REPORT TO THE CONGRESS

Need For Improved Administration Of Federal Support Of Shore Facilities And Vessels For Research Activities At Oceanographic Institutions

National Science Foundation
Department of the Navy

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

SEPT 23, 1970

COMPTROLLER GENERAL OF THE UNITED STATES
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B-169941

To the President of the Senate and the
Speaker of the House of Representatives

This is our report on the need for improved administration of Federal support of shore facilities and vessels for research activities at oceanographic institutions by the National Science Foundation and the Department of the Navy Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S C 53), and the Accounting and Auditing Act of 1950 (31 U S.C. 67)

Copies of this report are being sent to the Director, Office of Management and Budget, the Director, National Science Foundation, the Secretary of Defense, and the Secretary of the Navy

Elmer B. Staats

Comptroller General
of the United States

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ABBREVIATIONS

AEC	Atomic Energy Commission
DCAA	Defense Contract Audit Agency
GAO	General Accounting Office
NSF	National Science Foundation
ONR	Office of Naval Research

COMPTROLLER GENERAL'S REPORT TO THE CONGRESS

NEED FOR IMPROVED ADMINISTRATION OF FEDERAL SUPPORT OF SHORE FACILITIES AND VESSELS FOR RESEARCH ACTIVITIES AT OCEANOGRAPHIC INSTITUTIONS

National Science Foundation
Department of the Navy B-169941

D I G E S T

WHY THE REVIEW WAS MADE

The National Science Foundation and the Office of Naval Research each provide about 40 percent of the Federal support for oceanographic research carried out by educational and other nonprofit institutions. The Foundation granted over $229 million for basic scientific study of the oceans in fiscal years 1950-69.

Because of the Government's increased emphasis on this area of activity in recent years that resulted in the commitment of substantial public funds, the General Accounting Office (GAO) examined the Foundation's policies and practices for administering oceanographic research grants for the construction of shore facilities and the construction, conversion, and operation of research vessels The review was conducted principally at three major grantee institutions and covered the policies and practices of the Office of Naval Research which supports research activities of the same institutions:

--Woods Hole Oceanographic Institution, Woods Hole, Massachusetts;

--Columbia University's Lamont-Doherty Geological Observatory, Palisades, New York; and

--the University of Miami's Institute of Marine Science, Miami, Florida.

FINDINGS AND CONCLUSIONS

Construction of shore facilities

NSF
Foundation grants for constructing shore facilities ~~at~~ of oceanographic institutions have been administered by three separate program offices in the Foundation. Their policies and procedures have varied. In GAO's opinion, two of the offices did not have adequate formalized procedures for the management of construction projects by institutions receiving the grants. (See p. 8)

The two offices have determined requirements for the award and administration of a grant on a case-by-case basis. The Foundation would have greater assurance that grants are properly awarded and administered if the two offices would adopt formalized procedures like those of the third office. The adoption of uniform procedures would also eliminate the varied requirements now imposed upon grantees. (See p. 9.)

The Foundation does not have criteria which clearly distinguish between specialized research and graduate-level research facilities. Such criteria are important because grants for construction of specialized facilities may be for their total cost and grants for construction of graduate-level facilities are limited to an amount equal to that provided by the institution (See p. 11.)

Acquisition of research vessels

NSF
The Foundation had not developed long-range plans for funding the construction or conversion of research vessels and had not formally coordinated its funding with the Office of Naval Research which also finances the construction or conversion of research vessels for the same institutions. (See p. 16.)

NSF
The Foundation had not made or required feasibility studies as a basis for deciding whether to construct new vessels or convert old ones. An interagency study published in 1963 showed that conversion of old vessels for oceanographic research is, in the long run, both uneconomical and inefficient. The Foundation financed 12 major research vessels through fiscal year 1968; four were constructed and eight were converted. (See p. 18.)

NSF
The Foundation made only limited use of the expert shipbuilding services of other Federal agencies--the Navy, Maritime Administration, and Coast Guard--when designing and constructing research vessels. It has no capability in shipbuilding and cannot assist grantee institutions that need expert advice. (See p. 27.)

Research vessel operations

NSF
Some matters warrant joint consideration by the Foundation, the Office of Naval Research, and other Federal agencies.

1. There is a need for a Government-wide policy on ownership of federally-financed research vessels furnished to oceanographic institutions. The Foundation transfers title to the vessels to the institutions whereas the Office of Naval Research retains title. Because of the Foundation's policy, premiums for hull insurance are borne by the Government agencies financing the vessels' operating costs The annual costs of such premiums for

10 NSF-financed vessels averaged about $110,000 over the 5-year period, 1963-67. Such costs are not incurred under the Office of Naval Research's policy since it is the Government's general policy to be a self-insurer. (See p. 30.)

2. Several Federal agencies have provided funds to institutions to operate research vessels but have not formally coordinated their funding. As a result, institutions are uncertain how much in Federal funds will be available and Federal agencies cannot plan for the most desirable use of funds and research vessels. (See p. 33.)

3. A uniform and equitable method of allocating research vessel operating costs among the several Federal funding agencies should be prescribed for the institutions to follow. The institutions have used different allocation methods which in some cases do not provide for equitable sharing of costs. (See p. 38.)

RECOMMENDATIONS OR SUGGESTIONS

Various corrective actions were suggested to the Foundation. (See pp. 14, 25, 29, 32, 37, and 39.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

The Foundation considered GAO's suggestions sound and well taken and stated that some had been implemented whereas others would be adopted. (See app. III, p. 58.)

The Foundation pointed out basic differences between the programs administered by its three program offices but agreed that certain differences in procedures could be eliminated and adequate guidelines to grantees were needed. Foundation officials said that they would seek uniformity of policies and procedures, including the possibility of centralizing administrative responsibility for construction grants within the Foundation, as recommended. (See p. 14.)

The Foundation and the Navy stated that steps had been taken to coordinate long-range plans for financing vessel construction and conversion The Foundation further stated that it would conduct feasibility studies to determine whether construction or conversion of research vessels is best. Also, the Foundation is now using the shipbuilding services of other Federal agencies. (See pp 25 and 29)

The Foundation and the Navy pointed out the basic reasons for using different methods of funding the institutions' vessel operating costs. The Navy stated that these different approaches may present difficulties in working out joint funding but do not preclude it. The Foundation believes

the only alternative to the present system of multiagency support would be single agency funding with a transfer of funds from other agencies. (See p. 36.)

GAO believes that, although single agency funding will alleviate some of the administrative problems inherent in the present system, it will not eliminate the need for Federal agencies to formally coordinate their plans. Coordinated planning is needed to ensure that national goals in oceanographic research are adequately considered and jointly pursued.

MATTERS FOR CONSIDERATION BY THE CONGRESS

Some of the matters discussed in this report were presented to the President and the Congress in January 1969 by the Commission on Marine Science, Engineering and Resources, in its report "Our Nation and the Sea." The report presents a plan of action for a national marine science program.

GAO believes that its findings may be of interest to the Congress when considering the Commission's recommendations and their implementation by the executive branch.

CHAPTER I

INTRODUCTION

The General Accounting Office has examined into the National Science Foundation's (NSF) program for the support of basic research activities in oceanography at educational and other nonprofit institutions, with particular emphasis on the construction of shore facilities and research vessels and the support of vessel operations. The review also included a comparison of NSF's policies and practices with those of the Office of Naval Research, Department of the Navy, in supporting oceanographic research. The scope of the review is described on page 43.

Information on the operations of the three principal oceanographic institutions covered by our review--Woods Hole Oceanographic Institution in Massachusetts, Lamont-Doherty Geological Observatory of Columbia University in New York, and the Institute of Marine Science of the University of Miami in Florida[1]--is presented in appendix I.

NSF is authorized and directed by the National Science Foundation Act of 1950 (42 U.S.C. 1861) to develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences and to initiate and support basic scientific research through contracts and grants. Among its major activities, NSF supports the scientific study of the oceans which involves all relevant disciplines, such as chemistry, geology, geophysics, and biology. From its inception in 1950 through fiscal year 1969, NSF had awarded grants to educational and other nonprofit institutions totaling about $229 million for basic research and facilities for oceanography.

NSF's support of research in oceanography is an integral part of a national program which involves other agencies, such as the Office of Naval Research, Department of

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[1]In June 1969 the Institute was renamed the Dorothy H. and Lewis Rosenstiel School of Marine and Atmospheric Sciences.

the Navy; the Bureau of Commercial Fisheries, Department of the Interior; the Environmental Science Services Administration, Department of Commerce; the Atomic Energy Commission; and the National Aeronautics and Space Administration.

From 1959 to June 1966, the oceanographic activities of the several Federal agencies had been coordinated by an Interagency Committee on Oceanography under the Federal Council for Science and Technology. In June 1966 the Congress passed the Marine Resources and Engineering Development Act (33 U.S.C. 1101) to provide for a comprehensive, long-range, coordinated national program in the marine sciences. The act established two complementary coordinating bodies, the National Council on Marine Resources and Engineering Development and the Commission on Marine Science, Engineering and Resources.

The Council, with the Vice President of the United States as Chairman, comprises the heads of the major Federal departments and agencies having marine missions and is organizationally located in the Executive Office of the President. The Council is charged with the planning and coordination of current marine programs and advising and assisting the President. The life of the Council, which was limited in the original legislation, was extended by subsequent legislation to June 30, 1970, and a further one-year extension was pending at that date.

The Commission was composed of members appointed by the President early in 1967 representing diverse interests and areas of the country. It was directed to, among other things, formulate an adequate national marine science program that would meet the Nation's present and future needs without unnecessary duplication of effort and to recommend a Government-wide organization plan to carry out the program. In January 1969 the Commission submitted a final report entitled, "Our Nation and the Sea," to the President and to the Congress. As provided in the 1966 act, the life of the Commission expired 30 days after submission of its final report.

Since fiscal year 1960, NSF and the Office of Naval Research (ONR), have been the major supporters of the

Nation's oceanographic program. Each of the two agencies provides about 40 percent of the Federal support of basic research on oceanography being conducted at educational and other nonprofit institutions.

In addition to financing numerous individual oceanographic research projects, NSF provides funds to institutions for the design, construction, and conversion of research vessels and for the construction of shore facilities for the conduct of oceanographic basic research. From fiscal year 1960 through fiscal year 1969, NSF awarded grants of $25.4 million for shore facilities and $16.4 million for research vessels. Also, NSF provided funds to institutions for the support of research vessel operations. In fiscal year 1969, NSF awarded grants of about $8.6 million to 18 institutions for the support of 32 research vessels, ranging in length from 30 feet to 213 feet, and for an assortment of smaller vessels.

Under NSF's system of grant support, the Nation's educational and research institutions, through the submission of proposals, compete for support of research and facility projects for which they can demonstrate their competence and need. Proposals which are judged to be the most meritorious on the basis of reviews by qualified scientists are selected by NSF for grant support.

An NSF grant for support of a research project provides funds for salaries, supplies, equipment, travel, publications, and other expenses, as set forth in the grantee's approved budget. In addition, the grant provides funds for indirect costs at predetermined fixed rates. A grant for the construction of facilities provides funds for the costs of architectural and engineering services, site development, utilities, and equipment, but not for indirect costs.

A list of the principal management officials responsible for the activities discussed in this report is contained in appendix V.

CHAPTER 2

ADMINISTRATION OF GRANTS FOR CONSTRUCTION OF OCEANOGRAPHIC SHORE FACILITIES

NSF has been the principal Federal agency involved in financing the construction of shore facilities at oceanographic institutions. During fiscal years 1960 through 1969, NSF provided grant funds of about $20.3 million for financing, in whole or in part, the construction or renovation of 56 laboratory facilities, and about $5.1 million for the construction of seven pier facilities.

NEED FOR IMPROVED UNIFORM ADMINISTRATIVE PROCEDURES

NSF grants for construction of oceanographic research and training facilities and the procurement of major scientific equipment for these facilities have been awarded and administered by three program offices: (1) the Biological Oceanography Program Office,[1] Division of Biological and Medical Sciences, (2) the Oceanographic Facilities Program Office, Division of Environmental Sciences, (both divisions are under the Assistant Director for Research),[2] and (3) the Graduate Science Facilities Section under the Assistant Director for Institutional Programs.[2] (See NSF organization chart, app. II.)

Our comparison of the policies and procedures of the three grant program offices showed that the Graduate Science

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[1]Established in July 1968 to administer support of research as well as to assume the oceanographic construction activities of the former Facilities and Special Programs Office of the Division of Biological and Medical Sciences.

[2]Positions established in October 1969 to assume the responsibilities of the former Associate Director of Research and Institutional Relations, respectively.

Facilities Section had developed a satisfactory framework of instructions for the guidance of grantees and NSF program personnel but that the other two program offices had not provided adequate formalized instructions.

The Graduate Science Facilities Section awards and administers grants under conditions set forth in a pamphlet entitled "Grants for Graduate Science Facilities" and in supplemental instructions concerning technical and financial reporting requirements for grantees. This pamphlet provides guidance to institutions for the preparation of proposals for facility grants. It also requires a grantee to award contracts for the construction of a facility and the acquisition of equipment on the basis of formal advertising and to submit to NSF data regarding contract awards, contracts, and facility plans and specifications for use in connection with establishing the amount of the grant and in monitoring the construction work.

The procedures also provide for the Architectural Services Staff of the Assistant Director for Institutional Programs to assist the Graduate Science Facilities Section in reviewing facility plans and specifications and in rendering advice and recommendations both to the section and to the grantees regarding various aspects of the design of the facilities and their construction.

(1) The Biological Oceanography and (2) the Oceanographic Facilities Program Offices award and administer grants under conditions set forth in a pamphlet entitled "Grants for Scientific Research" which is designed primarily for the guidance of institutions submitting proposals for basic research grants, and does not contain specific guidance or requirements regarding the award or administration of facility grants.

These two program offices, in contrast to the Graduate Science Facilities Section which has formal procedures setting forth its requirements regarding facility grants, follow the practice of including such requirements on a case-by-case basis either in the grant agreement or in correspondence with the grantees. ~~however,~~ Because of the lack of formalized procedures, these requirements have differed ~~for~~ among the ~~various~~ several facility grants and have not always ~~included~~ been complete some ~~of the~~ requirements set forth in the formalized procedures of the Graduate Science Facilities Section.

Woods Hole, under an NSF grant of $2 million for the construction of the Laboratory of Marine Sciences, awarded and administered by the Biological Oceanography Program Office, awarded a fixed-price-incentive construction contract in the amount of $1.7 million without obtaining competitive bids. Woods Hole officials told us that the contract was awarded on the basis of discussions with four of the 20 contractors considered for the award of the contract, that the contractor selected best met Woods Hole's needs, and that the contract price was negotiated on the basis of a cost estimate prepared by Woods Hole's consulting engineer. We believe that, without formal competitive bidding, the grantee had no reasonable assurance that the contract price was the most favorable.

Lamont-Doherty, under an NSF grant of $700,000 toward the construction of two laboratory buildings, awarded and administered by the Oceanographic Facilities Program Office, made significant changes in the plans and specifications of the buildings without notifying NSF. The size of the buildings was increased and changes were made in their mechanical and structural aspects. The Graduate Science Facilities Section requires prior approval before significant changes can be made by the grantee in a construction project, but no such requirement is imposed by the other two program offices.

Also, the Assistant Director for Research does not have an architectural staff to assist the Biological Oceanography and Oceanographic Facilities Program Offices and NSF procedures do not require that the two program offices use the Architectural Service Staff of the Assistant Director for Institutional Programs. Officials of the two offices told us that the services of that staff have been used in some cases.

In our opinion, NSF would have greater assurance that grants are properly awarded and administered by the two program offices if they adopted formalized procedures similar to those of the Graduate Science Facilities Section.

In addition to the grants provided for the construction of oceanographic facilities, NSF has provided substantial amounts of funds for the construction of research and

educational facilities under other grant programs which NSF program offices have administered under differing procedures. Annual grants in support of all NSF-sponsored construction projects averaged about $40 million during 1966-68.

The need for uniform procedures governing facility construction programs was recognized by NSF's Internal Audit Office. As a result of findings by the Internal Audit Office, the NSF Comptroller, in a memorandum dated October 11, 1966, to the former Associate Director for Research, stated that variances in requirements between the various NSF facility construction programs had been noted and that it seemed appropriate for the program offices involved to collaborate in developing uniform requirements for the administration of NSF grants for the construction of facilities.

Since no action had been taken on this proposal, we discussed this matter in April 1969 with an official of the Office of the Assistant Director for Research, who informed us that he concurred in the need for uniformity in construction program requirements.

CRITERIA FOR DISTINGUISHING BETWEEN SPECIALIZED AND GRADUATE-LEVEL RESEARCH FACILITIES NEEDED

NSF has not prescribed criteria for clearly distinguishing between specialized research facilities and graduate-level research facilities. Such criteria are important because of NSF's policy which provides that grants to an institution for specialized research facilities may be for the total cost of the facilities but requires that grants to an institution for graduate-level research facilities must be limited to an amount equal to the non-Federal funds provided by the institution.

NSF has stated that the unique character and national importance of specialized research facilities warrant the award of grants for the full cost of such facilities.

A clear distinction between the two categories of research facilities would also facilitate the assignment of institutional proposals to the appropriate program office for evaluation and determination as to their propriety for an NSF

grant. The awarding of grants for (1) graduate-level research facilities is a function of the Graduate Science Facilities Section and (2) specialized research facilities is a function of the Biological Oceanography and the Oceanographic Facilities Program Offices.

Criteria for classifying research facilities are contained in an Office of the Director memorandum issued in December 1962. The memorandum defines major scientific tools and special environmental facilities, such as reactors and oceanographic vessels as specialized research facilities, but it is not clear as to the classification of oceanographic shore facilities. As a result, similar oceanographic facilities have not been consistently classified and the extent of NSF's participation in the construction costs has varied significantly. Following are examples of facilities for similar purposes which have been classified either as graduate-level research facilities or as basic research facilities.

The University of Alaska, College, Alaska, submitted a proposal in December 1966 requesting a graduate science facilities grant to finance a laboratory expansion program to provide increased space for research and training in marine science at the campus laboratory. The proposed facility was classified as a graduate-level research facility and the proposal was assigned to the Graduate Science Facilities Section which awarded a grant to the university of $106,000 covering about 50 percent of the total allowable construction costs.

In April 1965 Oregon State University, Corvallis, Oregon, submitted a similar proposal requesting a graduate science facilities grant to finance an addition to its oceanographic research laboratory for basic research and graduate training in oceanography. The proposed addition was classified as a specialized research facility and the proposal was assigned to the Oceanographic Facilities Program Office which awarded a grant to the university of $550,000 covering about 75 percent of the total allowable cost of constructing the addition. NSF program officials informed us that this addition would have been eligible for a grant under the graduate-level research facilities program, but in that case the grant would have been limited to 50 percent of the cost of the addition.

NSF awarded two grants to Lamont-Doherty totaling $350,000 to finance part of the cost of constructing the Marine Biology-Seismology Building. The building was completed in 1963 at a total cost of $600,863. According to the grantee's proposal, the building was to provide laboratory space for both basic research and graduate training in marine biology and seismology. One grant of $250,000 was awarded by the Graduate Science Facilities Section to cover approximately one-half of the estimated cost of the seismology portion of the building, whereas the other grant of $100,000 was awarded by the Biological Oceanography Program Office to cover the total estimated cost of the marine biology portion of the building. The project files contained no explanation for the award of two grants for the same purpose on differing bases.

We discussed the inconsistencies in the classification of research facilities with NSF program officials who expressed the view that the distinctions made in the December 1962 memorandum between graduate-level research and specialized research facilities are not clear in all respects and that a number of facilities financed by NSF grants could have been funded under either classification. The Deputy Assistant Director for Research agreed that the classification criteria were vague and that they should be clarified.

Conclusion

We believe that NSF should adopt uniform procedures for the award and administration of grants under all programs for the construction of research facilities. Such procedures could be patterned on the existing procedures applicable to graduate-level research facilities. In our opinion, the adoption of such procedures would not only provide for greater assurance of compliance with NSF policies but would eliminate the varied requirements now imposed upon grantees.

Toward achieving uniformity in the administration of research facility grants, we believe that it would be desirable to centralize the administration of all categories of facility grants in a single administrative office and to assign the Architectural Services Staff to that office. This staff could not only monitor the actual construction of facilities by grantees but also could assist the program offices in their evaluation of applicants' facility

proposals. Such a centralized administration of grants would not lessen the program offices' responsibilities for scientific evaluation of research facility proposals and for the award of grants.

Also, we believe that NSF should clarify its criteria for classifying research facility proposals so that the proposals will be assigned to the appropriate program office for consideration and negotiation of NSF's participation in the cost of the facilities consistent with its prescribed policies.

Recommendations to the Director, NSF

Accordingly, we recommend that NSF:

--Adopt uniform procedures for the award and administration of grants under all programs for the construction of research facilities, including adequate guidance to grantees in contracting for the necessary construction work.

--Consider the desirability of centralizing the administration of all facility grants in a single office.

--Clarify its criteria for classifying research facilities as between specialized research facilities and graduate-level research facilities.

Agency comments

The Director, NSF, in his letter dated September 5, 1969 (see app. III), pointed out certain basic differences between grants for the support of graduate-level research facilities which lend themselves to routine handling and grants for the support of specialized research facilities which require individual handling. He stated, however, that certain differences in procedures relating to the two categories of facilities could be eliminated without destroying the separate identities of the programs which were evolved to serve in different ways.

The Director stated that NSF concurred that adequate guidelines were needed to provide guidance to grantees in

contracting for work to be performed under NSF grants and that continued effort would be made by NSF to have such guidelines issued.

The Director concurred that there was a need for more clearly defined criteria for the classification of facility proposals and that steps would be taken to develop such criteria.

The NSF Deputy Assistant Director for Research subsequently advised us that NSF agreed that there was a need for uniform policies and procedures for the award and administration of facility grants and that NSF was analyzing means for achieving such uniformity including the possibility of centralizing this responsibility within NSF.

CHAPTER 3

CONSTRUCTION AND CONVERSION OF OCEANOGRAPHIC RESEARCH VESSELS

During fiscal years 1960 through 1969, NSF provided grant funds of over $16 million for the design and procurement of 28 oceanographic research vessels for use by educational and other nonprofit institutions. Our review showed that opportunities exist for more economical use of NSF grant funds for the design, construction, conversion, or modification of oceanographic research vessels by (1) developing long-range plans in cooperation with ONR for financing the procurement of such vessels and (2) making greater use of existing expert services of other Federal agencies specializing in the design and procurement of research vessels.

Also, we believe that NSF's policy of transferring title to research vessels to grantee institutions rather than retaining title to such vessels should be considered within the framework of a Government-wide policy.

NEED FOR PLANNING AND COORDINATING VESSEL PROCUREMENTS

NSF's annual budget submissions to the Congress requesting funds for the procurement of oceanographic research vessels have not been based upon a long-range plan of action. Rather, NSF has estimated the funds needed on the basis of proposals received and expected to be received from grant applicants. The decisions as to which institutions would be awarded grants for the procurement of research vessels have been made on the basis of those institutional proposals most worthy of support after funds have been appropriated by the Congress.

We believe that the development of a long-range plan for the procurement of research vessels is desirable because:

(1) The success of a national oceanography program requires the availability of a fleet of modern research vessels.

(2) Significant amounts of funds are involved.

(3) A long lead time is required to construct or convert a vessel.

(4) The needs and capabilities of grantee institutions during the anticipated useful life of the vessels must be considered.

(5) The research programs of other Federal agencies generally depend on the use of research vessels acquired with NSF grant funds.

In contrast to NSF, ONR maintains a 5-year plan for research vessel construction which identifies the recipient institutions and shows whether the vessels are replacements or new additions. The plan is part of the overall vessel construction program sponsored by the Oceanographer of the Navy which is, in turn, integrated into the total Navy Ship Construction program. This plan is subject to revision in the event of a change in the needs of the institutions, or a shift in the funds available for the Navy Ship Construction program. The staff of the NSF Assistant Director for Research has advised us that NSF recognizes that a need exists for long-range plans for research vessel construction and that such plans will be prepared.

Coordination with ONR

In the past, NSF and ONR had no procedure for formal coordination of plans for construction of new research vessels and replacement of existing research vessels. For example, both ONR and NSF had recognized the need for a new vessel to replace one of the Institute of Marine Science's two principal research vessels, either the PILLSBURY or the GERDA, and independently planned to finance the procurement of such a vessel. Subsequently, NSF awarded a grant of $1.4 million to the Institute for the procurement of a new vessel and ONR then deleted the requirement for a replacement vessel from its plan.

Subsequent to our discussions with NSF and ONR of their respective plans for financing the construction of research vessels, we noted that the two agencies had provided for coordination of their research vessel acquisition plans. In March 1969, ONR forwarded a copy of its 5-year plan for research vessel construction to NSF and informed NSF program officials that NSF's plans for construction and assignment of vessels would be taken into consideration in ONR's 5-year plans.

Also, an official of NSF's Office of the Assistant Director for Research told us that in March 1969 he had contacted the Deputy Assistant Oceanographer of the Navy, ONR, in an effort to bring about formal coordination between the two agencies in financing the construction of research vessels for oceanographic institutions. He advised us, however, that detailed plans for coordination had not been agreed upon.

Conversion versus construction of vessels

Studies conducted by the Interagency Committee on Oceanography of the Federal Council for Science and Technology have shown that, based on the experience of the U.S. Coast and Geodetic Survey and the Navy's Bureau of Ships (now the Naval Ship Systems Command), the conversion of old vessels to oceanographic research vessels is, in the long run, both uneconomical and inefficient. The Committee's report dated April 1963 on plans for a National Oceanographic Program for fiscal year 1964 stated that the average converted vessel has an estimated useful life of 5 to 10 years, compared with an estimated useful life of 20 to 30 years for a new vessel, and that a converted vessel is 50 to 100 percent more expensive to operate than a new vessel. The Committee's Ships Panel in an earlier study had concluded that, although certain immediate gains such as lower initial costs and earlier availability might be derived from the use of converted vessels, such use in any long-range program was entirely unwarranted and recommended that, in future oceanographic ship programs, Federal support be restricted to financing the construction of new vessels.

NSF's grants to educational and other nonprofit institutions for the procurement of oceanographic research vessels, in the majority of cases, were for the conversion or modification of military or other type ships into research vessels. NSF, however, had not made, or required the institutions to make, feasibility studies to determine whether converted vessels or new vessels would best serve the interests of a particular oceanographic institution and would accomplish the objectives of the oceanographic program within available funds. Also, NSF had not made long-range plans for the orderly replacement of the converted vessels.

The following table shows the amount of grants awarded by NSF during fiscal years 1961 through 1969 for the construction, conversion, or modification of 12 major research vessels, together with other pertinent information.

Grantee	Name of vessel	Length (feet)	Age (years)	Year completed	Amount of NSF grant
New construction					
Woods Hole	ATLANTIS II[1]	210	-	1963	$5,000,000
Duke University	EASTWARD	118	-	1964	1,145,000
Scripps Institution of Oceanography	ALPHA HELIX	133	-	1965	1,536,000
Johns Hopkins University	R. WARFIELD	106	-	1967	1,570,000
Converted					
University of Michigan	INLAND SEAS	108	19	1962	147,500
Stanford University	TE VEGA	135	31	1963	716,000
Texas A&M University	ALAMINOS	180	18	1963	975,000
Institute of Marine Science	PILLSBURY[2]	177	20	1963	489,000
Oregon State University	YAQUINA	180	19	1964	770,000
University of Hawaii	TERITU	96	11	1965	440,000
Modified:					
Institute of Marine Science	PILLSBURY	177	22	1965	300,000
University of Hawaii	TERITU	96	14	1968	127,000
Scripps Institution of Oceanography	AGASSIZ	180	22	1968	330,200
Lamont-Doherty	VEMA[3]	200	44	1968	396,000

[1]See photo on page 20.

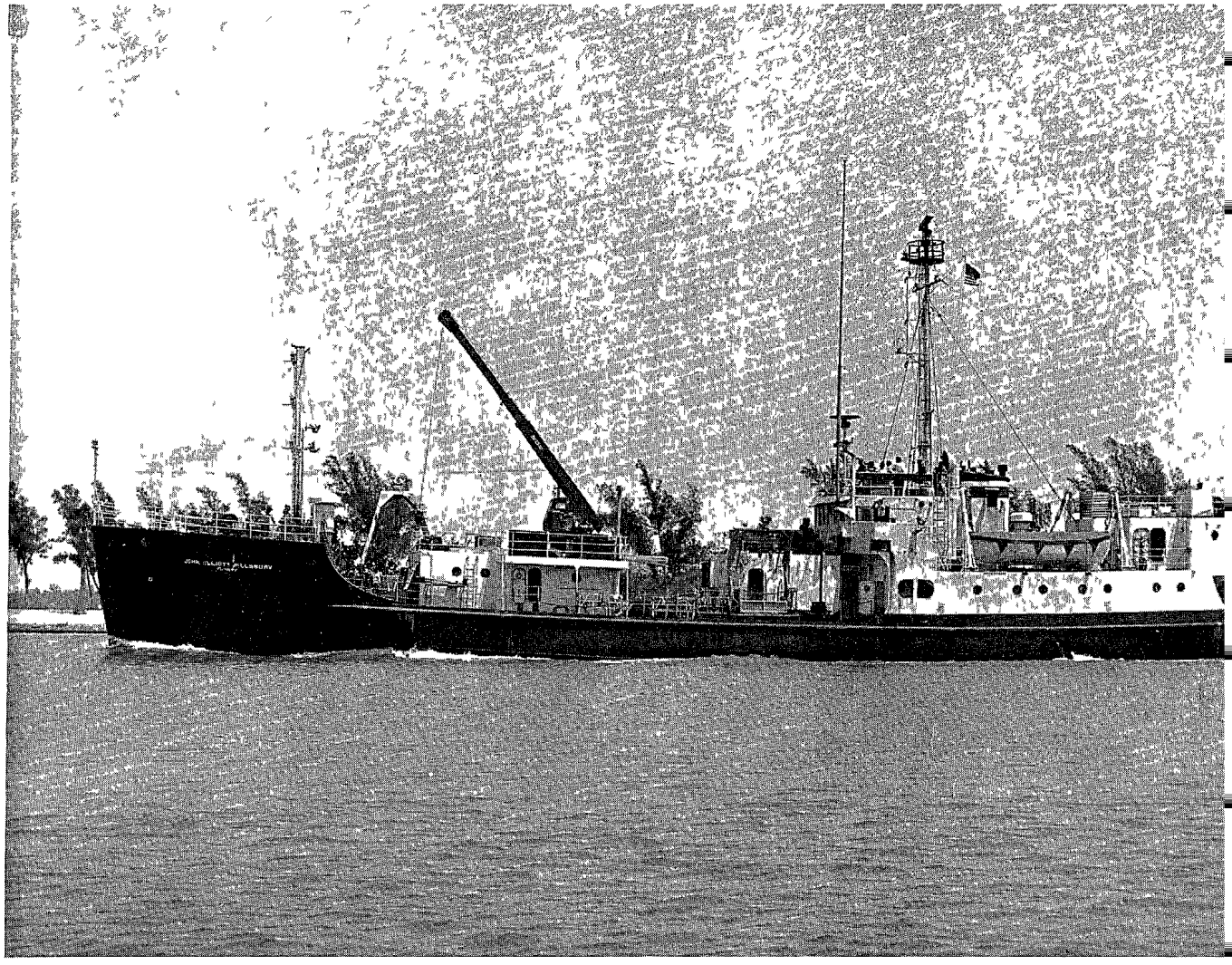
[2]See photo on page 21.

[3]See photo on page 22.

FURNISHED BY WOODS HOLE

R/V ATLANTIS II

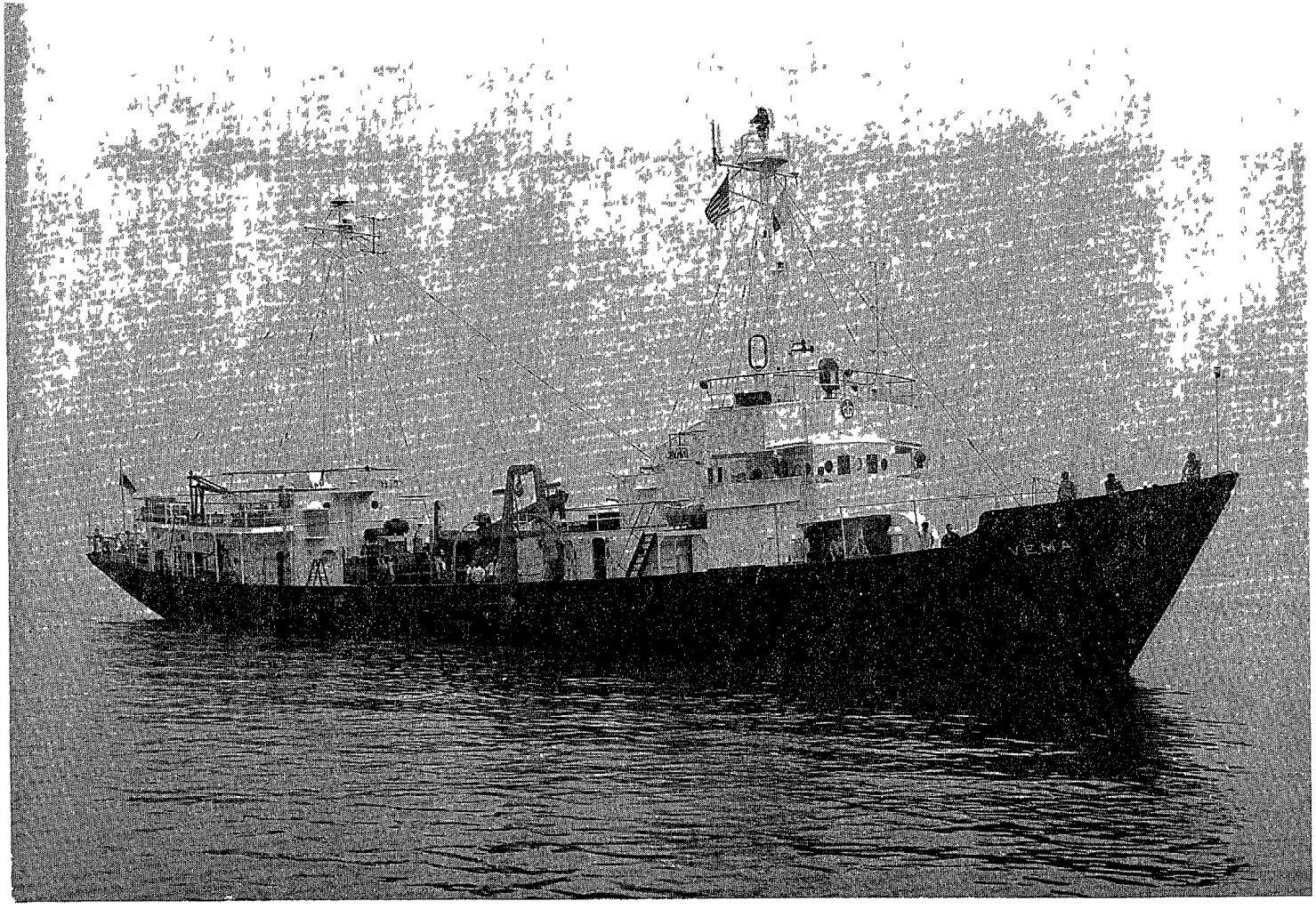
WOODS HOLE OCEANOGRAPHIC INSTITUTION



FURNISHED BY THE INSTITUTE OF MARINE SCIENCE

R/V PILLSBURY

INSTITUTE OF MARINE SCIENCE, UNIVERSITY OF MIAMI



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R/V VEMA

LAMONT DOHERTY GEOLOGICAL OBSERVATORY COLUMBIA UNIVERSITY

During hearings held in 1968 before the Subcommittee on Independent Offices of the House Committee on Appropriations, NSF presented information showing that at least five NSF-supported research vessels, including three converted World War II vessels, were overage and that their maintenance costs were excessive when compared to the value of the vessels. NSF officials have, on several other occasions, expressed an awareness of the disadvantages of using converted vessels for oceanographic research. However, NSF officials advised us that NSF had awarded grants for the conversion and modification of converted vessels primarily because it considered this to be the most expeditious means of putting research vessels into operation at the least initial cost.

The experience with two NSF-funded research vessels, the Institute of Marine Science's PILLSBURY and Stanford's TE VEGA, illustrates that converted vessels are costly to operate and have a limited useful life.

The Institute of Marine Science converted a former Army supply vessel to a research vessel--renamed the PILLSBURY--in lieu of its planned construction of a catamaran (a twin-hull vessel) to meet its oceangoing research vessel needs. In January 1961 the Institute had requested an NSF grant for the design and construction of the catamaran and had been awarded a grant of $150,000 for its design (of which $131,700 was disbursed). In September 1962, while the design of the catamaran was in process, the Institute acquired the Army supply vessel and requested an NSF grant for its conversion. NSF awarded a grant of $489,000 to cover the conversion cost. NSF's Advisory Panel for Oceanographic Facilities recommended that the grant be made because further evaluation of the catamaran's "sea-keeping characteristics" was necessary before it could be constructed. In 1964, NSF awarded another grant of $300,000 for further modification of the PILLSBURY.

The costs of operating the PILLSBURY increased substantially from about $377,000 in 1964 to about $618,000 in 1967. In June 1969, NSF awarded the Institute a grant of $1.4 million for the construction of a new vessel. The NSF "Proposal Review Summary and Program Recommendations" relating to this grant stated that a special survey of the

PILLSBURY in August 1967 showed that the PILLSBURY was in poor condition and, even with the best maintenance and operating practice, would need to be replaced before 1975, or about 10 years after the vessel was converted. NSF's review stated also that, although the proposed new vessel was intended as a replacement for the Institute's research vessel GERDA, it could instead serve as a replacement for the PILLSBURY, if necessary, as the need for replacement of both vessels was urgent.

In 1961 Stanford University, another NSF grantee, acquired the TE VEGA, a 135-foot schooner which had been built in 1930. NSF awarded Stanford a grant of about $716,000 to finance the cost of converting the TE VEGA to a research vessel; the conversion was completed in June 1963. The NSF files did not include a feasibility study regarding the decision to finance the cost of converting the vessel to a research vessel.

The TE VEGA was designated by NSF as a national facility and the on-board research programs conducted by Stanford and other organizations were subject to annual approval by a national advisory committee composed of representatives of Stanford and other institutions that used the vessel. The TE VEGA was also oriented toward training new oceanographers. In this role the TE VEGA was considered by NSF to be filling a critical need of the nation.

As brought out in the Interagency Committee on Oceanography report of 1963, a converted vessel, such as the TE VEGA, would generally have an estimated useful life of 5 to 10 years from the date of conversion. In May 1965, while the TE VEGA was being overhauled, a consulting engineer employed by NSF estimated that the remaining useful life of the vessel after completion of the overhaul would be only 2 or 3 years. In September 1968 Stanford decided to terminate the operations of the TE VEGA. Because of the vessel's high annual operating cost and NSF's limited ship support funds, NSF concurred in the decision.

Thus after about 5-1/2 years of service, the TE VEGA was retired and replaced by a 96-foot tuna clipper which was converted to a research vessel at the expense of Stanford. Because of the smaller size of the replacement

vessel, Stanford decided that it would not be used as a national facility as it would only accommodate its research needs.

We discussed the relative merits of conversion of used vessels versus construction of new research vessels with NSF's Deputy Assistant Director for Research, who agreed that feasibility studies should be made before deciding on construction or conversion of vessels. He stated that he was not involved in past decisions to convert used vessels to research vessels and that the responsible program officials were no longer employed by NSF. He expressed the opinion, however, that the conversions were probably financed because there was a great need for vessels at the time, and that the conversion of used vessels represented the fastest means of acquiring research vessels at the least cost. He also stated that, although NSF would continue to consider proposals for the conversion of used vessels, future conversions would probably be limited in number because of the shortage of vessels suitable for conversion.

Proposal and agency action

In a draft of this report transmitted to NSF and to the Navy for comment, we proposed that the Director, NSF, in formal coordination with the Secretary of the Navy, prepare definitive long-range plans for financing the procurement of research vessels for oceanographic institutions. We also proposed that the Director, NSF, establish procedures requiring feasibility studies before determinations are made as to whether NSF should fund the conversion of used vessels or the construction of new vessels.

The Director, NSF, and the Assistant Secretary of the Navy (Financial Management), advised us by letters dated September 5, 1969, and July 31, 1969, respectively (see apps. III and IV), that they concurred with our proposal regarding coordinated long-range plans and that steps had been taken to establish procedures for carrying out such coordination. The Director advised us also that, in coordinating long-range plans with ONR, feasibility studies would be conducted before determinations were made as to

whether the construction of new vessels or the conversion of used vessels should be funded. In June 1970 the Deputy Assistant Director for Research advised us that coordination procedures had been established.

With regard to the conversion of vessels financed by NSF in the past, the Director commented that such conversions were made at the time when a number of burgeoning oceanographic programs had reached a point where the availability of some kind of research vessel was crucial to their further development and that the conversion of available vessels served and would continue to serve effectively as an interim solution.

USE OF EXPERT SHIPBUILDING SERVICES OF OTHER FEDERAL AGENCIES

We believe that, in connection with financing the construction or conversion of vessels for oceanographic research, it would be desirable for NSF to avail itself of existing Government expertise in shipbuilding, especially since NSF itself does not have the in-house technical capability to advise and assist grantee institutions and to fully protect the interest of the Government. The Maritime Administration, the Naval Ship Systems Command, and the Coast Guard have in-house capability for handling all aspects of shipbuilding, including designing, soliciting bids for construction or conversion contracts, contracting, inspecting, and accepting delivery of a vessel.

In the case of grants for the construction or conversion of large research vessels, NSF has required grantee institutions to submit certain basic planning information for its review and concurrence. In some cases, NSF has submitted this information to marine architects--hired by NSF as consultants or serving on Government advisory committees--to obtain technical advice as to the architectural and engineering soundness of grantee institutions' vessel construction or conversion plans. In other cases, NSF has not sought the technical advice of knowledgeable persons or agencies and has confined itself to internal reviews mainly of the contract provision proposed by grantee institutions. NSF grants for the construction of small vessels generally have not included a requirement that the grantee submit engineering information to NSF, and NSF has relied on the institutions to obtain the necessary expert technical advice.

NSF's oceanography program staff does not include naval architects. Therefore, expert technical advice from other Federal agencies would be helpful to NSF in administering grants to those institutions which have no in-house capability in shipbuilding. In this regard, a University of Miami official, responsible for the administration of the contract for the conversion of the PILLSBURY, expressed the opinion that technical consultants should have been employed to develop adequate plans, specifications, and working drawings. This opinion was based on the fact that those prepared by the Institute of Marine Science pertaining to the

conversion of the vessel were deficient and, as a result, numerous changes had to be made to the contract which resulted in cost increases.

A Maritime Administration official told us that vessel design and construction services were available, on a reimbursable basis--when requested by an agency--encompassing the sequence of events from the inception of a vessel design to the actual delivery of the completed vessel. He advised us that Maritime assisted other Government agencies in the design and construction of oceanographic research vessels and would also assist NSF if so requested.

In 1961 the Interagency Committee on Oceanography proposed that its member agencies, including NSF, adopt certain recommendations aimed at achieving uniform contracting procedures for ship construction. One of the Committee's recommendations stated that all Federal agencies, which provide funds for the construction of oceanographic vessels in excess of 300 gross tons, be urged to adopt the following procedures so that the Government's interest would be more fully protected:

1. Ship characteristics and designs, which should meet the requirements of the user laboratory, may be prepared by a private contractor or a Government agency at the option of the funding agency.

2. Final contract design should be reviewed for technical feasibility by Maritime or the Navy's Bureau of Ships to the extent that the proposed design is sound from a naval architectural and marine engineering standpoint and that the contract plans and specifications form a satisfactory basis for competent bidding.

3. After approval of the final design, the funding agency should decide whether Maritime, the Bureau of Ships, the funding agency, or the user laboratory will handle all the remaining details including solicitation of bids, contracting, and inspection of the ship during construction.

4. The acceptance trials of ships built with Government funds should be conducted by survey boards of either Maritime or the Navy. The survey boards should be augmented to include user laboratory or agency representatives and should act for the funding agency to ensure that the finished ship meets the contract specifications. The funding agency should follow the recommendations of the Board prior to acceptance of the ship.

The NSF Deputy Assistant Director for Research advised the Chairman of the Committee in December 1961 that NSF concurred with the recommendation and believed that its adoption would be of material value in the program for augmenting the fleet of research vessels.

Although the recommended procedures were intended to apply to oceanographic vessels in excess of 300 gross tons, we believe that the procedures could be effectively applied to the construction or conversion of all NSF-financed oceanographic research vessels, regardless of size. Such procedures would provide for consistent expert review and administration of all aspects of vessel construction or conversion and would provide greater assurance that the Government's interests are being adequately protected.

We discussed the Committee's recommendation with the NSF Deputy Assistant Director for Research. He advised us in May 1969 that he agreed in principle with the recommendation and that he had initiated action for drafting procedures under which NSF would consistently seek the advice of Federal agency officials expert in the field of vessel construction and conversion.

Proposal and agency action

We proposed to the Director, NSF, that procedures be adopted requiring the utilization of the services of the Maritime Administration or other Federal agencies expert in vessel construction in all cases where NSF finances the procurement of oceanographic research vessels. The Director stated that he concurred with our proposal and that NSF is now following this procedure.

The Assistant Secretary of the Navy (Financial Management) informed us that the services of a special section within the Naval Ship Systems Command, whose primary responsibility is the design and construction of oceanographic research and surveying vessels, could be made available to NSF for assistance in its ship program.

TITLE TO RESEARCH VESSELS

NSF and ONR provide research vessels to oceanographic institutions on differing bases. ONR, as a matter of policy, retains title to the vessels, whereas NSF, in line with its general policy, conveys title to the vessels to grantee institutions, subject to the Government's right to reclaim the vessels in case of national emergency or when the vessels are no longer used by the institutions for oceanographic research. Because of NSF's policy of transferring title to the vessels to the grantee institutions, the premiums for hull insurance on the vessels are borne by the Federal agencies which finance the operating costs of the vessels.

Hull insurance provides coverage for damage to the hull, its fittings, machinery, boats, and equipment caused by perils of the sea, fire, collision, theft, and fraudulent breach of duty by the master and crew. Under ONR's policy of retaining title to the vessels, the Government does not pay for hull insurance premiums because of its policy of being a self-insurer.

We estimated that, during calendar years 1963-67, hull insurance premiums totaled about $550,000 on 10 research vessels, for which NSF had financed all or substantially all the construction or conversion costs, and that the costs of this insurance were borne for the most part by Federal agencies.

During our review we suggested to the Director, NSF, that, if NSF retained title to the vessels for which it had financed all or substantially all the construction or conversion costs, the purchase of hull insurance could be avoided under the Government's policy of self-insurance.

The Director advised us that NSF's policy of not taking title to equipment or facilities acquired by grantees with NSF grant funds best serves the goal of strengthening the scientific potential of an institution while protecting its independence. The Director agreed that the Government saves money through self-insurance but questioned whether the relatively small vessel operations program of NSF provided a statistically broad enough base to provide savings in the event of a major accident. He also expressed the view that, if the vessels were self-insured, any serious damage to a vessel could not be absorbed within the NSF budget without reprogramming funds, which is not always possible, and that seeking new funds from the Congress is time consuming and could cause delays of more than a year.

NSF's policy of conveying title may provide certain advantages both to NSF and the grantee institution and may involve considerations other than the added cost to the Government of financing hull insurance premiums. We noted, however, that the institutions where we made our review experienced no disadvantages in the conduct of their research programs by using Government-owned vessels furnished by ONR. Further, some of the vessels conveyed to oceanographic institutions were designated by NSF as national research facilities because of the national importance of these vessels in the area of oceanography. We believe that retention of title to these vessels by the Government would be consistent with the special status of the vessels and provide NSF with greater flexibility in their use.

With respect to the question of insurance coverage, the policy of the Government as a self-insurer has been well established and, in our opinion, the insurance of research vessels financed by NSF should be considered from the view point of the Government as a whole and should be consistent with the Government's established policy. A practical solution could be the use of broad, flexible grant arrangements which provide that NSF retain title to the vessels and that the grantees have full operational control over the use of the vessels.

We conclude that the matter of ownership of Government-financed research vessels, furnished to oceanographic institutions, requires the consideration of appropriate

coordinating bodies in the executive branch because it involves the oceanographic research activities financed by several Federal agencies and the need for a Government-wide policy.

Recommendation to the Director, NSF

We recommend that the Director, NSF, as a member of the National Council on Marine Resources and Engineering Development and the Federal Council for Science and Technology, present the question of ownership of research vessels to these coordinating bodies for consideration in establishing an appropriate Government policy regarding title to oceanographic research vessels purchased with Federal funds.

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In commenting on our recommendation, the Director expressed his concurrence and informed us that NSF was taking the steps necessary to implement it.

CHAPTER 4

SUPPORT OF RESEARCH VESSEL OPERATIONS

A substantial portion of NSF grant funds available for basic research in oceanography is annually committed to the operational support of research vessels at oceanographic institutions. In fiscal year 1969, NSF awarded grants totaling about $19 million for the support of basic research in oceanography. Of this amount $8.6 million was for the support of 32 research vessels and other assorted vessels operated or chartered by 18 universities and other nonprofit research institutions. NSF's level of support in recent years has been slightly in excess of 50 percent of the total cost of operating these vessels, ONR has provided about 40 percent, and the remaining support has been provided by other Federal agencies and State and local sources.

NEED FOR FORMAL COORDINATION OF FEDERAL SUPPORT OF RESEARCH VESSEL OPERATIONS

~~The~~ Federal agencies providing funds to oceanographic institutions in support of research vessel operations have not ~~formally~~ coordinated their ~~financial~~ support to meet the overall objectives of the national oceanographic program. ~~These~~ funds have been provided by ~~the various~~ Federal agencies principally on the basis of the needs presented by the individual institutions. Although NSF has taken into account the anticipated funding by other Federal agencies, it has not ~~jointly~~ participated with these agencies in planning for the most desirable use of the ~~available~~ funds for the support of vessel operations and for the optimum use ~~of the institutions'~~ research vessels.

~~The amount of~~ Funding provided by NSF to an institution, although subject to the availability of funds, generally has been determined on the basis of the difference between the institution's total estimated costs of ~~research~~ vessel operations and that portion of the costs that the institution expects to be financed by other Federal or private sources. An NSF Ship Operations Panel, composed of the two NSF program officials concerned with research vessel operations and four outside consultants, meets annually to review all vessel support proposals from institutions

and recommends the amount of grant funds to be awarded to each institution.

The practice of ONR and other Federal agencies has been to estimate for each year the amount of vessel support ~~funds~~ to be provided by them, individually, to an institution without regard to other sources of financing. The actual funding is provided under individual research project grants or ~~and~~ contracts as they are awarded during the year. The ~~amount~~ funds so provided is based on the estimated number of days a vessel will be at sea and is later adjusted to actual usage of the vessel.

NSF officials have expressed concern over this method of funding ~~research~~ vessel operations because the Federal agencies, even though they plan to support a given number of research projects and related ~~vessel~~ operating costs, may decide to cancel a project, ~~and withdraw the corresponding vessel support~~. This situation has resulted in institutions' either requesting additional funds from NSF, [generally at a time when NSF has already obligated all its available research vessel support funds,] or keeping the vessel in port ~~and~~ but charging the continuing fixed costs to ~~open support~~ grants and contracts.

We noted that ONR had not supported vessel operating costs at the Institute of Marine Science to the extent estimated by ONR for fiscal years 1966 and 1968. In fiscal year 1966 the Institute requested funds from NSF to cover a deficit in ship operating funds that was caused, in part, by ONR's reducing its support by about $37,000 below the amount originally planned. In fiscal year 1968 the Institute requested an additional $50,000 for vessel operations from NSF because ONR provided one third less than the Institute had originally expected from ONR.

With regard to the Institute's request for additional funds, NSF officials commented that the difference between the funding methods of ONR and NSF created problems for the Institute in preparing its requests to the two agencies for vessel operating funds. NSF records also showed that the University of Rhode Island, the University of Hawaii, and Texas A&M University had encountered difficulties in

preparing requests for research vessel support because of the two different funding methods.

Although there have been informal discussions between ONR and NSF on the feasibility of coordinated funding of vessel operations, this matter appeared to require consideration at the highest levels within the two agencies to finalize and implement procedures for coordinated funding. NSF and ONR officials, with whom we discussed this matter, agreed that coordinated support would be feasible and desirable and would result in better funding and administrative practices between the two agencies.

Coordinated funding, in our opinion, would also simplify administrative procedures at the grantee institutions by avoiding the uncertainty as to the amount of research vessel support funds to be received and would enable the institutions to plan for more effective utilization of their vessels. We believe that any coordinated funding arrangement between NSF and ONR should be extended to other Federal agencies which support the operation of research vessels at oceanographic institutions.

A grantee institution's decision to withdraw a national research vessel, such as the ALPHA HELIX, from operations because of fund limitations would seem to be appropriate for Government-wide consideration. The ALPHA HELIX--owned by Scripps Institution of Oceanography, University of California, and operated by it as a national research facility--was constructed in 1965 with financial support from NSF totaling about $1.5 million. This vessel was taken out of operation in November 1968 because the NSF grant funds provided for its operation had been expended and NSF's limited funds for support of vessel operations in fiscal year 1969 did not permit the continued financing of the operation of the vessel. Officials at Scripps Institution informed us of their concern about the inoperative status of the ALPHA HELIX and expressed the belief that special consideration should have been given to the continued operation of this vessel.

According to information submitted by NSF to the Subcommittee on Science, Research, and Development of the

House Committee on Science and Astronautics in connection with the hearings on NSF's fiscal year 1970 authorization, the scheduled operations of several other vessels were reduced or markedly altered in fiscal year 1969 because of the uncertainties created by expenditure ceilings. With limited funds available, it appears particularly important that the Government's vessel operating support activities be jointly considered by the sponsoring agencies so that research activities aboard vessels that contribute most to the national research program can be given proper consideration.

The Commission on Marine Science, Engineering and Resources, in its report of January 1969 entitled "Our Nation and the Sea," recommended that those functions of NSF and ONR which provide institutional support, such as the support of research vessel operations, should be transferred to one central agency for administration. On July 9, 1970, the President submitted Reorganization Plan No. 4 of 1970, which would establish the National Oceanographic and Atmospheric Administration in the Department of Commerce. The functions of this new agency would not include institutional support as proposed in the 1969 report and existing responsibilities for the support of research vessels operations would remain unchanged.

Proposal, agency comments, and our evaluation

We proposed that the Director, NSF, in coordination with the Secretary of the Navy, devise procedures for jointly financing the research vessel operating costs of oceanographic institutions.

In commenting on our proposal, the Director, NSF, stated that the uncertainties concerning levels of support at each institution stem more from the uncertainty of Federal funds available for research vessel operations than from the differences in methods of support. He expressed the belief that the only alternative to the present system of multiagency support would be single agency funding of research vessel operations, apart from individual agency research support, with appropriate transfers of funds from other agencies. This, according to the Director, would

decrease the administrative work load of the operating institutions but would not result in decreasing vessel operating costs or increasing vessel usage over present levels.

In commenting on our proposal, the Assistant Secretary of the Navy (Financial Management), pointed out the need for different approaches in financing the costs of operating research vessels because of the funding agencies' different missions. He stated that these different approaches might present difficulties in working out joint funding but did not preclude it.

Although the single agency funding concept referred to by the NSF Director would alleviate some of the ~~inherent~~ administrative problems ~~associated with~~ of the multiagency support system, it would not eliminate the need for Federal agencies to ~~formally~~ coordinate their plans ~~for providing funds to oceanographic institutions for support of research~~ vessel operations. Such coordination, in our opinion, would be necessary to ensure that national goals in oceanographic research are adequately considered and jointly pursued by ~~the various~~ also interested Federal agencies. Although coordinated planning may not result in an increase in the funds ~~available~~ for ship operations, we believe that it would permit the establishment of priorities for their most effective use ~~of the funds available for support of research vessels of the oceanographic institutions.~~

Recommendation to the Director, NSF, and the Secretary of the Navy

We recommend that, pending action on the recommendation of the Commission on Marine Science, Engineering and Resources, the Director, NSF, and the Secretary of the Navy, together with other Federal agencies which support oceanographic research vessel operations, establish procedures for ~~formal~~ coordination of the funding of vessel operations. Such coordination procedures would provide greater assurance to the institutions regarding the availability of Federal funds and to the sponsoring Federal agencies regarding the effective use of such funds within the overall objectives of a national program for oceanographic research.

NEED FOR UNIFORM AND EQUITABLE METHOD OF ALLOCATING RESEARCH VESSEL OPERATING COSTS

At the three oceanographic institutions included in our review, we found that each institution was using a different method of allocating research vessel operating costs to federally supported research projects. NSF and the other agencies supporting oceanographic research had not prescribed a uniform method of allocating costs so that the research projects benefiting from the use of research vessels would be charged on an equitable basis for the applicable vessel operating costs.

Woods Hole allocated its vessel operating costs only to those Federal grants or contracts which financed the projects undertaken by the chief scientist for whom a particular voyage had been arranged. Any projects undertaken by other scientists or technicians participating in the same voyage but working on research studies which were not a part of the chief scientist's projects were not charged a share of the costs of the voyage. This method of allocating costs tends to overstate the costs of the chief scientist's projects and to understate the costs of other research projects.

The Institute of Marine Science allocated its vessel operating costs to research projects on the basis of number of days a vessel was used for the benefit of one or more research projects, as determined by the scientists in charge of the projects and participating in the voyage. This method presupposed that an accurate vessel log was maintained for each voyage which would identify the projects being worked on each day of the voyage.

At Lamont-Doherty, we found that vessel logs were not maintained in a manner which would identify the projects being undertaken, nor the grants or contracts under which the projects were financed. Officials of Lamont-Doherty informed us that studies or experiments undertaken during a voyage were often multipurpose in nature and benefited more than one research project and possibly more than one funding agency. They stated, however, that, because the vessel logs did not identify the projects undertaken, the operating costs were generally allocated on the basis of the

availability of funds from the several funding agencies, rather than on the basis of projects undertaken.

Recommendation to the Director, NSF, and the Secretary of the Navy

In view of the different cost allocation methods used by oceanographic institutions, we recommend that the Director, NSF, in cooperation with the Secretary of the Navy, prescribe a uniform method of allocating research vessel operating costs to federally sponsored research projects, that would result in more representative cost allocations to individual projects and in an equitable distribution of costs between funding agencies.

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Both the Director, NSF, and the Assistant Secretary of the Navy (Financial Management) agreed on the need for a uniform method for institutions to allocate vessel operating costs to research projects sponsored by Federal agencies. The Assistant Secretary noted that the obstacles to arriving at a solution stemmed more from variations in practices of grantee institutions than differences between NSF and the Navy and stated that steps would be initiated to study the matter with NSF. The Director, NSF, advised us that, in cooperation with ONR, the institutions would be requested to work out reasonable changes in their cost allocation procedures.

INCONSISTENCY IN PERMITTING FEES TO BE PAID TO INSTITUTIONS USING VESSELS FINANCED BY THE GOVERNMENT

We noted an inconsistency between the practices of NSF and ONR with regard to permitting Woods Hole to earn fees on the operations of the two research vessels, the ATLANTIS II and the CHAIN. ONR's facilities contract, under which the research vessel CHAIN is made available to Woods Hole, provides that the costs of operating and maintaining the vessel be excluded from the cost base used in computing the fees to be paid by the Government under research contracts with Woods Hole. However, NSF has placed no such

restriction on Woods Hole with regard to the operation and maintenance costs of the ATLANTIS II, although NSF grant funds were used to finance the cost of constructing the vessel. The operation and maintenance costs of both vessels are paid for through charges to Government research grants and contracts.

Woods Hole's policy is to request a management fee on research projects that are performed under contracts with Federal agencies which provide for the payment of a management fee. The amount of the fee is generally 5 percent of the total estimated direct cost of a project. Woods Hole has included the operating costs of the ATLANTIS II in the cost base used in computing the fee. We estimate that, from January 1963 through December 1967, the Atomic Energy Commission (AEC) and ONR paid Woods Hole about $70,000 in management fees under research contracts with Woods Hole, on the basis of operation and maintenance cost of the ATLANTIS II.

During our review we brought this matter to the attention of the Director, NSF, who advised us that NSF agreed that it would be improper for any Government agency to pay a management fee to Woods Hole for the use of the ATLANTIS II and expressed the opinion that the negotiation of fees in accordance with the pertinent provisions of Federal procurement regulations should preclude such an occurrence. The regulations provide that fees be established as a fixed amount based on consideration of certain specific factors rather than as a percentage of a cost estimate.

Since Woods Hole has been paid fees under research contracts with Federal agencies based on the cost of operating the ATLANTIS II, we suggested to NSF that the payment of such fees be taken up with Woods Hole and the Federal agencies involved. Also, in August 1969 we suggested to the Director of Procurement Services, ONR, that its next negotiations with Woods Hole be based on a consideration of the fact that NSF financed the cost of constructing the ATLANTIS II and that its operating costs are financed under various Federal research contracts.

Agency action

The Assistant Secretary of the Navy (Financial Management), agreed that institutions should be precluded from charging fees to the Government for the operation of research vessels which have been financed substantially or in total with NSF funds. He stated that ONR adhered to this policy for those vessels supplied to institutions by the Navy.

Also, the Director of Procurement Services, ONR, advised us that, in connection with ONR's current negotiations with Woods Hole on a charter agreement for a new oceanographic vessel, ONR clearly indicated to Woods Hole that vessel operating costs for the CHAIN, the ATLANTIS II, and all other vessels furnished by the Government should be excluded from the cost base upon which fees are negotiated. He stated that this represented a change from ONR's previous procedures under which the operating costs of the ATLANTIS II were included in the cost base used as a basis for calculating a 5-percent management fee payable to Woods Hole.

The Director, NSF, informed us that NSF called AEC's attention to this matter by letter dated August 25, 1969, so that it could take similar action with respect to fees paid under its contracts involving the use of the ATLANTIS II. AEC advised NSF that, in determining the fee amount in future contracts with Woods Hole, it would consider the fact that Woods Hole received financial support from NSF for the operation and maintenance of the ATLANTIS II.

USE CHARGES FOR RESEARCH VESSEL DISCONTINUED

We noted that use charges paid by Federal agencies under research grants and contracts with Lamont-Doherty for the research vessel VEMA exceeded the cost of the vessel by $41,237. Columbia University's cost of acquiring the VEMA in 1953, and subsequent capital improvements, totaled $105,014. By 1963 Columbia University had recovered its costs as a result of assessing an annual use charge of $10,501 over a 10-year period against grants and contracts with Federal agencies (principally ONR, NSF, and AEC) for

research activities which required the use of the VEMA by Lamont-Doherty.

Columbia University, however, continued to assess the use charge against the Federal agencies' research grants and contracts beyond the 10-year period without specific approval from the agencies. Since NSF awarded Lamont-Doherty a grant of $396,000 in July 1967 for the renovation of the VEMA which was to be retained in use for another 20 years, there was no justification for continuing the use charge against Federal grants and contracts.

During our review at Lamont-Doherty, we discussed this matter with Columbia University officials and the resident auditor of the Defense Contract Audit Agency (DCAA). As a result of our discussions, the matter was taken up by DCAA with ONR and an agreement was reached between ONR and Columbia University that the use charge would be discontinued effective July 1, 1968. ONR did not insist on an adjustment of the prior year overcharges of $41,237 because of the apparent lack of a definitive understanding with Columbia University for the earlier period.

CHAPTER 5

SCOPE OF REVIEW

Our review was directed toward an evaluation of NSF's policies, procedures, and practices in the administration of grants to oceanographic institutions for the construction of shore facilities and the construction, conversion, and operation of research vessels. Our review was conducted at NSF headquarters in Washington, D.C., and at three major grantee institutions--Woods Hole Oceanographic Institution, Woods Hole, Massachusetts; Columbia University's Lamont-Doherty Geological Observatory, Palisades, New York; and the University of Miami's Institute of Marine Science, Miami, Florida--and covered grants awarded from fiscal year 1960 through 1969 to these and other selected institutions. We also reviewed the policies and practices of the Office of Naval Research which supports research activities of the same oceanographic institutions.

We reviewed pertinent project files and other records of NSF and the grantee institutions and interviewed NSF and institution officials concerned with the administration of the grants covered by our review. We had discussions with officials of the Office of Naval Research and other Federal agencies supporting oceanographic research programs to ascertain their administrative policies and procedures. We also reviewed NSF Internal Audit Office and Defense Contract Audit Agency reports pertaining to the programs covered by our review.

APPENDIXES

INFORMATION ON OPERATIONS

OF SELECTED GRANTEE INSTITUTIONS

WOODS HOLE OCEANOGRAPHIC INSTITUTION

The Woods Hole Oceanographic Institution--a private, nonprofit organization established in January 1930--is located on Cape Cod in Woods Hole, Massachusetts. Woods Hole owns about 26 acres of land on which its four major buildings and a number of smaller buildings are located and used as research laboratories, administrative offices, and residences for employees. (See the photo on p. 48.)

NSF provided grant funds of $2 million for the construction of the Laboratory of Marine Sciences, one of Woods Hole's major buildings, and ONR provided funds for the construction of another of the major buildings. The construction of a dock facility at a cost of about $3 million was also financed with grant funds furnished by NSF. Woods Hole operates four oceangoing research vessels as well as a deep submergence vessel and its tender. Its two major research vessels are the ATLANTIS II and the CHAIN. The ATLANTIS II, a specially designed research vessel, is owned by Woods Hole. Its construction was financed with NSF grant funds totaling about $5 million. (See the photo on p. 20.) The CHAIN is owned by the Department of the Navy. As of June 30, 1969, Woods Hole employed about 600 persons of whom 172 were scientific personnel.

The research work at Woods Hole is supported almost entirely by the Federal Government. ONR and NSF provide most of the funds. The following table shows the Federal funds provided in support of research activities at Woods Hole in calendar years 1967, 1968, and 1969, exclusive of funds provided for the construction of facilities.

MAJOR FACILITIES OF THE
WOODS HOLE OCEANOGRAPHIC INSTITUTION
R/V ATLANTIS II
NEW DOCK
R/V CHAIN
CATAMARAN FOR ALVIN
R/V GOSNOLD
R/V CRAWFORD
MAIN BUILDING
LABORATORY OF OCEANOGRAPHY
LABORATORY OF MARINE SCIENCES

Supporting agency	1967	1968	1969
National Science Foundation	$2,835,000	$2,695,254	$2,210,498
Office of Naval Research	5,295,000	5,597,457	5,963,320
Atomic Energy Commission	546,000	618,793	539,109
Department of the Interior	299,000	289,425	216,976
National Aeronautics and Space Administration	52,000	141,785	212,218
Department of Health, Education, and Welfare	94,000	109,583	123,982
Other	141,000	103,404	130,874
Total	$9,262,000	$9,555,701	$9,396,977

The Federal support funds provided in fiscal year 1969 included funds for the cost of operating Woods Hole's research vessels as follows:

Vessel	Funding agency			Total
	NSF	ONR	Other	
ATLANTIS II	$457,857	$ 324,425	$26,163	$ 808,445
CHAIN	50,442	631,848	-	682,290
CRAWFORD	22,515	-	-	22,515
GOSNOLD	137,303	35,405	44,905	217,613
LULA (catamaran)	-	103,989	-	103,989
ASTERIAS (small vessel)	3,241	1,548	629	5,418
Total	$671,358	$1,097,215	$71,697	$1,840,270

Woods Hole's research work in oceanography is conducted in the following four major scientific disciplines:

Geology and geophysics--Includes studies of the layers and structures of the ocean bottom and its characteristics.

Chemistry--Includes the chemical analysis of sea water, the measurement of radioactive fall-out, and the distribution of organic materials in the oceans.

Biological--Includes studies of small plant and animal life cycles, microbiology, and the physiology of marine organisms.

Physical oceanography--Includes studies in the densities, patterns, flows, and changes of the oceans.

A department of ocean engineering provides support for the above research activities; it includes computer and instrumentation services and the operation of the deep submergence research vessel, ALVIN.

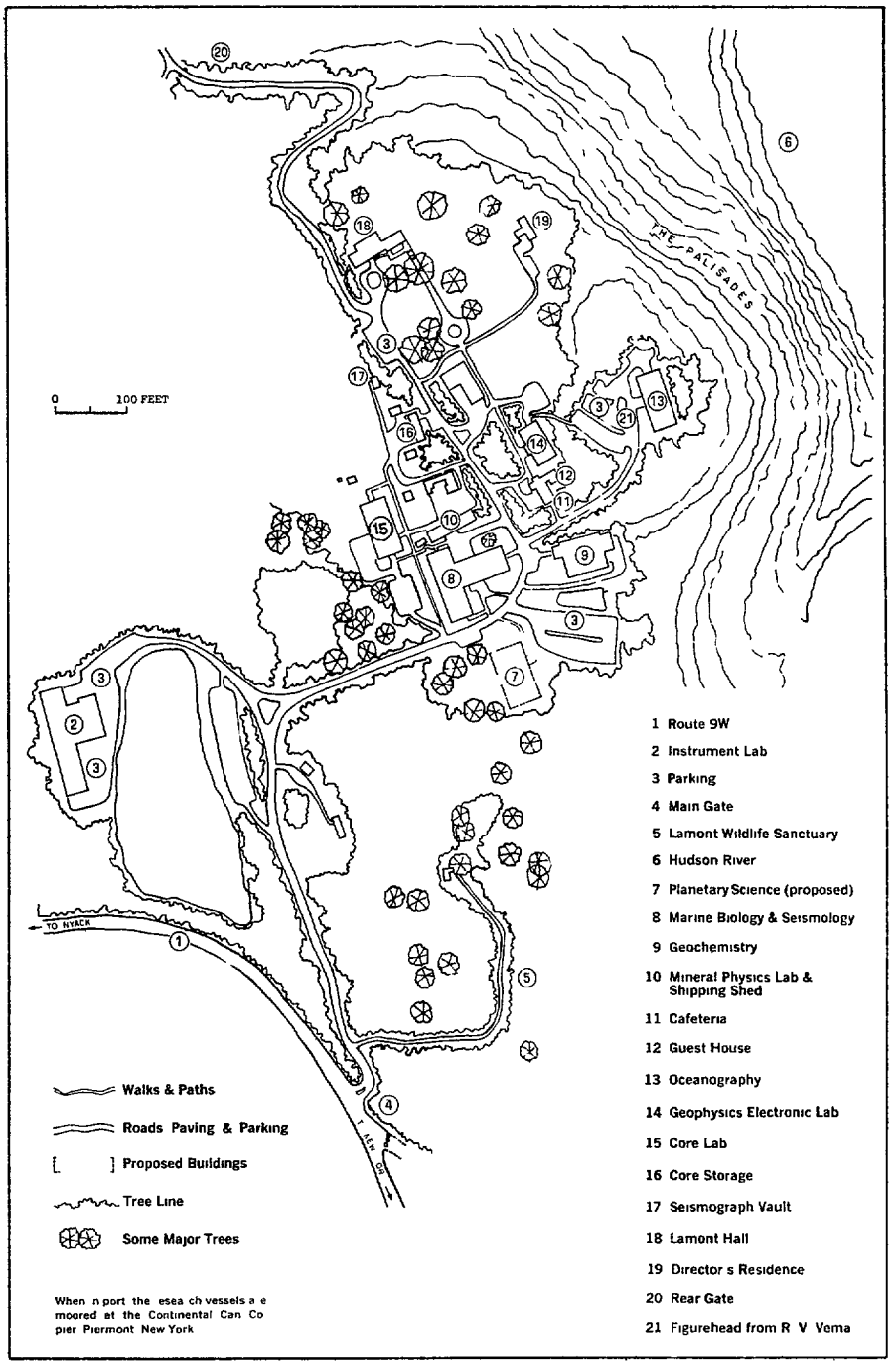
LAMONT-DOHERTY GEOLOGICAL OBSERVATORY

The Lamont-Doherty Geological Observatory, located on the Hudson River in Palisades, New York, is owned and operated by Columbia University as a center for instruction and research in geophysics. The Observatory is situated on a 125-acre site and comprises eight major buildings and a number of smaller buildings used as research laboratories, administrative offices, cafeteria, storage sheds, and a residence for the director. (See the map on p. 51.)

Lamont-Doherty estimated that the buildings cost about $3.41 million. NSF contributed $1.05 million toward the construction cost of about $1.8 million for three major buildings, the Marine Biology-Seismology Building, the Core Laboratory, and the Instrument Laboratory. The Navy is providing financial support for the construction of two other buildings by allowing annual use charges to be made against its contracts until 80 percent of the construction cost of about $860,000 is amortized. NSF also provided $120,000 for the renovation of a pier.

Lamont-Doherty operates two oceangoing vessels--the VEMA and the ROBERT D. CONRAD--and maintains geophysical field stations in Bermuda and the Canary Islands. The VEMA (see photo on p. 22) is owned by the University, the

Columbia University
The Lamont-Doherty Geological Observatory



FURNISHED BY LAMONT-DOHERTY

PALISADES, NEW YORK

ROBERT D. CONRAD is owned by the Navy. Lamont-Doherty's Bermuda field station also operates six smaller Government-furnished vessels.

The research work of Lamont-Doherty is almost entirely Government-supported. The following table shows the amount of Federal funds provided in support of research at Lamont-Doherty in fiscal years 1967, 1968, and 1969, exclusive of funds provided for construction of facilities.

Supporting agency	1967	1968	1969
National Science Foundation	$2,813,000	$2,104,371	$2,319,406
Office of Naval Research	3,336,000	3,415,824	3,027,852
Atomic Energy Commission	365,000	492,288	354,437
National Aeronautics and Space Administration	588,000	529,624	540,926
Department of the Air Force	577,000	442,877	307,017
Department of Health, Education, and Welfare	126,000	138,519	106,528
Other	82,000	102,742	114,298
Total	$7,887,000	$7,226,245	$6,770,464

The Federal support funds provided in fiscal year 1969 included funds for the cost of operating Lamont-Doherty's research vessels as follows:

Vessel	Funding agency NSF	ONR	Total
VEMA	$242,985	$257,985	$ 500,970
CONRAD	335,625	420,567	756,192
Total	$578,610	$678,552	$1,257,162

The Lamont-Doherty research activities are directed principally to the study of the earth, its origin and history, its structure, and its relation to the universe. The

research involves all scientific disciplines, although emphasis is placed on studies in seismology and oceanography.

Research is conducted in the following scientific disciplines:

Seismology--Includes the operation of seismic listening stations on land and on the ocean bottom.

Marine geophysics--Includes investigations of the nature of the materials beneath the ocean floor to determine the flow of heat through the ocean floor and to study the sounds in the ocean.

Submarine geology--Includes investigations aimed at the origin, structure, and history of ocean basins and deep-sea trenches.

Gravity--Includes studies of the long wave length components of the gravity fields over the world's oceans.

Physical oceanography--Includes investigations of the circulation of the ocean waters and distribution of water masses.

Chemical oceanography--Includes investigations directed toward developing an understanding of the chemical composition of sea water and sediments.

Other Lamont-Doherty areas of research include an investigation of the Arctic Ocean, the development of isotope methods for studying the earth, and studies of bottom-dwelling animals of the deep-sea floor.

In addition to research work, Lamont-Doherty conducts, as a integral part of Columbia University, an educational program leading to master of arts and doctor of philosophy degrees. Graduate work at Lamont-Doherty involves participation in the research programs of the Observatory, and participation on expeditions involving available research vessels. As of June 30, 1969, Lamont-Doherty had a staff of about 478, of whom 171 were scientific research personnel.

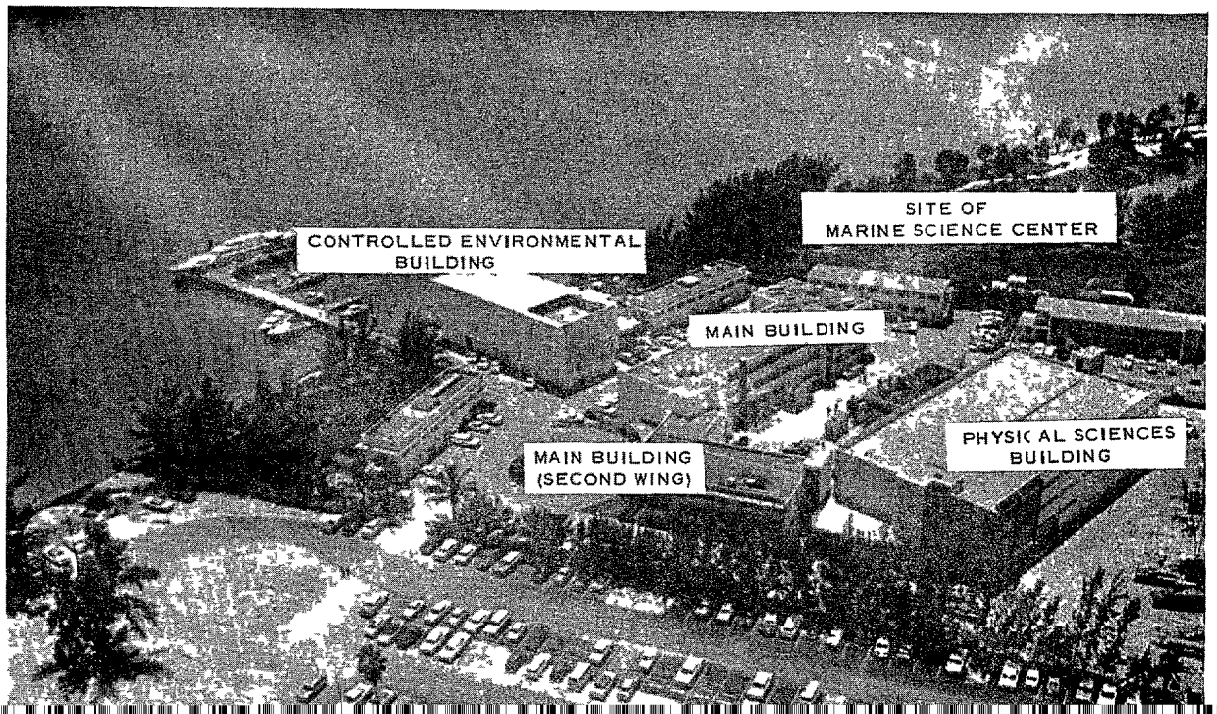
INSTITUTE OF MARINE SCIENCE

The Institute of Marine Science, located on Virginia Key about 10 miles from Miami, Florida, was established by the University of Miami in 1943. The Institute is located on 6 acres and its facilities consist of several buildings constructed at a cost of about $2.7 million. (See photo on p. 55.) NSF contributed $1.5 million toward the cost of constructing four buildings--the Physical Sciences Building, Controlled Environmental Building, Marine Science Center, and Wing 2 of the Main Building. The Institute operates two oceanographic research vessels--the GERDA and the PILLSBURY. The GERDA was donated to the Institute by a private source. The PILLSBURY (see photo on p. 21) was acquired by the Institute as a Government surplus vessel and converted into an oceanographic research vessel at a cost of $489,000 which was financed by NSF. The PILLSBURY was further modified later at a cost of $300,000 which was financed by NSF.

As of May 31, 1969, the Institute had a staff of 465 persons, of whom 248 were research personnel.

The following table shows the Federal funds provided to the Institute in support of its research activities during the fiscal years ended May 31, 1967, 1968, and 1969, exclusive of funds provided for construction of facilities.

Supporting agency	1967	1968	1969
National Science Foundation	$1,518,000	$1,347,781	$1,785,643
Department of the Navy	1,637,000	1,865,343	1,342,278
Department of Health, Education, and Welfare	228,000	118,546	56,095
Department of the Interior	210,000	326,211	393,508
Atomic Energy Commission	64,000	106,783	236,736
Department of the Army	37,000	44,342	51,613
Department of Commerce	82,000	67,477	38,203
Other	49,000	65,386	48,421
Total	$3,825,000	$3,941,869	$3,952,497

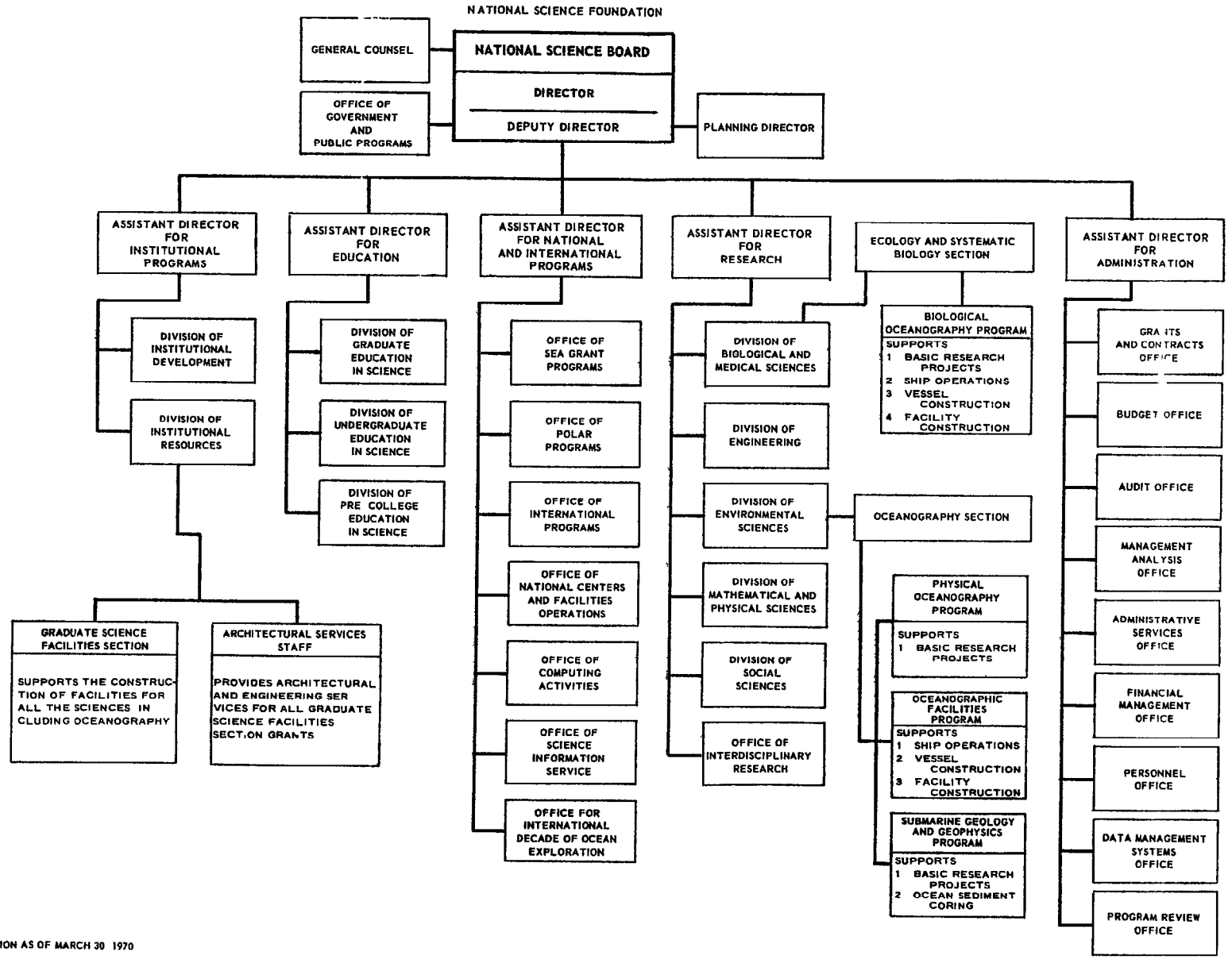

SITE OF
MARINE SCIENCE CENTER
CONTROLLED ENVIRONMENTAL
BUILDING
MAIN BUILDING
MAIN BUILDING
(SECOND WING)
PHYSICAL SCIENCES
BUILDING

The Federal support funds provided in fiscal year 1969 included funds for cost of operating the Institute's research vessels as follows:

Vessels	Funding agency NSF	ONR	Total
PILLSBURY	$592,114	$42,799	$634,913
GERDA	127,706	34,362	162,068
Total	$719,820	$77,161	$796,981

The Institute is composed of five research divisions. The Division of Biological Science conducts studies of the behavior of marine animals, such as the ability of sharks and bony fishes to detect various frequencies of sounds. The Division of Fishery Sciences undertakes studies primarily of the spawning, moulting, and hatching habits and the supply of various commercial fishes. The Division of Physical and Chemical Oceanography conducts research in areas such as water currents and undercurrents, hurricane movements, water structures, water properties, water acoustics, and the chemistry of air-sea interaction. The Division of Marine Geology and Geophysics conducts studies pertaining to the structure and the properties of the ocean floor. The Division of Ocean Engineering trains engineers in such areas as underwater communications, antisubmarine warfare, pollution, harbor protection, coastal erosion, oceanographic instruments, new fishing devices, and methods of locating sources of energy, food, chemicals, and minerals in the sea.

ORGANIZATION



ORGANIZATION AS OF MARCH 30 1970

NATIONAL SCIENCE FOUNDATION
OFFICE OF THE DIRECTOR
WASHINGTON, D C. 20550

SEP 5, 1969

Mr Frederick K. Rabel
Assistant Director
United States General
Accounting Office
Washington, D.C. 20548

Dear Mr Rabel·

This letter is in reply to your letter of June 3, 1969 to Dr. Haworth and the draft of your proposed report to the Congress entitled, "Federal Support for Construction of Shore Facilities and Vessels for Research Activities of Oceanographic Institutions."

In general, your suggestions and recommendations appear to the National Science Foundation to be sound and well taken. Many of these have already been implemented and others will be adopted in future practices. In a few cases, however, we believe there are underlying reasons for differing with the suggestions of the General Accounting Office. The separate recommendations given in the report are discussed in detail below.

The recommendations on the construction of oceanographic shore facilities are that NSF (1) provide for the adoption of uniform policies and procedures for the award and administration of grants for facility construction and consider the desirability of centralizing this administrative responsibility into a single office or division; and (2) develop clear and defined criteria for the classification of facilities insofar as it affects the extent to which NSF will participate in the costs of facilities. These recommendations result from a comparison made of the manner in which facilities proposals have been handled in three NSF program offices.

[See GAO note 1.]

[See GAO note 1.] We believe that certain differences in procedures relating to the two categories of facilities can be eliminated without destroying the separate identities in the program which were evolved to serve in different ways The graduate laboratory facilities mentioned respond to a homogeneous type of request which lends itself to routine handling. On the other hand, specialized research facilities are fewer in number, of a varied nature, and require individual handling.

With respect to the second recommendation in this section, we concur with the stated need for more clearly defined criteria for the classification of the facilities proposals, both as they affect administration and NSF participation in the cost of facilities. Steps will be taken to develop such criteria

The next set of comments pertain to the section entitled, "Construction and Conversion of Oceanographic Research Vessels." The recommendations of this section are as follows· (1) NSF, in formal coordination with the Department of the Navy, should prepare definitive long-range plans for financing procurement of research vessels for oceanographic institutions and establish procedures requiring feasibility studies before determinations are made as to whether NSF should fund the conversion or the new construction of vessels, (2) The Foundation should finalize procedures requiring the utilization of the services of the Maritime Administration or one of the other Government agencies expert in ship construction in all cases where NSF finances the procurement of oceanographic research vessels; (3) The Director, NSF, by virtue of his membership in the NCMRED and/or in FCST, should present the question of ownership of research vessels for consideration by these coordinating bodies so that an appropriate Government policy can be established

We concur with your first recommendation and are currently coordinating with the Office of Naval Research with respect to long-range plans as proposed. This coordination will include feasibility studies before determinations are made as to whether NSF should fund the conversion or the new construction of vessels.

We also concur with the recommendation to utilize other Government agencies expert in ship construction and are now following this procedure The new R/V Hero, for the Antarctic operations, was constructed through a transfer of funds to the Maritime Administration, and NSF was very pleased with this work. In addition to the above, a grant letter to the University of Miami dated June 27, 1969, a copy of which was recently sent to your office, contained special provisions for monitoring a ship construction grant. We believe the procedures outlined in this grant letter, which reflect our concurrence with your recommendation, can be adopted as standard procedures for this type of construction grants.

With reference to the third recommendation, we concur that the Director, NSF, should present the question of ownership of research vessels for consideration by appropriate coordinating interagency bodies so that a Government policy can be established We are taking necessary steps to implement this suggestion.

In addition to the above recommendations, this section of your report contains an extensive discussion of the comparative merits of construction versus conversion of vessels for use in oceanographic research. We should like to refer to the figures presented in this section.

The four newly constructed vessels averaging 142' l.o.a.^{2} cost a total of $9,156,000. The eight conversions/modifications averaging 146' l.o.a.^{2} cost a total of $4,690,700. At the price level prevailing in the early 60's when the four new vessels were funded, provision of eight additional new vessels in place of these conversions/modifications would have cost $18,300,000 or approximately four times the cost of the conversions and modifications. Regardless of the Foundation point of view with respect to the relative merits of construction versus conversion, there was no possibility of obtaining anything like the $18,300,000 which would have made possible eight new vessels. We point with considerable pride to the fact that NSF made possible the provision of eight vessels, whatever their individual merits, most of which will see far more than 10 years of productive oceanographic service. These conversions were made at a time when a number of burgeoning oceanographic programs had reached a point where the availability of some kind of research vessel was crucial to their future development In the early 60's there were vessels available for conversions, and the pressures in Congress and other portions of the Federal establishment were strong to utilize these existing facilities. As an interim solution, conversions have served and continue to serve very effectively.

The following comments pertain to the fourth section of your draft report entitled "Support of Ship Operations." The recommendations in this section pertain to all agencies involved in support of the operation of research vessels, the primary ones being ONR and NSF. These recommendations are that the Director, NSF· (1) in coordination with the Secretary of the Navy, should devise procedures for jointly financing the research vessel operating costs of oceanographic institutions,

[See GAO note 1.]

and (3) in cooperation with the Secretary of the Navy, should determine a uniform method of allocating ship operating costs to projects and agencies that would best serve the interest of the Government for funding and cost determination purposes and require application of this method by all grantee institutions. Our comments will reflect only the NSF position.

The differences in methods of funding ship operations among the several agencies are directly related to the differences in the missions of those agencies. The uncertainties concerning levels of support at each ship operating institution stem less from the differences in methods of support than from the increasing uncertainty concerning the collective total of Federal funds available for this purpose. The NSF's proportion of the total Federal funds provided for ship operations has increased steadily since the early 1960's primarily because our budget for oceanography has permitted such increase. ONR by contrast has been unable to increase its total investment for ship operations at the same rate. Since NSF's allocation of funds for this purpose leveled off in FY 1969 and shows the same trend for FY 1970, the coming crisis to be faced cooperatively by NSF and ONR will be finding sufficient funds to keep the fleet in operation. The situation would be no less critical if the funds were to be put into a single account for joint funding

As we see it, the only alternative to the present system of multi-agency support would be single agency funding of the fleet as such, apart from individual agency research support, with appropriate transfers of funds from other agencies by interagency agreements This would decrease the administrative load on the operating institutions, but would not decrease costs or increase ship usage over present levels

[See GAO note 1.]

We concur in the recommendation that attempts be made to reduce the differences among institutions in their methods of allotting ship charges However, in order not to interfere unduly with the internal affairs of the institutions nor to minimize the real differences which do exist among them in their mode of conducting shipboard operations, we will plan, with ONR, to request the laboratory directors themselves to work out reasonable changes in their procedures

Concerning the charging of fees to other Government agencies using the grantee's research vessel which has been financed substantially or in total with NSF funds, we have called AEC's attention to this matter by letter dated August 25, 1969 It is understood that ONR also was made aware of this matter and has taken action to preclude such payments

[See GAO note 1.]

the recommendation is made that the Director, NSF, direct the issuance of adequate guidelines to grantees, in connection with the award and administration of construction and other major procurement transactions to assure the economical and efficient use of grant funds.

We concur that a brochure is needed to offer guidance to grantees on their purchasing procedures and their use of contracts in carrying out work under NSF grants. Continued effort will be made by NSF to have such a brochure issued.

[See GAO note 1.]

In accordance with your suggestions, the Directors of the three oceanographic institutions principally dealt with in this report were furnished copies of the report and given the opportunity to review and comment on the segments which pertained to their areas of responsibility. Copies of the replies, which have been forwarded to your office, give interesting insight into the unique problems of operating research ships in waters that are often thousands of miles away from the institutions. [See GAO note 3.]

We are pleased to report on NSF progress along the lines recommended and will be glad to expand or amplify any of the points raised in this letter, or other points that you may consider require a more detailed explanation.

Sincerely yours,

W D McElroy

W D. McElroy
Director

GAO notes:

1. Deleted comments refer to material contained in draft report but omitted from final report.
2. The abbreviation l.o.a. refers to length overall.
3. The comments by the oceanographic institutions on a draft of this report have been considered in the preparation of our final report but copies of the replies have not been included.

DEPARTMENT OF THE NAVY
OFFICE OF THE SECRETARY
WASHINGTON D C 20350

Dear Mr. Bailey·

31 JUL 1969

The Secretary of Defense has asked me to reply to your letter of 5 June 1969 which forwarded the GAO draft report on Federal support for construction of shore facilities and vessels for research activities of oceanographic institutions.

I am enclosing the Navy reply to the report.

Sincerely,

Charles A. Bowsher

CHARLES A. BOWSHER
ASSISTANT SECRETARY OF THE NAVY
(FINANCIAL MANAGEMENT)

Mr. Charles M. Bailey
Director, Defense Division
U.S. General Accounting Office
Washington, D.C. 20548

Enclosure
(1) Navy Reply to GAO Draft Report of 5 June 1969 on Federal Support for Construction of Shore Facilities and Vessels for Research Activities of Oceanographic Institutions (OSD Case 2959)

COPY

Department of the Navy Comments

on

GAO Draft Report of 5 June 1969

on

Federal Support for Construction of Shore Facilities and Vessels for Research Activities of Oceanographic Institutions.

OSD Case No. 2959

Summary of GAO Findings and Recommendations.

This review, as indicated in the last sentence of the report, was directed primarily to the NSF's program for support of shore facilities and construction, conversion and operation of oceanographic research vessels. It relates to that part of the Navy's oceanographic program which supports oceanographic research at academic and non-profit institutions and overlaps the NSF program. This phase of the Navy's oceanographic program is almost entirely managed by the Office of Naval Research. Both the Navy and the NSF provide ships, facilities and operational support to institutions but on somewhat different bases.

The GAO recommendations applicable to Navy relate to the desirability of (1) closer coordination and joint planning by the NSF and the Navy on provisions of oceanographic research ships to institutions and (2) joint funding of ship operation support.

[See GAO note.]

ENCLOSURE (1)

[See GAO note.]

Summary of Department of the Navy Position.

The Navy concurs in the findings and recommendations of the report and in the desirability of coordinating research ship construction programs, and research ship operating costs and allocation of these costs among sponsoring projects and agencies with the NSF. This concurrence is tempered only by minor differences which are natural between the modus operandi of a mission-oriented agency and the NSF whose function is to support education and scientific research on a broad scale. Formal coordination between the Deputy Associate Director for Research, NSF, and the Deputy Assistant Oceanographer for Ocean Science, ONR, has been established and some of the details of the coordinating mechanism have been agreed upon.

Statement.

The GAO draft report is objective in calling attention to problem areas in the procurement and support of institutional research ships where ONR and NSF have joint interests. Both agencies have long felt the need for a better coordination mechanism and, in fact, have already taken steps to establish procedures for carrying out such coordination. The report provides additional incentive for this coordination and, in fact, outlines a number of areas where such coordination is necessary.

The following comments are submitted in the interest of making the report more exact or in clarifying the Navy's method of operation where this is not clear in the report.

(a)

[See GAO note.]

(b)

[See GAO note.]

(c) Page 40[27] With regard to this section on the use of expert services of other federal agencies for the design and construction of the NSF sponsored research vessels, it is worth noting that the Navy has a special section

(PMS-391 of the Naval Ship Systems Command) whose primary responsibility is oceanographic research and surveying ships. This source of talent could be made available to the National Science Foundation for assistance in their ship program.

(d) Page 49[33] In the section on the joint funding of ship operations, a rather strong case is made by the National Science Foundation for its concept of block funding. While this method of funding is suitable for the Science Foundation in its role of providing broad support to the universities of this country for education and scientific research, the Navy, which is a mission-oriented agency, cannot in good conscience provide block funding for the operation of a research vessel without regard to the research efforts being conducted. In fact, the provision of funds for the operation of research ships as a part of the research effort strengthens the program managers' efforts to consider research programs bearing on naval problems. This argument is presented to defend the necessity for two approaches to the funding of research ships and not as an argument against joint funding. These two different approaches may present difficulties in working out arrangements for joint funding but do not preclude it.

(e) Page 57[38] The Navy concurs in the recommendation for the development of a uniform method of allocating ship operating costs and the application of this method to all grantee institutions. Further, the Navy will initiate steps to study this program through the formal coordinating mechanism which has been established with the NSF. Several

advantages are apparent and something can be done to obtain a more uniform method. However, the obstacles for arriving at a solution stem more from variations in practices at the grantee institutions than in differences between the NSF and the Navy.

(f) Page 59[39] The Navy concurs in the recommendation that the charging of fees to the government be precluded for the operation of research ships which have been "financed substantially or in total with NSF funds". The Office of Naval Research adheres to this policy for those ships supplied to institutions by the Navy.

[See GAO note.]

GAO note: Deleted comments refer to material contained in draft report but omitted from final report.

PRINCIPAL MANAGEMENT OFFICIALS

RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES

DISCUSSED IN THIS REPORT

	Tenure of office	
	From	To
NATIONAL SCIENCE FOUNDATION		
DIRECTOR:		
W. D. McElroy	July 1969	Present
L. J. Haworth	July 1963	June 1969
A. T. Waterman	Apr. 1951	June 1963
DEPUTY DIRECTOR.		
Vacant	June 1970	Present
L. Levin (acting)	Oct. 1969	June 1970
Vacant	July 1968	Oct. 1969
J. T. Wilson	July 1963	July 1968
ASSISTANT DIRECTOR FOR RESEARCH (note a):		
E. C. Creutz	June 1970	Present
Vacant	Oct. 1969	June 1970
DEPUTY ASSISTANT DIRECTOR FOR RESEARCH (note b):		
E. P. Todd	Jan. 1970	Present
R. M. Robertson	Nov. 1961	Jan. 1970
ASSISTANT DIRECTOR FOR INSTITUTIONAL PROGRAMS (note a):		
L. Levin	June 1970	Present
Vacant	Oct. 1969	June 1970
DEPUTY ASSISTANT DIRECTOR FOR INSTITUTIONAL PROGRAMS (note c):		
H. E. Page	Aug. 1968	Present
L. Levin	Nov. 1966	Aug. 1968

PRINCIPAL MANAGEMENT OFFICIALS

RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES

DISCUSSED IN THIS REPORT (continued)

	Tenure of office	
	From	To
DEPARTMENT OF THE NAVY		
SECRETARY OF THE NAVY:		
John H. Chafee	Jan. 1969	Present
Paul R. Ignatius	Sept. 1967	Jan. 1969
Charles F. Baird (acting)	Aug. 1967	Sept. 1967
Robert H. B. Baldwin (acting)	July 1967	Aug. 1967
Paul H. Nitze	Nov. 1963	June 1967
ASSISTANT SECRETARY OF THE NAVY (Research and Development):		
Robert A. Frosch	July 1966	Present
Robert W. Morse	July 1964	June 1966
James H. Wakelin, Jr.	July 1959	June 1964
CHIEF, OFFICE OF NAVAL RESEARCH (note d):		
Rear Adm. C. O. Holmquist	June 1970	Present
Rear Adm. T. B. Owen	July 1967	June 1970
Rear Adm. John K. Leydon	July 1964	June 1967
Rear Adm. L. D. Coates	Jan. 1961	June 1964

[a]These positions were authorized by Public Law 90-407, which amended the National Science Foundation Act of 1950 effective July 18, 1968, but were not established until October 1969.

[b]Prior to October 1969 this position was designated as the Associate Director, Research.

PRINCIPAL MANAGEMENT OFFICIALS

RESPONSIBLE FOR ADMINISTRATION OF ACTIVITIES

DISCUSSED IN THIS REPORT (continued)

[c]From November 1966 to October 1969, this position was designated as the Associate Director, Institutional Relations.

[d]The holder of this position is also the Assistant Oceanographer for Ocean Science in the Office of the Oceanographer of the Navy.