

DOE/IG-0520

**AUDIT  
REPORT**

**PEER-REVIEWED SCIENTIFIC  
LITERATURE GENERATED AT THE  
DEPARTMENT'S LIGHT SOURCES**



AUGUST 2001

**U.S. DEPARTMENT OF ENERGY  
OFFICE OF INSPECTOR GENERAL  
OFFICE OF AUDIT SERVICES**



U. S. DEPARTMENT OF ENERGY  
Washington, DC 20585

August 31, 2001

MEMORANDUM FOR THE SECRETARY

FROM: Gregory H. Friedman (Signed)  
Inspector General

SUBJECT: INFORMATION: Audit Report on "Peer-Reviewed Scientific Literature Generated at the Department's Light Sources"

BACKGROUND

The Department of Energy (Department) operates four light source facilities which are used to conduct experiments in disciplines such as chemistry, biology, and physics. In Fiscal Year (FY) 2000, the light sources, located at Argonne National Laboratory, Brookhaven National Laboratory, Lawrence Berkeley National Laboratory, and the Stanford Linear Accelerator Center, received \$172 million in funding and served over 5,000 users. Research performed at the light sources resulted in the publication of over 540 peer-reviewed scientific journal articles in FY 2000.

For Department-sponsored research performed at these facilities, the Department's Office of Scientific and Technical Information (OSTI) is responsible for collecting and preserving the resulting scientific and technical information and, most importantly, making the information readily available to the public and to the general science community. To accomplish its mission, OSTI established agreements with 35 publishers to receive abstracts of articles relevant to the Department's scientific community, as well as information that was developed as the result of Government-sponsored research. When received from the publishers, OSTI enters these abstracts into a database entitled *PubSCIENCE*. Researchers throughout the scientific community can access this database to search for peer-reviewed journal articles in the physical sciences and other energy-related disciplines.

The objective of this audit was to determine if abstracts of peer-reviewed scientific journal articles generated from work performed at the Department's light sources were available for public dissemination through OSTI.

## RESULTS OF AUDIT

Only 44 percent of the abstracts associated with the research performed at the Department's light source laboratories in FY 2000 was available for public dissemination through OSTI. The audit disclosed that the abstracts were not available because the Department had not established adequate procedures to ensure that peer-reviewed journal literature for research performed at the light sources was collected in OSTI's *PubSCIENCE* database. Specifically, we found that the laboratories, although required to do so, did not notify OSTI of available peer-reviewed journal articles. Thus, OSTI lacked a comprehensive listing of relevant journal articles that would have served as a baseline to confirm the accuracy and completeness of the *PubSCIENCE* database. Secondly, even if the requisite information had been provided by the laboratories, OSTI had no systematic methodology for reconciling research articles which it had reason to anticipate would be in *PubSCIENCE* and those which were actually included in the database. It is difficult to determine the precise impact of the lack of a complete record in *PubSCIENCE*. However, based on the Department's objectives for the OSTI program, it is clear that researchers may not have had full and ready access to valuable government-sponsored research information and that scientific advancement was not fully promoted.

## MANAGEMENT REACTION

Management concurred with the finding and the recommendations included in the report and agreed to initiate corrective actions.

Attachment

cc: Deputy Secretary  
Under Secretary for Energy, Science and Environment  
Acting Director, Office of Science

# PEER-REVIEWED SCIENTIFIC LITERATURE GENERATED AT THE DEPARTMENT'S LIGHT SOURCES

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## TABLE OF CONTENTS

### **Overview**

Introduction and Objective.....	1
Conclusions and Observations.....	2

### **Abstracts Missing from Database**

Details of Finding.....	3
Recommendations and Comments .....	4

### **Appendix**

Scope and Methodology.....	6
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# OVERVIEW

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## INTRODUCTION AND OBJECTIVE

The Department of Energy (Department) operates four light sources that are national user facilities which provide varying intensities of light and are used to conduct experiments in disciplines such as chemistry, biology, and physics. The light sources are located at Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), Lawrence Berkeley National Laboratory (LBNL), and the Stanford Linear Accelerator Center (SLAC). The light sources received \$172 million in funding and served over 5,000 users in Fiscal Year (FY) 2000. Research performed at the light sources resulted in the publication of over 540 peer-reviewed scientific journal articles in FY 2000.

The Department's Office of Scientific and Technical Information (OSTI) is responsible for collecting, preserving, and making scientific and technical information resulting from Department-sponsored research available to the public. To accomplish the collection, preservation, and dissemination of information contained in peer-reviewed scientific journals, OSTI establishes agreements with publishers (35 at the time of our audit) to receive abstracts of articles relevant to the Department's scientific community, as well as information that was developed as the result of Government-sponsored research. When received from the publishers, these abstracts are entered into a database entitled *PubSCIENCE*. The database is a World Wide Web service for searching and accessing peer-reviewed journal articles in the physical sciences and other energy-related disciplines. Prior to establishing agreements with publishers, OSTI utilized abstracting and indexing contractors to obtain this information. However, this method was discontinued due to funding cuts.

In June 1997, the Office of Inspector General (OIG) issued Report DOE/IG-0407, *Audit of the Department of Energy's Scientific and Technical Information Process*. The audit determined that the Department had not implemented effective mechanisms to identify, collect, and disseminate scientific and technical information because expected deliverables had not been identified at the beginning of research projects. Currently, an OIG audit is being performed at the Environmental Molecular Sciences Laboratory to evaluate whether all scientific and technical information is being identified and reported by the Department's contractor.

The objective of this audit was to determine if abstracts of peer-reviewed scientific journal articles generated from work performed at the Department's light sources were available for public dissemination through OSTI.

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**CONCLUSIONS AND  
OBSERVATIONS**

Only 44 percent of abstracts of peer-reviewed scientific journal articles generated from work performed at the Department's light sources in FY 2000 were available for public dissemination through OSTI. The abstracts were not available because OSTI did not establish procedures to ensure that peer-reviewed journal literature for research performed at the light sources was collected in the *PubSCIENCE* database. As a result, scientific advancement was not fully promoted, and research and development efforts are more likely to be duplicated, because scientists are not aware of research already performed. Also, although the Department reported it exceeded its performance target to increase the availability of all scientific and technical information (reports, journal articles, and preprints) by 25 percent from FY 1999 to FY 2000, our review indicated that the availability of peer-reviewed journal articles generated at the light sources had decreased.

This audit identified significant issues that management should consider when preparing its yearend assurance memorandum on internal controls.

Signed  
Office of Inspector General

## ABSTRACTS MISSING FROM DATABASE

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### **PubSCIENCE Did Not Include Abstracts of All Peer-Reviewed Scientific Journal Articles**

Not all peer-reviewed scientific journal abstracts generated from work performed at the Department's light sources were available for public dissemination through OSTI. In fact, only 44 percent of the abstracts of peer-reviewed journal articles generated in FY 2000 were collected in OSTI's *PubSCIENCE* database. The following table shows the number of articles published in FY 2000 and the corresponding number of abstracts included in *PubSCIENCE* for each of the Department's light sources.

#### Peer-Reviewed Scientific Journal Articles

<u>Light Source</u>	<u>Articles Published</u>	<u>Abstracts in PubSCIENCE</u>	<u>Percentage</u>
BNL	261	110	42
SLAC	115	37	32
LBNL	105	59	56
ANL	<u>65</u>	<u>32</u>	<u>49</u>
Total	<u>546</u>	<u>238</u>	<u>44</u>

### **Department's Policy Is to Make Scientific Abstracts Available to the Public**

Departmental Order 241.1A, *Scientific and Technical Information Management*, requires that scientific and technical information is identified, processed, disseminated, and preserved in a manner that enables the scientific community and the public to locate and use the unclassified and unlimited scientific and technical information resulting from the Department's research and related endeavors. The Order requires Department contractors to announce scientific and technical information results to OSTI.

In accordance with the Government Performance and Results Act of 1993, the Department established a performance goal in its FY 2000 Performance Agreement to improve the management, dissemination, sharing and use of scientific and technical information. In support of this goal, the Department established a performance target in FY 2000 to increase the availability of all scientific and technical information, which includes reports, preprints, and peer-reviewed scientific literature, by 25 percent over FY 1999.

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**OSTI Did Not Establish Procedures to Ensure All Abstracts Were in the Database**

OSTI did not include abstracts of all articles in its *PubSCIENCE* database because it did not establish procedures to ensure that all relevant abstracts for research performed at the light sources were collected. The light sources maintain a bibliographic record of journal article publications. Such records should be submitted to OSTI for updating *PubSCIENCE* and determining which abstracts have not been transmitted from the publishers. Identifying missing abstracts through this reconciliation process would allow OSTI the opportunity to request the abstracts of the articles from the publishers and provide greater availability for the articles.

Although OSTI had established agreements with 35 publishers to receive abstracts, some publishers refused to participate in agreements with OSTI. Even though the publishers do not participate, OSTI could obtain journal citation data from the light sources and announce its availability in the *PubSCIENCE*. Obtaining this data would improve OSTI's performance in meeting dissemination and repository responsibilities for the scientific and technical information.

**Science Was Not Fully Promoted and Projects May Have Been Duplicated**

As a result, scientific advancement was not fully promoted and research and development efforts are more likely to be duplicated because scientists were not aware of research already performed. Also, although the Department reported it exceeded its performance target to increase the availability of all scientific and technical information (reports, journal articles, and preprints) by 25 percent from FY 1999 to FY 2000, our review indicated that the availability of peer-reviewed journal articles generated at the light sources had decreased. A comparison of the number of peer-reviewed journal articles, generated from the light sources and made available through *PubSCIENCE* in FY 1999 and FY 2000, indicated that the number of available articles decreased from 47 percent in FY 1999 to 44 percent in FY 2000. It should be noted, however, that the Department's performance target measured the availability of all types of scientific and technical information.

**RECOMMENDATIONS**

We recommend that the Director, Office of Scientific and Technical Information establish procedures to:

1. Periodically update the *PubSCIENCE* database with bibliographic records made available by the light sources in accordance with Department Order 241.1A;

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2. Identify and recover abstracts missing from *PubSCIENCE* from those publishers having agreements with OSTI; and,
  3. Collect and disseminate journal citation data from the light sources for peer-reviewed articles not covered by publisher agreements.

## **MANAGEMENT REACTION**

Management concurred with the finding and recommendations. For recommendation 1, management received assurance from the Office of Basic Energy Sciences that appropriate steps will be taken to make light source data available to OSTI so that the data can be captured for *PubSCIENCE*. A memorandum will be transmitted in the upcoming weeks to communicate this to the Department's laboratories so that OSTI can begin obtaining the data in FY 2002. For recommendation 2, management will implement quality assurance procedures by mid-FY 2002 to ensure that abstracts from publishers with which it has agreements are being included in *PubSCIENCE*. Finally, for recommendation 3, management will emphasize the requirement for journal citation data to the Department's scientific and technical information points of contact via an October 2001 teleconference, and also at the November 2001 Scientific and Technical Information Program meeting. Subsequently, management will track receipts of journal articles in FY 2002.

## **AUDITOR COMMENTS**

Management's comments were responsive to the finding and recommendations.

## Appendix

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### SCOPE

The audit was performed from November 14, 2000, to June 1, 2001, at the Argonne National Laboratory in Argonne, Illinois; Brookhaven National Laboratory in Upton, New York; the Lawrence Berkeley National Laboratory in Berkeley, California, and the Stanford Linear Accelerator Center in Stanford, California. The scope of the audit included the generation and collection of peer-reviewed scientific journal articles for FYs 1999 and 2000 by the Department's synchrotron radiation light sources, and the availability of that information through the Office of Scientific and Technical Information (OSTI).

### METHODOLOGY

To accomplish the audit objective, we:

- Researched Departmental regulations for scientific and technical information;
- Reviewed previous Office of Inspector General audit reports for scientific and technical information;
- Identified Department personnel with responsibilities for collecting and disseminating scientific and technical information;
- Interviewed Department personnel regarding copyright law implications for scientific and technical information;
- Evaluated OSTI's performance in providing public access to peer-reviewed scientific journal articles generated at the Department's light sources in FYs 1999 and 2000; and,
- Determined that performance measures were established in accordance with the Government Performance and Results Act of 1993.

The audit was performed in accordance with generally accepted Government auditing standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Because our audit was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We did not rely on computer-processed data to achieve our audit objective.

We held an exit conference with the Director, Project and Program Development, OSTI, on August 22, 2001.

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