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I. Introduction

The discussion in this paper is premised on three assumptions. First, the United States will need new technologies to meet its increasing energy demands by the end of the century. While the world energy demand is expected to double in a period of twenty to thirty years,[1] a recent study by the U.S. Department of Commerce indicates that the country's need for energy will grow 1.2% per person through the end of the century, and that the economy will grow by about 2.2% per year.[2] Second, this increasing demand for energy, deemed essential in order to maintain an acceptable level of economic activity, coupled with the oil crises of 1973-74 which gave rise to the demand for energy security in the United States, will necessitate the exploration of all reasonably promising energy alter-

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1. Cited in COUNCIL ON ENVIRONMENTAL QUALITY, SOLAR ENERGY—PROGRESS AND PROMISE 1 (1978).

2. Reported in Den. Post, Nov. 23, 1978, at 38, col. 1.

natives.[3] According to the National Energy Plan,[4] these principal alternative energy sources available to the United States—coal, nuclar power, and solar power (direct and indirect)—will be used in the years ahead. Finally, the steadily rising cost of fossil fuel, especially coal, the likely scarcity and increasing costs by the year 2000 of petroleum, natural gas, and U-235, and a growing concern over their detrimental environmental effects, will make these sources uneconomical for large scale electrical generation. Substitute sources will include OTEC, non-U-235 nuclear, and geothermal energy.

OTEC, an unconventional energy source and a unique energy technology, is an attractive alternative for several reasons. "[I]t can provide utilities with 'baseload capability' on line 24 hours a day. It can economically generate power at a level of 250 megawatts and up, enough for a moderate-sized city. Using a renewable resource, the sun, its 'fuel' is delivered directly to the site in usable form without charge. It is environmentally benign, emits no poisonous byproducts (barring the remote contingency of a massive leak of the working fluid—probably ammonia), and it is necessarily situated unobtrusively offshore, away from population centers. All evidence to date indicates that it has no harmful effect on ocean life; indeed, cold water upwellings are known to be beneficial to fish populations."[5]

Despite these attractive features, however, established utility companies have thus far shown little interest in pursuing technological studies and hardware demonstrations related to OTEC. This apparent lack of serious interest stems mainly from the perception that OTEC is an expensive, unproven, and risky undertaking. A combination of factors, including unproven economics (based on presently noncompetitive estimated costs of OTEC-generated energy), unverified social and environmental effects, and uncertainty as to the potential of energy from OTEC as well as how OTEC fits into the national energy policy is responsible for the prevailing skepticism. Also,

3. *See, e.g.*, Nye, Jr. *Nuclear Policy: Balancing Nonproliferation and Energy Security*, 78 DEP'T STATE BULL., Oct. 1978, at 39. *See also* 78 DEP'T STATE BULL., Sept. 1978, at 3.

4. Energy Policy and Planning, Executive Office of the President, THE NATIONAL ENERGY PLAN (U.S. Gov't Printing Off., April 1977).

5. Whitmore, *OTEC: Electricity from the Ocean*, 81 TECHNOLOGY REV., Oct. 1978, at 58-60.

the absence of an adequate legal and institutional framework further clouds the picture.

It seems that the uncertainty OTEC faces on technological and economic grounds will be dispelled by further studies and demonstration projects which are likely to be undertaken by the Department of Energy (DOE).[6] While the "engineering challenges to be bridged demand solutions of scale rather than of technical innovation,"[7] it is estimated that "the OTEC power plant should have an economic advantage over fossil fuel plants and nuclear plants well before the year 2000."[8]

However, these economic and technological issues will not be discussed here, nor will the financial aspects be investigated.[9] This study has as its primary focus those legal and institutional aspects which will ostensibly have a significant bearing upon the commercialization of OTEC. These issues are broadly classified as (1) jurisdictional, (2) regulatory, and (3) environmental. They will be discussed here in the context not only of existing international law—both customary and treaty law—but also of the current developments in the law and the probable changes in it, particularly those resulting from ongoing negotiations of the Third United Nations Conference on the

6. *Id.* at 58.

7. *Id.* at 61.

8. *Id.* at 63.

9. On technical, economic, and financial aspects, *see generally* H. KNIGHT, J. NYHART & R. STEIN, OCEAN THERMAL ENERGY CONVERSION (1977) [hereinafter cited as KNIGHT, NYHART & STEIN]; SCIENCE POLICY RESEARCH DIVISION, CONGRESSIONAL RESEARCH SERVICE, SUBCOMM. ON ADVANCED ENERGY TECHNOLOGIES AND ENERGY CONSERVATION RESEARCH, DEVELOPMENT AND DEMONSTRATION OF THE HOUSE COMM. ON SCIENCE AND TECHNOLOGY, 95TH CONG. 2D SESS., ENERGY FROM THE OCEAN 25-79 (Comm. Print 1978); E. FRANCIS, INVESTMENT IN COMMERCIAL DEVELOPMENT OF OCEAN THERMAL ENERGY CONVERSION (OTEC) PLANT-SHIPS (1977) (Prepared by Johns Hopkins University Applied Physics Laboratory for U.S. Dep't of Commerce); SOLAR ENERGY RESEARCH INSTITUTE, ECONOMIC FEASIBILITY AND MARKET READINESS OF EIGHT SOLAR TECHNOLOGIES: INTERIM DRAFT REPORT 130-45 (1978) (Prepared for U.S. Dep't of Energy) [hereinafter cited as SERI INTERIM DRAFT REP.]; R. TEFFT, R. KELLY, C. DICK, JR., & K. STEVENSON, TOWARD A LEGAL, INSTITUTIONAL AND FINANCIAL FRAMEWORK FOR OTEC DEMONSTRATION AND COMMERCIALIZATION (1978) (Prepared for ERDA by Tefft, Kelly and Motley, Inc.) [hereinafter cited as TEFFT, KELLY & MOTLEY, INC. STUDY]; B. WASHOM & J. NILLES, INCENTIVES FOR THE COMMERCIALIZATION OF OCEAN THERMAL ENERGY CONVERSION TECHNOLOGY (OTEC) (1977) (Prepared for RANN, Nat'l Sci. Found.); J. WITWER, J. ALICH, S. KOHAN, M. LEVINE, P. MEAGHER, E. PICKERING, F. SCHOOLEY, A. SLEMMONS, & T. THOMPSON, 1 A COMPARATIVE EVALUATION OF SOLAR ALTERNATIVES: IMPLICATIONS FOR FEDERAL RD&D 95-101 (1978) (Submitted to Solar Working Group, U.S. Dep't of Energy); and 5 SHARING THE SUN: SOLAR TECHNOLOGY IN THE SEVENTIES 392-548 (K. Böer ed. 1976).

Law of the Sea (LOS III).[10] Several alternatives will be discussed and recommendations offered in each area in light of the United States' interests.

This discussion will be prefaced by a short assessment of the possible arrangements for the siting of OTEC plants, their functions, and their potential for the United States.[11] The most likely configurations for OTEC plants will be: (1) an OTEC facility operating individually as a semipermanent fixture, or a number of plants moored in clusters of eight to ten plants around a central collection device, and connected to shore by a transmission cable, supplying electrical power for general consumption to a land-based electricity grid; or (2) an open sea OTEC facility, a plant-ship, migrating and "grazing" on the surface, seeking the maximum thermal differential gradient and supplying power for an energy-intensive industry at sea. Such a facility could, for example, produce onsite ammonia to be used for the production of fertilizers and industrial chemicals or as a hydrogen carrier for production of electricity, or aluminum, or engage in energy-intensive commodity processing such as manganese nodules. The energy produced then could be converted into other forms of energy, such as hydrogen, and the products produced onsite transported to shore by vessel. Such products could also be manufactured and processed in such places as Hawaii and Puerto Rico, which are close to some of the prospective sites of OTEC facilities.

Because of the thermal gradient needed to make OTEC operative, tropical regions within 10° of the equator, comprising about twenty million square miles, where the surface water is around 80°F., while the cold water 3,000 feet below is around

10. The Conference which began in Caracas in 1974 concluded its resumed seventh session on September 15, 1978 and will convene its eighth session in Geneva on March 19, 1979. For a short report on the latest session, see 15 UN CHRONICLE, Aug.-Sept. 1978, at 41-42. Voluminous legal literature has grown around the Conference issues. *See, e.g.*, various publications of the Law of the Sea Institute including the papers and proceedings of its annual conferences, and its occasional and special papers; 1-6 NEW DIRECTIONS IN THE LAW OF THE SEA (R. Churchill, M. Nordquist, S. Lay, K. Simmonds & J. Welch eds. 1973-77); R. DUPUY, THE LAW OF THE SEA: CURRENT PROBLEMS (1974); S. ODA, THE LAW OF THE SEA IN OUR TIME (1977); THE LAW OF THE SEA: ISSUES IN OCEAN RESOURCE MANAGEMENT (D. Walsh ed. 1977); Symposia in volumes 6-15 of SAN DIEGO L. REV., 6 *id.* at 339-513 (1969); 7 *id.* at 371-673 (1970); 8 *id.* at 453-747 (1971); 9 *id.* at 383-751 (1972); 10 *id.* at 425-691 (1973); 11 *id.* at 535-838 (1974); 12 *id.* at 491-742 (1975); 13 *id.* at 483-778 (1976); 14 *id.* at 507-750 (1977); 15 *id.* at 357-662 (1978).

11. The assessment is based on a study of sources cited in note 9 *supra*.

40° F., offer the most promising sites for OTEC facilities which fit into configuration one discussed above. For the United States, however, these sites are limited to the Gulf Coast, Hawaii, Puerto Rico, and the Pacific territories. According to the studies of the Energy Research and Development Administration (ERDA), a thermal resource of at least 300,000 megawatts lies just off the west coast of Florida.[12] It is anticipated that the technological developments expected from DOE's current OTEC Research, Development and Demonstration (RD&D) Program would allow the exploitation of this resource. Other sudies indicate that the off-grid applications mentioned in configuration two type facilities will have a market potential of an average of 30,000 to 40,000 megawatts during the years 2000 to 2025.[13]

II. JURISDICTIONAL, REGULATORY, AND ENVIRONMENTAL ISSUES

Regardless of the site of an OTEC facility, or its system and configuration, ownership, operation, energy potential and use, the move toward OTEC commercialization will be facilitated if the prevalent uncertainties regarding the issues to be discussed in this section are removed and an adequate legal and institutional framework is established, offering guidelines to interested parties. The following discussion, which is designed to present a broad outline of such a framework, surveys the current state of the law, suggests likely changes, identifies existing ambiguities, gaps and uncertainties, and makes recommendations to remove them.

A. *Jurisdictional Issues*

In the United States offshore areas, questions of jurisdiction, that is, questions pertaining to the competence to prescribe and apply the governing law to peoples, events, and activities in these areas, arise in two contexts: national-international and Federal-State. In the former, activities are governed by norms established by multilateral treaties, regional and bilateral arrangements, and customary law, supplemented by unilateral action; in the latter, by statutory law and judicial pronouncements.

1. *National-International Issues*

The unsettled state of the Law of the Sea is responsible for the presence of unresolved jurisdictional issues pertaining to

12. Cited in TEFFT, KELLY & MOTLEY, INC. STUDY, *supra* note 9, at 3.
13. Cited in *id.*

the installations of OTEC devices in offshore areas. The law is still in an evolutionary state and LOS III, which adjourned its resumed seventh session in New York on September 15, 1978 and will convene its next session in Geneva on March 19, 1979,[14] is attempting to formalize a comprehensive and generally acceptable convention dealing with all aspects of ocean space. While differences on some key issues, such as the mining of the deep seabed, still remain unresolved, the negotiations have shown a remarkable consensus on most issues likely to affect OTEC deployment and operation. Also, regional and bilateral arrangements and unilateral state practices and claims are instrumental in changing the traditional Law of the Sea.

The basic issue pertinent to the present discussion is a coastal state's rights in adjacent waters and on the high seas. Under traditional international law, the inquiry has centered on the limit of territorial waters, and additionally, since the 1958 Geneva Conventions on the Law of the Sea,[15] on the extent of contiguous zones and the outer limit of the continental shelf. Beyond these areas, the universally applicable concept has been freedom of the high seas.

a. *OTEC Devices Under Traditional International Law Regarding the Territorial Sea*

Historically, coastal nation states have enjoyed certain exclusive rights and privileges with respect to adjacent waters over a narrow belt of three marine miles along their coasts, measured from the low water mark, which constituted their territorial waters.[16] These rights are similar to those they exer-

14. 15 UN CHRONICLE, Aug.-Sept. 1978, at 41-42.

15. The following four conventions were concluded at the 1958 Law of the Sea Conference in Geneva: Convention on the Continental Shelf, *done* at Geneva, April 29, 1958, 15 U.S.T. 471, T.I.A.S. No. 5578, 499 U.N.T.S. 312 (effective June 10, 1964) [hereinafter cited as the Continental Shelf Convention]; Convention on Fishing and Conservation of the Living Resources of the High Seas, *done* at Geneva, April 29, 1958, 17 U.S.T. 138, T.I.A.S. No. 5969, 559 U.N.T.S. 285 (effective March 20, 1966) [hereinafter cited as the Fishery Convention]; Convention on the High Seas, *done* at Geneva, April 29, 1958, 13 U.S.T. 2312, T.I.A.S. No. 5200, 450 U.N.T.S. 82 (effective Sept. 30, 1962) [hereinafter cited as the High Seas Convention]; Convention on the Territorial Sea and the Contiguous Zone, *done* at Geneva, April 29, 1958, 15 U.S.T. 1606, T.I.A.S. No. 5639, 516 U.N.T.S. 205 (effective Sept. 10, 1964) [hereinafter cited as the Territorial Sea Convention].

16. *See generally* arts. 1-13 of the Territorial Sea Convention; M. MCDOUGAL & W. BURKE, THE PUBLIC ORDER OF THE OCEANS 174-304, 446-564 (1962) [hereinafter cited as MCDOUGAL & BURKE]; Baty, *The Three-Mile Limit*, 22 AM. J. INT'L L. 503 (1928); Kent, *The Historical Origins of the Three-Mile Limit*, 48 AM. J. INT'L L. 537 (1954).

cise over their internal waters and over their land masses, and were subject only to innocent passage of foreign vessels through these waters.[17] During the last fifty years, however, the breadth of territorial waters has been marked by a lack of uniformity. While the international conferences in 1930,[18] 1958,[19] and 1960,[20] failed to reach agreement on the limits of the territorial sea, the 1958 conference did adopt a proposal which could be read to measure the breadth of the territorial seas restrictively rather than defining it in affirmative terms. Article 24(1) of the 1958 Convention on the Territorial Sea and the Contiguous Zone[21] provides a coastal state limited jurisdiction over the high seas contiguous to its territorial sea. This zone "may not extend beyond twelve miles from the baseline from which the breadth of the sea is measured."[22]

Article 24 did not guarantee coastal states the same specified rights in the contiguous zones as they enjoy in their territorial waters;[23] however, it impliedly limited the coastal state's right to exercise those essential rights beyond the twelve-mile limit. The Convention thus precluded a coastal state from claiming territorial waters beyond twelve miles.

Under traditional international law, therefore, an OTEC device deployed for research[24] or commercial purposes within

17. Arts. 14-23 of the Territorial Sea Convention.

18. *See* Conference for the Codification of International Law, *Bases of Discussion*, League of Nations Publication C. 74. M. 39. 1929. V.

19. *See* United Nations Conference on the Law of the Sea, Official Records (7 Vols.), U.N. Doc. A/CONF. 13 (1958).

20. *See* Second United Nations Conference on the Law of the Sea, *Summary Records of Plenary Meetings and of the Meetings of the Committee of the Whole, Annexes and Final Act*, U.N. Doc. A/CONF. 19/8 (1960). Extensive literature exists on the 1958 and 1960 Law of the Sea Conferences. For a most comprehensive and thorough study of the various issues discussed in the conferences, see MCDOUGAL & BURKE. *See also* C. COLOMBOS, THE INTERNATIONAL LAW OF THE SEA (6th ed. 1967) [hereinafter cited as COLOMBOS]; D. BOWETT, THE LAW OF THE SEA (1967); Dean, *The Geneva Conference on the Law of the Sea: What Was Accomplished*, 52 AM. J. INT'L L. 607 (1958); Dean, *The Second Geneva Conference on the Law of the Sea: The Fight for Freedom of the Seas*, 54 *id.* at 751 (1960); Fitzmaurice, *Some Results of the Geneva Conference on the Law of the Sea*, 8 INT'L & COMP. L. Q. 73 (1959); Nanda, *Some Legal Questions on the Peaceful Uses of Ocean Space*, 9 VA. J. INT'L L. 343 (1969).

21. *See* note 15 *supra*.

22. Art. 24(2) of the Territorial Sea Convention.

23. This is in view of the distinction drawn between art. 24(1)(a) and 24(1)(b) of the Convention pertaining to a coastal state's right to take preventive or punitive measures by the infringement of its domestic regulations.

24. Historically, there has been no freedom of scientific research within the territorial sea. On marine scientific research *see generally* W. BURKE, SCIENTIFIC RESEARCH

the territorial limits would be within the exclusive competence of the coastal state, since the term "sovereignty" has been continuously used to describe a coastal state's rights in territorial waters.[25]

b. *OTEC Devices Under the Emerging Law on the Territorial Sea*

Although the 1958 convention failed to set a definite limit on the breadth of the territorial waters, state practices were fast eroding the traditional three-mile limit. A United Nations Secretariat study in 1968 revealed that fewer than one-third of the states reporting (30 of 92) had opted for less than six miles while nearly half (43 of 92) opted for twelve miles or more, and only a small number (9) were claiming more than twelve miles.[26]

The current product of the LOS III negotiations is the Informal Composite Negotiating Text (ICNT), a massive document containing 303 articles and 7 annexes,[27] which sets the breadth of the territorial sea at twelve miles,[28] and that of continguous zones for similarly specified purposes as were contained in the 1958 convention at twenty-four miles.[29] Within this adjacent maritime belt, a coastal state's sovereignty is recognized as extending to the air space over the territorial sea as well as to the seabed and subsoil,[30] and is limited only by the right of innocent passage.[31]

Although ICNT is to "serve purely as a procedural device and [to] only provide a basis for negotiation without affecting the right of any delegation to suggest revisions in the search for

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ARTICLES IN THE LAW OF THE SEA INFORMAL SINGLE NEGOTIATING TEXT (Occasional Paper no. 25, Law of the Sea Institute, University of Rhode Island, June 1975); FREEDOM OF OCEANIC RESEARCH (W. Wooster ed. 1973); Winner, *Science, Sovereignty, and the Third Law of the Sea Conference*, 4 OCEAN DEV. & INT'L L. 297 (1977); Wooster, *Some Implications of Ocean Research*, 1 *id.* at 13 (1974).

25. Arts. 1 and 2 of the Territorial Sea Convention.

26. *See* Document prepared by U.N. Secretariat, *Survey of National Legislation Concerning the Sea-bed and the Ocean Floor, and the Subsoil thereof, Underlying the High Seas Beyond the Limits of Present National Jurisdiction*, U.N. Doc. A/AC.135/11 and A/AC.135/11/Add. 1 (1968).

27. U.N. Third Conference on the Law of the Sea, *Informal Composite Negotiating Text from the Sixth Session*, U.N. Doc. A/CONF. 62/WP. 10 & Corr. 1-3 (1977) [hereinafter cited as ICNT].

28. *Id.* art. 3.

29. *Id.* art. 33.

30. *Id.* art. 2.

31. *Id.* arts. 17-32.

a consensus,"[32] there is an almost universal consensus on the twelve-mile limit for the territorial seas. Within this zone, the coastal state will have almost total control over the installation and operation of an OTEC facility, both for research and commercial use.

c. *OTEC Devices on the Exclusive Economic Zone and the Continental Shelf*

(i) *Exclusive Economic Zone*[33]

Beyond the twelve-mile territorial sea and the twenty-four-mile contiguous zone, ICNT recognizes a special area known as the Exclusive Economic Zone (EEZ) which extends seaward to a distance of 200 nautical miles from the baseline from which the breadth of the territorial sea is measured.[34] This zone has a special relevance for OTEC siting, because ICNT grants the coastal state

> sovereign rights for the purpose of exploring and exploiting, conserving and managing the natural resources, whether living or non-living, of the sea-bed and subsoil and the superjacent waters, and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds.[35]

Additionally, the coastal state's jurisdiction extends within EEZ to "(i) the establishment and use of artificial islands, installations and structures; (ii) marine scientific research; (iii) the preservation of the marine environment."[36] Other states enjoy some of the traditional freedoms of the high seas in EEZ—freedom "of navigation and overflight and of the laying of submarine cables and pipelines,"[37] but not fishing, scientific

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32. U.N. Third Conference on the Law of the Sea, *Informal Composite Negotiating Text—Explanatory Memorandum by the President*, U.N. Doc. A/CONF. 62/WP. 10/Add. 1 (1977), *reprinted* in 16 INT'L LEGAL MATERIALS 1099, 1100 (1977).

33. *See generally* D. JOHNSTON & E. GOLD, THE ECONOMIC ZONE IN THE LAW OF THE SEA: SURVEY, ANALYSIS AND APPRAISAL OF CURRENT TRENDS (Occasional Paper No. 17, Law of the Sea Institute, University of Rhode Island, June 1973); Alexander & Hodgson, *The Impact of the 200-Mile Economic Zone on the Law of the Sea*, 12 SAN DIEGO L. REV. 569 (1975); Kronfol, *The Exclusive Economic Zone: A Critique of Contemporary Law of the Sea*, 9 J. MAR. L. & COMM. 461 (1978); Hollick, *The Origins of the 200-Mile Offshore Zones*, 71 AM. J. INT'L L. 494 (1977); Phillips, *Exclusive Economic Zone as a Concept in International Law*, 26 INT'L & COMP. L. Q. 585 (1977).

34. ICNT, art. 57.

35. *Id.* art. 56(1)(a).

36. *Id.* art. 56(b).

37. *Id.* art. 58(1).

research, nor pollution control, which are now under the exclusive jurisdiction of coastal states.

The establishment of EEZ is perhaps the most significant development in the Law of the Sea since President Truman's Proclamation on the Continental Shelf in 1945,[38] which claimed for the United States the natural resources of the seabed and the subsoil of its continental shelf lying beyond the traditional three-mile limit. A variety of claims for exclusive jurisdiction by coastal states over the high seas area beyond their territorial seas followed the Truman proclamation, the most notable initially being claims by several Latin American countries to a 200-mile territorial sea[39] and more recently by Canada to a 100-mile pollution control zone.[40]

Subsequently, when LOS III began its deliberations, two proposals formed the basis of what has finally emerged as EEZ—one, a 200-mile economic zone, proposed by a majority of African states,[41] and the other, an exclusive "Patrimonial Sea" with an outer limit of 200 miles and similar jurisdiction over the natural resources up to the edge of the continental margin, adopted at the 1972 Santo Domingo Conference by a group of Caribbean countries.[42] Although these zones were orig-

38. Pres. Proc. No. 2267, 3 C.F.R. 67 (1943-48 Compilation). *See generally* Hollick, *U.S. Oceans Policy: The Truman Proclamations*, 17 VA. J. INT'L L. 23 (1977).

39. *See* Agreement between Chile, Peru, and Ecuador, August 18, 1952, Declaration on the Maritime Zone, art. 3 (II), U.N. Legislative Series, *Laws and Regulations of the Regime of the Territorial Sea* 723-27 (1957). *See generally* B. MACCHESNEY, SITUATION, DOCUMENTS AND COMMENTARY ON RECENT DEVELOPMENTS IN THE INTERNATIONAL LAW OF THE SEA, 1956, at 264-94, 448, 455-56, 486-87 (1957); B. AUGUST, THE CONTINENTAL SHELF: THE PRACTICE AND POLICY OF THE LATIN AMERICAN STATES WITH SPECIAL REFERENCE TO CHILE, ECUADOR AND PERU 187-203 (1960); F. GARCIA AMADOR, LATIN AMERICA AND THE LAW OF THE SEA (Occasional Ppaer No. 14, Law of the Sea Institute, University of Rhode Island, July 1972). In 1966, Argentina extended its territorial sea by a decree (Law No. 17, 094-M. 24, Buenos Aires, 29 December 1966) promulgating that "the sovereignty of the Argentine nation shall extend over the sea adjacent to its territory for a distance of 200 nautical miles measured from the line of the lowest tide." U.N. General Assembly, Ad Hoc Committee to study the peaceful uses of the sea-bed and the ocean floor beyond the limits of national jurisdiction, 2d Sess., *Survey of National Legislation Concerning the Sea-bed and the Ocean Floor, and the Subsoil thereof, Underlying the High Seas Beyond the Limits of Present National Jurisdiction* 7-8, U.N. Doc. A/AC.135/11 (1968).

40. *See* Arctic Waters Pollution Prevention Act of 1970, CAN. REV. STAT. c. 2, at 3-25 (1st Supp. 1970).

41. *Organization of African Unity: Declaration on the Issues of the Law of the Sea*, U.N. Doc. A/AC.138/86 (1972). *See also* U.N. Docs. A/AC.138/79 (1972); A/CONF. 62/33 (1974).

42. The 1972 Declaration of Santo Domingo is contained in U.N. Doc. A/AC.138/80 (1972).

inally conceived as essentially resource-control zones, the coastal states' powers are greatly enhanced by the grant of "exclusive jurisdiction" to them regarding exploration and exploitation, pollution control, and scientific research.

Although ICNT does not specifically mention coastal states' jurisdiction over OTEC activities within EEZ, it would be a valid conclusion that coastal states will have exclusive competence over the deployment and regulation of OTEC installations within their EEZ for research purposes or commercial operations. Any reasonable interpretation of ICNT provisions will support this conclusion. To illustrate, article 56(a) grants a coastal state "sovereign rights" within EEZ for "other activities for the economic exploitation and exploration of the zone, such as the production of energy from water, currents and winds." This would obviously include the energy produced by an OTEC operation. Article 60 explicitly provides for a coastal state's "exclusive right to construct and to authorize and regulate the construction, operation and use of: (a) Artificial islands; (b) Installations and structures for the purposes provided for in article 56 and other economic purposes; (c) Installations and structures which may interfere with the exercise of the rights of the coastal State in the zone." Article 247(2) provides that "[m]arine scientific research activities in the exclusive economic zone and on the continental shelf shall be conducted with the consent of the coastal State." Moreover, there is such an overwhelming consensus among the participants at LOS III on EEZ that even if the efforts to formalize a comprehensive treaty on the Law of the Sea were to fail, EEZ will in the near future be accorded legitimacy by state practices, transforming it into a rule of customary international law.

It appears that the coastal state's permission would be required to install an OTEC device in its EEZ either for research purposes or commercial operation. Until now, no nation state has adopted specific legislation addressing this issue. However, once OTEC technology and economics are proven, such legislative measures prescribing conditions for access to EEZ and outlining the legal and institutional arrangements under which a foreign entity is permitted to operate an OTEC facility within that zone will, in all probability, be adopted by countries wishing to attract a foreign owned/operated OTEC facility within its EEZ. Bilateral and regional arrangements

regarding the deployment and operation of an OTEC device within a coastal state's EEZ would be another way of establishing conditions for the installation of OTEC devices.

(ii) *Continental Shelf*

Under the 1958 Geneva Convention on the Continental Shelf,[43] "sovereign rights" of the coastal states in the continental shelf (defined as beginning at the seaward limit of the territorial sea and continuing to the 200-meter isobath),[44] are restricted to "exploring it and exploiting its natural resources,"[45] leaving unaffected the "legal status of the superjacent waters as high seas, or that of the airspace above those waters."[46] A coastal state's consent is imperative for any scientific research concerning the continental shelf and conducted there.[47]

Thus, although theoretically an OTEC device of another nation could be moored on a coastal state's continental shelf, while the device itself is located on the high seas, provided it did not interfere with the coastal state's exclusive right to exploit natural resources in that area,[48] the prospects that this would happen are unlikely without the consent of the coastal state. A coastal state's special rights in adjacent waters with regard to scientific research and pollution control are widely accepted, and with the emergence of EEZ, such a possibility without the coastal state's consent could be ruled out.

ICNT modifies the definition of the continental shelf by providing that it extends to the outer edge of the continental margin or to a distance of 200 miles when the outer edge of the continental margin does not extend that far.[49] While other ICNT provisions[50] do not substantially change the prior law,

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43. *See* note 15 *supra*.

44. Art 1 of the Continental Shelf Convention. The Convention left the legal definition of the continental shelf, a compromise formula, open-ended — up to a depth of 200 meters, or a technologically exploitable distance.

45. *Id.* art. 2.

46. *Id.* art. 3.

47. *Id.* art. 5(8). Although it adds that the coastal state "shall not normally withhold its consent" if a qualified institution makes a request, it grants the coastal state the right "if it so desires, to participate or to be represented in the research, and that in any event the results shall be published."

48. Based on arts. 4-5 of the Continental Shelf Convention, Knight makes this argument in Knight, *International Jurisdictional Issues Involving OTEC Installations*, in KNIGHT, NYHART & STEIN *supra* note 9, at 45-73.

49. ICNT, art. 76.

50. *Id.* arts. 77-85.

articles pertinent to OTEC siting should be noted.

Article 80 on "Artificial Islands, Installations and Structures on the Continental Shelf," provides that article 60, which grants the exclusive right to the coastal state to construct, authorize, and regulate construction, operation and use of such artificial islands, installations and structures, applies *mutatis mutandis*. Similarly, Article 247 adopts the consent regime for scientific research on the continental shelf, although some of the obstacles for conducting research in the waters above the continental shelf have been ameliorated.[51]

The conclusion is inescapable that a coastal state will have exclusive competence over the installation of any OTEC device located over its continental shelf for research or commercial purposes.

d. *OTEC Devices on the High Seas*

(i) *Traditional Law*

Under the freedom of the seas concept, every nation has unrestricted access to the high seas, but none is permitted any long term appropriation of any part of the high seas for its exclusive use.[52] This principle was recently reaffirmed by the U.S. Supreme Court.[53] The practical reasons for the universal acceptance of this principle lie in (1) the increasing use of the ocean as an international highway for commerce during the post-Industrial Revolution era, which coincided with the period of Western colonialism in the 18th and 19th centuries, and (2) the lack of effective occupation of large areas of ocean claimed by major powers.[54]

In 1958, the Geneva Convention on the High Seas codified the essence of the freedom of the seas by providing

> both for coastal and non-coastal states:
>
> 1. Freedom of navigation;
> 2. Freedom of fishing;
> 3. Freedom to lay submarine cables and pipelines;
> 4. Freedom to fly over the high seas.

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51. *See, e.g., id.* arts. 243-53.

52. Cited in COLOMBOS at 51.

53. U.S. v. Louisiana, 363 U.S. 1, 33-34 (1959) [Footnotes in the opinion omitted].

54. See COLOMBOS at 60-61.

> These freedoms and others which are recognized by the general principles of international law shall be exercised by all states with reasonable regard to the interests of other states in their exercise of the freedom of the high seas.[55]

Obviously, these freedoms—commercial navigation, military uses, fishing, laying of submarine cables and pipelines—give rise to conflicting uses of the high seas. For the management of these conflicting uses, the standard is that of reasonableness with regard to the interests of other users, that is, not unreasonably interfering with their uses. The deployment of an OTEC device for research or commercial purposes could be justified under this "reasonable use" concept. The recent U.S. legislation authorizing the construction of deep water ports beyond the limits of its territorial sea,[56] which was justified on this reasonable use theory,[57] offers an appropriate precedent. Since states traditionally have the primary responsibility for regulating the activities of vessels flying their flags on the high seas, applying that analogy to OTEC devices, any OTEC installation owned or authorized by a state on the high seas would be under its authority and control. Similarly, under the laws of nationality, nationals are always and everywhere subject to the laws of their nation state[58] and their activities on an OTEC device on the high seas would be governed by the laws of the state of their nationality.

(ii) *LOS III and the Deep Seabed*

Current negotiations in LOS III are still stymied on the nature and scope of the proposed regime for deep seabed mining.[59] Nevertheless, pertinent ICNT provisions which have a

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55. Art. 2 of the High Seas Convention. *See* note 15 *supra.*

56. The Deepwater Port Act of 1974, 33 U.S.C. §§ 1501-24 (1976) [hereinafter cited as DPA]. For legislative history and purpose see [1974] U.S. Code Cong. and Ad. News 7529. *See generally* Krueger, Nordquist, & Wessely, *New Technology and International Law: The Case of Deepwater Ports,* 17 VA. J. INT'L L. 597 (1977); Comment, *Territorial Status of Deepwater Ports,* 15 SAN DIEGO L. REV. 603 (1978); Note, *The Regulation of Deepwater Ports,* 15 VA. J. INT'L L. 927 (1975).

57. *See Hearings on S.1751 and S.2232 before the Special Joint Subcomm. on Deepwater Ports Legislation of The Senate Comm. on Commerce, Interior and Insular Affairs, and Public Works,* 93d Cong., 1st Sess., pt. 1, 606-19 (1973)(Statement of John Norton Moore).

58. *See generally* H. VAN PANHUYS, THE ROLE OF NATIONALITY IN INTERNATIONAL LAW (1959); Brownlie, *Relations of Nationality in Public International Law,* 39 BRIT. Y.B. INT'L L. 284 (1963); McDougal, Lasswell & Chen, *Nationality and Human Rights: The Protection of the Individual in External Arenas,* 83 YALE L. J. 900 (1974).

59. For a recent commentary, see LaQue, *Different Approaches to International Regulation of Exploitation of Deep-Ocean Ferromanganese Nodules,* 15 SAN DIEGO L.

bearing on the deployment and operation of an OTEC facility will be considered here. This discussion will be prefaced by noting the United Nations General Assembly Resolution 2749 of December 17, 1970,[60] which declared, among other things, that

> 1. The sea-bed and ocean floor, and the subsoil thereof, beyond the limits of national jurisdiction (hereinafter referred to as the area), as well as the resources of the area, are the common heritage of mankind.
> 2. The area shall not be subject to appropriation by any means by States or persons, natural or juridical, and no State shall claim or exercise sovereignty or sovereign rights over any part thereof.

ICNT attempts to give concrete shape to the "common heritage" concept. It declares the area constituting "the sea-bed and ocean floor and subsoil thereof beyond the limits of national jurisdiction"[61] (Area), and its resources to be "the common heritage of mankind,"[62] and envisages the establishment of an International Sea-Bed Authority (ISA) to organize and control activities in the Area. No state is to claim or exercise sovereignty there and no exclusive appropriation is permissible.[63] The legal status of the waters superjacent to the Area or that of the airspace above those waters are left unaffected.[64] While activities in the Area are defined as "all activities of exploration for, and exploitation of, the resources of the Area,"[65] in subsequent provisions,[66] activities are construed broadly as covering, among other subjects, those of marine scientific research, transfer of technology, and protection of the marine environment and human life. However, again in Article 150, activities are construed narrowly, referring only to exploration and exploitation of resources. Thus, there is considerable ambiguity regarding ISA's control in the Area.

REV. 477 (1978). *See also* Charney, *The International Regime for the Deep Seabed: Past Conflicts and Proposals for Progress*, 17 HARV. INT'L L. J. 1 (1976); Note, *A New Combination to Davy Jones' Locker: Melee over Marine Minerals*, 9 LOY. CHI. L. J. 935 (1978).

60. G.A.Res. 2749, 25 U.N. GAOR, Supp. (No. 28) 24, U.N. Doc. A/8028 (1970) (adopted by a vote of 108 to 0, with 14 abstentions: the United States voted for its adoption).

61. ICNT, art. 1(1).

62. *Id.* art. 136.

63. *Id.* art. 137(1).

64. *Id.* art. 135.

65. *Id.* arts. 1(3), 133(a).

66. *Id.* arts. 143-49.

Resources are defined as "mineral resources *in situ*,"[67] which are subject to ISA's licensing and regulation.[68] Minerals include "water, steam, hot water."[69] While it can be argued that ISA's jurisdiction extends to "fresh water aquifers and similiar *sub-surface* water sources, not the cold water lying near the seabed that might be used by an OTEC device,"[70] a broad interpretation by ISA of these provisions is quite possible, under which OTEC deployment for scientific research or commercial purposes could be covered.[71] Also, despite the current provision, under which ISA has no jurisdiction over the superjacent waters of the high seas,[72] it is probable that its jurisdiction in the near future will extend to activities in the water column and on the surface,[73] thereby affecting OTEC operations. Such an outcome would be consistent with the growing demands of the developing states for a strong ISA which could give meaning to "the common heritage" concept. Similarly, the mooring of an OTEC device on the high seas, which would require corings and other physical investigations of the ocean floor and the seabed, could be perceived as an economic use of the Area, and therefore subject to ISA's jurisdiction. Additionally, ISA could assume jurisdiction, should such mooring pose any actual or potential interference to seabed mining activities which are to be regulated by ISA. Of

67. *Id.* art. 133(b).

68. *Id.* Annex II.

69. *Id.* art. 133(c)(i).

70. Knight, *OTEC and the Law of the Sea: The Jurisdictional Problems*, in AMERICAN SOCIETY OF INTERNATIONAL LAW, INTERNATIONAL, LEGAL, POLITICAL AND INSTITUTIONAL ASPECTS OF OTEC DEMONSTRATION AND DEVELOPMENT 15 (Study prepared for ERDA, Sept. 1978) [hereinafter cited as ASIL STUDY].

71. Knight acknowledges this possiblity: "It is therefore not only conceivable but likely that if sufficient information were presented in international fora to indicate that OTEC and similar energy-producing devices might be substantial sources of economic wealth or political leverage, underdeveloped countries would move either in LOS-3 or in another forum to seek a regulatory regime governing such activities beyond the exclusive economic zones of coastal states." *Id.* at 15.

72. ICNT, art. 135.

73. *See, e.g.*, The Maltese Draft, a working paper introduced by the Delegation of Malta in the United Nations Seabed Committee in 1971, *Draft Ocean Space Treaty — Working Paper Submitted by Malta*, in REPORT OF THE COMMITTEE ON THE PEACEFUL USES OF THE SEA-BED AND THE OCEAN FLOOR BEYOND THE LIMITS OF NATIONAL JURISDICTION, 26 U.N. GAOR, Supp. (No. 21) 105, U.N. Doc. A/8421 (1971), which treats "international ocean space," the area beyond clearly defined limits of national jurisdiction, as a *unitary concept, encompassing seabed, water column, and surface, the whole constituting the "common heritage of mankind." Id.* pt. IV (emphasis added).

course, ISA could assert jurisdiction over marine scientific research in the Area which is to be carried out "exclusively for peaceful purposes and for the benefit of mankind as a whole."[74]

Consequently, it appears that under the envisaged seabed regime, OTEC activities on the high seas could be subjected to the jurisdiction of the proposed ISA. Perhaps two exceptions to ISA jurisdiction are possible: (1) A coastal state might extend its competence to an OTEC facility which lies beyond its EEZ, but which poses an actual or potential threat to its living and nonliving resources by adversely affecting the marine environment, or (2) if there is no accord at LOS III on a deep seabed regime and the existing law applies under which the deployment of an OTEC facility on the high seas could be justified under the "reasonable use" concept.

e. *Recommendations*

The major United States objectives which determine its policy on national-international jurisdictional issues include freedom of navigation and the establishment of an equitable regime for deep seabed mining. Since energy sources in the oceans including OTEC are of considerable significance to the United States, U.S. negotiators at LOS III should pay close attention to the implications of the emerging treaty on OTEC siting and deployment in adjacent coastal waters as well as on the high seas. The primary questions for consideration would be: (1) Is it in the United States' interest to seek freedom of OTEC siting and deployment in the emerging twelve-mile territorial seas and EEZ? (2) What kind of regime regarding OTEC activities on the high seas should the United States seek? (3) If efforts to finalize a comprehensive treaty on the Law of the Sea fail, what kind of claims would be in the United States' interest to assert?

Apparently, ICNT provisions regarding the extension of coastal states' boundaries to a twelve-mile territorial zone and a 200-mile EEZ are acceptable to the United States. Consequently, there are two policy options open to the United States regarding these zones. One is to accept the coastal state's exclusive competence in the region, which will exclude any U.S. OTEC siting in foreign waters within these zones and without

74. ICNT, art. 143(1).

the coastal state's consent; and the other is to seek freedom of OTEC activities within these zones.

There does not seem to be any chance of reversing the widely accepted policy of exclusive coastal state competence in the territorial waters, even if the U.S. were to vigorously seek an exception for OTEC activities. Similarly, despite some ambiguities regarding EEZ,[75] no exceptions in favor of OTEC activities in this zone are likely to be accepted by a majority of nations at the current LOS III negotiations. The United States could, perhaps, still seek such an exception if it were found to be in its interest and could make appropriate reservations to the finalized treaty. However, in light of the recent developments regarding a coastal state's assertion of its competence in coastal waters, especially pertaining to marine pollution and natural resources, it is unlikely that such a United States assertion would be recognized by other states. Thus, it is recommended that the United States accept the 200-mile coastal state competence regarding OTEC siting and deployment. This course of action would appear to be beneficial to the United States as well, since the U.S. has a major OTEC source lying off the west coast of Florida within its 200-mile zone. The recent United States extension of its fishery zone[76] and the establishment of zones to enforce navigational safety rules[77] and to control pollution[78] indicate that there would be a strong demand in the U.S. Congress to assert such control. It is recommended that as a first desirable step, Congress enact legislation creating a Coastal Energy Conservation and Management Zone extending to a 200-mile limit. Under this proposed legislation, the United States will claim jurisdiction for the specific purpose suggested by the title—energy conservation and management. The proposed legislation will be an interim measure, seeking limited jurisdiction patterned after the DPA[79] model. The proposed Act will be superseded by the legislation required to implement the EEZ provisions of the Law of the Sea Treaty when it is concluded.

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75. *See* notes 65-67 *supra* and the accompanying text.

76. Fishery Conservation and Management Act of 1976, Pub. L. No. 94-265, 90 Stat. 33, 16 U.S.C. §§ 1801-82 (1976).

77. 33 U.S.C. §§ 151-232 (1976), prescribe the enforcement of navigational safety rules.

78. *See* Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1593-94, § 58(a)-(c) (amending 33 U.S.C. § 1321 (1976)).

79. *See* note 56 *supra*.

The high seas, on the other hand, present a different set of challenges. Since the United States will presumably have the necessary technology and wherewithal to engage in OTEC activities on the high seas for research as well as for commercial purposes, perhaps the United States could seek to modify ICNT at the next session to specifically exclude OTEC activities from the competence of ISA. However, if the current discussion in LOS III negotiations on the deep seabed regime is any indication of what might be the regime pertaining to OTEC activities, such prospects do not look promising. The developing countries seek a strong ISA and probably will not accept OTEC activities being excluded from its jurisdiction, for they could argue that OTEC uses a resource covered under the concept "common heritage of mankind." If a treaty does not emerge, the United States could rely upon a reasonable use theory to engage in OTEC activities on the high seas.

The DPA offers a model of legislation for this purpose. The U.S. Congress specifically declared therein that nothing in the Act "shall be construed to affect the legal status of the high seas, the superjacent airspace, or the seabed and subsoil, including the Continental Shelf."[80] The U.S. President is authorized and requested under the Act to enter into negotiations with the neighboring governments of Canada and Mexico to determine "the desirability of undertaking joint studies and investigations designed to . . . eliminate any legal and regulatory uncertainty."[81] As a condition to the issuance of a license for the ownership, construction, and operation of a deepwater port, the Secretary of Transportation must determine that "the deep water port will not unreasonably interfere with international navigation or other reasonable uses of the high seas, as defined by treaty, convention, or customary international law."[82] Also, the designation of safety zones is "[s]ubject to recognized principles of international law,"[83] and the Secretary is required to prescribe various regulations which relate to activities involved in site evaluation and preconstruction testing at potential deepwater locations which may interfere with au-

80. *Id.* § 1501(b).
81. *Id.* § 1521(2).
82. *Id.* § 1503(c)(4).
83. *Id.* § 1509(d)(1).

thorized uses of the outer continental shelf.[84] Additionally, the environmental review criteria which are to be used to evaluate a proposed deepwater port include "the effect on alternate uses of the oceans and navigable waters, such as scientific study, fishing, and exploitation of other living and nonliving resources."[85] The duration of a license is limited to twenty years.[86]

2. *Federal-State Issues Related to OTEC Devices*[87]

In the United States' coastal waters, there still remain unresolved questions regarding the demarcation of authority between the Federal government and the adjacent coastal States. Further uncertainty is likely when the United States decides to expand its territorial seas to a twelve-mile limit and subsequently to claim its 200-mile EEZ; the two probable prospects with or without a comprehensive Law of the Sea treaty. The primary question is, what would be the States' rights in the newly acquired territory?

Since Federal-State jurisdictional issues may affect the research and demonstration phase of OTEC, as well as its advanced development phase for commercial purposes, this section will briefly describe, in an historical context, the current law on Federal-State jurisdiction in coastal areas, which will be followed by a discussion of the probable impacts of the United States extension of its boundaries in the oceans on Federal-State authority in the extended zones and on OTEC research and development.

a. *Current Law*

The 1945 Truman Proclamation,[88] which extended United States' jurisdiction to its continental shelf, left unresolved the question of Federal versus State authority over the shelf.[89] However, in a number of cases in the following five years[90] the

84. *Id.* § 1504(b)(2). The regulations are to be subject to recognized principles of international law. *Id.* § 1509(a).

85. *Id.* § 1505(a)(3).

86. *Id.* § 1503(h).

87. For a thorough and incisive study of Federal-State issues in the U.S. coastal waters, see M. BALL, LAW OF THE SEA: FEDERAL-STATE RELATIONS AND THE EXTENSION OF THE TERRITORIAL SEA (The Dean Rusk Center for International and Comparative Law, University of Georgia, Monograph No. 1, 1978) [hereinafter cited as M. BALL].

88. *See* note 38 *supra.*

89. *See* 13 DEP'T STATE BULL. 484 (1945).

90. *See, e.g.*, U.S. v. Louisiana, 339 U.S. 699 (1950); U.S. v. Texas, 339 U.S. 707 (1950); U.S. v. California, 332 U.S. 19, 38-39 (1947).

Supreme Court held that the Federal government had paramount rights in and full dominion over the resources in the territorial sea. Since several States had already granted leases for offshore oil production in the three-mile limit, these Supreme Court decisions generated strong political pressure,[91] to which the U.S. Congress responded in May 1963, by enacting the Submerged Lands Act.[92] This Act gave the States title and ownership of land and resources lying beneath the water extending seaward to its three-mile limit,[93] subject, however, to the continued U.S. authority and rights over such lands and waters "for the purposes of navigation or flood control or the production of power."[94] Under the Act, the United States expressly retained "all its navigational servitude and rights in and powers of regulation and control of said lands and navigable waters for the constitutional purposes of commerce, navigation, national defense, and international affairs."[95]

Six years after the enactment of the statute, a Federal district court specifically recognized the paramount power of the United States to control such waters for the purposes of navigation in interstate and foreign commerce.[96] More recently, Federal courts have confirmed that under the Act, Congress did not surrender to the States its constitutional power to regulate foreign commerce,[97] and have given recognition to the primacy of ongoing Federal interests in the seabed,[98] over the superjacent waters and their resources,[99] and surface activity in the three-mile territorial sea.[100]

In August 1953, just three months after the enactment of

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91. *See, e.g.*, E. BARTLEY, THE TIDELANDS OIL CONTROVERSY 68-74, 88 (1953); Krueger, *The Development and Administration of the Outer Continental Shelf Lands of the United States*, 14 ROCKY MTN. MINERAL L. INST. 643, 674-77 (1968); Comment, *Jurisdiction Over the Seabed: Persistent Federal-State Conflicts*, 12 URBAN L. ANN. 291 (1976).

92. 43 U.S.C. §§ 1301-1315 (1970). For legislative history and purpose of the Act, *see* [1953] U.S. Code Cong. & Ad. News 1385.

93. 43 U.S.C. § 1311(a),(b)(1970).

94. *Id.* § 1311(d).

95. *Id.* § 1314(a).

96. *See* Organized Village of Kake v. Egan, 174 F. Supp. 500 (D. Alaska 1959).

97. U.S. CONST., art. I, § 8 empowers Congress to regulate all aspects of foreign commerce.

98. *See* Zabel v. Tabb, 430 F.2d 199 (5th Cir. 1970), *cert. denied*, 401 U.S. 910; United States v. Rands, 389 U.S. 121, 127 (1967).

99. *See, e.g.*, Douglas v. Seacoast Products, Inc., 431 U.S. 265, 283-87 (1977).

100. *See, e.g.*, Ray v. Atlantic Richfield Co., 98 S. Ct. 989 (1978).

the Submerged Lands Act, the Outer Continental Shelf Lands Act[101] implemented the 1945 Truman Proclamation by declaring the policy of the United States: "that the subsoil and seabed of the outer Continental Shelf appertain to the United States and are subject to its jurisdiction, control, and power of disposition."[102] While the Act recognizes "the character as high seas of the waters above the outer Continental Shelf," thus leaving unaffected the right to navigation and fishing in such waters,[103] it specifically provides that:

> The Constitution and laws and civil and political jurisdiction of the United States are extended to the subsoil and seabed of the outer Continental Shelf and to all artificial islands and fixed structures which may be erected thereon for the purpose of exploring for, developing, removing, and transporting resources therefrom, to the same extent as if the outer Continental Shelf were an area of exclusive Federal jurisdiction located within a State: *Provided, however,* That mineral leases on the outer Continental Shelf shall be maintained or issued only under the provisions of this subchapter.[104]
>
> To the extent that they are applicable and not inconsistent with . . . Federal laws and regulations, . . . the civil and criminal laws of each adjacent State as of August 7, 1953 are declared to be the law of the United States for that portion of the subsoil and seabed of the outer Continental Shelf, and artifical islands and fixed structures erected thereon.[105]

Under the Act, the Coast Guard is authorized to make and enforce regulations "with respect to lights and other warning devices, safety equipment, and other matters relating to the promotion of safety of life and property on the islands and structures" erected on the Outer Continental Shelf (OCS).[106] While the Secretary of the Interior is authorized to administer and regulate the leasing of the OCS,[107] the Secretary of the Army is authorized to prevent obstruction to navigation which may be caused by artifical islands and fixed structures located on OCS.[108] The Act provides for the application of the civil and

101. 43 U.S.C. §§ 1331-43 (1970). For legislative history and purpose of the Act, *see* [1953] U.S. Code Cong. & Ad. News 2177.

102. 43 U.S.C. § 1332 (1970).

103. *Id.* § 1332(b).

104. *Id.* § 1333(a)(1).

105. *Id.* § 1333(a)(2).

106. *Id.* § 1333(e)(1).

107. *Id.* § 1334(a)(1).

108. *Id.* § 1333(f).

criminal law of coastal States existing on the effective date of the Act to the activities on the subsoil and seabed of OCS including artificial islands and fixed structures erected there.[109] In 1975 Congress amended the Act to apply current State laws.[110]

These statutes did not resolve the Federal-State controversy regarding the proper authority and control for the exploration and exploitation of OCS. The States continued to claim a stronger voice in the decisionmaking process because of the direct impacts on the States of OCS development. In response to a U.S. complaint against thirteen Atlantic coastal States that they were interfering with the exclusive U.S. rights to explore and exploit the natural resources of OCS, in 1975 the Supreme Court decided *United States v. Maine,*[111] in which it reaffirmed its earlier decisions that, as attributes of its external sovereign powers, the Federal government has "paramount rights in the marginal seas."[112]

More recently, however, the recognition of the coastal State's interest in activities over OCS has been evident in several new developments, including: (1) the formation of regional OCS advisory boards with State representatives on them;[113] (2) the devising of a new system under which the Department of the Interior will share with the States information regarding lease tracts;[114] and (3) the 1978 amendments to the Outer Continental Shelf Lands Act[115] under which States will be given a significant role in decisionmaking pertaining to leasing.[116]

Several other Federal statutes permit Federal-State participation in planning offshore activities,[117] including the Deep-

109. *Id.* § 1333(a)(2).

110. 43 U.S.C.A. § 1333(2) (Supp. 1978).

111. 420 U.S. 515 (1975).

112. *Id.* at 522-23.

113. The board's function is to advise the Secretary of the Interior on matters of discretionary authority under the OCS Lands Act. *See* U.S. DEP'T OF THE INTERIOR, GEOLOGICAL SURVEY, POLICIES, PRACTICES, AND RESPONSIBILITIES FOR SAFETY AND ENVIRONMENTAL PROTECTION IN OIL AND GAS OPERATIONS ON THE OUTER CONTINENTAL SHELF 5 (1977), cited in M. BALL, *supra* note 87, at 42 n. 159.

114. 43 Fed. Reg. 3883 (1978) (to be codified at 30 C.F.R. § 250.34); 43 Fed. Reg. 3887, 3889 (1978) (to be codified at 30 C.F.R. § 252); 43 Fed. Reg. 3895 (1978) (to be codified at 30 C.F.R. § 3301.8).

115. President Carter signed the 1978 Outer Continental Shelf Lands Act Amendments on Sept. 22, 1978, Pub. L. No. 95-372, 92 Stat. 629.

116. *Id.* Title II, § 208 (adding a new § 19), 92 Stat. 652-53.

117. *See, e.g.,* The Federal Water Pollution Control Act (FWPCA), 33 U.S.C. §§

water Port Act[118] and the Coastal Zone Management Act (CZMA).[119]

Under DPA, interested States are given an advisory role both in the formulation of regulations to carry out the purposes of the Act,[120] and in the issuance of deepwater port licenses.[121] Deepwater ports within the three-mile territorial waters of the United States are excluded from the Federal licensing scheme,[122] "thereby leaving deepdraft harbors under the licensing authority of the States and the Corps of Engineers."[123] A noteworthy feature of the Federal-State sharing of authority in DPA is that the Secretary of Transportation is not to issue a license to own, construct, or operate a deepwater port facility without the approval of the governor of each adjacent coastal State,[124] which effectively grants the governor veto power over the deepwater port application.[125] A State is to be so designated by the Secretary when it would be directly connected by pipeline or would be located within fifteen miles of a proposed deepwater port.[126] Also, the Secretary could designate a State as an adjacent coastal State if he determines, pursuant to a request by the State and the recommendation of the administrator of the National Oceanic and Atmospheric Administration (NOAA) that "there is a risk of damage to the coastal environment of such State equal to or greater than the risk posed to a State directly connected by pipeline to the proposed deepwater port."[127]

Adjacent coastal States are also given preferential rights

1251-1376 (1976), *as amended by* The Clean Water Act of 1977, Pub. L. No. 95-217, 91 Stat. 1566; The Fishery Conservation and Management Act (FCMA), Pub. L. No. 94-265, 90 Stat. 331 (codified in several sections of 16 & 22 U.S.C., the Act provides for the participation of States' representatives on Regional Fisheries Management Councils (16 U.S.C. § 1852 (1976)); Marine Protection, Research and Sanctuaries Act of 1972, 16 U.S.C. §§ 1401-34 (1976); The Endangered Species Act, 16 U.S.C. §§ 1531-43 (1976); and The Marine Mammal Protection Act, 16 U.S.C. §§ 1361-1407 (1976)).

118. 33 U.S.C. §§ 1501-24 (1976).

119. 16 U.S.C. §§ 1451-64 (1976).

120. 33 U.S.C. § 1504(a),(b) (1976).

121. *Id.* § 1503(c)-(e).

122. *Id.* § 1502(10).

123. *See* 33 U.S.C. § 403 (1976).

124. 33 U.S.C. § 1500(b) (1976).

125. *Id.* § 1503(c)(9).

126. *Id.* § 1508(a)(1).

127. *Id.* § 1508(a)(2). The regulations implementing the Act are contained in 33 C.F.R. § 148 (1977).

to deepwater port licenses under DPA.[128] As an original licensee, a State may transfer its license provided the transferee complies with the requirements of the Act.[129] Also, the law of the nearest adjacent coastal State—the State "whose seaward boundaries, if extended beyond 3 miles, would encompass the site of the deepwater port"[130]—is made applicable under the Act to licensed deepwater ports. Another notable provision is the authorization of an adjacent coastal State to "fix reasonable fees for the use of a deepwater port facility."[131] Such fees are subject to the approval of the Secretary of Transportation and are not to exceed economic, environmental, and administrative costs of such State.[132]

CZMA is designed to protect coastal resources by encouraging States to manage the coastal areas.[133] Federal-State partnership is envisaged, for the Act requires that federally conducted or supported activity within or directly affecting the coastal zone must be carried out in a manner "which is, to the maximum extent practicable, consistent with approved state management programs."[134] This "consistency" requirement is made applicable specifically to the OCS development activity.[135] "A set of Federal regulations defines terms and establishes guidelines for the approval of coastal zone management programs."[136]

CZMA Amendments of 1976 created a coastal energy impact program[137] which authorizes $800 million for the creation of a coastal energy impact fund for loan guarantees and grants to States which must have an approved coastal zone management program or be making satisfactory progress in developing

128. 33 U.S.C. § 1504(h)(2)(i)(2)(A) (1976).

129. *Id.* § 1503(f).

130. *Id.* § 1518(b).

131. *Id.* § 1504(h)(2).

132. *Id.*

133. *See generally* Hollings, *Congress and Coastal Zone Management*, 1 COASTAL ZONE MANAGEMENT J. 115 (1973); Knecht, *Coastal Zone Management—A Federal Perspective, id.* at 123; Zile, *A Legislative Political History of the Coastal Zone Management Act of 1972, id.* at 235; *Symposium—Implementation of the Coastal Zone Management Act of 1972*, 16 WM. & MARY L. REV. 717-822 (1975).

134. 16 U.S.C. §§ 1456(c)(1),(2) (1976).

135. 16 U.S.C. §§ 1453(4)(i), 1456(c)(3)(B) (1976).

136. *See* 15 C.F.R. pt. 923 (1978). For NOAA regulations implementing the consistency provisions, see 43 Fed. Reg. 10,510-33 (1978) (to be codified at 15 C.F.R. pt. 930).

137. 16 U.S.C. § 1456(a) (1976).

such a program.[138] Loans and loan guarantees also are authorized to aid coastal States in financing new or improved public facilities and services needed to handle new or expanded coastal energy activities. Additionally, grants are authorized from the fund to help the States plan for the consequences of increased coastal energy activities and to aid the States in preventing or mitigating unavoidable losses of valuable environmental and recreational resources.[139]

b. *Federal-State Issues in Light of LOS III*

When the United States extends its boundaries to a twelve-mile territorial sea and a 200-mile EEZ, two questions become pertinent: (1) would the State zone be extended from three to twelve miles? and (2) if such a State expansion were to take place, would the Federal government preempt the States in energy matters, including OTEC? Who would be the licensing Authority and what would be the licensing requirements? Since the coastal State is given police power over such islands and structures, the question arises as to which laws would be made applicable to them. In regard to the last question, the model provided by the Outer Continental Shelf Lands Act,[140] and DPA,[141] applies the law of the adjacent coastal State. This would seem to be the desirable approach to adopt. Thus, the law of the State where the transmission cables go ashore will apply to the extent that it is not inconsistent with Federal law. Other possibilities include general maritime law or the law of the State in which the OTEC firm is incorporated.

c. *Recommendations*

The primary concern regarding Federal-State jurisdictional issues in adjacent coastal waters relates to an efficient management of the 200-mile marine zone. There are arguments in favor of either leaving the coastal States' boundaries fixed at the three-mile limit or extending them to twelve miles. A commentator has aptly summarized the pros and cons:

138. *See id.* §§ 1456(a),(c),(d), 1464(b). *See generally* Hildreth, *The Operation of the Federal Coastal Zone Management Act as Amended*, 10 NAT. RESOURCES LAW. 211, 221-23 (1977).

139. *See* Hildreth, *supra* note 138, at 222-23.

140. 43 U.S.C. §§ 1331-43 (1970).

141. 33 U.S.C. §§ 1501-24 (1976).

> On the Federal side arguments could be advanced that the interest of inland States and of all citizens, the history of the sea as of national strategic importance, as well as greater naval and administrative capacity, weigh in favor of Federal control.
>
> On behalf of the States, it could be maintained that leaner, more responsive agencies, closer familiarity with daily, mundane marine-related affairs, and a diversity of local concerns render the States the preferred government to exercise authority over an expanded territorial sea.[142]

Irrespective of who owns the extended stretch of nine miles, what is sorely needed is a cohesive U.S. policy for a 200-mile maritime zone and an efficient and strong institutional structure to implement it. At present, several departments in the Federal government are involved in both the formation and the implementation of national policies in adjacent coastal waters.[143] Instead of a piecemeal legislative effort as a U.S. response to the demands posed by the extension of its maritime boundaries, an imaginative Federal oceans policy should be fashioned which will facilitate an equitable resolution of Federal-State issues.

During the last decade, a number of studies and reports on U.S. marine policy, including the 1969 report of the Commission on Marine Science and Resources (Stratton Commission), and reports by the National Advisory Committee on Oceans and Atomosphere (NACOA), have recommended the creation of a strong, independent, policy-setting body which could effectively coordinate national ocean policies and implementing activities.[144] The argument for the formation of a single policy-formulating authority is that it can balance the various national interests which are often competing—national security, national economy, international trade, and the global ecosystem. The argument against such centralization is that a specialized oceans agency would detract from important programs based on functional activities, such as OCS gas and oil exploration, which is at present handled by the Department of the Interior, and "should remain in Interior because of the land

142. M. BALL, *supra* note 87, at 23-24.

143. *See id.* at 54-55.

144. For a concise report on these activities, see A. WILSON, U.S. OCEAN POLICY: COORDINATION AND CONTROL, 1 MARINE POL'Y REP., No. 6 (Center for the Study of Marine Policy, College of Marine Studies, University of Delaware, Sept. 1978).

development expertise of the Bureau of Land Management and the U.S. Geological Survey."[145]

In October 1977, Senate bill S.2224[146] was introduced "to establish a national ocean policy and to set forth the missions of the National Oceanic and Atmospheric Administration [NOAA]." Asserting that U.S. ocean policy had long suffered from disparate processes and duplication of effort, the bill seeks to strengthen NOAA as the leading civilian ocean policy agency responsible for coordinating national ocean policy. The current situation is aptly summarized in a recent report by an observer:

> The important question is whether the ocean community should settle for the problems engendered by the largely uncoordinated program activities in the marine environment, or demand Federal action to improve control of governmental policies. No executive agency oversees all ocean programs. No Congressional committee oversees all of the great number of program interests expressed through all the competing uses of the marine environment. There is no major policy perspective against which specific development options can be judged for cohesiveness. There is no responsible body to assist the President in the formulation of immediate goals based on long-term national interest. There exists no criterion by which international or domestic concerns can be evaluated. The ocean environment encompasses such a vast array of important interests and considerations that muddling through by reacting to emergent needs is not in the best interest of the nation.[147]

Proposals for the creation of a strengthened policy-setting body include the formation of a Cabinet-level Marine Affairs Council,[148] a public corporation such as COMSAT, or a public body such as the Tennessee Valley Authority.[149]

Based upon a thorough appraisal and evaluation of the current U.S. offshore policies, especially of Federal-State authority and control in a myriad of activities occurring in this area, it is imperative that the administration of the government's oceans programs be centralized in a strong, effective, and independent body, and that Federal-State jurisdictional

145. *See id.* at 2.

146. Introduced in U.S. Senate on Oct. 20, 1977. Hearings were held on April 6, 1978.

147. A. WILSON, *supra* note 144, at 4.

148. NACOA made this recommendation in June 1977. *Id.* at 3.

149. *See* M. BALL, *supra* note 87, at 56-57.

and regulatory issues be resolved equitably. The next section will examine some of these issues, especially the ones relevant in the context of OTEC siting and development.

B. *Regulatory Issues*

Regulatory issues will be considered in this section in two contexts— international and Federal-State. This examination will be prefaced by a brief investigation of the legal status of OTEC devices.

1. *Legal Status of OTEC Devices*

It is important to determine the legal status of OTEC devices because many rights and obligations of such entities and those owning, operating, and manning them will flow from such a determination. The conferring of legal status on OTEC devices, whether fixed to the ocean floor or moveable either for stationkeeping or for grazing on the high seas, will legitimize their presence as well as their operation. The issue is two-fold: (1) who would authorize their presence and operation by licensing them? (the analogy is that of a flag state authorizing the use of its flag on a vessel), and (2) since traditionally a regulatory mechanism exists to regulate activities of structures designed as vessels on the oceans, would OTEC devices be considered vessels or quasi-vessels, at least for some purposes? The question of licensing will be discussed in the next section examining international and Federal-State regulatory mechanisms.

Whether an OTEC device is considered a vessel will not be dispositive of the complex legal issues raised by OTEC presence as a new user of the sea. There are, however, existing international guidelines, standards, and regulations applicable to vessels which have been established by the long standing use of the oceans for commercial navigation. It is useful to inquire whether the existing standards and regulations—those of safety, design and construction, collision and navigation, communication, and labor—will apply to OTEC devices and whether these regulations need to be modified in order to meet OTEC needs. Otherwise, new arrangements will have to be devised. In the national context, giving OTEC devices the sta-

150. *See generally* Nyhart, *OTEC Structures as Vessels*, in ASIL STUDY, *supra* note 70, at 213-33. *See also* Nanda, *The Legal Status of Surface Devices Functioning at Sea other than Ships (Drilling Rigs, Offshore Platforms, etc.)*, 26 AM. J. COMP. L. (Supp.) 233 (1978).

tus of vessels could confer upon them substantial economic benefits, in view of the fact that the U.S. shipping industry is subsidized by the United States government by means of providing mortgage guarantees, construction and operation subsidies, and tax advantages.[151]

Only during the last decade have international agreements regulating activities on the sea broadened their reach to cover OTEC-type structures. The 1969 Convention on Intervention on the High Seas, dealing with oil pollution casualties, set the stage by defining a ship as: "(a) any sea-going vessel of any type whatsoever, and (b) any floating craft with the exception of an installation or device engaged in the exploration of resources of the seabed and ocean floor and the subsoil thereof."[152] The Convention added a distinct category of "floating craft" to that of "vessel," the term traditionally used in such conventions. The 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter[153] defined vessels to include "floating craft, whether self-propelled or not."[154] The Convention called upon each contracting party to apply means required to implement the present convention of all "vessels . . . and fixed or floating platforms under its jurisdiction believed to be engaged in dumping."[155]

The 1973 Convention for the Prevention of Pollution from Ships[156] defines ship to mean "a vessel of any type whatsoever

151. *See, e.g.*, on ship mortgages, 46 U.S.C. §§ 911-84 (1970); subchapter XI, "Federal Ship Mortgage Insurance," of the Merchant Marine Act of 1936, 46 U.S.C. §§ 1271-80 (1970 & Supp. IV 1974), *as amended by* the Federal Ship Financing Act of 1972, Pub. L. No. 92-507. *See generally* Smith, Jr., *Ship Mortgages*, 47 TUL. L. REV. 608 (1973). On subsidies and tax advantages, see subchapters V and VI of The Merchant Marine Act of 1936, 46 U.S.C. §§ 1151-83(a) (1970 & Supp. IV 1974), *as amended by* The Negotiated Shipbuilding Contracting Act of 1976, Pub. L. No. 94-373 §§ 2,3,90 Stat. 1042; Internal Revenue Code, 26 U.S.C. § 861(e)(1976). *See generally* Cook, Jr., *Government Assistance in Financing Title XI Federal Guarantees*, 47 TUL. L. REV. 653 (1973); Kominers, *Federal Government Aids to Merchant Shipping, id.* at 691.

152. Article II (2), International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, *done* Nov. 29, 1969, 26 U.S.T. 765, T.I.A.S. No. 8068, *reprinted in* 9 INT'L LEGAL MATERIALS 25 (1970) (entered into force May 6, 1975).

153. Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Matter, *done* Dec. 29, 1972, 26 U.S.T. 2403, T.I.A.S. No. 8165 (entered into force August 30, 1975).

154. *Id.* art. III(2).

155. *Id.* art. VII(1)(c).

156. International Convention for the Prevention of Pollution from Ships, *done* Nov. 2, 1973, *reprinted in* 12 INT'L LEGAL MATERIALS 1319 (1973).

operating in the marine environment and includes hydrofoil boats, air-cushion vehicles, submersibles, floating craft and fixed or floating platforms."[157] In addition to ships entitled to fly the flag of the party, the Convention also applies to "ships not entitled to fly the flag of a Party but which operate under the authority of a Party."[158] Similarly, the 1976 Convention on the International Maritime Satellite Organization[159] defines a ship broadly as "a vessel of any type operating in the marine environment. It includes *inter alia* hydrofoil boats, air-cushion vehicles, submersibles, floating craft and platforms not permanently moored."[160] It appears that the terms being used now such as "floating craft," and "floating platforms," would include OTEC-type structures in the ocean environment. However, there are many conventions adopted under the auspices of the International Maritime Consultative Organization (IMCO), which do not cover OTEC-type facilities.[161] Which of these conventions should be made applicable to OTEC will depend upon the purpose of the convention and the probable benefit of its application to OTEC activities—both to the research and demonstration, and the development phases—so that OTEC commercialization is facilitated and expedited.

ICNT provisions on pollution, on the other hand, would cover OTEC devices. Dumping is defined to include wastes or other matter from "vessels, aircraft, platforms or other man-made structures at sea."[162] The terms used are "installations and devices,"[163] and "vessels, installations, structures and

157. *Id.* art. 2(4).

158. *Id.* art. 3(1).

159. Convention on the International Maritime Satellite Organization, *done* Sept. 3, 1976, *reprinted in* 15 INT'L LEGAL MATERIALS 1051 (1976).

160. *Id.* art. 1(f).

161. These conventions would include: International Convention for the Safety of Life at Sea, (SOLAS Convention), *signed* June 17, 1960, 16 U.S.T. 185, T.I.A.S. No. 5780, 536 U.N.T.S. 27; 1974 SOLAS Convention, *reprinted in* 14 INT'L LEGAL MATERIALS 959 (1975); International Convention for the Prevention of Pollution of the Sea by Oil, *opened for signature* May 12, 1954, 12 U.S.T. 2989, T.I.A.S. No. 4900, 327 U.N.T.S. 3, *as amended by* Amendments to the International Convention for the Prevention of Pollution of the Sea by Oil, *done* Apr. 11, 1962, 17 U.S.T. 1523, T.I.A.S. No. 6109, 600 U.N.T.S. 332; International Convention on Load Lines, *done* Apr. 5, 1966, 18 U.S.T. 1857, T.I.A.S. No. 6331, 640 U.N.T.S. 133; and International Convention on Civil Liability for Oil Pollution Damage, *done* Nov. 29, 1969, *reprinted in* 9 INT'L LEGAL MATERIALS 45 (1970).

162. ICNT, art. 1(1)(5)(a)(i & ii).

163. *Id.* art. 195(3)(c & d). The provisions cover all installations and devices in the marine environment.

other devices," flying the flag of the mining state or of its registry.[164] Therefore, regardless of the status of OTEC devices, they would be regulated under ICNT.

2. *International Regulatory Mechanisms and OTEC*[165]

a. *Current Law*

It should come as no suprise that no regulatory mechanism exists for specific application to OTEC, for as a new technology it has yet to make its debut as a user of ocean space. Of course, the primary purpose of providing a regulatory framework is to reduce uncertainty and risks attendant on pursuing OTEC activities, an important consideration not only for prospective investors, but also for eventual commercialization of OTEC.

It seems likely that in the initial stages of OTEC development for research and demonstration purposes and subsequently for commercial operation, broader guidelines and standards with built-in flexibility, rather than narrow, precise norms will be established. Developments in another relatively new area, transnational pollution,[166] show that the important tasks of setting and harmonizing standards and establishing appropriate machinery for implementation, usually occur first in regional settings[167] and appear later in a global setting where such need and feasibility have been clearly demonstrated. Because of unique regional situations, it is unrealistic to expect or even pursue universality and uniformity. The Regional Seas Program of the United Nations Environmental Program (UNEP),[168] which has developed in the last four years and is still developing action plans for seven regions—Mediterranean, Gulf of Arabia, Red Sea, Gulf of Guinea, Carribbean and adjacent regions, East Asian Seas, and South Pacific—illustrates regional efforts on environmental management.

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164. *Id.* art. 210(2).

165. *See generally* Faron, *International Regulatory Aspects of OTEC Development and Operation,* in ASIL STUDY, *supra* note 70, at 86-148.

166. *See generally* J. BARROS & D. JOHNSTON, THE INTERNATIONAL LAW OF POLLUTION (1974); Nanda, *The Establishment of International Standards for Transnational Environmental Injury,* 60 IOWA L. REV. 1089 (1975).

167. *See generally* Nanda, *supra* note 166, at 1101-08, 1126-27; note 168 *infra;* Okidi, *Toward Regional Arrangements for Regulation of Marine Pollution,* 4 OCEAN DEV. & INT'L L. 1 (1977).

168. *See* International Center, Industry and Environment, *Executive Report No. 30,* Oct. 30, 1978. UNEP has established a special Regional Seas Programme Activity Centre at its Geneva office.

Several existing arrangements regulating other activities in ocean space could be construed to cover OTEC-type structures and activities on them, or with modifications, could be made applicable to OTEC. A few examples of such arrangements relevant to OTEC follow for illustrative purposes.

The results of the last major effort to provide a framework for activities in ocean space, the 1958 Geneva Conventions, do provide some basis for regulating OTEC. For example, the freedoms enumerated in the High Seas Convention—navigation, fishing, laying of submarine cables and pipelines, and overflights[169]—are not exhaustive and it could be argued that OTEC activities do constitute a "reasonable use" of the high seas[170] and fall within the scope of the freedoms granted under the Convention.[171] Other pertinent provisions of the Convention include those authorizing states to lay submarine cables, pipelines and communications lines,[172] and those related to the states' regulation of the ocean pollution caused by their activities.[173]

The 1958 Convention on the Continental Shelf[174] contains prohibitions against: (1) obstruction of the laying and maintenance of submarine cables and pipelines on the continental shelf,[175] (2) the rights of coastal states affecting the legal status of the superjacent waters of the high seas,[176] and (3) "any unjustifiable interference with navigation, fishing or the conservation of the living resources of the sea."[177] It also provides for the protection of "fundamental oceanographic or other scientific research carried out with the intention of open publication."[178] As noted earlier, however, notwithstanding the provisions of the Convention on the Continental Shelf, the recent developments regarding extensive coastal states' claims in their offshore areas, especially the developments regarding EEZ, make it highly unlikely that OTEC activities could be conducted on

169. Art. 2 of the High Seas Convention, note 15 *supra*.
170. *See* notes 56-57 *supra* and the accompanying text.
171. *Id.*
172. The High Seas Convention, *supra* note 15, arts. 26-29.
173. *Id.* arts. 24-25.
174. *See* note 15 *supra*.
175. *Id.* art. 4.
176. *Id.* art. 3.
177. *Id.* art. 5(1).
178. *Id.*

another state's continental shelf without its consent.[179]

The question of who would authorize operation of OTEC devices on the high seas is at present unsettled. Would the current state practice on vessels, the flag state approach (which raises a further issue of the flags of convenience),[180] be made applicable; or, would the OTEC issue become as controversial as is the deep seabed mining issue at present?[181] It is premature to suggest the precise nature of the conditions and arrangements for OTEC activities on the high seas, for the current debate on the seabed mining issue and the conclusions which are finally reached at LOS III[182] will substantially affect the OTEC licensing and operations.[182]

As noted earlier, most existing standards and regulations affecting activities in ocean space apply primarily to vessels, a term recently broadened to include OTEC-type structures.[183] Institutional arrangements, both in setting standards and providing mechanisms for compliance are in various stages of development. One commentator describes the current state of affairs:

> These arrangements cover areas such as safety, navigational aids, collision avoidance, design and construction regulation, inspection, certification, port entry, liability, communications, and labor and crew qualification. Most of these arrangements arise in national rather than international contexts, in most cases because international standards have not been agreed upon, or because nations have not been willing to subject themselves to international authority. Some of these arrangements have been developed into conventions, which are binding on parties; others are still undergoing analysis by such forums as IMCO's Legal Committee in order to match institutional arrangements to the realities of ocean use. . . . International forums have just begun to regulate moored platforms and other relatively novel marine technology. If OTEC devices are considered vessels, which is likely, at least for grazing type OTECs, then the various institu-

179. *See* notes 43-51 *supra* and the accompanying text.

180. *See generally* B. BOCZEK, FLAGS OF CONVENIENCE (1962); McDougal & Burke, *supra* note 16, at 1008-1140.

181. In addition to the series cited in note 59 *supra*, *see generally* Burton, *Freedom of the Seas: International Law Applicable to Deep Seabed Mining Claims*, 29 STAN. L. REV. 1135 (1977); Charney, *Law of the Sea: Breaking the Deadlock*, 55 FOR. APP. 598 (1977), Galey, *From Caracas to Geneva to New York: The International Seabed Authority as a Creator of Grants*, 4 OCEAN DEV. & INT'L L. 171 (1977).

182. *Supra* note 181.

183. *See* notes 150-64 *supra* and the accompanying text.

> tional arrangements currently providing norms and rules of vessel operation may apply or be amended to apply to OTEC development.[184]

Regulations applicable to marine pollution which might have a bearing on OTEC activities will be discussed in the next section dealing with environmental problems.[185]

b. *Recommendations*

It is desirable to devise a regulatory scheme which assists OTEC commercialization by providing certainty to prospective investors. What must be carefully avoided is overregulation or an inflexible and cumbersome regulatory system which can be stifling, especially for a new technology.

It is not to be expected that a new international regulatory mechanism will be established in the near future under a convention that deals specifically with OTEC operations. Experience shows that it was only in the aftermath of the *Torrey Canyon* disaster[186] that the current major conventions on marine pollution from ships were negotiated—the 1969 conventions on civil liability[187] and intervention on the high seas,[188] and the 1973 convention on prevention of pollution from ships.[189] However, several existing mechanisms could be applied to OTEC activities. To illustrate, several IMCO conventions currently applicable to vessels might be modified and made applicable to OTEC devices. Similarly, a functional approach is possible, authorizing specialized U.N. agencies to bring OTEC devices and operations under their regulatory framework: the International Energy Agency, because of OTEC's involvement with energy production; the World Meteorological Organization (WMO), due to OTEC's research activities; the Food and Agricultural Organization (FAO), if OTEC generated energy is used for producing fertilizers or in aquaculture; and the United Nations Environmental Program, owing to the potential environmental effects of OTEC operations. Of course, ISA could assume jurisdiction because of its umbrella function over the

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184. Faron, *supra* note 165, at 96-97 (footnotes omitted).

185. *See* notes 240-72 *infra* and the accompanying text.

186. *See generally* G. GILL, F. BECKER & T. SOFER, THE WRECK OF THE TORREY CANYON (1967); Nanda, *The "Torrey Canyon" Disaster: Some Legal Aspects*, 44 DEN. L. J. 400 (1967).

187. *Supra* note 161.

188. *Supra* note 152.

189. *Supra* note 156.

proposed deep seabed regime.[190] This is possible, especially in veiw of the "common heritage" concept,[191] the probable OTEC conflict with deep seabed mining activities,[192] or the possibly environmentally adverse effects of OTEC operations.[193]

It is recommended that, in addition to the prescription of unilateral U.S. regulations dealing with issues related to licensing and registration, safety, conflicting sea uses, communications, import and export, foreign labor, insurance, liability and compensation schemes, etc., attention be given now to the devising of imaginative bilateral and regional arrangements to apply to situations such as the following:

1. The resolution of apparently competing interests of a coastal state and the licensing/registry state, where a foreign registered/licensed OTEC device is operating adjacent to a coastal state EEZ. The coastal state's interest in preventing harmful effects within its EEZ must be acknowledged and accommodated.

2. The use of bilateral or regional schemes under which a combination of a state or states and private enterprises pool their resources, technology, and know-how to enter into arrangements for research and/or commercial purposes, such as, joint ventures to construct, operate, and own OTEC devices in a specific geographic area. The question of such operations on the high seas, of course, will have to be addressed separately, perhaps requiring some sort of global arrangement. The growing experience in working with satellite communication systems might offer useful guidelines.[194]

3. The need for bilateral or regional consultative mechanisms which will address specific issues regarding the management of conflicting claims of ocean uses caused by OTEC presence. Fisheries arrangements[195] and existing agreements between neighbors on international waterways[196] offer useful precedents.

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190. ICNT arts. 154-92.

191. *Id.* art. 136.

192. *See id.* pt. XI (arts. 154-92) and Annexes II & III.

193. *See id.* pt. XII (arts. 193-238).

194. *See generally* Colino, *International Cooperation between Communications Satellite Systems: An Overview of Current Practices and Future Prospects*, 5 J. SPACE L. 65 (1977); Frutkin, *Direct Community Broadcast Projects Using Space Satellites* 3 *id.* at 17 (1975).

195. *See generally* NATIONAL LEGISLATION AND TREATIES RELATING TO THE LAW OF THE SEA 573-86 (U.N. Legislative Series 1976), U.N. Doc. ST/LEG/SER.B/18.

196. *See generally* Nanda, *supra* note 166, at 1101-08.

4. The need for dispute settlement mechanisms.

On the global level, regulations regarding OTEC siting on the high seas might become necessary because of the possible conflicts between competing claimants to ocean uses or between competing claimants to attractive OTEC sites (a contingency not likely to occur in the near future). Thus, mechanisms might have to be devised to set standards and regulations concerning the licensing and operation, and allocation of OTEC sites for settlement of disputes, and to insure the efficient and optimal use of the oceans for OTEC development. In the long run, it might be desirable to establish an International Energy Resources Conservation and Management Agency, and a code of conduct for OTEC activities.

3. *Federal-State Regulatory Mechanisms and OTEC*

a. *Current Law*

The need for a thorough assessment of the current Federal offshore policies and for a Federal-State relationship regarding adjacent coastal waters has been suggested earlier.[197] To deal specifically with OTEC issues, it is necessary to outline a rough approximation of how OTEC exploitation will occur in the next twenty years. In a recent study,[198] Tefft, Kelly, Dick, and Stevenson postulate the following scenario for OTEC exploitation to the year 2025:

The Selected Scenario

U.S. OTEC
Megawatts on Line

1980	85	90	95	00	05	10	15	20	25
	.5	2.5	5	10	50	100	150	200	250

Key Descriptors

1. Successful demonstration of economy of technology and environmental benignity of full systems by 1985 (.5 on line in 85 is demonstration(s) facilities).

2. Federal stimulation of follow-on exploitation by

a. establishment of benevolent legal regime

b. establishment of stimulative development institution

197. *See* notes 142-49 *supra* and the accompanying text.

198. TEFFT, KELLY & MOTLEY STUDY, *supra* note 9.

c. provision of substantial Federal financial incentives

3. Establishment of fostering legal, institutional, and financing framework by 1980.

4. Operations within framework to develop strategic plan for exploitation and to assemble facilities ventures concurrently with demonstration implementation, *i.e.*, 1980 to 1985.

5. Continued operations within framework during 1985 to 2000 at a pace sufficient to establish perfected industrial, legal, institutional, and financial infrastructure by 2000.[199]

The authors conclude that "decisive Federal action will be needed to carry out this scenario. The Executive Branch presently lacks the policy direction and the specific legal authority to take actions in the depth and breadth necessary to build the legal, institutional, and financial framework needed to underlay scenario execution. Thus, new Federal legislation is necessary."[200]

The authors offer a model of Federal legislation which takes into account the necessary interface with international law as well with State interests.[201] They propose the enactment of an "Ocean Thermal Energy Conversion, Development, Exploitation, and Regulation Act of 1980,"[202] which would establish, among other policy objectives, the following: OTEC shall be subject to exclusive Federal regulation; while in the short term, Federal participation in OTEC development, ownership, and/or operation will be necessary to stimulate deployment to meet the established energy generation goals (by the year 2000, a minimum of 10,000 megawatts of installed electric OTEC generation capacity usable within the United States, its territories and possessions and/or on U.S. flag vessels at sea, and of 250,000 megawatts by the year 2025),[203] a long term objective shall be non-Federal development, ownership, and operation.

To carry out these policies, the proposed legislation contains four titles: OTEC Development Financing Association; OTEC Inc.; Duties and Responsibilities of the Secretary of Energy; and Legal Regime.[204]

199. *Id.* at 8.
200. *Id.*
201. *Id.* at 11-24.
202. *Id.* at 10.
203. *Id.* at 11.
204. *Id.* at 12.

The authors provide a detailed institutional framework,[205] the analysis of which is beyond the scope of this paper. However, a few selected Federal-State regulatory issues will be examined here.

On the issue regarding the application of Federal versus State laws to OTEC activities in adjacent offshore areas, it should be noted that extensive case law has developed regarding the applicability of the pertinent Federal or State laws to injuries suffered by workers on fixed or submersible oil-drilling platforms or rigs.[206] Different rules have been applied to injuries occurring on fixed platforms within the three-mile zone as opposed to those occurring beyond the three-mile limit.[207] A landmark decision was a 1969 case, *Rodrigue v. Aetna Casualty & Surety Co.*,[208] in which the U.S. Supreme Court held that State law would apply to fixed offshore platforms in preference to general maritime law. In 1972, the Longshoremen's and Harbor Workers' Compensation Act[209] was amended, allowing a concurrent application of both Federal and State laws in case of an overlap.[210]

However, until Congress enacts comprehensive Federal legislation regarding OTEC, the guidelines on the applicable law are provided by the Supreme Court test of uniformity versus locality or diversity:

> if a case falls within an area in commerce thought to demand a uniform national rule, state action is struck down. If the activity is one of predominantly local interest, state action is sustained. More accurately, the question is whether the state interest is outweighed by a national interest in the unhampered operation of interstate commerce.[211]

More recently, in *Ray v. Atlantic Richfield Co.*,[212] the issue was that of a conflict between Washington State's tanker law regulating oil tankers in Puget Sound,[213] the Ports and Waterways

205. *Supra* note 201; TEFFT, KELLY & MOTLEY, INC., WORKING DRAFT, OTEC DEVELOPMENT, EXPLOITATION, AND REGULATION ACT OF 1980 (1978).

206. For discussion of these cases, see Comment, *Offshore Oil Platforms and Admiralty Law: Rodrigue in Retrospect*, 49 TUL. L. REV. 65 (1975).

207. *Id.*

208. 395 U.S. 352 (1969).

209. Pub. L. No. 92-576, 86 Stat. 1251 (1972), 33 U.S.C. §§ 901-50 (1976).

210. See Comment, *Broadened Coverage Under the LHWCA*, 33 LA. L. REV. 683 (1973).

211. California v. Zook, 336 U.S. 725, 728 (1949).

212. 98 S. Ct. 988 (1978).

213. Wash. Rev. Code Ann. § 88.16.170-190 (Supp. 1978).

Safety Act of 1972 (PWSA),[214] and the Constitution. The Supreme Court found certain safety features in the design and equipment of tankers which were required under Washington law to be invalid in the face of the preempting requirements set by PWSA.[215] The Court applied the uniformity/diversity tests and based its decision on the need for uniformity of safety design requirements. Applying the same test, it also struck down another provision of Washington law, which excluded tankers in excess of 125,000 DWT[216] from Puget Sound. However, the Court upheld another provision, which required that tankers over a certain size "take a Washington State licensed pilot while navigating Puget Sound,"[217] reasoning that this provision was more of an operating rule for local waters.[218]

The issues of licensing, the law applicable to OTEC facilities in adjacent waters, and the potential environmental and administrative burdens upon the coastal States were addressed by DPA in the context of deepwater port facilities and have been noted earlier.[219]

b. *Recommendations*

Federal and State interests coincide in a number of areas which will probably be affected by OTEC development—coastal zone management and land planning, revenue sharing, State costs and fees, and electricity rate regulations. The coastal States have a significant stake because of possible conflicts with other ocean uses, adverse environmental effects, siting of shore-based support facilities, etc. Thus, it will be in the mutual interest of the Federal government and coastal States that a mechanism be devised which is workable and feasible, effective and efficient, environmentally sound, and equitable in its reach while dealing with Federal-State interests.[220] These broad policy objectives should be given effect by a system under which:

1. The licensing and regulatory authority will be the Federal government.

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214. 33 U.S.C. §§ 1221-27, 46 U.S.C. 391(a) (Supp. V 1975). The provision on safety features held invalid is Wash. Rev. Code Ann. § 88.16.190(2) (Supp. 1978).

215. 98 S. Ct. at 996-1000.

216. Wash. Rev. Code Ann. § 88.16.190(1) (Supp. 1978).

217. Wash. Rev. Code Ann. § 88.16.180 (Supp. 1978).

218. 98 S.Ct. at 1000-1002.

219. *See* notes 120-32 *supra* and the accompanying text.

220. *See generally* note 205 *supra*.

2. The DOE/Federal Energy Regulatory Commission (FERC) will be the lead Federal agency to license and regulate OTEC activities, similar to the Department of Transportation/Coast Guard's role as the lead agency for licensing deepwater port facilities under DPA.

3. OTEC facilities in offshore areas will be considered a utility in interstate and foreign commerce and will be subject to regulations and procedures of FERC both as to rate regulation and technical standards.

4. The Coast Guard and the Corps of Engineers will be responsible for navigational safety and seaworthiness pertaining to OTEC facilities.

Such a scheme will accomodate Federal-State interests by providing for:

1. a Federal/State revenue sharing scheme, especially permitting States to recover the economic cost to them of a federal right-of-way for transmission cables through the three-mile territorial sea and also for shore-based facilities;

2. an effective Federal/State consultative mechanism; and

3. administrative advisory boards.

C. *Environmental Considerations*

A recent study has outlined the following environmental problems associated with the deployment of OTEC devices in the ocean:

> (1) the potentially toxic effect on marine life of metallic elements eroded or corroded from heat exchangers; (2) the adverse effect of mixing natural thermocline and salinity gradients; (3) the potentially toxic effects of working fluid seepage into the seawater or seawater into the working fluid; (4) the ecological impacts of concentrations of biocides (such as chlorine) used to prevent biofouling; (5) the safety of workers faced with exposure to chemicals; [and] (6) the effect on the microclimate of slightly lower air and surface temperatures around the plant.[221]

It should, however, be noted that this inquiry into the potentially adverse environmental impact of OTEC activities is speculative. Nonetheless, it is certainly desirable that these issues be addressed at this preliminary stage of OTEC development. The discussion in this section will open with a brief

221. SERI INTERIM DRAFT REP., *supra* note 9, at 137-39.

outline of the domestic (Federal-State) issues, and will focus primarily on international aspects of OTEC-related environmental issues.

1. *Domestic (Federal-State) Issues*

Potential environmental impacts from OTEC facilities in coastal waters include those from construction and operation of such facilities, cables and transmission lines, and onshore services and support facilities. The existing U.S. legislation relevant to OTEC activities both during its research and development phase and during the commercial phase includes the OCS Lands Act,[222] CZMA,[223] DPA,[224] and the National Environmental Policy Act of 1969 (NEPA).[225] Except for NEPA, the pertinent provisions of these statutes have already been examined in the preceding sections on jurisdiction[226] and regulatory mechansims.[227] Consequently, the discussion here will be confined to NEPA and recent developments regarding the other statutes.

NEPA requires Federal agencies to prepare records on environmental effects of and alternatives to "every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."[228] Since Federal involvement in OTEC development is expected to be substantial, at least during the initial stages, preparation of programmatic Environmental Impact Statements (EISs)[229] will be required during the research phase of OTEC development. Additionally, while OTEC facilities will be subject to site-specific EISs, because of Federal time, money, or effort an OTEC facility received,[230] it is possible that

222. 43 U.S.C. §§ 1331-43 (1970).

223. 16 U.S.C. §§ 1451-64 (1976).

224. 33 U.S.C. §§ 1501-24 (1976).

225. 42 U.S.C. §§ 4321-47 (1976).

226. *See* notes 92-141 *supra* and the accompanying text.

227. *See* notes 206-20 *supra* and the accompanying text.

228. 42 U.S.C. § 4332(c). *See generally* R. LIVOFF, A NATIONAL POLICY FOR THE ENVIRONMENT: NEPA AND ITS AFTERMATH (1976).

229. *See generally* Note, *The Scope of the Program EIS Requirement: The Need for a Coherent Judicial Approach*, 30 STAN. L. REV. 767 (1978).

230. Actions with direct effect as well as actions with indirect effects have been held subject to EIS requirements. Since Federal agencies are required to make a detailed statement on "major Federal actions significantly affecting the quality of the human environment," the question regarding the scope of "major Federal actions" assumes special importance. For a criticism of a broad interpretation of the term

regional EISs will also be needed, due to the cumulative effect of a number of OTEC facilities in a region.[231]

Among other significant developments, the Coast Guard, on December 4, 1978, proposed rules for administering an offshore oil pollution compensation fund,[232] which will be set up pursuant to the 1978 Outer Continental Shelf Lands Act Amendments,[233] which President Carter signed on September 22, 1978.[234] The Secretaries of Transportation and the Treasury will administer the fund, which is expected to cover "all marine oil pollution, including that discharged from onshore facilities and deepwater ports."[235] Under the 1978 amendments,[236] no license for the development and production of oil or gas on OCS will be granted unless it conforms with the requirements of CZMA.[237] Also, the Council on Environmental Quality (CEQ) is proposing new pollution clean up plans in which coastal States' interests are recognized.[238] It is also worth noting that since the total number of coastal zone management programs stands now at thirteen—California, Hawaii, Maine, Maryland, Massachusetts, Michigan, New Jersey, North Carolina, Puerto Rico, Oregon, Rhode Island, Washington, and Wisconsin[239]—more active State participation in decisionmaking can be anticipated.

2. *International Aspects*

In addition to the primary concern of the coastal state with its immediate marine environment, its interests also extend to the protection and preservation of a shared global marine environment. The latter is affected by unilateral state actions as well as collective actions by states. Selected recent developments of states' actions that might have a bearing on OTEC

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thereby requiring EISs for actions which may not be "major Federal actions," see Friedman, *The National Environmental Policy Act of 1969 - The Brave New World of Environmental Legislation*, 6 NAT. RESOURCES L. 44 (1973).

231. For a discussion of regional EISs, see Kleppe v. Sierra Club, 427 U.S. 390 (1976) *rev'g* Sierra Club v. Morton, 514 F. 2d 856 (D.C. Cir. 1975).

232. 43 Fed. Reg. 56840 (1978). *See* 9 ENVIRON. REP. (BNA) 1413 (1978).

233. Pub. L. No. 95-372, 92 Stat. 629 (1978).

234. *See* 9 ENVIRON. REP. (BNA) 972 (1978).

235. 43 Fed. Reg. 56,840 (1978).

236. *Supra* note 230.

237. 16 U.S.C. §§ 1451-64 (1976).

238. *See* 9 ENVIRON. REP. (BNA) 1416-17 (1978).

239. *Id.* at 1293.

development will be noted in this section, which will conclude with a brief comment on pertinent ICNT provisions.

a. *Unilateral U.S. Actions Related to the Marine Environment*

During the recent past, the U.S. Congress has adopted legislation with potential extraterritorial reach in the marine environment. For example, the Clean Water Act[240] extended the application of Section 311 (Oil and Hazardous Substance Liability) of the Federal Water Pollution Control Act[241] to cover activities which affect the resources of the 200-mile U.S. fisheries zone or its OCS. Earlier, the Fishery Conservation and Management Act of 1976[242] extended the U.S. fishery zone to 200 miles. Other U.S. acts with potential effect on maritime activities include the U.S. Ports and Waterway Safety Program,[243] the Marine Protection, Research and Sanctuaries Act of 1972,[244] the new Coast Guard Regulations concerning navigational aids,[245] and the DPA.[246]

The debate continues as to whether NEPA applies to major Federal actions abroad.[247] The argument for its application abroad was recently made at a Senate Subcommittee hearing by Russell E. Train, former EPA administrator, former CEQ chairman, and current president of the World Wildlife Fund. He asserted that House and Senate members attending a 1968 coloquium, which "served as a basis for NEPA," intended that the law apply beyond U.S. territorial limits, and that President Carter reinforced that view in his 1977 environmental message.[248] He added that an environmental policy which "failed to recognize the global nature of the human environment would be shortsighted," and that the U.S. should con-

240. Pub. L. No. 95-217, 91 Stat. 1566, 1593-96 (1977).

241. 33 U.S.C. § 1321 (1976).

242. Pub. L. No. 94-265, 90 Stat. 331 (1976).

243. 33 U.S.C. §§ 1221-27 (1976).

244. 16 U.S.C. §§ 1401-34 (1976).

245. *See, e.g.*, 42 Fed. Reg. 5964, 5966 (1977).

246. 33 U.S.C. §§ 1501-24 (1976).

247. *See generally* Comment, *Renewed Controversy Over the International Reach of NEPA*, 7 ENVT'L L. REP. 10,205 (1977); Sierra Club v. A.E.C., 4 *id.* at 20,685 (D.D.C. 1974); Environmental Defense Fund, Inc. v. U.S. Agency for International Development, 6 *id.* at 20,121 (D.D.C. 1975); Sierra Club v. Coleman, 405 F. Supp. 53 (D.D.C. 1975), *injunction continued*, 421 F. Supp. 63 (D.D.C. 1976); COUNCIL ON ENVIRONMENTAL QUALITY ENVIRONMENTAL QUALITY — EIGHTH ANNUAL REPORT Appendix G 395 (1977).

248. *See* 9 ENVIRON. REP. (BNA) 304 (1978).

sider the "significant extra-territorial environmental impacts" of its actions.[249] However, with regard to the application of NEPA to the Export-Import Bank (Eximbank), the concern of U.S. business is that EIS requirements for Eximbank would result in delays in getting loans and added costs to applicants, thereby depressing the rate of U.S. exports.[250]

The controversy will be settled through an Executive Order setting out responsibilities of Federal agencies for reviewing environmental effects of their overseas projects. Reportedly, under a proposed Executive Order, certain Federal actions having a significant adverse effect upon the environment of nonparticipating third countries or natural resources of global importance will be required to have abbreviated environmental reviews.[251] Eximbank President, John L. Moore, recently explained that the proposed Executive Order would require short environmental assessments primarily for "projects" to be financed by Eximbank.[252] Thus, if Eximbank were to finance the purchase of an OTEC plant for a developing state, an assessment would be required. It may also be noted that the Department of Energy has commissioned environmental impact assessments of a small floating OTEC test facility.[253]

Since so little is yet known about OTEC activities and operations, environmental assessments should be conducted during the research phase. The same applies in the commercial phase, whether the OTEC plant is to operate in a U.S. coastal zone, in the coastal zone of another state, or on the high seas.

b. *Multilateral Actions*

The 1972 U.N. Conference on the Human Environment in Stockholm[254] acknowledged the emerging norms of state responsibility and liability for transnational environmental damage. Under Principle 21 of the U.N. Declaration on the Human Environment, states are responsible for insuring "that activities within their jurisdiction or control do not cause damage to

249. *Id.*

250. *Id.* at 305.

251. *Id.* at 1049.

252. *Id.*

253. Noted in Stein, *Environmental Aspects of OTEC Development and Demonstration*, in ASIL STUDY, *supra* note 70, at 154.

254. *See Report of the U.N. Conference on the Human Environment*, U.N. Doc. A/CONF.48/14/Rev. 1 (1972).

the environment of other States or of areas beyond the limits of national jurisdiction."[255] Also, under Principle 22, "States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction."[256] Principle 7 calls upon states to "take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage or to interfere with other legitimate uses of the sea."[257]

Following the Stockholm conference, several conventions were concluded, including the London Convention on the Dumping of Wastes at Sea,[258] the 1973 IMCO Convention on the Prevention of Pollution from Ships,[259] and the 1974 Convention on the Safety of Life at Sea.[260] Also, there have been substantial bilateral and multilateral efforts to conclude new conventions for the prevention of marine pollution and the conservation and management of the marine environment[261] which might have some bearing on OTEC[261] operations.

c. *ICNT Provisions*

Part XII of ICNT contains 46 Articles dealing with the protection and preservation of the marine environment. States are obligated to protect and preserve the marine environment,[262] to refrain from polluting the environment of other states or areas beyond their national jurisdiction,[263] and to take measures to prevent, reduce, and control marine pollution.[264] Among specific measures, states are to minimize the release of toxic, harmful or noxious substances from dumping,[265] and pol-

255. *Id.* at 5.

256. *Id.*

257. *Id.* at 4.

258. *Supra* note 153.

259. *Supra* note 156.

260. *Reprinted in* 14 INT'L LEGAL MATERIALS 959 (1975).

261. In addition to note 168 *supra, see generally* 4 NEW DIRECTIONS IN THE LAW OF THE SEA, *supra note* 10, at 331-518; 6 *id.* at 456-562; Hickery, Jr., *Custom and Land-Based Pollution of the High Seas,* 15 SAN DIEGO L. REV. 409, 445-54 (1978); Okidi, note 167 *supra.*

262. ICNT art. 193.

263. See *id.* arts. 195(2), 238.

264. *Id.* art. 195(1).

265. *Id.* art. 195(3)(a)(iii).

lution from vessels[266] and "from all other installations and devices operating in the marine environment, in particular for preventing accidents and dealing with emergencies, ensuring the safety of operations at sea, and regulating the design, construction, equipment, operation and manning of such installations or devices."[267] In another article ICNT calls upon states "[i]n taking measures to prevent, reduce and control pollution of the marine environment . . . not to transfer, directly or indirectly, damage or hazards from one area to another or transform one type of pollution into another."[268] States are also to assume positive legal responsibility to cooperate in international monitoring programs,[269] and to assess the environmental impacts of their activities on the marine environment.[270] Article 210 deals specifically with activities in the Area:

> 1. International rules, standards and recommended practices and procedures shall be established . . . to prevent, reduce and control pollution to the marine environment from activities relating to the exploration and exploitation of the Area. Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.
>
> 2. . . . States shall establish national laws and regulations to prevent, reduce and control pollution of the marine environment from activites relating to the exploration and exploitation of the Area undertaken by vessels, installations, structures and other devices flying their flag or of their registry.

According to Article 236 on responsibility and liability, states are "responsible for the fulfilment of their international obligations concerning the protection and preservation of the marine environment [and] shall be liable in accordance with international law for damage attributable to them resulting from violations of these obligations."[271]

This chapter on the ocean's environment provides stronger guarantees than ever before.[272] OTEC activities and operations would certainly be covered under many of the principles and specific provisions contained in the chapter.

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266. *Id.* art. 195(3)(b).
267. *Id.* art. 195(3)(d).
268. *Id.* art. 196.
269. *Id.* art. 205.
270. *Id.* art. 207.
271. *Id.* art. 236(1).
272. For a critical appraisal of ICNT provisions on the marine environment, see Schneider, *Something Old, Something New: Some Thoughts on Grotius and the Marine Environment*, 18 VA. J. INT'L L. 147 (1977).

III. CONCLUSIONS

Since OTEC holds sufficient promise to warrant vigorous research efforts on its systems and technology,[273] it is equally important that an efficient and effective legal and institutional framework be devised without any further delay. It is for this reason that a major objective of this study has been to focus on some of the most pressing aspects related to OTEC development. Accordingly, the preceding discussion addressed only selected issues and either left untouched or barely touched upon several issues, including the potential application of antitrust laws to OTEC activities,[274] liability plans,[275] utility policy and regulation,[276] and financial arrangements and incentives including tax advantages[277] which might facilitate and expedite OTEC development.

Specific recommendations made here relate to both Federal-State and international aspects. To recapitulate, a comprehensive ocean management system for U.S. coastal areas is recommended, which requires comprehensive ocean management legislation. In the international arena, it may not be too early to consider the drafting of a convention which mandates environmental impact assessments of a state's major projects which could harm the environment of another state or the shared global environment, and provides for consultative mechanisms.[278] This should be followed by the drafting of an-

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273. *See* section I *supra*.

274. OTEC operations might have implications for antitrust laws, for the large investment needed for the construction, purchase or operations of an OTEC plant might require the involvement of several firms and/or states. Similarly, a joint venture may be an attractive vehicle to market OTEC technology and/or OTEC energy. For a discussion of some of the issues raised by joint arrangement for developing new technology or producing new products, see Baker, *Antitrust as a Spur to Technical Progress*, 23 AM. U. L. REV. 547 (1974).

275. *See generally* Faron, *supra* note 165, at 107-11; Nyhart, *Problems of Legal Responsibility and Liability to Be Anticipated in OTEC Operations*, in KNIGHT, NYHART & STEIN, *supra* note 9, at 129-64.

276. It is proposed that the Federal Energy Regulatory Commission, as the lead Federal Agency, assume responsibility for formulating and implementing the needed "utility policy" regarding OTEC.

277. *See generally* sources cited in note 205 *supra*; B. WASHOM & J. NILLES, *supra* note 9.

278. A Senate Resolution, S.49, was introduced in 1978 urging the United States "to negotiate an international treaty requiring environmental impact assessments on major projects that could harm the environment of another nation or the global commons. International impact statements could be filed with the . . . (UNEP)." The

other convention specifically dealing with OTEC activities as well as a code of conduct. Even if these tasks appear to be overwhelming, it is imperative that they be undertaken now.

Resolution would require states parties to the treaty to "consult with affected nations, or with the UNEP in cases involving global commons, to minimize harmful impacts across international boundaries." 9 ENVIRON. REP. (BNA) 539 (1978).