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Scott C. Whitney

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ENVIRONMENTAL REGULATION OF UNITED STATES DEEP SEABED MINING

SCOTT C. WHITNEY *

Seaward of the continental margin in the area generally known as the deep seabed are extensive deposits of manganese nodules containing over twenty metallic elements. Five of these elements are of vital importance to world industry: nickel, copper, cobalt, manganese, and molybdenum. Recently, several companies from the United States and elsewhere have developed the extremely expensive technology necessary to recover manganese nodules from the sea bottom. Recovery and production are certain to occur between now and 1980 if secure legal arrangements are achieved, either through an agreement in the United Nations Conference on the Law of the Sea (LOS) negotiations¹ or by unilateral United States action. In fact, several companies already have dredged nodules in substantial quantity, and at least two successful procedures for extracting metal from the nodules

* A.B., University of Nevada; J.D., Harvard University. Professor of Law, College of William and Mary. The author wishes to thank James R. Cox and Robert W. Emmett, third year law students at the College of William and Mary, for their valuable assistance in researching and drafting this article.

1. The purpose of this analysis is not to consider directly what regulatory and environmental provisions should be adopted by the ongoing LOS negotiations but rather to propose the regulatory and environmental provisions that the United States should implement in the likely event the LOS discussions become protracted, causing the United States and other countries possessing the technology to undertake unilateral deep-sea mining programs. Of course, many of the necessary environmental precautions probably would be imposed whether an LOS-developed entity or an individual state regulatory body did the regulating. The assumption that at least for an interim period deep-sea mining will be conducted on a unilateral basis is predicated on the following history of the LOS negotiations, which to date have shown little prospect for prompt resolution of the issue.

The third LOS Conference was held initially at the United Nations headquarters in December, 1973. That meeting was devoted to matters of procedure and organization. The second session, during which the substantive issues first were discussed, opened on June 20, 1974, in Caracas, Venezuela, and continued for ten weeks. Geneva hosted the third session from March 17 to May 9, 1975. The fourth session was held in New York from March 15 to May 7, 1976; there a dispute over the critical issue of deep seabed mining arose between the industrialized nations and the developing countries of the world, the so-called Group of 77 (now more than 115 nations). At the session's conclusion, the question of whether private and state companies were to be given access to the minerals of the seabed prior to the adoption of an LOS agreement remained unresolved. This impasse continued through the fifth and sixth sessions, held in New York during the fall

have been tested in pilot plants.² Although the requisite technology for deep-sea mining is available, no one fully understands the environmental implications of mining the ocean floor. What is certain is that, as with every action man undertakes, the mining of manganese nodules will have some effect on the oceans' environment.

At present there is no formal regulatory process that must be satisfied to conduct deep-sea mining. Mining companies, of course, must comply with existing laws and regulations relating to export control, customs, taxes, trade, maritime activities, and occupational safety and health. To meet the environmental and regulatory problems inherent in such a massive commercial venture, however, Congress must enact legislation that encourages exploitation of the oceans' natural resources according to sound economic and environmental principles. This Article examines the nature of deep-seabed mining and proposes a legislative framework within which these ventures can operate effectively. The Article then discusses the problems this country will confront while attempting to promote the responsible development of deep-sea mining in a hostile international environment.

NODULE MINING AND PROCESSING TECHNOLOGY

A typical mining operation involves two fundamental steps: recovery and processing. Three basic recovery systems presently are being considered for manganese nodule mining: air-lift pumping, hydraulic dredging, and continuous line bucket dredging. Air-lift pumping (ALP), or pneumatic lift dredging, involves a three-phase flow of air, water, and nodules. Compressed air is injected into a pipe at various depths to force water, the nodules, and the surrounding sediment into the bottom end of the pipe. The flow of water and air helps to vacuum the nodules off the seabed and carry them up the pipe to be deposited in the mining ship above.³ Hydraulic, or hydro-

of 1976 and the spring of 1977 respectively. As a result of the combination of new unilateral ocean claims with the lasting stalemate, the prospects of reaching an expedited future agreement are unlikely. At the conclusion of the sixth session, Ambassador Richardson testified he would recommend to the President that the United States "consider whether an agreement acceptable to all governments could be achieved through the kind of negotiations which have thus far taken place." Statement of Ambassador Richardson, at 14 before the Subcomm. on Public Lands and Resources of the Senate Comm. on Energy and Natural Resources, 95th Cong., 1st Sess. (July 26, 1977) (unpublished transcript).

2. SENATE COMM. ON INTERIOR AND INSULAR AFFAIRS, REPORT ON DEEP SEABED HARD MINERALS ACT, S. REP. NO. 754, 94TH CONG., 2D SESS. 7 (1976).

3. CONG. RESEARCH SERVICE FOR THE USE OF THE COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, 94TH CONG., 1ST. SESS., OCEAN MANGANESE NODULES 15-16 (Comm. Print 1975) [hereinafter cited as OCEAN MANGANESE NODULES].

lift, dredging is similar to ALP, but it relies entirely on pumped water to provide an upward flow through the pipe.⁴ Continuous line bucket (CLB) dredging, a simpler technique, utilizes a long continuous rope to which dredge buckets are attached. As the surface ship moves sideways, the loop of the dredge buckets is dragged across the ocean bottom, scraping up the nodules.⁵

Once brought to the surface, the nodules are prepared for the processing, extracting, and refining of the minerals. This may occur either at sea or on land. Because the composition of manganese nodules differs from that of any commercially mined land-based mineral deposit, the customary methods of extracting metals do not work. Generally, chemical leaching or hydrometallurgical techniques are considered the most commercially feasible methods of nodule processing.⁶

ENVIRONMENTAL CONCERNS OF DEEP-SEA MINING

Several investigations have been conducted to determine the nature of the environmental impact of manganese nodule mining. In 1970, at the invitation of Deepsea Ventures, Inc., a group of marine scientists under the direction of Dr. Oswald A. Roels of the Lamont-Doherty Geological Observatory observed a pilot ALP mining test near the Blake Plateau in the Atlantic.⁷ In 1972 investigators supported by the National Oceanic and Atmospheric Administration (NOAA) monitored a test of the CLB mining system in the North Pacific.⁸ Neither of the investigations reported significant adverse environmental effects.⁹ Nevertheless, others have warned that seabed mining will produce a broad spectrum of significant environmental disturbances.¹⁰ Although industry minimizes the impact of deep-sea mining and the United States government has not coordinated the

4. *Id.* at 18.

5. *Id.*

6. *Id.* at 20.

7. *Id.* at 27. See also *Deep Seabed Hard Mineral Resources: Hearings on H.R. 13076, H.R. 13904, and H.R. 14918 Before the Subcomm. on Oceanography of the House Comm. on Merchant Marine and Fisheries*, 92nd Cong., 2d Sess. 123-25 (1972) [hereinafter cited as *Hearings on H.R. 13076*].

8. OCEAN MANGANESE NODULES, *supra* note 3, at 27.

9. *Id.* According to Dr. Roels: "Provided the mining operation is conducted intelligently, then the discharged deep sea mining effluent would not represent an environmental hazard." *Hearings on H.R. 13076, supra* note 7, at 138.

10. *Deep Seabed Mining: Hearings on H.R. 1270, H.R. 6017, and H.R. 11879 Before the Subcomm. on Oceanography of the House Comm. on Merchant Marine and Fisheries*, 94th Cong., 2d Sess. 554-55 (1976) (testimony of Jonathan I. Charney). See also Frank, *Environmental Aspects of Deepsea Mining*, 15 VA. J. INT'L L. 815 (1975).

available data and analytical information, research to date has raised a number of environmental questions concerning both the ocean mining site and the processing plant location.

Ocean Site Concerns

Both the ALP and hydrolift systems transport nodules, sediment, and deep water to the surface; the CLB system is designed to bring only nodules to the surface, but in actuality some sediment may be entrapped and later dispersed throughout the water column. The discharge of sediment lifted from the ocean floor will create a dark "plume" of red clay over a large area of the ocean surface, which may cause a stimulation of photosynthetic activity and productivity, resulting in a phytoplankton bloom.¹¹ The discharged particulate material also may alter light penetration and reduce photosynthetic activity in lower layers. At present the effect of this is unknown; some have even suggested that it may be beneficial, or at least irrelevant.¹²

The operation of either the suction or bucket systems also will disturb the biological activity and sediment on the ocean bottom. Although present techniques are not 100% efficient in bottom coverage, scientists are concerned not only by the ability of bottom organisms to repopulate a mined area but also by the potential destruction of an entire species.¹³ In addition, bottom sediments that are stirred up by a mining operation may clog or smother benthic (bottom dwelling) organisms over a much wider area than that actually mined, thus further jeopardizing the reestablishment of the bottom ecosystem.¹⁴ The suspension of lifted sediments in the water column also may cause the transplantation of spores or other dormant forms of organisms from one area to another, where favorable temperature, light, and oxygen conditions in the overlying water may reactivate them.¹⁵ Similarly, alien antibodies may be set free from the ancient spores and organisms contained in the sediment that is removed from the floor, infecting animal and plant life in an "Andromeda Strain" scenario.¹⁶

Processing Site Concerns

Although most major companies involved in the development of manganese nodule mining have determined that processing will occur

11. Frank, *supra* note 10, at 815, 817-18.

12. OCEAN MANGANESE NODULES, *supra* note 3, at 28-29.

13. Frank, *supra* note 10, at 810-19.

14. OCEAN MANGANESE NODULES, *supra* note 3, at 28.

15. *Id.*

16. Frank, *supra* note 10, at 820.

ashore, shipboard processing may be economically attractive in the future. Highly pollutive chemicals with heavy alkaline and acid bases are used in the processing of the nodules, and if the methods are not self-contained, wastes or residues could produce a severe strain on the ecosystem in the mining area.¹⁷ Regardless of where the processing takes place, the disposal of waste, including manganese tracings, will create a potential environmental harm, the impact of which has not been evaluated fully. Assuming that the nodules are not processed at sea, extractive plants near the shoreline probably will be developed, thus increasing the chance that mining operations will have an adverse impact on the coastal zone. Moreover, the energy requirements of mining systems are substantial, and new energy sources need to be developed in either the coastal zone or at sea. The use of nuclear power would pose certain risks; ¹⁸ if other energy modes are employed, then different environmental problems will be encountered.

Clearly, the orderly development of deep-sea mining requires a regime of law that addresses both the regulatory and environmental aspects of this activity. Because the areas containing known commercial quantities of nodules are located seaward of the limits of the national resources jurisdictions that are recognized by international law, the ongoing sessions of the LOS Conference undoubtedly will continue their attempts to formulate an acceptable international regime with which to govern the regulatory and environmental matters. Meanwhile, pending the adoption of an international agreement, two bills have been introduced in the 95th Congress to promote the orderly development of hard mineral resources in the deep seabed.¹⁹ These bills, however, present fundamentally different regulatory approaches to the problem.

17. *Id.* at 819.

18. *Id.* at 820.

19. H.R. 3350, 95th Cong., 1st Sess. (1977) ("Deep Seabed Hard Minerals Act") [hereinafter referred to textually as the Murphy bill]; H.R. 3652, 95th Cong., 1st Sess. (1977) ("Ocean Mining Incentive Act of 1977") [hereinafter referred to textually as the Fraser bill].

The Murphy bill has been amended substantially by the House Subcommittee on Oceanography. Moreover, three bills have been introduced in the Senate. S. 2053, 95th Cong., 1st Sess., 123 CONG. REC. S13,924 (daily ed. Aug. 5, 1977); S. 2085, 95th Cong., 1st Sess., 123 CONG. REC. S14,688 (daily ed. Aug. 12, 1977); S. 2168, 95th Cong., 1st Sess., 123 CONG. REC. S16,046 (daily ed. Sept. 30, 1977). This study does not undertake to evaluate the various versions but rather to determine, using the Murphy and Fraser bills as points of departure, which regulatory and environmental provisions should be adopted by the Congress to control deep-sea mining.

REGULATORY OPTIONS

The Deep Seabed Hard Minerals Act,²⁰ introduced by Representative Murphy of New York, recognizes that America's mineral needs will continue to expand beyond domestic sources of supply, the national interest requires an access to strategic minerals independent of the export policies of foreign nations, and the adverse impact on the country's balance-of-payments caused by the purchase of foreign minerals must be avoided.²¹ Because abundant deposits of manganese nodules exist in the seabed of international waters and American companies are developing the technology to exploit this resource, the Murphy bill emphasizes that it is in the national interest to encourage the perfection of this technology by enacting interim legislation that creates a licensing program to insure the security of deep-sea mining investments.²²

Although the Murphy bill styles itself as "interim legislation" and leaves the door open to supersession when and if an LOS agreement is ratified,²³ it grants qualifying mining companies exclusive licenses to designated blocks or areas of the deep seabed measuring as much as sixty thousand square kilometers.²⁴ Moreover, qualifying companies would receive a ten-year exploration period and, if commercial recovery "has begun from a licensed block within the ten-year period, such license shall remain in force for as long as commercial recovery from the block continues with reasonable diligence, as determined pursuant to regulations promulgated by the Secretary pursuant to section 16."²⁵ Actual commercial recovery may not begin prior to January 1, 1978; after that date, the mining operations may not occur until the licensee obtains a commercial recovery permit.²⁶ At the time of issuance of the permit or ten years from the license date, whichever is sooner, the licensee must relinquish those portions of his choice of the original block in an amount necessary to reduce the licensed area to no more than thirty thousand square kilometers.²⁷

20. H.R. 3350, *supra* note 19.

21. *Id.* § 2(a).

22. *Id.*

23. *Id.* § 5(b) (4).

24. *Id.* § 3(4).

25. *Id.* § 5(b) (7). The licensing system of the Murphy bill is somewhat similar to the licensing system structured by the Outer Continental Shelf Lands Act which provides for a five-year exploration period and a life-of-the-field production period. 43 U.S.C. § 1337(b) (1970).

26. H.R. 3350, *supra* note 19, § 9(a).

27. *Id.* § 11.

One of the key provisions of the Act provides that when there is a transition to an international regime that is binding on the United States,

[t]o the extent that the provisions of the international regime permit, the United States shall sponsor applications from licensees under this Act for licenses under the international regime and shall insure, to the maximum extent possible, that such licensees receive the same rights, and have the same duties, under the international regime as are provided under this Act.²⁸

Thus, licensees would receive substantial "grandfather rights" under the Murphy bill. Because an international regime would become binding on the United States only after being ratified by the Senate and signed by the President, the United States probably would not agree to any regime that did not permit it to sponsor its existing licensees for equivalent rights under the international structure. Furthermore, the Murphy bill provides that if the United States approves an agreement which produces "an actual, measurable loss of investment" for any licensee, the licensee will receive compensation computed by a federal district court pursuant to the criteria established in section 13(b).²⁹ If the licensee has not received his commercial recovery permit, he is compensated for his investment losses occurring before the date of supersession; if the licensee has obtained a commercial recovery permit, his compensation is expanded to enable him to recover the "loss of investment in equipment and facilities utilized for commercial recovery and processing of deep seabed minerals."³⁰ In no event can a licensee recover research, testing, or evaluation costs, and the eligibility for any compensation terminates ten years after the issuance of a permit for commercial recovery.³¹

The Ocean Mining Incentive Act of 1977,³² introduced by Representative Fraser of Minnesota, presents a substantially different legal and conceptual framework to govern the deep-sea mining efforts of American companies. Rather than emphasizing national mineral self-sufficiency, balance-of-payments considerations, and the need to expedite commercial production, the Fraser bill stresses the global (as well as national) interest in exploiting the deep seabed under the aegis of an international treaty produced by the LOS Conference. An LOS treaty would insure, among other things, the world-wide distribution

28. *Id.* § 12.

29. *Id.* § 13.

30. *Id.* § 13(a).

31. *Id.* § 13(a), (c).

32. H.R. 3652, *supra* note 19.

of deep-sea mining benefits and "enhance[d] development of the common heritage of mankind."³³ Thus the Fraser bill does not undertake to provide a regulatory process or format for deep-sea mining³⁴ but rather a "transitional" process that will not threaten LOS negotiations.³⁵ The bill acknowledges the need to provide incentive to mining firms to continue developing the requisite technology, that is, to proceed with "prototype experimentation"³⁶ until July 1, 1980, and upon expiration of the Act, absent an LOS treaty, to provide the participating mining firms "with the necessary further incentives for actual commercial recovery of mineral-bearing nodules from the deep seabed."³⁷

To this end an ocean mining incentive program would provide federal insurance to mining firms during the prototype phase.³⁸ Two kinds of loss would be covered: loss or damage from physical interference or sabotage by persons "against whom a legal remedy does not exist or is unavailable in any legal forum to which any such mining firm has access" or "any loss of continuity of operations resulting from significant change in the international status of the deep seabed area."³⁹ The insurance coverage would not exceed \$100,000,000⁴⁰ and would be available only if the program's Director determined that coverage was not available elsewhere at a reasonable

33. *Id.* § 2(a). The bill declares its purposes to include, *inter alia*, support for the work of the LOS Conference and encouragement of a timely agreement on a treaty. *Id.* § 3(a) (1). For the text of this provision see note 35 *infra*.

34. The bill provides: "[I]f agreement is not reached at the Law of the Sea Conference, legislation should be enacted which establishes a more comprehensive legal regime for the commercial recovery of nodule resources after July 1, 1980." *Id.* § 13(3).

35. *Id.* § 3(a) (1). This section provides: "It is therefore declared to be the purposes of the Congress in this Act—(1) to support the work of the Third United Nations Conference on the Law of the Sea and to encourage timely agreement on a treaty." In addition, § 13 provides:

The Congress hereby expresses—

(1) its support for United States participation in the United Nations Conference on the Law of the Sea; and (2) its intention that this Act be considered to be supportive of the objectives of the Conference, in that this Act, in anticipation of agreement being reached at the Conference, allows United States mining firms to proceed toward ocean mining capability without rupturing the negotiations process.

Id. § 13.

36. *Id.* § 2(a) (5).

37. *Id.* § 3(a) (3).

38. *Id.* § 6(a).

39. *Id.* § 6(b) (1).

40. *Id.* § 6(b) (2) (A).

cost.⁴¹ The amount of any claim would be determined by a panel composed of equal numbers of government employees from the Office of Ocean Mining Incentives and the Department of the Interior.⁴² If, after a joint review of the panel decision by the Secretaries of Commerce and the Interior,⁴³ the mining company disagrees with the Government's disposition of its claim, it must resort to a federal district court within two years after the decision of the Secretaries.⁴⁴

The Fraser bill's insurance protection would be available only to companies qualifying as eligible mining firms. To qualify, section 5(b) requires that a business apply to the Director of the Office of Mining Incentives, which the bill would place within NOAA.⁴⁵ The applicant must demonstrate the ability to engage in prototype operations through evidence of experience, financial capacity, and access to technology and data.⁴⁶ Among the factors the Director is to weigh in determining eligibility are evidence that the firm has engaged in research and development in nodule resource mining for at least five years, has spent at least \$20,000,000 on such research and development, and will locate processing facilities in places subject to the jurisdiction of a state or the United States.⁴⁷

From a regulatory standpoint the only common ground between the two bills is that both purport to encourage the continued progress in United States deep-sea mining pending the outcome of the LOS negotiations. Obviously the Murphy bill provides significantly more incentive. Indeed, the Fraser bill provides no meaningful incentive whatsoever. Those few firms that can qualify for eligibility only receive insurance with obscure coverage, unknown cost, and a collection procedure that is entrusted to a bureaucratic process of undetermined length, which must be exhausted before the claimant may avail himself of a judicial remedy. In addition, absent passage of an LOS treaty by the end of the prototype phase, an eligible mining firm is given only the nebulous assurance that Congress will provide United States mining firms with the necessary incentives to promote the commercialization of the deep-sea mining industry.⁴⁸ This assurance, however, is placed among the "Purposes" rather than in the substantive provisions of the bill and clearly is not binding on a subsequent Congress. Moreover, the Fraser bill provides no incentive to pioneering mining firms

41. *Id.* § 6(b) (2) (C).

42. *Id.* § 6(b) (4) (A).

43. *Id.* § 6(b) (5).

44. *Id.* § 6(b) (6).

45. *Id.* § 5(a) (1)-(b) (1).

46. *Id.* § 5(b) (2).

47. *Id.* § 5(b) (2) (A)-(C).

48. *Id.* § 3(a) (3).

in the event that an LOS treaty is forthcoming. In fact, given the language espousing the worldwide distribution of deep-sea mining benefits to enhance mankind's common heritage,⁴⁹ the Fraser bill might act as a disincentive. Thus, of the two proposals, the Murphy bill is the only regulatory option that provides a workable interim process and establishes, in the event an LOS treaty is not ratified, an ongoing, viable regulatory framework. Further, if an LOS treaty is forthcoming, the Murphy bill provides a mechanism for transition to an international regime that either protects the lessees' equities or, failing that, provides a compensation scheme for investments made before the leases are modified or abrogated.

OPTIONS FOR ENVIRONMENTAL CONTROL

Like man's activities in the stratosphere and outer space, the environmental consequences of his activities in the benthonic regions are largely unknown. Accordingly, the first and most critical element in formulating an adequate environmental protection process for deep-sea mining is an expedited program to assess the environmental impacts that will result at each stage of the proposed mining, transporting, and processing operations. Such an assessment is essential to identify unavoidable impacts, damage mitigation strategies, and alternatives of proposed measures for each level of operations. A comprehensive analysis is also necessary to determine the short- and long-term cost-benefit ratios of the various alternatives and those resources that will be irretrievably committed in a prospective program. Similarly, an environmental assessment of deep-sea mining in all of its various phases is necessary before federal decision-makers can undertake a meaningful analysis in compliance with the National Environmental Policy Act of 1969 (NEPA).⁵⁰

Both the Murphy and Fraser bills recognize the need for environmental protection, but the Murphy bill does not require an environmental assessment program.⁵¹ For example, section 7(a) of the Murphy bill provides that "the Secretary *may* conduct any necessary research for the purpose of acquiring necessary information to establish such [environmental] criteria and standards and *may*, from time to time, revise the criteria and standards as scientific data may

49. *Id.* § 2(a) (3)-(4). See note 33 *supra* & accompanying text.

50. 42 U.S.C. § 4332 (1970).

51. The Murphy bill, H.R. 3350, *supra* note 19, contains six references to environmental protection: §§ 2(a) (9), 5(a) (4), 5(b), 7, 8(b), and 9(b); the Fraser bill, H.R. 3652, *supra* note 19, contains three references to environmental protection: §§ 2(a) (6), 3(a) (4), and 7.

warrant.”⁵² If the Secretary does conduct research, then, with the consent of the head of the agency concerned, he “*may* avail himself of such officers and employees, advice, information, laboratories, vessels, and other facilities of any federal agency as may be helpful in the conduct of such research.”⁵³ In contrast, section 2(a) (6) of the Fraser bill recognizes that: “The environmental effect of deep seabed mining is not fully understood and therefore in the interest of full compliance with the National Environmental Policy Act, as well as facilitating the normal industry development, it is important that a program of environmental assessment of deep sea mining be accelerated.”⁵⁴ Accordingly, the Fraser bill further provides in section 7(a): “The Administrator of the National Oceanic and Atmospheric Administration *shall* accelerate the program of environmental assessment of deep seabed mining with a view to ascertaining the environmental impact of such mining, including associated retrieval and land-based processing, *at the earliest possible time.*”⁵⁵

Under NEPA, this assessment must be completed prior to any irreversible or irretrievable resource commitment to insure the availability of data essential to the preparation of a meaningful and legally sufficient Environmental Impact Statement.⁵⁶ Without the essential baseline data provided by a comprehensive scientific analysis, federal agencies cannot reasonably consider any of the environmental questions that the law requires them to analyze.⁵⁷ Stripped of basic background material, any Environmental Impact Statement (EIS) would lack meaningful content, and a subsequent EIS when the mining company seeks its commercial production permit, as is required by the Murphy bill,⁵⁸ would be open to judicial attack as merely a *post hoc* justification of an accomplished fact.

Both the Murphy and Fraser bills specifically provide for compliance with NEPA. Under the Murphy bill, however, the totality of

52. H.R. 3350, *supra* note 19, § 7(a) (emphasis supplied).

53. *Id.* § 7(b) (emphasis supplied).

54. H.R. 3652, *supra* note 19, § 2(a) (6).

55. *Id.* § 7(a) (emphasis supplied). In addition, one of the enumerated purposes of the bill is “to accelerate a program of environmental assessment of deep sea mining and to insure the establishment of needed environmental regulation . . .” *Id.* § 3(a) (4).

56. *Scientists’ Inst. for Pub. Information v. AEC*, 481 F.2d 1079 (D.C. Cir. 1973). *See also* *Natural Resources Defense Council v. Nuclear Regulatory Comm’n*, 547 F.2d 633 (D.C. Cir. 1976), *cert. granted on other issues*, 97 S. Ct. 1098 (1977); Council on Environmental Quality, *Preparation of Environmental Impact Statements: Guidelines*, 40 C.F.R. § 1500.2 (1976) [hereinafter cited as CEQ Guidelines].

57. *Calvert Cliffs’ Coordinating Comm., Inc. v. AEC*, 449 F.2d 1109 (D.C. Cir. 1971).

58. H.R. 3350, *supra* note 19, § 9(b).

environmental protection consists of a requirement to prepare a NEPA EIS⁵⁹ and a vesting of the secretary with the discretionary authority to institute the type of research program discussed earlier.⁶⁰ The Fraser bill, in section 7(b), specifically provides that the Administrator of NOAA shall accelerate the preparation of a general programmatic EIS within one year from the effective date of the Act and that similarly, based on appropriate studies, he shall establish within one year "general criteria for the carrying out of prototype operations in a manner so as to protect the marine environment."⁶¹ Thereafter, section 7(c) requires the Administrator, with inter-agency coordination and assistance, to issue regulations established on the programmatic EIS and general criteria to protect the marine environment.⁶²

Even if litigation concerning implementation of the Fraser bill does not occur, the preparation of an EIS for the section 7(c) rule-making and the actual rulemaking itself would consume most, if not all, of 1979. Thus, only six months would remain before the bill's expiration date for mining companies to apply for eligibility status under the bill and prepare a specific EIS for each such designation.⁶³ Apparently in recognition of this difficulty, section 7(d) provides for the issuance of interim regulations until the general requirements of sections 7(b) and 7(c) are met.⁶⁴ These interim regulations must comply with section 7(c)(3), which requires notice of the nature and extent of proposed prototype operations, the reporting of actual or potential effects of these activities on the marine environment, and the presence of a monitoring team from the Environmental Protection Agency (EPA) aboard the vessels conducting the prototype operations.⁶⁵

59. *Id.* § 5(b). Apart from this provision, the law clearly requires the preparation of an EIS for federally authorized operations outside the territorial limits of the United States. *Enewetak v. Laird*, 353 F. Supp. 811 (D. Hawaii 1973); COUNCIL ON ENVIRONMENTAL QUALITY, ENVIRONMENTAL IMPACT STATEMENTS: AN ANALYSIS OF SIX YEARS' EXPERIENCE BY SEVENTY FEDERAL AGENCIES 64 (1976) [hereinafter cited as CEQ ANALYSIS]. See also Council on Environmental Quality, Draft Provisions to Implement the National Environmental Policy Act (NEPA) for Agency Activities Affecting the Environment in Foreign Nations and the Global Commons (Jan. 11, 1978).

60. See text accompanying notes 50-52 *supra*.

61. H.R. 3652, *supra* note 19, § 7(b).

62. *Id.* § 7(c).

63. In addition to the programmatic EIS specifically required by § 7(b), NEPA clearly requires preparation of a specific EIS for each eligibility designation that is site-specific. *County of Suffolk v. Secretary of the Interior*, 562 F.2d 1368 (2d Cir. 1977); CEQ Guidelines, *supra* note 56, § 1500.6.

64. H.R. 3652, *supra* note 19, § 7(d).

65. *Id.* § 7(c)(3).

It is doubtful that provision for interim regulations cures the timing problem created by sections 7(b) and 7(c) for two reasons. First, the bill apparently contemplates the approval of interim operations without the preparation of either a programmatic EIS or a specific EIS related to particular eligibility designations. As such, the Fraser bill conflicts with NEPA, which requires the compilation of both types of statements.⁶⁶ Second, section 7(c)(3), when invoked in the context of section 7(d) interim operations, countermands the bill's qualification requirements for eligibility designations. Thus, instead of the detailed designation findings generally required by section 5(b),⁶⁷ under the interim regulations an applicant need only give the Administrator notice of his proposed *modus operandi*, file reports, and allow for an EPA monitoring team. Because the completion of the long-term regulation process would consume most of the contemplated life of the bill, in practical effect the section 7(d) interim plan constitutes the format under which prototype operations will be approved and conducted, and the remainder of the bill is surplusage. During the operation of the entire interim program no EIS would be completed.

REGULATORY REGIME

The Fraser bill articulates the important principle that "[t]he absence of a legal regime constitutes an impediment to deep sea mining progress by creating investment uncertainty" ⁶⁸ An effective regulatory regime must create incentive by providing security. The Murphy format, with the amendments suggested hereafter, clearly best meets this criterion. A qualified mining company cannot be expected to hazard the immense investment that is necessary for the effective development of a deep-sea mining operation unless it possesses extraction rights in a specific geographic area and over a definite period of time to develop its claim and enjoy the fruits of its efforts.⁶⁹

To insure that qualified licensees will benefit from their investment and developmental efforts, the regulatory process must guarantee that in the event of an international treaty the rights of licensees either will be protected or fully compensated. Further, the physical realities of producing deep-sea mining operations must be recognized. Given the present state of the art, a ten-year period for developmental

66. See notes 56-58, 63 *supra* & accompanying text.

67. See text accompanying notes 45-47 *supra*.

68. H.R. 3652, *supra* note 19, § 2(a)(3).

69. The Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1333-1343 (1970), recognizes the basic equitable and pragmatic necessity for vesting these minimal rights in private enterprise. See note 25 *supra*.

purposes is not unreasonable. The time limitation created by the expiration date of the Fraser bill by itself renders that proposed program unacceptable.

Although the regulatory program should vest rights in qualified licensees, it also must insure that licensees are fit, willing, and able to perform the development and production required by the national interest. The Murphy bill sets forth five requirements that must be met by a mining firm before the Secretary may issue a license, only one of which, financial responsibility, pertains to fitness and ability.⁷⁰ Otherwise the Murphy bill delegates to the Secretary the duty to establish licensing procedures and provides only scant guidelines.⁷¹ The inclusion of more specific qualifying provisions such as those enumerated in section 5(b) of the Fraser bill⁷² would improve the Murphy proposal.

Another desirable component of any regulatory program is the requirement that adequate technical and operational regulations be forthcoming at each stage of development to insure effectiveness,

70. H.R. 3350, *supra* note 19, §5, provides in pertinent part:

Before he may issue a license, the Secretary must first determine, in the consideration of each license application—

(1) that the applicant is financially responsible;

(2) that the activities under the license will not unreasonably interfere with the rights of other states or persons in their exercise of the freedoms of the high seas, as recognized under the general principles of international law;

(3) that the issuance of a license does not conflict with any international obligation of the United States, established by any treaty or convention which is ratified by and becomes binding upon the United States;

(4) that activities under the license will not pose an unreasonable threat to the integrity of the marine environment and will be conducted in accordance with environmental standards delineated in regulations promulgated pursuant to section 16;

(5) that minerals recovered under authority of the license, to the extent of the proportionate interest therein of all United States entities, will be processed in the United States, or on board United States vessels.

71. *Id.* § 6(a) provides:

The Secretary is authorized and directed to establish procedures governing the application for, and the issuance of, licenses pursuant to this Act. Such procedures shall contain an adequate mechanism for full consultation with all other interested Federal agencies and departments, and for the full consideration of the views of any interested members of the general public.

See also *id.* § 6(c) (4), which contemplates that the Secretary's regulations will include the data enumerated in § 6(c) (4) (i)-(iii).

72. See text accompanying notes 45-47 *supra*.

safety, and continuing environmental protection. National supervision over deep-sea mining will necessitate ongoing regulations such as those presently imposed by the United States Geological Survey Operating Orders to govern technical aspects of outer continental shelf projects.⁷³ The Murphy bill does not insure that such regulatory surveillance will occur. Section 6(a) provides that "the Secretary is authorized *and directed* to establish procedures governing" licensing applications and issuances.⁷⁴ In contrast, section 16(a), which establishes the Secretary's regulatory authority, provides only that "the Secretary is authorized to issue such reasonable rules and regulations as may be necessary to carry out the provisions of this Act, including . . . (4) work requirements and diligence in performance; (5) environmental criteria and standards; [and] (6) multiple use standards."⁷⁵ Section 16(a) should be amended to conform with section 6(a) and not only authorize but direct the Secretary to issue rules relating to ongoing technical and operational developments. Similarly, section 16's enumeration of subject matter should be expanded to authorize the promulgation of protective provisions comparable to the United States Geological Survey Operating Orders.

ENVIRONMENTAL REGIME

As discussed above, effective environmental regulation of deep-sea mining demands prompt implementation of an expedited but continuing comprehensive scientific research assessment program whose results will permit the meaningful preparation of each programmatic and site-specific licensing EIS. The Murphy bill therefore should be amended to include the Fraser bill's sections 2(a) (6), 3(a) (4), and 7(a)-(c). Moreover, some lawful interim mechanism must be devised that satisfies environmental requirements but avoids delay in continued developmental efforts by United States mining companies. One solution would be legislation allowing interim operating licenses similar to the temporary nuclear operating licenses permitted by a 1972 amendment⁷⁶ to the Atomic Energy Act.⁷⁷ Then, as now, Congress was concerned with meeting a need of the nation while simultaneously protecting the quality of the environment. After *Calvert Cliffs' Co-*

73. Geological Survey, Outer Continental Shelf, 30 C.F.R. § 250.12 (1976) (promulgated pursuant to §§ 5-6 of the Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1334-1335 (1970)).

74. H.R. 3350, *supra* note 19, § 6(a) (emphasis supplied).

75. *Id.* § 16(a).

76. 42 U.S.C. § 2242 (Supp. II 1972).

77. 42 U.S.C.A. §§ 2011-2296 (1973 & Supp. 1977).

*ordinating Committee, Inc. v. AEC*⁷⁸ effectively had paralyzed the Atomic Energy Commission's licensing process, Congress enacted interim legislation to permit the completion of licensing then in progress. Under the terms of the amendment, if the conditions providing for the operation of a facility adequately protected the environment on a short-term basis, then a temporary license could be issued.⁷⁹ In the context of deep-sea mining, Congress could structure abbreviated environmental requirements to insure that no irreparable damage is caused by temporary mining operations permitted during the period necessary to conduct baseline studies, establish criteria, promulgate regulations, prepare the requisite programmatic EIS, and process each site-specific licensing application submitted with an EIS.

THE INTERNATIONAL ENVIRONMENTAL REGIME OF LAW UNTIL AN LOS TREATY IS FORTHCOMING

Even after the development of environmental regulations for United States mining companies, the problem remains of negotiating an adequate international environmental regime with other industrial nations engaged in deep-sea mining operations. The history of international accord for effective international environmental controls suggests that negotiating adequate regulations with those countries most likely to engage in deep-sea mining will be difficult.⁸⁰

Article 145 of the LOS Informal Composite Negotiating Text, dealing with protection of the marine environment, is nothing more than a generalized policy statement.⁸¹ Such generality has characterized

78. 449 F.2d 1109 (D.C. Cir. 1971).

79. 42 U.S.C. § 2242(b) (2) (Supp. II 1972). This section provides:

(b) With respect to any petition filed pursuant to subsection (a) of this section, the Commission shall issue a temporary operating license upon finding that:

...
(2) operation of the facility during the period of the temporary operating license in accordance with its terms and conditions will provide adequate protection of the environment during the period of the temporary operating license

80. The foreign nations with the requisite technology, resources, and motivation that are most likely to embark on deep-sea mining ventures within the next twenty years are: Australia, the Federal Republic of Germany, France, Japan, New Zealand, the Soviet Union, the United Kingdom, Canada, and Belgium. In addition to either direct or indirect government involvement in mining research, development, and processing, more than 100 companies around the world are now engaged in various endeavors to exploit mineral resources from the ocean floor. OCEAN MANGANESE NODULES, *supra* note 3, at 37, 55-57.

81. Article 145 provides:

With respect to activities in the Area, necessary measures shall be

the meetings convened to address international environmental problems. Nevertheless, one innovative suggestion has been advanced that is somewhat more specific. Professor Goldie has proposed employing an international environmental impact statement process modelled after the NEPA requirements as a basis for an international environmental regime of law.⁸² Goldie's thesis is that in international law legal doctrines come into being through the emergence of a "relatively specific articulation of the notion of justice," a demand for its legal implementation, an articulation of the notion in the form of laws and rules, and finally, its conceptualization into a legal doctrine which presumably is both intelligible and enforceable.⁸³ Goldie concludes that section 102 of the National Environmental Policy Act of 1969⁸⁴ satisfies the criteria for a legal doctrine "because it embodies the reception and legal expression of a deeply held value at large in modern society."⁸⁵

To date, however, no other nation has enacted even for *domestic* purposes anything approximating NEPA,⁸⁶ which suggests that the principles of NEPA fall short of being deeply-held values in modern society. Indeed, even within the United States as of March, 1976, despite extensive litigation to compel federal agency compliance,⁸⁷

taken in order to ensure effective protection for the marine environment from harmful effects which may arise from such activities in accordance with Part XII of the present Convention:

(a) The prevention of pollution and contamination, and other hazards to the marine environment, including the coastline, and of interference with the ecological balance of the marine environment, particular attention being paid to the need for protection from the consequences of such activities as drilling, dredging, excavation, disposal of waste, construction and operation or maintenance of installations, pipelines and other devices related to such activities;

(b) The protection and conservation of the natural resources of the Area and the prevention of damage to the flora and fauna of the marine environment.

Informal Composite Negotiating Text, U.N. Doc. A/CONF. 62/WP. 10 (1977).

82. L. GOLDIE, INTERNATIONAL IMPACT STATEMENTS AND THE CONSERVATION OF THE OCEAN ENVIRONMENT IN A DEEP SEABED HARD MINERALS MINING REGIME, reprinted in *Deep Seabed Hard Minerals: Hearings on H.R. 9, H.R. 7732, and H.R. 12233 Before the Subcomm. on Oceanography of the House Comm. on Merchant Marine and Fisheries*, 93d Cong., 2d Sess. 117 (1974).

83. *Id.* at 12-13.

84. 42 U.S.C. § 4332 (1970).

85. *Id.* at 13.

86. See, e.g., Rabie, *Disclosure and Evaluation of Potential Environmental Impact of Proposed Governmental Administrative Action*, 1976 TYDSKRIF VIR HEDENDAAGSE ROMEINS-HOLLANDSE REG. 40.

87. In the first five and one-half years of NEPA enforcement, at least 654 cases were instituted to compel compliance by federal decision makers. CEQ ANALYSIS, *supra* note 59, at 31.

many agencies' NEPA practices continued either to be legally defective or to fall significantly short of the spirit of the Act and the guidelines established by the Council on Environmental Quality for preparation of impact statements.⁸⁸

One evident reason that no foreign nation has adopted NEPA-type constraints on governmental decision making is that none is willing to allow individual citizens or groups the right to challenge state actions or to require environmental accountability from the government.⁸⁹ In the United States the dispute over whether an EIS is required is the most frequently litigated issue between federal agencies and environmentalist groups seeking to enforce NEPA.⁹⁰ Given these circumstances, the idea of an International Environmental Policy Act (IEPA) cannot be regarded as attainable within any meaningful future period. If a country is unwilling to account to its own citizens for the consequences of its decisions, it is unrealistic to expect that nation to be accountable to some amorphous international entity or community or to surrender its sovereignty so that some judicial entity may enforce international environmental requirements against it. The dismal failure to date to achieve any enforceable or effective regime of law to stop ocean dumping, to assure tanker safety, to protect whales and other endangered species, or to prevent nuclear proliferation does not encourage the belief that an international regime of law regulating deep-sea mining environmental practices has any near-term prospect of success. Moreover, as indicated earlier, imposition of a NEPA-type process on deep-sea mining is only part of the regulation necessary to assure adequate environmental protection.⁹¹

In the foreseeable future only a few nations will possess the capital base and technology to participate in deep-sea mining. Thus there is no pressing short-term need to evolve a regime of law that is recognized and obeyed by all or even most nations. The prospect of resolution of this matter in the LOS Conference is minimal.⁹² Although these efforts to arrive at a multilateral international regime of law for

88. For example, some 20 of 70 federal agencies as of March, 1976, had not adopted NEPA regulatory guidelines that reflected the current CEQ guidelines for the preparation of environmental impact statements. *Id.* at 5.

89. See, e.g., Rabie & Eckard, *Locus Standi: The Administration's Shield and the Environmentalist's Shackle*, 9 COMP. & INT'L L.J. S. AFRICA 141 (1976).

90. Over half of the 654 NEPA cases mentioned in note 89 *supra* involved the issue of whether a federal agency was required to prepare an environmental impact statement. CEQ ANALYSIS, *supra* note 59, at 31.

91. See text accompanying notes 73-75 *supra*.

92. See note 1 *supra*.

deep-sea mining should not cease, the United States and others possessing the requisite technology should continue to develop the proposed mining projects and negotiate on a bilateral basis those environmental practices to be enforced during these operations.

Achievement of a number of effective bilateral agreements probably would facilitate and expedite the evolution of a comprehensive regime of international environmental law. The bilateral approach has several other virtues that should be noted. These negotiations are less likely to be encumbered by the types of extraneous issues that have bemired LOS negotiations. In addition, bilateral meetings would focus considerable world visibility on the negotiating countries. Although world public opinion traditionally has little influence on the conduct of certain nations when negotiations involve critical world power relations, those countries may be more tractable with respect to environmental questions. For example, considerable evidence indicates that the Soviet Union has been influenced by domestic and foreign criticism to recognize the need for environmental protection, at least in the situation involving Lake Baykal.⁹³

Furthermore, bilateral negotiations are likely to produce environmental regulations that are site-specific and responsive to the peculiar ecological conditions within given mining blocks. Thus these meetings would avoid the production of a list of meaningless generalities that are of little value in explicit enforcement situations.

Finally, these negotiations will involve complex economic factors, and the United States probably will have a stronger bargaining position in a bilateral situation. The compliance with NEPA and other federal legislation enacted during the previous decade has demonstrated that this country's environmental reform is becoming increasingly costly, and the ability of the economy to meet these demands has become a major national issue.⁹⁴ Moreover, other industrialized nations that compete with the United States have not enacted comparable environmental legislation to govern their own manufacturing activities.⁹⁵ The resulting unequal environmental costs have produced significant trade distortions. The import relief provisions of

93. P. PRYDE, CONSERVATION IN THE SOVIET UNION 21, 63-64 (1972).

94. For a discussion of capital formation problems related to environmental costs see Whitney, *Capital Formation Options to Finance Pollution Control*, 3 COLUM. J. ENV'T'L L. 42 (1976).

95. Congress has recognized the gravity of this problem. The Federal Water Pollution Control Act Amendments of 1972, § 6, 33 U.S.C. § 1251 note (Supp. II 1972), provides:

(a) The Secretary of Commerce, in cooperation with other interested Federal agencies and with representatives of industry and the

the Trade Act of 1974⁹⁶ were structured in part to cope with this problem.⁹⁷ Subsequently, the International Trade Commission has recommended the imposition of import relief measures with respect

public, shall undertake immediately an investigation and study to determine—

(1) the extent to which pollution abatement and control programs will be imposed on, or voluntarily undertaken by, United States manufacturers in the near future and the probable short- and long-range effects of the costs of such programs (computed to the greatest extent practicable on an industry-by-industry basis) on (A) the production costs of such domestic manufacturers, and (B) the market prices of the goods produced by them;

(2) the probable extent to which pollution abatement and control programs will be implemented in foreign industrial nations in the near future and the extent to which the production costs (computed to the greatest extent practicable on an industry-by-industry basis) of foreign manufacturers will be affected by the costs of such programs;

(3) the probable competitive advantage which any article manufactured in a foreign nation will likely have in relation to a comparable article made in the United States if that foreign nation—

(A) does not require its manufacturers to implement pollution abatement and control programs,

(B) requires a lesser degree of pollution abatement and control in its programs, or

(C) in any way reimburses or otherwise subsidizes its manufacturers for the costs of such program;

(4) alternative means by which any competitive advantage accruing to the products of any foreign nation as a result of any factor described in paragraph (3) may be (A) accurately and quickly determined, and (B) equalized, for example, by the imposition of a surcharge or duty, on a foreign product in an amount necessary to compensate for such advantage; and

(5) the impact, if any, which the imposition of a compensating tariff or other equalizing measure may have in encouraging foreign nations to implement pollution abatement and control programs.

(b) The Secretary shall make an initial report to the President and Congress within six months after the date of enactment of this section [Oct. 18, 1972] of the results of the study and investigation carried out pursuant to this section and shall make additional reports thereafter at such times as he deems appropriate taking into account the development of relevant data, but not less than once every twelve months.

96. 19 U.S.C.A. §§ 2101-2487 (Supp. 1977).

97. See Whitney, *The Trade Act of 1974: Coping With Unequal Environmental Control Costs*, 16 B.C. INDUS. & COM. L. REV. 577, 592-605 (1975).

to specialty steel,⁹⁸ shoes,⁹⁹ color television,¹⁰⁰ honey,¹⁰¹ mushrooms,¹⁰² and sugar.¹⁰³

Consequently, in bilateral negotiations concerning deep-sea mining regulations, if a nation rejects the adoption of a rule or practice that the United States regards as essential to environmental protection and if that refusal produces unequal operational costs that result in a trade distortion, this country's negotiators should indicate that import relief against the advantaged foreign product can and will be imposed. Thus another nation's incentive to avoid fully adequate environmental regulations for economic advantage might be reduced significantly, and the United States would have considerable economic leverage to support its negotiating stance.

CONCLUSION

Deep-sea mining of manganese nodules by American and foreign firms is inevitable given the ever-increasing demand for industrial elements. The requisite technological and economic resources are available; only a guaranteed security for corporate investment and effort is lacking. Congress can and should enact a legislative program that provides this assurance subject to compliance with sound regulatory and environmental principles. Similarly, a concomitant effort to influence foreign countries through a series of bilateral negotiations and agreements to adhere to sound environmental safeguards will advance the goal of efficient, responsible exploitation of the natural resources in the ocean's seabeds. Moreover, such bilateral agreements could provide a basis for the emergence of favorable customary international law that would promote the negotiation of a viable LOS agreement.

98. U.S. Int'l Trade Comm., Report to the President on Investigation No. TA-203-2 (Feb. 14, 1977).

99. U.S. Int'l Trade Comm., Report to the President on Investigation No. TA-201-18 (Feb. 8, 1977).

100. U.S. Int'l Trade Comm., Report to the President on Investigation No. TA-201-19 (Mar. 22, 1977).

101. U.S. Int'l Trade Comm., Report to the President on Investigation No. TA-201-14 (June 29, 1976).

102. U.S. Int'l Trade Comm., Report to the President on Investigation No. TA-201-17 (Jan. 10, 1977).

103. U.S. Int'l Trade Comm., Report to the President on Investigation No. TA-201-16 (Mar. 17, 1977).