

U.S. DEPARTMENT OF ENERGY
OFFICE OF INSPECTOR GENERAL

AUDIT OF MANAGEMENT OF THE
LABORATORY DIRECTED RESEARCH AND DEVELOPMENT PROGRAM
AT THE LAWRENCE LIVERMORE NATIONAL LABORATORY

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OFFICE OF AUDIT SERVICES

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Audit Report Number: CR-B-98-02

SUMMARY

The Department's national laboratories, since their establishment, have been permitted to conduct a limited amount of discretionary research activities. The Department's Defense Program laboratories, such as the Lawrence Livermore National Laboratory, generate funding for Laboratory Directed Research and Development (LDRD) programs by charging their total laboratory operating and capital equipment budgets a flat surcharge of up to 6 percent. The ceiling was mandated by the Congress in authorization legislation.

This audit was performed to determine whether the LDRD program at Lawrence Livermore was managed in accordance with applicable laws and regulations. Audit work was conducted at the Department's Headquarters and at Lawrence Livermore. Discussions were also held with representatives of the Oakland Operations Office.

Department and Lawrence Livermore systems to select and manage LDRD projects were in general compliance with requirements specified in Departmental Orders. However, actions taken in Fiscal Years 1996 and 1997 by the Department and the management and operating contractor had the effect of increasing the \$50 million annual level of discretionary research work conducted at Lawrence Livermore by an equivalent of \$19 million. This increased level of discretionary research was primarily obtained at the expense of Department directed research.

Several factors contributed to the increased level of discretionary research. The Department directed that its laboratories not charge general and administrative expenses to Fiscal Year 1997 LDRD projects. In addition, the Department entered into a contractual arrangement with the operating contractor that allowed University of California laboratories to implement a supplementary discretionary research program, and legislation was enacted that permitted the Laboratory to use a portion of license and royalty fees for discretionary research. The Department of Energy also permitted intra-Departmental requisition projects to be assessed for LDRD activities by both the sending and receiving laboratory.

PART I

APPROACH AND OVERVIEW

INTRODUCTION

An audit of the Laboratory Directed Research and Development (LDRD) program at the Lawrence Livermore National Laboratory was conducted to determine whether it was managed in accordance with applicable laws and regulations. It included reviews of program funding, project selection, and Departmental and contractor administration of the program.

Fieldwork was conducted during May and June 1996 and February and March 1997 at the Department of Energy Headquarters in Washington, DC and the Lawrence Livermore National Laboratory in Livermore, California. The audit covered LDRD activities in Fiscal Years 1995, 1996, and 1997. Headquarters, Oakland Operations Office, and Lawrence Livermore officials were interviewed to obtain an understanding of policies, procedures, and reports relating to the LDRD program. We examined a judgmentally selected sample of Lawrence Livermore projects and held discussions with principal investigators to determine compliance with Departmental policies and procedures. Financial reports were also analyzed to determine their accuracy and laboratory compliance with funding limitations.

The audit was conducted in accordance with generally accepted Government auditing standards for economy and efficiency audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the objectives of the audit. Since we placed only limited reliance on computer-generated data during the audit, we did not test the reliability of such data. Our review would not necessarily have disclosed all internal control weaknesses that may exist. An exit conference was held with Defense Programs' officials on November 5, 1997.

BACKGROUND

It is common practice in private or commercial research and development sectors to permit laboratories to undertake discretionary research. Basically, it is thought that discretionary research gives scientists the opportunity to use their imagination and inventiveness to tackle challenges that would be considered too risky or too far outside the mainstream of the laboratory's basic mission.

The Department's national laboratories, since their establishment, have been permitted to conduct a limited amount of discretionary research activities. These activities have been referred to under various names over the years: special studies, exploratory studies, discretionary research and development, seed money, program development research, exploratory research and development, and currently LDRD. The objectives of the LDRD program are to (1) maintain scientific and technical vitality of the laboratories, (2) enhance the laboratories' ability to address future Departmental missions, (3) foster creativity and stimulate exploration of forefront science

and technology, (4) serve as a proving ground for new research, and (5) support high-risk, potentially high-value research and development. The amount and nature of these discretionary activities varied with time and among the various laboratories.

Throughout the 1960s, 1970s, and early 1980s, discretionary research activities were largely informal in nature. Then, in 1983, the Department formally established procedures that permitted laboratory directors to use specific portions of their operating budgets to fund discretionary research and development projects. This action paralleled the recommendations of a national panel in the early 1980s that supported discretionary research at Federal laboratories with appropriate Departmental involvement.

The Office of Inspector General and the General Accounting Office have conducted several audits on contractor discretionary research and development activities. These audits identified deficiencies in both laboratory and Departmental management of these activities. The audit results are more fully described in Appendix B. A recurring issue was that Departmental laboratories exceeded authorized funding levels. In response to the concerns raised, the Department issued Order 5000.4 in 1991, which strengthened procedures and the Exploratory Research and Development program was renamed as the LDRD program. Further, the National Defense Authorization Act for Fiscal Year 1991 provided a statutory definition for LDRD as "research and development work of a creative and innovative nature which, under the regulations, ... is selected by the director of a laboratory for the purpose of maintaining the vitality of the laboratory in defense-related scientific disciplines." In April 1992, additional refinements of LDRD requirements were incorporated in Department Order 5000.4A, which was replaced by Department Order 413.2 in March 1997.

The Department's Defense Programs' laboratories generate funding for LDRD programs by charging their total laboratory operating and capital equipment budgets a flat surcharge of up to 6 percent. This ceiling was mandated by the Congress in authorization legislation. The actual rate is reviewed annually by the Department, and the surcharge has varied among its laboratories (e.g., in Fiscal Year 1996, the Department permitted Defense Programs' laboratories to charge up to 6 percent, while the Energy Research laboratories were permitted to use between 2 and 3.5 percent of their annual budgets for LDRD). Annual funding of Livermore's LDRD program is estimated to total approximately \$50 million in Fiscal Years 1996 and 1997.

PART II
RESULTS OF AUDIT

DETAILS OF FINDING

The audit indicated that the Department and Lawrence Livermore systems to select and manage LDRD projects were in general compliance with requirements specified in Departmental Orders 5000.4A and 413.2. However, actions taken by the Department and the contractor had the effect of increasing the amount of discretionary research work conducted at Lawrence Livermore by approximately \$19 million. This increased level of discretionary research was primarily obtained at the expense of Department directed program research.

We identified several factors for the increased level of discretionary research. For Fiscal Year 1997, the Department changed its practice and directed that Livermore not charge general and administrative expenses to LDRD projects. In addition, the Department entered into a contractual arrangement with the operating contractor that allowed University of California laboratories to implement a supplementary discretionary research program, and legislation was enacted that permitted the Laboratory to use a portion of license and royalty fees for discretionary research. The Department of Energy also permitted intra-Departmental requisition projects to be assessed for LDRD activities by both the sending and receiving laboratory. This, in effect, doubled the LDRD assessment on these efforts.

The following sections describe how each of these independent actions collectively increased funding for discretionary research at the Lawrence Livermore National Laboratory.

General and Administrative Expenses

Contractor general and administrative expenses are no longer charged to the LDRD program. In March 1996, the Department issued guidance directing that the national laboratories cease charging general and administrative expenses to LDRD projects. The memorandum to field elements stated that the objective was to standardize the accounting for general and administrative expenses on LDRD projects throughout the Department's laboratories. In Fiscal Year 1996, the application of general and administrative expenses to Lawrence Livermore's \$50.4 million LDRD funding level absorbed about \$14.6 million of the funding available for discretionary research projects. Lawrence Livermore charged general and administrative expenses to LDRD projects through Fiscal Year 1996. In contrast, based upon March 1996 Departmental guidance, the elimination of the application of general and administrative expenses to LDRD in Fiscal Year 1997 increased the amount of discretionary research work conducted at Lawrence Livermore by about 30 percent, or \$15 million. As a result of the policy change, Department directed program research work will now have to absorb the general and administrative expenses once charged to Lawrence Livermore's LDRD program.

Performance Fee

Lawrence Livermore also received a \$4 million allocation from the University of California in Fiscal Year 1996 for the purpose of funding an additional discretionary research and development program not included under the LDRD program. This \$4 million was provided to the University of California as a performance fee for the operation of the laboratory. The Lawrence Livermore contract stated that the University may use a portion of its fee to conduct University directed research and development. According to Lawrence Livermore's financial policies and procedures, the University of California funded program was defined as "Research and Development projects selected by the Laboratory Director or designee, and funded by the University of California under [the DOE contract]." The Departmental contract with the University stated that this research "does not require DOE approval, however, it shall be performed on a non-interference basis with any DOE directed and funded work of the Laboratory, within the general scope of work and in accordance with the terms of [the] contract." The contract further limited the funding level for this discretionary research to the performance fee.

Discussions with Headquarters and Lawrence Livermore officials indicated that they do not believe that the University of California funded program should be included under Lawrence Livermore's LDRD program nor be included under the 6 percent funding ceiling. Consistent with this perspective, the Department replaced its Order 5000.4A on LDRD with Order 413.2 in March 1997. It now excludes contractually-agreed-to-discretionary research from the LDRD program.

Licensing and Royalty Income

In addition, Lawrence Livermore was eligible to receive discretionary research funding through its licensing program. During Fiscal Year 1996, LDRD projects generated 15 licenses and approximately \$1 million in licensing and royalty fees. Lawrence Livermore projected that 37 percent of this income, or \$370,000, would be used for discretionary research and development on the laboratory's mission and objectives and for education and training. Of the remaining fees, the inventors would receive 35 percent, 16 percent would cover patenting and licensing costs, and the remaining 12 percent would cover technology transfer facilitation. The distribution was consistent with recent legislation relating to funds generated as a result of licensing arrangements between Federal laboratories and the commercial sector.

At Lawrence Livermore, the University of California automatically retains title for inventions other than for weapons-related or exceptional circumstance inventions. In these cases, before licensing can take place, title to the subject inventions must be waived from the Department to the Regents of the University of California, who then hold title under the terms of the contract with the Department. The University of California granted authority to Lawrence Livermore's Director to determine the disposition of any licensing and royalty income remaining after the author's/inventor's share and patent and licensing costs. Under this authority, Lawrence Livermore's Director determined that royalty income remaining was to be distributed to the respective originating directorate of each license on an annual basis. First consideration for use of

these funds is given to fund scientific research and development, education, and other activities that increase the licensing potential for transfer of laboratory technologies to industry. The level of funding from licensing and royalty income is expected to increase substantially in the future.

Intra-Departmental Requisitions

Lawrence Livermore assessed a 6 percent LDRD surcharge on intra-Departmental requisition orders from other Department laboratories. These laboratories, however, had already assessed an LDRD surcharge prior to transferring the work to Livermore. This duplicate assessment provided Lawrence Livermore with \$566,000 in discretionary research funds for Fiscal Year 1996. While the duplicate application of the LDRD surcharge on such orders was not in violation of Departmental Order 413.2, it resulted in making less funds available for Department directed program research.

Laboratory and Departmental officials informed us that the Department's accounting system does not preclude duplicate surcharges on intra-Departmental requisition transactions. A Livermore official stated that the Department would be required to make an accounting change to prevent the dual assessment. An official in the Office of Chief Financial Officer at Headquarters indicated that this issue had surfaced as a potential problem.

CONCLUSION

A combination of actions taken by the Department and the management and operating contractor at Livermore, coupled with statutory changes, have resulted in increases in the amount of discretionary research conducted by Lawrence Livermore. Based on Fiscal Year 1996 and 1997 figures, we estimate that the changes had the effect of increasing the \$50 million annual level of discretionary work by 38 percent, or \$19 million.

We recognize that the concept of laboratory directed research is accepted in the commercial sector and the importance of LDRD activities at Lawrence Livermore, where many productive scientific research efforts have resulted. However, unless there is a corresponding augmentation in the overall funding for the laboratory, as the amount of discretionary research increases, there will be a parallel reduction in the resources available for traditional Department directed activities.

RECOMMENDATION

The Department is required to annually evaluate the level of funding provided for LDRD activities. Consistent with this requirement and as a part of the annual budget process, we recommend that the Assistant Secretary for Defense Programs analyze the impact of all the actions discussed in this report and determine if the level of discretionary research at Lawrence Livermore, as well as other Defense Programs' laboratories, is appropriate and permits the Department to accomplish its congressionally-mandated mission.

PART III

MANAGEMENT AND AUDITOR COMMENTS

The Office of Defense Programs provided comments and concurred with the audit recommendation. Defense Programs, however, did not consider itself to be directly responsible for the four issue areas presented in the report. Additionally, Defense Programs did not provide an action plan detailing how it would implement the recommendation.

As part of its response to the initial and official draft reports, Defense Programs provided information (included in Appendix A) that, from its perspective, clarified the issues discussed in the report. Specific management and auditor comments follow.

Management Comment. The Office of Defense Programs stated that neither University of California Directed Research and Development (UCDRD) program funds nor royalty and licensing income can be considered to add to the LDRD funds. Neither is provided by the Department, and each has a specified purpose separate from LDRD. Further, the Controller's guidance not to charge general and administrative expenses on LDRD is consistent with relevant statutes. With regard to the latter issue, the Office of Defense Programs stated that effective October 1, 1997, it ended the LDRD duplicate surcharge on funds transferred between its laboratories.

Auditor Comment. The audit report does not question Departmental or contractor compliance with the law or regulations. Instead, it underscores the fact that the level of discretionary research has increased significantly at the Lawrence Livermore National Laboratory. The report also indicates that the original source of funding for these additional discretionary research efforts is the Department of Energy. In addition, this increased level of discretionary research was primarily obtained at the expense of Department directed research. For example, the decision to no longer charge general and administrative expenses to the LDRD program will require that Department directed research activities absorb about \$15 million of these expenses. Accordingly, the audit concluded that all discretionary research activities should be taken into consideration in determining the level of LDRD funding provided to the laboratory.

PART IV

APPENDICES

Information Provided By The Office Of Defense Programs

The Office of Defense Programs provided the following information on the four issue areas discussed in the audit report.

I. General and Administrative Expenses

The Controller's March 1996 memorandum provided Departmental policy on the treatment of general and administrative expenses for Laboratory Directed Research and Development (LDRD) costs. The guidance was issued without the intent to avoid charging general and administrative expenses to LDRD projects. Rather, the intent of this guidance was to ensure consistency of the accounting practices of the Defense Programs' laboratories with other Departmental laboratories, which treated LDRD as a general and administrative type expense.

Further, while the Cost Accounting Standards (CAS) that the management and operating contractors are required to follow do not specifically apply to the accounting for LDRD projects, there are similarities between LDRD projects and independent research and development activities discussed in CAS 420. Under CAS 420, independent research and development projects are not final cost objectives but are considered to be support activities. Since independent research and development activities are of general benefit to a company, they are considered similar to general and administrative expenses and therefore do not receive a general and administrative expense allocation. In developing the Department's policy, the Controller determined that the similarities to independent research and development would dictate comparable treatment for LDRD across the complex. The policy, with respect to general and administrative expenses, is not a site-specific issue, nor is it specific to the Office of Defense Programs.

The Controller's guidance included the following statement: "Please be advised this guidance in no way modifies the establishment of funding for LDRD programs, which remains under the authority of the designated, responsible cognizant Secretarial Officer." The Office of Defense Programs, well aware of the Controller's guidance not to charge general and administrative expenses on LDRD, concurred with the Controller's memorandum.

As a result of the Controller's guidance, Defense Programs' laboratories still have no more than 6 percent of operating and capital expenses available as LDRD funds as allowed by law (section 3132 of the National Defense Authorization Act for Fiscal Year 1991, Pub. L. No. 101-510, hereafter, "law") and DOE Order 413.2.

II. Performance Fees

The University of California Directed Research and Development (UCDRD) program is supported with University of California funds (not Departmental funds), which are part of its performance management fee under its management and operating contract with DOE as modified May 30, 1995. Article V of the contract with the University of California also provides that "the parties agree that the University has the absolute right to expend the payment received under this clause at its sole discretion." UCDRD funds are not Departmental funds; they cannot be rightly construed as a supplement to LDRD funds and do not contribute to the total discretionary research category that is limited to 6 percent by law and DOE Order 413.2.

LDRD funds and UCDRD funds are clearly distinguished based on ownership. An additional distinction is apparent in the restrictions placed on the use of the UCDRD funds by the University of California, Office of the President. Those restrictions are contained in guidelines intended to enhance collaborations between Lawrence Livermore and the University of California campuses. Particularly encouraged is collaborative research with University of California personnel in joint projects, exchange of research personnel, and research that will enhance the long-term growth and health of the campuses and the laboratory. The University of California, Office of the President, determines the annual funding for Lawrence Livermore's UCDRD.

III. Licensing and Royalty Income

The disposition of the income by the University of California is prescribed by the terms and conditions of the management and operating contract with the Department, consistent with the Bayh-Dole Act, which was enacted in 1980 and the Stevenson-Wydler Technology Innovation Act of 1980, as amended in 1989. The treatment of the income is unrelated to whether it was derived from an invention made under the LDRD program.

Use of Royalties

The clause included by DOE in 1992 in its management and operating contract with University of California regarding disposition of income from royalties or related income requires an annual plan be provided for the use of royalties and related income from technology transfer activities. In addition, a separate accounting at the end of the year as to how the funds were actually used is to be provided. Anticipating that questions about the relationship of royalties or related income to other funds might be raised, as early as 1990, a standard clause was developed: "Under no circumstances shall these royalties and income be used for an illegal augmentation of funds

furnished by the U.S. Government." This clause is also inserted into the DOE contract with the of licensing and royalty is not a site-specific issue, nor is it specific to the Office of Defense Programs.

IV. Intra-Departmental Requisitions

The draft report correctly states that the application of a duplicate LDRD surcharge on funds transferred between two Departmental laboratories "is not in violation of Departmental Order 413.2." [p.7, par.]. Defense Programs, in cooperation with the Office of Chief Financial Officer, however, will evaluate the Department's policy in light of the duplicate surcharges identified in the report.

Auditor's Note: Defense Programs, in response to the Official Draft Report, indicated that it had completed the phase-out of the duplicative surcharge practice on October 1, 1997.

Prior Audit Reports Regarding Laboratory and Department
Management of Exploratory Research and Development

Exploratory Research and Development Funds at Los Alamos National Laboratory

U.S. Department of Energy, Office of Inspector General, DOE/IG-0267, May 17, 1989

The Department limited LANL's discretionary spending of operating funds. In Fiscal Years 1986 and 1987, the Department authorized LANL to spend two percent (\$33.7 million) of its operating funds for research meeting the Exploratory Research and Development (ER&D) program requirements. LANL actually spent \$131.4 million, or about seven percent of its operating funds, for discretionary purposes. This included at least \$25.9 million which was not spent for research. While the Department was aware of LANL's discretionary spending practices, it did not take effective action to require LANL to comply with the limitations and requirements of the ER&D program. As a result, LANL spent \$97.7 million for discretionary projects that were not authorized by the Department.

Exploratory Research and Development Program at Argonne National Laboratory

U. S. Department of Energy, Office of Inspector General, ER-0-89-07, June 6, 1989

The Argonne National Laboratory used overhead funds during the 3-year audit period for: (1) \$7.2 million in research that did not meet the DOE Order 5000.1A definition of ER&D, (2) ER&D that exceeded the authorized funding level by \$2.5 million, and (3) ER&D expenditures that were not authorized or reported to DOE.

Discretionary R&D Funds

General Accounting Office (GAO), RCED-91-18, December 5, 1990

Department of Energy controls were weak over the administration and use of discretionary R&D funds at the Lawrence Livermore, Sandia, and Los Alamos National Laboratories. DOE had not effectively implemented the control mechanisms contained in DOE Order 5000.1A. Further, DOE had not formally reviewed, nor set a funding ceiling applicable to, the Basic Research component of Los Alamos' Discretionary R&D program and had no formal systems of controls in place covering Basic Research. GAO recommended that the Secretary of Energy (1) periodically assess the benefits of 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 ER&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.

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