

Summary Minutes of the

U.S. Department of Energy (DOE)
Secretary of Energy Advisory Board
Public Meeting

Committee Members: John Deutch, Chair; Arun Majumdar, Vice Chair; Rafael Bras; Michael Greenstone; Michael McQuade; Richard Mies; Dan Reicher; Ram Shenoy; via teleconference, Paula Hammond; Steven Koonin

Date and Time: June 14, 2016, 8:30 AM – 12:00 PM MT

Location: Idaho National Laboratory (INL) Meeting Center
775 University Boulevard
Idaho Falls, ID 83415

Purpose: Quarterly Meeting of the Secretary of Energy Advisory Board (SEAB)

SEAB Staff: Karen Gibson, Director and Designated Federal Officer; Corey Williams-Allen, Principal Deputy Director and Deputy Designated Federal Officer; Maria Callejas, Deputy Director

Presenters: Mark Peters, Director, Idaho National Laboratory; Wayne Austad, Director, INL CYBERCORE Integration Center

Meeting Summary

SEAB members heard opening remarks by Energy Secretary Ernest Moniz. Following the opening remarks, the first agenda item consisted of updates from the chairs of the following SEAB task forces: Biomedical Sciences, Future of Nuclear Power, DOE National Laboratories, and Federal Energy Management. The next agenda item was an opportunity for public comment, followed by two presentations on R&D for the future of nuclear power and cybersecurity at the DOE national laboratories. The meeting adjourned at the conclusion of the presentations.

Opening of Public Meeting

John Deutch called the meeting to order and thanked Mark Peters, Director of INL, for hosting SEAB's quarterly public meeting. He stated that he looked forward to the briefings that Peters' team has prepared for the Board. Deutch, then, introduced Secretary Ernest Moniz.

Secretary Moniz first thanked and acknowledged the good work of SEAB. In his remarks, the Secretary acknowledged the support of Governor Otter and the Idaho Congressional Delegation of INL and nuclear power generally. He then provided a high-level overview of INL's responsibilities, highlighting two principle focus areas of the Lab: nuclear energy and cyber security. He described the Advanced Test Reactor as a remarkable facility that provides access to research and testing of nuclear energy technologies. The Secretary then provided a brief update on the Department's role in Mission Innovation (MI), noting in response to a question about the depth of the narrative, how much money would be spent, and what the desired outcomes would be - that it is still a work in progress and is mostly written up in the FY17 budget submission to Congress. Deutch indicated that as soon as the Department can translate the

proposed increases in funding to useful outcomes, it will be in a better position. Secretary Moniz then described the MI Ministerial and the enabling framework that was adopted. A number of SEAB members asked what happens to intellectual property (IP) under MI. The Secretary stated that nothing will be different – and pointed to the Department’s IP agreement with China regarding the US-China Clean Energy Research Center (CERC), stating that DOE will apply a similar process with others involved in MI.

The Secretary recognized how active and influential SEAB has been over the past three years – and thanked the Board, once again, for their service. He discussed the Departmental response to the Report of the Task Force on Methane Hydrates and highlighted the implementation of recommendations from SEAB and others on contract modeling with the national laboratory systems. He also noted that the now annual report to Congress on nuclear nonproliferation, recommended by the Task Force on Nuclear Nonproliferation, is popular and has had big impact. The Secretary described the success of the QER in justifying the idea that serious analytical approach can be helpful in the debate. He also described the baseline documents that are under draft – not recommendations – and noted that the documents will be rolled out in September.

The Secretary concluded by discussing his newest charge to SEAB on CO₂ utilization and negative CO₂ emissions technology. He noted that Arun Majumdar will chair the task force and that the group will review on-going activities in the DOE, industry, national laboratories, academia, and non-profits and identify new opportunities for research and cooperation.

Updates from SEAB Task Force Chairs

Steven Koonin provided a brief update on the **Task Force on Biomedical Sciences**, which was charged by the Secretary to explore the potential for increased collaboration between DOE and NIH to address challenges in biomedical sciences. He noted that the Task Force is looking for mechanisms for collaboration between DOE and NIH (but not funding). Koonin provided a readout from the first meeting of the Task Force on March 10 and 11th at the NYU Center for Urban Science and Planning in Brooklyn. The Task Force is gearing up for a second meeting, to take place at Lawrence Berkeley National Laboratory on July 18 and 19th, which will focus on the relevant DOE capabilities and NIH needs: such as technology, data, modeling and simulation, imaging, materials, and sensing.

The second meeting will expand upon areas that have already been discussed and explore the following topics under consideration: advanced molecular and cellular technologies; infectious disease and radiation; and organizations and mechanisms for DOE-NIH collaborations. The task, roughly stated, is to find the large elements in a matrix of biomedical challenges framed largely (but not exclusively) by NIH and of DOE technical capabilities in computing, informatics, materials, and sensing. The Task Force will also look at two DOE relevant topics: low dose radiation technologies and biological threats. It is expected that 40 individuals will join this invitation-only meeting to provide perspective on the aforementioned. The Task Force members will then begin to write their report – with anticipated delivery of the finished report by the September SEAB meeting. The Task Force has not been looking at the Brain Initiative, but will take a closer look at the Secretary’s urging.

John Deutch provided a status update on the **Task Force on the Future of Nuclear Power**, indicating that the group holds monthly meetings. Deutch went on to describe the study as a roadmap or path forward for nuclear power. The principal purpose of the report is to describe a U.S. led initiative to achieve nuclear deployment at scale in the 2030-2050 timeframe. The draft report is with the Task Force for review, and he anticipates the report should be completed by the September 2016 SEAB meeting. He noted that the draft report focuses on:

1. Economics – with a carbon charge on emitters or a carbon payment to non-emitters, then nuclear is competitive on least cost of energy.
2. Market structure - Will the market structure allow the baseload generation to be dispatched? If the market structure is wrong, then you can forget about nuclear.
3. National security benefits
4. Advanced nuclear reactors – report will lay out a timeline for what would be required to get this done – a \$10B/15 year timeline
5. Management structure – a quasi-public/private structure
6. Licensing and safety
7. International linkages – a nuclear accident anywhere is a nuclear accident everywhere

Arun Majumdar provided a brief update on the **National Laboratories Task Force**, indicating that the work of the group will focus on the review and tracking of studies on the national laboratories and providing the Department with their findings. Majumdar noted that we have had four major reports with a whole gamut of recommendations. The Department is now in state of implementation. The task force is holding monthly calls to hear briefings from DOE on progress. Majumdar also highlighted the work of a subgroup led by Richard Meserve and Richard Mies to review the Department’s implementation of the recommendations in the NNSA-related studies, and asked that Mies provide an update on their efforts. Deutch noted that there has been progress and saluted the Secretary for keeping focus on these efforts.

Richard Mies reported that he and Meserve are pleased with their interactions with NNSA. He also noted that there has been a lot of activity/progress and that the Sub-group has reviewed documents. Collectively, the Sub-group members believes that culture change will be the real challenge to the implementation of recommendations to the NNSA. Mies also stated that the Sub-group will continue to monitor the progress being made by NNSA and report progress to the National Lab Task Force and full SEAB. He also reiterated that the group is not looking for new changes to recommend, but is focusing on the Department’s implementation plans.

Dan Reicher gave a brief update on the **Task Force on Federal Energy Management**. The purpose of the Task Force is to look at how to improve the use of energy across Federal buildings and land. An initial draft of the report is underway, and he noted that the final report will be delayed, likely until the September SEAB meeting. Reicher described the draft report on the broad scope of federal energy management and DOE’s FEMP. The Task Force has identified 10 issues/opportunities:

1. Federal energy goals and who good a tool are they
2. How to improve federal energy efficiency efforts – RCTs
3. Use of energy saving performance contracts (ESPCs) for improving efficiency and leveraging private sector investment
4. Improving energy savings by reducing the federal footprint
5. How to improve the federal government’s procurement
6. Role that PMAs play in advancing key goals
7. Challenges in developing clean energy on federal lands, endangered species, etc.
8. How to increase and improve deployment of alternative fuel vehicles
9. Use of military bases and federal buildings as test beds.
10. How to strengthen Federal Energy Management Program

Reicher noted that the report is long, stating that it covers important parts of the landscape related to the President's Executive Order issued last spring. He then mentioned that the report will look at how to implement the Order and is aimed at serving to inform the next Administration.

Public Comment Period

There were two public comments. Leading up to the June 14th meeting in Idaho Falls, SEAB received a comment via email asking the Department to consider changing the venue to Washington, DC so that more members from the public could have the opportunity to participate in the meeting. The second comment came from Michael Reichenberger, an INL intern and student at Kansas State University. He asked the SEAB chairman if the Future of Nuclear Power Task Force would look into technologies required for a successful reactor. The SEAB chairman thanked Reichenbergerr for his insight and stated that the task force was not looking in that area but he would share his comment with the task force to see if the task force should incorporate this into their study.

Role of Nuclear Energy

Mark Peters, Director of Idaho National Laboratory (INL), provided an overview of the opportunities, challenges, and solutions to enable a clean energy future with nuclear energy. He began his presentation by stating that there is an urgent need for clean reliable energy and that nuclear energy should play a role in meeting that need. He noted that there are challenges to enable nuclear energy as a reliable clean energy source – noting the economic, safety, non-proliferation, and waste management barriers. He noted that the acceleration of innovation in the nuclear energy space would remove barriers to a cleaner, safer, nuclear energy source – and advocated that the industry needs policy and RD&D enablers to support that effort. Peters then proceeded to give an overview of GAIN (Gateway for Accelerated Innovation in Nuclear), a DOE Office of Nuclear Energy initiative between INL, Argonne National Laboratory, and Oak Ridge National Laboratory, which provides the nuclear community with access to the technical, regulatory, and financial support necessary to move innovative nuclear energy technologies toward commercialization while ensuring the continued safe, reliable, and economic operation of the existing nuclear fleet. Peters went on to state that GAIN intends to integrate and facilitate efforts by private industry, universities and government research institutions to test, develop and demonstrate advanced nuclear technologies to accelerate the licensing and commercialization of these systems. Peters then stated that this new framework for a faster and more cost-effective innovation cycle for nuclear energy eliminates the sequential progression for innovation by integrating DOE/industry, vendors/suppliers, and utilities thus optimizing the nuclear energy community for collaboration while reducing the cost of advanced nuclear energy systems. Peters thanked the Board for visiting INL and concluded his presentation.

DOE Cybersecurity @ the National Laboratories

Wayne Austad, INL's director CYBERCORE Integration Center, presented on the integrated approach of the national laboratories (INL, Pacific Northwest National Laboratory, and Sandia National Laboratories) supporting national security with a focus on INL's core capabilities. Austad highlighted INL's cybersecurity focuses, characterizing it as a reconfigurable city/region enabling holistic solutions and mitigations of technology and infrastructure interdependencies. He then went on to describe control systems cyber, components that govern and execute complex processes within chemical, critical manufacturing, energy, nuclear, transportation, defense, water and wastewater sectors and how this differs from information technology. Austad then discussed the critical national challenges in the control systems for cyber as well as the common R&D challenges related to cyber in diverse mission spaces. He then provided an overview INL's, PNNL's and Sandia's unique capabilities and approaches to

R&D. To conclude his presentation, Austad highlighted the long-term national benefit of integrated approach that the national laboratories have developed because of the following:

- Science of New Cyber-Informed Control Theories and Engineering Practices
- Enhance the Security of Embedded Systems, Nuclear Facilities, and Energy Infrastructure
- Establish a Dedicated R&D National Workforce
- Effectively Integrate Control Systems Cyber Investments

Austad thanked SEAB for inviting him to present on the topic and concluded his presentation.

Meeting adjourned at 12:00PM.

Respectfully Submitted:

Karen Gibson
Designated Federal Officer

I hereby certify that these minutes of the June 14, 2016, SEAB meeting are true and correct to the best of my knowledge.

A handwritten signature in black ink that reads "John Deutch". The signature is written in a cursive, flowing style.

John Deutch
Chair, Secretary of Energy Advisory Board