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REPORT OF THE
COMPTROLLER GENERAL
OF THE UNITED STATES

UNITED STATES
GENERAL ACCOUNTING OFFICE

SEP 22 1976

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Deep Ocean Mining Environmental
Study-- Information And Issues

National Oceanic and Atmospheric
Administration
Department of Commerce

Completion of the two-phase Deep Ocean Mining Environmental Study is needed to resolve environmental impact questions which may arise when mining of manganese nodules starts on the deep seabed.

U.S. firms will begin prototype mining in 1977, and phase II of the study must be done simultaneously.

The Department of Commerce budget request for fiscal year 1977 does not include phase II. If this phase is not financed and does not begin in fiscal year 1977, a unique opportunity to assess the environmental impact of deep ocean mining before the beginning of full-scale mining operations will be lost.

The Department agrees that phase II is necessary, but the exact plan and funding requirements are still under consideration.

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ABBREVIATIONS

| | |
|-------|---|
| CLB | continuous-line-bucket |
| DOMES | Deep Ocean Mining Environmental Study |
| EIS | Environmental Impact Statement |
| GAO | General Accounting Office |
| NOAA | National Oceanic and Atmospheric Administration |
| OMB | Office of Management and Budget |

COMPTROLLER GENERAL'S REPORT
TO THE SUBCOMMITTEE ON
MINERALS, MATERIALS, AND FUELS
COMMITTEE ON INTERIOR
AND INSULAR AFFAIRS
UNITED STATES SENATE

DEEP OCEAN MINING
ENVIRONMENTAL STUDY--
INFORMATION AND ISSUES
National Oceanic and
Atmospheric Administration
Department of Commerce

D I G E S T

Manganese nodules are potato-shaped formations found on the ocean floor in many parts of the world. Recovery of minerals contained in these nodules--especially copper, nickel, cobalt, and manganese--could provide important resources for the U.S. (See pp. 1 and 2.)

Several American firms have made great progress in developing capability to mine these nodules commercially; four are planning to start prototype mining in 1977. However, unresolved legal issues affect mining in international waters, and environmental impact assessments are needed. These uncertainties could delay commercial mining.

Adoption of an international law-of-the-sea treaty and passage of proposed domestic legislation governing deep ocean mining could resolve the legal issues. Timely completion of the Deep Ocean Mining Environmental Study by the National Oceanic and Atmospheric Administration is needed to resolve environmental impact questions. (See pp. 3 to 6.)

This two-phase study was started in 1975 to assess the environmental impact of deep ocean mining. Phase I, now in progress, will provide information on premining environmental conditions and will predict probable environmental effects. Phase II, intended to start in fiscal year 1977, will provide an opportunity to observe and measure actual changes in the marine environment caused by mining tests. (See pp. 7 and 8.)

2 The Department of Commerce budget request for fiscal year 1977 does not include the \$1.3 million sought by the National Oceanic and Atmospheric Administration for the phase II study. Commerce decided not to request these funds because of constraints imposed by the Office of Management and Budget and because the National Oceanic and Atmospheric Administration could not assure Commerce that prototype mining would actually occur in fiscal year 1977.

3 In addition, Commerce and Office of Management and Budget officials question whether phase II should be paid for by the Federal Government or the mining industry. (See pp. 7 and 8.) 27

Phase II is necessary and should begin in fiscal year 1977 when prototype mining begins. If this is not done,

--a unique opportunity to assess the environmental impact of deep seabed mining before the beginning of full-scale mining operations will be lost;

--data needed to develop scientifically sound environmental guidelines for mining operations will not be obtained; and

--licensing for deep seabed mining required by legislation pending before the Congress might be delayed.

The National Oceanic and Atmospheric Administration has indicated that limited financing may be provided through reprogramming actions within the Department of Commerce. However, if only limited funding is made available for 1977, the National Oceanic and Atmospheric Administration will not be able to fully evaluate prototype mining planned for that year; this means that the planned phase II report will be less complete and less useful statistically than it would be otherwise. (See pp. 10 to 15.)

It is in the Government's interest to finance the Deep Ocean Mining Environmental Study phase II, leaving the question of whether industry or the Government should ultimately bear the cost to be resolved subsequently. If it is decided that industry should pay all or part of the cost, the Government could determine a method of recovery at a later date. (See p. 15.)

The Department of Commerce agreed with GAO that industry's tests of prototype deep ocean mining systems must be observed, measured, and evaluated in a meaningful manner. They agreed also that phase II is necessary to evaluate actual effects of the early versions of operational systems, permitting the development of environmental guidelines prior to full-scale deep ocean mining operations by U.S. industry.

The Department said that when phase II's final plans are approved it will inform the appropriate committees of the Congress and the Office of Management and Budget of its proposed funding adjustments. (See p. 16.)

CHAPTER 1

INTRODUCTION

In a January 30, 1976, letter the Chairman, Subcommittee on Minerals, Materials, and Fuels of the Senate Committee on Interior and Insular Affairs, requested that we evaluate the potential effects if phase II of the Deep Ocean Mining Environmental Study (DOMES) is not funded. This study is being done by the National Oceanic and Atmospheric Administration (NOAA), Department of Commerce. Subsequently we also agreed to provide information concerning the potential importance of manganese nodules to the United States, the progress being made by private industry toward mining them commercially, and the need for and progress toward completing the study.

MANGANESE NODULES AND THEIR IMPORTANCE TO THE UNITED STATES

Manganese nodules are varying-sized, potato-shaped formations found on the ocean floor throughout many parts of the world. Although only about 3 percent of the ocean's floor has been extensively surveyed, there is abundant evidence that manganese nodule deposits exist in potentially commercial quantities. Deposits having the greatest economic potential are located in an area known as the Pacific quadrangle (an east-west belt south of Hawaii, about 1,000 miles wide and 4,800 miles long) in water deeper than 13,000 feet.

The nodules are rich in several metals of important economic interest, especially copper, nickel, cobalt, and manganese. Federal Government reports show that there is an increasing domestic and worldwide demand for these four metals. They also show that known commercially recoverable land-based resources are limited, whereas manganese nodule deposits on the deep seabed are virtually unlimited.

The nodule deposits are of particular importance to the United States. Although we produce 85 percent of our copper requirements, we produce less than 10 percent of our needs for nickel, cobalt, and manganese. These metals are critical to the electrical industry and in the manufacture of steel and steel alloys. Studies indicate that recovery of the four metals contained in the manganese nodules by U.S. firms could result in this country

--becoming independent of foreign suppliers in meeting national security needs for these metals and

--exporting these four metals, thus turning a projected \$6 billion balance of payments deficit for these metals into a surplus by the year 2000.

Resource-rich third-world nations are beginning to exert more control over their mineral resources, as demonstrated by the recent oil embargo and by third-world nations' demands for a new world economic order. An August 1974 Stanford Research Institute report, "Strategic Resources and National Security," ranked manganese, cobalt, and nickel among the most critical materials which would affect national security if shortages occurred.

Aside from the question of independence from foreign sources of critical metals, the vast economic potential of the nodule deposits must also be considered. This potential has drawn the interest of the mining industry in the United States as well as in many other countries.

CHAPTER 2

PROGRESS TOWARD COMMERCIAL MINING

Development of the complex technology for recovering and processing manganese nodules from the deep seabed has been underway for more than a decade, and great progress has been made. In November 1975 a representative of the American Mining Congress stated that the "collective" position of the deep seabed developers is that:

- They have identified nodule deposits which could provide satisfactory mine sites.
- They have largely solved the metallurgical problems of extracting metals from the nodules.
- Development of the mining systems has progressed from the drawing board to large-scale at-sea experimentation.

He stated further that there is no longer any doubt about the technical and economical feasibility of deep seabed mining.

FIRMS ENGAGED IN DEEP SEABED MINING EFFORTS

A June 1975 Congressional Research Service report states that although many companies individually began exploration and development of deep seabed mining systems, the recent trend has been for them to band together into national or international consortia. ^{1/} Advantages claimed from this form of organization include: (1) broadened Government support in the absence of an international agreement regarding exploitation of the deep seabed, (2) benefits of combining diverse capabilities, (3) pooled investments, and (4) shared risk.

The report identified the U.S. firms involved in efforts toward commercial mining of manganese nodules. These firms are part of four major international consortia:

^{1/}For purposes of this report, the term "mining firm" is used to refer to both the consortia and individual mining companies.

ConsortiaU.S. firms involved

| | |
|-------------------------|--|
| The Kennecott Group | Kennecott Copper Corporation |
| Deep Sea Ventures, Inc. | Tenneco, Inc., and U.S. Steel's Essex Iron Company |
| Ocean Management, Inc. | SEDCO, Inc. |
| The CLB Group | Ethyl Corporation, Occidental Minerals, Phelps-Dodge, N.L. Industries, Superior Oil, Utah International, U.S. Steel, General Crude Oil, ARCO, and Ocean Resources, Inc. |

Another firm, Lockheed Missiles & Space Company, Inc., is also actively engaged in deep seabed mining research and development, but not as part of a consortium.

The CLB Group is a different type of international consortium. This group, involving more than 25 major firms from six countries, is a joint effort to develop a continuous-line-bucket (CLB) system for nodule mining which will be offered for sale to interested mining firms. A CLB Group representative told us that after final prototype testing in 1977 the consortium will dissolve and the individual firms will be free to build their own CLB mining systems, ships, and processing plants.

PLANS FOR COMMERCIAL MINING

The following schedule shows the planned events leading to commercial mining.

| <u>Mining firm</u> | <u>Prototype testing period (note a)</u> | <u>Decision regarding commercial mining</u> | <u>Begin commercial operations</u> |
|-----------------------------------|--|---|------------------------------------|
| Deepsea Ventures, Inc. | January 1977 to June 1977 | Late 1978 | Late 1981 |
| Lockheed Missiles & Space Company | Summer 1977 | 1978 or 1979 | 1982 or 1983 |
| The CLB Group | Summer 1977 | After 1977 | Not applicable |
| Ocean Management, Inc. | June 1977 to March 1978 | 1979 | Spring 1981 |
| The Kennecott Group | January 1978 to January 1979 | 1978 or 1979 | 1980 to 1982 |

^a/The Kennecott Group, Lockheed Missiles & Space Company, and the CLB Group plan full-scale prototype tests of their mining systems. The Ocean Management and Deepsea Ventures consortia plan pilot (less than full-scale) tests. For purposes of this report the term prototype refers to all mining tests.

Costs involved in developing
commercial mining capabilities

The mining firms estimate cumulative expenditures of at least \$109 million to develop deep seabed mining technology and cumulative investments of from \$1.5 to \$2.4 billion to achieve commercial operations.

The following schedule based on information provided us by the mining firms shows their interim and projected development costs.

| <u>Mining firm</u> | <u>Approximate interim costs</u> | <u>Projected cumulative costs</u> |
|--------------------------------------|--------------------------------------|---------------------------------------|
| | (millions) | |
| Deepsea Ventures, Inc. | \$22-\$30 (through 1975) | \$300 |
| Lockheed Missiles & Space Company | \$20-\$25 (through 1976) | \$500 |
| The CLB Group | <u>a</u> /\$7 (through 1977) | <u>a</u> /\$10 |
| Ocean Management, Inc. | \$35-\$50 (through 1980) | \$300-\$800 |
| The Kennecott Group | \$25-\$35 (through 1975) | \$400-\$800 |

a/Includes the mining system only.

Constraints in starting
commercial mining operations

Mining firms noted two major constraints which may delay full-scale commercial mining operations:

- Several unresolved international legal issues concerning exploitation of deep seabed mineral resources.
- Equipment design decisions which could be affected by the results of environmental studies not yet completed.

U.S. firms are hesitant about starting commercial mining of manganese nodules without national or international guaran-

tees of security for their anticipated large investments. They state that financial institutions will not provide necessary capital without such guarantees. Unless an international agreement regarding exploitation of the deep seabed is reached, the mining firms will reevaluate their positions on commercial mining operations.

The timing of the environmental studies is crucial to the start of commercial mining operations. Mining firm officials claim that the environmental assessment should be completed no later than 1977 if it is to be of value in mining equipment design considerations. Officials of two mining firms told us that if environmental guidelines and regulations were issued after mining equipment was built, the firms could be required to severely modify or even scrap some of their equipment at a considerable cost. These costly problems and the consequent delays in mining could be avoided, according to one official, if environmental studies such as DOMES were completed before decisions to begin full-scale mining operations were made.

SCHEDULED PROTOTYPE MINING TESTS IN 1977

Deepsea Ventures publicly announced in December 1975 that it planned prototype mining tests at a specific site in the Pacific quadrangle in 1977. In addition, Ocean Management, Inc., the CLB Group, and Lockheed plan prototype mining tests in 1977. NOAA plans to monitor the Deepsea Ventures test in fiscal year 1977 and the Ocean Management test in fiscal year 1978, but has yet to decide whether to monitor the two additional tests.

CHAPTER 3

THE DOMES PROJECT

Under the National Environmental Policy Act of 1969 (Public Law 91-190), an Environmental Impact Statement (EIS) is required on proposals for legislation and all other major Federal actions significantly affecting the quality of the human environment. In recent years, the United States has been involved in international conferences seeking to reach agreement on a law-of-the-sea treaty, and legislation concerned with deep ocean mining of manganese nodules by U.S. firms has been introduced in the Congress.

NOAA started a study in 1972 to assess the environmental impact of deep sea mining. The May 1973 report on this study stated that preliminary investigations provided information on what was needed for an effective evaluation of deep sea mining, and suggested a three-phase environmental assessment study to make the evaluation. NOAA subsequently requested funding for a DOMES pilot study to begin in fiscal year 1975. This request was approved in concept by NOAA, but because of budget constraints funds could not be made available until fiscal year 1976.

In 1974 the Department of the Interior prepared a draft EIS to support the law-of-the-sea negotiations. The draft was never finalized because the necessary basic data was not available. NOAA announced in May 1974 it would implement the DOMES project to develop this basic information and thus allow an adequate EIS on deep ocean mining to be prepared.

PURPOSE AND OBJECTIVES

The purpose of DOMES is to acquire the information necessary to provide both a timely and an independent assessment of the impact of deep ocean manganese nodule mining on the marine ecosystem before commercial mining operations begin. The DOMES project was formulated in cooperation with the academic community and the mining industry. It consists of a two-phase study, first to obtain basic information on the deep ocean environment and then to assess the impact of prototype mining operations on that environment.

The objectives of phase I are to (1) obtain enough pre-mining environmental information to develop statistically defensible basic data in the mining region, (2) develop the ability to predict the consequences of ocean mining on the marine environment, and (3) allow establishment of preliminary environmental guidelines for mining manganese nodules. Phase I studies are being done at three different locations within the Pacific quadrangle. The objectives will be accomplished during five cruises to these areas to gather data. The data collected and its interpretation will substantially complete the premining basic data needed in formulating an EIS.

Phase II is intended to determine the accuracy of environmental impact predictions developed during phase I. NOAA expects that phase II will verify and where necessary modify phase I's predictive models and provide final information for an EIS, permitting development of scientifically sound environmental guidelines. The guidelines are expected to permit final modifications of mining system hardware and operational techniques, if such changes are required, before commercial mining begins.

FUNDING AND CURRENT STATUS

Total expected phase I costs of \$3 million were provided in fiscal year 1976. Fieldwork started in August 1975 and will continue through November 1976. It will be augmented by several environmental research studies performed in prior years. NOAA plans to issue the first preliminary phase I report in late 1976 and a final report in January 1978.

The DOMES project manager told us in April 1976 that three of the five planned phase I cruises had been completed and a fourth was in progress. He said contract studies with 19 principal investigators from five academic institutions, one private organization, and two Federal agencies were in process, and that these studies account for \$2,104,000, about 70 percent of total phase I costs.

To start phase II, NOAA asked the Department of Commerce to include \$2.6 million in its fiscal year 1977 budget. The Commerce Budget Office recommended against this request because (1) in 1975, when the budget request was made, they could not be assured that any prototype mining would begin in 1977 and (2) they questioned whether phase II should be federally funded. NOAA appealed the Budget Office's recommendation to the Secretary of Commerce, and at the Secretary's

direction, phase II funding was restored in the budget request submitted to the Office of Management and Budget (OMB) for review.

To achieve a Federal budget ceiling of \$395 billion in fiscal year 1977, OMB imposed a funding limitation on each Federal agency and department. Since the total amount initially requested by Commerce exceeded its assigned limitation, OMB asked Commerce to revise the budgeted programs.

During subsequent budget negotiations with Commerce, NOAA suggested that the \$2.6 million requested for phase II work could be extended over a 2-year period and that \$1.3 million would be sufficient in fiscal year 1977. In late 1975 Commerce dropped phase II funding completely from its budget proposal because of the OMB-imposed funding constraints.

As a result, NOAA officials are developing an alternative approach to start a minimum phase II effort in fiscal year 1977, with about \$400,000 to \$500,000 to be made available by reprogramming funds within the Department of Commerce. NOAA will request full funding for 1978 and subsequent years of the phase II program.

NOAA's planning for phase II is largely dependent on the outcome of preliminary phase I results. Although NOAA prepared a draft phase II plan in November 1975, DOMES officials say it will not be put in final form until the results of the phase I interim report are available. At that time, work to be accomplished during phase II can be better determined. The phase I interim report is scheduled to be issued in late 1976.

CHAPTER 4

EFFECTS OF NOT FUNDING

DOMES PHASE II

To determine the effects on phase II if requested fiscal year 1977 funds are not obtained, we considered two possibilities: (1) no funds provided for DOMES phase II and (2) limited funds provided in fiscal year 1977 under NOAA's alternative approach.

EFFECTS OF NO FUNDS FOR DOMES PHASE II

If phase II is not done when and as planned, the opportunity to verify the accuracy of environmental impact predictions developed during phase I will be lost, input for the EIS will be restricted to phase I results, and environmental guidelines for use by industry in the design of mining equipment and operational techniques will have to be based on phase I preliminary predictions of environmental effects. In addition, legislation pending before the Congress requires that licenses issued for deep seabed mining would include environmental protection requirements. Without the kind of data generated by phase II, there might be considerable delay in issuing these licenses.

EFFECTS OF LIMITED PHASE II PROGRAM DURING FIRST YEAR

To determine how expected phase II results would be affected, assuming that only limited funding is available in fiscal year 1977, we relied heavily on the views of DOMES project officials and a draft technical development plan prepared by them for phase II. The DOMES project manager advised us in September 1976 that the plan had not been put in final form.

Tentative plans for phase II

NOAA's draft phase II plan calls for a 4-year program beginning in fiscal year 1977, with interim reports within 6 months after each monitoring test and a final report about September 1980. The phase II schedule is tied to the mining firms' planned test schedules because phase II monitoring must be done simultaneously with the mining tests.

Phase II requires monitoring of precommercial (either prototype or pilot scale) industrial tests of mining systems and assumes that actual commercial mining sites will have environmental characteristics comparable to those of the three basic locations studied during phase I. Planned phase II operations involve

- making environmental studies at the mining test site before the test to confirm that the environmental parameters of the site are within range of those expected based on phase I results;
- monitoring mining system operations and measuring effects of (1) the surface discharge plume 1/ on the upper water column, (2) the dredgehead discharge plume 2/ on the lower water column, and (3) the dredgehead 3/ itself on the seabed; and
- making followup studies to document immediate post-mining site recovery and dissipation of the two discharge plumes and to study longer term recovery rates at the mining test sites.

The draft phase II plan estimates of total costs are as follows:

| <u>Fiscal year</u> | <u>Phase II estimated costs</u> |
|--------------------|-------------------------------------|
| 1977 | \$1,300,000 |
| 1978 | 1,630,000 |
| 1979 | 1,985,000 |
| 1980 | <u>1,300,000</u> |
| Total | <u>\$6,215,000</u> |

1/Water and sediment from the ocean floor discharged into the surface water during mining operations.

2/Water and sediment disturbed by the dredgehead as it moves along the ocean floor.

3/Device operated on the ocean floor to pick up manganese nodules.

Effects identified

The effects on phase II objectives and expected results from a limited fiscal year 1977 funding level of \$400,000 to \$500,000 are the loss of

- up to about 90 percent of the scientific data to be gathered from the Deepsea Ventures test, which will reduce the statistical confidence of the final report and weaken support for its conclusions and recommendations,
- the opportunity to fully monitor a mining system operation which involves the only mining site known to be within one of the test sites studied in phase I,
- the first test interim report which could be useful to DOMES in modifying and/or refining further phase II monitoring plans and to industry in identifying probable needs for equipment design and operational techniques, and
- one year in the time available for followup monitoring of prototype mining site recovery rates.

A reduced fiscal year 1977 funding level, however, is not expected to delay issuance of the final phase II report in about September 1980.

Loss of overall scientific value from Deepsea Ventures test

With reduced funding in fiscal year 1977, DOMES officials stated that monitoring of the Deepsea Ventures test would be limited to physical monitoring of the size, dispersion, and resettlement rate of the bottom sediments and water discharged at the surface. They would not be able to determine (1) the chemical nature of the plume itself and the associated plant and animal life, (2) the effects of the surface discharges on the chemistry and biology of the upper water column, and (3) the effects of mining operations on the physical, chemical, and biological attributes of the lower water column and the seabed.

They believe reduced funding would result in the loss of about 90 percent of the scientific data and almost all of the environmental impact data planned to be gathered from the Deepsea Ventures test. This loss could be reduced to about

70 percent if additional funds were made available in fiscal year 1978 for analysis of samples. This situation would permit them to take a limited number of samples during the Deepsea Ventures test, which would then be stored for subsequent analysis when fiscal year 1978 funds became available. Either situation, however, would adversely affect the quality and usefulness of the final phase II report because the reduced scientific data available from monitoring two tests instead of three would lower the statistical levels of confidence which could be placed on the phase II report's conclusions and recommendations.

Loss of scientific test data
on Deepsea Ventures mining
operations and test site

The draft phase II plan calls for monitoring three prototype test operations. DOMES officials believe that three mining systems should be monitored because each may involve differences in mining systems or techniques and each will be used in different areas with different ocean bottom and ocean surface environments. At least three tests are necessary to cover the range of mining systems and to provide the experience (from initial test monitoring) necessary to assure that later tests are complete and the conclusions reached on environmental effects are statistically defensible.

Limited monitoring of the Deepsea Ventures test would thus result in limited information regarding the environmental effects of that firm's mining systems and operational techniques on one of the three mining areas to be studied. Deepsea Ventures is the only mining firm which has publicly disclosed its mining test site location, and the site is in one of the three locations where NOAA made basic studies during phase I. Accordingly, it offers the only firm opportunity to date for testing actual mining effects at a site for which detailed premining basic data has been obtained.

This loss of data would be more serious if, for example, marked environmental effects were observed from the Deepsea Ventures test but not the other two tests, and could not be measured quantitatively due to the lack of enough scientists and equipment aboard the NOAA monitoring ships to do a thorough job. It would be even more serious if important environmental effects were later identified from either or both of the other two tests. In any event, if NOAA did not fully monitor the Deepsea Ventures test, the full impact of mining on the environment would not be known.

Loss of expected benefits from
first interim test report

According to the draft phase II plan, an interim report will be prepared within 6 months after each mining test is monitored. These reports are expected to provide preliminary data that can be rapidly analyzed. Subsequent interim reports will update the previous reports and the final phase II report will be a complete analysis of the entire DOMES project. The interim reports are expected to be useful to NOAA in determining the need for adjustments in subsequent phase II monitoring and to the mining firms in adjusting equipment configurations and operating techniques, if needed, to reduce any identified adverse effects on the environment. Reduced funding in fiscal year 1977 will limit the scientific and environmental impact data available for the interim report on Deepsea Ventures scheduled for October 1977.

Officials of four mining firms told NOAA officials that they were very interested in the interim report results because of their need to know, as soon as possible, what if any adjustments to mining equipment and/or operational techniques might be necessary for commercial mining. These interim reports would appear to be of prime importance because these firms plan to decide by 1980 whether to proceed with commercial mining; the costs of any equipment design modifications or operational changes needed to minimize adverse environmental effects may be critical to those decisions; and the final phase II report, which is not expected before September 1980, would be available too late for industry's needs.

Loss of 1 year's postmining
site recovery monitoring

The draft phase II plan calls for monitoring environmental recovery rates at each mining test site. After each mining test is completed, a DOMES vessel will quickly return to the site for a short time to carry out postmining studies. Additional return visits to each mining site at periodic intervals are planned to assess recovery rates over the longer term. Since Deepsea Ventures will conduct the first mining test to be monitored during the planned 4-year period of phase II operations, it provides the longest period for evaluating mining site recovery rates.

Reduced funding in fiscal year 1977 will result in the loss of 1 year's study of postmining recovery rates at that site. Whereas postmining site monitoring for Deepsea Ventures

is planned to cover a 3-year period, similar monitoring for Ocean Management (the next longest study opportunity) is planned to cover about a 2-year period. Thus, the longest postmining study opportunity would be lost.

The loss of 1 year in postmining monitoring would be important if initial monitoring showed adverse effects on the environment and a slow rate of recovery. In that situation, the longer term monitoring would be very important. On the other hand, if recovery rates are relatively rapid, the additional monitoring period might not be too important.

WHO SHOULD FUND PHASE II?

While there is agreement that an EIS will be required whether deep ocean mining is regulated by international treaty or domestic legislation, Federal officials disagree about who should pay for and develop the data needed to support the EIS. NOAA's plans for DOMES are based on the belief that the Federal Government is responsible for monitoring industry's prototype mining tests and assessing the environmental effects. This is the basic objective of phase II. Mining industry officials believe that this research should be paid for and managed by the Federal Government to nullify possible charges that an industry-financed and conducted study would be biased and the validity of the results questionable. Prominent members of the marine science community also support a federally sponsored and managed phase II study.

Some Federal officials believe, however, that it may not be the Government's responsibility to pay for the entire EIS. They contend that the Government on other occasions has required industry to pay for and make environmental assessments of their operations before the development of an EIS. We found that these cases often coincide with an application for a Government license in an industry already under Federal regulation.

We believe it is in the Government's best interest to fund phase II pending resolution of the question whether industry or the Government should ultimately bear the cost. If it is subsequently decided that industry should pay all or part of the cost, the Government could determine a method of recovery at a later date.

AGENCY COMMENTS

In an August 4, 1976, letter the Department of Commerce agreed with our conclusion that industry's tests of prototype deep ocean mining systems must be monitored and evaluated in a meaningful manner. It also agreed that phase II of the Deep Ocean Mining Environmental Study is necessary in order to monitor and evaluate actual effects of the early versions of operational systems to permit the development of environmental guidelines prior to full-scale deep ocean mining operations by U.S. industry.

With regard to funding phase II, Commerce stated that:

"Both NOAA and the Department have assigned a high priority to the DOMES Program and intend to pursue Phase II diligently. However, this priority must be considered in the context of the stringent budget restraints faced by all Departments, its priority relative to other NOAA programs, and the fact that Phase I had barely begun when the decision on Phase II had to be made. We did not consider any uncertainty with respect to industry's prototype testing schedule to be a critical factor. The decision not to request specific funding for Phase II was made within the context that appropriate internal funding adjustments could be made if subsequent events indicated that a start on Phase II was necessary during FY 1977."

Commerce has found it necessary to start phase II during fiscal year 1977, but the exact plan and funding requirements are still under consideration by NOAA and Commerce. When the final plans for phase II during fiscal year 1977 are approved, the appropriate committees of the Congress and the Office of Management and Budget will be informed of the expected funding adjustments. Commerce believes that this course of action will provide adequate support for the DOMES program during the coming year.

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United States Senate

COMMITTEE ON
 INTERIOR AND INSULAR AFFAIRS

WASHINGTON, D.C. 20510

30 January 1976

Honorable Elmer B. Staats
 Comptroller General of the United States
 General Accounting Office
 441 G Street, N. W.
 Washington, D. C. 20548

Dear Mr. Staats:

I understand that the President's proposed budget for FY 1977 does not contain any funding for the Phase II Deep Ocean Mining Environmental Study (DOMES II).

As you know, this Committee has before it legislation (S. 713) which would establish a licensing system to regulate U. S. nationals who engage in recovering manganese nodules from the deep ocean floor. Licenses issued under this legislation would include environmental protection requirements. Without the kind of data which would be generated by DOME II, there might be considerable delay in issuance of such licenses.

The DOMES study has represented an effort by the Federal Government to analyze the potential environmental consequence of an activity before the activity takes place. I am deeply concerned about what appears to be a step backward in this process.

I believe that the General Accounting Office could be very helpful in evaluating the potential impacts of lack of funding of DOMES II. I would appreciate it very much if you would initiate the necessary action and furnish me with a report as soon as possible.

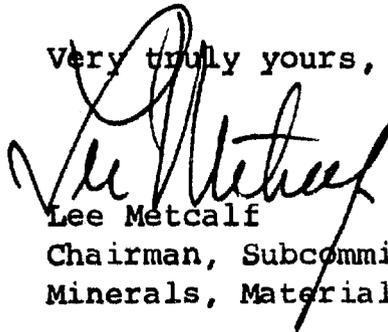
Mr. Elmer B. Staats
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If your staff has any questions about this request, they may call D. Michael Harvey, Deputy Chief Counsel of the Committee, at 224-1076.

Thank you for your cooperation.

Very truly yours,

A handwritten signature in black ink, appearing to read "Lee Metcalf", written over the typed name and title.

Lee Metcalf
Chairman, Subcommittee on
Minerals, Materials and Fuels



UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Administration
Washington, D.C. 20230

Honorable Elmer B. Staats
Comptroller General of the
United States
General Accounting Office
Washington, D.C. 20548

Dear Mr. Staats:

The Department of Commerce appreciates the opportunity to comment on the May 1976 draft report "Deep Ocean Mining Environmental Study - Information and Issues" prepared by the General Accounting Office (GAO) for the Chairman, Subcommittee on Minerals, Materials, and Fuels, Committee on Interior and Insular Affairs, United States Senate.

The Department of Commerce agrees with the GAO conclusion that industry's tests of prototype deep ocean mining systems must be monitored and evaluated in a meaningful manner. Since 1972 the National Oceanic and Atmospheric Administration (NOAA) has been working with industry and other relevant Federal agencies on the assessment of potential environmental effects of deep ocean mining. Following several cruises sponsored by NOAA as early as 1972, we then developed plans for the two-phase Deep Ocean Mining Environmental Study (DOMES) Program. A preliminary phase of the DOMES Program was initiated during FY 1975 and Phase I was fully implemented in FY 1976. We believe that Phase I, in itself, is making an important contribution to our knowledge of the potential environmental effects of deep ocean mining; however, as the GAO concluded, Phase II is necessary in order to monitor and evaluate actual effects of the early versions of operational systems. This will permit the development of environmental guidelines prior to full scale deep ocean mining operations by U.S. industry.

Both NOAA and the Department have assigned a high priority to the DOMES Program and intend to pursue Phase II diligently. However, this priority must be considered in the context of the stringent budget restraints faced by all Departments, its priority relative to other NOAA programs, and the fact that Phase I had barely begun when the decision on Phase II had to be made. We did not consider any uncertainty with respect to industry's prototype testing schedule to

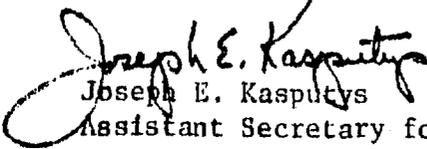
be a critical factor. The decision not to request specific funding for Phase II was made within the context that appropriate internal funding adjustments could be made if subsequent events indicated that a start on Phase II was necessary during FY 1977. Dr. White testified before the House Appropriations Subcommittee that he would, if necessary, reprogram funds internally to support this effort.

We have since found it necessary to initiate Phase II during FY 1977, but the exact plan and funding requirement are still under consideration by NOAA and the Department. There have been a number of revisions to the plans since the FY 1977 budget request was first considered. When the final plans for Phase II during FY 1977 are approved, the appropriate committees of the Congress and the Office of Management and Budget will be informed of our anticipated funding adjustments. We believe that this course of action will provide adequate support for the DOMES Program during the coming year.

As currently being discussed, the Phase II program will not undertake full monitoring of all aspects of prototype testing operations in FY 1977. However, we do plan at this time to place primary emphasis in FY 1977 on a full-scale investigation of the surface discharge plume, which potentially provides the most significant environmental impact. Currently, plans also are being developed to emphasize later other environmental aspects of deep ocean mining, such as monitoring the bottom plume and evaluating benthic recovery rates. Using this approach of phased studies, we do not believe that the scientific merit of the program will suffer as serious a reduction as the report indicates.

I can assure you that we attach great significance to Phase II of the DOMES Program and that we will strive to develop the information essential for U.S. industry to proceed with the development of deep ocean mineral resources in an environmentally compatible manner.

Sincerely,


Joseph E. Kasputys
Assistant Secretary for Administration