consider in its efforts to maintain and strengthen its commitment to safety and environment stewardship as it relates to nuclear energy.

In consideration of its potential recommendations, and as background, the Subcommittee was asked to:

- Summarize the current strengths and deficiencies present in the national and global nuclear energy industry as it relates to safety and protecting the environment;
- Identify the current strengths and deficiencies present in the state of Idaho as it relates to the State's ability to support expansion of its role in nuclear energy and operations;
- Outline the potential environmental and safety risks that currently exist in the State of Idaho as it relates to the eventual cleanup of existing nuclear waste; and,
- Summarize the potential environmental and safety risks that may currently or potentially exist as it relates to the continuing nuclear energy research and operations in Idaho.

Recommendations

Section One

What can the State of Idaho do to mitigate and/or eliminate potential environmental and safety risks relating to nuclear energy research in Idaho?

Recommendation 1.1 – Continue to sustain and communicate the State's commitment to safety and the environment.

The Subcommittee recommends the creation of a focal point within the State for citizens to access information on nuclear energy, Idaho National Laboratory (INL) cleanup and operations, environmental monitoring, nuclear energy research, news and recent developments, transportation routes, emergency planning, etc. The appropriate location for this focal point may be the Governor's Office of Energy Resources.

- Emphasize an "honest broker" role to inform the public about nuclear energy research, development and operations, including INL's role in as the nation's lead laboratory supporting nuclear energy.
- Highlight the successes of INL cleanup efforts and oversight of current operations, including improvements made throughout the years and the degree to which the environment continues to be protected in and around the INL.
- Coordinate with INL to expand access to venues for interactions among engineers, scientists, educators, and citizens on environmental and nuclear energy topics through elementary and secondary class modules, social media, hands on experiences, etc.
- Include virtual tours and tutorials on the INL and nuclear energy topics that are available on demand.
- Include information about the advantages, risks, benefits, and costs, to the State of Idaho and to the nation associated with nuclear power research and development, including information on environmental and economic impacts relative to other types of energy development.
- Include information about the history of nuclear power research at the INL for the past three generations. Many Idahoans may not be aware of the early history of the laboratory and hence may not understand or appreciate its prominent role in the development of commercial nuclear power.
- To enhance transparency about new technology being developed at the INL, disseminate news releases and media advisories throughout Idaho and the intermountain west region.
- Track and disseminate information on national nuclear energy related issues of interest to Idaho citizens such as the future disposition of used nuclear fuel and high level waste.

Background

The State of Idaho, the Department of Energy (DOE), the Environmental Protection Agency, and the Nuclear Regulatory Commission (NRC) have regulations and requirements to ensure protection of human health and the environment during nuclear energy related operations. Communication with Idaho's citizens regarding the steps taken to mitigate and/or eliminate potential environmental and safety risks would help address public concerns. Idaho citizens should feel comfortable that the state's commitment to environmental stewardship will not be compromised. To that end, citizens need access to information, increasingly on their own terms and time frame, and, it is important to have a structure in place to meet their needs. The State plays many roles in nuclear energy research and operations (e.g., oversight, permitting, economic development, transportation safety, emergency response) are valuable sources of information. The State's leadership on cleanup of INL legacy waste is a clear demonstration of Idaho's ongoing commitment to maintain a safe and healthy environment.

Recommendation 1.2 – Provide oversight for safe and secure transportation of nuclear material.

The Subcommittee recommends the State of Idaho INL Oversight Program continue to provide coordination of the State's role for oversight of safety in transportation and emergency response. The interface between citizens and the State of Idaho should be transparent and provide easy access to information.

The state can coordinate the focus on future or expanded needs for the safe transport of nuclear materials through Idaho. Through the INL Oversight Office, Idaho State Police, Idaho Transportation Department, Idaho National Guard, and other federal, state, local, and county officials, interested Tribes and non-governmental organizations, can come together to identify future needs for transportation and public safety, pursue funding to fill those needs, and optimize coordination among the different groups.

Background

The State of Idaho plays several important roles in overseeing transportation of nuclear materials and waste and preparedness for emergency response. The transportation of nuclear materials and waste is expected to continue as part of normal INL operations, and may expand as industry locates near the INL or elsewhere. The INL Oversight Program was established by the Idaho Legislature in 1989 to independently assess impacts from the INL. The Oversight Program's responsibilities include coordinating State protocols for shipments of waste from INL and receipt of used nuclear fuel. The Shoshone-Bannock Tribes also participate in oversight of radioactive waste shipments through the Fort Hall Reservation along I-15 southeast of the INL.

We are cognizant of the existence of the National Transportation Stakeholder Forum that is working on issues related to the transportation of nuclear waste that is currently being shipped

across the nation to other nuclear facilities with the involvement of the Shoshone-Bannnock Tribes and State of Idaho.

Recommendation 1.3 –Take opportunities to set the stage for future development of nuclear energy research and operations in Idaho.

The Subcommittee recommends that the State of Idaho take a lead role in water and the environment by making an early assessment of water demands of new energy developments to guide future development at the INL and elsewhere.

Through its Office of Species Conservation, the Subcommittee recommends the State of Idaho put the necessary plans in place to address endangered species issues (e.g., sage grouse) that may potentially impact future nuclear development at the INL.

We also encourage the State of Idaho to maintain a dialogue with the Shoshone-Bannock Tribes about the potential development of nuclear energy facilities at locations in which they have an interest.

Background

The LINE Commission has received information at its meetings that Idaho's resources, location, and climate make it attractive for nuclear energy research and operations. The INL, in particular, is well-suited to future development because it has processes in place and is currently managing waste and materials, providing safeguards and security, and monitoring environmental conditions.

The Subcommittee has identified opportunities that can be pursued now to assure Idaho's and INL's continued suitability for future development of nuclear energy research and operations. One opportunity is anticipation of water needs for nuclear energy research and operations as part of the State's water planning processes conducted by the State Water Board and Idaho Department of Water Resources. Another opportunity relates to the protection of endangered species on federal land in Idaho. The INL site contains prime sage grouse habitat. It is expected that sage grouse could be proposed for listing as an endangered species within the next five years. If that occurs, locations for development at the INL could be significantly limited. There is a window of opportunity to convince the federal government that listing is not needed to protect the species due to state and regional conservation efforts.

Moreover, we are aware that the INL is located on land over which the Shoshone-Bannock tribes have both treaty rights, through the Fort Bridger Treaty of 1868, and aboriginal rights. The Shoshone-Bannock tribes will need to be informed by the Federal Government if new areas on the INL are to be opened for new uses.

Recommendation 1.4 –Utilize and expand the mission of CAES to address water quality issues.

The Center for Advanced Energy Studies (CAES) is a partnership of INL, University of Idaho, Idaho State University, and Boise State University to advance energy science in Idaho. The Subcommittee recommends utilizing and expanding the mission of CAES to develop ways of addressing water quality issues. This mission should provide solutions to protecting water, including ground, surface, and storm water, and water used in any processes at the INL. This research should also address issues with transportation, spills, fire, and areas where water might be used in suppression of fire or hazardous cleanup. Transferring and adopting this technology to other industries and uses should be part of this mission.

Background

The INL understands the importance of protecting water both on and off site. This protection includes ground, surface, storm, run off, and process water. Current operations at INL protect and address water issues with constant attention and research being direct towards protecting Idaho's water resources. Past practices that may have not addressed water quality adequately, such as the use of injection wells, have ceased. Continued cleanup, research, and monitoring are taking place to remediate any problems.

Section Two

What can the State of Idaho do to identify public/private partnerships or roles to support and strengthen INL's safety capabilities?

Recommendation 2.1 – Expand the role of CAES to include a focus on education and training for nuclear and workplace safety, including the development of partnerships with national organizations and academies, engineering societies, safety professional societies, among others.

The Subcommittee recommends expanding the CAES partnership to include a new center for the advancement of nuclear and workplace safety. We envision a world-class facility for education and professional training in nuclear operations safety, workplace safety, quality assurance, and quality control at internationally accepted standards. The new center will attract professionals in the nuclear energy industry from throughout the United States and globally. Organizations such as Electric Power Research Institute (EPRI), the Institute of Nuclear Power Operations (INPO), and others with a stake in advancing R&D in nuclear safety should be called on to support the expansion of CAES.

Moreover, a myriad of national engineering, scientific, and professional organizations are dedicated to advancing knowledge in various technical fields. Many of these groups conduct

independent, timely research on critical national issues. Also, some engineering and professional societies have state and/or local chapters comprised of engineers, scientists, and safety professionals employed in the private sector, academia, government, non-profit organizations, and as consultants. Their expertise may be valuable to CAES as faculty, researchers, administrators, and supporters.

The workplace safety aspects of this recommendation have potential state-wide application. Links for sharing information such as best practices and means of enhancing safety culture on job sites could capture synergy on issues common to industrial safety across Idaho.

Background

There are tremendous opportunities to enhance the mission of CAES to meet a myriad of national and international goals in nuclear energy development. Many national organizations may be able to play a role in that objective. For example, consistent with the presentation to the LINE Commission on September 21, 2012, the EPRI, INPO, and other organizations and companies have a strong interest in the future of nuclear energy research and development at the INL.

Recommendation 2.2 – Convene an international conference on nuclear safety, in cooperation with national academies, engineering societies, safety professionals, and other organizations and individuals.

The Subcommittee recommends that State of Idaho convene an international conference to discuss the future of nuclear safety, possibly under the auspices of the National Academy of Engineering or the International Atomic Energy Agency. The conference would be structured to involve professional engineering societies, safety professionals, and scientific organizations as well as state agencies, tribal governments, NRC, DOE, universities, corporations, national laboratories, and non-governmental state, national, and international organizations, and individuals, with a sincere interest in improving understanding of nuclear safety, especially relating to commercial nuclear power generation. The conference will be open to the public and the proceedings will be broadcast simultaneously. While such an international conference would be a major undertaking for the primary sponsor(s), it will have the potential to engender dialogue and understanding.

Background

An international conference on nuclear safety has the potential to focus global attention on Idaho, the INL, and the private sector. The benefits of hosting such a major conference in Idaho would not be limited to its economic impact on the state and region. In fact, the most profound impacts include: fostering cross-disciplinary dialogue and dissemination of knowledge; increasing global awareness of Idaho as a superb destination for business investment and tourism; and enhancing understanding and appreciation of INL, CAES, and Idaho's universities.

Engineering and safety professional societies, such as the American Nuclear Society, the American Society of Civil Engineers, the American Society of Mechanical Engineers, the National Society of Professional Engineers, the American Institute of Chemical Engineers, the Institute of Electrical and Electronics Engineers, along with the National Academy of Engineering and the National Academy of Science, among other national organizations, are dedicated to advancing knowledge, professional expertise, and technical standards. Many sponsor or participate in national or international conferences that draw attendees from all over the world. They also publish conference proceedings and many other technical documents.

Recommendation 2.3 – Assure the availability of a workforce that is educated, trained, and following world class safety standards needed for nuclear energy-related construction, research, and operations.

The Subcommittee recommends that we leverage the scientific strength of the major universities in the region to ensure a steady pipeline of safety and environment professionals educated and credentialed in the disciplines needed to protect the public, the environment and the workforce from the hazards of nuclear material. Career opportunities in safety and the environment in the nuclear field need to be addressed in high schools throughout Idaho so that students have some idea of available programs as they consider and prepare for their future.

Background

The availability of educated, knowledgeable, and experienced safety and environment professionals is needed to establish world class standards for working safely with nuclear materials. Advanced degree programs are required to provide the knowledge level needed for world class credentialed safety professionals.

Section Three

What else can the State of Idaho consider in its efforts to maintain or strengthen its commitment to safety and environment stewardships?

Recommendation 3.1 – Form a Science Advisory Group to focus on nuclear energy facility siting issues.

The Subcommittee recommends that the State of Idaho form an advisory group to conduct an evaluation of current state regulatory requirements, oversight, and monitoring. The Science Advisory Group will determine if the existing requirements are holistic and robust enough to assess the future challenges and meet stewardship goals for siting and operating a nuclear facility while simultaneously protecting human health and the environment. The Science Advisory Group will also assess plans and proposals for construction, transportation, and long-term stewardship, to include end-state status when programs have been completed, as appropriate.

Also, it is suggested that the Governor's Office of Energy Resources or the Idaho Department of Commerce be tasked to evaluate new opportunities for the development of nuclear energy facilities in Idaho. A preliminary review of geology, technical capabilities, infrastructure, public opinion, and the prevailing regulatory environment, should be evaluated in the context of considering any new developments.

Background

The LINE Commission received testimony at its Idaho Falls meeting on September 21, 2012, from various sources calling for the development of commercial nuclear power plants, as well as for an expanded presence of nuclear power R&D at the INL. As the nation's economy improves and investment in merchant power generating capacity becomes more feasible, it behooves the State of Idaho to be prepared to consider the potential impacts of siting nuclear facilities in Idaho on a timely basis. Many environmental and safety issues require years of background data to support licensing and permitting.

By Idaho State law [IC 67-2351 to 67-2355], known as the "Energy Facility Site Advisory Act," the State of Idaho provides for technical assistance by the state to local jurisdictions considering permits for the construction and operation of energy facilities used for generation of electricity. According to the Act, a "city or county may request assistance in the evaluation of the environmental attributes and impacts of the operation of the facility from the department of state government as provided in this act." This approach was enacted in 2007 after considerable deliberation by the Legislature.

Recommendation 3.2 – Consider appointing a Science Advisor in the Governor's Office.

The Subcommittee recommends the Governor consider appointing a Science Advisor to evaluate a myriad of complex technical, energy, environmental, and public issues facing Idaho. Another function of the Science Advisor would be to serve as the Governor's principal liaison to the INL. In that capacity, the role of Science Advisor would not be to duplicate DEQ's INL Oversight Office, but rather provide an independent understanding of the role and importance of the nuclear energy research and operations at the INL and elsewhere within the state, and help explain that critical role and responsibility to Idahoans. A third, and no less important role of the Science Advisor, would be to elevate the discourse on the importance of science, technology, engineering, and mathematics (STEM) education to Idaho's and the nation's future.

It is possible that a senior INL or DOE executive may be loaned to the State of Idaho, or that a distinguished volunteer will come forward, to fill this proposed role for a finite period of time at little or no cost to the State of Idaho. Regardless of how the Science Advisor is selected or appointed, it is important that this individual have an appropriate level of technical expertise and experience in the environmental and safety area.

Background

Complex issues relating to the INL, nuclear energy development, the environment, natural resources, the regulation of electrical power generation and transmission, economic impacts, among others, cut across state government agency responsibilities in Idaho. With so many issues and interests at play, an independent Science Advisor reporting to the Governor would be an invaluable source for comprehensive, unbiased, and timely assessments.

Recommendation 3.3 – Highlight the role of the State of Idaho DEQ INL Oversight Office.

When the general public brings into question environmental or safety issues at the INL, the State of Idaho should engage the DEQ INL Oversight Office to investigate and explain those concerns to the public.

The State of Idaho should convene an annual meeting of affected parties to the Settlement Agreement to discuss milestones and identify concerns. The parties should: highlight success, such as milestones that have been met; bring to the attention of all parties those milestones which may be in jeopardy of not being met; and provide recommendations on the resolution of any concerns. That report should be widely distributed.

Absent such an approach, the INL Oversight Office should consider publishing and posting on its website an annual report on the progress on cleanup activities being conducted by the DOE's contractors on meeting cleanup milestones and obligations. The availability of the report card should be announced in Idaho media.

Background

Idaho's citizens would benefit by having more information about the status of cleanup activities at the INL and the regulatory commitments that have been achieved as well as those that remain to be fulfilled pursuant to the Settlement Agreement and other laws or rules.

Recommendation 3.4 – Communicate with the public about the Settlement Agreement.

The Subcommittee recommends that the State of Idaho communicate with its citizens about the purpose and status of the Settlement Agreement, especially if there is a possibility that the role of, and activities at, the INL will change in the future. A better understanding of prevailing laws and rules, and what is meant by consent and non-consent status, may be relevant in the context of the potential development of new nuclear energy facilities by the private sector in Idaho.

Background

The debate and discussion regarding Idaho's Settlement Agreement at the LINE Commission meetings has highlighted both the importance of this agreement and the need for continued dialogue with the public on its scope, status and issues. For example, the Settlement Agreement provisions for receipt of used nuclear fuel are focused on INL; however, comments received

during LINE Commission meetings indicates some citizens have the perception that these provisions apply anywhere in Idaho.

With respect to any potential modification of the Settlement Agreement, the State has the ability, in its sole discretion, to make changes to its terms, conditions and obligations. While it is important that the original intent of the agreement be maintained, modifications to further INL's mission as Lead Laboratory for Spent Nuclear Fuel may need to be considered.

Recommendation 3.5 – Support potential research and development projects that can be conducted in a safe and protective manner, such as the High Burn Up Fuel Storage Demonstration.

Research and development projects which can be conducted at INL in a way that protects the health and safety of the public and the environment, including the Snake River Plain Aquifer, should be supported by the State. The High Burn Up fuel storage demonstration (involving 15.5 metric tons of used nuclear fuel) presented at the October 2012 LINE Commission meeting is an example of such a project.

Background

A demonstration project for storage of high burn up fuel is being planned by the Department of Energy to generate data needed to support long term storage of fuel that has achieved high burn up rates. The INL Site is a logical site for such a demonstration because the necessary facility, transportation, and security infrastructure is already in place. Current methods of storing and managing the used fuel would provide protection for the public and the environment.

Findings of the Subcommittee on Safety and Environment

In addition to its recommendations, in the course of its work the subcommittee made findings as follows:

1. Progress in Meeting Requirements and Milestones

The subcommittee found that the agreements and commitments between DOE-ID and the State of Idaho have been effective in ensuring cleanup of legacy waste and protecting the environment and health of workers and the public. The two main agreements that are in place that relate to cleanup and waste management are the:

1) Federal Facility Agreement and Consent Order (FFA/CO). The FFA/CO 1991between DOE, the State and EPA establishes a process for evaluating past potential releases to the environment at the INL, determining the risk any releases may pose to human health and the environment, and evaluating potential remedial actions

2) Settlement Agreement. The 1995Settlement Agreement (and its associated amendments) between DOE, the Navy and the State, includes provisions that permit DOE to receive up to 1,133 shipments of spent nuclear fuel (including up to 400 kilograms per year of spent nuclear fuel for research purposes) at the Idaho National Laboratory for storage on the condition that all spent fuel leave Idaho by 2035, when it was assumed a geologic repository would be available. In return, the agreement provides for placement of spent nuclear fuel in dry storage, treatment of high-level waste stored at the Idaho Nuclear Technology and Engineering Center, removal of buried waste from 5.69 acres at the Radioactive Waste Management Complex, and removal of 65,000 cubic meters of transuranic waste stored at the Radioactive Waste Management Complex.

The subcommittee finds that 959 of 963 milestones set by these agreements have been met. This demonstrates the agreements put in place are effective and have been successful.

The cleanup actions to-date have focused on reducing risk to the public and the environment. The most recent Five Year review of CERCLA Response Actions at INL states that "remedial responses are protective of human health and the environment or are expected to be protective upon completion. In the interim, exposure pathways that could result in unacceptable risk are being controlled". (*DOE/ID-11429 Rev.0, January 2011*).

Any new missions or activities that would have potential impacts to public or environmental risks will be evaluated under current regulatory requirements.

DOE-Idaho's contractors continue to progress towards timely completion of both FFA/CO and Settlement Agreement Milestones. The table below summarizes this progress.

Table 1. Status of Cleanup Progress (from INL's Idaho Impact Newsletter, October 2012)

Waste/Fuel	**Commitment**	**Status as of August 30, 2012**
Buried Waste	Excavate 5.69 acres (7,485 m^3)	3.11 acres of waste excavated, 5,647 m3 have been retrieved and shipped off-site
Stored Transuranic waste	Ship 65,000 m^3 offsite	38,5000 m^3 shipped off-site (74% complete)
Liquid waste	Treat 900,000 gal, Close 15 tanks	Treatment facility in startup, 11 of 15 tanks emptied, cleaned, grouted and closed
Calcine waste	Treat 4,400m^3; 'road ready' by 2035	Permit application for Hot Isostatic Press treatment and calcine retrieval to be submitted December 2012
INL Site Cleanup	Cleanup decisions for 10 Areas across the INL Site	All decisions in place, 959 of 963 milestones met on time to date
Used Nuclear Fuel	55.0 Metric Tons allowed (of which 0.4 metric tons per year can be for research); all spent fuel must leave by 2035	27.6 metric tons brought in (none removed)

2. Aquifer Protection.

Public comments raised concerns about aquifer protection related to INL. Past practices at the INL that led to contamination of the Snake River Plain Aquifer, such as injection of waste water and uncontained waste disposal, have ceased and would not be allowed under today's environmental protection standards. The buried, stored, and liquid waste that pose a threat of migration contaminants are being removed. The cleanup decision signed by DOE, the State and EPA for groundwater beneath the INL determined that risks from INL plumes are at acceptable levels at the INL boundary for unrestricted land use and that maximum groundwater contaminant concentrations are expected to decrease over time. (*DOE/ID -11385, September 2009*). The LINE Commission received a presentation from the DEQ (Gerry Winter) which confirmed that trends show decreasing concentrations of contamination in groundwater over time. Researchers from the U.S. Geological Survey, State of Idaho, DOE Environmental Science and Research Foundation, and other institutions will continue to monitor for contaminants and their transport through the aquifer to assure the safety of this critical water resource. Technologies and storage systems for the calcine waste and used nuclear fuel at the INL Site are designed to prevent a release of contamination to the environment

Any current or future facilities at INL must comply with all environmental requirements to assure aquifer protection.

3. Seismic Analysis .

Public comments were received voicing concerns related to seismic activity posing risk to INL. Earthquake activity in and around the INL is tracked to develop an understanding of earthquake processes and the potential for future, large magnitude earthquakes. The INL acquires earthquake data in real-time and uses it to evaluate seismic hazards and set facility specific design criteria for seismic safety of workers and the public. The Snake River Plain also plays a role in the effects of seismic activity at the INL. Investigators since the late 1960s recognized that the Snake River Plain subsurface conditions seem to dampen seismic waves. In 1997, an independent review panel concluded that the alternating layers of basalt and sediments of the Snake River Plain was highly effective in damping ground motion.

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