

DOCUMENT RESUME

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[Reporting of Federal Funds for Research and Development].
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Report to Sen. Charles H. Percy; by Jerome H. Stolarow,
Director, Procurement and Systems Acquisition Div.

Issue Area: Improved Federally Sponsored Services Essential to
Science and Technology (2007).

Contact: Procurement and Systems Acquisition Div.

Budget Function: General Science, Space, and Technology: General
Science and Basic Research (251).

Organization Concerned: National Science Foundation; Department
of Defense; National Aeronautics and Space Administration;
Department of Energy; National Institutes of Health.

Congressional Relevance: House Committee on Science and
Technology: Science, Research and Technology Subcommittee;
Senate Committee on Human Resources: Health and Scientific
Research Subcommittee. Sen. Charles H. Percy.

Annually, the National Science Foundation (NSF) gathers data from Federal agencies on their research and development support. The reporting procedures of four agencies responsible for over 85% of the Federal research and development funds included in the Foundation's reports were reviewed for 1976 (the completed year), 1977 (the current year), and 1978 (the budget year). The overall totals were found to be reasonably accurate although there were some uncertainties regarding classifications within some of the categories. The four agencies demonstrated that they used sound bases for deciding which funds should be reported to NSF as research and development. The Department of Defense reported all of its research, development, test, and evaluation appropriation plus costs of military personnel engaged in research and development activities. The National Institutes of Health decisions concerning programs to be included are reviewed annually by senior staff. Because by law all National Aeronautics and Space Administration programs are research and development, that agency's entire program is reported. The Department of Energy's budget consists of subprogram categories which make it easy to determine which programs are research and development. (RRS)

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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

PROCUREMENT AND SYSTEMS
ACQUISITION DIVISION

B-133183

AUGUST 9, 1978

The Honorable Charles H. Percy
United States Senate

Dear Senator Percy:

By letter dated June 7, 1977, you requested that we review Federal agencies' reporting of research and development funding data to the National Science Foundation. You requested that we assess reporting accuracy and consider ways it could be improved. In meetings with your office, we agreed to work with the Foundation to insure that it received the maximum benefit of our work. We previously furnished you three separate reports on the other aspect of your interest concerning agencies contracting for research and development in the private sector.

BACKGROUND

Annually, the National Science Foundation gathers data from Federal agencies on their research and development support. It collects data for 3 fiscal years: the completed year, the current year, and the budget year. It sends questionnaires to the departments and agencies requesting funding data in total and by such categories as the character of the work (basic research, applied research, and development), performer (intramural, industrial firms, etc.), field of science, agency program, and amounts spent for research and development plant. Geographic (State) data is collected for the completed year only. These data are used to prepare three documents.

The first publication, "Detailed Statistical Tables," contains the reported data without analytical comment. The next publication, "Highlights," analyzes the data. "Federal Funds for Research, Development, and Other Scientific Activities" analyzes the trends and describes the methods used to gather the data.

The Office of Management and Budget also publishes a summary of Federal research and development support for the 3 years as part of the President's budget. The summary is based on data collected from the agencies using the same definitions as those of the Foundation for basic research, applied

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research, and development, but it is less detailed than the "Federal Funds" report.

The Office of Management and Budget requires data to be initially submitted not later than September 15, before the end of the fiscal year, for publication in January. The Foundation gives the agencies until the following March to complete their questionnaires. It requires that the agencies explain any differences between the figures reported to it and those previously supplied to the Office of Management and Budget.

FINDINGS AND CONCLUSIONS

We reviewed the reporting procedures of four agencies responsible for over 85 percent of the Federal research and development funds included in the Foundation's reports for fiscal years 1976 (the completed year), 1977 (the current year), and 1978 (the budget year). Because the transactions were complete, we examined in particular the agencies' compilation and reporting of funds for fiscal year 1976 and found the overall totals to be reasonably accurate. However, within some of the categories; for example, basic research, applied research, and development, there were some uncertainties as to classification.

Our confidence in the total funds reported is based on the four agencies' demonstration that they used sound bases for deciding which funds should be reported to the Foundation as research and development. The Department of Defense reported all of its research, development, test, and evaluation appropriation, plus costs of military personnel engaged in research and development activities. At the National Institutes of Health, Department of Health, Education, and Welfare, the decisions as to which programs to include and which to exclude are reviewed annually by senior staff of the Office of the Director.

National Aeronautics and Space Administration programs are, by Office of Management and Budget definition, all research and development. It reports its entire program to the Foundation. The Department of Energy's budget consists of subprogram categories that officials find easy to use in deciding whether they are research and development. For example, in the portion of the budget for weapons activities, process development is classified as research and development, but uranium-235 production is not.

There were, however, some uncertainties regarding the allocation of funds to the various categories. Some of these uncertainties are inherent in the system, primarily because the agencies do not budget, justify, manage, or account for their activities with National Science Foundation categories. Judgment must be used, therefore, by agency analysts in deciding the funds that should be placed in each category. Errors can be reduced by carefully applying the Foundation's definitions and reviewing their application, but the judgment factor cannot be eliminated.

The Department of Defense, for example, has a budget category called Research (6.1). In categorizing these funds for the Foundation, the Air Force reports all research as basic, whereas the Army and the Navy report only part of such funds as basic.

The Foundation believes that differences between the Air Force and the Army and the Navy reflect the services' judgment as to the nature of their research and are not necessarily a sign of incorrect reporting. The Foundation also notes that the Air Force has followed its reporting practice for many years and has, therefore, reported consistently from year to year.

At the National Institutes of Health, we were told:

"* * * the research spectrum is so complex and so difficult to categorize except at the extremes, that NIH has questioned the likelihood of arriving at meaningful distinctions between basic and applied in large areas of the medical field."

To overcome this difficulty, the National Institutes of Health has worked out methods of categorizing most of its research to meet Foundation requirements. Officials told us that they were trying to resolve major questions in classifying the remaining one-fifth of their research funds.

Other studies have recognized the difficulty in drawing a clear distinction between basic and applied research. For example, the National Academy of Sciences reported the difficulty of identifying funds for basic research, especially for agencies with complex programs.

At two agencies, we found instances of backing into target figures set at the beginning of the budget process for the Office of Management and Budget's special analysis. The

budget analysts had difficulty matching these totals when aggregating the detailed information required for the subsequent National Science Foundation report. For example, one subagency apportioned a \$142 million difference across the various fields of science to arrive at the fiscal year 1978 subtotal previously submitted.

We believe that two of the three Foundation documents do not adequately convey the data limitations described above. The "Detailed Statistical Tables" and the "Highlights" explain that budget and current year information is estimated. But they do not contain a discussion of the difficulties encountered in distinguishing between basic and applied research and classifying research by field of science.

The final report, "Federal Funds for Research, Development, and Other Scientific Activities" contains introductory information on the general limitations and a fuller statement in the technical notes. This information is needed in the two documents which precede the final report.

SUGGESTIONS AND AGENCY ACTIONS

We discussed with Foundation officials the advisability of checking in more detail how selected agencies gather their data and complete the questionnaires. The purpose of this would be to decrease uncertainties in the reporting of the data. They agreed with our suggestion and told us that they had been checking completed questionnaires for reporting inaccuracies over the years and that a formal program for carrying out more detailed reviews had been in progress for the past year.

We also suggested that the Foundation print a more detailed discussion of limitations to the quality of the data in the "Detailed Statistical Tables" and add a footnote on this point to "Highlights," which Foundation officials agreed to do. They agreed to consider strengthening the language on the limitations of the data in all three publications.

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We reviewed the reporting activities of the Departments of Defense; Health, Education, and Welfare; and Energy; and the National Aeronautics and Space Administration. At each agency we discussed with responsible personnel the procedures for gathering and coordinating statistics for the National

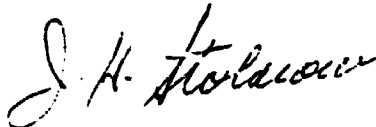
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Science Foundation. We examined in detail the procedures of the Departments of the Army, the Navy, and the Air Force within the Department of Defense; the National Institutes of Health at the Department of Health, Education, and Welfare; and selected programs of the Department of Energy and the National Aeronautics and Space Administration.

We did not obtain formal agency comments. The matters in this report, however, were discussed with agency officials and their comments were included when appropriate.

As arranged with your office, we are simultaneously releasing copies of this report to interested committees of the Congress. Copies are also being sent to the Director, Office of Management and Budget; the Secretaries of the Departments of Defense, Health, Education, and Welfare; and Energy; the Administrator of the National Aeronautics and Space Administration; and the Director of the National Science Foundation.

Sincerely yours,

A handwritten signature in cursive script, reading "J. H. Stolarow".

J. H. Stolarow
Director