



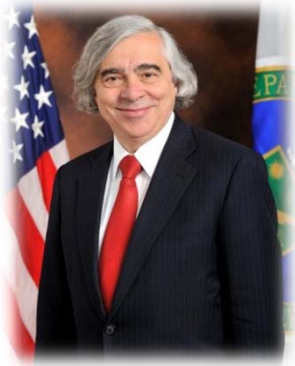
U.S. DEPARTMENT OF
ENERGY

OFFICE OF
**ENVIRONMENTAL
MANAGEMENT**

SEAB Task Force on EM Technology Development

Gerald Boyd
Task Force Member

September 29, 2015



❖ Secretary Moniz

➤ “While the Department's Office of Environmental Management has made significant progress in closing a number of projects, many of the most challenging projects remain and will for decades to come.”

❖ Secretary of Energy Advisory Board Task Force on EM Technology Development

➤ Advise the Secretary on:

- 1) Opportunities and barriers for science and technology development for cleanup;
- 2) Means to implement a program to develop such technologies; and
- 3) Funding of the program.

- 1) **Richard A. Meserve (Chair)** is Senior of Counsel with Covington & Burling LLP, a Washington-based law firm and President Emeritus of the Carnegie Institution for Science
- 2) **Gerald Boyd** is a Vice President for Stoller Newport News Nuclear (SN3), a wholly owned subsidiary of Huntington Ingalls Industries
- 3) **Rafael L. Bras** is the provost and executive vice president for Academic Affairs at the Georgia Institute of Technology
- 4) **Thomas O. Hunter** retired as President and Laboratories Director of Sandia National Laboratories
- 5) **Deborah S. Jin** is a fellow of the National Institute of Standards and Technology (NIST) and an adjunct professor of physics at the University of Colorado Boulder
- 6) **David Kosson** is the Cornelius Vanderbilt Professor of Engineering and Professor of Civil and Environmental Engineering at Vanderbilt University, and is the Principal Investigator for the multi-university Consortium for Risk Evaluation with Stakeholder Participation
- 7) **M. David Maloney** is Emeritus Technology Fellow at CH2M HILL, and serves on the firm's Technology Leadership Board and Sustainability Leadership Board

- ❖ S-1 tasks SEAB in May 2014
- ❖ Task Force held public meetings in July and October 2014
- ❖ SEAB released report for public comment in November 2014
- ❖ SEAB Task Force issued report in December 2014
- ❖ DOE released report in January 2015
- ❖ S-1 (DOE) response discussed with SEAB at March 2015 meeting
- ❖ Final response issued May 2015

Secretary of Energy Advisory Board

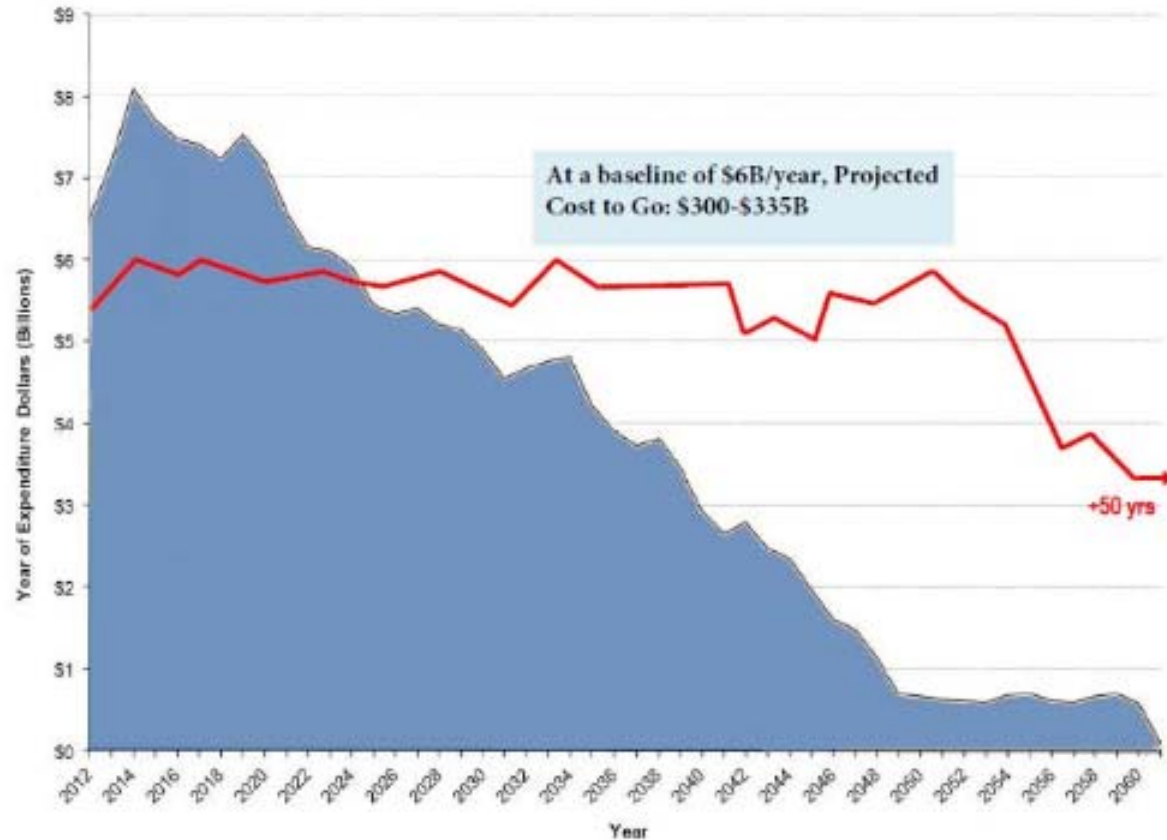
Report of the Task Force
on Technology Development for
Environmental Management

December 2014



U.S. Department of Energy

- The cumulative future cost with unconstrained annual budget allocations is estimated at approximately \$200B.



Source: DOE Laboratory Directors' presentation to SEAB (Mar.27, 2014).

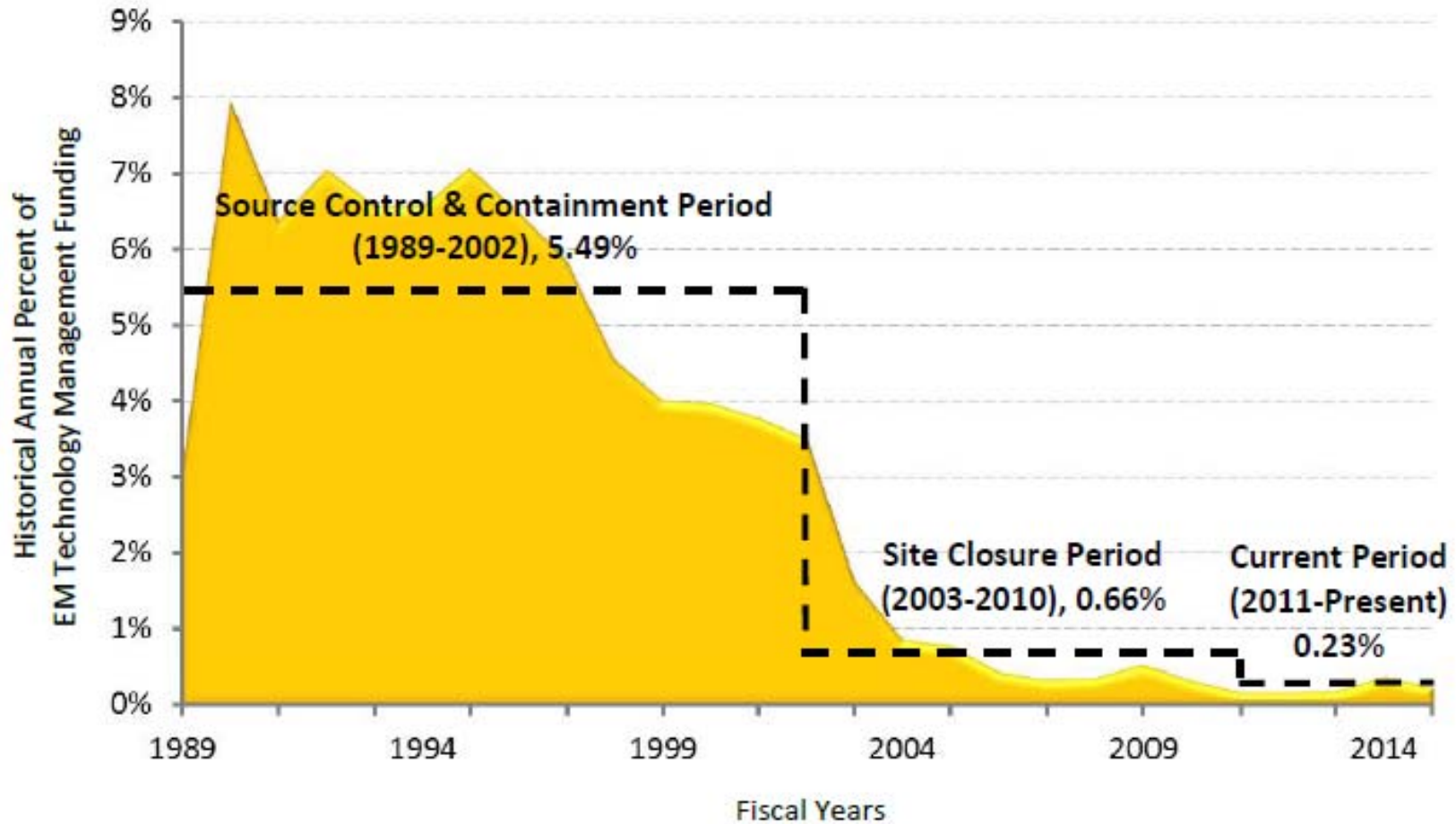


Figure 11. Historical EM Investment in Technology Development and Deployment

Summary of Task Force Recommendations

- ❖ **Opportunities for management improvement**
 - **Employ a systems approach**
 - **Align with regulatory framework**
 - **Engage academia, other technologists, and key stakeholders**
 - **Establish contract incentives**
- ❖ **Technology Portfolio and Funding Targets**
 - **3% of EM Budget: \$5B to \$6B → \$150M to \$180M**
 - **Total Task Force Target: \$140M to \$185M**
 - 1) **Incremental technologies: \$30M to \$50M**
 - 2) **High impact technologies: \$75M to \$100M**
 - **Start at \$10M to \$15M**
 - 3) **Fundamental research: \$25M**
 - 4) **EM university collaboration: \$10M**

- 1) **Incremental technologies – strive to improve the efficiency and effectiveness of existing cleanup processes**
- 2) **High impact technologies – are outside the day-to-day program, target big challenges, and hold the promise of breakthrough improvements**
- 3) **Fundamental research – provides knowledge and capabilities that bear on the EM challenges**
- 4) **EM university collaboration**
 - **Engage faculty, postdocs, and graduate students in the pursuit of the EM mission in order to provide a pipeline of new ideas**
 - **Access advances in engineering and science**
 - **Provide a cadre of educated personnel for participation in the EM program in the decades ahead**



The Secretary of Energy
Washington, DC 20585

May 5, 2015

MEMORANDUM FOR THE MEMBERS OF THE
SECRETARY OF ENERGY ADVISORY BOARD

ERNEST J. MONIZ

FROM:
SUBJECT:

DOE Assessment of and Response to the SEAB Report on
Technology Development for Environmental Management

Thank you for the Secretary of Energy Advisory Board's (SEAB) report on technology development for environmental management. I appreciate the time and effort that you and the task force members invested in assessing the Office of Environmental Management's (EM) current technology posture, and providing me circumspect and actionable advice.

In May 2014, I tasked the SEAB to examine and report on (1) opportunities and barriers for science and technology development for environmental cleanup, (2) means to implement a program to develop such technologies, and (3) funding of an environmental management technology program. Your report provides valuable insight, and your recommendations provide a solid foundation upon which the Department can better integrate scientific and technological advances into EM's mission activities.

You acknowledged that EM's technology management program has waned over the last decade due, in large part, to inadequate funding. You also recognized that the continued success of EM's mission depends on advances in science and technology. As such, you affirmed the need for a robust technology management program at DOE to meet the anticipated 30 more years and well over \$235 billion needed to complete the remaining cleanup work, much of which is technically complex and high-risk.

Overall, I agree with your recommendations and suggestions. The suggested framework for organizing EM's technology portfolio smartly considers:

- (1) The strategic need for fundamental research and high-impact technologies and solutions, and
- (2) The tactical need for technologies that provide incremental improvements in safety, operational efficiency, waste minimization, and environmental protection

This portfolio will be shaped by EM's multi-faceted mission and the various technology gaps and opportunities. EM's portfolio will also be influenced by the duration of EM's remaining mission, which extends over two more workforce generations.

Realities make it very difficult to fund an environmental management technology program at about three percent of EM's annual budget or between \$140 to \$185 million as you had recommended. However, I firmly believe that the Department's technology portfolio at levels that are commensurate with the technical complexities and risks associated with EM's cleanup work. I also believe that the Department must take advantage of opportunities that are afforded by scientific and technological advancements to accomplish its mission more efficiently, sooner.

Beginning in fiscal year 2016 and more earnestly in fiscal year 2017, the Department will ramp-up its budget for technology management activities.

Your recommendations and suggestions are well-received. The Department's report as a springboard for reviving the EM technology management program has already taken steps to design and implement a technology management program that incorporates your recommendations. Our complete response to the Department's key actions, is attached.

Departmental Response: SEAB Task Force Recommendations on Technology Development for Environmental Management



Introduction

In May 2014, Energy Secretary Ernest Moniz charged the Secretary of Energy Advisory Board (SEAB) to provide advice as to how the United States (U.S.) Department of Energy (DOE) could more effectively ensure the development of technology necessary for the Office of Environmental Management (EM) to complete its mission cleanup of legacy waste sites. The SEAB formed a Task Force on Technology Development for Environmental Management (Task Force) to examine and report on:

- (1) Opportunities and barriers for science and technology development for cleanup;
- (2) Means to implement a program to develop such technologies; and
- (3) Funding of the program.

In its December 2014 report, the Task Force noted that successful completion of the cleanup of the EM sites will likely require advances in science and technology and that these advances can provide the means for completing the EM mission more swiftly, more inexpensively, more safely, and more effectively. As the Task Force noted, technology offers that opportunity.

The Task Force further noted that new technology for the EM mission is not just an opportunity, but, in reality, a necessity—observing that, “new technology is necessary because there are significant challenges associated with the cleanup work ahead.”

The conclusion of the Task Force was that the EM mission will have difficulty meeting its commitments unless new approaches to technology management are pursued. As a result, the Task Force called on DOE to take immediate and specific actions to address the many inherent technical risks and to execute the EM mission in a safe and efficient manner without further delay and added costs.

This report outlines the recommendations of the SEAB Task Force, provides DOE's assessment of those recommendations, and summarizes actions being undertaken by DOE. This report also describes the management framework for integrating technology into the EM program as a business norm and as a mission imperative.

- ❖ Overall, DOE agrees with the recommendations and suggestions
- ❖ Suggested technology portfolio structure smartly considers
 - EM's tactical need for technologies that provide incremental improvements in safety, operational efficiency, waste minimization, and environmental protection
 - EM's strategic need for fundamental research and high-impact technologies and solutions
 - Complexity of EM's operating framework → technical, legal, regulatory, stakeholder, and budgetary influences
- ❖ Funding
 - Difficult to fund at suggested levels
 - Will be commensurate with technical uncertainties and risks
 - Gradual ramp-up beginning in FY 2016 and earnestly in FY 2017

- ❖ **Mission success since 1989**
- ❖ **Challenging work lies ahead: 50 years and \$250B**
- ❖ **Science and technology will be leveraged to**
 - **Enhance worker and facility safety**
 - **Assure environmental and public protection**
 - **Do work smarter**
 - **Reduce federal liability**
- ❖ **Expand collaboration with technologists within and outside of DOE**
- ❖ **Invest in the next workforce**
- ❖ **Create an enabling program**