United States General Accounting Office

GAO

Report to the Chairman, Environment, Energy, and Natural Resources Subcommittee, Committee on Government Operations, House of Representatives

December 1990

ENERGY MANAGEMENT

Better DOE Controls Needed Over Contractors' Discretionary R&D Funds

143420

RELEASED

RESTRICTED——Not to be released outside the General Accounting Office unless specifically approved by the Office of Congressional Relations.

GAO/RCED-91-18

GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-235781

December 5, 1990

The Honorable Mike Synar
Chairman, Environment, Energy, and
Natural Resources Subcommittee
Committee on Government Operations
House of Representatives

Dear Mr. Chairman:

In response to your January 10, 1989, request and subsequent discussions with your office, this report discusses four issues relating to the discretionary research and development activities of three Department of Energy (DOE) laboratories and DOE's management controls over these activities. Specifically, the report addresses the need for, uses of, and DOE management controls over its laboratories' discretionary R&D activities.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time, we will send copies to the Secretary of Energy and other interested parties.

This work was performed under the direction of Victor S. Rezendes, Director, Energy Issues, who can be reached at (202) 275-1441. Other major contributors are listed in appendix I.

Sincerely yours,

J. Dexter Peach
Assistant Comptroller General

Executive Summary

Purpose

The Department of Energy's (DOE) nine multiprogram laboratories conducted discretionary research and development (R&D) activities costing approximately $123 million during fiscal year 1989. Citing past examples of uncontrolled use of certain R&D funds by the laboratories, the Chairman of the Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations, asked GAO to examine the authority and need for, uses of, and controls over DOE's discretionary R&D funds. As agreed with his office, GAO focused the review on the discretionary R&D activities at the Lawrence Livermore, Sandia, and Los Alamos National Laboratories.

Background

Section 303 of Public Law 95-39, the Energy Research and Development Administration's fiscal year 1977 authorization act, gives DOE specific authority to approve the use of a reasonable amount of laboratory funds to conduct employee-suggested R&D projects selected at the discretion of the laboratory directors—discretionary R&D.

In December 1983 DOE revised an internal order (DOE Order 5000.1, Change 1; now codified as DOE Order 5000.1A) and formally established a discretionary R&D program called Exploratory Research and Development (Exploratory R&D). This order also established policies and procedures governing the Exploratory R&D program, including criteria for determining appropriate and inappropriate uses of Exploratory R&D funding, and established program oversight responsibilities. Two of the laboratories (Sandia and Los Alamos) conducted some discretionary R&D activities prior to the formal establishment of the Exploratory R&D program. In implementing the program, Sandia substituted Exploratory R&D for its existing discretionary R&D efforts, Lawrence Livermore created an Exploratory R&D program, and Los Alamos incorporated Exploratory R&D as a component of its existing discretionary R&D program. Los Alamos' discretionary R&D program currently consists of two components: Basic Research and Exploratory R&D.

Results in Brief

Both DOE and laboratory officials support the need for some discretion on the part of laboratory directors in choosing R&D projects. Further, the Congress has approved a "reasonable amount" of funding for such activities. Notwithstanding this support, the absence of any formal DOE studies aimed at assessing the benefits resulting from the multiprogram laboratories' discretionary R&D activities leaves open to question DOE's plans to significantly increase the funding levels for these activities.

The vague wording of DOE's existing criteria for use of discretionary R&D funds makes judgments about appropriate and inappropriate uses of funds difficult at best. When GAO examined these activities against its reading of these criteria, it found that the laboratories had spent funds on activities that are questionable.

DOE's management controls are weak over the administration and use of discretionary R&D funds at the three laboratories GAO reviewed. DOE has not effectively implemented the control mechanisms contained in the DOE order, including the requirement that the operations offices review the nature of projects carried out under the order and that the cognizant secretarial officer annually visit the laboratories and review the results of Exploratory R&D.

Further, DOE has not formally reviewed, nor set a funding ceiling applicable to, the Basic Research component of Los Alamos' program. DOE does not have guidance on the use of funds from Los Alamos' Basic Research component and has no formal system of controls in place covering Basic Research.

DOE acknowledges these weaknesses. It has recently developed draft guidance that, if approved and effectively implemented, should clarify the criteria on appropriate uses of Exploratory R&D funds, strengthen DOE oversight of the laboratories' discretionary R&D activities, and apply to Basic Research.

Principal Findings

Authority and Need for Discretionary R&D Funding

The Congress, through the enactment of section 303 of Public Law 95-39, authorized DOE to approve the use of a "reasonable amount" of laboratory funds for discretionary R&D activities. For its Exploratory R&D program, DOE determined that the maximum funding level should be equal to 2 percent of the operating budgets at the three laboratories GAO reviewed. DOE has never made any formal determination, however, regarding the appropriate funding level for the Basic Research component of Los Alamos' discretionary R&D program, which Los Alamos funds at a level equal to about 5 percent of its operating budget. DOE and laboratory officials told GAO that the Basic Research component of Los Alamos' discretionary R&D program is not subject to the DOE order on

Exploratory R&D and DOE does not have any guidance that specifically applies to Basic Research.

DOE and laboratory officials cited three studies as supporting the need for discretionary R&D. The studies concluded that discretionary R&D funding for the laboratories would enhance the laboratories' capabilities and improve their performance. However, these studies did not take into account DOE's experience in conducting discretionary R&D through its Exploratory R&D program. DOE has also done little to assess the benefits of its laboratories' discretionary R&D programs. In GAO's view, the absence of such analysis leaves open to question DOE's plans to increase, by fiscal year 1991, discretionary R&D funding at the three laboratories GAO reviewed by about 26 percent over the fiscal year 1988 level.

Vague Criteria Make Judging Use of Discretionary R&D Funds Difficult

Guidance in the DOE order on Exploratory R&D is not clear enough to ensure that laboratories use these funds appropriately. When GAO examined these activities against its reading of the criteria, it found that the laboratories had spent funds on activities that are questionable. For example, the DOE order prohibits the purchase of general purpose capital equipment, but it neither defines "general purpose" nor specifies the types of equipment that may be purchased with these funds.

DOE has not established any guidance on how Los Alamos' Basic Research funds may be used. GAO found that Los Alamos used some discretionary R&D funds for activities that did not involve actual research. Even more significantly, Los Alamos, with DOE's knowledge, used over $2.6 million of the Basic Research funds to pay uncollected costs for reimbursable projects done at the laboratory.

Weak DOE Controls Over Discretionary R&D Activities

DOE lacks effective controls over laboratories' discretionary funds. Weaknesses GAO observed include the following: (1) DOE headquarters did not conduct the annual program oversight reviews required by DOE order, (2) the Albuquerque Operations Office did not review Exploratory R&D projects, (3) DOE provided virtually no oversight of Los Alamos' Basic Research program, (4) DOE did not communicate spending provisions contained in authorization and appropriations acts to its field offices, and (5) DOE did not require that laboratories file project reports with the DOE Scientific and Technical Information Center.

DOE has begun improving its controls over discretionary funds. For example, its Office of Defense Programs and Albuquerque Operations Office have recently conducted reviews of the laboratories' programs.

Recommendations

GAO recommends that the Secretary of Energy (1) periodically assess the benefits of the DOE laboratories' discretionary R&D activities relative to their costs, (2) review and revise DOE Order 5000.1A to clarify guidance on appropriate and inappropriate uses of Exploratory R&D funds, and (3) establish that the guidance applies to all discretionary R&D activities carried out by the laboratories, including the Basic Research component of Los Alamos' program.

In addition, GAO makes a number of recommendations to the Secretary aimed at improving DOE's oversight of its laboratories' discretionary R&D activities.

Matter for Congressional Consideration

To ensure that expenditures under section 303 of Public Law 95-39 are not excessive, the Congress may want to consider clarifying the term "reasonable amount" by establishing a specific funding ceiling for DOE's discretionary R&D program.

Agency Comments

GAO discussed this report with DOE and laboratory officials. They generally agreed with the facts presented and suggested several changes that were incorporated where appropriate. However, as requested, GAO did not obtain official agency comments on this report.

Contents

Executive Summary		2
Chapter 1 Introduction		8
	DOE's Multiprogram Laboratories	9
	DOE's Statutory Authority to Authorize Discretionary R&D by Its Laboratories	10
	DOE Order Creates Exploratory Research and Development Program	11
	DOE Inspector General Critical of Los Alamos' Discretionary R&D Program	14
	Objectives, Scope, and Methodology	15
Chapter 2 DOE Needs to Better Assess the Appropriate Funding Level for Discretionary R&D		19
	Congress Has Not Set Specific Limits on Discretionary R&D Funding	19
	DOE Allowed One Laboratory to Fund Discretionary R&D Activities Above the Ceiling It Set for Exploratory R&D	20
	DOE Has Done Little to Assess the Need for and Benefits of Discretionary R&D	22
	DOE Had Not Informed a Congressional Subcommittee of the Full Extent of Discretionary R&D Expenditures	24
	Conclusions	26
	Recommendations to the Secretary of Energy	27
	Matter for Consideration by the Congress	27
Chapter 3 DOE Guidance on Laboratories' Use of Discretionary R&D Funds Is Unclear		28
	DOE Has Not Provided the Laboratories With Clear Guidance on the Use of Exploratory R&D Funds	28
	DOE Has No Guidance Covering $48 Million in Annual Discretionary R&D Expenditures	32
	Conclusions	35
	Recommendations to the Secretary of Energy	36

Chapter 4 DOE Needs to Improve Controls Over Laboratories' Discretionary R&D Activities

	37
Control Mechanisms Are Not Utilized or Do Not Exist	37
DOE Has Not Communicated Statutory Spending Provisions to the Laboratories	40
DOE Guidance Does Not Incorporate All Pertinent Requirements of Public Law 95-39	42
Conclusions	43
Recommendations to the Secretary of Energy	44

Appendix

Appendix I: Major Contributors to This Report	46

Table

Table 2.1: Exploratory Research and Development Allocations	25

Abbreviations

DOE	Department of Energy
DOE IG	DOE Inspector General
ERAB	Energy Research Advisory Board
ERDA	Energy Research and Development Administration
FY	fiscal year
GAO	General Accounting Office
IR&D	Institutional Research and Development
ISRD	Institutional Supporting Research and Development
R&D	research and development

Introduction

The Department of Energy (DOE), through its nine multiprogram laboratories, conducts a broad range of defense- and energy-related research and development (R&D) activities. Most of the R&D conducted by DOE is under the direction of DOE's program office managers and is financed by the program offices and funds from other users of the laboratories. DOE also has authority, under the fiscal year (FY) 1977 authorization act for the Energy Research and Development Administration, to approve the use of a reasonable amount of laboratory funds for conducting employee-suggested R&D projects selected by the laboratory directors.

On December 13, 1983, DOE revised a departmental order (DOE Order 5000.1, Change 1) to establish the Exploratory Research and Development (Exploratory R&D) program, authorizing the multiprogram laboratory directors to conduct some R&D of their choosing. Research and development of this nature is called discretionary R&D. Unlike the program-directed R&D, which is funded and managed by the program office managers, discretionary R&D is managed by the laboratory directors and, in most cases, is financed through an assessment against the laboratories' operating funds. The purpose of the Exploratory R&D program is to provide the laboratories with the opportunity to investigate innovative and creative scientific and technological ideas. The nine multiprogram laboratories conducted discretionary R&D costing approximately $123 million during FY 1989.

Citing DOE's increasing demand on the federal dollar and past examples of uncontrolled use of certain R&D funds by the laboratories, the Chairman of the Environment, Energy, and Natural Resources Subcommittee, House Committee on Government Operations, in his letter of January 10, 1989, asked us to examine the authority and need for, uses of, and controls over DOE's discretionary R&D funds. As agreed with his office, we focused our review on the discretionary R&D activities carried out by three defense laboratories—the Lawrence Livermore, Sandia, and Los Alamos National Laboratories.[1] In addition, because a 1989 report by DOE's Office of the Inspector General (IG) had found problems with Los Alamos' discretionary R&D program, we expanded our work at Los Alamos to include discretionary R&D activities carried out in FYs 1986 and 1987.

[1] We focused our review on the laboratories' FY 1988 activities because this was the most recent year for which complete data were available.

DOE's Multiprogram Laboratories

DOE, established on October 1, 1977, is responsible for conducting a broad program of energy- and defense-related R&D. DOE and its predecessor agencies have traditionally utilized the multiprogram laboratories for this purpose. There are nine DOE multiprogram laboratories owned by the government and operated by contractors. They receive programmatic direction from DOE's program offices and contractual oversight and administrative support from DOE's field operations offices.

The nine multiprogram laboratories serve as DOE's primary mechanism for conducting energy and defense R&D. These laboratories are large and diverse and employ scientists and engineers who conduct basic and applied research in a broad range of disciplines. The reservoir of scientific and technical knowledge accumulated at the laboratories through R&D can be used and re-used by other laboratories, state and federal governments, industry, and universities for solving problems and exploring new areas of technology.

These multiprogram laboratories are operated for the government by contractors from universities and private industry. For example, AT&T Technologies is under contract to operate Sandia, and the University of California is under contract to operate Lawrence Livermore and Los Alamos. During FY 1988, funding for the nine contractor-operated multiprogram laboratories was approximately $4.1 billion, or about 30 percent of DOE's overall FY 1988 budget. The DOE funding levels for the nine multiprogram laboratories were approximately $4.3 billion in FY 1989 and $4.8 billion in FY 1990.

Since it conducts energy- and defense-related R&D, DOE has arranged the nine multiprogram laboratories into two groups, the energy laboratories and the defense laboratories. The energy laboratories are under the cognizance of the Director of Energy Research. The defense laboratories, under the cognizance of the Assistant Secretary for Defense Programs, conduct primarily defense-related R&D, including energy R&D related to defense issues. For example, these laboratories design nuclear weapons and develop other technologies needed to ensure national security.

Organizational Structure for Managing the Defense Programs Laboratories

DOE's headquarters Office of the Assistant Secretary for Defense Programs (Defense Programs) provides general oversight to the laboratories and specific direction for activities conducted under the DOE weapons program, while the field operations offices provide contractual oversight and administrative support. According to Defense Programs officials, Defense Programs provides general direction for activities

conducted under the weapons program to ensure that the laboratories conduct R&D that coincides with Defense Programs' general program objectives. The field operations offices provide a formal link between DOE headquarters and the laboratories. Each operations office is responsible for contract management at the laboratories under their jurisdiction. For example, the Albuquerque Operations Office administers the contracts for Los Alamos and Sandia, while the San Francisco Operations Office administers the contract at Lawrence Livermore. According to DOE officials, the operations offices are also responsible for overseeing (1) procurement for and by laboratories under their jurisdiction, (2) safety matters at the laboratories, (3) security at the laboratories, and (4) the financial operation of the facilities.

DOE's Statutory Authority to Authorize Discretionary R&D by Its Laboratories

DOE has general authority to conduct or manage a broad range of R&D deemed necessary by the Secretary of Energy. Several different enabling statutes, including the Atomic Energy Act, the Energy Reorganization Act of 1974, and the Department of Energy Organization Act, provide the authority for its R&D activities. In addition, under section 303 of Public Law 95-39, the Energy Research and Development Administration FY 1977 authorization act, DOE has specific authority to approve the use of laboratory funds to conduct employee-suggested R&D projects selected at the discretion of the laboratory directors.[2]

DOE's Enabling Statutes

DOE cites a number of different statutes as providing authority for conducting a wide range of R&D activities. For example, the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.), provides DOE with broad, discretionary authority to carry out R&D activities in the field of nuclear energy. One purpose of the Atomic Energy Act is to provide for a program of conducting, assisting, and fostering R&D. The Atomic Energy Act directs DOE to, among other things, exercise its powers to ensure the continued conduct of R&D, and to assist in acquiring theoretical and practical knowledge.

One of the purposes of the Energy Reorganization Act of 1974, as amended (42 U.S.C. 5801 et seq.), is to have DOE (formerly the Energy Research and Development Administration) direct federal R&D activities for all sources of energy and to carry out basic research activities. Under the Energy Reorganization Act, DOE is responsible for planning,

[2]DOE has not clearly articulated its views as to the relationship between section 303 and its general authority under its enabling statutes. We are continuing to examine this matter.

coordinating, supporting, and managing, as well as for encouraging and conducting, energy R&D for all energy sources, with respect to both near-term and long-range energy needs. The Secretary has broad authority under the Energy Reorganization Act to determine the areas or fields of R&D activities to be pursued; the persons or institutions to perform the R&D; and the form of payment. Further, he is authorized to take whatever steps he considers necessary or appropriate to perform the functions for which he is responsible.

The Department of Energy Organization Act (42 U.S.C. 7101 et seq.), which created DOE, consolidated and granted to the Secretary and DOE the responsibility for R&D that was formerly fragmented among several federal agencies. Under the DOE act, DOE is responsible for planning, coordinating, supporting, and managing a balanced and comprehensive energy R&D program.

DOE's Specific Authority

In addition to its general authority to manage or conduct energy R&D activities, DOE also has specific statutory authority to approve the use of a portion of laboratory operating funds to conduct some R&D projects selected at the discretion of the laboratory directors. Section 303 of Public Law 95-39, the Energy Research and Development Administration Authorization Act for FY 1977, permits the directors of DOE's laboratories, with the approval of the Secretary, to use a "reasonable amount" of the laboratories' operating budgets to fund "employee-suggested research projects up to the pilot stage of development."

DOE Order Creates Exploratory Research and Development Program

In furtherance of its mission of conducting defense- and energy-related R&D, DOE has historically allowed the laboratory directors to conduct some R&D at their discretion. However, in December 1983 DOE issued a revised order formally establishing the Exploratory R&D program. DOE created the Exploratory R&D program to provide a formal mechanism through which the laboratories could foster the development of new science and technology ideas related to their defense and energy missions. This order also established policies and procedures governing the Exploratory R&D program, including criteria for determining appropriate and inappropriate uses of Exploratory R&D funds, and established program oversight responsibilities. DOE later revised and re-issued the order as DOE Order 5000.1A in September 1986.

DOE Order 5000.1A authorizes the laboratories' directors to utilize a portion of their operating budgets—the specific amount to be approved

annually by the Assistant Secretary for Defense Programs or the Director of Energy Research—to fund the early exploration and exploitation of creative and innovative scientific and technological concepts developed in the course of the laboratories' work. Also, under the order Exploratory R&D expenses are considered an allowable overhead cost under the laboratories' operating contracts. During FY 1989 the nine multiprogram laboratories conducted discretionary R&D costing approximately $123 million, $77 million of which was categorized as Exploratory R&D. The three defense laboratories we reviewed accounted for approximately $50 million, or 66 percent of the total Exploratory R&D program expenditures by the nine laboratories.

The three laboratories we reviewed developed and submitted proposals to the Albuquerque and San Francisco Operations Offices demonstrating how they planned to implement the Exploratory R&D program. Two of the three laboratories had conducted discretionary R&D activities prior to the formal establishment of the Exploratory R&D program. In implementing the program, Sandia substituted Exploratory R&D for its existing discretionary R&D efforts, Lawrence Livermore created an Exploratory R&D program, and Los Alamos incorporated Exploratory R&D as a component of its existing discretionary R&D program. Los Alamos' discretionary R&D program currently consists of two components: Basic Research and Exploratory R&D.

Sandia's Discretionary R&D Program

Sandia's discretionary R&D program is called Independent Research and Development (Independent R&D). According to Sandia officials, a committee known as the Applied Research and Technology Activity Committee annually selects the projects to receive Exploratory R&D funding. Sandia accumulates funds for Independent R&D through charges against non-DOE reimbursable work.[3] According to Sandia officials, this is currently a 5-percent assessment, which in FY 1988 amounted to approximately 1.3 percent of Sandia's total operating budget. In FY 1988 Sandia funded 39 Exploratory R&D projects totaling approximately $14.6 million.

[3]Reimbursable work refers to work or services performed or to be performed for another federal or nonfederal entity for which DOE is compensated by a specific type of offsetting collection, known as reimbursement, which may be credited as authorized by law to the appropriation or fund account of DOE. The reimbursable work or services performed by DOE are financed by the funds of the ordering federal entity or by cash advances from a nonfederal entity.

Lawrence Livermore's Discretionary R&D Program

Lawrence Livermore's discretionary R&D program is called the Institutional Research and Development (IR&D) Program. In 1988 it consisted of four components: (1) Exploratory Research, which allows the disciplinary departments and divisions to promote pioneering work in the various scientific disciplines (chemistry and materials science, computing, physics, etc.); (2) Director's Initiatives, which supports a few large projects chosen by the laboratory director with the potential to develop into large, multiyear programs; (3) Individual Awards, which provides Lawrence Livermore's researchers with the opportunity to develop their innovative ideas by competing for seed funding outside of the normal programmatic channels; and (4) the University of California Institutes, which supports the mutual interests of the laboratory and the nation's academic and research establishments.[4] Lawrence Livermore utilizes a committee to recommend to the director research proposals that should receive Exploratory R&D funding. Unlike Sandia, Lawrence Livermore funds its IR&D program through an assessment against both reimbursable work and all DOE-funded programs at the laboratory. This assessment generally equates to a total funding level of about 2 percent of the laboratory's total operating budget. Lawrence Livermore's Exploratory R&D funding for FY 1988 amounted to approximately $18 million, with which Lawrence Livermore funded 85 Exploratory R&D projects. These included four University of California Institutes, which, in turn, were made up of a number of smaller projects.

Los Alamos' Discretionary R&D Program

The Los Alamos National Laboratory incorporated Exploratory R&D into a larger, existing, discretionary R&D program. Los Alamos' discretionary R&D program, Institutional Supporting Research and Development (ISRD), consists of two components, Basic Research and Exploratory R&D. According to Defense Programs officials, Los Alamos established the Exploratory R&D component by renaming a portion of the existing ISRD program and categorizing those projects meeting the criteria of DOE Order 5000.1, Change 1, into its Exploratory R&D component. Los Alamos utilizes peer and management groups to review project proposals and recommend projects for funding. Like Lawrence Livermore, Los Alamos funds its ISRD program through an assessment against all DOE-funded programs and reimbursable work. Unlike Sandia and Lawrence Livermore, Los Alamos' assessment level from FY 1984 through 1988 ranged from a low of 7.2 percent to a high of 7.9 percent, averaging out to an annual assessment against Los Alamos' total operating

[4]Lawrence Livermore removed the University of California Institutes from its Exploratory R&D program beginning in FY1989.

budget of about 7.6 percent. This assessment level, broken down by ISRD components, shows that on the average Los Alamos financed Exploratory R&D at a level of 2.3 percent of its total operating budget and Basic Research at 5.4 percent. Los Alamos' total FY 1988 discretionary R&D funding was $65.8 million, $17.9 million of which was categorized as Exploratory R&D.

DOE Inspector General Critical of Los Alamos' Discretionary R&D Program

In May 1989 DOE's Office of the Inspector General (IG) completed a review of Los Alamos' discretionary R&D program for FYs 1986 and 1987.[5] The IG found several problems at Los Alamos. For example, during FYs 1986 and 1987, Los Alamos' actual discretionary R&D expenditures totaled $131.4 million, or approximately 7 percent of its total operating budget. Thus, the IG concluded that Los Alamos exceeded its Exploratory R&D funding limit—2 percent of its operating budget—by $97.7 million over the 2-year period. In addition, Los Alamos spent $25.9 million on projects the IG considered to be inappropriate for Exploratory R&D funding. Finally, the IG recommended that the Assistant Secretary for Defense Programs seek a legal opinion from the DOE General Counsel as to the propriety of assessing DOE's budgeted programs to finance discretionary R&D projects.

Los Alamos disagreed with the IG's conclusions because, according to Los Alamos, they were the result of the IG's narrowly focused interpretation of DOE Order 5000.1A and inappropriate use of the order to audit its entire ISRD program. According to Los Alamos, the IG inappropriately applied the criteria in DOE Order 5000.1A to projects funded under the Basic Research component of Los Alamos' discretionary R&D program. Los Alamos maintained that the Basic Research component of its program is not governed by this order and therefore is not subject to its policies and procedures.

DOE headquarters accepted the IG's report as factually correct but commented that the IG did not consider other factors that would have affected its conclusions. Further, DOE concurred with Los Alamos' position that the Basic Research portion of the laboratories' discretionary R&D program was not subject to the funding criteria and limits established under DOE Order 5000.1A.

[5]Exploratory Research and Development Funds at Los Alamos National Laboratory, U.S. DOE, Office of Inspector General, Report No. DOE/OIG-0267, May 17, 1989.

As a result of the IG's report, the Assistant Secretary of Energy for Defense Programs tasked the Deputy Assistant Secretary for Military Applications with conducting a review of the defense laboratories' discretionary R&D activities to provide a basis for his response to the DOE IG's report on these activities at Los Alamos. In its May 3, 1990, response to the IG, DOE agreed, among other things, to seek a legal opinion from its Office of General Counsel on the propriety of assessing budgeted programs and using the resulting funds for discretionary projects. DOE further agreed to review Los Alamos' procedures for the non-exploratory R&D (Basic Research) portion of its discretionary R&D program and approve or revise them. The study group report has not yet been completed, but the draft report found, among other things, that (1) a laboratory's having more than one discretionary R&D program is likely to cause management difficulty and misperception, (2) Defense Programs does not have a structured approach for reviewing and determining appropriate funding levels for discretionary R&D, (3) the criteria in DOE Order 5000.1A regarding appropriate and inappropriate uses of Exploratory R&D funds are subject to a wide range of interpretations, and (4) neither operations offices nor Defense Programs has had adequate procedures for overseeing the defense laboratories' discretionary R&D programs in the past.

In response to these findings, DOE has developed draft guidance which, if implemented, will address most of the concerns raised by the study group. The version of the draft guidance we reviewed would, among other things, (1) apply to all discretionary R&D activities carried out by the laboratories, (2) provide a structured approach for determining the maximum discretionary R&D funding level for each laboratory, (3) clarify the criteria on appropriate and inappropriate uses of discretionary R&D funds, and (4) revise and reiterate the oversight responsibilities of DOE headquarters and field offices.

Objectives, Scope, and Methodology

The objectives of this review were to examine (1) the need for DOE laboratories to be able to carry out discretionary R&D (including DOE's justification for the funding levels it allowed), (2) how the funds are being used by the laboratories, and (3) DOE controls over discretionary R&D funds at DOE's national laboratories. In addition, we examined DOE's authority to authorize its laboratories' discretionary R&D programs. To address these questions, we performed work at DOE headquarters, the San Francisco and Albuquerque Operations Offices, and the Lawrence Livermore, Los Alamos, and Sandia National Laboratories. We also

reviewed relevant work done by the DOE IG and determined that additional audit work was necessary in order to adequately respond to the requester's questions. We focused our review on discretionary R&D programs at the three laboratories during FY1988 because this was the most recent year for which complete data were available. These laboratories accounted for 70 percent of the total Exploratory R&D expenditures and 82 percent of the overall discretionary R&D expenditures for FY 1988 of which we are aware. We placed additional emphasis on the Los Alamos discretionary R&D program because of the problems identified by the DOE IG and the laboratory's disagreement with the IG's findings. Accordingly, we also selected and reviewed eight FY 1986 and 1987 discretionary R&D projects at Los Alamos that the DOE IG identified as being inappropriate for discretionary R&D funding.

To examine the authority for the laboratories' accumulating and spending government funds on R&D of their choosing, we (1) obtained an analysis of the authority for this type of discretionary R&D from the DOE controller; (2) identified and examined the authority and basis for the discretionary R&D programs at these laboratories; and (3) examined whether assessing budgeted programs to fund discretionary R&D activities violates specific provisions of authorization acts or the acts providing the majority of DOE's appropriations (the Energy and Water Development and Interior and Related Agencies Appropriations).

To determine the need for discretionary R&D funds, we (1) reviewed studies identified as documenting the need for discretionary R&D funds at DOE laboratories and (2) examined Los Alamos' justification for discretionary R&D funds in excess of the 2 percent approved by DOE headquarters.

To determine the uses of discretionary R&D funds, we selectively reviewed a total of 37 discretionary R&D projects funded at Los Alamos during FYs 1986-88 and at Sandia and Lawrence Livermore during FY 1988, to determine if they met the DOE criteria for such funding as specified in DOE Order 5000.1A. Specifically, we selected and examined eight FY 1988 Exploratory R&D projects at Sandia, nine FY 1988 Exploratory R&D projects at Lawrence Livermore, and six FY 1988 Exploratory R&D projects at Los Alamos. In addition, we reviewed six FY 1988 Los Alamos projects that were funded from the Basic Research component of Los Alamos' discretionary R&D program. We also reviewed one Exploratory R&D and seven Basic Research projects at Los Alamos funded in FYs 1986

and 1987 and identified by the DOE IG as being inappropriate for discretionary R&D funding. We used Los Alamos' internal policies and procedures for Basic Research to evaluate if such funds were expended for allowable purposes. We selected some projects to review in detail on the basis of our initial assessment that the projects appeared not to meet one or more of the criteria in DOE Order 5000.1A and selected additional projects on basis of size to ensure that we reviewed both large and small projects. Because we selectively chose projects for review rather than choosing them randomly, our findings are not necessarily representative of all projects at the three laboratories or DOE-wide. The 23 FY 1988 Exploratory R&D projects we examined accounted for about 12 percent of the total number of Exploratory R&D projects and about 18 percent of the total Exploratory R&D funding at the three laboratories included in our review.

To assess the controls over discretionary R&D funds at DOE's laboratories, we reviewed applicable DOE orders, guidance, reports, evaluations, and other documents related to discretionary R&D programs to determine whether an adequate system of management controls is in place to ensure that discretionary R&D funds are spent only for legitimate R&D projects meeting DOE criteria for such funding.

We interviewed DOE officials from the Office of the Deputy Assistant Secretary for Military Applications and the Office of the Deputy Assistant Secretary for Planning and Resource Management, both under the Office of the Assistant Secretary for Defense Programs; Office of the Assistant Inspector General for Audits, the Capital Regional Audit Office, and the Western Regional Office, all within the Office of the Inspector General; the Policy, Financial Policy, and Budget Offices within the Office of the Assistant Secretary for Management and Administration; the Office of Field Operations Management within the Office of Energy Research; the Office of Civilian Radioactive Waste Management; and the Albuquerque and San Francisco Operations Offices. We also interviewed management officials and project participants at the three national laboratories. Finally, we interviewed officials from the Office of Management and Budget's Energy Group and the Department of Defense's Cost Pricing and Financing Office.

We performed our work from March 1989 through September 1990 in accordance with generally accepted government auditing standards. As requested, we did not obtain comments from the agency. However, we did review the facts developed through our review with responsible agency and laboratory officials who generally agreed with the accuracy

of the facts presented. We have incorporated their comments where appropriate.

DOE Needs to Better Assess the Appropriate Funding Level for Discretionary R&D

In authorizing DOE to allow its laboratories to conduct discretionary R&D, the Congress limited such expenditures to "a reasonable amount" of the laboratories' operating budgets. Under its Exploratory R&D program, DOE has authorized the laboratories we reviewed to spend up to 2 percent of their operating budgets for discretionary R&D. However, Los Alamos has spent an additional 5 percent of its operating funds on discretionary R&D activities carried out under what DOE and Los Alamos had considered to be a related but separate program. DOE has not formally reviewed, nor set a funding ceiling applicable to, the Basic Research component of Los Alamos' discretionary R&D program. According to DOE officials, DOE will approve Los Alamos' entire FY 1991 discretionary R&D program as Exploratory R&D.

DOE cites three studies as supporting the laboratories' need for discretion in selecting some R&D projects for funding. The studies concluded, in part, that discretionary R&D funding for the laboratories was necessary to enhance the laboratories' capabilities and improve their use and performance. The studies do not consider the 5 years of experience that DOE has acquired since the implementation of its Exploratory R&D program. DOE has not carried out a detailed assessment of the benefits accruing to the Department as a result of the discretionary R&D activities it has authorized. Further, until this year DOE did not disclose, in response to inquiries by its House Appropriations Subcommittee Chairman, the full extent of discretionary R&D expenditures at the defense laboratories.

Congress Has Not Set Specific Limits on Discretionary R&D Funding

The Congress has not legislatively set forth a specific funding ceiling for the DOE laboratories' discretionary R&D programs. While section 303 of the Energy Research and Development Administration (ERDA) Appropriations Authorization Act of 1977 (P.L. 95-39) provides DOE with specific authority to allow its laboratories to conduct discretionary R&D, it does not set forth a precise limit on how much funding should be made available for this purpose. Rather, section 303 of Public Law 95-39 states,

> "Any Government-owned contractor-operated laboratory, energy research center, or other laboratory performing functions under contract to the Administration [DOE], may, with the approval of the Administrator [the Secretary of Energy], use a reasonable amount of its operating budget for the funding of employee-suggested research projects up to the pilot stage of development ...."[Emphasis added.][1]

[1]The ERDA act of June 1977, under which DOE carries out research and development activities, refers to the Administrator of the Energy Research and Development Administration. Since the creation of DOE in October 1977, these activities have been performed by the Secretary and the Department. For consistency, in this report, generally we will refer only to the Secretary or DOE.

We were unable to determine from the legislative history of Public Law 95-39 a specific definition of the term "reasonable amount." The conference report on a predecessor to the bill that became Public Law 95-39 refers to the intended funding level for employee-suggested R&D as being "very modest." The Senate version of the predecessor bill contained no provision comparable to what became section 303. However, the House version would have authorized the agency to permit a laboratory to use "up to one-half of one percent of its operating budget" for such activities (Sen. conf. rept. 1327 on H.R. 13350, 94th Cong., 2nd Sess. at 59).

DOE Allowed One Laboratory to Fund Discretionary R&D Activities Above the Ceiling It Set for Exploratory R&D

In implementing the exploratory R&D program established under Order 5000.1A, DOE has determined that an appropriate maximum funding level is 2 percent of the operating budgets for the laboratories we reviewed. However, DOE has made no such formal determination regarding the appropriate funding level for activities carried out under the Basic Research component of Los Alamos' discretionary R&D program. DOE has allowed Los Alamos to regularly fund its discretionary R&D program in excess of 7 percent of its operating budget. According to DOE and laboratory officials, the portion of Los Alamos' discretionary R&D program funded in excess of the approved 2 percent is not subject to DOE Order 5000.1A and, thus, is not subject to the 2-percent ceiling set by DOE under the order. We saw no basis for this distinction. Further, DOE officials informed us that Defense Programs will approve Los Alamos' entire FY 1991 discretionary R&D program as Exploratory R&D under DOE Order 5000.1A.

DOE Order 5000.1A authorizes the laboratories' directors to utilize a portion of their operating budgets—the specific amount is to be approved annually by the Assistant Secretary for Defense Programs or the Director of Energy Research—to fund the early exploration and exploitation of creative and innovative scientific and technological concepts developed in the course of the laboratories' work. Also, under the order, Exploratory R&D expenses are considered an allowable overhead cost under the laboratories' operating contracts. DOE's Assistant Secretary for Defense Programs is responsible, under DOE Order 5000.1A, for annually approving the Exploratory R&D funding level for the three laboratories we reviewed. For each year since FY 1985, the level has been equal to about 2 percent of the laboratories' operating budgets.

However, Los Alamos' total discretionary R&D program has, since the creation of the Exploratory R&D program, been funded at a level substantially greater than the level set by the Assistant Secretary for

Defense Programs for Exploratory R&D. Los Alamos, since 1984, has consistently spent over 7 percent of its operating budget for discretionary R&D. This equates to a yearly difference of $35 million to $50 million between the explicitly approved and actual spending levels for FYs 1984 through 1988.

Los Alamos' discretionary R&D expenditures have exceeded the formally established funding limit for Exploratory R&D primarily because, in implementing its Exploratory R&D program, Los Alamos incorporated Exploratory R&D into its existing, larger discretionary R&D program. Los Alamos' discretionary R&D program now has two components—Exploratory R&D and Basic Research. DOE and Los Alamos had considered the Basic Research component of the laboratory's program to be outside of the Exploratory R&D program and, thus, not subject to the spending limitations set by the Office of Defense Programs for Exploratory R&D under DOE Order 5000.1A.

In our view, there appeared to be little difference between the Basic Research and Exploratory R&D components of Los Alamos' program. Los Alamos informed us that the Basic Research component of its program is, as the name suggests, intended to be used to fund basic scientific and engineering research and related activities supporting development of externally funded basic research programs at the laboratory. The laboratory further informed us that Exploratory R&D is intended to fund applied scientific and engineering research and research activities supporting development of externally funded applied programs in defense, energy, environment, industrial applications, and space at the laboratory. The order defines Exploratory R&D as "work funded solely at the discretion of a laboratory director for early exploration and exploitation of creative and innovative scientific concepts developed in the course of the laboratory's normal technical work." (Emphasis added.) We believe that the types of activities described by Los Alamos as falling within the Basic Research component of its discretionary R&D program, laboratory-directed basic scientific and engineering research, could also be accommodated by DOE's definition of Exploratory R&D.

No DOE directives or guidance specifically govern the Basic Research component of Los Alamos' program, nor has DOE formally established a funding level for the component. DOE's Controller and officials in the Office of Defense Programs informed us, however, that Los Alamos has annually informed it of the activities associated with the Basic Research component of Los Alamos' program. In addition, according to a written response to a series of questions we posed to DOE, because it has not

taken exception to the expenditures, DOE has tacitly approved them. DOE has now determined that there is no specific value to a laboratory's having more than one system of discretionary R&D activities and, in fact, having different sources and criteria for discretionary R&D "is likely to cause management difficulty and misperception." Defense Programs' officials told us that, beginning in FY 1991, they will treat Los Alamos' entire discretionary R&D program as one program under DOE Order 5000.1A and any subsequent guidance DOE issues.

DOE Has Done Little to Assess the Need for and Benefits of Discretionary R&D

DOE and laboratory officials believe that laboratories need to be able to carry out discretionary R&D and cited two studies as support for this view. These studies predate the creation of DOE's Exploratory R&D program and thus do not take into account DOE's 5 years of experience with a formal discretionary R&D program since the implementation of the Exploratory R&D program. DOE has done little to evaluate the discretionary R&D activities it has authorized to determine the extent to which the results have benefited DOE's programs.

Officials Believe Discretionary R&D Is Needed

Officials in DOE Defense Programs and its Office of Energy Research, as well as laboratory management officials at the three laboratories we reviewed, generally stated that discretionary R&D funding for the laboratories is necessary and the program has been a success. Several DOE and laboratory officials also told us that discretionary R&D focuses on developing innovative and creative ideas that serve as the basis for future programmatic R&D work at the laboratories. Officials in DOE's Office of Energy Research told us that the Exploratory R&D program is an excellent tool for identifying promising new ideas and technologies and weeding out the bad without using a substantial amount of funds.

These officials cited three studies as demonstrating the need for discretion on the part of the laboratory directors in choosing some of the R&D activities they carry out for the government. The studies concluded, in part, that discretionary R&D funding for the laboratories was necessary to enhance the laboratories' capabilities and improve their use and performance. While one study focused on all federal laboratories, the others focused only on DOE's multiprogram laboratories. The studies recommended that the laboratories be allowed to use a percentage (5 to 10 percent) of their annual funding to support R&D conducted at the laboratory director's discretion.

The Energy Research Advisory Board's (ERAB) study of the DOE multiprogram laboratories recommended that each laboratory be permitted to use a portion of its capital and operating budgets to fund R&D at the laboratory director's discretion. The Deputy Secretary of Energy requested this study to assist DOE in shaping the future of its multiprogram laboratories. The ERAB study, issued in September 1982 and updated in December 1985, concluded that the capabilities of the multiprogram laboratories could be better utilized. As a result, the ERAB panel recommended that to enhance the laboratories' capabilities the laboratory directors should be permitted to conduct some R&D at their discretion. The panel recommended that 1 to 2 percent of the laboratories' capital and operating budgets be designated for this purpose. This range of recommended discretionary funding was revised to 5 to 10 percent in the ERAB panel's 1985 update.

Subsequent to the first ERAB study, a study by the White House Office of Science and Technology Policy also recommended that a portion of the federal laboratories' annual funding be used for discretionary R&D. This study, completed in May 1983 and referred to as the "Packard study" after the panel's Chairman, David Packard, addressed all 700 federal laboratories. The panel concluded that the U.S. government needed to improve the use and performance of the federal laboratories to offset some of the increasing challenges to the nation's economic and military competitiveness. Consequently, the panel recommended that the laboratories be allowed to explore new and creative scientific ideas by allowing the laboratory directors the flexibility to conduct some R&D of their choosing. The panel recommended that "at least 5 percent and up to 10 percent" of the laboratories' annual funding be available for discretionary R&D. The panel further recommended that agencies establish a mechanism to evaluate the results of such work and that the size and existence of discretionary funds should be related to laboratory performance.

DOE Has Done Little to Assess the Programmatic Benefits of Discretionary R&D Activities

To what extent have the multiprogram laboratories' discretionary R&D programs benefited DOE programs? DOE does not know because it has not carried out any formal assessments of the benefits accruing to its programs as a result of the discretionary R&D activities it has allowed its laboratories to conduct.[2] In June 1988 the DOE Office of Energy Research

[2]As discussed in ch. 4, both DOE headquarters and the DOE operations offices have carried out some reviews of Exploratory R&D activities. However, these reviews have not assessed the relative costs and benefits of the activities.

did evaluate the Exploratory R&D programs of the five multiprogram laboratories it oversees. However, the study focused on the structure and procedures of the programs carried out at the laboratories, not the benefits of the projects they carried out relative to the foregone programmatic work. The report noted that "the ultimate measure of the Exploratory R&D program's success lies not in an analysis of its structure and procedures, but in an assessment of outcomes and impacts." However, the study said that such an assessment was beyond its scope. As noted in chapter 1, in 1989 DOE's Office of Defense Programs also reviewed the defense laboratories' discretionary R&D programs, but this study also focused on procedures and program structure.

Because Los Alamos and Lawrence Livermore fund their discretionary R&D activities through assessments against DOE program funds and reimbursable work, an increase in the proportion of the funds used for discretionary R&D will result in a corresponding decrease in the proportion of the funds available for conducting other DOE R&D activities.[3] For this reason, we believe that an assessment of the benefits accruing to DOE's programs relative to the programmatic work that would be foregone is appropriate before any decision is made to increase the proportion of funds assessed for discretionary R&D. An assessment of the programmatic benefits of the laboratories' discretionary R&D activities could be accomplished by having DOE's program offices review the results of discretionary R&D activities relevant to their programs and provide feedback to the Assistant Secretary for Defense Programs or the Director of Energy Research.

DOE Had Not Informed a Congressional Subcommittee of the Full Extent of Discretionary R&D Expenditures

DOE has not consistently reported all discretionary R&D expenditures by its defense laboratories in response to specific inquiries by a House appropriations subcommittee. The Chairman, House Appropriations Subcommittee on Energy and Water Development, has annually asked DOE, since its FY 1986 appropriation hearings, to disclose what is in its budget for discretionary funding for the laboratory directors. The discretionary R&D funding level set by DOE for the laboratories is not explicitly identified in DOE's budget request because discretionary R&D is treated as an overhead expense by the laboratories and DOE. In addition, in its response DOE had consistently provided information on expenditures made only under the Exploratory R&D program. Expenditures

[3]As noted in ch. 1, Sandia's discretionary R&D activities are funded through an assessment against non-DOE reimbursable work.

through the Basic Research component of Los Alamos' overall discretionary R&D program, which included Exploratory R&D, have not been reported to the Subcommittee. As shown in table 2.1, these unreported expenditures totaled over $200 million during the period covered by the incomplete DOE responses.

Table 2.1: Exploratory Research and Development Allocations

Dollars in millions

National laboratory	1984	1985	1986	1987	1988	Total
			Reported to the Subcommittee			
Los Alamos	$15.1	$15.7	$17.6	$16.7	$17.9	**$83.0**
Lawrence Livermore	0.01	3.7	15.8	16.8	18.0	**$64.3**
Sandia	2.1	6.6	7.4	11.1	14.6	**$41.8**
			Not Reported to the Subcommittee			
Los Alamos	$31.9	$34.3	$37.0	$49.5	$47.9	**$200.6**

DOE officials offered a number of possible explanations for why this information was not given in response to the Chairman's inquiries, but could not provide a precise explanation. DOE officials speculated that the information on the Basic Research component of Los Alamos' program was omitted from DOE's responses in previous years as a result of the Assistant Secretary for Defense Programs' interpreting the question as referring only to the Exploratory R&D portion of laboratories' discretionary R&D funds. The basis for this speculation was that the question was first asked shortly after the implementation of the Exploratory R&D program. These officials further speculated that, in recent years, the people who prepared the information in response to the Chairman's questions were following the example set by their predecessors by not including information on the Basic Research component of Los Alamos' program. Further, on the basis of discussions with DOE Defense Programs and Albuquerque Operations Office officials, it appears that Los Alamos and DOE did not want to highlight the disparity between the size of Los Alamos' program and those of the other defense laboratories. The DOE office responsible for obtaining and assembling DOE's response to the Chairman's questions said that for the 1990 hearings, it included the Basic Research information for Los Alamos' discretionary R&D program in the form of a footnote in its original draft response to the Subcommittee. However, when we reviewed the 1990 hearing record, we could not locate the footnote, and DOE could not explain why the footnote was not included in the response to the Subcommittee except to speculate that it was dropped as a result of a clerical error.

During the FY 1991 appropriation hearings, DOE, in its response to the Chairman's questions, did provide information on the level of funding for the Basic Research component of Los Alamos' program. It also noted that its general policy on laboratory-directed R&D has not been implemented uniformly, citing the Basic Research component of Los Alamos' discretionary R&D program. DOE further informed the Chairman that (1) the Basic Research component of Los Alamos' program was not included in the Exploratory R&D program at its inception and (2) DOE's oversight of the Basic Research component of Los Alamos' program has not been adequate. DOE informed the Chairman that it has drafted a policy statement that will ensure uniform compliance with relevant DOE orders and set a uniform funding level for the discretionary R&D activities of the defense laboratories, including the Basic Research component of Los Alamos' program (see ch. 1).

DOE's response to the Chairman also indicates that DOE intends to increase the approved funding for the laboratories' Exploratory R&D activities from about $50.5 million in FY 1988 to $124.4 million in FY 1991. The projected 1991 funding includes $39.1 million for the Basic Research component of Los Alamos' program, which, according to the information it provided to its appropriations Subcommittee Chairman and GAO, DOE intends to incorporate into its Exploratory R&D program. This represents a 26 percent increase in the overall discretionary R&D budgets of the three laboratories between FYs 1988 and 1991, and 6.2 percent of Los Alamos', 1.5 percent of Sandia's, and 4.3 percent of Lawrence Livermore's projected FY 1991 operating budgets.

Conclusions

While there may be a need for DOE laboratory directors to carry out R&D at their own discretion, DOE has done little to assess the extent to which the discretionary R&D that has been carried out to date has been beneficial to the Department and the relative costs of the activity in terms of foregone programmatic work. In our view, such information is needed in order for DOE to determine the appropriate level of discretionary R&D to be carried out by the laboratories. We believe that, until it has conducted such an analysis, DOE lacks a firm basis for increasing the amount of discretionary R&D carried out by the laboratories.

We also saw no basis for Los Alamos' maintaining a discretionary R&D program with two components, one of which DOE and Los Alamos had determined falls outside of the scope of DOE Order 5000.1A. We encourage DOE to establish a funding level that will cover all of the discretionary R&D activities carried out by its laboratories, not just those

under the Exploratory R&D program. DOE also needs to ensure that information provided to the Congress on its discretionary R&D activities is complete and accurate. Information that DOE provided to the House Subcommittee as part of its FY 1991 appropriation submission indicates that the reporting problem is being corrected.

Finally, in our view, the Congress may wish to consider establishing a specific funding level for discretionary R&D activities. The legislative history of section 303 of Public Law 95-39 indicates the Congress' desire that funding levels for such activities be "very modest." However, because the legislative history is not totally clear, it cannot be determined whether the level of funding DOE has allowed Los Alamos to carry out, and which it plans to allow other laboratories to carry out in the future, exceeds or will exceed a "reasonable" level.

Recommendations to the Secretary of Energy

We recommend that the Secretary of Energy periodically assess the relative benefits and costs of past discretionary R&D activities. This could be done by including a requirement that the annual reports on discretionary R&D submitted by the laboratory directors be reviewed by the various DOE program offices in order that they may judge the value of past discretionary activities to their programs and provide feedback to the Assistant Secretary for Defense Programs. Further, this input by the program offices could be considered by the Assistant Secretary in recommending to the Secretary a discretionary R&D funding ceiling for each laboratory. We also recommend that the Secretary ensure that the funding level established for each laboratory cover all discretionary R&D carried out at the laboratory. As discussed in chapter 1, the proposed guidance on discretionary R&D developed by DOE, in its current form, would apply to all discretionary R&D activities carried out by the laboratories and, when implemented, satisfy this recommendation.

Matter for Consideration by the Congress

To ensure that expenditures under section 303 of Public Law 95-39 are not excessive, the Congress may want to consider clarifying the term "reasonable amount" by establishing a specific funding ceiling for DOE's discretionary R&D program.

DOE Guidance on Laboratories' Use of Discretionary R&D Funds Is Unclear

DOE has not developed clear criteria on how laboratories may use discretionary R&D funds. DOE Order 5000.1A contains criteria on appropriate and inappropriate uses of Exploratory R&D funds; however, some of the criteria are not clear and therefore are subject to a variety of interpretations. Further, DOE has provided no guidance that covers the Basic Research component of Los Alamos' discretionary R&D program. While the majority of the projects we reviewed appeared to be employee-suggested, some funds were used for activities that were questionable when examined against our reading of the criteria.

DOE Has Not Provided the Laboratories With Clear Guidance on the Use of Exploratory R&D Funds

DOE guidance contained in DOE Order 5000.1A is not clear enough to ensure that DOE laboratories use Exploratory R&D funds appropriately. While most of the projects we reviewed appear to be consistent with section 303 of Public Law 95-39 and Order 5000.1A, in some cases laboratories have spent funds on activities that appear inappropriate. However, we could not make a clear determination in most of these cases because of the vague language used in the order.

DOE Order 5000.1A provides criteria on how DOE laboratories may use Exploratory R&D funds. It contains a list of activities that are allowable and a list of activities that are prohibited. However, some of the criteria contained in the order are vague. Because of this, the laboratories have developed their own interpretations of the criteria in the order. DOE and laboratory officials agreed that some of the order's provisions are ambiguous. More specifically, we found that the three laboratories used Exploratory R&D funds to

- purchase capital equipment,
- substitute for or increase funding for projects funded from other sources,
- fund relatively large projects,
- initiate projects whose funding appeared to create a commitment to multiyear funding, and
- fund a project that did not appear to involve actual research.

Again, we could not make a firm determination as to the appropriateness of these uses of Exploratory R&D funds because of the vague language in DOE Order 5000.1A.

Laboratories Purchase Capital Equipment With Exploratory R&D Funds

Seven of the 24 Exploratory R&D projects we reviewed involved the purchase of capital equipment at some point over the life of the projects. DOE Order 5000.1A states that, "[e]xploratory R&D expenditures may not be used to . . . fund capital expenditures of a general purpose nature." However, the order does not define the term "general purpose." As a result, the three laboratories have interpreted the order as allowing the purchase of capital equipment so long as it is related to the Exploratory R&D project being funded. For example, according to Los Alamos' policies and procedures,

> ". . . purchase of general purpose equipment is allowable if that equipment is purchased for use by the [Exploratory R&D] project during the project's lifetime. It is not permitted to use funds from an ERD [Exploratory R&D] project to buy capital equipment for use by projects other than the ERD project, including general support activities on a Laboratory-wide basis."

The order, by using the undefined term "general purpose," is not clear as to the classes of equipment that can and cannot be purchased for Exploratory R&D projects. For example, one Sandia project required the purchase of a $25,000 computer for an Exploratory R&D project. A computer could have a variety of other applications after the completion of an Exploratory R&D project. It is not clear whether, under the DOE order, the computer should be considered "general purpose capital equipment."

Laboratories Use Exploratory R&D Funds to Substitute for or to Increase Other Funding

Thirteen of the 24 projects we reviewed received funding from at least one other source in addition to receiving Exploratory R&D funds. According to DOE Order 5000.1A, Exploratory R&D funds may not be used to "substitute for or increase funding for tasks normally funded by DOE or other users of the laboratory." The meaning of this criterion is not clear. One possible interpretation is that Exploratory R&D projects should not receive funding from other sources while receiving Exploratory R&D funds.

Two of the laboratories we reviewed developed significantly different interpretations of this criterion, both of which permit the funding of projects with Exploratory R&D and other funds. Lawrence Livermore interpreted the order as prohibiting the use of Exploratory R&D funds to resurrect a previously canceled program or project. Lawrence Livermore added Exploratory R&D funds to projects funded from other sources. Los Alamos, on the other hand, interpreted the order as allowing an Exploratory R&D-funded project to also receive funding from other sources, as

long as the Exploratory R&D tasks are separate and distinct from those funded from the other sources. Los Alamos further interpreted this provision of the order as prohibiting the use of Exploratory R&D funds to "augment" funding for tasks normally funded by others. Los Alamos' interpretation was that "[b]y augment, the order meant not to duplicate identical research tasks . . . ."

The 13 Exploratory R&D projects we reviewed that had received additional funding included a Los Alamos project that received both Department of Defense and Exploratory R&D funds in FYs 1985-89. The Los Alamos project manager submitted two proposals: one to the Department of Defense and another to the laboratory for Exploratory R&D funds. The double funding was appropriate, according to the Los Alamos project manager, because the tasks for each proposal were separate and distinct. Upon reviewing the proposals, however, we could find no clear distinction.

Additionally, two Lawrence Livermore projects could be inconsistent with the language of the DOE Order. One project began in 1982 and received DOE funds from several laboratory program divisions. In 1984, when the Exploratory R&D program began, Exploratory R&D funds were used to supplement the project's other DOE funds. Total project funds, in FYs 1982-88, were $9.6 million, $3.1 million of which was Exploratory R&D funds.

The other project began in fiscal year 1986 and, by the end of fiscal year 1988, had received funding of about $1.1 million, $400,000 of which was Exploratory R&D funds. Because the Exploratory R&D and DOE funds had been combined, Lawrence Livermore officials were unable to distinguish how the Exploratory R&D funds were spent.

Laboratories Used Exploratory R&D Funds for Projects That May Not Be "Relatively Small"

The DOE Order specifies that appropriate Exploratory R&D includes, but is not limited to, "relatively small projects." The criterion that funded projects should generally be "relatively small" was added to the order in 1986 to restrict the size of funded projects, according to a DOE review of Exploratory R&D at its research laboratories. Yet the order does not define, in dollars or other parameters, what constitutes a "relatively small project." On the basis of discussions with laboratory officials and a file review, we determined that the laboratories have not developed specific interpretations of this criterion.

The laboratories have funded projects ranging from $20,000 to $11.8 million. For purposes of illustration, we observed that 14 of the 24 Exploratory R&D projects we reviewed received funds in excess of $500,000 over the life of the project, and 9 received over $1 million in discretionary R&D funding. One of the five Los Alamos projects funded at over $500,000, for example, began in FY 1987 and, by the end of FY 1990, will have received a total of $3.3 million. One of the five Lawrence Livermore projects funded in excess of $500,000 began in FY 1984 and received a total of $3.9 million. One of the four Sandia projects was a 3-year project that began in FY 1986 and received a total of $1.3 million in Exploratory R&D funds. Laboratory officials pointed out that these projects are "relatively small" when looked at in the context of advanced R&D.

Laboratories Funded Multiyear Exploratory R&D Projects

The majority of the projects we reviewed received Exploratory R&D funding for at least 3 years, and many appeared to require multiyear funding to achieve the stated project objectives. DOE Order 5000.1A prohibits the use of Exploratory R&D funding to ". . . create an implicit commitment of multi-year funding by initiating projects which will require significant funding in future years to reach a useful stage of completion." However, this criterion is difficult to interpret because "useful stage of completion" and "significant funding" are not defined.

The criterion could be interpreted to mean that each project should result in some useful product after the first year of funding so that if future funding is unavailable, the resources committed to the project will not have been wasted. DOE officials told us that while the criterion could be read this way, they would not consider this interpretation reasonable because most projects require more than 1-year's funding to develop a product. The laboratories have generally interpreted it to mean that the project's progress should be reviewed prior to awarding each year's funding and a project should not be funded for more than 3 years. Laboratory officials told us that multiyear funding is generally necessary for these projects.

The Exploratory R&D projects we reviewed ranged in length from 20 days to 8 years; the majority of the projects received funding for 3 years or more. The funding of some of the projects appeared to create an implicit commitment to multiyear funding. For example, the proposal for one Los Alamos Exploratory R&D project stated that several years' funding would be necessary to achieve the project objectives. Similarly, a Lawrence Livermore Exploratory R&D project proposal noted that the

project would cost approximately $3.6 million and would take about 4 years to complete. A Sandia Exploratory R&D project proposal clearly indicated that the project would require funding for 3 years. According to the project proposal, the first 2 years were devoted to developing materials and conducting measurements. The project required funding for a third year to reach the point where it was ready for demonstration.

One Funded Project Did Not Appear to Involve Actual Research

One of the 24 Exploratory R&D funded projects we examined did not appear to involve actual research by the laboratory, as prescribed in DOE Order 5000.1A and section 303 of Public Law 95-39. DOE Order 5000.1A defines Exploratory R&D as the "early exploration and exploitation of creative and innovative scientific concepts developed in the course of the laboratory's normal technical work." This implies that these funds should be used for actual R&D work carried out by the laboratory. This provision is consistent with section 303 of Public Law 95-39, which authorized DOE to allow its laboratory directors to fund employee-suggested research projects.

One Lawrence Livermore project we reviewed, funded for $25,000, paid for membership in North Carolina State University's Precision Engineering Center and did not appear to involve actual research by the laboratory. According to Lawrence Livermore officials, the membership enabled the laboratory to gather and exchange information on new products and studies in precision engineering. These officials consider the membership an appropriate use of Exploratory R&D funds under their interpretation of the DOE order. In our view, this project does not fall within the definition of Exploratory R&D because it does not involve the "early exploration and exploitation of creative and innovative scientific concepts developed in the course of the laboratory's normal technical work."

DOE Has No Guidance Covering $48 Million in Annual Discretionary R&D Expenditures

DOE has not established any guidance covering the use of funds from the Basic Research component of Los Alamos' discretionary R&D program. This program accounted for about $48 million of Los Alamos' approximately $66 million in FY 1988 discretionary R&D expenditures. We found that Los Alamos used some funds for activities that did not involve actual research. Even more significantly, Los Alamos, with DOE's knowledge, has used over $2.6 million in Basic Research program funds between FYs 1984 and 1987 to cover uncollected costs for reimbursable work at the laboratory.

Order 5000.1A Does Not Apply to Basic Research

Both DOE and Los Alamos interpret Order 5000.1A as not applying to the Basic Research component of Los Alamos' discretionary R&D program. DOE has not issued any other formal guidance that describes how Basic Research funds are to be used. In 1982 Los Alamos did issue an internal policy memorandum covering the Basic Research component of its discretionary R&D program; the memorandum was revised in 1986 and again in 1989. These documents provide general guidance on appropriate uses of these funds and the process for selecting projects for funding. The 1982 guidance predates the creation of the Exploratory R&D program; the 1986 guidance covers Los Alamos' entire discretionary R&D program, including Basic Research, but makes no distinction between the two components; and, the 1989 revision does distinguish between the Exploratory R&D and Basic Research components of Los Alamos' discretionary R&D program. DOE's Office of Defense Programs has not officially adopted this guidance nor has it reviewed Basic Research projects to determine whether projects funded were allowable. In addition, the DOE IG's 1989 review of selected projects, including Basic Research projects carried out in FYs 1986 and 1987, found that Los Alamos used funds on many of the projects for purposes that were inconsistent with provisions of Order 5000.1A. DOE officials believe that the majority of the Basic Research projects currently being funded at the laboratory would meet a more reasonable interpretation of the criteria contained in DOE Order 5000.1A.

Basic Research Used for Questionable Activities

Los Alamos used funds for purposes that, in our view, are not consistent with section 303 of Public Law 95-39. In particular, we reviewed three projects in which Los Alamos used FY 1986 discretionary R&D Basic Research funds to cover costs it incurred for canceled reimbursable projects. Los Alamos also used Basic Research funds for activities that are not actual research.

The following three cases describe instances in which Basic Research funds were used to cover the costs of reimbursable projects that were canceled without DOE's receiving full payment for the work performed.

- Multiparameter Light Scattering Project. Mesa Diagnostics, a small private company, proposed and sponsored the reimbursable project. According to DOE, payment for work done at the DOE laboratories for nonfederal government and private organizations must be received by DOE before work begins. Los Alamos began work in 1985 after the company paid DOE for the first year's work. However, Los Alamos continued

the project beyond the first year, incurring expenses totaling $1.8 million, even though DOE had not received advance payment for the additional work. When DOE sought payment for these expenses, Mesa Diagnostics stated that it did not have the funds and could not continue the project. DOE subsequently settled this matter with Mesa Diagnostics, which agreed to pay DOE $300,000. Los Alamos charged the remaining $1.5 million in costs to a newly created Basic Research project.[1]

- Army Blast Over-pressure Project. Los Alamos also used Basic Research funds to pay unreimbursed expenditures for a terminated reimbursable project sponsored by the U.S. Army. The Army Blast Over-pressure Project was to develop a new standard for noise exposure for soldiers. The project was to place Army volunteers in a cement-lined shed, detonate small explosive devices surrounding the shed, and test the subjects' hearing. DOE's Under Secretary canceled the project because it was not within DOE's mission and would involve experimentation on human subjects. DOE allows its laboratories to conduct approved work for other federal agencies, with reimbursement subsequent to commencement of the work. The Army refused to pay the $1.1 million cost incurred by Los Alamos because the project was terminated. Los Alamos transferred the $1.1 million in expenses to a Basic Research project.
- Animal Biomedical Project. DOE cancelled another project in conjunction with the Army's Blast Over-pressure Project. The Animal Biomedical Project involved testing the effects of explosive shock waves on sheep. When the project was cancelled prior to its completion, the Army again refused to pay for the work done and Los Alamos used Basic Research funds to cover the costs incurred for the project.

Los Alamos created each of these projects with DOE's knowledge. Los Alamos and DOE Albuquerque Operations Office officials told us that charging these costs to the Basic Research component of Los Alamos' discretionary R&D program was appropriate because the research activities that resulted in the costs were mutually beneficial to the laboratory and the project sponsors. However, in our view, these projects are clearly outside the scope of section 303 of Public Law 95-39 because none of the projects involved employee-suggested R&D. Further, in both cases Los Alamos, with DOE's knowledge, circumvented the laboratory's procedures for selecting Basic Research projects. Laboratory officials agreed that the process leading to the decision to fund these projects did not comply with Los Alamos' internal policy guidance.

[1]The DOE Inspector General is reviewing DOE and Los Alamos actions on this project; its report is due later this year. GAO's Office of Special Investigations is also examining issues relating to this project.

Los Alamos also used Basic Research funds for activities that were not actual research. For example, funds were used for recruiting, secretarial support, and consultant fees. Additionally, Los Alamos designated a research and development center as a Basic Research project and used Basic Research funds to pay the center's entire fiscal year 1988 expenses of $1.7 million. Basic Research funds were also used to pay for a $36,000 engineering design for the center's office space. Los Alamos also funded, in part, another research and development center from Basic Research funds. Los Alamos used these funds to pay for facility maintenance costs, visitor expenses, workshops, and one-half of the administrative staff's salaries.

Los Alamos officials told us that these costs were allowable under the laboratory's policies, procedures, and guidance. They said that with regard to the use of Basic Research funds to pay for the administrative expenses of the R&D center, the center was established to manage and conduct a set of programs involving related science and technology. Further, like all division-level organizations in the laboratory, the administrative costs of the center are distributed equitably to the research programs carried out by the center. Because these costs were not for actual research, as specified in section 303 of Public Law 95-39, we question whether these costs can be paid from funds authorized specifically for conducting employee-suggested research.

Conclusions

DOE has not provided its laboratories with sufficiently clear guidance on discretionary R&D to ensure that the funds are spent on appropriate projects and activities. Some of the guidance that DOE has provided in DOE Order 5000.1A is unclear; as a result, criteria are subject to varying interpretations. Without clear guidance, neither the laboratories nor those responsible for oversight of their discretionary R&D activities will be able to accurately determine whether expenditures are appropriate. We found that the three laboratories have had to interpret some of the criteria themselves and have spent funds on activities that are questionable when examined against the DOE order.

Even more significantly, there is no DOE guidance for the Basic Research component of Los Alamos' discretionary R&D program. DOE has allowed Basic Research program funds to be used to cover some costs that are, in our view, inconsistent with section 303 of Public Law 95-39.

Recommendations to the Secretary of Energy

We recommend that the Secretary of Energy review and revise DOE Order 5000.1A to clarify guidance on the appropriate and inappropriate uses of Exploratory R&D funds. Areas requiring further definition and/or elaboration include

- the permissible conditions under which, and the general types of, capital equipment that can be purchased for use on Exploratory R&D projects;
- the appropriateness of funding Exploratory R&D projects jointly with related activities funded from different sources;
- the appropriate size of Exploratory R&D projects; and
- the appropriate duration of Exploratory R&D projects.

We also recommend that the Secretary establish guidance that applies to all discretionary R&D activities carried out by the laboratories, including the Basic Research component of Los Alamos' program, and establish controls to ensure that discretionary R&D funds are used only for employee-suggested R&D activities, as specified in section 303 of Public Law 95-39. As discussed in chapter 1, DOE has developed draft guidance that will address most of these recommendations, and we encourage the Secretary to review and implement this guidance with these recommendations in mind.

DOE Needs to Improve Controls Over Laboratories' Discretionary R&D Activities

DOE lacks effective controls over the administration and uses of laboratories' discretionary funds. The DOE management control weaknesses we observed include the following: (1) DOE headquarters did not conduct the annual oversight reviews required by DOE Order 5000.1A; (2) the Albuquerque Operations Office did not review the nature of Exploratory R&D projects as required by the DOE order; (3) DOE provided virtually no oversight of discretionary R&D activities carried out under the Basic Research component of Los Alamos' discretionary R&D program; (4) DOE did not identify and communicate provisions governing spending contained in authorization and appropriations acts to its field offices; and (5) DOE did not require that laboratories file project reports with its Office of Scientific and Technical Information. However, DOE has begun making improvements in its controls over discretionary funds.

Control Mechanisms Are Not Utilized or Do Not Exist

DOE has done little to review discretionary R&D projects carried out at the three laboratories we reviewed. DOE has not consistently implemented all of the control mechanisms contained in Order 5000.1A. In addition, DOE has no formal system of controls in place, comparable to a DOE order, to cover the Basic Research component of Los Alamos' discretionary R&D program.

Headquarters Review Mechanism Rarely Utilized

DOE's Office of the Assistant Secretary for Defense Programs, the office responsible for overseeing the utilization of Exploratory R&D funds at the three laboratories, has not regularly conducted the annual on-site reviews required by DOE Order 5000.1A. The order requires that the cognizant Secretarial Officer—the Assistant Secretary for Defense Programs—"Overview the utilization of [E]xploratory R&D by laboratory managements. . . ." According to DOE, these reviews for the three Defense Programs laboratories were intended to be the primary headquarters oversight mechanism.

However, DOE has conducted only two of these reviews at the three laboratories we reviewed since the DOE order creating its Exploratory R&D program was issued in December 1983. The first reviews were conducted on September 25 and 26 and October 10, 1984, at Sandia, Los Alamos, and Lawrence Livermore, respectively. The second reviews were conducted on October 21, 22, and 23, 1986, at Sandia, Los Alamos, and Lawrence Livermore, respectively.

Defense Program officials told us that the reviews have often been deferred because of other higher priority issues within the Office of

Defense Programs. They also cited management turnover within the Office as a major reason for not conducting the reviews required by the DOE order.

Little Oversight by the Albuquerque Operations Office

The DOE Albuquerque Operations Office has done little to oversee Exploratory R&D activities at Los Alamos and Sandia. This has been due, in part, to confusion over the delineation of oversight responsibilities between Defense Programs and Albuquerque.

DOE Order 5000.1A gives responsibility for reviewing the uses of Exploratory R&D funds to both the Assistant Secretary for Defense Programs and the DOE Operations Offices. The order requires that (1) the Assistant Secretary for Defense Programs, as discussed above, overview the utilization of Exploratory R&D by laboratory managements during the annual on-site review and (2) the manager of the responsible operations office review the nature of Exploratory R&D expenditures and report the findings to the Assistant Secretary for Defense Programs.

However, it appears that the DOE Albuquerque Operations Office's reviews of Exploratory R&D expenditures at Los Alamos and Sandia have, until recently, been limited to determining if Exploratory R&D expenditures at the laboratories exceeded the funding ceiling for such activities. The reviews concluded that the programs were being conducted in accordance with DOE Order 5000.1A, despite the apparent lack of project-specific review by the Albuquerque office of FYs 1986 and 1987 projects to determine whether they were consistent with criteria established in Order 5000.1A that govern the use of Exploratory R&D funds. DOE's San Francisco Operations Office has provided somewhat greater oversight of the discretionary R&D activities at Lawrence Livermore by reviewing a draft of the laboratory's annual report on its Exploratory R&D activities. Defense Programs officials do not feel that this has been an especially critical review and do not consider it to have been adequate.

The Albuquerque Operations Office official responsible for overseeing the discretionary R&D activities at Sandia and Los Alamos told us that the Office's review had been limited because of its view that it was responsible only for (1) ensuring that the laboratories' Exploratory R&D expenditures did not exceed the limit set by the Assistant Secretary for Defense Programs and (2) reporting the Office's findings to Defense Programs. In his view, Defense Programs was responsible for reviewing the

actual uses of the funds at the annual on-site review it is required to conduct at the laboratories.

The Albuquerque office has recently taken steps to improve its oversight of the uses of Exploratory R&D funds at Los Alamos and Sandia. Albuquerque required that Los Alamos submit a list of projects funded in FY 1988 along with a brief summary of each; it then selected and reviewed six projects for compliance with the criteria found in DOE Order 5000.1A. Albuquerque limited its review of Sandia's FY 1988 discretionary R&D activities to an informal discussion with Sandia officials. Operations office officials told us that they provided less stringent oversight at Sandia because the DOE IG did not find any problems at Sandia and more extensive oversight therefore is not warranted.

Defense Programs recognizes that oversight of these activities needs to be improved. Defense Programs officials told us that DOE will issue policies and procedures to clarify oversight responsibilities for these activities and stress their importance.

Little Oversight of the Basic Research Component of Los Alamos' Discretionary R&D Program

DOE lacks policies and procedures regarding oversight responsibilities for the Basic Research component of Los Alamos' discretionary R&D program. According to DOE and Los Alamos officials, the oversight requirements contained in DOE Order 5000.1A do not apply to this component of Los Alamos' program. However, as of September 1989, DOE has not issued any other guidance that sets forth oversight responsibilities for the Basic Research component.

As a result, there has been little DOE oversight of the activities conducted under the Basic Research component of Los Alamos' discretionary R&D program. The Albuquerque Operations Office official responsible for overseeing Exploratory R&D activities at Los Alamos told us that the Office is not responsible for overseeing, nor does it oversee, the discretionary R&D activities conducted within the Basic Research component of Los Alamos' program.

Defense Programs has also done little to oversee Basic Research. One Defense Programs official told us that DOE provides some oversight through the weapons program budget review as part of the DOE budget process, but he recognized that this oversight is not adequate. A Defense Programs official, formerly responsible for reviewing the defense laboratories' budget submissions, agreed that the budget review process provides minimal oversight and the primary headquarters review

mechanism is the annual on-site review. However, as discussed above, only two of these reviews have been conducted since 1984.

DOE Has Not Communicated Statutory Spending Provisions to the Laboratories

We found that at least one authorization and one appropriations act contain provisions governing assessments against the funds provided.[1] However, DOE lacks the controls needed to ensure that these provisions are considered when its laboratories make assessments against the appropriations to provide funding for discretionary R&D. The two acts we identified that contain the provisions governing spending are the Nuclear Waste Policy Act of 1982 and the Interior and Related Agencies Appropriation Acts.[2]

Nuclear Waste Policy Act

The Nuclear Waste Policy Act (P.L. 97-425) limits the use of funds from the Nuclear Waste Fund to non-generic R&D. The Nuclear Waste Fund is made up of fees paid to the Secretary of Energy by producers and owners of high-level nuclear waste. Section 302(d) of the act states that the Secretary may make expenditures from the waste fund "only for purposes of radioactive waste disposal activities under titles I and II, including . . . the conducting of nongeneric research, development, and demonstration activities under this Act." Title I of the act concerns the disposal and storage of radioactive waste; title II sets forth a program of research, development, and demonstration regarding disposal of radioactive waste.

The term "nongeneric" is not defined in the act, but our reading of the act leads to the conclusion that funded research, development, and demonstration activities should be limited to those directly related to the siting and development of licensed repositories for covered radioactive waste, and to the demonstration of handling, storage, and management of this waste at such sites. Our review of the legislative history of the act supports this conclusion. Accordingly, any assessments against the waste fund that are used for discretionary R&D must be used for projects directly related to the siting or development of licensed repositories for high level waste and spent fuel and related demonstration activities.

[1] As discussed in ch. 1, we did not attempt to review all of the appropriations acts that have provided funds used to carry out discretionary R&D activities.

[2] The restriction contained in the Interior and Related Agencies Appropriation Act first appeared in the 1983 act and has been repeated in each subsequent act through the FY 1990 Interior and Related Agencies Appropriation Act.

Neither DOE nor its laboratories have established any controls that reconcile the amount of discretionary R&D funds assessed from the Nuclear Waste Fund with the amount of funds used for discretionary R&D projects that are allowable under the Waste Act. As a result, DOE cannot be assured that it is in compliance with the act's requirements. During FY 1988 Los Alamos and Lawrence Livermore assessed approximately $946,000 and $355,000, respectively, from the waste fund for their discretionary R&D activities. In FY 1989 those amounts were about $1 million and $420,000, respectively.

Officials from DOE's Office of Civilian Radioactive Waste Management are aware of the laboratories' practice of assessing monies spent at the laboratories for their discretionary R&D activities. An official in DOE's Office of Civilian Radioactive Waste Management told us that the Office recognizes that assessing monies from the waste fund for discretionary R&D may be a violation of the act and referred the issue to the DOE IG about 2 years ago. According to this official, the IG in turn referred the issue to the DOE General Counsel, who has not yet determined whether the practice is permissible. She added that the Office of Civilian Radioactive Waste Management will take whatever action the General Counsel recommends.

The Lawrence Livermore official responsible for Exploratory R&D activities at the laboratory told us that he believes that the waste program is a net beneficiary of the Exploratory R&D program. This is because more waste-related work is conducted under the Exploratory R&D program, he believes, than the waste program contributes to the laboratory's Exploratory R&D program. He added, however, that the laboratory has not conducted the analysis necessary to prove it.

Interior and Related Agencies Appropriation Act

The Department of the Interior and Related Agencies Appropriation Act, which contains appropriations for DOE's fossil energy programs, has, since 1983, contained a general provision prohibiting the levying of any assessments against funds provided by the act without first notifying the Appropriations Committees. Specifically, section 309 of the FY 1988 act states that, "No assessments may be levied against any program, budget activity, subactivity, or project funded by this Act unless such

assessments and the basis therefore are presented to the Committees on Appropriations and are approved by such committees."[3]

Lawrence Livermore and Los Alamos both assessed funds provided under the act without DOE's having notified the Committees. For FY 1988 DOE fossil energy programs contributed approximately $103,000 to Lawrence Livermore's Exploratory R&D program and $97,000 to Los Alamos' overall discretionary R&D program. For FY 1989 these amounts were about $104,000 and $108,000, respectively.

The Deputy Director of DOE's budget office told us that DOE has no specific policies and procedures for reviewing authorization and appropriation act language. Further, he believes that communicating information on special provisions is the responsibility of the headquarters offices that fund the laboratories' programs. The Director of the budget office within DOE's Office of Fossil Energy told us that he believes that it is his Office's responsibility to review appropriations and authorization act language for these types of restrictions, but the Office does not pay very much attention to the general provisions sections as they rarely change from year to year. He was not aware of the general provision in the Interior and Related Agencies Appropriations Acts that prohibits assessing funds provided by the acts without notification to and prior approval from the Appropriations Committees.

Officials at the San Francisco and Albuquerque Operations Offices told us that DOE's Office of Budget is responsible for identifying these limitations or requirements because they apply across the agency.

DOE Guidance Does Not Incorporate All Pertinent Requirements of Public Law 95-39

DOE Order 5000.1A does not incorporate the requirement contained in section 303 of Public Law 95-39 that project reports be filed with DOE's Scientific and Technical Information Center (renamed the Office of Scientific and Technical Information) in Oak Ridge, Tennessee, at the completion of each project. As a result, two of the three laboratories we reviewed are not complying with this requirement.

According to the National Science Board, disseminating the results of basic scientific research, whether successful or not, is important if that research is to be of value to other researchers. An official at DOE's Office

[3]This legislative prior approval provision appears to violate the so-called Chadha decision, I.N.S. v. Chadha, 462 U.S. 919 (1983), which held that a one-House congressional veto is unconstitutional. The constitutionality of this provision has not been judicially challenged, however, and a discussion of this issue—and how it might be resolved by the courts—is beyond the scope of this report.

of Scientific and Technical Information reiterated this point: By maintaining research results at a central location, DOE hopes to minimize the potential for duplicative research and maximize the usefulness of the results of R&D conducted by its contractors. Thus, submitting Exploratory R&D project reports could prevent duplication of efforts and wasted costs.

Sandia and Los Alamos do not routinely submit required project reports at the completion of each project to DOE's Office of Scientific and Technical Information. Sandia and Los Alamos officials said they are required to submit only an annual report to DOE's Albuquerque Operations Office. The annual reports include project summaries that state the general project objectives, but these summaries are generally no longer than one paragraph and do not include detailed project information.

Lawrence Livermore, on the other hand, prepares a detailed annual report that is widely distributed, including submission to DOE's Office of Scientific and Technical Information.

Conclusions

DOE has not carried out the oversight of discretionary R&D activities that is needed for assurance that laboratories are spending funds appropriately. DOE has not carried out key responsibilities contained in Order 5000.1A for overseeing Exploratory R&D funds. Further, it has established no requirements for overseeing Los Alamos' Basic Research activities, and its review of these activities has been minimal. DOE also lacks controls needed to ensure that it is complying with applicable provisions contained in authorization and appropriations acts and that laboratories send project reports to the DOE Office of Scientific and Technical Information, as required by section 303 of Public Law 95-39.

DOE has acknowledged that better oversight is needed and has begun making improvements in some of these areas. We note that DOE Order 5000.1A contained oversight requirements that, if they had been effectively implemented, could have obviated some of these oversight concerns.

Recommendations to the Secretary of Energy

We recommend that the Secretary of Energy direct the Assistant Secretary for Defense Programs and the Director, Office of Energy Research, to

- carry out the on-site reviews, or other headquarters oversight reviews, required in DOE Order 5000.1A, or any superseding guidance;
- expand the oversight provisions of Order 5000.1A, or any superseding guidance, to cover all discretionary R&D activities, including the Basic Research component of Los Alamos' discretionary R&D program;
- incorporate into Order 5000.1A, or any superseding guidance, the requirement contained in Public Law 95-39 that project reports be submitted to DOE's Office of Scientific and Technical Information at the completion of each project; and
- clarify with operations office managers how oversight responsibilities listed in Order 5000.1A, or any superseding guidance, will be conducted so as to ensure that all requirements contained in the guidance are carried out.

As discussed in chapter 1, DOE is aware of the control weakness discussed in this chapter and has informed us that it intends to issue revised guidance that we believe will, if effectively implemented, address most of these recommendations.

We further recommend that the Secretary direct the Director, Office of Budget, to establish the necessary controls to ensure that DOE laboratories' assessment of funds for discretionary R&D complies with applicable provisions in appropriation and authorization acts.

Major Contributors to This Report

Resources, Community, and Economic Development Division, Washington, D.C.

Judy A. England-Joseph, Associate Director, Energy Issues
Richard A. Hale, Assistant Director
Jonathan N. Kusmik, Evaluator-in-Charge
Rebecca L. Johnson, Staff Evaluator
Molly MacLeod, Reports Analyst

Office of the General Counsel

Susan W. Irwin, Attorney Advisor

Denver Regional Office

Peter Fernandez, Regional Management Representative
Edward Sanchez, Regional Assignment Manager
Charles Trujillo, Staff Evaluator
Jocelyn R. Duran, Staff Evaluator

Ordering Information

The first five copies of each GAO report are free. Additional copies are $2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20877

Orders may also be placed by calling (202) 275-6241.

United States
General Accounting Office
Washington, D.C. 20548

Official Business
Penalty for Private Use $300

First-Class Mail
Postage & Fees Paid
GAO
Permit No. G100