Idaho National Laboratory: A World Class National Laboratory

Presentation to the DOE-NE

Nuclear Energy Advisory Committee (NEAC)

Dec. 9, 2016

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The INL Has Many Strengths

- An outstanding senior management team.
- Successful integration of two different cultures
  - ANL-W ; Chicago Operations Office
  - INEEL ; Idaho Operations Office
- Significant diversification and growing budgets
  - Budget $1034M vs. $686M in 2006
- Successful hiring of quality personnel
  - Staffing 4161 vs. 3425 in 2006
- Increasingly seen as a world-class national laboratory by others

Charge to the Subcommittee

- "...request that NEAC now undertake a forward looking review of where you believe the Idaho National Laboratory should be ten years from now to maintain overall world-class status in nuclear energy research, development, and demonstration, and considering its role as a maturing multi-program national laboratory."
- "The review should result in a summary report providing any recommended actions for NE and BEA to achieve the ten-year end-state for the INL, in terms of leadership, governance, oversight, program engagement, user facility approaches, ownership, stewardship and partnership."

What is a World Class National Laboratory?

- Very briefly, a world-class nuclear science and technology research, development and demonstration (RD&D) laboratory is generally considered as one that is recognized by peers, customers and competitors as one of the best in research in a broad range of nuclear technologies and related fields, leads in the introduction of new technologies into the marketplace, attracts close interactions with other leading organizations on a national and international scale, has the respect and admiration of and is looked to as a key partner by worldwide industry, attracts top talent into career paths and hosts top students, Post Docs, and faculty in research opportunities , and is known and admired in public circles.

Subcommittee Approach

- Consistent with this charge, the Facilities Subcommittee of NEAC took the following approach:
- Identify **Opportunities** for the INL consistent with the environment that exists today and is anticipated to exist in 10 years.
- Identify **Barriers** to reaching those opportunities.
- Provide **Recommendations** for actions to overcome the barriers and take advantage of the opportunities to enhance the role of the INL as a world-class national laboratory.

Subcommittee Members

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  - John Ahearne, Dana Christensen, Tom Cochran, Dave Hill, Hussein Khalil, Andy Klein, Pete Miller, Paul Murray, Mark Rudin, John Sackett (Chair), Andrew Sherry
  - Mike Corradini, Al Sattelberger, Regis Matzie
- DOE coordinators
  - Shane Johnson
  - Furstenau, Ray
  - Petry, Kimberly

Views from the International Community

The international community recognizes INL as an internationally leading US DOE national laboratory in key areas specific to its mission. However, the community suggests that INL cannot fully achieve its mission and objectives without developing a more effective engagement with the global nuclear community.

Engagement enables facilities sharing, further enhancement of the research infrastructure and financial sharing of programs to enhance value for money and reduce costs.

Recommendations for International Engagement

- it is recommended that an *international strategy be developed to: (a) optimize collaboration in S&T programs, skills development and facilities access/development, and (b) build effective frameworks for INL engagement with international agencies (IAEA, NEA/OECD, GIF).*
- *Doing so will help ensure that the INL contributes to activities of significant interest for the international community, establishing an important U.S. presence.*

Views from the National Laboratory Community

- The challenges INL faces as lead lab for nuclear energy RD&D were recognized as being strongly related to the challenging environment for nuclear power generation and development in the U.S.
  - Creates competition for limited funding
  - Need for INL to take a leadership role in developing understanding of the role of nuclear power
- Challenges for inter-Lab collaboration include the lack of a formal framework for collaboration that establishes a reasonably stable, accepted role for each Lab.

Recommendations for National Laboratory Collaboration

- *INL should continue building its role and capacity to serve as a catalyst for a more focused nuclear energy RD&D program that serves national objectives in the energy realm and effectively utilizes the nuclear energy capabilities distributed across the national laboratory system.*
- *INL and CAES should team with experts at other organizations to advance energy-system-analysis capabilities, with the aim of clarifying the benefits and drawbacks of alternative energy strategies*.
  - Such analysis capabilities are needed to substantiate and clarify the role and benefits of nuclear energy generation and would support the development of sound energy strategies at the national and regional levels.

Views from Industry

- Although the INL is well recognized by other research organizations around the world, there is a lack of knowledge and understanding of INL capabilities in industry, especially international industry.
- The model for development of advanced nuclear power technology is changing in important ways. Innovators from the private sector, often in collaboration with established industry-entities, are providing new emphasis on advanced nuclear-power technology. The INL has the opportunity to be a national laboratory that supports these emergent reactor vendors and meets those needs as a trusted partner, not a job shop.

Recommendations for Industry Collaboration

- *The role of the **Nuclear Science User Facilities** (**NSUF)** in providing information, access and expert support for private investment at facilities and expertise across the complex should be broadened and internationalized as part of this initiative.*
- ***The Gateway for Accelerated Innovation in Nuclear (G**AIN)* is an excellent start in reducing cost and procedural barriers to private investment and should be continued and expanded.*
- To gain the confidence of the national/international community in nuclear power development*, the INL must demonstrate fiscal responsibility and technical capability by completing major projects on time, schedule and budget.*

Views from the State of Idaho

- The Idaho National Laboratory is growing in prominence within the state of Idaho as it has attracted talent for both staff and leadership. Leadership is increasingly engaged with the public and with the university system. The multi-program nature of the INL is facilitating this trend, especially in areas related to cybersecurity and homeland security.
- Much of the negative publicity and constraint imposed on the INL is the result of problems associated with another entity at the site, namely the clean-up activity. The settlement agreement reached with the state of Idaho dictated a schedule for cleanup and imposed penalties if not met, penalties imposed on research. This has the effect of constraining the Laboratory in some of its most important research to the detriment of both the INL and the State of Idaho.

Recommendations for Collaboration with the State of Idaho

- *It is recommended that DOE-NE and EM begin discussion with the state of Idaho to update the settlement agreement to reflect current realities and opportunities for Idaho.*
- *It is also recommended that the INL establish a scientific and engineering presence in the Treasure Valley (Boise), locating employees there doing work relevant to needs and interests of Idaho*.
- *It is also recommended that the capability of the Center for Advanced Energy Studies (CAES) be enhanced to play a major role in focusing regional, national and international policy on energy technology choices.*

Views of the INL from the Public

- In spite of considerable efforts for outreach, there is limited understanding by many communities in the state of Idaho of the research role of the laboratory.
- Locally, the INL has been effective in reaching out to the public and the current senior leadership has both the credibility and desire to become important spokespersons for the INL.
- However, watchdog groups that have an interest in lab activities, such as the Snake River Alliance, indicate that they have a better understanding of ongoing cleanup activities than research activities at the lab.

Recommendations for Interaction with the Public

- *INL management should reach out to watchdog groups to establish a means of keeping these groups informed on a regular basis of lab activities, including research activities, and seek where appropriate their input regarding lab objectives and operations.*
- The INL should consider forming *a joint research project with NREL, academic and NGO experts to prepare a report on options for addressing climate change. In this context, leverage the expertise at the INL as a multi-program laboratory and its partnership with other laboratories, especially NREL, to provide the expert analysis that establishes the context within which nuclear power choices exist*.

DOE Oversight and Management

- The history of DOE's relationship with its laboratories reveals an escalation of prescriptive orders, stretching resources and limiting the freedom to tailor oversight to the need.
- There is strong trust between DOE-HQ, DOE-ID, and INL senior leadership, which needs to continue to be translated down into the DOE and INL organizations.
- The CRENEL report recognized that, "The Idaho National Laboratory . . . together with DOE's Office of Nuclear Energy (NE) and the Idaho Operations Office (IOO), has been leveraging the knowledge and experience of SC in tailoring contractor assurance (CAS) to its site. Through these efforts, Idaho should be considered a top performer with the contractor assurance program, demonstrating a good relationship between the site office and the laboratory.

DOE Oversight and Management

- The Commission to Review the Effectiveness of the National Energy Laboratories (CRENEL) concluded that oversight needed to be reimagined. The DOE response emphasized that, for the labs as a whole:
  - "…oversight has grown increasingly transactional rather than strategically mission-driven."
  - "…importance of providing an environment in which DOE sets the mission needs and provides oversight, while the managing contractor and laboratory leadership and staff put together the teams and structure programs in response to the mission needs, all in the public interest."

Recommendations for DOE Management and Oversight

- *The committee recommends that DOE/NE, ID and INL Jointly enumerate the elements of an oversight model that addresses DOE's key objectives, namely: (1) recognizing values, (2) continuing to build trust, (3) maintaining alignment and quality, (4) maximizing impact, (5) managing effectiveness and efficiency, and (6) ensuring lasting change.*
  - Trust between the DOE (both field office and headquarters) and the contractor is essential for effective oversight, especially performance of the contractor-assurance program to identify and disclose issues.
- *The INL should propose alternatives to burdensome and non-value added DOE contract requirements*.

INL as a Multi-Program Laboratory

- The INL has grown significantly in work associated with homeland security and clean energy research and technology development. DOE-NE and DOE-ID have been excellent stewards of this growth, which has resulted in major advances important to the country. They are to be commended.
- This growth has been important in establishing the reputation of the INL as a world-class national laboratory, in attracting significant talent, growing budgets and positioning the INL to be a major player in energy technology development.

Recommendations for Multi-Program Initiatives

- Establish a lead role in examining elements necessary to provide energy security for the nation. *Include evaluation of differing energy technologies, their technical and financial risks, limitations, time for deployment, storage, and environmental impacts.*
- *Develop and demonstrate clean energy systems at scale, taking advantage of the physical INL site and supporting infrastructure.*

Recommendations for Multi-Program Initiatives

- *Evolve the lab culture to one that takes the long view, embraces collaboration and competition on ideas, and that values diversity and inclusion. Attract and support scientists and engineers who are innovators in their fields, leading to new and important laboratory initiatives.*
- *INL and DOE should make maximum use of flexible working arrangements, where appropriate, to build staff capability.*
- *Increase the scientific impact of the lab through high quality publications and innovations and a focus on internal and external collaborations.*

Views of the INL from the Renewable Energy Community

- The INL and NREL have established important cooperative programs to address the relationship between wind, solar and nuclear. There is both a need and an opportunity for those relationships to be strengthened if the US is to meet its emission goals.
- There is a lack of understanding of limitations of wind and solar, e.g. why a partnership with nuclear is important. Technical partnerships, however, offer the opportunity to overcome these perceptions, as demonstrated by the strong relationship now developed between the INL and NREL.

Recommendations for Cooperation with the Renewable Energy Community

- *DOE should better coordinate cooperation within the Department between NE and ER.*
- *Consistent with this, the INL and NREL should continue to strengthen their working relationships.*
- *Explore and promote nuclear technologies that are compatible with wind and solar.*
  - Many of the innovations in nuclear power systems currently being funded by the private investment community are pursing this goal, often leading to smaller systems that can load follow.

Conclusion

- **The Idaho National Laboratory has many opportunities to grow as a world-class national laboratory.**
    - Never has there been greater interest in energy technology choices, the role of nuclear power and the need to address climate change effectively.
    - The INL has major responsibilities for enhancing its own capabilities while working closely with partners across the nuclear-research community, both domestic and International.
- **Establishing understanding within the technical community, political leadership and the public about the role of nuclear power in emission-free energy production is essential to the INL's future.**
    - This is a challenge for both DOE-NE and the INL.
    - An important component of the INL is the Center for Advanced Energy Studies (CAES), providing a semi-independent organization led by a consortium of universities with the ability to address both technical and policy considerations of energy-technology choices.
- **There is a strong leadership team in place, a mission important to the nation, strong growth as a multi-program laboratory and a growing ability to attract world-class talent.**