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DEPARTMENT OF
ENERGY

Uncertain Progress in
Implementing National
Laboratory Reforms



**Resources, Community, and
Economic Development Division**

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September 10, 1998

The Honorable F. James Sensenbrenner, Jr.
Chairman
The Honorable George E. Brown, Jr.
Ranking Minority Member
Committee on Science
House of Representatives

The Department of Energy (DOE) manages the largest laboratory system of its kind in the world. Since the early days of the World War II Manhattan Project, DOE's laboratories have played a major role in maintaining U.S. leadership in research and development (R&D). With 23 laboratories in 14 states, a combined budget of over \$10 billion a year, and a staff of about 60,000, DOE is responsible for ensuring that the laboratory system is managed in an effective, efficient, and economical manner.

DOE's stewardship of the laboratory complex has been questioned over the past 20 years by various advisory groups. These groups have identified management weaknesses in the way DOE manages its laboratory system. In recent years, the Congress has held several hearings on various aspects of the future of the national laboratories. Since 1994, we have testified three times on the missions and management of the national laboratories.

Concerned about DOE's progress in making needed management reforms, you asked us to

- identify the recommendations by various advisory groups for addressing management weaknesses at DOE and the laboratories and
- evaluate how DOE and its laboratories have responded to these recommendations.

Results in Brief

For nearly 20 years, many advisory groups have found that while DOE's national laboratories do impressive research and development, they are unfocused, are micromanaged by DOE, and do not function as an integrated national research and development system. Weaknesses in DOE's leadership and accountability are often cited as factors hindering fundamental reform of the laboratories' management. As a result, advisory groups have made dozens of recommendations ranging from improving strategic planning to streamlining internal processes. Several past advisory

groups have also suggested major organizational changes in the way the laboratories are directed.

To address past recommendations by advisory groups, DOE, at our request, documented the actions it has taken, from creating new task forces to developing strategic laboratory plans. While DOE has made some progress—principally by reducing paperwork burdens on its laboratories—most of its actions are still under way or have unclear outcomes. Furthermore, these actions lack the objectives, performance measures, and milestones needed to effectively track progress and account for results. Consequently, the Department cannot show how its actions have resulted, or may result, in fundamental change. For example, its Strategic Laboratory Missions Plan, which was developed to give more focus and direction to the national laboratories, does not set priorities and is not tied to the annual budget process. Few experts and officials we consulted could show how the plan is used to focus missions or integrate the laboratory system. DOE’s latest technique for focusing the laboratories’ missions is the “technology roadmap.” Roadmaps are plans that show how specific DOE activities relate to missions, goals, and performers. Roadmaps are a promising step but have been used in only a few mission areas and are not directly tied to DOE’s budget process. Moreover, several laboratory directors questioned both the accuracy of the actions DOE has reported taking and their applicability at the laboratory level. DOE’s organizational weaknesses, which include unclear lines of authority, are a major reason why the Department has been unable to develop long-term solutions to the recurring problems reported by advisory groups. Although DOE created the Laboratory Operations Board to help oversee laboratory management reform, it is only an advisory body within DOE’s complex organizational structure and lacks the authority to direct change.

Background

The missions of DOE’s 23 laboratories have evolved over the last 55 years. Originally created to design and build atomic bombs under the Manhattan Project, these laboratories have since expanded to conduct research in many disciplines—from high-energy physics to advanced computing at facilities throughout the nation. DOE’s goal is to use the laboratories for developing clean energy sources and pollution-prevention technologies, for ensuring enhanced security through reductions in the nuclear threat, and for continuing leadership in the acquisition of scientific knowledge. The Department considers the laboratories a key to a growing economy fueled by technological innovations that increase U.S. industrial competitiveness and create new high-skill jobs for American workers.

Missions have expanded in the laboratories for many reasons, including changes in the world's political environment.

Nine of DOE's 23 laboratories are multiprogram national laboratories; they account for about 70 percent of the total laboratory budget and about 80 percent of all laboratory personnel. Three of these multiprogram national laboratories (Lawrence Livermore, Los Alamos, and Sandia) conduct the majority of DOE's nuclear weapons defense activities. Facing reduced funding for nuclear weapons as a result of the Cold War's end and the signing of the comprehensive nuclear test ban treaty, these three laboratories have substantially diversified to maintain their preeminent talent and facilities. The remaining laboratories in DOE's system are program- and mission-dedicated facilities. (See app. I for a list of all DOE laboratories.) DOE owns the laboratories and contracts with universities and private-sector organizations for the management and operation of 19, while providing federal staff for the remaining 4.

The Congress is taking a growing interest in how the national laboratories are being managed. Recently introduced legislation would restructure the missions of the laboratories or manage them in new ways. Some previously proposed organizational options include converting the laboratories that are working closely with the private sector into independent entities or transferring the responsibility for one or more laboratories to other federal agencies whose missions are closely aligned with those of particular DOE laboratories. We have reported to the Congress that DOE's efforts to sharpen the focus and improve the management of its laboratories have been elusive and that the challenges facing the Department raise concerns about how effectively it can manage reform initiatives.¹

Advisory Groups Cite Continuing Mission and Management Concerns at the National Laboratories

Over the past several years, many government advisory groups have raised concerns about how DOE manages its national laboratory system. Major concerns centered on three issues:

- The laboratories' missions are unfocused.
- DOE micromanages the laboratories.
- The laboratories are not operating as an integrated system.

¹Department of Energy: National Laboratories Need Clearer Missions and Better Management (GAO/RCED-95-10, Jan. 27, 1995).

More recent advisory groups have reported similar weaknesses, prompting the Congress to take a close look at how the national laboratory system is meeting its objectives.

Concerns Raised by Advisory Groups

We identified nearly 30 reports by a wide variety of advisory groups on various aspects of the national laboratories' management and missions. (See app. II for a list of past reports.) Most of these reports have been prepared since the early 1980s. The reports include the following:

- In 1982, DOE's Energy Research Advisory Board reported that the national laboratories duplicate private-sector research and that while DOE could take better advantage of the national laboratories' capabilities, it needed to address its own management and organizational inefficiencies, which hamper the achievement of a more effective laboratory system.²
- In 1983, a White House Science Council Panel found that while DOE's laboratories had well-defined missions for part of their work, most activities were fragmented and unrelated to the laboratories' main responsibilities.³
- In 1992, DOE's Secretary of Energy Advisory Board found that the laboratories' broad missions, coupled with rapidly changing world events, had "caused a loss of coherence and focus at the laboratories, thereby reducing their overall effectiveness in responding to their traditional missions as well as new national initiatives. . . ."⁴
- A 1993 report by an internal DOE task force reported that missions "must be updated to support DOE's new directions and to respond to new national imperatives. . . ."⁵

The most recent extensive review of DOE's national laboratories was performed by a task force chaired by Robert Galvin, former Chairman of the Motorola Corporation. Consisting of distinguished leaders from government, academia, and industry, the Galvin Task Force was established to examine alternatives for directing the laboratories' scientific and engineering resources to meet the economic, environmental, defense,

²The Department of Energy Multiprogram Laboratories: A Report of the Energy Research Advisory Board to the United States Department of Energy (Sept. 1982).

³Report of the White House Science Council, Federal Laboratory Review Panel, Office of Science and Technology Policy, Executive Office of the President (May 20, 1983).

⁴Final Report, Secretary of Energy Advisory Board (1992).

⁵Changes and Challenges at the Department of Energy Laboratories: Final Draft Report of the Missions of the Laboratories Priority Team (1993).

scientific, and energy needs of the nation. Its 1995 report identified many of the problems noted in earlier studies and called for a more disciplined focus for the national laboratories, also reporting that the laboratories may be oversized for their role.⁶

The Galvin Task Force reported that the traditional government ownership and contractor operation of the laboratories has not worked well. According to its report, increasing DOE's administration and oversight transformed the laboratories from traditional contractor-operated systems into a virtual government-operated system. The report noted that many past studies of DOE's laboratories had resulted in efforts to fine-tune the system but led to little fundamental improvement. Regarding the management structure of DOE's non-weapons-oriented laboratories, the task force recommended a major change in the organization and governance of the laboratory system. The task force envisioned a not-for-profit corporation governed by a board of trustees, consisting primarily of distinguished scientists and engineers and experienced senior executives from U.S. industry. Such a change in governance, the task force reported, would improve the standards and quality of work and at the same time generate over 20 percent in cost savings.

Other findings by the task force and subsequent reports by other advisory groups have focused on the need for DOE to integrate R&D programs across the Department and among the laboratories to increase management efficiencies, reduce administrative burdens, and better define the laboratories' missions.

In June 1995, DOE's Task Force on Strategic Energy Research and Development, chaired by energy analyst Daniel Yergin, issued a report on DOE's energy R&D programs.⁷ The report assessed the rationale for the federal government's support of energy R&D, reviewed the priorities and management of the overall program, and recommended ways of making it more efficient and effective. The task force recommended that DOE streamline its R&D management, develop a strategic plan for energy R&D, eliminate duplicative laboratory programs and research projects, and reorganize and consolidate dispersed R&D programs at DOE laboratories.

⁶Alternative Futures for the Department of Energy National Laboratories, Secretary of Energy Advisory Board Task Force on Alternative Futures for the Department of Energy National Laboratories, DOE (Feb. 1995).

⁷Energy R&D: Shaping our Nation's Future in a Competitive World. Final Report, Final Report of the Task Force on Strategic Energy Research and Development, Secretary of Energy Advisory Board, DOE (June 1995).

In August 1995, the National Science and Technology Council examined laboratories in DOE, the Department of Defense (DOD), and the National Aeronautics and Space Administration (NASA).⁸ The Council reported that DOE's existing system of laboratory governance needs fundamental repair, stating that DOE's laboratory system is bigger and more expensive than is needed to meet essential missions in energy, the environment, national security, and fundamental science. The Council recommended that DOE develop ways to eliminate apparent overlap and unnecessary redundancy between its laboratory system and DOD's and NASA's.

DOE's Laboratory Operations Board was created in 1995 to focus the laboratories' missions and reduce DOE's micromanagement. Members serving on the Board from outside DOE have issued four different reports, which have noted the need to

- focus and define the laboratories' missions in relation to the Department's missions,
- integrate the laboratories' programmatic work, and
- streamline operations, including the elimination or reduction of administrative burdens.

In March 1997, the Office of Science and Technology Policy reported on laboratories managed by DOE, DOD, and NASA.⁹ The Office cited efforts by the three agencies to improve their laboratory management but found that DOE was still micro-managing its laboratories and had made little progress toward reducing the administrative burdens it imposes on its laboratories. The Office recommended a variety of improvements in performance measures, incentives, and productivity and urged more streamlined management.

In March 1997, a report by the Institute for Defense Analyses (IDA) found that DOE's processes for managing environment, safety, and health activities were impeding effective management.¹⁰ According to IDA, DOE's onerous review processes undermined accountability and prevented timely decisions from being made and implemented throughout the entire nuclear weapons complex, including the national laboratories. IDA

⁸Future of Major Federal Laboratories, National Science and Technology Council (Aug. 1995).

⁹Status of Federal Laboratory Reforms. The Report of the Executive Office of the President Working Group on the Implementation of Presidential Decision Directive PDD/NSTC-5, Office of Science and Technology Policy, Executive Office of the President (Mar. 1997).

¹⁰The Organization and Management of the Nuclear Weapons Program, Institute for Defense Analyses (Mar. 1997).

specifically noted that DOE's Defense Programs had confusing line and staff relationships, inadequately defined roles and responsibilities, and poorly integrated programs and functions. IDA concluded that DOE needed to strengthen its line accountability and reorganize its structure in several areas.

DOE Lacks an Effective Strategy for Addressing Advisory Groups' Recommendations

At our request, DOE provided us with a listing of the actions it took in response to repeated calls for more focused laboratory missions and improved management. But while DOE has made progress—principally by reducing paperwork burdens on its laboratories—most of its actions are still in process or have unclear expectations and deadlines. Furthermore, the Department cannot demonstrate how its actions have resulted, or may result, in fundamental change.

To analyze progress in laboratory management reform, we talked to DOE and laboratory officials and asked DOE to document the actions it has taken, is taking, or has planned to address the recommendations from several advisory groups.¹¹ We used DOE's responses, which are reprinted in appendix III, as a basis for discussions with laboratory and DOE officials and with 18 experts familiar with national laboratory issues. We asked these experts to examine DOE's responses. Several of these experts had served on the Galvin Task Force and are currently serving on DOE's Laboratory Operations Board (app. IV lists the experts we interviewed). The actions DOE said it is taking include

- creating various internal working groups;
- strengthening the Energy R&D Council to facilitate more effective planning, budgeting, management, and evaluation of the Department's R&D programs and to improve the linkage between research and technology development;
- increasing the use of private-sector management practices;
- adopting performance-based contracting and continuous improvement concepts;
- improving the oversight of efforts to enhance productivity and reduce overhead costs at the laboratories;
- expanding the laboratories' work for other federal agencies;
- evaluating the proper balance between laboratories and universities for basic research;
- improving science and technology partnerships with industry;

¹¹DOE agreed with GAO to document only those actions taken in response to advisory groups' recommendations published since the 1995 Galvin Task Force report. These reports are listed in DOE's response in app. III.

-
- reducing unnecessary oversight burdens on laboratories;
 - developing the Strategic Laboratory Missions Plan in July 1996 that identified laboratory activities in mission areas;
 - creating the Laboratory Operations Board, which includes DOE officials and experts from industry and academia, to provide guidance and direction to the laboratories; and
 - developing “technology roadmaps,” a strategic planning technique to focus the laboratories’ roles.

DOE’s Actions Offer Uncertain Progress

Most of the actions DOE reported to us are process oriented, incomplete, or only marginally related to past recommendations for change. For example, creating new task forces and strengthening old ones may be good for defining problems, but these measures cannot force decisions or effect change.

DOE’s major effort to give more focus to laboratory missions was a Strategic Laboratory Missions Plan, published in July 1996. The plan describes the laboratories’ capabilities in the context of DOE’s missions and, according to the plan, will form the basis for defining the laboratories’ missions in the future. However, the plan is essentially a descriptive document that does not direct change. Nor does the plan tie DOE’s or the laboratories’ missions to the annual budget process. When we asked laboratory officials about strategic planning, most discussed their own planning capabilities, and some laboratories provided us with their own self-generated strategic planning documents. None of the officials at the six laboratories we visited mentioned DOE’s Strategic Laboratory Missions Plan as an essential document for their strategic planning.

A second action that DOE officials reported as a major step toward focusing the laboratories’ missions is the introduction of its “technology roadmaps.” These are described by DOE as planning tools that define the missions, goals, and requirements of research on a program-by-program basis. Officials told us that the roadmaps are used to connect larger departmental goals and are a way to institutionalize strategic planning within the Department. Roadmaps, according to DOE, will be an important instrument for melding the laboratories into a stronger and more integrated national system. DOE reports that roadmaps have already been developed in some areas, including nuclear science, high-energy physics, and the fusion program.

Experts we interviewed agreed that creating roadmaps can be a way to gain consensus between DOE and the laboratories on a common set of objectives while also developing a process for reaching those objectives. However, some experts also stated that it is too soon to tell if this initiative will succeed. One expert indicated that the Department has not adequately analyzed its energy R&D problems on a national basis before beginning the roadmap effort. Another was uncertain about just how the roadmaps will work. According to a laboratory director who was recently asked to comment on the roadmap process, more emphasis needs to be placed on the results that are expected from the roadmaps, rather than on the process of creating them. Furthermore, roadmapping may be difficult in some areas, especially for activities involving heavy regulatory requirements.¹² When we asked DOE officials about roadmapping, we were told that it is still a work in progress and will not be connected directly to the budget process for months or even years.

Other DOE actions are also described as works in progress. For example, the use of performance-based contracts is relatively new, and the results from the strengthened R&D Council are still uncertain. The R&D Council includes the principal secretarial officers who oversee DOE's R&D programs and is chaired by the Under Secretary. According to DOE, the Council has a new charter that will promote the integration and management of the Department's R&D.

One area in which DOE reports that it has made significant improvements is reducing the burden of its oversight on the national laboratories. Although some laboratory directors told DOE that their laboratories are still micromanaged, most officials and experts we interviewed credited DOE with reducing oversight as the major positive change since the Galvin Task Force issued its report in 1995.

The Laboratory Operations Board Was Created to Provide Laboratory Focus

DOE's major organizational action in response to recent advisory groups' recommendations was to create the Laboratory Operations Board in April 1995. The purpose of the Board is to provide dedicated management attention to laboratory issues on a continuing basis. The Board includes 13 senior DOE officials and 9 external members drawn from the private sector, academia, and the public. The external members have staggered, 6-year terms and are required to assess DOE's and the laboratories' progress in meeting such goals as management initiatives, productivity improvement, mission focus, and programmatic accomplishments.

¹²Comments from the Laboratory Operations Board meeting, Feb. 24, 1998.

The Board's external members have issued four reports, the results of which largely mirror past findings by the many previous advisory groups. These reports have also concluded that DOE has made some progress in addressing the problems noted by the Galvin Task Force but that progress has been slow and many of the recommendations need further actions.

Several experts we interviewed generally viewed the Board positively. Some, however, recognized that the Board's limited advisory role is not a substitute for strong DOE leadership and organizational accountability. One expert commented that the effectiveness of the Board was diminished by the fact that it meets too infrequently (quarterly) and has had too many changes in membership to function as an effective adviser. Other experts agreed but indicated that the Board still has had a positive influence on reforming the laboratory system. One expert said that the Board's membership is not properly balanced between internal and external members (although originally specifying 8 of each, the Board's charter was recently changed to require 13 DOE members and only 9 external members). Another expert indicated that the Board could increase its effectiveness by more carefully setting an agenda for each year and then aggressively monitoring progress to improve its management of the laboratory system.

Laboratory officials we interviewed also viewed the Board in generally positive terms; some commented that the Board's presence gives the laboratories a much needed voice in headquarters. Others noted that the Board could eventually play a role in integrating the laboratories' R&D work across program lines, thereby addressing a major concern about the laboratories' lack of integration noted by past advisory groups.

Although the Board can be an effective source of direction and guidance for the laboratories, it has no authority to carry out reform operations. One expert said that even though the Board monitors the progress of reform and makes recommendations, it is still advisory and cannot coordinate or direct specific actions.

Laboratory Directors Have Concerns About Some DOE Actions

DOE requested comments from the laboratory directors on a draft of its response to our request for information about the actions DOE is taking to meet the advisory groups' recommendations. Some of the directors raised questions about both the accuracy of DOE's reported actions and their applicability at the laboratory level. For example, some laboratory officials

believe little progress has been made in meeting past recommendations to provide more focus on the laboratories' missions:

"[This] remains in the future. We have seen nothing yet."

"The response appears to sidestep the important need for lab-focused budgeting and strategic planning. The response discusses strategic planning in terms of DOE roadmaps for each program, not in terms of plans for each lab. Many labs continue to have a broad mission which crosses several [programs]. . . . While there may be an ongoing review by the [program officers], the labs have no evidence this is occurring and there have been no actions to address this."

"The [Galvin Task Force] wanted one clear lead lab in each mission or program, and DOE did not do that; there are 2 to 4 "principal" labs for each major business. Even for major program areas, 12 of the 15 programs listed in the department's laboratory mission plan have more than one laboratory listed as primary performer."

". . . it is not clear that DOE has made any significant progress as the response implies. . . ."

In commenting on DOE's response to the Galvin Task Force's recommendation that DOE reorganize to provide better integration in applied energy programs, two laboratory directors responded as follows:

"[The] tone of the response in [DOE's response] is a bit more optimistic than actual experience in the field justifies. . . . Only modest improvements have occurred to this point. . . ."

"No reorganization has occurred . . . no integration has occurred."

Another laboratory director commented on DOE's response to the Galvin Task Force's recommendation that DOE establish mechanisms to manage multiprogram laboratories as a system. According to the director,

"the examples provided to substantiate the labs working together as a system are not all new, some were in place when [the Galvin Task Force] wrote [its] report. Also, there have been a number of meetings between the multi-program labs but that is the extent of any progress in this area (little change has been made)."

In response to the Galvin Task Force's recommendation that the laboratories be given a greater role in environmental management, one laboratory director said,

“The labs have largely been held at arm’s length rather than included as part of the team. There have been recent efforts to correct this but there is no plan or action in place to correct it.”

Additionally, when we asked several laboratory officials for examples of their progress in responding to past advisory groups, most spoke of actions they have taken on their own initiative. Few could cite an example of a step taken in direct response to a DOE action. For example, several laboratory officials cited an increased level of cooperation and coordination among the laboratories involved with similar R&D activities. They also mentioned adopting “best business practices” to increase productivity, reduce overhead costs, and measure progress by improved metrics. However, many laboratory officials told us that many of their actions were taken to meet other demands, such as legislative and regulatory mandates, rather than as direct responses to the studies’ recommendations or to DOE’s policies.

DOE Lacks an Effective Strategy for Managing Recommended Changes

Despite its efforts to respond to the advisory groups’ recommendations, DOE has not established either a comprehensive plan with goals, objectives, and performance measures or a system for tracking results and measuring accountability. As a result, DOE is unable to document its progress and cannot show how its actions address the major issues raised by the advisory groups. Experts we contacted noted that while DOE is establishing performance measures for gauging how well its contractors manage the laboratories, DOE itself lacks any such measurement system for ensuring that the objectives based on the advisory groups’ recommendations are met.

Organizational Weaknesses Are Preventing Laboratory Management Reform

We, along with past advisory groups and internal DOE studies, have often reported on DOE’s complex organizational structure and the problems in accountability that result from unclear chains of command among headquarters, field offices, and the laboratories. For example, a 1997 DOE report stated that

“lack of clarity, inconsistency, and variability in the relationship between headquarters management and field organizations has been a longstanding criticism of DOE operations. This is particularly true in situations when several headquarters programs fund activities at laboratories. . . .”¹³

¹³DOE Action Plan for Improved Management of Brookhaven National Laboratory, DOE (July 1997).

DOE's Laboratory Operations Board also reported in 1997 on DOE's organizational problems, noting that there were inefficiencies due to DOE's complicated management structure. The Board recommended that DOE undertake a major effort to rationalize and simplify its headquarters and field management structure to clarify roles and responsibilities.

Similarly, the 1997 IDA report cited serious flaws in DOE's organizational structure. Noting long-standing concerns in DOE about how best to define the relationships between field offices and the headquarters program offices that sponsor work, the Institute concluded that "the overall picture that emerges is one of considerable confusion over vertical relationships and the roles of line and staff officials."

DOE's complex organization stems from the multiple levels of reporting that exist between the laboratories, field offices (called operations offices), and headquarters program offices. DOE's laboratories are funded and directed by program offices—the nine largest laboratories are funded by many different DOE program offices. The program office that usually provides the dominant funding serves as the laboratory's "landlord". The landlord program office is responsible for sitewide management at the laboratory and coordinates crosscutting issues, such as compliance with environment, safety, and health requirements at the laboratories. DOE's Energy Research is landlord to several laboratories, including the Brookhaven and Lawrence Berkeley laboratories. Defense Programs is the landlord for the Los Alamos and Lawrence Livermore national laboratories. The program offices, in turn, report to either the Deputy Secretary or the Under Secretary.

Further complicating reporting, DOE assigns each laboratory to a field operations office, whose director serves as the contract manager and also prepares the laboratory's annual appraisal. The operations office, however, reports to a separate headquarters office under the Deputy Secretary, not to the program office that supplies the funding. Thus, while the Los Alamos National Laboratory is primarily funded by Defense Programs, it reports to a field manager who reports to another part of the agency.

As a consequence of DOE's complex structure, IDA reported that unclear chains of command led to the weak integration of programs and functions across the Department, wide variations among field activities and relationships and processes, and confusion over the difference between line and staff roles.

Weaknesses in DOE's ability to manage the laboratories as an integrated system of R&D facilities is one of the most persistent findings from past advisory groups, as well as from our 1995 management review of laboratory issues. We concluded that DOE had not coordinated the laboratories' efforts as part of a diversified research system to solve national problems. Instead, DOE was managing the laboratories on a program-by-program basis. We recommended that DOE evaluate alternatives for managing the laboratories that would more fully support the achievement of clear and coordinated missions. To help achieve this goal, we said that DOE should strengthen the Office of Laboratory Management to facilitate the laboratories' cooperation and resolve management issues across all DOE program areas. DOE did not strengthen this office. DOE's primary response to our recommendations and those made by the Galvin Task Force was creating the Laboratory Operations Board.

A further consequence of no central laboratory authority is the inability to track and enforce laboratory reforms. Experts we interviewed cited DOE's complex structure and lack of a strong central laboratory authority as hindering the effective implementation of advisory groups' recommendations. Comments made to us included the following:

"DOE's organization is a mess. You cannot tell who is the boss. DOE would be much more effective if layers were removed."

"DOE has not been responsive to recommendations for organizational changes and improvements in [reporting] relationships."

Experts we consulted noted that DOE's organizational weaknesses prevent reform. According to experts, DOE's establishment of working groups to implement recommendations can be helpful for guiding reform, but these groups often lack the authority to make critical decisions or to enforce needed reforms. One expert commented that "the current DOE organizational structure is outdated . . . there is no DOE leadership to implement changes."

We believe these organizational weaknesses are a major reason why DOE has been unable to develop long-term solutions to the recurring problems reported by advisory groups. The absence of a senior official in the Department with program and administrative authority over the operations of all the laboratories prevents effective management of the laboratories on an ongoing basis.

As far back as 1982, an advisory group recognized the need for a strong central focus to manage the laboratories' activities. In its 1982 report, DOE's Energy Research Advisory Board noted "layering and fractionation of managerial and research and development responsibilities in DOE on an excessive number of horizontal and vertical levels. . . ." ¹⁴ The Board recommended that DOE designate a high level official, such as a Deputy Under Secretary, whose sole function would be to act as DOE's chief laboratory executive. Although DOE did not make this change, the Under Secretary has assumed responsibility for ensuring that laboratory reforms are accomplished.

Conclusions

Despite many studies identifying similar deficiencies in the management of DOE's national laboratories, fundamental change remains an elusive goal. While the Department has many steps in process to improve its management of the laboratories—such as new strategic planning tools and the Laboratory Operations Board—the results of these efforts may be long in coming and may fall short of expectations. Other actions DOE is taking are focused more on process than on results, and most are still incomplete, making it difficult to show how DOE intends to direct the laboratories' missions and manage them more effectively as an integrated system—a major recommendation of past advisory groups. The Department has not developed a way to show how its actions will result in practical and permanent laboratory reform. We believe that without a strategy for ensuring that reforms actually take place, DOE will make only limited progress in achieving meaningful reforms.

Establishing accountability for ensuring that its actions will take place in a timely manner is a challenge for DOE. The Department's complex organizational structure creates unclear lines of authority that dilute accountability and make reforms difficult to achieve. In our 1995 management review of DOE's laboratories, we reported that if DOE is unable to refocus the laboratories' missions and develop a management approach consistent with these new missions, the Congress may wish to consider alternatives to the present relationships between DOE and the laboratories. Such alternatives might include placing the laboratories under the control of different agencies or creating a separate structure for the sole purpose of developing a consensus on the laboratories' missions. Because of DOE's uncertain progress in reforming the laboratories' management, we

¹⁴The Department of Energy Multiprogram Laboratories: A Report of the Energy Research Advisory Board to the United States Department of Energy (Sept. 1982).

continue to believe that the Congress may wish to consider such alternatives.

Recommendation to the Secretary of Energy

To ensure the timely and effective implementation of recommendations from the many past laboratory advisory groups, we recommend that the Secretary of Energy develop a comprehensive strategy with objectives, milestones, DOE offices and laboratories responsible for implementation actions, performance measures that will be used to assess success in meeting implementation objectives, a tracking system to monitor progress, and regular progress reports on the status of implementation.

Agency Comments

We provided a draft of this report to DOE for review and comment. Although DOE did not comment directly on our conclusions and recommendation, the Department said that we did not take into account the full range of changes that it has undertaken. Changes discussed by DOE include a series of initiatives implemented to strengthen management, streamline the strategic planning processes, and enhance interactions between DOE and the laboratories. The Department also said that the cumulative effect of these changes reflects significant progress in implementing the recommendations of past advisory groups.

While stating that much has been accomplished to improve the management of the national laboratories, DOE also acknowledges that more needs to be done to ensure a fully integrated management system, including better focusing the laboratories' missions and tying them to the annual budget process. DOE anticipates that these actions will take at least 2 more years to accomplish.

In preparing our report, we considered the actions the Department reports it has taken to implement past recommendations from laboratory advisory groups. While the types of reported actions are positive, progress made toward the goals and objectives of reform cannot be determined without a plan for measuring progress. As we state in our report, some laboratory directors have reported to DOE that they have not seen the results of some of these actions at their level. We continue to believe that DOE needs to monitor, measure, and evaluate its progress in accomplishing reforms. If it does not do so, it will have difficulty holding its managers accountable for making the needed changes and determining if funds are being spent wisely on the reform process.

Appendix VI includes DOE's comments and our response.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to the Secretary of Energy and the Director, Office of Management and Budget. We will make copies available to other interested parties on request.

Our review was performed from December 1997 through August 1998 in accordance with generally accepted government auditing standards. See appendix V for a description of our scope and methodology.

If you or your staff have any questions about this report, please call me at (202) 512-3841. Major contributors to this report are listed in appendix VII.

A handwritten signature in black ink, appearing to read "Victor S. Rezendes". The signature is fluid and cursive, with the first name "Victor" and last name "Rezendes" clearly distinguishable.

Victor S. Rezendes
Director, Energy, Resources,
and Science Issues

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Abbreviations

DOE	Department of Energy
GAO	General Accounting Office
DOD	Department of Defense
IDA	Institute for Defense Analyses
NASA	National Aeronautics and Space Administration
NSTC	National Science and Technology Council
R&D	research and development

Department of Energy's Laboratories

Dollars in millions

Laboratory	Contractor	Location	Estimated fiscal year 1998 budget authority
Multiprogram laboratories			
Argonne National Laboratory	University of Chicago	Chicago, IL	\$522
Brookhaven National Laboratory	Brookhaven Science Associates	Upton, NY	417
Idaho National Engineering Laboratory	Lockheed Martin Idaho Technologies Co.	Idaho Falls, ID	783
Lawrence Berkeley National Laboratory	University of California	Berkeley, CA	368
Lawrence Livermore National Laboratory	University of California	Livermore, CA	1,866
Los Alamos National Laboratory	University of California	Los Alamos, NM	1,345
Oak Ridge National Laboratory	Lockheed Martin Energy Research	Oak Ridge, TN	685
Pacific Northwest National Laboratory	Battelle Memorial Institute	Richland, WA	448
Sandia National Laboratories	Sandia Corp. (Lockheed Martin)	NM and CA	1,358
Program-dedicated laboratories			
Ames Laboratory	Iowa State University	Ames, IA	31
Federal Energy Technology Center	Federally staffed	PA and WV	973 ^a
Fermi National Accelerator Laboratory	University Research Assoc., Inc.	Batavia, IL	271
National Renewable Energy Laboratory	Midwest Research Institute	Golden, CO	192
Oak Ridge Institute for Science and Education	Oak Ridge Associated Universities	Oak Ridge, TN	85
Princeton Plasma Physics Laboratory	Princeton University	Princeton, NJ	81
Stanford Linear Accelerator Center	Stanford University	Palo Alto, CA	185
Thomas Jefferson National Accelerator Facility	Southeastern Univ. Research Assoc., Inc.	Newport News, VA	67
Specific-mission laboratories			
Bettis Atomic Power Laboratory	Westinghouse Electric Corp.	West Mifflin, PA	324 ^a
Environmental Measurements Laboratory	Federally staffed	New York, NY	10 ^a
Knolls Atomic Power Laboratory	KAPL, Inc. (Lockheed Martin)	Niskayuna, NY	286 ^a
New Brunswick Laboratory	Federally staffed	Argonne, IL	4 ^a
Radiological and Environmental Sciences Laboratory	Federally staffed	Idaho Falls, ID	5 ^a
Savannah River Technology Center	Westinghouse Savannah River Co.	Aiken, SC	194 ^a

Note: This list includes only laboratories owned by the Department of Energy (DOE) and operated either under a management and operating contract or by DOE employees. DOE funds other laboratories through grants to and cooperative agreements with universities.

^aReflects a prior year's value carried forward.

Source: DOE (July 14, 1998).

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DOE's Responses to Past Advisory Groups' Recommendations

Note: Abbreviations used in this appendix are listed at the end.



The Under Secretary of Energy
Washington, DC 20585

March 16, 1998

Mr. Victor S. Rezendes
Director, Energy, Resources and Science Issues
United States General Accounting Office
Washington, DC 20548

Dear Mr. Rezendes:

With this letter I am forwarding the response to a request for information on the status of recommendations primarily related to the Department of Energy's laboratories and research and development programs. This submission has been prepared in response to a letter from you dated December 4, 1997.

Let me take this opportunity to comment on some of our activities aimed at improving the Department's research and development planning as well as its management and coordination of research and development activities.

Secretary Peña, Deputy Secretary Moler and I recognize that the Department's important national missions can be accomplished only with strong R&D programs. We are working to better integrate the various research programs and to integrate the national laboratories into a system. In addition, we know that the Department must continue to improve the laboratory governance system and the overall management of the laboratories. The Galvin Report, the Institute for Defense Analyses "120-Day Study," and recent Laboratory Operations Board reports -- all of which the Department strongly supported -- raise important management issues. The substantial progress on many of these issues is outlined in the attached report, but we acknowledge that much work remains to be done.

Secretary Peña often refers to the Department's laboratory system as a prized national asset and realizes that stewardship of that asset is an important responsibility for any Secretary of Energy. Under his direction in the last few months, the following the actions have been taken:

(1) *R&D Council.* DOE is expanding the responsibilities and strengthening the accountability of the R&D Council. The Council, which I now chair, comprises the principal secretarial officers who oversee most DOE R&D programs. It has a new charter, issued on January 13, 1998, that will promote integration and management of the Department's R&D, both within and across program areas. In addition to providing stronger high level guidance, support, and leadership to the entire R&D enterprise, the R&D Council will be responsible for the initiation, oversight and implementation of numerous R&D management improvements.

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(2) *Technology Roadmaps.* Technology roadmaps address specific scientific and technical problems by defining goals, engaging in a consensus building process with R&D performers and stakeholders, and developing R&D plans most likely to achieve success. Technology roadmaps will serve as a primary tool with which to "strategically manage" the cross-cutting R&D needs and capabilities of the Department.

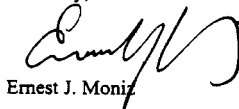
In particular, roadmaps will be an important vehicle for melding the individual DOE laboratories into a stronger and more integrated national laboratory system. They will be used to establish clear linkages between DOE missions, the programs designed to accomplish those missions, the technologies required to make those programs successful, and the specific R&D programs or tasks required to "produce" those technologies. Mission roadmaps will be developed along the Department's business lines, under the guidance of the corresponding R&D Council Working Group. In addition, cross-cutting roadmaps will be developed to strengthen enabling technologies for multiple missions.

The R&D Council has directed that each of the four DOE business lines develop and present for review roadmaps in critical technology areas. This process is moving forward with the full cooperation of the national laboratory directors. Several prototype roadmaps will be completed by the summer of 1998. A schedule will be developed, by the summer of 1998, for the completion of the remaining roadmaps.

(3) *The Selection of R&D Performers.* The Department, under the guidance of the R&D Council, will be intensifying its evaluation of the ways in which grants and contracts are awarded, including technology transfer and partnership agreements, to ensure they are made on the basis of sound scientific and technical review. This evaluation will, in particular, consider the important role of peer review, and the adequacy of competition in the making of awards.

I trust you will find this overview valuable as you complete your review. Please consider the attached response a work in progress. The nature of many of the recommendations is such that they are actually goals toward which the Department must continually strive. We will continue to measure our progress toward achieving those goals and will be happy to share those reports with you. We would be happy to discuss these issues in more depth at your request.

Sincerely,



Ernest J. Moniz

Enclosure

cc: Secretary Federico Peña
Deputy Secretary Elizabeth A. Moler

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Recommendations from the Galvin Task Force (February 1995)

National Security

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
<p>Primary mission of weapons labs must be ensuring a safe, secure and reliable stockpile in the absence of nuclear testing. Priorities are to: Attract and retain skilled scientists, Enhance surveillance of weapons, Continue hydrodynamic testing, Assess problems, reanalyze data, and Sustain the scientific process.</p>	<p>7/26/96</p>	<p><u>Accepted:</u> - Being Implemented - President's Clinton's statement of September 25, 1995, emphasized the importance of DOE's Science-Based Stockpile Stewardship (SBSS) program in order to be able to reach a Comprehensive Test Ban Treaty. The SBSS is the primary mission of the three weapons laboratories. The SBSS priorities, reflected in the program plan and the 1996 Budget request are consistent with the Galvin Report priorities. They include: A) enhanced surveillance focusing on three major areas: 1) materials science, 2) aging model development, and 3) testing and monitoring technologies. This program is developing models which account for aging effects in weapons materials, components, and systems that help us to predict service lifetimes and to schedule (with the DOD) necessary component replacement. B) an advanced hydrodynamic radiographic capability based on requirements identified by a tri-lab Physics Requirements. C) The National Ignition Facility (NIF) for high energy density physics that opens a window to conditions of temperature and pressure close to those that occur in nuclear weapons. And D) the Accelerated Strategic Computing initiative (ASCI), leading-edge modeling and simulation capabilities needed for virtual testing and prototyping. In addition, the Department recognizes the importance of retaining existing scientists with essential skills and of attracting additional new scientists to ensure a future skill base.</p>
<p>DOE organization should reflect importance and interdependence between intelligence support and non-proliferation, non-proliferation, and stockpile stewardship</p>	<p>8/5/96</p>	<p><u>Accepted:</u> Periodic Secretarial level meetings covering all aspects of National Security issues are held.</p>
<p>LLNL should retain weapons design competence and NIF responsibilities but transfer, over 5 years, direct stockpile support activities in nuclear materials development to Los Alamos.</p>	<p>5 years</p>	<p><u>Not accepted:</u>- The President announced his requirement for maintaining US deterrent under a CTBT August 11, 1995. After an interagency review of the responsibilities of the weapons labs under a CTBT, the President announced on September 25, 1995 that continued vitality of all three DOE nuclear weapons labs was essential. This decision was based on the realization that two design laboratories are necessary for the success of stockpile stewardship</p>
<p>Continued support for DARHT, LANSCE/LAMPF, and NIF.</p>	<p>8/6/96</p>	<p><u>Implemented:</u> In budgets and program plans.</p>

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No further production capabilities needed; use existing capabilities at Pantex, LANL, and Sandia.	6/96	Accepted in part: The Programmatic Environmental Impact Statement (PEIS) analyzed the requirements for the weapons complex configuration, including consolidation of the production facilities. Utilization of existing capabilities at Y-12, the Kansas City Plant, Pantex, and the Savannah River Site (at a level discussed in the PEIS) were determined to be the most cost effective alternative to meet the needs of the enduring stockpile.
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Galvin - Energy and Environment

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Reorganize to provide better integration among applied energy programs, between these and industry, and between applied and basic energy research at labs.		Alternative Approach Being Implemented - The Research and Development Council, now chaired by the Under Secretary, is one of the mechanisms designed to facilitate more effective planning, budgeting, management, and evaluation of DOE R&D programs and to improve the linkage between research and technology development. Under its Terms of Reference, it has the responsibility to coordinate and integrate all R&D across the Department, including basic and applied energy research and technology development. The Council works to ensure that vital Department of Energy missions are effectively served by the R&D programs of the Department and its national laboratories through effective strategic planning. In addition, members of the Laboratory Operations Board are responsible for providing advice on effort by the Department to enhance integration among basic and applied research programs, and between the laboratory system and other R&D performers.
Integrate energy and environment.		Accepted: The modest improvements to date will be enhanced by the revitalized R&D Council. The Council has three standing working groups, representing business lines of the Department, i.e., Energy Resources, National Security, and Environmental Quality. The Director of Energy Research serves on each. The groups address strategic planning of cross-cutting science, technology, and operational issues within business lines and prepare recommendations to the Council on the resolution of those issues. These efforts are designed to improve integration of work related to both energy and the environment. (Also see response on page 10.)

Galvin - Lab missions and organization

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Establish clear mission statements for labs, to be used for budgeting and strategic planning.	"promptly"	Alternative Approach Being Implemented: - In the hierarchy of planning the Department has missions and the Laboratories have the responsibility for assuring that they have the capability to carry out appropriate portions of the Department's missions effectively and efficiently. The labs' capabilities were summarized in the Strategic Laboratory Missions Plan - Phase I of June 1996. The development of "roadmaps," with laboratory participation, will form the basis for the improved definition of the laboratories' roles and overall enhancement of the budgeting and planning efforts.

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Establish mechanisms to manage multi-program labs as a system.		<u>Accepted</u> : - Secretarial level review of cross-cutting issue areas, including allocation of resources and measurement of performance provides the mechanism for treating the laboratories as a system or a collection of subsystems. The Strategic Laboratory Missions Plan - Phase I of the Laboratory Operations Board (LOB) summarized ongoing activities. Examples of laboratories being managed as a subsystem within a larger system include: Global Climate Change, Human Genome, High Temperature Superconductivity, and High Energy and Nuclear Physics programs.
Establish lead labs based on missions and programs.		<u>Alternative Approach Being Implemented</u> - Rather than an ab initio establishment of lead labs, the Department, through the Strategic Laboratory Missions Plan - Phase I identified laboratories with primary responsibility for implementing major portions of each mission area. DOE looks to these labs as the primary performers in the mission areas and makes strategic investments in these program areas at those institutions. As roadmaps are implemented more extensively, the lead lab approach will become more effective.
Establish Centers of Excellence within lab system.		<u>Not formally accepted</u> - However, laboratory groups performing research to carry out the missions of the Department comprise de facto centers of excellence.

Galvin - Weapons site cleanup

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Improve DOE management and leadership.		<u>Accepted</u> : - Being Implemented - New leadership is being recruited. The Department has increased its management capability by hiring and training project managers, cost estimators, and contract coordinators. It has changed its business practices in key areas such as greater use of the private sector, fixed price contracts, management and integration contracts (M&I), and the use of performance-based contracting. The use of the Quality Improvement Team Concept has afforded the Department continuous improvement in its management enterprises.
Establish substantial commitment and high priority to correct problems with EM program.		<u>Accepted</u> : - Being Implemented - DOE has made a substantial commitment to improve the management and administration of the environmental management program in areas such contract reform, privatization, revised budgeting and accounting procedures, with emphasis on discrete projects, and project management.

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<p>Establish Environmental Advisory Board.</p>		<p><u>Alternative Approach Being Implemented:</u> DOE has several advisory boards and independent reviews providing independent advice to the EM program. It was determined that the existing advisory boards were sufficient to provide the advice needed by the Department. The EM program is committed to:</p> <ol style="list-style-type: none"> 1. Continued utilization of the Environmental Management Advisory Board (EMAB), which was established prior to the recommendation, 2. Studies by panels of the National Academy of Sciences, 3. The Development of On-site Innovative Technologies (DOIT) Committees, and 4. Site Specific Advisory Boards that exist at every major cleanup site. <p>The EMAB was established in 1990 to help guide policy. The Board has 28 members representing a wide range of organizational perspectives and fields of expertise, including the National Laboratories. EMAB subcommittees address key issues including risk management, cost-effective cleanup, technology development and transfer, and deployment.</p>
<p>Provide greater role for labs in EM.</p>		<p><u>Accepted:</u> - Being Implemented - DOE will continue to provide strong support to the national labs for environmental clean-up technology development. In FY 1995, DOE labs performed 45% of the EM programs' technology development effort. Lead sites were established for the major EM Technology Development Focus Areas, as recommended in the Galvin Report. Cost and performance of the DOE labs, vis-a-vis other R&D performers, continues to provide the basis for decisions regarding future funding allocations. Efforts to reduce the costs of doing business at the national labs should enhance their competitive position for attracting work in this and other areas of R&D. In FY 1996 - 1997, the labs responded to competitive calls for applications for the new EM Science program. Universities, other federal labs, industry as well as DOE laboratories are program participants. The newly dedicated Environmental Molecular Sciences Laboratory was designed to bring a new generation of scientific research working on the solution of DOE's clean-up problems.</p>
<p>Make labs available to entire government as a powerful environmental resource.</p>		<p><u>Accepted:</u> - Being Implemented - DOE is working with other government agencies to expand use of the national labs. DOE and/or DOE labs currently have Memoranda of Understanding with DOD, HHS, the National Institute of Standards and Technology, EPA, the Department of Agriculture, and the Department of Transportation. These agreements help provide the framework for making the national labs available as a national resource in areas of environmental technology. The Work-for-Others program requirements have been simplified. This will make it easier for other agencies to use the DOE lab capabilities for their environmental R&D needs.</p>

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<p>Better address unrealistic elements of cleanup compliance agreements made with State and federal agencies.</p>		<p>Accepted: - Being Implemented - The recently released draft report, "Accelerating Clean Up: Paths to Closure" reflects a substantial reevaluation of what can realistically be accomplished in the clean-up picture over the next ten years. The major focus is on reducing costs without increasing risks. The goal of the ten-year plan is that only the major sites such as Richland, Savannah River, and Idaho will still be actively cleaning up problems such as high level waste and groundwater and soils beyond the year 2006. Options for accelerating and streamlining clean-up, identified as a result of the planning process, are being discussed with regulators.</p> <p>In addition, DOE is committed to negotiating appropriate structural changes to our compliance agreements to provide the flexibility needed because of shifting site conditions and budget realities, replacing elaborate long-term enforceable schedules with enforceable short-term schedules, emphasizing results-oriented milestones rather than process milestones. For example, DOE signed 32 new compliance agreements regarding mixed waste treatment under the Federal Facility Compliance Act, most of which used this more flexible type of approach. The new clean-up agreement for the Nevada Test Site also uses such an approach, as well as the renegotiated Rocky Flats clean-up agreement.</p>
<p>Involve public more in decision-making.</p>		<p>Accepted: - Being Implemented - DOE agrees that public and stakeholder involvement is vital and has several major actions ongoing. For example, EM established the Office of Public Accountability. DOE has expanded the Environmental Management Advisory Board, formed Site-Specific Advisory Boards at many DOE sites, and incorporated public input to its environmental technology development program. Since 1993, "Establishing a strong partnership between the DOE and its Stakeholders" has been one of the six strategic goals of the EM program. In addition, Secretary Peña has repeatedly expressed his strong support of greater openness and increased public involvement.</p>
<p>Give more attention to EM environmental challenges.</p>		<p>Accepted: - Being Implemented - EM has identified four primary focus areas involving major challenges - waste tanks, subsoil characterization, mixed wastes, and decontamination and decommissioning. Roadmaps leading to environmental mitigation are being developed in each of these areas. A research program is being developed which will enable cleanup to be done more efficiently or effectively, thus reducing both short term risks and long term costs.</p>

Galvin - Science-Engineering

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
<p>Strengthen fundamental science and engineering at labs and universities.</p>		<p>Accepted: - Being Implemented - Requests for increased funding in basic science are part of the FY99 Budget. To ensure that available funds are used most effectively, the LOB is evaluating the Department's peer review process, which is used to allocate funds to quality performers and evaluate their performance. A report is expected within the next month.</p>
<p>Maintain proper balance between universities and labs for basic research.</p>		<p>Accepted: - Being Implemented - Each Program Secretarial Officer with responsibility for research and development is engaged in a process to determine if there are benefits to concentrating their work in a smaller number of performers. As part of this process, the balance between labs, and universities for basic research will be considered.</p>

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<p>Budget O&M for facilities under Energy Research separately from specific programs.</p>		<p><u>Not accepted:</u> The Department does not believe that the recommendation would provide significant benefits, and could greatly reduce management's flexibility to respond to unexpected needs in either research or facility operations funding. Performing research is the rationale for the operation of facilities. Research funds might have to be used to repair unanticipated breakdowns in facilities. Without the ability to quickly move funds to fix such a problem, research activities of a considerable number of scientists, in universities, industry, and the national laboratories, could be curtailed. Conversely, exploitation of an unexpected research breakthrough might be facilitated by moving facilities operating funds to support the research.</p>
<p>Provide better integration of basic research, technology development and applications, especially in environmental remediation.</p>		<p><u>Accepted:</u> - Being Implemented - The Office of Energy Research and the Office of Environmental Management have developed an integrated strategic plan for coordination of R&D; the newly completed Environmental Molecular Sciences Laboratory integrated research program offers new capabilities specifically designed to provide integration and collaboration specifically related to environmental remediation. The R&D Council was established to facilitate more effective planning, budgeting, management, and evaluation of DOE R&D programs and to improve the linkage between research and technology development and application. In addition, the integration role played by the R&D Council is designed to improve R&D management by the Department, including better alignment of research agendas with departmental missions, development of an integrated database of R&D information, and improved technical reviews of programs at laboratories.</p>
<p>Provide additional stimulation of lab-university cooperation in basic research.</p>		<p><u>Accepted:</u> - Being Implemented - Existing laboratory-university relationships are particularly strong at the scientific user facilities. To enhance the level of interaction at the research level, the Department encourages laboratories to establish cooperative research programs with universities and industry as partners in basic laboratory research. Such incentives are included in the new University of Chicago contract to manage Argonne National Laboratory. Implementation of improved means of remote access to DOE user facilities by university researchers will enhance integration of the laboratories into the national R&D infrastructure. The Environmental Management Science Program specifically includes joint laboratory-university cooperation. The DP ASCI program targets university involvement in the development and use of supercomputers.</p>

Galvin - Economic role of labs

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
<p>Focus technology transfer activities of labs on technology areas contributing directly to DOE missions of national security, energy, and the environment.</p>		<p><u>Accepted:</u> - Being Implemented - Technology partnerships which are the primary mechanism for technology transfer from the labs can be established only when certain criteria are met. The criteria require all partnerships to: 1) support core missions; 2) provide economic and other benefits to the nation; 3) have clear measures to ensure performance and accountability; 4) be formed in a fair and open manner; and 5) be managed by best business practices.</p>

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<p>Give lab directors flexibility to start new technical projects at periphery of current missions.</p>		<p><u>Accepted:</u> - Being Implemented - Laboratory directors currently may use discretionary funds, called Laboratory Directed Research and Development funds (LDRD), to initiate new technical projects. LDRD enhances the ability of the laboratories, through limited discretionary research and development work of a creative and innovative nature, to address such new ideas and technical projects that may lead to important program contributions. Laboratories are allowed by statute to use these funds for industrial partnerships which are consistent with the needs of the laboratory as determined by the laboratory directors.</p>
<p>Expand competitive selection of CRADA activities, and provide more rigorous technical and merit reviews by external experts.</p>		<p><u>Accepted:</u> - The Department is reviewing its present policy for all forms of science and technology partnerships and its mechanisms for implementation. Among items being considered are the selection of work, the choice of partners or outside sponsors, the importance to the missions of the Department, and how performance of the work is evaluated.</p>

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Galvin - Governance

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Corporatize lab system based on private sector model over one to two years.	1 to 2 years	<u>Not accepted</u> : - Alternative Approach Being Implemented - The Department supported the development of a new modus operandi for the national laboratories, but the goals established by the Galvin Report could best be accomplished within the existing government-owned, contractor-operated model using best business practices. Since the issuance of the Galvin Report, the Department has taken steps to reduce its intensive administrative oversight of the laboratories through the use of a laboratory self-assessment process augmented by annual two week reviews by DOE functional and ES&H line managers. Many DOE orders and directives have been simplified or eliminated and, Work Smart Standards, which tailor safety requirements to the facility rather than entire site, have formed the basis for ES&H evaluations. A Laboratory Operations Board, consisting of eight external members selected from industry and academia and eight senior Department management officials, with the Under Secretary as Chair was established in April 1995. The Board's responsibility is to provide strategic direction for the laboratories, and help provide sharper mission focus and coordination among the laboratories. Advice from the Board has helped ensure the Department continues to adhere to a more business-like, results-oriented management approach to its laboratories. Using performance metrics developed with the guidance of the LOB, the Department was able to demonstrate that the DOE laboratories' research to support cost ratios and total costs per research FTE were consistent with similar data for private sector research laboratories. Productivity improvements of 5%/year resulted from these improvements.

Yergin Task Force (June 1995)

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Continue federal government leadership, focus, and financial support for energy R&D.		<u>Accepted</u> : - Being Implemented - Through its Energy Resources Program Offices (EE, FE, and NE), the Department continues to be the major supporter of energy R&D and this is reflected in budget requests. The Department provided support to the PCAST Energy Research and Development Panel whose recent report "Federal Energy Research and Development for the Challenges of the Twenty-First Century" will serve as a guideline for future investments.
DOE should, within 6 months, report to SEAB on a process for reducing total energy R&D costs by 15 percent over one year.	6 months	A draft report, "Cutting Costs and Reducing Burdens, Opportunities to Improve the Department's Management of Non-Laboratory R&D" was prepared in response to this recommendation. The report concluded that there was no way that a 15% savings could be realized purely by productivity improvements within the Department. It further found that in order to achieve the 15% reduction, contractors needed to be called upon to make their internal processes more efficient.

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DOE should, within 6 months, recommend opportunities for streamlining R&D management, eliminating overlapping management contracts, duplicative laboratory programs, marginal and overlapping research projects and facilities, and programs not directly related to strategic DOE energy R&D missions.	6 months	<u>Accepted in part:</u> - Being Implemented - The Laboratory Operation Board Program Management Reviews examined at the Assistant Secretary level the processes by which management decisions were made and recommended improvements were included in the Third Report of the LOB External members. As given below in this document, responses to a number of the recommendations have been received but responses to others, e.g., improved program integration and selection of R&D performers, are part of the Under Secretary's Roadmap Development Initiative.
DOE should incorporate private sector "best practices" for managing energy R&D.		<u>Accepted:</u> - Being Implemented - Productivity measures, rewards and incentives, delegation and authorization, and accountability are "private sector principles" that DOE has made some progress in implementing. However, opportunities remain for further implementation of best practices.
DOE should, within 6 months, submit a legislative package to Congress suggesting streamlining of federal and DOE procurement regulations.	6 months	<u>Alternative Approach being implemented:</u> As part of its review of the Yergin Committee's recommendation, the DOE Task Force met with other Federal research agencies and found that legislated procurement requirements did not result in excessive procurement costs to the Department's contracted research. To the contrary, by replacing the Federal norm by best commercial practice, contractors' procurement costs were reduced significantly. Therefore, as part of the program to reduce administrative costs associated with the performance of research, no legislative changes are contemplated at present.
DOE should develop a thorough analysis of the cost structure of performing R&D with DOE support in various settings--universities, government labs, private non-profit labs, and private for-profit entities.	6 months	<u>Accepted in part:</u> - Being Implemented, for Laboratories - DOE developed productivity metrics provide a way of measuring the input costs of performing research and have been compared with analogous metrics used by the private sector. Comparable metrics for academia and other government laboratories do not exist. For completeness, output as well as cost need to be measured and compared. While output performance measures have been developed and incorporated in some recently negotiated M&O contracts, they are not universally accepted..
Develop an integrated strategic plan and process for energy R&D, and use this process to determine funding priorities and manage a diverse energy R&D investment portfolio.		<u>Accepted:</u> - Being Implemented - The Comprehensive National Energy Strategy presently under development will provide the strategic framework. The roadmapping activity being advanced by the R&D Council will shape R&D programs consistent with the strategic goals.
Develop cost-sharing strategies for energy R&D with industry.		<u>Accepted:</u> - Being Implemented - Individual program offices have cost sharing programs with industry. Examples include: Partnership for New Generation Vehicles, American Battery Consortium, and the Clean Coal program.
Continue investment in energy-related research at universities.		<u>Accepted:</u> - Being Implemented - Each Program Secretarial Officer with responsibility for research and development is engaged in a process to determine the most appropriate choice of R&D performer. The continued involvement of universities in energy-related research is among the considerations in the process.
Reorganize and consolidate currently dispersed R&D programs at DOE labs around defined strategic research foci (centers of excellence), avoiding unnecessary duplication.		<u>Alternative Approach Being Implemented:</u> -The concept of centers of excellence has not been adopted by the Department. However, the need for a rational consolidation of R&D performers has been accepted. The roadmapping initiative will help identify the benefits derived from concentrating work in fewer, selected performers.

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Place overall responsibility for energy R&D portfolio strategy, budgeting, management, and integration over existing programmatic divisions under a single person reporting directly to the Secretary of Energy		<u>Not Accepted</u> : Specific portions of the energy R&D portfolio are managed at the Assistant Secretary level. The R&D Council, chaired by the Under Secretary, provides overall integration of energy R&D programs and raises responsibility for the overall R&D portfolio to the Secretarial level.
Reactivate energy R&D advisory board.		<u>No Action</u> .
DOE, working with OMB and Congress, should explore 2-year budget appropriation cycle, and alternative financing arrangements for energy R&D.		The Department has not taken an official position on this subject. However, Congressional hearings were held in Spring 1997 on biennial budget cycles for R&D with inconclusive results.

NSTC Future of Major Federal Laboratories (August 1995)

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Improve management and cut redundancy.	2/15/96 report to President	<u>Accepted</u> : Many of the items reported in this document have as their rationale the improvement of the management of research and the reduction in the cost of performing research. The Department has used the Laboratory Operations Board to provide guidance in these matters. It has reviewed its performance and those of its contractors, has provided measures for this review and incentives for improvement. It has revitalized the R&D Council to facilitate more effective planning, budgeting, and management. It has participated on interagency committees to benefit from the experience of other research organizations and avoid duplication by sharing with other agencies (NIH - Genome Project, NSF - basic physics and chemistry, DOD - weapons research) and has been involved in many joint projects with them (Commerce - PNGV; FAA - computer systems design).
Modernize labs in post Cold War era. Consider whether nuclear weapons design should be consolidated from two labs to one.	9/30/95	The President announced his requirement for maintaining US deterrent under a CTBT August 11, 1995. After an interagency review of the responsibilities of the weapons labs under a CTBT, the President announced on September 25, 1995 that the continued vitality of all three DOE nuclear weapons labs was essential. This decision was based on the realization that two healthy design laboratories are necessary for the success of the stockpile stewardship program.
Preserve adequate funding for high priority programs in basic and applied research. First achieve savings through streamlining and management improvements, then reduce or eliminate lower priority programs.	mid-Feb 96 status report	<u>Accepted</u> : The actions undertaken by the Department to improve its management and thereby reduce its costs by implementing, as appropriate, the recommendations of the various advisory panels are described herein. The selective pruning of lower priority programs is the very nature of the budget process that has been implemented in the Department.

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Improve environmental remediation - link strategic plan for scientific research with technological applications for environmental remediation and establish closer ties with other agencies.	mid-Feb 96 status report	Being Implemented - DOE is working with other government agencies to expand use of the national labs where much of its scientific research is performed. DOE and/or DOE labs currently have Memoranda of Understanding with DOD, HHS, the National Institute of Standards and Technology, EPA, the Department of Agriculture, and the Department of Transportation. These agreements help provide the framework for making the national labs available as a national resource in areas of environmental technology. The Work-for-Others program requirements have been simplified. This will make it easier for other agencies to use the DOE lab capabilities for their R&D needs.
Explore ways of reducing overlap and redundancy between labs and other federal R&D facilities.	mid-Feb 96 status report	<i>No action</i>

External Members' Report, Laboratory Operation Board (October 1995)

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
DOE should provide clear incentives to the labs to help facilitate more aggressive cost-cutting efforts.		<u>Accepted</u> : - Being Implemented - Management fees incorporated in newly negotiated performance based contracts are dependent upon laboratories reaching negotiated performance levels. Measures for defining the performance include demonstrated productivity enhancement using the productivity metrics. To facilitate aggressive cost-cutting by the labs, the Department has reduced unnecessary oversight burdens and changed procurement requirements from Federal norm to best commercial practice.
DOE and labs together should identify functional areas in both entities where work and workers can be removed to enhance R&D productivity.		<u>Accepted</u> : - Being Implemented - The Laboratory Operations Board continues to oversee the productivity enhancement efforts of the laboratories related to reducing support costs. The FY 97 actuals have been obtained and follow the trend of productivity enhancement of the previous two years.
DOE and labs should reach agreement on a set of metrics to be used for assessing productivity improvements.		<u>Accepted</u> : - Being Implemented - A set of productivity metrics have been agreed upon and productivity improvements of about 5% for the years 1994 - 1997 have been demonstrated using these metrics. These metrics have been incorporated into some new contracts.
DOE should continue to identify and reduce or eliminate excessive burdens on the labs.		<u>Accepted</u> : - Being Implemented - Laboratory Directors meetings are held frequently during which such concerns are raised and discussed with DOE Senior Management. When appropriate, the issues are raised with the LOB which may make recommendations to the Department. One such example is the "megarule" where a distinction was ultimately made between contracts to manage laboratories and facilities resulting in additional allowable costs to laboratory contractors but overall lower costs to the Department.
DOE's Strategic Laboratory Mission Plan should explain the basis for DOE decisions to place funds at labs, universities, or the private sector and should define major long-term outcomes expected.		<u>Accepted</u> : - Being Implemented - The Roadmap initiative will provide the basis for these decisions which will ultimately be incorporated into the revised <i>Strategic Laboratory Missions Plan</i> .

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DOE and labs should develop and enforce a clear set of roles and responsibilities for both DOE and the labs that contribute to the effectiveness and efficiency of lab operations.		<u>Accepted:</u> - Being Implemented - The Department provides funds and general programmatic guidance to the research performers who are responsible for actually doing the work and bringing the results to the Department which assesses the performance.
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Second Report of External Members (September 1996) Note: This report included the status of activities at the labs and the Laboratory Operation Board's planned activities. It did not include recommendations.

LOB will review DOE R&D programs with regard to rationale for mix of R&D performers.

LOB will examine DOE's small mission-specific labs to validate their roles and determine if they can be privatized, closed, or candidates for alternative contracting mechanisms.

LOB will examine institutional and strategic plans for multi-purpose labs and how they contribute to DOE mission.

LOB will document and review the mechanisms used in DOE for evaluating the scientific and technical merit of the work in the labs.

Third Report of External Members (September 1997)

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
DOE should rationalize and simplify its headquarters and field management structure to make a more effective line management, clearer roles and responsibilities, and reduced cost.	6 month status report	<u>Accepted:</u> Options for improving headquarters and field management structure are under review by the Department.
DOE should implement new principles for reporting that will let researchers spend more time on research and less time writing unread reports.	6 months	<u>Accepted:</u> - Being Implemented - A set of principles for technical reporting, which include appropriateness, annual reporting, minimum content, and convenience (such as electronic submission), has been adopted by the R&D Council. The Office of Fossil Energy will begin implementation by March 15. The Fossil Energy experience will serve as an example for the rest of the Department.
DOE should develop a plan to strengthen its R&D program management through hiring, training, and using or transferring personnel from industry, universities, or labs.	6 months	<u>Accepted:</u> - Being Implemented - An internal DOE committee is examining options for ensuring that a continuing supply of skilled and trained technical program managers is available to the Department. The committee will complete its work and issue a report in March 1998.

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Each R&D Assistant Secretary should determine if there are benefits to be gained from concentrating their work in a smaller number of performers and report back to the Board with proposed changes.	90 days	<u>Accepted</u> : - The recommended analysis is ongoing. Reports will be made to the Laboratory Operations Board on progress.
DOE should set priorities for the energy mission, develop a roadmap for future major scientific facilities, and develop greater integration across R&D programs and report to the LOB on the progress.	6 month status report	<u>Accepted</u> : - Being Implemented - a) The Department has the lead for developing a government-wide energy plan. B) The Office of Energy Research will develop its roadmap for new scientific facilities on a program by program basis. The advisory committees for each program within ER will participate extensively in the process. The plan will focus on the next ten years but will attempt to project needs through 2015. The plan is expected to be completed in draft by May 1998 and in final by June. Guidance for new facilities and plans for closing current ones, as well as international participation, will be included in the report. One of the most complex problems contemplated by the roadmap is the need for new computational facilities. The Offices of Energy Research and Defense Programs are taking the lead. C) The R&D Council will tackle this problem in order to provide a more integrated view. C) The restructured R&D Council, chaired by the Under Secretary, will promote the integration of the Department's R&D, both within and across program areas.

External members report on Headquarter and Field Structure Issues (October 1997)

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Reorganize so that each field office reports directly to the Program Secretarial Officer (PSO) that funds most of the work of the contractors managed by the field office.		<u>Under Consideration.</u>

Office of Science and Technology Policy (OSTP) Status of Federal Laboratory Reforms (March 1997)

Recommendation	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Enhance scientific and technical excellence.		
Review and modify laws, regs, and guidance governing personnel practices to strengthen scientific competence and renewal in the workforce.		<i>Together with the issuance of this Report, Dr. John H. Gibbons, Assistant to the President for Science and Technology, announced the formation of an interagency Working Group to address the recommendations contained in the Report. The Department is participating in this Working Group and will review the Working Group's recommendations and determine what, if any, actions the Department should take..</i>

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Develop performance measures tailored to unique character of R&D to assess research quality, importance, and lab productivity.		<i>See above.</i>
Develop incentives to reward agencies and labs for initiatives that preserve or enhance programmatic excellence and productivity while reducing costs.		<i>See above.</i>
Streamline management and improve productivity.		
Intensify agency leadership.		<i>See above.</i>
Review laws and regs that impede lab reform to identify ones that can be repealed or modified.		<i>See above.</i>
Reduce the number and length of agency-specific regs, directives, and procedures to absolute minimum.		<i>See above.</i>
Through working with the Administration and Congress, pilot a project to fund R&D tasks at labs on a multi-year basis.		<i>See above.</i>
Improve use of lab capabilities to address national needs.		
NSTC should examine ways to reduce barriers to optimum utilization of labs and promote greater cooperation among all federal agencies, labs, and with the industrial and academic sectors.		<i>See above.</i>
NSTC should establish an interagency working group on federal labs to address these recommendations, review barriers to reform, share lessons learned, and develop and implement an action plan to continue the reform movement.		Completed: <i>See above.</i> Such a Working Group was indeed established.

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Institute for Defense Analysis "120 day study" of DOE Defense Programs (July 1996)

Recommendation (NOTE: see attachment which describes recommended changes reported to Congress on 6/4/97, and how those changes address the findings, management principles, and organizational principles in the IDA report)	Recommended implementation date	Implementation status/reason not implemented/reason implementation date not met/expected implementation date
Re-engineer ES&H review and approval process.		
Use a single integrated field-led review of contractors' safety processes and documentation, with strong streamlined headquarters oversight.	9/30/98	<p>This is an element of the first recommended change in DOE's 6/4/97 report to Congress: shift primary responsibility for facility operations, including ES&H functions, to the area and site offices in the field, with limited oversight by Headquarters and the Operations Offices. The entire Department is adopting this concept through the implementation of Integrated Safety Management (ISM). Our goal is to accelerate the adoption of the team-based approach by accelerating the adoption of Integrated Safety Management.</p> <p>Current plans also envision a pilot project to test and evaluate the concept of an integrated team being tasked by, and reporting to a site or area office manager who will have authority to approve contractor systems and documentation. Based on the results of the pilot, the concept will be formalized and rolled out to all DP field locations.</p>
Streamline stockpile management.		
Streamline processes and reduce number of people (re-engineer).	9/30/98	<p>The re-engineering planning was suspended in July 1997 to allow for RIF planning, and resumed after 1/12/98. The use of single integrated field-led reviews in the above recommendation is a part of the re-engineering effort. DP has also established the Stockpile Management Integration Council which will oversee the re-engineering effort and ensure it most effectively supports the mission and balances resources with the workload. Members of the SMIC are senior managers in DP-20, Albuquerque and its area offices, Oak Ridge and Savannah River. The SMIC was one of the four changes reported to Congress on 6/4/97.</p> <p>From the time the IDA study was completed in December 1996, the number of employees in HQ DP has declined by about 17% from 353 to 293. This reduction was accomplished through attrition without backfilling, voluntary separations through buyouts, and involuntary separations (RIFs). Many of the reductions were in the facility oversight disciplines in DP-20, DP-10, and DP-45 which were highlighted by IDA as targets for reduction. DP plans to further reduce its staffing to the Strategic Alignment Initiative target of 269 by FY1999. This would be a total reduction of 84 people from the time of the IDA study, which is about 24 percent.</p>

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Improve integration of stockpile stewardship.		
Improve linkages between Stockpile Stewardship and management.	9/30/98	<p>Several initiatives have been completed, or are underway to improve the integration between the stockpile stewardship program (managed by DP-10 and executed primarily at the three weapons laboratories) and the stockpile management program (managed by DP-20 and executed primarily at the weapons plants). Our target date for completing all of these initiatives is 9/30/98, although several are already completed.</p> <p>With each iteration of the Annual Stockpile Stewardship and Management Plan (now called the Stockpile Stewardship Plan and often referred to as the "Green Book"), these two parts of the weapons program are becoming more closely integrated. The planning process involves all key offices in HQ DP, the field offices, and the plants and laboratories; as well as our customers in DOD.</p> <p>The Deputy Assistant Secretaries in DP-10 and DP-20 interact on a regular basis, and there is increasing interaction and coordination among their staffs. At the same time, DP is promoting greater interaction and coordination between the plants and laboratories. One example is that over 30 AlliedSignal manufacturing engineers from the Kansas City Plant are currently working one or two year assignments with LLNL. As an immediate benefit, these transfers helped AlliedSignal reduce the number of RIFs they had to manage in FY1998. More importantly, these assignments help LLNL obtain manufacturing expertise, and more in-depth knowledge of the stockpile management production program; and when these engineers return to AlliedSignal they will bring to the KCP increased knowledge of stockpile stewardship and LLNL's specific role.</p> <p>In response to one of the recommended changes in the 6/4/97 report to Congress, a Defense Programs Analysis Group (DPAG), consisting primarily of representatives of the laboratories, but also the production plants, was established to perform systems analysis and provide decision support information to DOE line managers. A key focus for the DPAG is the Stockpile Life Extension Program (SLEP) and the integration of stockpile stewardship and management tasks in support of SLEP.</p> <p>Finally, in an effort focused specifically on this recommendation, DP has an activity underway entitled Plants and Laboratories Integrated Next Year. Among its several tasks, this activity will build on and institutionalize the initiatives described above,</p>
Prepare annual high-level DP R&D plan.	10/28/97	The Stockpile Stewardship Plan ("Green Book") referred to above, serves as DP's annual high-level R&D plan. The FY1998 plan was submitted to Congress on 10/28/97. The FY1999 plan is currently under development.
Integrate programs of the three national weapons labs.	3/31/98	The actions responding to the above two recommendations also promote increased integration among the three weapons laboratories. In a more focused effort in this regard, DP conducted the Tri-Lab study, and the Laboratory Institutional Vitality Initiative (LIVI) study which looked at progress in integrating the three laboratories. The LIVI study also examined how the different DOE programs conducted at each laboratory (e.g., stockpile stewardship for DP, non-proliferation for NN, environmental management for EM) have synergies among themselves and promote the institutional health of the laboratories.
Install a disciplined resource allocation process.		

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Strengthen connection between requirements and budgets.	9/30/98	DP has been making steady progress in this area over the past several years. The Government Performance and Results Act, the DOE Strategic Management System, and the DP strategic planning process which produces the Stockpile Stewardship Plan (Green Book), have especially stimulated progress in the FY1998 and FY1999 budget cycles. For the FY1999 program, we plan to show linkages from the National Security Strategic Plan, through the Stockpile Stewardship Plan, to the performance-based budget, and finally to the performance objectives, measures and expectations in the performance-based management contracts for our plants and laboratories.
Improve infrastructure planning and investment.	3/31/98	On 12/16/97, DP promulgated its policy on facility and infrastructure management at all DP sites. This action was the culmination of a multi-year effort to establish requirements for infrastructure and facility management that was consistent with DOE's policy for Life Cycle Asset Management (DOE O 430.1), and would meet DP's special needs in reconfiguring the weapons complex for the 21st century. The policy requires that each site prepare a site facility plan that will support budget formulation and justifications. These plans should be completed during the 2nd QTR of FY1998 and will support the FY1999 budget.
Install strong management.		
Assign principal deputy assistant secretary in DP responsibility for running DP HQ and integrating policy and oversight decisions.	9/30/98	The DP re-engineering and reorganization effort which resumed after 1/12/98 will consider the need for a Principal Deputy Assistant Secretary who would function primarily as a Chief Operating Officer, as recommended by IDA.
Improve management of people and their careers.		
Reevaluate training, education, and career development programs.	9/30/98	One of the recommended changes in the 6/4/97 report to Congress was to establish a Technical Resource Group to provide matrix technical support throughout the weapons complex. This new organization will be managed from the field, and the manager will be responsible for the effective utilization of current resources, for improving the capabilities of the existing personnel through training and work assignments, and for the acquisition of new technical personnel for the current and future technical needs of the complex. In addition to this very targeted initiative, the DP re-engineering and reorganization effort which resumed after 1/12/98 will evaluate career management systems and determine the need for changes or additions to existing programs.

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<p>Rotate large numbers of field people, including M&O contractors through HQ.</p>	<p>9/30/98</p>	<p>DP already has formal programs to bring representatives from the laboratories and plants back to Washington for extended tours in HQ DP assignments. Some of these are assigned to the Weapons Council which advises DP senior management. Others work on special initiatives or assignments with members of the DP staff.</p> <p>In providing matrix technical support to managers throughout the weapons complex, the Technical Resource Group described above will provide a continuous cross-fertilization between HQ and field organizations. A similar existing entity called the Core Technical Group is managed out of HQ and provides technical support to managers in Defense Programs and Environmental Management. Members of this group serve on an as available basis because they have a permanent assignment with a DP or EM office. Their assignments throughout the weapons complex contribute to a cross fertilization between HQ and field elements, and help provide the field with a HQ perspective and vice-versa.</p> <p>Finally, the DP re-engineering and reorganization effort will consider the use of HQ-to-field, and field-to-HQ rotations and assignments for federal employees.</p>
<p align="center">Organizational options</p>		
<p>Evaluate two options: (1) Establish single operational focus for stockpile management and weapons complex trusteeship in Albuquerque, (2) consolidate headquarters and the Albuquerque Operations Office.</p>	<p>05/15/97</p>	<p>DP convened a group of senior managers from DOE HQ, DOE field organizations, and the plants and laboratories in March of 1997 to evaluate these and other options. This was followed by an internal review team which developed the four recommended changes in the 6/4/97 report to Congress. In addition the team clarified the respective roles of HQ (planning and program direction), and the field (program execution). The Stockpile Management Integration Council was formed to ensure a unified and clearly understood line of direction from HQ to the field and to eliminate the problem identified in the IDA report that there are two HQ for stockpile management.</p>
<p>Evaluate three options: (1) Have operations offices report to their dominant Assistant Secretary, (2) have operations offices report to a Chief Operating Officer (COO); continue having Operations Offices report through Field Management to the Deputy Secretary.</p>	<p>3/31/98</p>	<p>The IDA Report correctly states "It is noteworthy that every reporting relationship has been tried by DOE. Each has strengths and weaknesses, and none is clearly superior to the others." The Secretary believes that improvements in field-headquarters management require improvement in management, not changes in organization or wiring diagrams. The most important of these management improvements will be the development of an improved planning and budgeting system, which will provide a more disciplined and effective means for the field to participate in important departmental decisions.</p>

**Abbreviations Used in
Appendix III**

ASCI	Accelerated Strategic Computing Initiative
COO	Chief Operating Officer
CRADA	Cooperative Research and Development Agreement
CTBT	Comprehensive Test Ban Treaty
DARHT	Dual-Axis Radiographic Hydrodynamic Testing Facility
DOD	Department of Defense
DOE	Department of Energy
DOIT	Development of On-site Innovative Technologies
DP	Office of Defense Programs
DPAG	Defense Programs Analysis Group
DP-10	Office of Defense Programs for Research and Development
DP-20	Office of Defense Programs, Military Application and Stockpile Management
DP-45	Office of Defense Programs for Program Support, Technical and Environmental Support
EE	Office of Energy Efficiency and Renewable Energy
ER	Office of Energy Research
EM	Environmental Management
EMAB	Environmental Management Advisory Board
EPA	Environmental Protection Agency
ES&H	environment, safety and health
FAA	Federal Aviation Administration

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FE	Office of Fossil Energy
FTE	full-time equivalent
HHS	Department of Health and Human Services
HQ DP	Headquarters, Office of Defense Programs
IDA	Institute for Defense Analyses
ISM	integrated safety management
KCP	Kansas City Plant
LAMPF	Los Alamos Meson Physics Experiment
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Scattering Facility
LDRD	Laboratory Directed Research and Development
LIVI	Laboratory Institutional Vitality Initiative
LLNL	Lawrence Livermore National Laboratory
LOB	Laboratory Operations Board
M&I	management and integration contract
M&O	management and operating
NE	Office of Nuclear Energy, Science and Technology
NIF	National Ignition Facility
NIH	National Institutes of Health
NN	Office of Nonproliferation and National Security
NSF	National Science Foundation

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NSTC	National Science and Technology Council
O&M	operations and maintenance
OMB	Office of Management and Budget
OSTP	Office of Science and Technology Policy
PCAST	President's Committee of Advisors on Science and Technology
PEIS	Programmatic Environmental Impact Statement
PNGV	Partnership for New Generation Vehicles
PSO	Program Secretarial Officer
R&D	research and development
RIF	involuntary separation
SBSS	Science-Based Stockpile Stewardship
SEAB	Secretary of Energy Advisory Board
SLEP	Stockpile Life Extension Program
SMIC	Stockpile Management Integration Council

External Experts Consulted by GAO

DOE's Laboratory Operations Board, External Members

Dr. John P. McTague (Vice Chairman)
Vice President, Technical Affairs
Ford Motor Company

Dr. Robert P. Bringer
Staff Vice-President, Environmental Technology and Services (Retired)
3M Corporation

Dr. Paul A. Fleury
Dean, School of Engineering
University of New Mexico

Dr. Paul Gilman
Executive Director, Commission of Life Sciences
National Academy of Sciences

Dr. Alexander MacLachlan
Senior Vice President and Chief Technical Officer (Retired)
E. I. du Pont de Nemours and Company

Dr. Maxine Savitz
General Manager, Allied Signal Aerospace
Ceramic Components

Rear Admiral Robert H. Wertheim, U.S. Navy (Retired)
Consultant
Science Applications International Corporation

Galvin Task Force

Robert Galvin (Chairman)
Chairman, Executive Committee
Motorola, Inc.

Dr. Henry Kendall
Professor of Physics
Massachusetts Institute of Technology

Dr. Herbert York
Director Emeritus
Institute for Global Conflict and Cooperation

Appendix IV
External Experts Consulted by GAO

**Secretary of Energy
Advisory Board**

Dr. Walter E. Massey (Chairman)
President
Morehouse College

Dr. Leon Lederman
Director Emeritus
Fermi National Accelerator Laboratory

Marilyn Lloyd
Consultant
The Lloyd Group

**Institute for Defense
Analyses**

Michael Leonard
Division Director
Strategy, Forces and Resources Division

Dr. David R. Graham
Assistant Director
Strategy, Forces and Resources Division

Dr. James D. Silk
Assistant Director
Science and Technology Division

Yergin Task Force

Dr. Larry Papay
Senior Vice President and Manager of Research and Development
Bechtel Corporation

Other

Dr. Alvin W. Trivelpiece
Director
Oak Ridge National Laboratory

Scope and Methodology

To determine the recommendations that have been made by past advisory groups and the actions DOE has taken in response to these recommendations, we identified findings and recommendations from past studies on DOE's national laboratories. While we examined studies on the laboratories dating back 25 years—to gain a more complete understanding of findings from past reviews of the laboratories' operations—as agreed with DOE, we concentrated on only the most recent advisory groups' recommendations to determine DOE's specific responses. We provided DOE with a list of the recommendations from the eight most recent advisory group studies and asked the Department to indicate what actions it has taken and is taking to address each of these recommendations. Appendix III contains DOE's response. Appendix II lists all of the past studies of the laboratories' operations.

To provide an outside perspective on the actions DOE indicated it has taken in response to the recommendations of past advisory groups, we interviewed 18 external experts. We judgmentally selected these experts on the basis of their experience and familiarity with DOE's laboratory system. We included persons external to DOE and the executive branch who were involved in completing each of the eight most recent studies with recommendations. Our list of experts included present external members of DOE's Laboratory Operations Board, selected members of the Galvin Task Force, selected members of the Secretary of Energy Advisory Board, and representatives of the Institute for Defense Analyses. DOE concurred with our list and did not suggest additional experts. Before conducting our interviews, we provided each expert with the list of recommendations from past advisory groups and DOE's responses to the recommendations. We then asked the experts to provide their comments on those responses. A list of the external experts we contacted appears in appendix IV.

To obtain the views of laboratory officials, we visited the following laboratories: Sandia National Laboratory and Los Alamos National Laboratory in New Mexico, Lawrence Berkeley National Laboratory, Lawrence Livermore National Laboratory, and the Stanford Linear Accelerator Center in California, and the National Renewable Energy Laboratory in Colorado. We asked officials at these laboratories to comment on the list of recommendations from past advisory groups and DOE's responses, as well as identify any actions taken. We also interviewed DOE officials responsible for overseeing these laboratories. These officials were from DOE's operations offices in Albuquerque, New Mexico, and Oakland, California, and DOE's site or area offices in Albuquerque and

Appendix V
Scope and Methodology

Santa Fe, New Mexico; Berkeley, Livermore, Palo Alto, California, and Golden, Colorado.

We conducted our review from December 1997 through August 1998 in accordance with generally accepted government auditing standards.

Comments From the Department of Energy



The Under Secretary of Energy
Washington, DC 20585

August 3, 1998

Mr. Victor S. Rezendes
Director
U.S. General Accounting Office
Energy, Natural Resources and Science Issues
Resources, Community, and Economic
Development Division
Washington, D.C. 20548

Dear Mr. Rezendes:

Thank you for the opportunity to review and comment on the General Accounting Office (GAO) draft report entitled: DEPARTMENT OF ENERGY: Uncertain Progress in Implementing National Laboratory Reforms. The Department of Energy (DOE) believes that while the draft report recognizes some progress made by DOE, in terms of the central concerns described (i.e., "unfocused laboratory missions," "laboratories not operating as an integrated system," and "micromanagement by DOE"), it fails to take into account the full range of changes that have been undertaken by the Department.

Over the past few years, the Department has implemented a series of initiatives aimed at strengthening management, streamlining strategic planning processes, and enhancing interactions among the various components of the DOE research and development system. We believe these reforms, taken together, have helped to guide the Department's ongoing efforts to improve the management of the laboratory system, both from the perspective of achieving the Department's missions and increasing its administrative efficiency and accountability.

"Unfocused Laboratory Missions"

The Department of Energy is charged with carrying forward important energy, national security, environmental, and science missions for the American people. The national laboratories develop, maintain, and use world-class science and technology capabilities necessary for achieving the Department's missions. By choice, the scope of the large multi-program laboratories is not limited in focus on a single mission. Instead, the broad set of competencies within each laboratory supports a portfolio across the Department's missions, with varying weights at each laboratory.

The attached charts from the Strategic Laboratory Mission Plan-Phase I reflect the distribution of work across the laboratories related to each mission area. It is clear that there is a concentration of related work across the laboratories--there is also room for further focusing of efforts. However, to optimize the use of the laboratories as a system, the Department needs the flexibility to bring together unique multidisciplinary skills and equipment from across the laboratories to

See comment 1.

Appendix VI
Comments From the Department of Energy

solve complex problems. We believe, therefore, the entire portfolio across the entire system is what needs to be judged.

Since 1995, the Department has instituted several important reforms to ensure that the work at the laboratories is directly linked to the Department's missions and program objectives. In April 1995, the Department established the Laboratory Operations Board (LOB), an advisory body consisting of senior DOE officials, two laboratory directors (who rotate on one-year assignments), and external members from the private sector, academia, and the public. Because the LOB includes senior Departmental officials, it ensures that dedicated management attention on issues such as cost and performance of the DOE laboratories is provided on a continuing basis. Furthermore, the DOE and laboratory officials on the LOB are precisely the people with the authority to implement management improvements.

See comment 2.

To date, the LOB has participated in the development of the Strategic Laboratory Missions Plan (SLMP-Phase I), made recommendations on DOE's research and development (R&D) program management and institutional planning, and provided advice on alternative contracting options to DOE's small laboratories. The external members of the LOB are in the process of documenting and reviewing the mechanisms used throughout the Department for evaluating the scientific and technical merit of the work of the laboratories. As part of this effort they are currently seeking input for evaluation from those who participate in the advisory and review process. In terms of the SLMP-Phase I, the Department agrees with the GAO draft report's characterization and has undertaken revision of the document

Another way in which the Department is improving linkages between program goals and research activities is through the Research and Development Council. In April 1995, the Department established the R&D Council, and in January 1998, the Department rechartered and revitalized the forum for the purpose of improving and focusing Department-wide R&D activities. The Under Secretary and the program assistant secretaries now work more closely with one another to coordinate planning, programming, and laboratory management.

A major benefit of this approach is that through the use of newly implemented R&D portfolio management and technology roadmapping efforts, the R&D Council helps to integrate and rationalize R&D activities throughout the Department and across the national laboratories. Roadmapping and portfolio analysis are currently being integrated into the Department's budget review process to provide DOE senior management with new strategic management tools to develop and evaluate the Department's overall technology strategies for achieving program goals and for establishing a focused R&D agenda. We anticipate that this integration will be completed over the next two budget cycles.

"Laboratories Not Operating as an Integrated System"

To ensure an ongoing dialogue with the laboratories and their continuing participation in building a stronger corporate culture, the Under Secretary meets regularly with the Laboratory

See comment 3.

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Directors. This already has benefitted program integration and increased accountability. There has been significant progress in the laboratories working in partnership and as a system. In particular, the laboratory directors are themselves initiating more multi-laboratory coordinated efforts.

For example, the Conceptual Design Report for the Department's Fiscal Year (FY) 1999 initiative to build a \$1.3 billion Spallation Neutron Source has been prepared by a team involving several DOE laboratories: Lawrence Berkeley National Laboratory for the ion source; Los Alamos National Laboratory for the linear accelerator; Brookhaven National Laboratory for the compressor ring; and Argonne National Laboratory and Oak Ridge National Laboratory for the target and instrumentation. Oak Ridge National Laboratory has overall responsibility for the project.

Similarly, the foundational report, "*Technology Opportunities to Reduce U.S. Greenhouse Gas Emissions*," October 1997, was a successful collaboration by the Directors of DOE's eleven national laboratories. This study was led by Oak Ridge National Laboratory and the National Renewable Energy Laboratory, with the other nine laboratories being substantial contributors. It is an important ingredient for the development of the energy R&D portfolio.

There are numerous other excellent examples of interlaboratory collaborations in this year's draft Institutional Plans. We have enclosed data on such collaborations from Argonne National Laboratory to provide one example of the breadth and depth of these activities.

"Micromanagement"

In terms of micromanagement, as recognized in the draft GAO report, the Department has made "significant improvements" in reducing oversight of the laboratories. The initiatives of the Department and its laboratories include reducing the burden of unnecessary reporting and dramatically reforming the Department's procurement rules, benchmarking laboratory activities to the private sector, instituting integrated safety management, and reengineering business practices to enhance productivity. The Department's success in these efforts has been exemplary--we are on track to accomplish a \$2 billion reduction in costs over five years, exceeding the original goal of \$1.4 billion.

The Department shares the GAO's view that Micromanagement can adversely impact research and development. That is why the Department recognizes the importance of using management approaches tailored to the different program objectives and laboratory characteristics. There is no attempt to impose a single management approach on programs. The Office of Defense Programs, for example, performs a large portion of its work at the three weapons laboratories with a single mission focus in mind: the maintenance of a safe, secure, and reliable nuclear weapons stockpile. The Office of Energy Research, on the other hand, sponsors a wide range of basic research at dozens of institutions--including DOE laboratories--around the country.

See comment 4.

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See comment 5.

Finally, the GAO draft report criticizes the Department's implementation of past recommendations by advisory groups stating that most of the Department's actions are "still under way or have unclear outcomes." Notwithstanding the significant reforms mentioned above, the Department notes that many of the recommendations cited in the draft report are, in fact, goals to pursue and processes to improve continuously rather than specific actions to be undertaken. Thus, by their nature, actions taken by the Department to accomplish these recommendations will require a continuing commitment and ongoing effort.

For example, the Galvin report recommendation to "strengthen fundamental science and engineering at the laboratories and universities," is a goal rather than a single objective that can be met and removed from a list. Other examples include:

- Integrate energy and environment. (Galvin)
- Improve DOE management and leadership. (Galvin)
- Involve the public more in decision-making. (Galvin)
- Provide better integration of basic research, technology development and applications, especially in environmental remediation. (Galvin)
- Continue Federal government leadership, focus and financial support for energy R&D. (Yergin)
- DOE should incorporate private sector "best practices" for managing energy R&D. (Yergin)
- DOE should continue to identify and reduce or eliminate excessive burdens on the laboratories. (LOB)

These goals reflect guiding principles that the Department has readily accepted and is endeavoring to reflect in its program and budget priorities, in how it uses merit and peer reviews, in the performance measures it includes in contracts, and in the means it uses to attract and retain the best scientists.

In summary, many of the Department's efforts in implementing national laboratory reforms are not discrete actions taken in reaction to incidents or problems that need to be resolved. They are part of a comprehensive structure the Department is developing in order to implement a new management system, one with all of the pieces interrelated and tied to the DOE Strategic Plan.

We believe the cumulative effect of these actions reflect significant progress in implementing the recommendations of the various advisory committees and towards improving the management and performance of the national laboratories. These changes will not be lasting, however, until the Department is able to institutionalize the key improvements as part of its performance-based management system.

We believe the DOE senior management's commitment to performance-based management, and to an improved planning and budget process, will achieve a long-term, stronger management system for the Department's laboratory system. Coordinated interactions of the LOB, the R&D

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Council, and the Laboratory Directors will ensure that the new management culture is institutionalized and continuously improved. The new emphasis on technology roadmaps and portfolio analysis, should provide the right tools to more effectively develop priorities, budgets, and program plans. We readily admit that the entire system integration is not yet complete.

In the new era of government performance and results-based management, it is important that we value outcomes as well as outputs. The Department manages the largest and most distinguished laboratory system in the world. It has attracted scientists and engineers from all over the Federal government, from universities, the private sector, and from countries around the world. Over 18,000 scientists from universities and U.S. industry use the laboratories' scientific user facilities to carry out their research every year. Similarly, other Federal agencies and the private sector invest their R&D resources to the amount of \$1 billion annually in the Department's laboratories.

Furthermore, it is worth noting that the laboratories have won more R&D 100 awards than any private sector organization and twice as many as all other federal agencies combined. Moreover, of the 71 Nobel Prize awardees supported by the Department, most were associated with the laboratories.

These figures are indicators of the scientific excellence and productivity at our national laboratories and of a system that is not fundamentally broken. The Department's national laboratories are indeed among the finest in the world. All large management and research complexes present many challenges and opportunities for continued improvement. DOE's management and laboratory system is no exception. There is much left to do. We are committed to continued reform and improvement that enables the laboratory system to continue to thrive at the highest level of excellence.

Sincerely,



Ernest J. Moniz

Enclosures

The following are GAO's comments on the Department of Energy's letter dated August 3, 1998.

1. We agree that DOE's multiprogram laboratories can be focused on more than a single mission area and that varying weights can be assigned to that mission area at different laboratories. We also agree with DOE's comment that further focusing of efforts at the laboratories is needed. This is a common finding from past advisory groups that have studied the laboratories.

2. We agree that the DOE and laboratory officials on the Laboratory Operations Board are in a position to recommend management improvements. Experts we interviewed told us that the Board has had a positive influence. But, as an advisory group, the Board does not have the authority to direct the implementation of needed changes; it must rely on its internal members to effect change. As we stated in our report, the Board's limited advisory role is not a substitute for strong DOE leadership and organizational accountability.

As we also stated in our report, the Department's efforts to integrate goals and research programs through activities such as roadmapping are useful. However, we believe that such efforts will be successful only if they are integrated into DOE's budget process. Although such integration has not yet taken place, we applaud DOE's plans to integrate the roadmapping process with the Department's budget process.

3. DOE reports that the laboratories have made progress in working in partnerships and as a system, noting that laboratory directors themselves have initiated further multilaboratory coordinated efforts. Laboratory directors we contacted also cited these partnerships but commented that they were often created without DOE's direction and guidance. Furthermore, one laboratory director said that DOE should establish more lead laboratories for these partnerships and that too many laboratories are involved in some programs.

As we stated in our report, weaknesses in DOE's ability to manage the laboratories as an integrated system of research and development facilities is one of the most persistent findings from past advisory groups.

4. Although we did not evaluate the improvements DOE cited in reducing its oversight of the laboratories, experts and laboratory officials credited DOE with reducing its oversight of the laboratories as a major change in

response to the Galvin Task Force's report. Also, we did not analyze the effect of micromanagement on research and development as part of this report.

5. Whether the Department considers the past studies' recommendations as goals or single objectives to be met, we believe that DOE needs to measure its progress in meeting these goals or objectives. DOE is not doing so yet. Although DOE is developing performance measures for its laboratory contractors as part of its "performance-based management system," it has not yet established performance measures to ensure that its own ongoing reform efforts are managed effectively. Without such measures, DOE cannot determine how much progress it has achieved.

We also agree with DOE that senior management's commitment to performance-based management and an improved planning and budget process is essential to the achievement of a long-term, stronger management system for its laboratory system. We believe an effective implementation plan with performance measures, milestones, and a system for tracking progress will assist the Department in obtaining this commitment and holding these managers accountable for achieving the desired results.

While we agree with the Department that it is important to value outcomes as well as outputs, we believe that past advisory groups' recommendations have often been repeated in subsequent studies because DOE has been unable to effectively measure the outcomes and outputs of the reform process. Without adequate measures for tracking progress, future studies are likely to find the same management deficiencies.

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