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UNITED STATES GENERAL ACCOUNTING OFFICE

WASHINGTON, D C 20548

HUMAN RESOURCES  
DIVISION

July 21, 1976

Dr Robert E Hughes  
Assistant Director for Astronomical,  
Atmospheric, Earth, and Ocean Sciences  
National Science Foundation

Dear Dr Hughes

The General Accounting Office has completed a survey of the National Science Foundation's Antarctic research program administered by the Division of Polar Programs. The survey was made primarily to acquaint us with the policies and procedures used to award and manage Antarctic research grants and contracts. We examined the procedures followed in (1) identifying and communicating research needs to the research community, (2) processing and evaluating research proposals, (3) disseminating research results and (4) storing and using Antarctic research specimens. In addition, we reviewed Antarctic related studies, agreements, correspondence and budgets. We also held discussions with officials of the National Science Foundation, the Office of Management and Budget, and the National Academy of Sciences.

In May 1972, an Office of Management and Budget ordered study of the program's logistics costs and their relation to changes in the level or mix of research projects was completed. Our inquiries concerning a number of the principal recommendations dealing with logistics support showed that they were constructively considered by Foundation officials, therefore, we did not pursue the logistic support operations during our survey.

Under Office of Management and Budget Circular A-51, revised August 4, 1971, the Foundation is responsible for developing and implementing an integrated United States Antarctic program. Its responsibilities include (1) funding logistics support activities and research programs, (2) serving as a clearinghouse and source of information on the existence and location of Antarctic records, and (3) coordinating and arranging cooperative scientific programs with other nations participating in Antarctic research under the terms of the Antarctic Treaty. As you know, the United States position on

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Antarctica is to maintain an active and influential presence, which is accomplished through maintenance of stations at Antarctica and other actions which support the performance of research. For fiscal year 1977, Antarctic program expenditures are estimated to be \$45 million of which \$5.1 million is applicable to scientific research projects and \$39.9 million is for operational support. Therefore, considering the cost of operational support the research can be considered as quite costly.

Our survey identified opportunities to improve (1) competing for Antarctic research funds, (2) assessing the implementation of suggested research areas, and (3) controlling the distribution of Antarctic research core samples and dissemination of research results. A discussion of these matters and our recommendations follow.

OPPORTUNITY TO INCREASE  
COMPETITION FOR ANTARCTIC  
RESEARCH FUNDS

The Antarctic research program funds a much higher percentage of research proposals than other Foundation programs. For the fiscal years 1971 through 1975 the Antarctic research program funded about 80 percent of the proposals acted upon. In total the Foundation funded about 50 percent of the proposals acted upon. Comparatively, therefore, the competition for funding Antarctic research proposals appears to be limited.

We believe the high acceptance rate for Antarctic research proposals results in part because there are fewer proposals to choose from. A National Academy of Sciences official stated that many researchers are discouraged from submitting proposals to perform research in Antarctica because of the extreme climatic conditions, and the remoteness of the area. Another reason, given by a Division of Polar Programs official, is the time lost from school (one academic year). Preproposal activity, contacts between the Foundation's program managers and potential researchers before a formal proposal is submitted, also reduces the number of formal proposals being submitted, however, this activity occurs throughout the Foundation Program. Officials informed us that the reasons for discouraging submission of a formal proposal for Antarctic research funds include (1) lack of research funds, (2) research is to be performed in an area where there is lack of logistics capability, (3) not an area of program interest, and (4) the research does not have to be performed in Antarctica.

Unsolicited proposals for Antarctic research are generally submitted in response to personal contacts between program officials and the research

community or general Foundation literature. No specific announcements of Antarctic research areas are made through the Foundation's literature. For example, two publications that are used to communicate Antarctic research needs are the Foundation's annual report and its guide to programs. In discussing the Antarctic research program these publications identify the relevant sciences, broadly describe some of the research areas, and generally discuss field research activities. However, they do not identify the specific research areas in which research is needed or identify the locations at which such research can be performed.

We believe the use of announcements to the research community that are more specific with respect to areas of research and research locations may help increase the number of research proposals. Specific data is available from the Division of Polar Programs' future work plans which include 2-year, 5-year, and 10-year plans that could be used in developing program announcements. Division of Polar Programs officials agreed that attempts should be made to increase competition for Antarctic research funds. We were advised that they were considering the use of a brochure which would more specifically advise the research community of needed research.

#### Recommendation

You should experiment with a program announcement to advise the research community of the research needs in Antarctica. The announcement should, to the extent possible, fully identify and define the specific areas of research or tasks to be performed and indicate the planned locale where the research can be performed.

#### NEED TO DETERMINE STATUS OF RESEARCH AREAS SUGGESTED BY THE NATIONAL ACADEMY OF SCIENCES

The Polar Research Board (formerly known as the Committee on Polar Research) of the National Academy of Sciences has been a major source used by the Foundation in developing the Antarctic research program. The Board was established in 1958 to provide expert advice on polar scientific research. Among other activities, the Board surveys the United States scientific community for research areas for the Antarctic program. Division of Polar Programs officials informed us that the Board's activities are funded annually by the Foundation at about \$106,000.

In 1971 at the Foundation's request, the Board undertook an effort to develop a series of discipline-oriented studies for Antarctic research program planning. The Board issued a series of reports entitled "Guidelines

for U S Program Planning 1973-1983 " The reports generally outlined a suggested 10-year plan of scientific investigation in a number of research areas such as glaciology, upper-atmosphere physics, geology, and solid earth geophysics The reports were to be used by the Division of Polar Programs to revise its 2-year, 5-year, and 10-year work plans, which are used respectively for field support preparations, budget planning, and long-range planning

At the time of our survey officials of the Division of Polar Programs and the National Academy of Sciences advised us that the Antarctic program had not been reviewed to determine the extent to which the research areas suggested by the Board were carried out Each year the Antarctic research program is the subject of a Foundation Director's program review These reviews usually discuss current programs, recent program accomplishments, and outline future work plans However, these reviews do not account for the status of research areas suggested by the Board Program officials advised us that they could determine the status of each research area suggested by the Board but that records to readily provide the data were not maintained

The status of research areas suggested by the Board should be readily available to program management to aid in evaluating research proposals, planning future research, and in communicating research areas and priorities to the scientific community In addition, considerable effort and expense were used in developing the research areas, which seemingly justifies accounting for their status At the close of our survey Division of Polar Programs officials advised us that a review of Antarctic research areas was underway We were informed that program managers were reviewing activities of prior periods to identify the research that had been performed as suggested by the Board

#### Recommendations

You should provide for a review of the Antarctic research program to determine the extent to which research areas suggested by the Polar Research Board have been implemented Once the current status of the research areas has been determined, a system of recordkeeping should be established that will keep management informed as to each year's progress in implementing the suggested areas of research Such a system should show by individual research area, the past, current and planned research projects and identify the results obtained

#### NEED FOR INCREASED CONTROL OVER CORE SAMPLE RESEARCH

As part of the field research in Antarctica, ocean sediment, earth, and ice cores are obtained and brought back to the United States for study and

analysis The cores are stored at three facilities and the curators have authority to release samples from the cores for research

When core sample research is funded by the Foundation procedures exist for dissemination of the research results The researcher is required to submit a progress report or a reprint of the published research results to the Foundation In contrast, when a core sample is released by a curator for research that is not funded by the Foundation, there are no requirements for the researcher to report the research results to the Foundation The Library of Congress, under contract to the Foundation, abstracts and catalogues Antarctic research from a number of sources for its monthly publication, "Current Antarctic Literature" which is distributed to the scientific community, such as universities, scientists, and libraries If core research, not supported by the Foundation, were published it is highly probable that the Library of Congress would abstract such research and include it in its publication, however, the Foundation has no assurance that all core sample research results not supported by it are published

Data obtained for us by Foundation officials from the Antarctic Core Facility at Florida State University--the largest of the three core storage facilities--showed that the majority of cores were released for research not supported by the Foundation During the first 8 months of fiscal year 1976, the curator distributed 4,334 core samples, of which 1,958, or 45 percent were for Foundation-supported research, and 2,376 core samples, or 55 percent, were released for research not supported by the Foundation

The 4,334 core samples were released by the curator to 29 researchers Only 8 of the 29 researchers were being supported by the Foundation Division of Polar Programs officials estimate that the actual number of core researchers to be triple that of the researchers receiving the core samples directly from the storage facility because many researchers distribute the core samples or part of them to other researchers after completing their analyses The curator's approval is not required for secondary distribution of the core sample We were informed also that in some instances the curator is aware of the multiple core sample use because the researcher requesting the core sample asks permission to make further core sample distribution However, the exact extent that core samples are passed among researchers without permission is not known The unrestricted core sample distribution results in (1) lost opportunity for the Foundation or the curator to insure the qualifications of the researcher, which is considered when core samples are distributed to a researcher by the curator, and (2) no assurance that the results of research conducted by the secondary researchers will be made known to the Foundation or the scientific community

Division of Polar Program officials agreed that a need exists to better control distribution of Antarctic research core samples and dissemination of research results. The officials also stated that the core sample research performed by secondary researchers is important and should be reported to the scientific community.

Recommendations

You should (1) revise the core sample distribution requirements to provide for Foundation or curator approval of all core sample research, and (2) extend the requirements pertaining to dissemination of core sample research results supported by the Foundation to include core research which is non-Foundation supported.

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We appreciate the courtesy and cooperation given to our representatives during our survey. We shall appreciate your written comments on the matters discussed and will be pleased to discuss them further with you or members of your staff.

Sincerely yours,



Ronald F. Lauve  
Associate Director