

I. OVERVIEW

The Department of Energy (DOE) manages one of the largest and most distinguished laboratory systems in the world. With origins in the Manhattan Project, the DOE laboratories have evolved over the past 50 years to become a major component of the Nation's infrastructure for maintaining U.S. leadership in scientific discovery and knowledge generation. Programs conducted at the Department's laboratories have consistently challenged our basic understanding of the world around us and driven new fields of scientific inquiry and technology development.

Innovations and capabilities from the DOE laboratories are behind innumerable technological achievements that have affected the Nation's security, environmental quality, knowledge base, prosperity, and quality of life. Examples include:

- Development of the world's first nuclear explosive in a span of 28 months, from when the first scientists arrived at Los Alamos National Laboratory in 1942 to the first nuclear test in 1945.
- Development and continuous refinement of increasingly sophisticated computers. From the Univacs of the 1950s to the first trillion-operations-per-second supercomputers today, the Department's laboratories have been a test bed for the first model of nearly every new top-end computer.
- Technology breakthroughs in essentially all forms of energy sources and energy-efficiency technologies, including: the original work on nuclear reactors; development of enhanced methodologies for oil and gas exploration; creation of new battery technologies for electric vehicles, high-temperature superconducting materials, new substrates for photovoltaic panels, and new energy-efficient window and building technologies; and advances in the development of the scientific and technological foundations for fusion energy as a potential future energy source.¹
- Original development of the field of medical isotope production and utilization and continued leadership in the field of nuclear medicine.

¹ See *Success Stories: The Energy Mission in the Marketplace*, May 1995, U.S. Department of Energy.

More than 60 Nobel Prize winners have been associated with the Department or its laboratories, including four of the five U.S. scientists who won Nobel Prizes in physics and chemistry in 1995.

In addition, the Department's laboratories have received more R&D 100 awards—the most widely recognized award for practical innovations—than has any other public or private organization.² In 1995, DOE's research was recognized with 32 of these awards.

The legacy of accomplishments by the Department's laboratories is clear, and their potential future contributions are great. Research currently under way at the DOE laboratories could help meet the national goals of:

- Environmental quality through clean energy sources and pollution-prevention technologies
- Enhanced security through technical advances that enable continued reductions in the nuclear risk without nuclear testing
- Sustained leadership across the frontiers of scientific knowledge
- Economic productivity through technology innovations that enter the marketplace through partnerships with the private sector

Although the Department of Energy laboratories had their origins in the Cold War, and their growth was fueled considerably by national security requirements, these institutions now serve a broad array of national needs. Optimizing their use to help meet the Nation's needs as we enter the 21st century will be a major challenge—and opportunity—of the post-Cold War world.

Reforms at the Department and its Laboratories

Tightening Federal budgets and shifting national priorities all have put new pressures on the Department of Energy and its laboratories. The Department has addressed these challenges through an ambitious set of reforms aimed at enhancing its strategic focus, cutting costs, and instituting management changes that improve performance.

With regard to the laboratories, the Department has pursued a series of initiatives over the past two years. Many of these were launched directly in response to recommendations of the Task Force on Alternative Futures for the

² Since the first of these awards in 1963, technologies funded by the Department of Energy have won more R&D 100 awards than all other government agencies combined and more than twice as many as the top industrial winner.

Department of Energy National Laboratories, which Secretary O’Leary established in February 1994 and which issued its report in February 1995.

The Department established the Laboratory Operations Board in April 1995 to ensure that dedicated management attention is provided on a continuing basis to issues involving the cost and performance of the Department’s laboratories. The Board consists of an equal number of senior officials from the Department and external members drawn from the private sector, academia, and the public. The external members of the Board provide semiannual reports to the Secretary through the Secretary of Energy Advisory Board. In their first report, the external members provided the following overall assessment of reforms under way by the Department and its laboratories:

We found that very substantial and pervasive changes presently are underway at the Department and the DOE laboratories. These changes hold the potential to substantially improve R&D productivity, enhance mission focus, and eliminate onerous administrative burdens at the DOE laboratories...The overall picture that we see includes reform actions that have been necessary for many years. Major administrative processes are being aggressively reengineered at several of the laboratories in a fashion that will cut costs by tens of millions of dollars this year alone. These actions will enable the Department to meet its target of \$1.4 billion in cost reduction at the laboratories over five years, which suggests to us that a more ambitious goal should be set.³

A summary of the Department’s laboratory reform initiatives is provided in Box 1 on page 8. As of March 1996, the Department projected that its productivity improvement efforts would result in more than \$1.7 billion in savings over five years through significant reductions in unnecessary administrative costs across the laboratory system.

This document will provide the framework for achieving greater efficiencies and productivity from the laboratories. It was developed under the auspices of the Laboratory Operations Board to help the Department and the Nation get the most from the DOE laboratory system. It is responsive to the specific direction of President Clinton to the Department of Energy, Department of Defense, and National Aeronautics and Space Administration “to clarify and focus the mission assignments of their laboratories” for the purpose of sustaining and enhancing the service of these R&D institutions to the Nation’s long-term needs.⁴

³ *Report of the External Members of the Department of Energy Laboratory Operations Board, Secretary of Energy Advisory Board, October 26, 1995, p. 3.*

⁴ Statement by the President, Future of Major Federal Laboratories, Office of the Press Secretary, September 25, 1995; this directive was among those announced in response to the Interagency Federal Laboratory Review, Office of Science and Technology Policy, May 15, 1995.

Elements of the Plan

This plan outlines a vision and a set of management principles that will guide actions to reform the laboratories. It provides detailed information on the Department's missions and the laboratories' roles in those missions in order to provide a basis for sound management decisions.

Volume I provides an overview of how the Department uses the laboratories. It describes the major mission objectives that the Department executes through its laboratories, it depicts the roles of the Department's multiprogram laboratories in addressing the Department's missions, and it delineates the management principles and organizational characteristics that the Department and its laboratories will strive to fulfill into the next century. Volume I also includes mission profiles for each of the DOE laboratories. These profiles provide a concise summary of the major scientific facilities, R&D competencies, accomplishments, funding levels, and R&D relationships for each laboratory. These profiles also include a "mission footprint" for each laboratory, showing how each laboratory's R&D activities maps onto the major missions of the Department.

Volume II provides a mapping of the Department's R&D programs onto the DOE laboratory structure. Mission activity profiles are included for more than 166 discrete R&D budget functions (called Budget and Reporting, or B&R, Codes) which compose the total R&D funding that goes from the Department to its laboratories. These profiles provide a description of each mission activity, its funding history, how the funding is distributed among multiple R&D performers (DOE laboratories, academia, industry), and the level of effort for each DOE laboratory. These profiles designate the relative roles of the laboratories in carrying out each of these B&R program functions, based on their proportion of fiscal year 1995 funding.