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THE CONTINENTAL SHELF LANDS OF THE UNITED STATES:
MINERAL RESOURCES AND THE LAWS AFFECTING THEIR
DEVELOPMENT, EXPLOITATION, AND INVESTMENT POTENTIAL

ELLIOTT DAHLE, JR.

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SEA GRANT PUBLICATION

UNC-SG-73-11

JUNE, 1973



ERRATA

The following changes should be made in the University of North Carolina Sea Grant Publication UNC-SG-73-11, "The Continental Shelf Lands of the United States: Mineral Resources and the Laws Affecting their Development, Exploitation, and Investment Potential" by Elliott Dahle, Jr.

- P. 6, l. 13 "arquably" should read "arguably"
- P. 15, l. 1 "the oil" should read "petroleum"
- P. 16, l. 18 "situation" should read "situations"
- P. 28, l. 1 "are focal" should read "are the focal"
- P. 48, l. 5 "initiate" should read "enact"
- P. 48, l. 11 "shore" should read "coastal"
- P. 49, l. 4 "value is" should read "cost will be"
- P. 49, l. 4 "materially affect" should read "materially and adversely affect"
- P. 49, l. 10 "returning" should read "restoring"
- P. 49, Footnote 293 Should read Id.; Section 90.58.130 (7).
- P. 49, Footnote 294 Should read Id.; Section 90.58.230.
- P. 49, Footnote 295 Should read Coastal Zone Analysis, supra note 154, at 64, citing P. L. 1971, Ch. 279, Section 1.
- P. 51, l. 10. "upon which" should read "upon which states must focus"
- P. 51, l. 13. delete "such uses as"
- P. 51, l. 13 "which may" should read "which, if left uncontrolled, may"
- P. 52, l. 6 "directed towards" should read "relating to"
- P. 52, l. 8 should read "An example of offshore environmental legislation is Maine's"
- P. 53, Footnote 317 Should read 38 M.R.S.A. Section 551.

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MINERAL RESOURCES AND THE LAWS AFFECTING THEIR
DEVELOPMENT, EXPLOITATION, AND INVESTMENT POTENTIAL

by

Elliott Dahle, Jr.

Independent Study Under
Professor Seymour Wurfel

This work was partially sponsored by Office of Sea Grant,
NOAA, U.S. Dept. of Commerce, under Grant No. 04-3-158-40,
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SEA GRANT PUBLICATION UNC-SG-73-11

JUNE, 1973

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FOREWARD

This document becomes the fourth Sea Grant publication produced by the Law of the Sea Sea Grant research project at the School of Law of the University of North Carolina. Its more lengthy symposium predecessors are: Attitudes regarding a Law of the Sea Convention to Establish an International Seabed Regime, April, 1972; The Surge of Sea Law, March, 1973; and Sea Law: The View of Developing Nations in Latin America, May, 1973.

Elliott Dahle, the present author, is a 1973 law graduate from the University of North Carolina who is embarking upon a career in the investment business. He here draws upon his two areas of specialization and focuses them upon the sea in an effort to evaluate legal factors influencing investment in ocean industries other than fishing. This requires a rather unique blend of interdisciplinary talent, knowledge and judgment.

This paper first presents a succinct factual exposition of known ocean resources and technologies; then a statement of present investment practices in exploring and exploiting marine resources; next a terse examination of the more important current international, national, federal and state legislation pertinent to the control and regulation of sea enterprise investments; followed by observations regarding some of the strengths and weaknesses of existing legal requirements; all of which leads to a tentative conclusion that much remains to be done before this type of investment will really become "safe" for little old ladies. This,

of course, does not imply that the major oil companies are not well aware of precisely what they are doing.

Mr. Dahle's intrepid exploration into a largely virgin territory is not only courageous, but may serve as a catalytic agent to engender more writing on this novel and intriguing subject. It may even possibly extend the concept of the function of the ecologist to protect the public against the squandering of natural resources to include economic resources as well.

This may be the last North Carolina Sea Grant Program publication under the leadership of retiring Coordinator Dr. John Lyman. Both he and Assistant Coordinator William Rickards, by their support, regularly evidence their belief that a blend of law and marine biology is necessary to conserve our sea heritage.

This work is a result of research sponsored by NOAA Office of Sea Grant, Department of Commerce, and the State of North Carolina, Department of Administration.

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INTRODUCTION

The purpose of this paper is to present an overview of the United States' Continental Shelf legislation with special emphasis being placed on the development and exploitation of the Shelf's mineral resources.

Part I of this study attempts to provide the reader with a working knowledge of the Continental Shelf's physical characteristics and its present delimitation.

In order to generate a degree of awareness of both the current and potential value of the U.S. Continental Shelves, Part II presents an overview of the mineral resources known to exist in such areas. While this list is by no means exhaustive, it does purport to accurately categorize the various resources discussed therein.

Investment in our Continental Shelf mineral resources and other related oceanographic activities has grown steadily for the past three decades. Consequently, the third portion of this study initially analyzes private investment from both the corporate and individual standpoint. An effort is therein made to expose both the benefits and drawbacks that accompany such expenditures. Additionally, a subsequent discussion views public investment in ocean-oriented activities from both a policy and bureaucratic standpoint.

With this background in mind, it is hoped that the ensuing discussion of the nationwide legislation affecting the development and exploitation of marine resources on the U.S. Continental Shelf will

perhaps be more meaningful. For sake of clarification, Federal and State legislation are treated separately under corresponding subdivisions. Although an independent analysis of their common regulatory scheme is not presently undertaken, hopefully the necessary relationship between these two levels of legislation will be apparent.

Finally, current legal developments on the international front are brought into perspective notwithstanding the fact that the major concern of International Sea Law is in the regulation and equitable allocation of the resources of the deep seabed.

I. THE CONTINENTAL SHELVES OF THE UNITED STATES: PHYSICAL DESCRIPTION AND DELIMITATION

A. Physical Description

Almost universally, the land masses are bordered by a relatively shallow underwater terrace. The broad gently sloping landward portion is the Continental Shelf;¹ while the narrow, steeper outer portion, where the terrace drops off to meet the deep sea floor, is the Continental Slope.² On a worldwide basis, the Continental Shelf averages 40 miles in width, with the average depth at the outermost edge being 420 feet.³ The average decline from the shore to the outer edge is approximately 10 feet per mile⁴ and is somewhat steeper on the inner as opposed to the outer portions.⁵ The Continental Slope, on the other hand, has an average slope

¹H.B. Stewart, Jr., The Global Sea 32 (1963) [hereinafter cited as Stewart].

²Id.

³Id. at 33.

⁴Id.

⁵Id.

of approximately 400 feet per mile.⁶

Often, when describing the bottom of the Continental Shelf, the terms "seabed" and "subsoil" are used. The distinction between the two is that the "seabed" constitutes the surface line dividing the sea from the "subsoil."⁷

Although the precise origin of the Continental Shelf and Slope is still unknown,⁸ two processes, erosion and sediment, are the most popular theories advanced for explanatory purposes.⁹ Probably the best explanation is that a combination of the two account for the Shelf areas of the world.¹⁰

The total area represented by the U.S. Continental Margins is 1,370,000 miles.¹¹ The Continental Margin consists of the total combined area of the Continental Shelf and Slope. The United States' Continental Margins are as follows: Atlantic Margin, Florida Margin, Gulf of Mexico Margin, Pacific Margin, Alaska Pacific Margin, Aleutian Shelves, Bearing Sea Shelf, and the Arctic Margin.¹² Of the total 1,370,000 miles of submerged land in the U.S. Continental Margins, the apportionment of mileage in relation to water depth is as follows: (1) 875,000 miles is located under water ranging from 0-200 meters deep; (2) 255,000 in waters ranging from 200-1,000 meters deep; and (3) 240,000 in waters ranging

⁶Id.

⁷M.W. Mouton, The Continental Shelf 35 (1952).

⁸Stewart, *supra* note 1, at 34.

⁹Id.

¹⁰Id.

¹¹Commission on Marine Science, Engineering and Resources, Marine Resources and Legal-Political Arrangements for Their Development VII - 198 (1968) [hereinafter cited as Panel Report 3].

¹²Id.

from 1,000-2,000 meters deep.¹³

B. Delimitation

On September 28, 1945, President Truman issued a proclamation asserting the United States' claim to its Continental Shelf.¹⁴ At this time, the width of the territorial sea zone recognized by most states was three miles.¹⁵ The Truman Proclamation carefully stated that the President was not making a claim over the waters adjacent to the United States' territorial sea. Instead, the claim referred only to "jurisdiction and control over the resources of the subsoil and the subsea."¹⁶

The Proclamation itself did not define the term "continental shelf," but such a definition was present in an accompanying press release: "submerged land which is contiguous to the continent and which is covered by no more than 100 fathoms of water."¹⁷

The Truman Proclamation immediately caused reaction from all over the world and was followed by similar declarations from a number of different nations. Consequently, it soon became evident that some attempt at a uniform multilateral pronouncement had to be made.¹⁸ The responsibility for this task fell on the International Law Commission, an organization created by the United Nations General Assembly in

¹³Id.

¹⁴Pres. Proc. No. 2667, 10 Fed. Reg. 12303 (1945, [hereinafter cited as Truman Proclamation]).

¹⁵Scott, THE CONTINENTAL SHELF AND THE UNITED STATES, 22 S. Car. L. Rev. 37 (1970) [hereinafter cited as Scott].

¹⁶Truman Proclamation, supra note 14.

¹⁷Scott, supra note 15, at 37 citing 13 Dept. State Bull. 484 (1945).

¹⁸Id.

1947,¹⁹ whose purpose was to assist in the codification and progressive development of International Law.²⁰

One of the first areas selected for codification by the ILC was the law of the sea. After several preliminary drafts and reports, the ILC in 1956 adopted a body of rules concerning the law of the sea²¹ and proposed that an international conference be called for the purpose of considering the final draft.²² Approving this proposal, the United Nations General Assembly sponsored the Conference at Geneva which began in February of 1958.²³

Eighty-six nations attended this conference and passed four important conventions, one of which was the Geneva Convention on the Continental Shelf.²⁴ Article I of the Convention contains the following and presently recognized definition of the Continental Shelf:

For the purpose of this article the term 'continental shelf' is used as referring (a) to the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial sea, to a depth of 200 meters or, beyond the limit, to where the depth of the superjacent waters admits of the exploration of natural resources of the said areas; (b) to the seabed and subsoil of similar areas adjacent to the coasts of islands.²⁵

There is little question that the Convention confers on coastal nations the same complete and exclusive rights in the natural resources

¹⁹Id.

²⁰Id. citing G.A. Res. 174, U.N. Doc. A/104 (1947).

²¹Id. at 39.

²²Id.

²³Id.

²⁴Id.

²⁵Id., citing U.N. Doc. No. A/Conf. 13/L.55 (1958).

of the Shelf that they have in those of their territorial seabed.²⁶ On the other hand, the waters above the Shelf are not territorial seas of the coastal nation, but instead are high seas subject to the sovereignty of no state and open to all nations for many uses.²⁷

The Convention, however, does suffer from one major uncertainty: it is unclear as to where the coastal states' rights in the seabed actually cease.²⁸ This question results from the definition of "continental shelf" in Article I. According to this article, the "continental shelf" extends at least to where the waters are 200 meters deep, and beyond this depth, if the natural resources are still exploitable. With today's technology, the limits of exploitation as envisioned at Geneva are now obsolete.²⁹ Therefore, if a literal interpretation of Article I is followed, arguably the Shelf of every coastal nation extends indefinitely until it meets the Shelf of some other coastal nation.³⁰

Because so many nations have in fact adhered to this strict or literal interpretation of Article I, commentators argue that it is now time for international redefinition of the Continental Shelf. Numerous proposals for redefinition have been advanced by various interest groups in the United States.³¹ Additionally, in its report to President Nixon in 1969, the Commission on Marine Science, Engineering and Resources made

²⁶L. Henkin, Law for the Sea's Mineral Resources 15 (1968) [hereinafter cited as Henkin].

²⁷Id.

²⁸Id. at 16.

²⁹W.T. Burke, Ocean Sciences, Technology, and the Future International Law of the Sea 55 (1965) [hereinafter cited as Burke].

³⁰Henkin, *supra* note 26, at 20.

³¹Burke, *supra* note 29.

a major recommendation that called for a definition of the Shelf that would fix the limit at the 200 meter isobath or 50 nautical miles from the baseline, whichever is further.³²

II. AN OVERVIEW OF THE MINERAL RESOURCES OF THE UNITED STATES' CONTINENTAL SHELVES

A. Petroleum

Worldwide, petroleum is known to abound off many Continental Shelves. One estimate is that of 1,000 billion barrels of oil and the equivalent of 350 billion barrels of natural gas.³³ The volume of recoverable petroleum in any given reservoir is generally referred to as "reserves."³⁴ Within this category there exist two sub-categories: "proved reserves" and "prospective reserves." "Proved reserves" are those reserves remaining in the ground that can be estimated fairly accurately by data from drilled wells.³⁵ Less accurate are estimates of recoverable reserves in undrilled parts of the reservoir and added reserves that might become available through improved recovery techniques not yet utilized; these are known as "prospective reserves."³⁶

A 1968 estimate by V.E. McKelvey stated that on the United States' Continental Shelves the "proved reserves" consisted of 4 billion barrels of crude oil and 31 trillion cubic feet of natural gas.³⁷ Additionally,

³² Commission on Marine Science, Engineering and Resources, Our Nation and the Sea: A Plan for National Action 145 (1969) [hereinafter cited as Our Nation and the Sea].

³³ J. Krauss, Factors Influencing a U.S. Position in a Future Conference of the Sea 12 (1971) [hereinafter cited as Krauss].

³⁴ Panel Report 3, *supra* note 11, at VII - 194.

³⁵ Id.

³⁶ Id.

³⁷ Id. at 201.

"prospective reserves," in these same areas, were reported to be 180 billion barrels of crude oil and 900 trillion cubic feet of natural gas.³⁸ These estimates are only a small component of the total U.S. "proved" and "prospective" reserves which were estimated by this same person to be as follows: 31 billion barrels of "proved" crude oil and 286 trillion cubic feet of "proved" natural gas; and 547 billion barrels of "prospective" crude oil and 2,737 trillion cubic feet of "prospective" natural gas.³⁹

Presently, with six per cent of the world's population, the United States consumes almost a third of all energy used in the world.⁴⁰ The fact that our petroleum resources are severely limited can be clearly illustrated by referring to our oil and gas ratios in terms of reserves to annual production. With regard to crude oil, the ratio between 1950 and 1970 declined from 13 years to 8.9 years.⁴¹ On a similar basis, the natural gas ratio declined from 26.9 years to 12.1 years during the same period of time.⁴² In both cases, a combination of rapid growth requirements, and the sluggish pace of new discoveries and developments have contributed to this deficiency. The probable result is that the United States will, during the 1980's, have to import more than fifty per cent of the oil and gas it will then consume.⁴³

³⁸Id.

³⁹Id.

⁴⁰U.S. News and World Report, THE PRESIDENT'S BLUEPRINT FOR MEETING THE NATION'S NEEDS 72 (April 30, 1973) [hereinafter cited as Blueprint].

⁴¹C. Olmstead, The Prospects for Petroleum and Mineral Development 167 (1971).

⁴²Id.

⁴³Id.

B. Other Minerals

1. Chemical constituents of sea water

Minerals in this category include the metals and salts of the following: Magnesium, sodium, calcium, bromine, potassium, sulfur, strontium, boron, and uranium.⁴⁴ Two methods of removal can be utilized with regard to these minerals. One, is the older method of removal of chemical compounds by evaporation.⁴⁵ The other, is the more modern method of direct recovery from the seawater itself.⁴⁶ The mineral resources presently derived by the latter method - salt, magnesium, and bromine - are in sufficient concentration in the sea as to be inexhaustible.⁴⁷ This concentration, however, is extremely low and has consequently limited the production of these metals. In fact, one estimate of the gross value per cubic mile of sea water of 17 common industrial elements is less than \$600,000.⁴⁸

2. Surficial deposits

Surficial minerals can be categorized as either consolidated or unconsolidated. Consolidated surficial minerals consist of exposed stratified deposits of coal, ironstone and limestone, on one hand, and authigenic coatings of manganese and phosphorite on the other.⁴⁹

Unconsolidated surficial minerals are found in shallow beach areas or in offshore placers. The placers are mainly confined to the

⁴⁴Askevold, OCEAN MINING IN PERSPECTIVE, 4 Stan. J. Int'l S. 125 (1969) [hereinafter cited as Askevold].

⁴⁵Stewart, supra note 1, at 103.

⁴⁶Id.

⁴⁷Panel Report 3, supra note 11, at VII-101.

⁴⁸Id.

⁴⁹Askevold, supra note 44, at 125.

inner edge of the continental shelves and it is unlikely that significant placer deposits will be found on the Continental Slope or beyond.⁵⁰

Among the minerals in this category are: heavy mineral sands, iron sands, silica sands, lime sands, and sand and gravel.⁵¹

3. Hard rock minerals

Hard rock minerals can also be categorized as either consolidated or unconsolidated. The consolidated hard rock minerals are found in disseminated massive, vein, or tabular deposits and include the following: coal, iron, tin, gold, sulfur, metallic sulfides, and metallic salts.⁵² Although metallic vein deposits are commonly associated with intrusive igneous rocks the Shelves and Slopes are composed dominantly of sedimentary rocks. Igneous rocks, however, are known in three areas on the U.S. Continental Shelf: the Gulf of Maine, Monterey Bay, and off the Golden Gate in California.⁵³

Unconsolidated hard rock minerals consist of diamonds, platinum, tin and gold either in shallow beach areas or in offshore placers.⁵⁴ Heavier minerals of this classification include: magnetite, rutile, ilmenite, zircon, leucocoxene, monazite, chromite, scheelite, and wolframite.⁵⁵

4. Minerals concentrated in marine organisms

Tunicates, which are often referred to as "sea squirts,"

⁵⁰Panel Report 3, supra note 11, at VII - 103.

⁵¹Askevold, supra note 44, at 125.

⁵²Id.

⁵³Panel Report 3, supra note 11, at VII - 105.

⁵⁴Askevold, supra note 44, at 125.

⁵⁵Id.

have the amazing ability to filter out and collect the element vanadium to a concentration 50,000 times of that found in sea water.⁵⁶ Through a similar process, oysters are able to concentrate 200-fold the copper that they filter from the water.⁵⁷ In the future, metal farms utilizing these organisms and their concentrated mineral deposits may become practicable.⁵⁸

III. U.S. INVESTMENT IN CONTINENTAL SHELF MINERAL RESOURCES

A. Corporate Investment

1. Seabed industries

The ocean industries investing in the development and exploitation of U.S. Continental Shelf mineral resources or related activities are a heterogeneous group among which the following interests exist: Continental Shelf oil and gas extraction; chemical extraction of minerals from sea water; mining of sand, gravel, and sulfur; oceanography; and servicing and supplying those companies engaged in the extraction of minerals. There are differences in present and anticipated rates of growth of ocean industries. This is primarily due to the fact that although all categories of ocean enterprise share common problems, distinct differences exist in their operating requirements, degree of competition, investment, and relationship with the Federal Government.⁵⁹

⁵⁶ Stewart, *supra* note 1, at 109.

⁵⁷ Id.

⁵⁸ Id.

⁵⁹ Commission on Marine Science, Engineering and Resources, Industry and Technology V-7 (1969) [hereinafter cited as Panel Report 2].

Many public and private studies have been made to assess the overall scale of ocean-oriented business.⁶⁰ While estimates as high as \$50 billion have been made, the Commission on Marine Science, Engineering and Resources believes the true value of ocean activity in terms of contribution to the Gross National Product to be between \$15 and \$25 billion.⁶¹ However, this figure includes the recovery and processing of all natural resources, the sea transportation industry, the marine recreation industry, Government expenditures, and the net export of marine goods and services.⁶²

Despite investment risks, capital to finance current industrial ocean projects has not been hard to obtain. Most of the capital and effort has understandably been directed toward oil and gas because it offers the greatest return on investment.⁶³ However, industry's evaluation of the prospects of profit in the oceans is substantially influenced by regulatory restraints, legal uncertainties, and the Federal Government's ocean policy.⁶⁴ Both the intensity of interest and related hazards of investment in this field are evidenced by the number of acquisitions and mergers now occurring in ocean-oriented industries.⁶⁵ The offshore service and supply industry is an excellent example of the diversification trend. Companies within this industrial category have stabilized their level of business by diversifying into such areas as ocean engineering,

⁶⁰ Id. at V-8.

⁶¹ Id.

⁶² Id.

⁶³ Id.

⁶⁴ Id.

⁶⁵ Id.

exploration, mining, diving, construction, and pipe laying through the acquisition of smaller companies with either a restricted product or service line.⁶⁶

The first modern offshore well was drilled in 1948 in the United States.⁶⁷ Today, there are in excess of 16,000 offshore wells in the United States,⁶⁸ however, this is quite a decrease from the 1956 total of 56,000 wells.⁶⁹ Reasons given for this decrease are as follows: acreage in the Gulf of Mexico has not been offered for leasing on a regular basis; prices at the wells have been regulated at artificially low levels; the costs of drilling deeper wells and drilling further offshore have sharply increased; the odds of hitting nonproductive wells have increased; the costs of labor and materials have increased; and finally, the incentives for producers to risk money in the search of new supplies of petroleum are insufficient.⁷⁰ Prospects for the petroleum industry do appear to be brighter in view of President Nixon's April 18, 1973 message to Congress concerning the nation's energy needs.⁷¹ In this speech, he directed the Secretary of the Interior to take steps which would triple the annual acreage leased on the Outer Continental Shelf by 1979.⁷² To further encourage more exploration by oil and gas companies, the President also encouraged Congress to give investment credits of 7%

⁶⁶Id.

⁶⁷Krauss, supra note 33, at 12.

⁶⁸Id.

⁶⁹Time Magazine, May 14, 1973 at page 59.

⁷⁰Id.

⁷¹Blueprint, supra note 40, at 72.

⁷²Id. at 73.

for wells that prove to be dry and 12% for productive wells.⁷³ Additionally the oil depletion allowance of 22% is to remain unchanged.⁷⁴

To date, about \$18 billion has been invested world-wide by the offshore petroleum industry.⁷⁵ Of this amount, approximately \$13 billion has been invested by U.S. firms.⁷⁶ It is estimated that by 1980 the world-wide cumulative investment will reach \$55 billion. The major capital expenditures that compose the total investment figure are bonus bids, new technology, exploration, and drilling.⁷⁷ Of the \$13 billion invested to date by U.S. firms, \$5.85 billion has gone toward the payment to the Federal Government and the States of bonus and royalty payments for offshore sites.⁷⁸

Because of the high operating risks and the large capital outlays required, most companies producing offshore oil and gas are large corporations.⁷⁹ Occasionally, several small companies will form joint offshore ventures,⁸⁰ but such combinations make up only a small portion of the 30 to 35 U.S. oil companies involved in such production.⁸¹ These producers are in turn supported by hundreds of contractors who provide services and supplies. A small percentage of these contractors is

⁷³Time Magazine, AT LAST, THE ENERGY MESSAGE, 57 (April 30, 1973) [hereinafter cited as Energy Message].

⁷⁴Id.

⁷⁵Panel Report 2, supra note 59, at V-9.

⁷⁶Id.

⁷⁷Id.

⁷⁸Id. at V-24.

⁷⁹Id.

⁸⁰Id.

⁸¹Id.

controlled by the oil companies through majority stockholdings.⁸² Zapata Off-Shore Company of Houston, Texas is representative of the type of company categorized as an offshore service and supply firm. Among the supplies that it sells are jack-ups, semi-submersibles, drillships, and self-contained platforms.⁸³

One of the petroleum industry's main problems, aside from the legal uncertainty as to the outer limits of the Continental Shelf and regulatory restraints, is the public opinion that oil refineries and their associated facilities are among the worst polluters in America. Efforts to attract an oil refinery to the North Carolina coast, for example, have been met with much objection.⁸⁴ This objection generally has been twofold: first, it has been based on legitimate environmental concerns; and second, it has been based on the clandestine methods used by some oil promoters to circumvent the environmental issue.⁸⁵

The contribution of marine mining of minerals other than oil and gas to the world's current mineral supply is still minimal.⁸⁶ For instance, in 1967, less than \$200 million in marine products were mined directly from the ocean floor.⁸⁷ This figure is less than 0.04 per cent of the world's total mineral production then estimated at some \$700

⁸² Id.

⁸³ FT Business Publications, Oil and Petroleum International Yearbook, 1971-1972 2 (1972).

⁸⁴ The Raleigh News and Observer, OIL REFINERY IDEA QUESTIONABLE, (April 1, 1973).

⁸⁵ Id.

⁸⁶ Askevold, *supra* note 44, at 119.

⁸⁷ Id.

billion.⁸⁸ Proponents of ocean mining cite four factors that would tend to support increased investment in ocean mining:

(1) an anticipated acceleration of demand for mineral commodities resulting in an accelerating depletion of land reserves; (2) a need for strategic independence; (3) allowance for the lengthy time lag which occurs between the discovery of any mineral deposit and the mining and processing phases; and (4) the fact that certain ocean mining operations are already profitable and can compete with land based operations.⁸⁹

In general, no hard mining of practical significance is being conducted on the U.S. Continental Shelves except for sulfur, sand, gravel, and oyster shells.⁹⁰ This mining, for the most part, is pursued in shallow water by relatively small companies in response to unique local supply and demand situations.⁹¹ Sulfur, on the other hand, is mined through a drill hole, and consequently is related to petroleum in both its exploration and recovery techniques and in its economic and legal problems.⁹² Many companies are showing diverse interests in future operations due to the variety of potentially profitable situation.⁹³ Some companies are oriented solely toward entrepreneurial opportunities in ocean mining, while others are already well-established in either land mining or petroleum.⁹⁴ Existing legal arrangements are considered

⁸⁸ Id.

⁸⁹ Id. at 120.

⁹⁰ Panel Report 2, *supra* note 59, at V-29.

⁹¹ Id.

⁹² Id. at 30.

⁹³ Id.

⁹⁴ Id. at V-31.

unsatisfactory in view of today's rapidly developing technology.⁹⁵ A more secure investment climate is needed for the commitment of substantial sums to ocean mining. Present legislation has not encouraged hard rock mineral exploration and exploitation because the limits of national jurisdiction are unclear.⁹⁶ Therefore, redefinition of the Continental Shelf is a necessity for the hard mineral industry. Furthermore, to provide the investment encouragement, many commentators also feel that domestic legislation in the form of an amendment to the Outer Continental Shelf Lands Act of 1953 is required. The result they desire would be a permit free, non-exclusive prospecting arrangement, whereby prior authorization would not be required.⁹⁷

Another important ocean-oriented industry is that of oceanography. Although this field is predominately Government-sponsored, it is increasingly attracting wide-spread interest throughout the private investment sector of our economy.⁹⁸ Many of the tasks performed by the Government require electrical and related instrumentation manufactured by private industrial firms.⁹⁹ The over-all ocean market and its funding patterns were significantly altered in 1970 with the creation of the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA).¹⁰⁰ Although NOAA is expected to control

⁹⁵T.S. Ary, Implications for the Hard Mineral Industry 73 (1971).

⁹⁶Id.

⁹⁷Id.

⁹⁸Standard and Poors Industrial Survey, Electronics-Electrical: Basic Analysis E18 (1972).

⁹⁹Id.

¹⁰⁰Id.

much of the civilian marine research and resources activity of the Federal Government, to those companies that are designing, fabricating, and marketing equipment or services, the Government market will continue to be scattered in numerous departments and agencies across the country.¹⁰¹ The economic slowdown in 1970 did not affect oceanographic spending nearly so much as did this change in the Federal administrative organization.¹⁰² However, it has been reported that in 1972 the oceanic market resumed its previous characteristic rate of rapid growth.¹⁰³

2. Seabed economics

About 80% of the total domestic offshore oil supply is currently being produced from water depths of less than 100 feet.¹⁰⁴ The reasons for this slow advancement to deep waters have been primarily economic.¹⁰⁵ Analyses of offshore operations indicate that costs rise sharply with increasing water depths, and in the deeper water of the Outer Continental Shelf, costs on the average are already approaching marginal limits.¹⁰⁶ Thus, as operations move toward the edge of the shelf, only the very large and highly productive accumulations of petroleum will be economical to produce.¹⁰⁷

Existing platforms in the Gulf of Mexico cost between \$1 and \$6 million depending on water depth and distance from shore whereas site

¹⁰¹Id.

¹⁰²Id.

¹⁰³Id.

¹⁰⁴National Petroleum Council, Petroleum Resources Under the Ocean Floor 8 (1969) [hereinafter cited as Petroleum Resources].

¹⁰⁵Askevold, *supra* note 44, at 124.

¹⁰⁶Petroleum Resources, *supra* note 104, at 8.

¹⁰⁷Id. at 9.

preparation costs on land are minimal.¹⁰⁸ In addition, costs of operating over water are two to four times those on land, and offshore pipelines often result in similarly increased expenditures.¹⁰⁹ One recent analysis of the costs of producing petroleum off the coast of Louisiana indicated that present-value net profit dropped all the way to nine cents per barrel at ocean depths of 400 feet as compared to 33 cents at 100 feet and 50 cents onshore.¹¹⁰

With regard to the mining of minerals other than oil and gas, costs are also presently greater for offshore operations than for comparable land-based operations, although many offshore operations are still very profitable.¹¹¹ One area of ocean mining that is in need of important technological advances before it can in fact become profitable is that of extracting chemical constituents from sea water. As indicated earlier in this study, the gross value per cubic mile of sea water with regard to the 17 most common industrial elements is less than \$600,000.¹¹² A plant to recover these 17 elements would have to be approximately the size of the present Dow magnesium plant at Freeport, Texas which pumps some two million gallons of sea water per minute. The economic feasibility of building and operating a plant of this size to recover 17 elements having a yearly gross value of only \$600,000 is not readily apparent.¹¹³

¹⁰⁸Panel Report 2, supra note 59, at V-24.

¹⁰⁹Id.

¹¹⁰Id.

¹¹¹Askevold, supra note 44, at 124.

¹¹²Panel Report 3, supra note 11, at VII-101.

¹¹³Id.

3. Seabed technology

The technological capability of industrial petroleum development in offshore areas has been steadily increasing.¹¹⁴ The exploration capability will continue to considerably precede exploitation capability as the industry is already drilling wells in waters as deep as 1,300 feet.¹¹⁵ Platform designs have been proposed for great depths and their utilization presently appears practical for depths up to 600 feet.¹¹⁶ A few underwater well completions have been made in depths of close to 300 feet.¹¹⁷ Furthermore, it has been estimated that within less than five years, technology will allow drilling and exploration in water depths up to 1,500 feet, and within ten years this technical capability will be extended to between 4,000-6,000 feet.¹¹⁸

The hardrock mining industry is also making much technological progress.¹¹⁹ Presently, the deepest hardrock mining occurs at the 200-250 foot level.¹²⁰ It is predicted that by 1980 such mining will be extended to the 300 foot level, and by the year 2000, the technological capability to mine at 600 feet should be attained.¹²¹

B. Individual Investment

1. Oceanographic industries and the stock market

¹¹⁴Petroleum Resources, *supra* note 104, at 8.

¹¹⁵*Id.* at 7.

¹¹⁶*Id.* at 8.

¹¹⁷*Id.*

¹¹⁸*Id.*

¹¹⁹Askevold, *supra* note 44, at 136.

¹²⁰*Id.* at 137.

¹²¹*Id.*

Many ocean industries in areas of advanced technology are not fully understood by the investing public.¹²² Nevertheless, their ocean-related concepts of profitability are sound, and the investment community has been intrigued greatly by ocean endeavors.¹²³ This enthusiasm has been indicated by considerable publicity and advertising in both the popular press and business journals.¹²⁴ Additionally, two ocean mutual funds were created in 1968, and numerous symposia and publications have been sponsored by brokerage houses.¹²⁵ Thus, despite certain economic risks, capital has not been lacking to finance current industrial ocean projects. Furthermore, it is anticipated that capital will remain available for projects judged by the investment community as having high profit potential.¹²⁶

The stockmarket, however, has continued to puzzle and plague investors with its erratic behavior. Numerous companies are reporting higher first quarter earnings than ever, only to see their listed stock down from 1-51% since January 1973.¹²⁷ Pollution control stocks, on the average, are down some 28.3% from their record high attained only four months ago.¹²⁸ Offshore drilling stocks have registered a net loss

¹²²Panel Report 2, *supra* note 59, at V-9.

¹²³Id.

¹²⁴Id.

¹²⁵Id.

¹²⁶Id.

¹²⁷U.S. News and World Report, NERVOUS MARKET: THE REASONS, 73 (May 7, 1973).

¹²⁸Id.

of 23.5%,¹²⁹ while natural-gas pipeline stocks have not fared much better by suffering a 14.4% decrease in price.¹³⁰ Additionally, oil machinery and service companies have plummeted 8.5%,¹³¹ and the copper industry on the whole has seen its stocks dip 3.1%.¹³² In fact, the only oceanography-oriented securities that have shown gains are international oils which are up 6.5%,¹³³ and gold-mining which is up a striking 55.5%.¹³⁴

2. Oceanography-oriented mutual funds

To date, two mutual funds are in existence which list their investment objectives as that of investing in "companies which are engaged in the supply, research, development or marketing of products components and services related to the ocean environment."¹³⁵ These two mutual funds are Oceanographic Fund, Incorporated and Ocean Technology Fund, Incorporated. Both are "no-load" funds with the former having its general headquarters in Jersey City, New Jersey, and the latter having its principal offices in Detroit, Michigan.

Oceanographic Fund, Inc. lists its common stock holdings as 86.4% of its entire investment portfolio as of June 30, 1972.¹³⁶ Its

¹²⁹Id.

¹³⁰Id.

¹³¹Id.

¹³²Id.

¹³³Id.

¹³⁴Id.

¹³⁵Oceanographic Fund, Incorporated, Prospectus 4 (Dec. 27, 1972) [hereinafter cited as Oceanographic].

¹³⁶Id. at 13.

apportionment of common stock holdings in relation to industry-types is as follows:

(1) Electronics and instrumentation	6.5%
(2) Offshore drilling, exploration and services	6.97%
(3) Offshore oil and gas	17.58%
(4) Recreation	12.22%
(5) Shipbuilding and repair	6.47%
(6) Shipping	6.48%
(7) Water treatment and environmental control	5.28%
(8) Diversified oceanographic	15.39%
(9) Non-oceanographic	8.37% ¹³⁷

As of June 30, 1972, the total net assets of the fund were \$16,567,020.¹³⁸ Ocean Technology Fund, Inc. is a much smaller mutual fund, as its total net assets at approximately the same date were only \$2,729,250.¹³⁹ Furthermore, unlike its larger counterpart, Ocean Technology Fund's entire investment portfolio consists of common stocks. Its breakdown by industry-type is as follows:

(1) Environmental	4.2%
(2) Instrumentation	4.8%
(3) Offshore equipment and supplies	33.5%
(4) Offshore exploration and drilling	15.4%

¹³⁷Id. at 13 and 14.

¹³⁸Id. at 15.

¹³⁹Ocean Technology Fund, Incorporated, Prospectus 19 (Aug. 31, 1972).

	24
(5) Seafood products	23.6%
(6) Shipbuilding and transportation	4.7%
(7) Miscellaneous	13.8% ¹⁴⁰

In comparing the investment portfolios of these two funds it is interesting to note their tendency to favor the securities of offshore-oriented companies. This industry-type comprises over 24% of Oceanographic Fund's security investment portfolio and 38.9% of Ocean Technology Fund's entire investment portfolio. The other areas of major interest for these two funds appear to be recreation and seafood products. Oceanographic Fund's investment in the former totals 12.22% of its common stock holdings, while its investment in the latter is categorized in its prospectus as "diversified oceanographic" and represents 15.39%. On the other hand, Ocean Technology Fund's prospectus does not indicate any investments in recreational securities but does list an investment in seafood products' securities which comprises 23.6% of its overall investment portfolio.

While Ocean Technology Fund is not listed or reported on by any major stock exchange, Oceanographic Fund is and, therefore, its performance can be easily charted. On June 30, 1972, its net asset per share was \$8.20.¹⁴¹ By May 9, 1973, its net asset per share was listed at \$6.76.¹⁴² Furthermore, the 1971 annual growth rate of the fund was 17.5% as compared to a 1972 annual growth rate of only 8.8%.¹⁴³

¹⁴⁰ Id. at 21.

¹⁴¹ Oceanographic, *supra* note 135, at 15.

¹⁴² The Wall Street Journal (May 9, 1973).

¹⁴³ P. Johnston, ed., Investment Companies: Mutual Funds and Other Types 3 and 11 (1972).

Additionally, the return per share from January 30, 1972 to September 30, 1972 was .9% as compared to a zero return from September 30, 1972 to December 31, 1972.¹⁴⁴

Emphasis must be placed on the fact that the decline in net earnings and earnings per share of Oceanographic Fund cannot be solely attributed to its ocean-oriented investments, as mutual funds, on the whole, have been on a rather steep decline since 1970.¹⁴⁵

C. Public Investment

1. Federal policy and goals

The benefits which the United States seeks from its use of the seas include: "(1) production of wealth, (2) maintenance of national security, (3) acquisition of knowledge, (4) promotion of public and private welfare, and (5) advancement of world community interests."¹⁴⁶ Today, the U.S. Government is well aware of the eventual need for new mineral resources. The Continental Shelf, now being mined, has hardly been explored, and the extent of the resources that lie there can only be guessed.¹⁴⁷ The United States, although desiring that its Continental Shelf resources be exploited, also wishes that the exploitation be economical and orderly with some concern for conservation and minimizing the likelihood of international disputes.¹⁴⁸

¹⁴⁴Id. at 11 and 19.

¹⁴⁵Id. at 20.

¹⁴⁶Alexander, NATIONAL JURISDICTION AND THE USE OF THE SEA, 8 Nat. R.J. 373-75 (1968).

¹⁴⁷Henkin, *supra* note 26, at 4.

¹⁴⁸Id. at 10.

The energy crisis is particularly acute and was the subject of President Nixon's April 18, 1973 address to Congress.¹⁴⁹ As previously discussed, the purpose of this message was to encourage and increase Outer Continental Shelf development and exploitation of oil and gas reserves.¹⁵⁰ To accomplish this goal, the President proposed both that Congress initiate certain investment credits and retain the existing oil depletion allowance, and that the Secretary of the Interior take appropriate steps to ensure that the annual acreage leased on the Outer Continental Shelf is tripled by 1979.¹⁵¹ Although some people may object to these proposals, the fact to bear in mind is that the various interests of the United States do not always point in the same direction. Difficult choices have been and must continue to be made between intermediate and long-term interests, on the one hand, and competing public and private interests on the other.¹⁵²

The basic ocean policy of the Federal Government is contained in two legislative acts: The Marine Resources and Engineering Development Act of 1966, and the Federal Coastal Zone Management Act of 1972. The declaration of policy and objectives of the Marine Resources and Engineering Development Act as contained in Section 2(a) is as follows:

It is hereby declared to be the policy of the United States to develop, encourage, and maintain a coordinated, comprehensive, and long-range national program in marine science for the benefit of mankind to assist in protection of health and property,

¹⁴⁹Blueprint, supra note 40, at 73.

¹⁵⁰Id.

¹⁵¹Id.

¹⁵²Henkin, supra note 26, at 11.

enhancement of commerce, transportation, and national security, rehabilitation of our commercial fisheries, and increased utilization of other resources.¹⁵³

In view of this basic ocean policy, in the late 1960's four major studies were undertaken at the Federal level that focused on the utilization of our coastal resources: A Plan for the Multiple Use of the Coastal Zone; Our Nation and the Sea; The Estuarine Pollution Study; and the National Estuary Study.¹⁵⁴ In these studies, the nature of the nation's coastal resources was discussed in detail, major threats to them were identified, and recommendations were made on possible approaches to eliminate the threats.¹⁵⁵ Furthermore, while differing on specific recommendations, these projects saw the states as the key managerial units for any coastal resource program.¹⁵⁶ The Federal Government's role was viewed mainly as that of providing technical and financial assistance to the states.¹⁵⁷

On October 28, 1972, President Nixon signed the Coastal Zone Management Act of 1972.¹⁵⁸ If the Act is properly funded and enforced, coastal states will be encouraged to develop mechanisms for the future planning and management of their respective coastlines.¹⁵⁹ Under the Act

¹⁵³Public Law 89-154, 89th Congress, Section 944, June 17, 1966.

¹⁵⁴E.H. Bradley, Jr. and J.M. Armstrong, A Description and Analysis of Coastal Zone and Shoreland Management Programs in the United States 21 (1972) [hereinafter cited as Coastal Zone Analysis].

¹⁵⁵Id.

¹⁵⁶Id. at ix.

¹⁵⁷Id.

¹⁵⁸Pub. L. 92-583, Oct. 27, 1972, 86 Stat. 1280.

¹⁵⁹Hershman, THE FEDERAL COASTAL ZONE MANAGEMENT ACT OF 1972, LCL Report 8 at 1 (1972) [hereinafter cited as LCL Report 8].

State governments are focal point for coastal zone management.¹⁶⁰

The states will be assisted in their work by Federal grants. These grants will come in two stages: initial grants will be available to assist the states in developing their respective management programs; and shortly thereafter, further grants will be made available to help administer these programs.¹⁶¹

The Federal administrative organization heading the Act is the NOAA,¹⁶² which has replaced the pre-existing Commission on Marine Science, Engineering and Resources.¹⁶³ The NOAA is an agency within the Department of Commerce, thus permitting full coordination with certain ocean research efforts such as the National Sea Grant Program.¹⁶⁴

2. Federal public investment

Federal public investment can be categorized as follows:

(1) Government sponsored research and development; (2) Governmental supporting services; and (3) Governmental leasing and royalty revenue.

The first category, Government sponsored research and development (R&D) can be further subdivided into marine science R&D and marine technology R&D. The Federal Government spends some \$150 million per year on marine research.¹⁶⁵ The U.S. Department of Defense, primarily

¹⁶⁰ Id. at 2.

¹⁶¹ Id.

¹⁶² Id.

¹⁶³ President Nixon's Annual Report to Congress, The Federal Ocean Program 7 (1972) [hereinafter cited as Ocean Program].

¹⁶⁴ LCL Report 8, *supra* note 159, at 2.

¹⁶⁵ Our Nation and the Sea, *supra* note 32, at 23.

through the U.S. Navy, accounts for approximately one third of this total.¹⁶⁶ The other major funding agency is the Department of Commerce through NOAA.¹⁶⁷ Some 85 U.S. Government laboratories exist along the coasts and Great Lakes.¹⁶⁸ These laboratories form a valuable component of the national capability in marine science. Additionally, numerous other NOAA projects are in progress.

Another very important program in support of marine science is that sponsored under the National Sea Grant Colleges and Programs Act of 1966 which was originally administered by NSF.¹⁶⁹ The Sea Grant Program, today under the guidance of NOAA, provides support for marine research in areas not covered by the Navy or other NOAA programs.¹⁷⁰

While science aids in our understanding of the oceans, technology provides methods for their expanded utilization.¹⁷¹ Contributions to marine technology have come from the individual, industrial, educational, and governmental segments of our society.¹⁷² Of the private contributors the industrial sector has done the most to develop civil marine technology.¹⁷³ The Federal Government's role, apart from that of the Navy and NOAA has been modest. Federal agencies have supported technological development generally through their contacts with industry and academic

¹⁶⁶ Id.

¹⁶⁷ Ocean Program, *supra* note 163, at 105.

¹⁶⁸ Our Nation and the Sea, *supra* note 32, at 25.

¹⁶⁹ N.J. Padelford, Public Policy for the Seas 26 (1970) [hereinafter cited as Padelford].

¹⁷⁰ 1970 Reorg. Plan No. 4, Section 1(d), eff. Oct. 3, 1970, 35 Fed. Reg. 15627, 84 Stat. 2090.

¹⁷¹ Our Nation and the Sea, *supra* note 32, at 30.

¹⁷² Id. at 33.

¹⁷³ Id.

institutions, although some technological development has taken place in Federal laboratories.¹⁷⁵ Until recently, most of the development that has taken place at the Federal level has been mission-oriented and thus not very comprehensive.¹⁷⁶ With the advent of NOAA this situation is being corrected and it is hoped that there will be more interagency coordination of marine R&D activities at the policy level.¹⁷⁷ The proposed Fiscal Year 1973 budget of \$672 million, for the nation's entire Federal Ocean Program, represents an increase of some \$60 million over Fiscal Year 1972.¹⁷⁸ The increase in specific areas of marine science activity funding are as follows: coastal zone development - 195%; oceanographic research - 66%; and nonliving resources - 90%.¹⁷⁹ Prospective federal fiscal retrenchment may substantially curtail such expenditures in Fiscal Year 1974.

The Federal Government also provides many supportive services directly and indirectly affecting ocean industries other than the aforementioned R&D services.¹⁸⁰ Such services include the weather forecasting and charting operations of the Environmental Science Services Administration (ESSA), the maintenance of navigable waterways by the Corps of Engineers, and the life and property protection services of the U.S. Coast Guard.¹⁸¹ Furthermore, the U.S. Department of Interior,

¹⁷⁴Id.

¹⁷⁵Id.

¹⁷⁶Id.

¹⁷⁷Ocean Program, *supra* note 163, at 7.

¹⁷⁸Id. at 9.

¹⁷⁹Id.

¹⁸⁰Panel Report 2, *supra* note 59, at V-13.

¹⁸¹Id. at 14.

through its various agencies, offers numerous investment-oriented services to industrial concerns. For example, the Geological Survey is responsible for investigations to provide companies information with regard to the exploration and exploitation of mineral resources located in marine environments. The Geological Survey has assumed this duty in connection with its overall responsibility for managing the resources of the Outer Continental Shelf.¹⁸² In connection with these same resources, the Bureau of Land Management has assumed the administrative duties involved. Its primary function is to administer the leasing of Outer Continental Shelf lands to private industrial concerns.¹⁸³ And finally, the Bureau of Mines' main objective, in this regard, is that of fostering the growth of the U.S. marine mining industry.¹⁸⁴

Under Section 8 of the Outer Continental Shelf Lands Act of 1953, the Secretary of Interior has explicit authority to grant oil and gas leases in the areas of the Continental Shelf not reserved to the states under the Submerged Lands Act of 1953.¹⁸⁵ By 1970, bonus revenues to the U.S. Government from some 1,300 oil and gas leases on the Outer Continental Shelf had totaled approximately \$3 billion.¹⁸⁶ In addition to this source of revenue, the 4,000 oil and gas wells presently producing

¹⁸² Id.

¹⁸³ Commission on Marine Science, Engineering and Resources, Science and Environment III-84 (1969) [hereinafter cited as Panel Report I].

¹⁸⁴ Id.

¹⁸⁵ 67 Stat. 462 (1952), 43 U.S.C. Section 1337 [hereinafter cited as Outer Continental Shelf Lands Act].

¹⁸⁶ M. Baldwin and J. Page, ed., Law and the Environment 13 (1970) [hereinafter cited as Baldwin].

on these leased areas provide a steady source of annual royalties to the Federal Government.¹⁸⁷ Furthermore, it is estimated that in this fiscal year alone, the Outer Continental Shelf will produce more than \$4 billion in revenues for the Government.¹⁸⁸

3. State public investment

The State public investment in marine-oriented activities, aside from funding numerous local agencies, has been primarily in coastal zone management endeavors. Alabama's state program spending for protection, conservation, and research activities in the coastal zone area is approximately \$300,000 annually.¹⁸⁹ Louisiana's program spending is geared to a much more extensive research program and is consequently \$1 million per annum.¹⁹⁰ In Mississippi, the Gulf Coast Research Laboratory is responsible for research and the Mississippi Marine Conservation Commission for leasing of offshore bottoms and estuarine conservation. The annual expenditure of the above two agencies is approximately \$500,000, 75% of which is allocated to research.¹⁹¹ To date, the Gulf Coast states have the highest annual expenditures for marine-related activities. However, with the nationwide trend toward passage of coastal zone management legislation, the Pacific Coast and Atlantic Coast states could very shortly close the gap.

¹⁸⁷ Id.

¹⁸⁸ Fortune Magazine, AN ANNUAL REPORT FOR THE FEDERAL GOVERNMENT, at page 2 (May, 1973).

¹⁸⁹ Panel Report 1, supra note 183, at III-170.

¹⁹⁰ Id. at III-172.

¹⁹¹ Id. at III-174.

IV. AN OVERVIEW OF THE NATIONWIDE LAWS AND REGULATIONS AFFECTING
INVESTMENT IN MINERAL RESOURCES OF THE UNITED STATES'
CONTINENTAL SHELVES

A. Federal Regulation

1. Federal power as a limit upon State control of marine
resources

Prior to 1945, each coastal state had complete sovereignty over the Continental Shelf adjacent to its respective shoreline. The Federal Government condoned this attitude and refused to issue mineral leases off the coast.¹⁹² Then, in 1945, the Federal Government reversed its position, bringing legal action to quiet its title to lands within the 3 mile limit off the California Coast.¹⁹³ As for the area past the 3 mile limit, the Truman Proclamation claimed Federal ownership of the seabed.¹⁹⁴ Consequently, the natural resources of the subsoil and the seabed were placed under the administrative jurisdiction of the Secretary of the Interior.¹⁹⁵

In a series of decisions: United States v. California, 332 U.S. 19 (1947); United States v. Texas and United States v. Louisiana, 339 U.S. 699 (1950); the Supreme Court confirmed title of the United States to the bed of the Continental Shelf beyond the line of mean low tide.¹⁹⁶ However, on May 22, 1953, Congress upset this Federal ownership

¹⁹²Baldwin, *supra* note 186, at 233.

¹⁹³Id.

¹⁹⁴Stone, UNITED STATES LEGISLATION RELATING TO THE CONTINENTAL SHELF, 17 Int'l and Comp. L.Q. 107 (1968) [hereinafter cited as Stone].

¹⁹⁵Baldwin, *supra* note 186, at 233.

¹⁹⁶Id.

by giving away a large part of the Continental Shelf to the states under the Submerged Lands Act.¹⁹⁷ Essentially, the Act gave the states title to the bed of the territorial sea within their boundaries up to 3 miles in the Atlantic and Pacific Oceans and 3 leagues or 10.5 miles in the Gulf of Mexico.¹⁹⁸ Additionally, the rights of the United States, seaward, were preserved.¹⁹⁹

Subsequently, in United States v. Louisiana, 363 U.S. 1 (1960), and United States v. Florida, 363 U.S. 121 (1960), the Gulf boundaries were reset at 9 miles for Texas and Florida, on one hand, and 3 miles for Louisiana, Mississippi and Alabama on the other.²⁰⁰ On December 14, 1971, the United States Supreme Court denied a Louisiana motion to reconsider its 1960 decision.²⁰¹ This denial left intact the prior ruling that Louisiana had only a 3 mile boundary in the Gulf.²⁰² On the same date, the Federal Government made a motion to withdraw funds from an escrow account previously created in connection with these boundary disputes.²⁰³ Subsequently, on December 20, the Supreme Court granted this Federal motion.²⁰⁴ In general, these two U.S. Supreme Court decisions have the practical effect of giving the Federal Government title to the disputed submerged lands located off the western half of Louisiana's

¹⁹⁷ 67 Stat. 29, 43 U.S.C. Secs. 1301-1315 (1953).

¹⁹⁸ Stone, *supra* note 194, at 105.

¹⁹⁹ Id.

²⁰⁰ Baldwin, *supra* note 186, at 233.

²⁰¹ Hershman, GEOMORPHOLOGICALLY SPEAKING, LCL Report 3 at 3 (1972).

²⁰² Id.

²⁰³ Id.

²⁰⁴ Id.

coastline.²⁰⁵

Another series of opinions construing the Submerged Lands Act, was handed down by the U.S. Supreme Court in December, 1967. In United States v. Louisiana, et al., 389 U.S. 155, the question was whether Texas, whose boundary had been recognized by the Court in 1960 as extending 3 leagues into the Gulf, was entitled to measure the 3 leagues from the outer edge of artificial jetties or was limited to 3 leagues Gulfward from its natural shoreline as it existed in 1845 when she was admitted to the Union.²⁰⁶ The Court reasoned that since Texas claimed and had been recognized to be qualified for the 3 league grant, as distinguished from the 3 geographical mile grant, the base line from which to measure its Gulfward boundary was its historical boundary as it existed upon her admittance to the Union because the 3 league grant was keyed to that date and the artificial jetties were not in existence at that date.²⁰⁷

Also of general interest is United States v. Ray, et al., 281 F.S. 876 (1965), which involved the assertion by certain parties of the right to erect a resort structure on reefs and islands located, about 10 miles off the coast of Florida, without obtaining the proper permit from the U.S. Corps of Engineers.²⁰⁸ The defendants had applied for a permit and were denied one.²⁰⁹ Nonetheless, they proceeded to dredge and fill in one of the reefs.²¹⁰ The U.S. sought a preliminary injunction

²⁰⁵ Id.

²⁰⁶ Stone, THE MARINE ENVIRONMENT - RECENT LEGAL DEVELOPMENTS, 2(1) Nat. R.L. 27 (1969) [hereinafter cited as Marine Environment].

²⁰⁷ Id.

²⁰⁸ Id. at 30.

²⁰⁹ Id.

²¹⁰ Id.

which in turn was granted in a judgement by the Court which stated that the authority of the Secretary of the Army to prevent obstruction to navigation in the navigable waters of the United States extended to any artificial islands and fixed structures that might be erected on the Outer Continental Shelf.²¹¹

2. Federal pollution control

Major Federal pollution control legislation relating to the Continental Shelves is designed to prevent the spilling of oil and oily substances. Public awareness of the numerous environmental problems related to oil spills was intensified by the widely publicized Santa Barbara Oil Spill of 1969. The magnitude of this spill in the Santa Barbara Channel has been estimated by one expert to have amounted to 3,250,000 gallons of oil.²¹² The immediate damage assessments were not so grave. The Federal Water Pollution Control Administration (FWPCA) indicated no fish kills, reasonably healthy kelp beds, and no appreciable damage to planktonic and intertidal plants.²¹³ Furthermore, the view of the California Department of Fish and Game was similar.²¹⁴ However, these immediate damage assessments were somewhat misleading as later damage to marine mammals on San Miguel Island was noted by Life Magazine.²¹⁵ Likewise, the FWPCA later assessed bird damage to be severe.²¹⁶

²¹¹Id.

²¹²Baldwin, supra note 186, at 8.

²¹³Id. at 9.

²¹⁴Id.

²¹⁵Id.

²¹⁶Id.

Long-term damage from this oil spill was hard to estimate but believed to be potentially serious because of the complexity and individual characteristics of crude oil.²¹⁷ Damage could result by virtue of the fact that hydrocarbons in petroleum are highly stable in marine organisms, thereby passing through the food chain with little alteration.²¹⁸ Furthermore, these hydrocarbons may not only be retained but can actually be concentrated in the marine food chain to a point where toxic levels may be reached. The result can be irreversible damage to marine organisms, to the marine food chain itself, and eventual destruction of the yield and value of the food which we hope to recover from the sea.²¹⁹

Major U.S. oil pollution legislation dates back to the Oil Pollution Act of 1924.²²⁰ This Act prohibited the discharge of oil from a vessel into the navigable territorial seas and inland waters.²²¹ The Act, however, was considered practically worthless as "discharge" was defined to mean a willful or grossly negligent act.²²²

In 1965, Congress passed an amendment to the Federal Water Pollution Control Act of 1948 which was designated the Water Quality Act and designed to establish a national policy for the prevention, control, and abatement of water pollution.²²³ The FWPCA, which has administered

²¹⁷ Id. at 10.

²¹⁸ Id.

²¹⁹ Id.

²²⁰ 43 Stat. 604-606, 33 U.S.C. 431-437; repealed by Pub. L. 91-224, Ap. 3, 1970, 84 Stat. 113.

²²¹ Id. at Section 433.

²²² Padelford, *supra* note 169, at 211.

²²³ 62 Stat. 1155 as amended by Pub. L. 89-234, Oct. 2, 1965, 79 Stat. 903.

the Act since its inception, was transferred from HEW to the Department of Interior.²²⁴ The major deficiency of this legislation is that it specifically deals with vessels and oil pollution in navigable waters without mention of or application to offshore oil rigs.²²⁵

The Water Quality Improvement Act of 1970²²⁶ specifically applies to oil and gas rig pollution, but does not affect offshore operations beyond the 3 mile limit.²²⁷ Within the 3 mile limit, any applicant for a Federal license must provide certification to the State in whose waters discharge would originate that there is reasonable assurance that such activity will be conducted in a manner that will not be violative of the applicable water quality standards.²²⁸ Furthermore, the Act makes the owner or operator of any such offshore facility absolutely liable up to an amount of \$8 million (barring Act of God, war, negligence of the United States, or act of a third party) for costs incurred by the United States in cleaning up discharge in U.S. navigable waters and adjoining shorelines.²²⁹ With regard to negligent discharges, no liability limitation exists.²³⁰ Of additional interest is the fact that cleanup costs can be recovered from the United States if the owner or operator of the offshore facility can show, in an action before the

²²⁴1966 Reorg. Plan No. 2, eff. May 10, 1966, 31 Feb. Reg. 6857, 80 Stat. 1608.

²²⁵Baldwin, supra note 186, at 26.

²²⁶Pub. L. 91-224, Section 21 (b) (1), April 3, 1970.

²²⁷Baldwin, supra note 186, at 37.

²²⁸Id.

²²⁹Id.

²³⁰Id.

U.S. Court of Claims, that he or she was not responsible for the claim.²³¹

The Federal Water Pollution Control Act Amendments of 1972 supercede many of the provisions of the 1948 Act as amended in 1965.²³² The amended Act, which is to be administered by EPA, has set as a national goal the elimination of the discharge of pollutants into all U.S. navigable waters by 1985.²³³ Within the Act there is a listing of toxic pollutants and a subsequent prohibition against their discharge.²³⁴ If such pollutants are in fact discharged, certain provisions make the responsible parties liable for their cleanup.²³⁵ Another important provision of the Act authorizes citizen suits against either the violators of the Act or the EPA for dereliction of its enforcement responsibilities.²³⁶

The Marine Protection, Research and Sanctuaries Act of 1972, commonly referred to as the "Ocean Dumping Act," established a new permit system for the dumping of waste materials other than oil in areas designated as marine sanctuaries.²³⁷ The Act, which is administered by the Secretary of Commerce, provides that no permit, license, or other authorization shall be granted with relation to such activities unless

²³¹ Id.

²³² Smith, NEW ENVIRONMENTAL LAW ISSUE, LCL Report 9 at 1 (1973) [hereinafter cited as LCL Report 9]. Pub. L. 92-500, Oct. 18, 1972, 86 Stat. 816.

²³³ Id.; 33 U.S.C.A. 1251 (a) (1).

²³⁴ Id.

²³⁵ 33 U.S.C.A. 1321 (b) and (1).

²³⁶ LCL Report 9, supra note 232, at 1; 33 U.S.C.A. 1365.

²³⁷ Id. at 3; Pub. L. 92-532, Oct. 23, 1972, 86 stat. 1061.

the Secretary first certifies that they are in harmony with the purposes of this legislation.²³⁸ Both EPA and the Corps of Engineers are empowered to issue regulations and to establish conditions for the issuance of such permits.²³⁹ Of additional importance is another provision which allows the Secretary to designate marine sanctuaries that he determines necessary for the purpose of preserving or restoring certain areas for their conservation, ecological, recreation, or esthetic values.²⁴⁰ The Act has set \$10 million aside for such future acquisitions.²⁴¹

3. Federal mining regulations

In the Outer Continental Shelf Lands Act of August 7, 1953, Congress arranged for Federal administration of the Shelf seaward of the 3 mile limit.²⁴² In general, state laws were adopted as Federal law for the Outer Continental Shelf opposite each state. These state laws were, however, to be administered by Federal officials and courts, and were not to be a basis for any state claim of interest or jurisdiction in the Outer Continental Shelves.²⁴³

Under Section 5 of the Act, the Secretary of Interior may prescribe and amend such rules and regulations as he determines to be necessary and proper in order to provide for conservation of the natural

²³⁸16 U.S.C.A. 1432 (f).

²³⁹LCL Report 9, supra note 232, at 3 and 4.

²⁴⁰16 U.S.C.A. 1432 (a).

²⁴¹16 U.S.C.A. 1434.

²⁴²Outer Continental Shelf Lands Act, supra note 185.

²⁴³Baldwin, supra note 186, at 233 and 234.

resources on the Outer Continental Shelf.²⁴⁴ Although the Act requires no public hearing before making such rules and regulations, there is a general requirement that the rules be published in the Federal Register 30 days before their effective date and that interested persons have the opportunity to petition for the issuance, amendment, or repeal of the rule.²⁴⁵

The Interior Secretary is given explicit authority to grant mineral leases in Section 8 of the Act.²⁴⁶ Additionally, he has the authority to cancel leases, subject to the right of judicial review, but only if such leases are "non-producing."²⁴⁷ Producing leases, on the other hand, may be cancelled only after an appropriate proceeding in the U.S. District Court whereby it is shown that the owner or operator has failed to comply with one of the following: (1) the provisions of the Outer Continental Shelf Lands Act; (2) the lease agreement; (3) or the regulations in force and effect on the date of the issuance of the lease.²⁴⁸

The Secretary has divided authority between the Bureau of Land Management (BLM) and the U.S. Geological Survey (USGS) to supervise and regulate actual operations on Outer Continental Shelf lands.²⁴⁹ Leasing

²⁴⁴Id. at 19.

²⁴⁵Id.

²⁴⁶Dole, OCEAN MINERALS AND THE LAW, 2(1) Nat. R.L. 357 (1969) [hereinafter cited as Dole].

²⁴⁷Baldwin, supra note 186, at 19.

²⁴⁸Id.

²⁴⁹R. Slovenko, ed., Oil and Gas Operations: Legal Considerations in the Tidelands and on Land 228 (1963).

procedures followed by BLM and USGS prior to the 1969 Santa Barbara Oil Spill did not provide for either public hearings or any evaluation by the Department of Interior of other non-mineral uses of marine resources.²⁵⁰ The exact procedural steps for oil and gas leasing in force at this time can be summarized in the following manner. First, the exploratory phase began once an oil company obtained a letter from USGS permitting data gathering on oil and gas deposits by seismic surveys and drill core sampling.²⁵¹ The company next indicated its interest in particular areas of the shelf by requesting that the Interior Secretary offer them for public lease.²⁵² USGS and BLM then analyzed the request and jointly recommended that the Department of Interior either make a lease sale or refrain from doing so.²⁵³ If such a lease sale was recommended, and the Secretary subsequently agreed to it, BLM would prepare leasing maps of the areas to be sold.²⁵⁴ Notice of map availability would accordingly be published in the Federal Register.²⁵⁵ Soon thereafter, BLM would issue a call for nomination of units that companies might wish to have offered for lease sale, and oil and gas companies would correspondingly nominate such areas by notifying the USGS Region Supervisor.²⁵⁶ BLM would then publish notice of the lease sale in the Federal Register.²⁵⁷

²⁵⁰Baldwin, supra note 186, at 19.

²⁵¹Id.

²⁵²Panel Report 2, supra note 59, at V-31.

²⁵³Baldwin, supra note 186, at 19.

²⁵⁴Id.

²⁵⁵Id.

²⁵⁶Id. at 20.

²⁵⁷Id.

At the sale, the oil and gas companies would submit sealed bids for the tracts offered. BLM, as executor of the lease, would make the award to the highest qualified bidder, with the lease being for five years or as long thereafter as oil or gas is produced on the land tract.²⁵⁸ A drill plan of the oil company would subsequently be forwarded to the USGS Regional Supervisor for approval along with information from the exploratory drilling operations. Finally, after discovery, a development plan was to be submitted to, and approved, by USGS.²⁵⁹

On August 22, 1969, after the Santa Barbara Oil Spill, the Department of Interior published new regulatory information policies requiring submission by oil companies of certain structural interpretations as well as other raw data before commencement of the exploratory phase.²⁶⁰ These new regulations also required BLM to request USGS to prepare reports on the mineral resources of all areas initially considered for mineral leasing.²⁶¹ Furthermore, after the leasing program was actually decided upon and prior to the final selection of the leasing tracts, BLM was required to carefully evaluate the potential effect of the leasing program on the total environment and its resources.²⁶² At this time the BLM Director could hold public hearings and consult with state agencies, organizations, and individuals to aid in his

²⁵⁸ Id.

²⁵⁹ Id.

²⁶⁰ Id. at 33.

²⁶¹ Id. at 34.

²⁶² Id.

aforementioned evaluations and determinations.²⁶³ Thereupon, the Director alone was charged with developing special leasing stipulations to protect the environment which were to be published in the Federal Register at least 30 days prior to the lease sale.²⁶⁴

In a 1972 case, Natural Resource Defense Council v. Morton, 337 F. Supp. 165, affirmed 458 F. 2d 827, conservation groups alleged that the Environmental Impact Statement filed by the Interior Department prior to its proposed leasing of approximately 380,000 acres of shelf lands off the Louisiana Coast for oil and gas exploration was inadequate.²⁶⁵ A preliminary injunction had been granted by the District Court pending completion of an adequate impact statement.²⁶⁶ The Court of Appeals, in affirming the District Court, stated that the Interior Department should have more thoroughly considered the potential alternatives to the proposed lease sale regardless of whether or not such alternatives might be under their direct control.²⁶⁷

The U.S. Corps of Engineers also has jurisdiction over certain aspects of offshore mineral exploration. Section 4(6) of the Outer Continental Shelf Lands Act specifies the authority of the Secretary of the Army over offshore oil rigs.²⁶⁸ Basically, he has the power to prevent obstruction to navigation in navigable U.S. waters, which includes

²⁶³ Id.

²⁶⁴ Id.

²⁶⁵ LCL Report 9, supra note 232, at 5.

²⁶⁶ Id.

²⁶⁷ Id.

²⁶⁸ Outer Continental Shelf Lands Act, supra note 185.

artificial islands and fixed structures located on the Outer Continental Shelf.²⁶⁹ Therefore, once a lessee desires to begin drilling, a permit for platform construction must be obtained from the Army Corps of Engineers. Regulations for the granting of such construction permits were once based solely on the navigational effects of the proposed project.²⁷⁰ However, in 1967, the grounds for denying a permit were broadened to include the effects of the activity on the public interest in water quality, pollution, and preservation of natural resources.²⁷¹

B. State Regulation

1. State governmental framework

In order to accurately describe the state administrative framework relating to the mineral resources of the U.S. Continental Shelves it is necessary to examine, from a functional perspective, the various local agencies that are connected with the coastal zone. For this purpose, the state of Louisiana serves as a good model. Two of the primary agencies dealing with Louisiana's coastal zone are the State Mineral Board and the Conservation Department.²⁷² These two agencies have jurisdiction over all mineral resources in the coastal zone areas.²⁷³ The State Mineral Board leases submerged lands for the production and development of these mineral resources, and additionally, supervises

²⁶⁹ Marine Environment, *supra* note 205, at 30.

²⁷⁰ Baldwin, *supra* note 186, at 27.

²⁷¹ *Id.* at 28.

²⁷² Louisiana Advisory Commission on Coastal and Marine Resources, Louisiana Government and the Coastal Zone - 1972 30 (1972) [hereinafter cited as Advisory Commission]. The administrative authority of these agencies may have been altered prior to or during the 1973 legislative session.

²⁷³

Id.

these leases once they come into effect.²⁷⁴ The Conservation Department creates and enforces administrative policy relating to the oil and gas conservation laws.²⁷⁵

The Department of Public Works is another agency that has a primary role with respect to resource management in the coastal zone. The major function of the Department, in this regard, is to support and provide engineering services for all public works and water resources development within the region.²⁷⁶

Many local agencies are connected with Louisiana's overall pollution control effort. As previously mentioned, the Department of Conservation has jurisdiction over water pollution that is caused by oil operations.²⁷⁷ The state's other principal pollution control agencies are the Air Control Commission and the Stream Control Commission.²⁷⁸ The latter has assumed primary responsibility for the state's water pollution control effort, especially as it relates to discharges from industrial sources.²⁷⁹ The Department of Health has jurisdiction over water pollution that has health implications, such as sewage,²⁸⁰ and pollution from radiation sources is regulated by the Division of Radiation Control of the Board of Nuclear Energy.²⁸¹

²⁷⁴ Id.

²⁷⁵ Id.

²⁷⁶ Id. at 31.

²⁷⁷ Id.

²⁷⁸ Id. at 35.

²⁷⁹ Id. at 31.

²⁸⁰ Id. at 31.

²⁸¹ Id. at 32.

In addition to its major agencies having responsibility over the coastal zone, Louisiana has created limited-purpose offices and commissions with similar duties.²⁸² Of special interest is the Louisiana Coastal Commission which works closely with the State Department of Public Works and the U.S. Army Corps of Engineers. The Commission has ultimately planned to construct an ocean-going ship channel some 40 feet deep and 400 feet wide across the southern portion of the state.²⁸³

In order to more fully understand the regulatory roles of the state agencies that operate in the coastal zone, it is necessary to further examine them in the context of their relationships with various Federal agencies. Louisiana's pollution control agencies work closely with the EPA in implementing Federal laws and regulations for air and water pollution control.²⁸⁴ Likewise, both the Department of Conservation and the Mineral Board enjoy a close association with various Interior Department agencies in connection with the leasing of submerged lands for the exploration and development of minerals.²⁸⁵ In general, most of the previously mentioned state agencies do have relationships with their Federal counterparts that can range anywhere from a highly structured and legally defined connection to mere periodic cooperation.

2. State coastal zone management legislation

The first programs related to the coastal zone that were

²⁸²Id. at 33.

²⁸³Id. at 67 and 68.

²⁸⁴Id. at 35.

²⁸⁵Id. at 36.

initiated at the state level are as follows: the beach access programs of Texas (1959) and Oregon (1967); and the wetlands preservation programs of Massachusetts (1963, 1965), Rhode Island (1965), and Maine (1967).²⁸⁶ In 1971, Washington and Rhode Island became the first two states to initiate comprehensive coastal zone management programs.²⁸⁷

In Washington the impetus for legislative action was derived from the following two sources: (1) a court ruling which prohibited any construction or dredging and filling in the state tidelands until legislation specifically allowing such activities was enacted; and (2) pressure from conservation groups for a program to preserve the state's shore areas.²⁸⁸ The Act passed by the state legislature, entitled the Shorelines Management Act of 1971, established a basic mechanism for controlling the use of the state's shorelines as authority was given to local units to administer the management program in accordance with a master plan established by the State Department of Ecology.²⁸⁹ The geographical jurisdiction of the program is as follows: the seaward boundary is set at the seaward limit of the state's jurisdiction in accordance with the Outer Continental Shelf Lands Act; and the landward boundary is 200 feet inland from the shoreline.²⁹⁰ For purposes of implementation, the state legislature provided funds of \$500,000 for the first biennium and

²⁸⁶ Coastal Zone Analysis, supra note 154, at 20.

²⁸⁷ Id. at 62.

²⁸⁸ Id.

²⁸⁹ Id.; W.R.C.A., Chapter 90.58, June 1, 1971, Section 90.58.050.

²⁹⁰ Coastal Zone Analysis, supra note 154, at 72.

\$900,000 for the second.²⁹¹

Once the aforementioned master plans have been developed, they are to provide the basis for a permit system regulating developments whose value is greater than \$1,000 or which materially affect public use of the areas within the program's jurisdiction.²⁹² The permit system is to be administered by local governments, with the Department of Ecology having the right of appeal whenever it is of the opinion that a permit decision does not comply with the various provisions of the Act.²⁹³ Violators of the provisions of the Act are liable for the cost of returning such lands to their original condition. Furthermore, in the case of willful violations, fines and jail sentences can both be imposed on the guilty party.²⁹⁴

Rhode Island's coastal zone program was enacted on the basis of a recommendation by the Governor's Committee on the coastal zone which had been created in 1969 to study possible alternatives for managing the state's coastal zone.²⁹⁵ The jurisdiction of Rhode Island's plan is greater than that of Washington's as it regulates certain enumerated activities, regardless of location, if they affect the coastal areas of the state.²⁹⁶ For purposes of administration, a Coastal Zone Management Council has been created.²⁹⁷ This council is composed of representatives

²⁹¹Id. at 64.

²⁹²Id. at 63.

²⁹³Section 90.58.130 (7).

²⁹⁴Section 90.58.230.

²⁹⁵Coastal Zone Analysis, *supra* note 154, citing P.L. 1971, Ch. 279, Section 1.

²⁹⁶Id. at 72.

²⁹⁷Id. at 76.

of the state legislature, the general public, local government officials from coastal areas, and the Directors of the State Departments of Natural Resources and of Health.²⁹⁸

Many states are still in the planning stage with regard to their coastal zone management programs. Certain Gulf Coast states have already initiated significant studies relating to the problems of proper management of their coastal resources. Louisiana, in particular, established an Advisory Commission on Coastal and Marine Resources in 1971. The purpose of the Commission is to study the state's coastal zone and recommend a management plan for its conservation and development.²⁹⁹ The Commission is not responsible for approving or disapproving any specific project, but instead is to develop a master management plan for the entire coastal region.³⁰⁰ This master plan will in turn supply the framework within which decisions regarding specific projects will be made.³⁰¹ Three actions are being taken to insure that the coastal zone management plan being formulated considers all relevant factors: (1) all parties who are participating in or planning projects for the use of coastal resources are to be given notice of the planning activities of the Commission; (2) at the same time that such notice is given, the Commission is to insure such parties that they will have an opportunity to be heard by the Commission with the information gained through this hearing to be considered in formulation of the aforementioned plan; and

²⁹⁸ Id.

²⁹⁹ Advisory Commission, *supra* note 272, at 12.

³⁰⁰ Id.

³⁰¹ Id., at 13.

(3), the Commission will register all coastal zone projects being proposed or planned so that there will be an accurate and up-to-date listing of proposed projects using substantial resources of the coastal zone.³⁰²

North Carolina's Comprehensive Estuarine Plan Committee earlier drafted a plan which hopefully will result in the enactment of a coastal zone management plan by the 1974 State legislature. Present attempts to pass the bill resulted in a watered-down version which recently was withdrawn from legislative consideration.

In the future, one particular area upon which is the use of offshore waters within Federal jurisdiction but outside state jurisdiction, especially with regard to the regulation of such uses as oil and mineral exploitation which may have significant adverse effects on the states' coastal areas.³⁰³

3. State pollution control

State pollution control legislation presently is not very extensive. A few states have instituted various acts and programs which should serve as future models for other coastal states. California and Washington have passed state Environmental Policy Acts which closely resemble the National Environment Policy Act (NEPA).³⁰⁴ These two state "NEPA" programs are designed to control air, water, and solid waste pollution.³⁰⁵ Additionally, some states have passed offshore

³⁰² Id. at 13 and 14.

³⁰³ Coastal Zone Analysis, *supra* note 154, at 81.

³⁰⁴ Id. at 87.

³⁰⁵ Id.

management legislation. Examples of such programs are the following: Massachusetts's Offshore Mineral Resource Law of 1968; New Jersey's legislation prohibiting the dumping of wastes and refuse in offshore waters (1970); and the dredge and fill laws passed by many state legislatures which primarily protect navigational rights but which may have some broader implications directed towards the control of oil pollution.³⁰⁶

One piece of innovative environmental legislation is Maine's Coastal Conveyance of Petroleum Act of 1970. The Act created the Environmental Improvement Commission which was designated to make regulations for the transfer of oil and petroleum products between vessels and offshore facilities within the jurisdiction of the state.³⁰⁷ Two basic ingredients for an effective program were provided: strong regulatory authority and the necessary funding for implementation.³⁰⁸ With regard to regulatory jurisdiction, the Act declares that "The powers and the duties of the Commission shall extend . . . to a distance 12 miles from the coast line of the state."³⁰⁹ In the view of some commentators, however, there is some doubt as to the power of Maine's Environmental Improvement Commission beyond the United States'

³⁰⁶ Id. at 84.

³⁰⁷ The School of Law and the University of Maine, Maine Law Affecting Marine Resources, Volume III at 484 (1970) [hereinafter cited as Maine Law - Volume III]. 38 M.R.S.A. 541-557 as added P.L. 1969.

³⁰⁸ Coastal Zone Analysis, *supra* note 154, at 121.

³⁰⁹ 38 M.R.S.A. 544 (1).

territorial sea.³¹⁰

The Act imposes unlimited absolute liability on those who spill oil.³¹¹ Persons damaged by such pollution will be allowed recompense for their damages from a specially created fund.³¹² The parties liable will in turn be obligated under the Act to reimburse the Fund for any damage payments over \$15,000 that are made.³¹³

The Maine legislature initially appropriated \$30,000 to implement the Act.³¹⁴ In order to provide for the continuing operation of the Commission, the Marine Coastal Protection Fund was established. This Fund, which initially pays injured parties for their damages, is financed by license fees and penalties.³¹⁵ The license fee is for the transportation of oil and is based on a levy of 1/2 cent per barrel of petroleum products transferred by the applicant during the licensing period.³¹⁶ A limit of \$9,000,000 has been placed on the Fund with up to \$100,000 authorized to be spent on research and development in the "causes, effects, and removal of pollution caused by oil, petroleum products and their by-products on the marine environment."³¹⁷ It should be emphasized that the licensing provision may be challenged as a

³¹⁰ Volume III, supra note 307, at 485.

³¹¹ 38 M.R.S.A. 552 (2).

³¹² 38 M.R.S.A. 551 (2) A.

³¹³ 38 M.R.S.A. 551 (6) B.

³¹⁴ Coastal Zone Analysis, supra note 154, at 121.

³¹⁵ Maine Law - Volume III, supra note 307, at 485.

³¹⁶ Id.

³¹⁷ Coastal Zone Analysis, supra note 154, at 121.

violation of the Commerce and Due Process Clauses of the United States Constitution.³¹⁸

4. State mining laws

Panel Report III of Our Nation and the Sea: A Plan for National Action by the Commission on Marine Science, Engineering and Resources contains a brief summary of all state and local activity in the non-living resources of the sea. Of special importance is the brief synopsis given of each coastal state's mining legislation.³¹⁹

No attempt here will be made to analyze the mining legislation of each coastal state. Instead a more detailed approach will be taken with respect to Maine and Louisiana.

Maine's present hard mineral legislation is contained in 10 M.R.S.A. 2101-2111.³²⁰ Section 2101 deals with the composition and jurisdiction of the Act's major administrative body, the Maine Mining Bureau (MMB). MMB is composed of seven members, one from each of the following state administrative organizations: Departments of Agriculture, Forestry, Economic Development, Inland Fisheries and Game, Sea and Shore Fisheries, Environmental Improvement Commission, and Geology.³²¹ Clearcut jurisdiction has been given to MMB over offshore substrata owned or held in trust by the state.³²²

³¹⁸Id.

³¹⁹Panel Report III, supra note 11, at VII-165-VII-177.

³²⁰The School of Law and the University of Maine, Maine Law Affecting Marine Resources, Volume IV at 824 (1970) [hereinafter cited as Volume IV].

³²¹10 M.R.S.A. 2101-A (1967).

³²²Volume IV, supra note 320, at 825.

The purpose of the Act as set forth in Section 2101-A is as follows:

It shall be the purpose of the Maine Mining Bureau to administer, regulate and control:

1. Mineral Development. Mineral development and mining on state lands, inland waters and offshore territory of the State of Maine;
2. Natural Resource Conservation. Natural resource conservation as it relates to mineral and oil and gas development.³²³

Under the definitional provision, Section 2101-B, "hard minerals" are defined as "all naturally occurring mineral deposits exclusive of oil and gas, coal, and lignite."³²⁴ "Mining" is defined as "all the extractive and beneficiative processes necessary to remove and prepare for market a mineral deposit."³²⁵

The procedure that an individual or corporation must follow to mine for hard minerals off Maine's coast is as follows: "in order to locate a claim, one must first secure a prospector's permit; in order to obtain a license to mine, a claim must be recorded in accordance with Section 2104; and finally, in order to obtain a mining lease, one must comply both with the requirements of his license and the provisions of Section 2106."³²⁶ Furthermore, Section 2103 restricts the size of any one claim to a tract of 1500 x 600 feet but does not limit the number of claims an individual may hold.³²⁷

Maine's oil and gas regulation is contained in The Oil and Gas Conservation and Development Control Act of 1969.³²⁸ The Act is

³²³ 10 M.R.S.A. 2101-A (1969).

³²⁴ 10 M.R.S.A. 2101-B(3) (1969).

³²⁵ 10 M.R.S.A. 2101-B(5) (1969).

³²⁶ Volume IV, supra note 320, at 828.

³²⁷ 10 M.R.S.A. 2103 (1969).

³²⁸ 10 M.R.S.A. 2153-2166.

administered by the MMB and is designed primarily to conserve the oil and gas reserves of the state's coastal waters. The Act's jurisdiction, however, extends "to all lands located in the state, however owned, including submerged lands on the continental shelf within the territorial seaward boundary of this state, and any lands owned or administered by any government or agency or political subdivision thereof over which the state, under its police power, has jurisdiction."³²⁹ Provisions relating to well spacing and certificates of compliance are Sections 2157 and 2153, respectively. Other provisions regulate the general integration of interests, the just and equitable share of production, and violations of the Act in general.³³⁰

In Louisiana, the Department of Conservation and the State Mineral Board jointly regulate mining in the state's offshore waters. Prior to drilling any well in the coastal zone, the proper application must be submitted to the Department of Conservation.³³¹ The permit then issued will allow the operator to drill as long as he is in compliance with the Department's regulations.³³² In general, these regulations are designed to reduce the adverse effects of oil operations on the environment. For example, there are rules stipulating the type and condition of blowout equipment that may be used. The required use of such equipment is intended to prevent environmental damage at the well site.³³³ With certain exceptions, test wells can only be drilled

³²⁹ 10 M.R.S.A. 2156.

³³⁰ 10 M.R.S.A. 2153 and 2163.

³³¹ Advisory Commission, *supra* note 272, at 86.

³³² Id.

³³³ Id.

during daylight hours as this is the time when emergencies can best be handled.³³⁴ Additionally, before an oil well can be abandoned, a permit must be obtained from the Conservation Department and an acceptable plan of abandonment approved.³³⁵ Such plans are designed to protect fresh water from contamination by salt water or hydrocarbons and to prevent the escape of liquid wastes from the drilled well.³³⁶

Specifically, in the area of pollution control, the Department requires reports of oil spills for the purpose of subsequent cleanup and corrective action.³³⁷ In addition, Statewide Orders Nos. 29-C-29-H serve as guidelines for waste control in the Gulf of Mexico as they regulate production commingling, well spacing, and dual completions.³³⁸

The State Mineral Board's primary responsibility is that of leasing state-owned lands for the development and production of minerals.³³⁹ The leasing procedure may be initiated by the Board either on its own or at the request of a prospective lessee.³⁴⁰ Once the procedure has been commenced, the Board is required to investigate the land tract under consideration and assess its leasing value.³⁴¹ Shortly thereafter, notice of an intention to lease must be conveyed to all

³³⁴Id.

³³⁵Id. at 87.

³³⁶Id.

³³⁷Id. at 88.

³³⁸Id.

³³⁹Id. at 125.

³⁴⁰Id. at 126.

³⁴¹Id. at 125.

known prospective lessees with specified minimum terms present to prevent bargain hunting for less than the proper value.³⁴² Essential items of the notice requirement are a description of the land, the time for receiving bids, and the royalty to be demanded.³⁴³ The bids then received are publicly opened in Baton Rouge at the time stipulated in the published notice.³⁴⁴ The Board has the authority to either accept the most favorable bid or reject all bids received and readvertise the property for competitive bidding.³⁴⁵

The Board's supervisory powers over the leases which it executes involve the determination of whether or not the lessee has complied with the terms of the lease, and the authority to initiate legal action designed to protect the interests of the state and/or to annul the lease.³⁴⁶ Furthermore, under special circumstances, leases can be amended.³⁴⁷

In Louisiana, the following revenues are annually derived from oil and gas: bonuses - \$5 million, rentals - \$0.5 million, royalties - \$25 million, and severance tax - \$214 million.³⁴⁸ By comparison, the cost of the aforementioned regulatory effort by the state is only \$2.25 million.³⁴⁹

³⁴² Id. at 126.

³⁴³ Id.

³⁴⁴ Id.

³⁴⁵ Id.

³⁴⁶ Id. at 127 and 128.

³⁴⁷ Id. at 128.

³⁴⁸ Panel Report 3, *supra* note 11, at VII-173.

³⁴⁹ Id.

V. INTERNATIONAL LAW AND THE U.S. CONTINENTAL SHELF

A. Prospects for an International Regime Having Authority Over the U.S. Continental Shelf

With regard to a future International Regime of the seabed within the Continental Shelf areas of particular nations, two major types of claims can be envisioned.³⁵⁰ The first is the assertion by a state that its marine resources are subject to its exclusive appropriation and that no other state, without its consent, may have access to them.³⁵¹ Support for this demand will stem from previous concepts concerning the Continental Shelf,³⁵² and the fact that a considerable number of nations have not only laid claims to adjacent submarine areas but have also created arrangements and expectations regarding the exploration and exploitation of the natural resources in these areas.³⁵³ Additional factors suggesting the desirability of "exclusive control" by the coastal state are as follows: the costs in providing for another method of allocating access to these resources; the requirements of economic regulation and administration of marine resources exploration, exploitation, and development; and finally, the requirements of national security against outside threats.³⁵⁴

The claim most likely to be counterposed to this "exclusive control" approach is the "general community approach" that mineral

³⁵⁰ Burke, *supra* note 29, at 54.

³⁵¹ Id.

³⁵² Id.

³⁵³ M.S. McDougal and W.T. Burke, The Public Order of the Oceans 634 (1962) [hereinafter cited as *Public Order*].

³⁵⁴ Id. at 633.

resources of the seabed are open to free access of all who wish to benefit from them and that no single nation should be authorized to acquire exclusive control over them.³⁵⁵ Justification for this policy is based on the contention that mankind, by utilizing this approach, can achieve greater net value from the use of the oceans.³⁵⁶

In the United Nations, current ocean law negotiations are taking place with the direct participation of close to 90 nations.³⁵⁷ Although these talks reflect the conflict between the two aforementioned approaches, a possible compromise resolution has emerged.³⁵⁸ The main features of this proposed agreement are as follows: (1) A relatively narrow territorial sea will be set at the 12 mile limit, and past this point, the international community will control; (2) a fairly wide coastal band will be created in which permanent managerial functions on the part of the coastal state will be coupled with permanent prerogatives of the international community; and (3), purely international management of the deep seabed area by an international agency possessing regulatory powers tied to strictly applicable criteria regarding the economic efficiency of offshore operation will be arranged.³⁵⁹

Although such an agreement is only a possibility at this time, according to many commentators, the time to create a regime for the ocean is the present, and any failure to do so will only maximize the existing

³⁵⁵ Burke, *supra* note 29, at 54.

³⁵⁶ Public Order, *supra* note 353, at 631.

³⁵⁷ Hargrove, *NEW CONCEPTS IN THE LAW OF THE SEA*, 1(1) *Ocean Dev. and Int'l L.J.* 5 (1973) [hereinafter cited as Hargrove].

³⁵⁸ *Id.*

³⁵⁹ *Id.* at 11 and 12.

inequities and conflicts concerning world ocean resources.³⁶⁰

B. Organizations Promoting and Coordinating Marine Activities
at the International Level

Such organizations can be divided into "nongovernmental" and "intergovernmental" organizations. The major nongovernmental organizations are contained within the framework of the International Council of Scientific Unions (ICSU).³⁶¹ On the other hand, the intergovernmental organizations are largely within the United Nations system.

The United Nations structure contains the following intergovernmental organizations which promote and coordinate marine activities: United Nations Educational, Scientific and Cultural Organization (UNESCO); (2) Intergovernmental Oceanographic Commission (IOC); (3) World Meteorological Organization; and (4) Food and Agriculture Organization (FAO).³⁶²

UNESCO's basic concern is that of oceanic research and related scientific work worldwide.³⁶³ UNESCO's marine science programs are conducted by its Office of Oceanography which also serves as secretariat for IOC.³⁶⁴

As a result of the International Geophysical Year's initiative in promoting a joint scientific attack on the ocean's problems, a resolution was introduced in 1958 at the Tenth General Conference of UNESCO which led to a Preparatory Meeting of the Intergovernmental

³⁶⁰ Id. at 12.

³⁶¹ Panel Report 1, *supra* note 183, at II-58.

³⁶² Id. at II-58-61.

³⁶³ Id. at II-58.

³⁶⁴ Id.

Conference in Copenhagen in July 1960.³⁶⁵ Following these meetings, the Eleventh General Conference of UNESCO in 1960 established the IOC.³⁶⁶ The purpose of IOC is "to promote scientific investigation with a view to learning more about the nature and resources of the oceans, through the concerted action of its members."³⁶⁷ IOC has no funds of its own, as UNESCO provides most of its financial support.³⁶⁸ IOC receives advisory services from ICSU and the Advisory Committee on Marine Resources Research of FAO.³⁶⁹

The World Meteorological Organization (WMO) was organized in 1951 as a specialized agency of the United Nations. One goal of WMO is to facilitate cooperation in meteorology and organize the necessary mechanisms for exchange of weather data.³⁷⁰ In 1961 WMO established the World Weather Program which devised an international system for observing the atmosphere over the entire globe.³⁷¹ This system was named the World Weather Watch, and in addition to observation it also transmits, processes and analyzes the world-wide weather data.³⁷²

FAO is mainly concerned with fishery problems and the influence

³⁶⁵Id.

³⁶⁶Id.

³⁶⁷Id.

³⁶⁸Id.

³⁶⁹Id.

³⁷⁰Yearbook of the United Nations, 982 (1970) [hereinafter cited as Yearbook].

³⁷¹Panel Report 1, *supra* note 183, at II-60.

³⁷²Id.

of physical variables on the location and extent of living resources.³⁷³
 In 1961, FAO established the Advisory Committee of Marine Resources
 Research (ACMRR) to advise FAO on the fishery aspects of oceanographic
 research.³⁷⁴

C. International Pollution Control

1. The International Convention for the Prevention of Pollution of the Sea by Oil

This convention which prohibits the discharge of oil and
 oily substances into the sea was opened for signature on May 12,
 1954 in London and amendments thereto were made on April 11, 1962
 and October 21, 1969.³⁷⁵ Under the terms of this agreement
 a 50 mile zone measured from land seaward was established within which
 the discharge of oil or any oily mixture is prohibited.³⁷⁶ Under Annex
 (I) of the April 11, 1962 amendments "mile" was defined as a nautical
 mile of 6,080 feet or 1,852 meters.³⁷⁷ Violations of the Act's provisions
 were made subject to the laws of the territory in which the ship is
 registered.³⁷⁸ Numerous exceptions to the prohibitory provisions of the
 Convention exist. For example, unavoidable leakage and leakage due to
 damage of the ship were exempted.³⁷⁹ Additionally, the discharge of oil

³⁷³Yearbook, supra note 370, at 902 and 903.

³⁷⁴Panel Report 1, supra note 183, at II-58.

³⁷⁵S. Lay, R. Churchill, and M. Nordquist, ed., New Directions
 in the Law of the Sea 557 (1973) [hereinafter cited as New Directions].
 12 TIAS 4900 (1961), 17 TIAS 6109 (1966); 9 International Legal Materials
 1-8 (unratified).

³⁷⁶Id. at 558.

³⁷⁷Id. at 567.

³⁷⁸Id. at 559.

³⁷⁹Id.

from a ship for the purpose of securing the safety of the ship, preventing damage to the ship's cargo, or for saving life at sea was likewise exempted.³⁸⁰

2. The International Convention on Civil Liability for Oil Pollution Damage

This agreement was reached in Brussels on November 29, 1969.³⁸¹ Convinced of the need to insure that adequate compensation was available to persons who suffer damage caused by oil pollution, this Convention attempted to adopt uniform international rules and procedures for determining questions of liability and for providing sufficient recompense in such cases.³⁸²

Under Article II, the scope of the Convention is restricted to pollution damage caused in the territorial sea of the contracting state and to preventive measures taken to minimize such damage.³⁸³

Article III (1) states that the owner of a ship shall be liable for any pollution damage caused by oil which has escaped or been discharged from the ship.³⁸⁴ Exceptions to this general liability provision are found in Article III (2) and (3). In subsection (2), acts of war and acts of God are excepted.³⁸⁵ Likewise, damage wholly caused by a third party or by the Government does not give rise to personal

³⁸⁰ Id.

³⁸¹ ⁹ International Legal Materials 45-62 (unratified).

³⁸² New Directions, *supra* note 375, at 602.

³⁸³ Id. at 603.

³⁸⁴ Id.

³⁸⁵ Id.

liability of the shipowner.³⁸⁶

Actual liability for any one incident is limited to an aggregate amount of 2,000 francs for each ton of the ship's weight.³⁸⁷ In no event can this aggregate amount exceed 210 million francs.³⁸⁸ Article V (9) defines "franc" as a unit consisting of "sixty-five and a half milligrams of gold of millesimal fineness nine hundred."³⁸⁹ Whenever liability is established, the proper amount of gold is first determined and then converted into the currency of the state in which the ship is registered.³⁹⁰

In order to avail himself of the aforementioned liability limitation, the owner must establish a fund constituting the total sum representing the limit of his liability with the Court or other competent authority in the state where the action is brought.³⁹¹ The fund will then be distributed among the claimants in proportion to the amounts of their established claims.

3. The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage

In Brussels on December 18, 1971, the IMCO adopted an instrument entitled the International Compensation Fund for Oil Pollution Damage.³⁹² The "Fund" as it is normally called, was established with the following aims:

³⁸⁶ Id.

³⁸⁷ Id.

³⁸⁸ Id.

³⁸⁹ Id. at 604.

³⁹⁰ Id.

³⁹¹ Id.

³⁹² 11 International Legal Materials 284-302 (unratified).

Article II (1) (a) to provide compensation for pollution damage to the extent that protection afforded by the Liability Convention is inadequate; (b) to give relief to shipowners in respect of the additional financial burden imposed on them by the Liability Convention, such relief being subject to conditions designed to ensure compliance with safety at sea and other conventions; (c) to give effect to the related purposes set out in this Convention.³⁹³

Article IV sets the guidelines by which the "Fund" will fulfill its function under Article 2 paragraph 1 (a). Subsections (2) and (3) list certain exceptional situations in which the "Fund" will incur no obligation to pay such additional compensation to the damaged party.³⁹⁴ Subsection (4) limits the total amount of compensation payable by the "Fund," for any one incident, to 450 million francs.³⁹⁵

Finally, Article V sets similar guidelines for the "Fund" in fulfilling its function under Article II, paragraph 1 (b). Key provisions here are subsection (1), which states the amount of the obligation incurred by the "Fund,"³⁹⁶ and subsection (3) which sets forth those situations in which the "Fund" will be wholly or partially exonerated from its obligation.³⁹⁷

VI. CONCLUSION

In retrospect, special emphasis must again be placed on the fact that this study purports to be only a survey and not an exhaustive treatment of any topic relating to the Continental Shelf of the United States.

³⁹³New Directions, supra note 375, at 612.

³⁹⁴Id. at 613.

³⁹⁵Id. at 614.

³⁹⁶Id. at 614 and 615.

³⁹⁷Id. at 615.

The industrial survey of oceanographic-oriented endeavors only discusses certain selected corporate ventures and various problems that have been encountered in this context. From this discussion one should be able to detect expanding and intensified efforts in our economy's industrial sector to develop and exploit the ocean's resources. One can sense the attitude that the ocean is indeed the last unexplored frontier truly accessible to man. Such an outlook is undoubtedly conducive to immediate and continued corporate investment. Furthermore, the additional incentives recently proposed by President Nixon should encourage private direct investment in Outer Continental Shelf oil and gas resources.

One area completely excluded from the coverage of this project is that of the industrial and legal considerations relating to "living" resources of the Continental Shelf. Undoubtedly, a concurrent discussion of this topic would have been both meaningful and appropriate. However, in view of the broadened coverage that would have been required by such a discussion, a decision to omit was reached.

Certain difficulties were encountered in the subsection analyzing individual investment in marine resources as the paucity of available written material precluded thorough research of this topic. The resulting discussion should not, however, be considered indicative of the fact that individual investment in the ocean's resources and related industrial endeavors is unprofitable. The poor return on such investments is largely the result of both an unpredictable stock market and the miserable management performance of mutual funds in general.

President Nixon's recent energy statement reveals immediate goals that the Executive Branch of our Federal Government has with regard to

the discovery, development, and conservation-oriented use of the nation's marine resources. Strong indications are also present that marine research and technology will be appreciably advanced through increased Government investment. As a result, society as a whole will benefit.

For the future, the most significant legislative action in this field will be related to coastal zone management and pollution control. Today's society is becoming increasingly environment-conscious. As a nation, we are acutely aware of the serious problems that will be encountered if pollution and an unregulated exploitation of our natural resources are allowed to continue. The only feasible method of combating damage to our environment is through carefully drafted and properly enforced legislation.

The international community is also cognizant of both the worldwide shortage of natural resources and the ill-effect of environmental pollution. Significant changes should occur in the allocation and management of marine resources whenever an international agreement is reached on the proper form and authoritative limits of an international seabed regime. Furthermore, the formation of an International Environmental Protection Agency could very well occur in the near future.

In closing, it should be stated that the original purpose of this study was to produce an end-product capable of assisting the investment community, as a whole, in opportunities related to the mineral resources of the United States Continental Shelf. Apparently, the only investment guidelines that can be drawn in this context relate to existing legislation and future environmental law trends. Therefore, as a research goal, perhaps this idea was a little premature. Nevertheless, the nation's private direct investors are just awakening to the prospects

in addition to oil and gas that lie offshore. The point to bear in mind is that corporate ventures, which have previously been hampered by numerous technological deficiencies, are now encouraged by the prospects of increased technical aid from the Federal Government. Thus, it is probable that proper use of industrial and governmental research and development, as it becomes available, will increase the return of offshore operations. Once such ventures in fact become more profitable, individual investors will receive much greater assurance and encouragement to the effect that selected purchases of ocean-related industrial securities are indeed a wise investment.

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