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93d Congress
2d Session

COMMITTEE PRINT

File

DEEPWATER PORT POLICY ISSUES

A STAFF ANALYSIS

PREPARED AT THE REQUEST OF

HENRY M. JACKSON, Chairman

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
UNITED STATES SENATE

PURSUANT TO

S. Res. 45
A NATIONAL FUELS AND ENERGY POLICY STUDY

Serial No. 93-42 (92-77)

Printed for the use of the
Committee on Interior and Insular Affairs

U.S. GOVERNMENT PRINTING OFFICE
24-935 WASHINGTON : 1974

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C., 20402 - Price $1.10

SENATE RESOLUTION 45

National Fuels and Energy Policy Study

This publication is a background document for the National Fuels and Energy Policy Study authorized by Senate Resolution 45, introduced by Senators Jennings Randolph and Henry M. Jackson on February 4, 1971, and considered, amended, and agreed to by the Senate on May 3, 1971.

The resolution authorized the Senate Interior and Insular Affairs Committee, and ex officio members of the Committees on Commerce and on Public Works and the Joint Committee on Atomic Energy, to make a full and complete investigation and study of National Fuels and Energy Policies.

Subsequently, on March 1, 1974, in the furtherance of the purposes of Senate Resolution 45 (92d Congress), the Senate approved the addition of ex officio members from the Committees on Finance, on Foreign Relations, on Government Operations, and on Labor and Public Welfare, also.

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MEMORANDUM OF THE CHAIRMAN

To Members and ex officio members of the Senate Committee on Interior and Insular Affairs' National Fuels and Energy Policy Study (S. Res. 45):

The advent of the supertanker has produced a corresponding need for port facilities adequate to handle vessels of unprecedented size.

At the present time, the United States has no deepwater ports designed for this purpose. However, as our dependence on imported oil grows, the possible use of supertankers to carry these imports becomes increasingly significant.

Legislation is now pending before the Congress which would authorize the construction of deepwater ports under public or private sponsorship. Congressional action is required because most potential deepwater port sites are outside U.S. territorial limits, where only the Federal government can exercise authority.

The selection of sites for deepwater ports, their construction and operation raise a number of basic economic, environmental and political issues which should be carefully explored before Congress takes final action on deepwater port legislation.

With this in mind, I have asked that this background paper on Deepwater Port Policy Issues be prepared for the use of Senators participating in the National Fuels and Energy Policy Study. The paper, which was prepared by C. Suzanne Reed of the Committee staff, not only describes the relevant issues but also suggests the possible outlines of Federal deepwater port policy. I believe that all Members of the Senate will find this analysis helpful in considering legislation on this subject.

HENRY M. JACKSON, *Chairman.*

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DEEPWATER PORT POLICY ISSUES

A Staff Analysis

PREPARED BY

C. SUZANNE REED
Professional Staff Member

AT THE REQUEST OF

SENATOR HENRY M. JACKSON, *Chairman*
COMMITTEE ON INTERIOR AND INSULAR AFFAIRS
UNITED STATES SENATE

PURSUANT TO S. RES. 45

A NATIONAL FUELS AND ENERGY POLICY STUDY

JULY 1974

INTRODUCTION

As a nation which has become increasingly reliant on imported petroleum to meet national energy demands, the United States is now confronted with several major policy decisions regarding current trends in the world petroleum distribution and transportation system.

In 1972, petroleum supplied 46 percent of total U.S. energy demand.[1] Of the 16.7 million barrels a day (MMB/D) of petroleum used in that year, 4.7 MMB/D or 28 percent were imported from foreign sources. As domestic energy demands continued to increase and domestic oil production declined, the volume of U.S. petroleum imports climbed until, in November, 1973, oil arriving from foreign sources amounted to over 7.1 MMB/D.[2]

In 1973 about one-fifth of U.S. petroleum imports was transported overland by pipeline from Canada, while the remaining four-fifths were carried by tankers from foreign sources overseas.

The average size of tankers used to transport petroleum supplies to the United States is 30,000–35,000 deadweight tons[3] (dwt). However, on a world scale the need to transport ever larger volumes of oil over long distances between petroleum producing and consuming nations has led to the development and increasing use of very large crude carriers (VLCC's) which range in size from 200,000 to 500,000 deadweight tons.

Commonly called "supertankers" these vessels can transport large volumes of oil on a long haul voyage at a lower cost than tankers of a smaller size.

Supertankers require substantial water depths in order to maneuver, and many foreign nations have developed deepwater ports to accommodate the growing number of such vessels in use today. Deepwater ports may be naturally deep or dredged areas close to shore, or they may take the form of unloading structures located in naturally deep waters some distance offshore.

While there are several proposals to construct deepwater ports in the United States, none has been built, primarily because a Federal policy to authorize and regulate the construction, operation and use of such facilities does not yet exist.

Furthermore, although there is still considerable interest in building deepwater ports, changes in U.S. energy policy precipitated by the Middle-East oil embargo of late 1973 and early 1974 have altered some of the basic presumptions upon which plans to develop such facilities in the United States were originally based.

As we enter a period of transition in national energy policies and practices, there is some question over the need for deepwater ports in the United States, as well as opposition to the adoption of a Federal policy which would encourage their development. Before such matters can be resolved, several complex issues must be addressed.

---

[1] *United States Petroleum Statistics*, Independent Petroleum Association of America, 1973.
[2] *Oil and Gas Journal*, November 12, 1973.
[3] Deadweight ton identifies a ship's total carrying capacity including internal provisions at saltwater summer load line immersion. Actual cargo capacity is slightly less. To derive approximate oil cargo capacity in barrels multiply the deadweight tonnage of a tanker by 7.4.

CHAPTER 1.—ECONOMICS OF SUPERTANKERS

Supertankers today represent a substantial portion of the total deadweight ton capacity in the world tankship fleet, and their numbers and size continue to increase. While only 10 percent of the 4,336 vessels operating in the world tankship fleet have capacities greater than 100,000 dwt, they represent almost 40 percent of the fleet's total deadweight ton capacity. Of these vessels 276 are between 200,000 deadweight tons and 500,000 deadweight tons in size.

The average size of vessels under construction in world ship yards increased from 116,300 deadweight tons in 1970 to 147,200 deadweight tons in 1973. Of the 792 vessels under construction as of October, 1973, 335 were in the 200,000–500,000 deadweight ton class range. Nine vessels ranging from 225,000–265,000 deadweight tons are being constructed in U.S. yards under the Merchant Marine subsidy program administered by the Maritime Administration. Additional applications to construct more than 50 tankers ranging up to 425,000 deadweight tons under the program have been received for 1974.

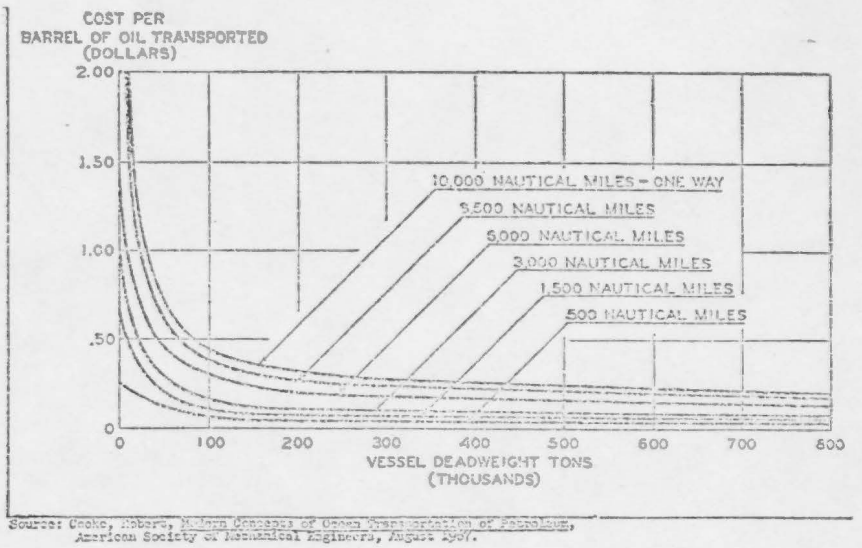
It is primarily the cost advantages of supertankers which have led to their increasing use in the world petroleum transporation system. The costs per deadweight ton of building and operating supertankers are considerably less than for smaller tankers. According to a study prepared for the September 1973 Intersociety Transportation Conference:

> * * * the capital component in the cost of carrying oil decreases as tanker size increases.
>
> There are several reasons for the reduction in capital cost per deadweight ton. The hull weight does not increase proportionally with cargo capacity; furthermore, auxiliary equipment, pumps, and piping systems are relatively insensitive to size. Accommodation cost is a function of the ship's complement, and since manning is nearly constant for tankers 50,000 to 500,000 dwt, this cost per deadweight ton also decreases with an increase in tanker size.[2]

These economies of scale reduce the cost of transporting large volumes of crude petroleum on a long-haul voyage.[3] (See figure 1.)

[2] Porricelli, Joseph D. and Keith, Virgil, "Tankers and the U.S. Energy Situation—An Economic and Environment Analysis." For presentation at the Intersociety Transportation Conference of the Intersociety Committee on Transportation, Sept. 24-27, 1973, p. 042. (Referred to hereafter as Porricelli and Keith). Total tanker transportation costs also depend on such variable factors as labor wages and allowances; the costs of equipment and supplies for operation, maintenance and repair; and expenses for fuel, insurance and tax. (For a more complete discussion of such factors see Porricelli and Keith, pp. 037-059.) While such costs may increase in the future, the Corps of Engineers *U.S. Deepwater Port Study* notes that certain cost increases may be offset by new technological or engineering advances which could effectively reduce both tanker construction and operating expenses; and that such advances might well result in reduced labor and crew requirements, efficiences in fuel utilization and reduced in-port, turnaround and in-ballast time (Vol. V, pp. 149-156).

[3] There is little reason to expect that the transportation of petroleum products by supertankers will ever become an economically justifiable practice. The design specifications which would be required to carry a variety of products aboard one vessel, or to pump a diversity of products through the same pipeline, and the need to deliver various products among widely distributed destinations are all factors supporting this contention. Furthermore, if the United States remains dependent on such nearby foreign refining centers as the Caribbean or Canada, the relatively short distance between these locations and the United States would operate against the economic advantages of supertanker transportation which result in part from a long-haul voyage.



Source: Cooke, Alberg, Modern Concepts of Ocean Transportation of Petroleum, American Society of Mechanical Engineers, August 1967.

FIGURE 1.—The relationship between vessel size, transportation cost and route length.

In the United States, where a growing reliance on more distant sources of petroleum supplies such as the Middle East has spurred substantial interest in transporting petroleum imports by supertanker, major oil ports are too shallow for supertankers to enter. Because there are no deepwater ports in the United States the transportation cost saving which might be achieved by carrying oil imports in supertankers will depend in part on the cost of building deepwater ports along U.S. shores.

The cost of building U.S. deepwater ports could range from $150 million for a terminal buoy located in naturally deep water off the coast and connected by pipeline to shore, to over $1 billion for dredging and maintaining a conventional harbor and channel system. The cost of other types of deepwater ports such as artificial islands or fixed piers falls somewhere within this range depending on the complexity, size, location, and throughput of the facility envisioned.

The economic feasibility of building a deepwater port depends on moving large volumes of oil through the facility on a sustained basis. Estimates of cost savings in petroleum transportation which could be realized through deepwater port development in the United States range from $0.02 to $0.50 per barrel of oil delivered depending upon the size of the supertankers carrying the oil and on the size, location, throughput and lifetime of the facility involved. Among all the various deepwater port designs and locations evaluated, the lowest volume throughput for which any facility would be feasible is 600,000 barrels of oil a day.[4]

Based on oil import projections published before the Middle-East oil-embargo which began in October of 1973, the Corps of Engineers

[4] See for example, statement of Dr. William Johnson, Energy Advisor to the Deputy Secretary of Treasury, *Hearings, before Senate Special Joint Subcommittee on Deepwater Ports Legislation*, 93d Cong., 2d Sess. Serial No. 93-59.

U.S. Deepwater Port Study predicted that using supertankers to transport U.S. oil imports instead of using the maximum size vessels now able to enter U.S. ports could yield average annual cost savings as high as $1.7 billion by the year 2000. However, the study also states that:

> "The extent to which these savings would accrue to the U.S. economy and how they would be distributed within the economy cannot be predicted with confidence." [5]

Historically, tanker transportation costs have represented a small fraction of the price of finished petroleum products. Furthermore, with recent increases in the cost of a barrel of oil, transportation costs have even less influence on the final petroleum product price. The American consumer could, therefore, expect little, if any, reduction in the price, for example, of a gallon of gasoline, to result from the use of supertankers and development of U.S. deepwater ports. Thus, rather than citing direct benefits to the consumer, those promoting deepwater port development in the United States argue that supertankers are environmentally as well as economically preferable to tankers of conventional size and that U.S. deepwater ports will generate a variety of secondary economic growth benefits in adjacent coastal areas.

[5] Corps of Engineers, *U.S. Deepwater Port Study*, Aug., 1972, Vol. 1, pg. 10.

CHAPTER 2.—ENVIRONMENTAL IMPACTS

Many sources have concluded that certain environmental advantages can result from using supertankers to transport petroleum supplies. It is often pointed out that for a given level of imports the use of supertankers would reduce the risks of tanker groundings, collisions, and oil spills by reducing the number of ships operating in U.S. harbors and ports. For example, one Government source reports that:

> In 1970 there were approximately 4,000 ship calls or unloadings to handle petroleum imports to the United States. These ships averaged 30,000 dwt. If forecast 1985 imports arrive in this same average ship size, traffic would increase to approximately 21,000 ship calls. If the ships averaged 80,000 dwt, which is about the largest size currently handled by the deeper U.S. ports, approximately 8,000 port calls would be required. * * * If imports could arrive in a 320,000 dwt VLCC, total activity could be reduced to less than 2,500 annual port calls each year. This assumes the increase in imports can be brought in as crude oil to a refinery—such a reduction in ship calls does not appear practical if imports are brought in as products to widely scattered terminals.[1]

One analysis of tanker related oil spills based on U.S. Coast Guard statistical data revealed that, from a viewpoint of tanker casualties and subsequent pollution, tankers larger than 80,000 dwt can transport a given quantity of oil over a given distance some seven times more safely than tankers below 80,000 dwt.[2]

In spite of such findings however, there are some characteristics of supertankers which pose particular problems for their operation and use. The sheer length, beam, and draft of a supertanker require it to have a much greater maneuvering area and stopping distance than a tanker of conventional size. While a tanker of 60,000 dwt may be 731 feet long and 105 feet wide with a 43-foot draft, a 250,000 dwt tanker may be 1,143 feet in length, 170 feet in width and draw almost 70 feet fully loaded. In addition, supertankers may carry 6 to 10 times as much oil as a tanker of conventional size, thus the potential for environmental damage from oil pollution in the event of a single supertanker casualty far exceeds that presented by a tanker of smaller capacity.[3]

Offshore Deepwater Ports

The substantial water depths (70 to 100 feet) required for supertankers to operate has thus far inhibited their use to transport petro-

[1] Porricelli and Keith, p. 086.
[2] Porricelli and Keith, pp. 072, 073.
[3] For example, a 250,000 dwt tanker may carry 1.8 million barrels of oil as compared to 440,000 barrels carried by tankers 60,000 dwt in size.

leum imports directly to U.S. ports. American ports located close to the major petroleum import demand centers are too shallow to receive tankers larger than 80,000 dwt and most ports are restricted to tankers half that size.

When tankers of greater size carry oil supplies destined for the U.S. market they may land their cargo at a nearby foreign deepwater port location such as the the Virgin Islands from which oil is transshipped by smaller tankers to U.S. ports. Alternatively, a large capacity vessel may anchor in a deepwater location offshore and offload its cargo to smaller barges and vessels until it has been sufficiently lightered to maneuver in shallow waters. The transportation cost and risk of oil spills increases each time cargo is transferred, making transshipment and lightering less desirable than shipping oil directly to U.S. ports.

Existing channels, harbors, and ports could be dredged to depths sufficient for supertanker operations, a course pursued by some foreign nations and supported by some local U.S. port authorities. However, in many U.S. harbors, dredging would involve the removal and subsequent disposal of as much as 35 feet of bottom material. Past experiences with dredging in America and reports of foreign experience indicate that such operations are not only costly but can also be highly damaging to the marine and coastal environment. In addition, as previously discussed, there is substantial reason for concern over the risks of operating supertankers close to shore.

It is generally agreed that offshore supertanker terminals offer the greatest environmental as well as economic advantage of any deepwater port design.

There is a wide range of offshore terminal designs.[4] However, the one which appears to be most widely used and which has been proposed for installation off U.S. shores, is a monobuoy structure known as the single point mooring buoy (SPM).

At over one hundred foreign locations, monobuoys are used to load and unload supertankers with reported success. Such facilities usually consist of pumping buoys which are anchored to the ocean bottom and feed into a submarine pipeline connected to shore.

One advantage of this type of facility is that locating supertanker terminals offshore reduces tanker casualty risks. U.S. Coast Guard figures reveal that tanker accidents such as collisions, rarely occur on the open sea. Rather, ship oil spills generally occur in near-shore areas where traffic congestion is the heaviest and, where the maneuvering of ships is restricted by narrow winding channels.[5]

As illustrated in Table 1, comparing the incidents of oil pollution which might result from importing a given volume of crude oil using supertankers and offshore deepwater ports as opposed to conventional tankers and ports demonstrates that over a 20-year period, 80,000 dwt tankers using inner-harbor terminals would have a greater number of oil spills resulting in a higher total loss of crude oil than 250,000 dwt tankers using offshore terminals.

[4] See Appendix A.
[5] Porricelli and Keith, p. 087.

TABLE 1.—COMPARATIVE TANKER CASUALTIES OVER 20 YEARS[6]

Assumptions:
Throughput of 2 million barrels per day in both cases.
Case 1=Oil transported to conventional ports in tankers averaging 50,000 deadweight tons (DWT).
Case 2=Oil transported to offshore terminals in supertankers averaging 250,000 deadweight tons; transshipment to shore via pipelines.

Range of spills (in long tons)	Number of incidents		Number of tons of oil spilled	
	Case 1	Case 2	Case 1	Case 2
1 to 150	24.0	3.0	1,680.0	186.0
151 to 500	8.5	.65	3,306.5	250.3
501 to 3,000	3.8	.44	4,674.0	514.8
3,001 to 14,000	1.4	.21	11,144.0	1,577.1
14,000+	.17		8,364.0	
Total	37.87	4.3	29,168.5	2,528.2

[6] Source: Council on Environmental Quality.

While emphasizing the benefits of reduced tanker traffic, those promoting offshore deepwater port concepts state that the use of such facilities to receive supertanker-borne petroleum imports would also reduce the potential for oil spill related damage in coastline areas. For example, the U.S. Army Corps of Engineers has commented that:

> Estuaries and coastal wetlands are the most biologically productive areas of the marine ecosystem, also the most sensitive to damage from construction and oil spill effects. At inshore sites, such damage would be unavoidable. At offshore sites, however, construction effects are minimized and the probability that spilled oil will enter sensitive estuarial areas is much reduced. In addition, the weathering of oil that could take place in route to an estuarine area would tend to remove the most immediately toxic and lethal fractions of the oil. The consensus of the researchers was that far offshore locations minimized the potential for environmental damage.[7]

According to those favoring the development of offshore deepwater ports an added factor in their favor is that, as currently proposed for the United States, the transfer of oil cargo from terminal to shore would be accomplished by means of underwater pipeline rather than by transshipment vessels. A U.S. Department of Commerce report on offshore terminal facilities concluded:

> The most desirable type of connection between an offshore petroleum terminal and onshore refineries, from the economic and environmental points of view, is a pipeline. Because there would be no vessels involved, the risk of pollution from ship grounding, collision, and cargo transfer would not exist. Generally there would be considerably less handling of the oil, with no need for onshore refinery marine terminals, hence less pollution risk.[8]

Other discussions of pipeline connections between offshore terminals and land-based facilities emphasize that waterbottom disturbance

[7] "North Atlantic Regional Study, Preliminary Report", pg. 24.
[8] *Offshore Terminal Systems Concepts*, Soros Associates, Inc. U.S. Dept. of Commerce, September 1972, vol. 2, p. 4.

caused by laying a pipeline would be neither permanent nor severe and that the possible risks of oil discharge from pipeline damage would be reduced by burying the pipeline beneath the ocean floor. In this regard, Porricelli and Keith state:

> Extensive experience has shown pipelines to be relatively safe. According to data published by the Corps of Engineers, 95 percent of the underwater pipeline spills which occurred during the interval of 1967 and 1972 were caused by ships' anchors damaging the line. The Corps concluded that burying the pipeline would definitely mitigate these accidents and that pipelines not damaged in this manner operate with spill rates less than half a barrel per million barrels throughput.[9]

In spite of these findings some environmentally concerned individuals and groups count as severe the permanent disturbance and destruction of wetlands, wildlife habitats, and other coastal environments caused by connecting pipelines to storage and transfer facilities onshore. Furthermore, pipelines connecting offshore terminals to shore will be of a type and size not widely used in the United States. Dissatisfaction with the U.S. Government's current pipeline monitoring capabilities have led some to question unflinching assertions of pipeline safety.

In general, however, industry has reported highly favorable results with the use of offshore monobuoy structures. According to owners and operators, the structures have handled large volumes of oil with relatively few operational difficulties or damage to the environment.[10] Terminal owners and operators have, however, recognized the need to resolve problems resulting from both tanker and terminal equipment designs and practices. These problems have stimulated the industry to establish the Single-Point Mooring Forum, under the auspices of the Oil Companies International Marine Forum, in an effort to improve tanker mooring and cargo transfer engineering and operation practices.

Continuous efforts to improve the design, construction and operation of tankers, and of navigation and related petroleum transportation systems can prevent many of the adverse impacts associated with waterborne movements of petroleum. Such improvements will be required on both the domestic and international front regardless of what policy the United States adopts toward the development of deepwater ports or of the size of tankers used to import U.S. petroleum supplies.

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[9] Pg. 094.

[10] Mascenik, John, "Offshore Deepwater Crude-Oil Terminals," *Oil and Gas Journal*, vol. 21, pp. 91-110, March 5, 1973. In addition to industry reports Porricelli and Keith state that: "A common ecological misgiving that is attributed to monobuoys is that a monobuoy as opposed to an offshore island or structure has no facility such as a boom to contain small spills in light seas. This is in fact true. However, the spill rate associated with monobuoys does not support this concern. Moreover, portable booms could be deployed under favorable weather conditions" (p. 093).

In contrast, however, a National Science Foundation funded technology assessment of outer continental shelf oil and gas operations reported that, "There was no effective capability for containing and cleaning up oil on the OCS before Union's blowout at Santa Barbara, California. Subsequent crash efforts by industry and government have produced only limited capability even now. In fact, wave heights, wind velocities, and currents on much of the U.S. OCS exceed designed capabilities at least a third of the time.

"Containment and clean-up on the OCS itself may be an illusory goal since, as a practical matter, there is an upper limit on sea conditions beyond which neither is possible. Although the primary effort should be to prevent accidents, it will never be possible to prevent all accidents and there must be some adequate means for responding when an accident does occur. Consequently, efforts should continue to be made to improve the performance of containment and clean-up devices. However, the primary development effort should be to achieve a capability to deal effectively with oil spills which threaten to come ashore." (Emphasis supplied.) *Energy Under the Oceans: A Summary Report of a Technology Assessment of OCS Oil and Gas Operations.* University of Oklahoma, 1973, pg. 13.

CHAPTER 3.—SECONDARY GROWTH IMPACTS

Deepwater port development is commonly associated with both beneficial economic, and adverse environmental secondary growth impacts. However, it is important to emphasize that the impacts of petroleum transportation, processing and distribution activities will increase as a result of the overall increase in total energy demand and use nationally, and may not properly be attributed solely to constructing U.S. deepwater ports. Nevertheless, a number of sources agree that, in the absence of specific controls, deepwater port development could cause a *concentration* of such impacts to occur. In areas which have already experienced significant industrial development, the incremental burdens placed on the environment by land requirements and effluents associated with petroleum-related industrialization could be particularly severe.

According to the Department of the Interior:

> "* * * location of deepwater port facilities in areas where there are existing refineries and petrochemical industries might only initially require expansion of existing storage, handling, and refining facilities to process the incoming crude. . . . The essence of the situation lies in the fact that even minor incremental refinery production could add pollutants to an environment that may already be stressed to its limits by previous industrial and commercial activity. For example, concentration of a high level of oil imports through one site in the highly developed and densely populated Mid-Atlantic area could be expected to result in significant environmental impacts.[1]

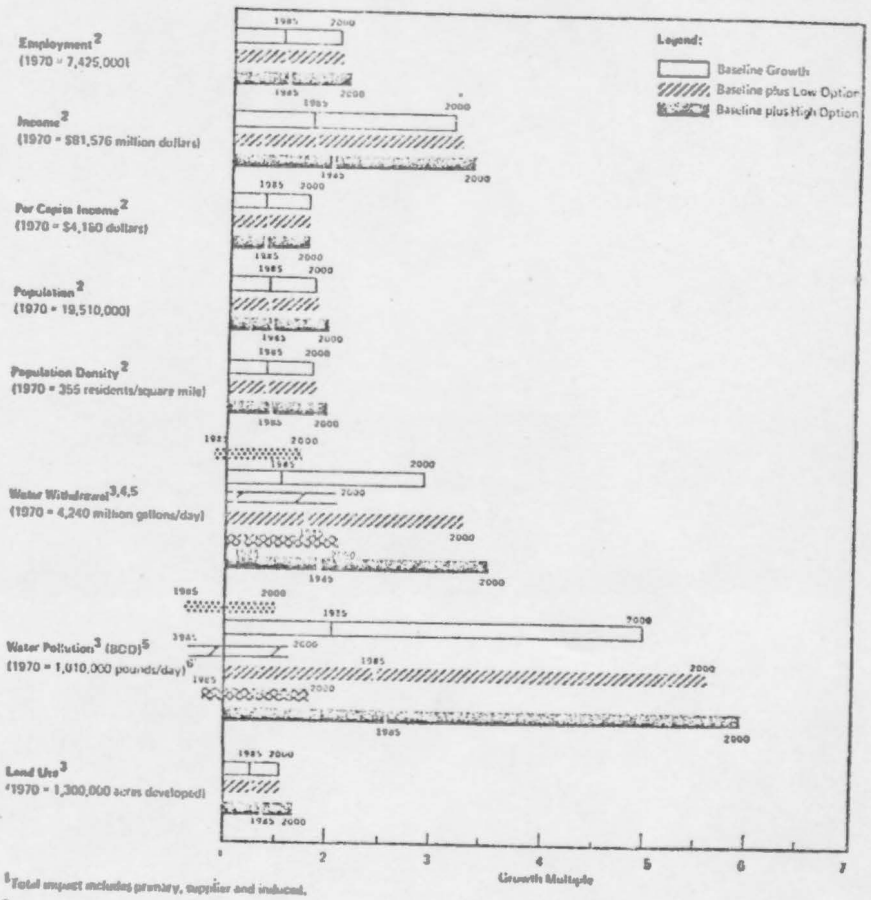
Petroleum related industrialization generated by a deepwater port may increase employment and yield additional revenues and other economic benefits in some areas. However, the anticipated environmental impacts of such growth include:

1. Increased land requirements for petroleum storage facility, refinery, and petrochemical industry sites;
2. Degradation and despoilation of wetlands, estuarine areas, wildlife habitats and recreation values;
3. Increased burdens on water supply from both industrial and residential growth;
4. Increased industrial and municipal discharge of polluting effluents into waterways and a subsequent decline in water quality;
5. Increased polluting emissions into atmosphere and subsequent decline of air quality;
6. Increased pressures for land development to provide roadways, housing, and municipal services such as schools and

[1] U.S. Department of the Interior, *Draft Environmental Impact Statement: Deepwater Ports*, June 1973, pp. IV-87.

hospitals to accommodate population increases induced by industrial growth.

The estimated magnitude of secondary growth impacts varies from source to source and depending upon the locality and basic assumptions under which impacts are assessed. For example, the Council on Environmental Quality projected secondary growth impacts of various deepwater port locations at different levels of imports as indicated in Figures 2, 3, and 4.[2]



[1] Total impact includes primary, supplier and induced.

[2] Entire Mid Atlantic Region.

[3] Pertaining to the Mid Atlantic Belt - comprised of northern Delaware, western Pennsylvania, and northern, central, and southern New Jersey.

[4] Freshwater equivalent.

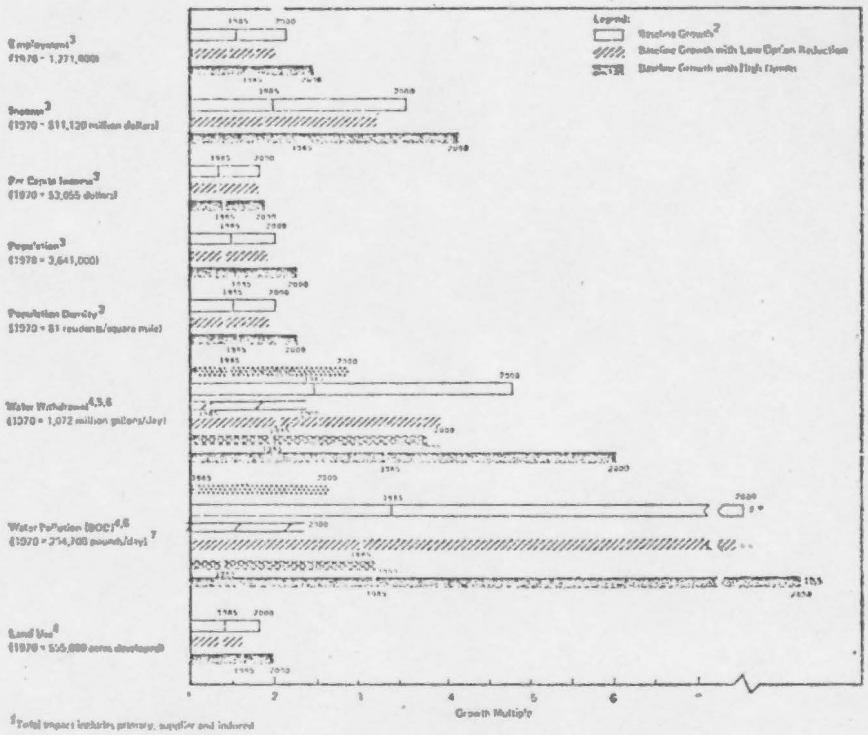
[5] Upper of bar pairs assumes full application of advanced waste treatment sufficient to meet 1983 effluent standards ("best available"). Lower of bar pairs assumes full application of "best practical" technology (1977 standards).

[6] Assumes full secondary treatment ("best practical") by 1970.

Source: Arthur D. Little, Inc.

FIGURE 2.—Mid-Atlantic region 1985/2000: Selected measures of estimated total relative refinery and petrochemical-based economic and environmental impacts.

[2] *Potential Onshore effects of Deepwater Oil-Terminal Related Industrial Development*, Report to the Council on Environmental Quality by Arthur D. Little, Inc., Vol. 1, pp. 1-26, 1-43, 1-51 (1973).



[1]Total impact including primary, supplier and induced

[2]Baseline assumes no deepwater terminal at any location along the Gulf

[3]Total State

[4]Louisiana Gulf Coast.

[5]Fresh water equivalent

[6]Upper of bar sets assumes full application of advanced waste treatment technology to meet 1983 effluent standards ("best available"); lower of bar sets assumes full application of "best practicable" technology (1977 standard)

[7]Assumes full secondary treatment of total population in 1970

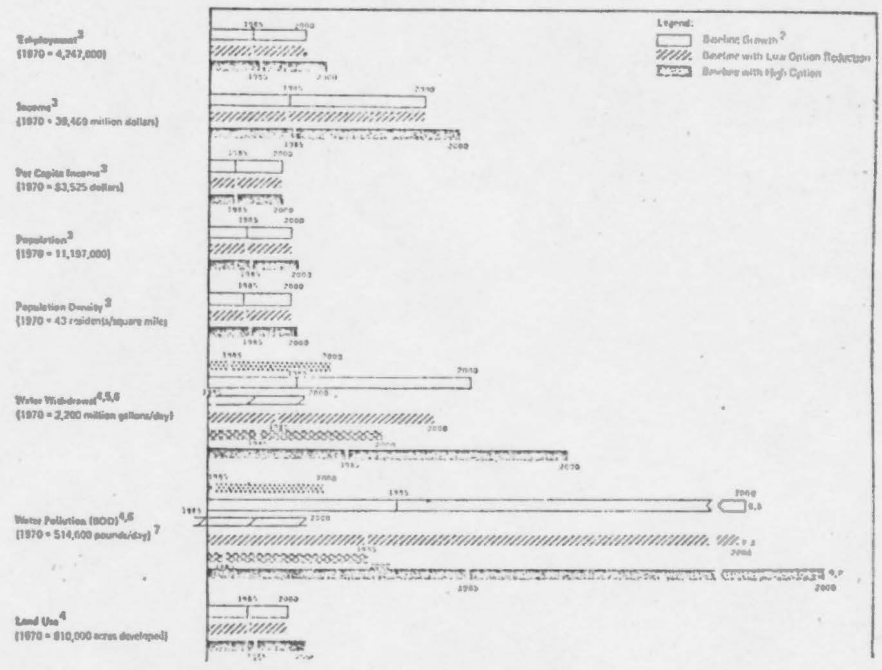
Source: Arthur D. Little, Inc

FIGURE 3.—Louisiana: 1985/2000: Selected measures of estimated total relative refinery and petrochemical-based economic and environmental impacts.

The justifiability of expectations that secondary growth and land-side environmental impacts will result from the development of deepwater ports has been supported by several other Government and independent studies.[3] Most sources agree that while not necessarily required from a technological point of view, there is significant economic incentive to locate petroleum transportation, processing and related facilities in areas where such facilities or access to such facilities already exist. Without certain institutional controls to encourage dispersion of deepwater ports and related industrialization, many foresee a tendency for these patterns of development to intensify and increase as deepwater ports become incorporated into the petroleum supply and distribution system.

Suitable controls might be designed so that inland demand centers are supplied by pipeline with crude oil rather than with products

[3] For a more complete discussion of secondary growth impacts see Appendix D.



[1] Total impact includes primary, supplier and induced.

[2] Baseline assumes no deepwater terminal at any location along the Gulf.

[3] State total.

[4] Texas Gulf Coast region.

[5] Fresh water withdrawal.

[6] Above all low cases assumes full application of advanced wastewater treatment technology to meet 1983 effluent standards ("best available"); lower of two cases assumes full application of "best practical" technology (1977 standards).

[7] Assumes full secondary treatment ("best practical") in 1976.

Source: Arthur D. Little, Inc.

FIGURE 4.—Texas: 1985/2000: Selected measures of estimated total relative refinery and petrochemical-based economic and environmental impacts.

refined at locations nearby a deepwater port, thus encouraging the development of refineries and petrochemical industries away from land areas adjacent to terminal sites.

For example, the results of a U.S. Department of Transportation study suggest that refining deepwater port throughput at inland sites would be tenable and perhaps even preferable, from an economic point of view.

DOT investigations led them to conclude that:

> In terms of transportation costs, refinery location is a significant factor affecting the least cost superport location. *However, superport location does not affect the least cost refinery location.* (Emphasis added)
>
> The transportation cost savings offshore attributable to a superport can be more than offset by the dissaving due to uneconomical location of refineries.[4]

[4] Hearings, Senate Special Joint Subcommittee on Deepwater Ports Legislation, 93d Cong., 2d Sess., Serial No. 93-59.

While current industry proposals call for the development of deepwater ports with throughputs as high as 3 or 4 million barrels per day, economic analysis has demonstrated that a reasonable rate of return could be realized by operating terminals at a much lower throughput capacity of around 1 million barrels per day.[5] It might therefore, be feasible to limit the throughput allowed at any one terminal. Such action would operate to reduce pressure for refinery and petrochemical industrial development in the adjacent land area.

At high U.S. crude oil import levels, throughput limitations or other dispersion policies could result in locating deepwater ports adjacent to areas which have not previously experienced either extensive port or refinery and petrochemical industrial development and which would benefit most from economic growth.

Although it has been argued that the secondary economic benefits of deepwater port development outweigh the risks of adverse secondary environmental impacts, some studies of the secondary economic impacts of deepwater port development suggest that the cost of providing additional public services required by accelerated growth may, in some cases, render the relative benefits of new industrialization to State and local governments only marginal. Conceivably this could reduce the incentive for a State to welcome deepwater port development off its shores. In this regard many States have been actively seeking the establishment of adequate environmental and economic safeguards at the Federal level and assurances that State interests will be given full consideration in any federally administered deepwater port licensing and regulation program.

Furthermore, in light of a developing concern for improved protection and management of the coastal zone, industry proposals to construct offshore deepwater ports have prompted many coastal States to enact legislation which will significantly influence the future of such development in the United States.

[5] Dr. William Johnson, *Hearings before Senate Special Joint Subcommittee on Deepwater Ports*, 93d Cong., 2d Sess., Serial No. 93-59.

CHAPTER 4.—COASTAL STATE RESPONSE

In general, the Gulf Coast States favor deepwater port development and hope to benefit from the associated secondary growth impacts. Most attractive to these States is the anticipated increase in employment and revenue generated by refineries and petrochemical industries which may locate onshore to process crude oil moving through an offshore terminal. The prospect of such benefits has resulted in the establishment of the Offshore Terminal Commission in Texas and the Deep Draft Harbor and Terminal Authority in Louisiana. The States of Mississippi and Alabama have joined forces to create the Ameraport Corporation and are seeking to formalize their activities pursuant to a Federally approved interstate compact. While such entities vary with respect to organization and statutory authority, each has as its objective to promote the development of a deepwater port off its parent State's shores.

In the course of evaluating and formulating policies toward deepwater port development, these States have conducted numerous studies to assess potential port-generated economic and environmental impacts. In most cases such studies have concluded that substantial economic benefits will accrue to the States if environmental and secondary growth impacts can be effectively controlled. Some State authorities view public ownership of deepwater ports as the only means of exercising such control. This belief has led the Texas Offshore Terminal Commission to propose building a State-owned deepwater port in order to guarantee that the facility will be regulated in a manner fully consonant with State interests.[1] As a corollary to efforts promoting deepwater port development, Gulf Coast States have also strengthened their coastal zone management and environmental protection laws.

On the East Coast, environmental quality is of primary concern and there is considerable opposition to refinery siting and petrochemical industrial development. Strong coastal zone protection laws with the effect of prohibiting or severely limiting the development of deepwater ports have been proposed or enacted in several Northeastern States, including Delaware, New Jersey, and Maine.

Nevertheless, Atlantic Coast States have continued to assess the potential benefits of offshore deepwater ports. Maine is currently weighing the possible economic growth advantages of a supertanker terminal and refinery siting proposal against its potential adverse environmental impacts. Delaware has completed a study considering the possibility of constructing a State-controlled deepwater port offshore to eliminate the need for lightering operations and the risks of oil pollution in the Delaware Bay. New Jersey is considering legislation to create a State agency which would build, own and operate a deepwater port. In spite of such proposals public opposition to deepwater ports and

[1] Texas Offshore Terminal Commission, *Plan for Development of a Texas Deepwater Terminal*, Jan. 24, 1974.

related industrial expansions along the Atlantic Coast will most likely remain strong enough to block or substantially delay any such development.

On the West Coast expectations are that shipments of Alaska North Slope oil will require accommodations for tankers ranging up to 150,000 dwt at three main ports; Puget Sound, San Francisco, and Los Angeles/Long Beach. Unlike the Gulf and Atlantic Coasts, some of the major West Coast port complexes are not constrained from receiving deep draft tankers by insufficient water depths. While a 150,000 dwt tanker is not properly classified as a "supertanker" it is capable of carrying close to 900,000 barrels of oil in one haul. Officials and residents of West Coast States have begun to express concern over having these tankers operating close to shore. There is, therefore, growing support for building deepwater ports offshore along the West Coast to receive tankers carrying Alaskan oil.

The pressures of increasing petroleum transportation activities on the West Coast have also resulted in accelerated efforts to improve vessel traffic monitoring and control systems. Such efforts are in addition to those promoting the enactment and implementation of coastal zone management and protection, and land-use planning programs.[2]

Responding in particular to West Coast concerns, the Congress, in 1973, acted to provide safeguards against possible adverse impacts of moving large volumes of Alaskan oil in coastwise trade. Thus, the measure authorizing the Trans-Alaskan Pipeline[3] accelerated the deadline, as applied to vessels in coastwise trade, by which the U.S. Coast Guard would exercise its authority under the Ports and Waterways Safety Act of 1972[4] to require marine transport safeguards such as advanced communication and traffic control systems, double bottoms and segregated ballast.

In general, deepwater port development on the West Coast will hinge on the movement of oil from the Trans-Alaska pipeline. Even though deepwater ports could be developed at nearshore locations, growing sentiment on the West Coast appears to favor deepwater port development offshore.

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[2] California, for example, has enacted the Coastal Zone Conservation Act which established planning standards and strict regulation over all development in the State's Coastal zone. The San Francisco Bay Conservation and Development Commission has also been established to regulate non-marine related development activities.

[3] PL 93-153.

[4] 33 U.S.C. 1321-1322.

CHAPTER 5.—THE NEED FOR U.S. DEEPWATER PORTS

When deepwater port development was first proposed in the United States, the need for such facilities was based on projections of unprecedented increases in United States petroleum import demands. Accordingly, industry and government sources associated a failure to build deepwater ports in the United States with excessive petroleum transportation costs, the exportation of refinery capacity, loss of employment and revenue, adverse impact on U.S. balance of payments, and congestion of U.S. port and harbor facilities accompanied by increasing risks of environmental degradation.

The argument for deepwater port development has lost some force over the last year as changes in national policies and programs reflect a growing concern for reducing U.S. reliance on imported petroleum supplies. Some opponents of deepwater port development have even suggested that there is no longer a need for U.S. deepwater ports and that a Federal program authorizing their development might inhibit the achievement of newly established energy policy goals by creating an infrastructure wholly dependent on the continuation of petroleum imports. There are two reasons why, however, considerable interest in deepwater port development continues in the United States.

First, according to current plans, oil produced on Alaska's North Slope will be carried to West Coast ports by tankers ranging up to the 150,000 dwt class. While a 150,000 dwt tanker is not properly considered a "supertanker," it can carry close to 900,000 barrels of oil. Even though ports on the West Coast are deep enough to accommodate 150,000 dwt tankers, officials and residents of West Coast States have expressed growing concern over unloading large volumes of oil close to shore. There is a popular view on the West Coast that offshore deepwater ports should be used to unload oil transported from the Alaskan North Slope.

Second, although future U.S. demand for petroleum imports will depend on several highly variable and unpredictable factors including the success of efforts to promote energy conservation and curtail growth in energy demand, and to develop domestic energy supplies including alternative energy forms, such demands will probably remain high at least through the next decade. This would be a long enough period to allow the owners of a deepwater port to recover their original investment in the facility.

It is assumed, in spite of the political uncertainties involved, that imported petroleum supplies will originate from the Middle East where over 80% of proven world petroleum reserves are located. If demand for petroleum imports remains high then the United States could recognize significant environmental and economic advantages if imports from the Middle East could be transported directly to U.S. deepwater ports as crude petroleum rather than being shipped as refined products from nearby foreign refining centers.[1] The number of

[1] As stated previously, the cost advantages of supertankers depend on transporting large volumes of crude petroleum over long distances. The transshipment of products from nearby foreign refining sites is more costly than shipping crude oil directly to the United States. In addition the greater number of ships required and the added disadvantage that petroleum products are considered more toxic to the environment than crude petroleum make transshipment of products less desirable than the transportation of crude petroleum by supertankers from an environmental point of view.

U.S. deepwater ports which may be required depends on such factors as overall national energy demand, the availability of domestic energy supplies and the growth in U.S. refinery capacity.

National Energy Demand

Although projections about the level of growth in national energy demand varied, there was little dispute prior to the Middle East oil embargo which began on October 17, 1973, that demand for petroleum products in the United States would at least double over the next decade. Energy forecasters predicted that petroleum import demands would, therefore, double by 1980, and that a major portion of these imports would be crude oil from the Middle East.

For the year preceding the Middle East oil embargo, it appeared that such projections would probably prove correct as patterns of U.S. energy consumption demonstrated a rapid growth in oil import levels and a shift towards greater reliance on Middle East oil supplies. For example, in 1972 major sources of U.S. crude oil imports were Mideast/Africa (867.7 thousand barrels per day (MB/D)), Canada (854.4 MB/D), and Latin America/Caribbean (501.5 MB/D). By September of 1973 the average annual totals of crude petroleum imports by major source were: Mideast/Africa, 1494.6 MB/D; Canada, 1146.9 MB/D; Latin America/Caribbean, 639 MB/D.

As events during the embargo demonstrated, however, high growth in national energy demand and increasing reliance on imported petroleum supplies need not continue indefinitely.

During the Middle East oil embargo, the United States substantially reduced energy consumption. Although energy demands increased after the oil embargo was lifted, conservation of energy continues to be espoused as a national goal. How successful energy conservation efforts are in the future depends on what national policy directives are put into force. At the very least, however, the higher cost of energy should continue to result in more productive and efficient use of energy supplies which will reduce the rate of growth in national energy demand below pre-embargo oil import projections. Nevertheless, there is little dispute, that even though the *rate* of growth is slowed, overall U.S. energy demands will continue to increase. What portion of these demands are met by petroleum imports depends on the availability of domestic energy supplies.

Domestic Energy Supply

During the Middle East oil embargo, achieving national energy self-sufficiency emerged as a high priority national goal. As a result, programs to increase oil and gas production on the Outer Continental Shelf, accelerate the production and use of coal, and develop alternative energy forms such as nuclear power, geothermal steam, solar energy, and gas and liquid fuels from coal, moved ahead with added momentum. However, in spite of the new commitment to national energy self-sufficiency, most forecasters agree that the time when the United States can rely on its own energy resources lies some distance in the future.

For example, one Government source has estimated that, even under an accelerated program to develop alternative domestic energy forms and curtail energy demands, a significant volume of crude petroleum imports (possibly as great as 4.4 million barrels a day) will be required into the next decade.[2] If such projections are correct, the need to import substantial quantities of petroleum will continue for some time to come.

Furthermore, insofar as energy self-sufficiency is concerned, the President's announced objective for "Project Independence" (the official Administration watchword for the national energy self-sufficiency goal) is to achieve a "capacity" for self-sufficiency. According to an Administration spokesman, such a "capacity of self-sufficiency . . . does not necessarily mean zero imports. If by 1980 world conditions are sufficiently stable and world sources of oil sufficiently diverse, it may well be in the national interest to continue the importation of some limited amounts of crude oil." [3]

According to this view, it would appear that a policy directed towards obtaining a capacity for energy self-sufficiency by the beginning of the next decade does not mean that the United States will discontinue petroleum imports. Furthermore, even though successful development of alternative domestic energy forms should reduce future import levels to below original pre-embargo forecasts it is still anticipated that import demands will be high enough to warrant the development of U.S. deepwater ports if such imports are in the form of crude petroleum as opposed to petroleum products.

U.S. Refinery Capacity

Because it is not economically feasible to transport refined petroleum products by supertankers, the need for deepwater ports in the United States depends on what volume of petroleum imports arrive as *crude oil*. It is the availability of domestic refinery capacity which determines what portion of petroleum imports arrive as crude oil as opposed to refined products.

Refinery expansion in the United States has been at a virtual standstill over the last decade. During this period, environmental concerns, siting controversies, and uncertainties about crude oil supplies caused by the Mandatory Oil Import Program led to an exporting of refinery capacity to foreign sites where tax advantages and lack of environmental controls favor such development.

Following revocation of the Mandatory Oil Import Program and prior to the Middle East embargo, crude oil was imported to the United States in sufficient volume to offset the difference between domestic crude oil production and domestic refinery capacity. Additional imports in the form of petroleum products arrived in quantities sufficient to make up the difference between U.S. refinery output and the national demand for petroleum products. Thus, in late 1973, U.S. refinery capacity stood at about 13.6 million barrels a day (MMB/D) exceeding domestic crude oil production by 3 MMB/D. U.S. petroleum products demand equalled 17 MMB/D with the difference between domestic demand and refinery output (2.4 MMB/D) being met by petroleum products imports.

[2] *The Oil and Gas Journal* (March 18, 1974), Federal Energy Office estimate.
[3] Reprinted in Appendix B of this report.

In spite of early 1973 Administration pronouncements and changes in policy designed to encourage domestic refinery construction, subsequent gains in refinery capacity were the result of expanding existing facilities or completing projects already underway at the time that Federal policy changes were announced. Since there is no Federal refinery siting policy *per se*, a mix of State and local policies, Federal environmental controls, various technological factors, and prospects for reliable crude oil supplies will continue to determine the rate at which new domestic refinery capacity is brought on line. Furthermore, leaving policy considerations aside, actually constructing a new refinery can take anywhere from 2 to 3 years.

Until such time as the gap between demand for petroleum products and U.S. refinery capacity is closed, further increases in petroleum import demands will most likely be met by refined products rather than crude oil. This would appear to be true even though domestic crude oil production declined almost 10% over the last year, from 10.8 MMB/D in 1972 to 9.8 MMB/D in 1973. It would seem that the decline in domestic petroleum production rates would precipitate an increase in crude oil imports, and that the Middle East with its vast oil reserves might be the largest source of supply. However, oil produced in the Middle East as well as in most other foreign nations is sour (high sulfur content) crude petroleum, while most American refineries are designed to process the sweet (low sulfur content) crude petroleum produced in the United States. Supplies of sweet crude in the world market are tight, yet both technological and environmental factors prevent the use of the more widely available sour crude oil in American refineries until they are properly refitted to process sour crude and remain in compliance with air quality standards. Even with some relaxation of air quality standards as recommended by oil industry spokesmen, retrofitted refineries and new refineries equipped to handle high sulfur crude oil will be required if the United States expects to increase substantially the volume of crude oil supplies imported from the Middle East.

The relationship between deepwater port development and U.S. refinery expansion leads to a discussion reminiscent of the controversy over "what came first, the chicken or the egg?" Industry representatives repeatedly assert that domestic refinery expansion will not progress at a rapid rate without assurances of secure crude oil supplies. In the industry's view, such assurances inevitably involve a commitment to the development of U.S. deepwater ports which will allow them to plan on transporting crude oil in the most economic means possible.

However, unless there is sufficient domestic refinery capacity available, few deepwater ports will be needed in the United States since nearby foreign refining centers will supply the United States with petroleum products.[4]

Because it is generally agreed that the United States will need to import petroleum supplies from foreign sources for some time to come, industry spokesmen and Federal officials warn against forcing the United States to rely on foreign refinery capacity by failing to enable

[4] See ch. 1, Note 3. *supra*.

the development of U.S. deepwater ports. Industry and government studies have concluded that the United States economy would lose potential investment and employment opportunities as industry turned to foreign refinery sites. Furthermore, the economic and environmental advantages of supertanker transportation would be lost to the United States as greater numbers of conventional tankers were used to transport petroleum products to American ports.

In summary, there appears to be a need to build deepwater ports on the West Coast soon, in order to facilitate the transportation of oil from Alaska's North Slope. Furthermore, as far as the need to build deepwater ports off other U.S. coastal areas is concerned, those who have considered the prospects of reducing United States energy demand and increasing domestic energy supplies feel that future import levels will warrant the development of at least a few deepwater ports in the very near future. Accordingly, it is argued that the failure to establish a Federal program enabling U.S. deepwater port development to proceed soon, will result in continued exportation of refinery capacity accompanied by economic loss, and an incremental increase in burdens on U.S. port and harbor facilities to a point where both economic and environmental costs are being borne unnecessarily by the United States because it has no deepwater ports.

CHAPTER 6.—INTERNATIONAL AND DOMESTIC LEGAL IMPLICATIONS

At the present time, there is no Federal agency *specifically* and *exclusively* empowered to authorize and oversee the construction, operation, and use of deepwater ports.

Development of deepwater terminal facilities at near shore sites (within U.S. territorial limits) would require a number of different Federal, State and local authorities to exercise their jurisdiction with respect to: (1) siting, constructing and operating the various structures and facilities involved; (2) insuring compliance with standards of environmental quality and land use; and (3) assuring that operational and navigation safety standards are met. Development of such near shore facilities is therefore subject to a whole range of permit procedures and standards of compliance implemented by a complex interface of Federal, State, local and possibly interstate government entities. For example, in addition to whatever standards of development are imposed by State, regional or local authorities, deepwater port development within territorial waters would require the grant of a permit by the Corps of Engineers, pursuant to its authority under the Rivers and Harbors Act, over dredging and erecting structures in navigable waters; approval from the U.S. Coast Guard under its authority to regulate navigation and transportation of hazardous materials; and the concurrence of other Federal agencies with environmental protection functions. Approval of deepwater port development by any Federal agency would undoubtedly be considered a "major Federal action" and as such would require the preparation of an environmental impact statement pursuant to Section 102(2)(C) of the National Environmental Policy Act. However, by virtue of their jurisdiction over landside activities, and because the Federal Government has conveyed certain rights to the States under the Submerged Lands Act, the States are viewed as having dominant control over deepwater port development in territorial waters.

In spite of the fact that sufficient legal authority exists to enable deepwater port development within the three-mile territorial limit, the availability of natural deepwater sites within these boundaries is limited. Thus, while there is still some pressure to dredge existing U.S. ports to provide sufficient depths for supertanker operations, industry has responded to the opportunities for more economic petroleum transportation by joining in consortia which propose to construct and operate offshore deepwater ports. Two such proposals involve siting four or five single point mooring terminal buoys in a cluster, about 25 miles off the U.S. gulf coast, that is, beyond U.S. territorial limits. The facilities would be linked by buried submarine pipeline to shore-based storage, pipeline, refining, and processing facilities.

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The United States has no clearly defined legal framework by which to authorize and regulate deepwater port construction and operation in international waters. Before such activities can proceed it will be necessary to resolve both the international and domestic legal issues involved.

International Legal Implications

As far as can be determined, a U.S. deepwater port constructed in international waters would be the first such facility located outside a nation's territorial limits anywhere in the world. While a nation exercises absolute jurisdiction over its territorial waters by virtue of the International Convention on the Territorial Sea and Contiguous Zone,[1] the freedom of all nations to make certain recognized uses of waters beyond territorial boundaries is guaranteed by the International Convention on the High Seas.[2] In addition, the Convention on the Continental Shelf [3] authorizes a coastal nation to erect structures on its continental shelf for the purpose of exploring and exploiting the mineral and non-living resources, and sedentary living species on or under the seabed.

No existing international law, treaty, or agreement specifically recognizes the construction and operation of deepwater ports as a permissible use of international waters. Absent such authority, the United States could possibly wait and hope for clarification of pertinent international legal issues by the 1974 Law of the Sea Conference before authorizing the development of deepwater ports. However, in view of the time element involved, both with respect to reaching international agreement and the number of years required to plan and construct an offshore terminal facility, many believe that pursuing this course would place unnecessary and costly burdens of uncertainty on the deepwter port development process.

It is also conceivable that a nation wishing to use the high seas in a manner not specifically authorized by international law might unilaterally extend its territorial jurisdiction for this purpose. However, official and non-official sources alike regard such action by the United States as inappropriate in view of this nation's desire to seek limitations during the Law of the Sea Conference on unilateral extensions of territorial jurisdiction. Furthermore, those who favor

[1] Adopted by the United Nations Convention on the Law of the Sea, April 29, 1958 (U.N. Doc. A./Conf. 13/L. 52). According to article 1 of the Convention "The sovereignty of a State extends, beyond its land territory and its internal waters, to a belt of sea adjacent to its coast, described as the territorial sea." Historically, a majority of nations (including the United States) claimed three miles as the extent of their territorial limits although claims to wider margins of six and twelve miles were also made. Recently, however, many nations have asserted jurisdiction over much larger areas in a manner commonly described as "creeping jurisdiction" to protect fishing or other economic and environmental interests. It is anticipated that the 1974 Law of the Sea Conference will establish twelve miles as the acceptable maximum limit for extension of territorial jurisdiction.

[2] Adopted by the United Nations Convention on the Law of the Sea, April 29, 1958 (U.N. Doc. A/Conf. 13/L. 53) article 2 of the Convention provides that: "The high seas being open to all nations, no state may validly purport to subject any part of them to its sovereignty. Freedom of the high seas is exercised under the conditions laid down by the articles and by the other rules of international law. It comprises, *inter alia*, both for the coastal and noncoastal States:

(1) Freedom of navigation;
(2) Freedom of fishing;
(3) Freedom to lay submarine cables and pipelines; and
(4) Freedom to fly over the high seas.

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

[3] Adopted by the United Nations Conference on the Law of the Sea, April 29, 1958 (U.N. Doc. A/CONF. 13/L. 55). Article 1 of the Convention defines "continental shelf" as ". . . the seabed and subsoil of the submarine areas adjacent to the coast but outside the area of the territorial seas, to a depth of 200 metres or, beyond that limit, to where the depth of the superjacent waters admits of the exploitation of the natural resources of the said areas;" and ". . . the seabed and subsoil of similar submarine areas adjacent to the coasts of islands."

developing U.S. deepwater ports maintain that sufficient authority to exercise Federal jurisdiction on the high seas for that purpose may be inferred from the existing international regime.

For example, it has proved tempting to search the Convention on the Continental Shelf for authority to construct and operate deepwater ports. However, this approach has been consistently rejected by both government and academic sources on the grounds that the Continental Shelf Convention supports only those activities which are related to the exploration and exploitation of the OCS seabed resources, a use for which deepwater ports are not intended.

Some sources have also suggested that deepwater ports might fall into the category of roadsteads, water areas "used for the loading, unloading and anchorage of ships" which according to Article 9 of the Convention on the Territorial Sea and Contiguous Zone,[4] when they "would otherwise be situated wholly or partly outside the outer limit of the territorial sea, are included in the territorial sea." In general, however, analogizing deepwater ports to roadsteads, or to artificial islands, vessels or any other structures or activities *specifically* governed by international accord is regarded as inconsistent with the meaning and intent of international law.

The most widely supported belief is that constructing and operating deepwater ports beyond a nation's territorial limits constitutes a "reasonable use" as contemplated by Article 2 of the Convention on the High Seas.[5] Thus, under the authority of this Convention a nation might properly exercise jurisdiction on the High Seas in order to license and regulate such facilities. Proponents of this interpretation find support for their view in the phrase *inter alia* which implies that the authors of the Convention on the High Seas foresaw a need to permit a broader range of uses than those four specified in Article 2. This interpretation has been actively promoted by the U.S. Department of State and other Executive agencies.

However, although they consider development of deepwater port facilities to be a reasonable use of the high seas under international law, the State Department also feels it is necessary to continue to seek multilateral agreement on a coastal State's exclusive right to authorize and regulate such facilities within a designated "Coastal Seabed Economic Area."

For this reason, the United States Delegation attending the Third International Conference on the Law of the Sea has been working to clarify international regulation of deepwater ports by proposing draft treaty articles concerning the construction, operation and use of offshore installations affecting a coastal States' economic interests.[6]

The Department of State has also reported that there are nine international conventions to which the United States is party which could bear directly on the development and implementation of a national deepwater port policy. These include:

1. *Convention on the Territorial Sea and Contiguous Zone* (establishes sovereignty over territorial waters and guarantees rights of innocent passage).

[4] See note 1. *supra.*
[5] See note 2. *supra.*
[6] *United States of America; Draft Articles for a chapter on the Rights and Duties of States in the Coastal Seabed Economic Area,* reported in Appendix C.

2. *Convention on the High Seas* (assuring freedom of navigation, of fishing, to lay submarine cables and pipelines, and to fly over the high seas).

3. *Safety of Life at Sea Convention* (SOLAS) (pertaining to ship construction, equipment and operational standards affecting the safety of passengers and crew).

4. *International Convention on Load Lines* (pertaining to the control of certain operational aspects of ships docked in foreign ports).

5. *Internatonal Regulations for Preventing Collisions at Sea* (voluntary rules of the road).

6. *International Convention for the Prevention of Pollution of the Sea by Oil* (as amended) (directed towards the reduction of intentional and nonintentional discharges of oil into the sea).

7. *International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution* (not yet in effect).

8. *International Convention on Civil Liability for Oil Pollution Damage.*

9. *Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage* (not yet in effect).

In the State Department's view, some amendments to these international agreements may be necessary in order to accommodate deepwater port development. Accordingly, a statement submitted to the Senate Special Joint Subcommittee on Deepwater Ports Legislation discussed these admendments as follows:

> The Convention for Safety of Life at Sea (1960) and the International Convention on Load Lines (1966) both establish systems whereby the presence of certain certificates may be checked and the requirements of the convention enforced in foreign ports by the port state. Amendment of these conventions may be necessary to assure their application to superports. Potential amendment to the multilaterally developed International Regulations for Preventing Collissions at Sea may provide a possible basis for particularizing rules of the road for superport areas. Some provisions of the International Convention for the Prevention of Pollution of the Sea by Oil, in particular the 1971 amendment to this Convention, would also apply to superports. The International Convention Relating to Intervention on the High Seas in cases of Oil Pollution Casualties would appear to apply to superports when it comes into effect. Finally, the International Conventions on Civil Liability for Oil Pollution Damage (1969) and on Establishment of an International Fund for Compensation for Oil Pollution Damage (1971) might apply to superports, if amended.[7]

Regardless of the authority under which the U.S. Federal Government describes its jurisdiction over offshore deepwater ports, the facility must be constructed and operated in a manner which will not unduly interfere with the rights of other nations under international law or with authorized uses of the oceans in which the United States or its citizens may be involved, such as Outer Continental Shelf resource exploitation, fishing, or scientific research, and marine environmental protection.

[7] *Hearings before Senate Special Joint Subcommittee on Deepwater Ports Legislation*, 93d Cong., 2d Sess., Serial No. 93-59.

Domestic Legal Implications

Without some formal provision to that effect the laws of the United States would not automatically extend to a deepwater port facility constructed beyond territorial waters. The manner in which these laws are applied will depend upon the basis in international law by which the United States describes its jurisdiction over facilities constructed on the high seas and the institutional arrangement designed to administer U.S. deepwater port policy.

The development and operation of deepwater ports whether they are within or outside U.S. territorial waters, involves a broad range of national concerns including energy resource supply, environmental quality, navigational safety, and economic viability. As will be discussed in Chapter 7, responsibility for these matters resides in a number of Federal agencies, offices and bureaus. Those Federal Laws which might be particularly applicable to deepwater ports and their associated facilities are those regulating tanker operations, the erection of structures and environmental quality in navigable waters; leasing on the Outer Continental Shelf, pipeline safety, air and water quality, and management of the coastal zone. Some of the major laws effecting these policies include:

Rivers and Harbors Act (33 U.S.C. 540 et seq.).

Ports and Waterways Safety Act (33 U.S.C. 1221–1222).

Federal Water Pollution Control Act as amended (33 U.S.C. 1251 et seq.).

Marine Protection, Research and Sanctuaries Act of 1972 (86 Stat. 1052; 33 U.S.C. 1401–1421).

Outer Continental Shelf Lands Act (43 U.S.C. 1331–1346).

Clean Air Act (42 U.S.C. 1857 et. seq.).

National Environmental Policy Act (42 U.S.C. 4321 et seq.).

Coastal Zone Management Act (16 U.S.C. 1451–1464).

In addition, the Federal Government has conveyed certain rights within territorial limits to the States under the Submerged Lands Act (67 Stat. 29, 43 U.S.C. 1301 et seq.).

The body of law governing activities within U.S. territorial boundaries and in navigable waters could if applied to deepwater port development on the high seas, provide basic environmental and navigational safeguards. However, some of the unique aspects of deepwater port construction, operation and use require that additional and more specific protection be devised. For example, questions on, whether existing U.S. law is sufficient to fully regulate port facilities on the high seas were raised during 1973 hearings before the Senate Special Joint Subcommittee on Deepwater Ports.

State Department response to the question, ". . . what specific further actions, including additional studies or investigations, do you recommend the Federal Government undertake with respect to the development of deepwater ports?" was as follows:

> The State Department believes that more detailed consideration should be given to questions such as shipping and navigational safety requirements, storage and transshipment, environmental requirements, the customs laws and civil and criminal jurisdiction as related to the operation of deepwater

port facilities. Such consideration could provide inputs for further decisions on regulatory and licensing policies." [1]

A number of independent and government sources have emphasized a need to meet environmental protection and navigation safety concerns related to deepwater port development by providing the legislative authority necessary to:

Establish site quality evaluation criteria which include consideration of both direct marine, and secondary landside environmental impacts;

Establish specific engineering design, equipment and operating standards for deepwater ports and their associated pipeline and storage facilities;

Develop standards for vessel operation and for cargo transfer, oil spill prevention and oil spill containment systems.

In addition, an interagency Study Group formed by the White House to examine the legal issues involved in deepwater port development reported on two matters of particular interest.

First, with respect to licensing pipelines on the Outer Continental Shelf the study group pointed out that the Department of Transportation has clear authority to regulate the *safety* of pipelines carrying natural gas pursuant to 49 U.S.C. Chapter 24. On the other hand, Department of Transportation authority to regulate pipelines carrying petroleum or other hazardous substances in interstate commerce (18 U.S.C. Chapter 39; 49 U.S.C. §§ 1655(e)(4)) applies neither to pipelines located on the United States Outer Continental Shelf or to storage facilities located on land.

The OCS Lands Act (43 U.S.C 1334(c)) authorizes the Secretary of the Interior to license pipeline construction on the Outer Continental Shelf and, in consultation with the Interstate Commerce Commission and the Federal Power Commission, to assure that they are operated without discrimination against any potential shipper of oil, gas, or other mineral products gathered from the shelf. The OCS Act does not, however, provide the the enforcement of safety requirements. According to the White House Legal Study Group it is, therefore, uncertain whether the Department of Interior or the Department of Transportation is responsible for regulating the safety of pipelines on the Outer Continental Shelf. The Study Group recommended that deepwater port legislation clarify authority to regulate the safety of pipelines and storage facilities associated with deepwater ports both to assure that no regulatory vacuum exists and to avoid overlapping jurisdiction among Federal agencies.

Second, the study group reported a need to extend the Customs Laws of the United States over a deepwater port with special regard for whether the port was a fixed structure with storage facilities or simply a pumping buoy. In the case of the former, according to the Study Group, there would be a need to conduct customs activities on the facility itself, while customs regulation of a pumping buoy structure would be better handled onshore. Furthermore, the Study Group recommended that coastwise trade, (which is controlled by the Bureau of Customs) with U.S. deepwater ports, be limited to American vessels.

[1] *Hearings before Senate Special Subcommittee on Deepwater Ports*, 93d Cong., 2d Sess., Serial 93-59. For a complete list of responses to this question by other Federal agencies see Appendix F of this report.

The importance of assuring that U.S. deepwater port development proceeds in a manner fully consistent with national and international laws and policies pertaining to navigational safety and both marine and landside environmental quality has been discussed in a broad body of literature on the subject of deepwater ports. However, one area of considerable importance which has not received such careful attention is the possible anticompetitive implications of deepwater port development.

Principles of preserving competition in the American economy are embodied in several laws and a long history of case law in antitrust. Briefly, the major provisions of Federal laws designed to preserve competition in the American economy are the Sherman Act (15 U.S.C., Sec. 1–7), the Clayton Act as amended by the Robinson-Patman Act (15 U.S.C., Sec. 12–27), and the Federal Trade Commission Act (15 U.S.C., Sec. 41–59).

The Sherman Act makes illegal every contract, combination, or conspiracy in restraint of trade or commerce among the several States or with foreign nations, and makes it illegal for any person to monopolize or to combine or conspire with any other person to monopolize any part of such commerce.

The Clayton Act prohibits price discrimination (except when based on grade, quality or quantity; or made in good faith to meet competition; or where only due allowance for difference in the cost of selling or transportation is made) where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly in any line of commerce. Section 7 of the Clayton Act forbids mergers in any line of commerce where the effect may be substantially to lessen competition or tend to create a monopoly.

The Federal Trade Commission Act states that unfair methods of competition and unfair or deceptive acts or practices in commerce are unlawful.

In addition, while not properly considered an antitrust law, the Interstate Commerce Act (49 U.S.C., Sec. 1–1301), which regulates the operation of railroads and water carriers in interstate commerce, also assures that common carrier oil pipelines will be operated without discrimination against any oil shipper.

Pursuant to these statutes, the Department of Justice, the Federal Trade Commission and the Interstate Commerce Commission all have functions related to preserving competition in the U.S. economy.

In spite of the protection afforded by these laws, however, it has been suggested that legislation authorizing the development of deepwater ports should provide specific assurances against the possible anti-competitive impacts of such development.

In testimony during Senate committee hearings on legislation authorizing the development of offshore deepwater port facilities, the Director of the Federal Trade Commission's Bureau of Competition stated the Commission's concern that the owners of such facilities would effectively control the entry and distribution of crude oil for significant areas of the country. The potential for abuse of such power, in the Commission's view, warrants the establishment of vigorous license application review procedures and permit conditions.[3] Possible

[3] Hearings, *Senate Joint Subcommittee on Deepwater Ports Legislation*, 93d Cong., 2d sess., Serial No. 93-59.

abuses suggested in Federal Trade Commission testimony included the potential for port owners to engage in exclusionary or discriminatory behavior and to influence the location of future refinery capacity and petrochemical industries.

Further testimony presented by the Justice Department's Anti-Trust Division emphasized that deepwater ports must be operated in a manner which would provide "reasonable and nondiscriminatory access to other competing firms." According to the Anti-Trust Division testimony, even though an installation could ostensibly be operated as a "common carrier" (along the lines described by the Interstate Commerce Act), certain characteristics of deepwater port facilities might permit reasonable access to be denied as a practical matter by sizing or routing the facility and pipeline in such a way as to make it impractical or uneconomic for some potential customers to use, or by imposing tariff requirements which could not be met by potential users.

While the Justice Department viewed as unnecessary any ban on joint activities by oil companies in the construction and operation of deepwater ports they testified further that:

> An argument can be made that large scale joint ventures are unnecessary in these offshore facilities. The usual reason given for prevalence of joint ventures in the petroleum industry is that situations presenting considerable risks and very large capital requirements make necessary sharing of both risk and investment.
>
> But in construction of large pipeline systems, for example, petroleum companies have followed the 90–10 practice; 10 percent of capital requirements are met by direct investment and 90 percent by outside financing.
>
> If the total costs estimated for [deepwater ports off the Gulf Coast] range from $390–400 million, then the capital investment, after outside financing, might run $39–40 million. This is not an inordinate sum for one of the major oil companies and might not be insurmountable for . . . smaller . . . companies.
>
> And a sharing-the-risk argument—often used to justify joint interests in exploration and drilling—does not seem applicable to this situation.
>
> The demand for imported oil,' which will be steady and growing over the foreseeable future, would seem to insure against any significant financial risk in the construction and operation of such an offshore facility.
>
> Bank financing should be no problem, and indeed, a deepwater port would seem such a good financial opportunity that one need not assume it would be attractive only to those already in the petroleum industry.[4]

According to Justice Department testimony, deepwater port development could be made subject to a "commodities clause" prohibiting a company which owned a deepwater port from using the facility to transport any commodity which it owns in whole or in part or in which it has any interest. The commodities clause was added to the

[4] Ibid.

Interstate Commerce Act by amendment in 1906 and currently applies only to railroads. However, such a provision might serve as an appropriate safeguard against the possible anti-competitive impacts of deepwater port development.

The Justice Department did not favor applying a "commodities clause" provision to deepwater port development. They did feel, however, that an application to construct a deepwater port should be subjected to their review prior to its approval.

The Federal Trade Commission testified that Federal policy should require that the FTC be consulted on the anti-competitive implications of a deepwater proposal before authorization was granted.

The Justice Department, Federal Trade Commission, and the Interstate Commerce Commission all felt that it was important to assure that deepwater ports and their associated pipelines would be regulated as "common carriers" by the Interstate Commerce Commission.

While, it is not certain what, in practice, the anti-competitive impacts of deepwater port development might be, it is possible that any potential for lessening competition through deepwater port development could be effectively reduced if appropriate controls were applied. Those who lack confidence in this approach, however, suggest that some form of public ownership of deepwater ports is the ultimate solution to the problem of potential anti-competitive abuse.

CHAPTER 7.—INSTITUTIONAL ASPECTS OF DEEPWATER PORTS

Legislation to authorize and regulate deepwater ports must describe an institutional arrangement to carry out Federal deepwater port policy and coordinate that policy with the policies and programs administered by other Federal government entities. In addition, because the technical aspects and secondary growth impacts of deepwater port construction and operation will involve the environmental and economic policies of the coastal States, regulation of deepwater port development will also require the coordination of Federal activities with those of State and local government.

Federal Responsibility

Before considering what institutional arrangement would be most suitable for administering Federal deepwater port policy it is useful to consider what government policies which have some relationship to deepwater port development are being carried out under existing law.

Several Federal agencies have responsibilities and expertise relating to the development of deepwater ports. They are as follows:

DEPARTMENT OF TRANSPORTATION

DOT has overall research, planning and coordination responsibility with respect to the economic, social and environmental interplay between domestic and international transportation systems and established policies, regulations and laws.

DOT also has authority to establish regulations for the safe transportation of hazardous materials, petroleum, and petroleum products in offshore areas and by pipelines and other carriers in interstate or foreign commerce.

Additional DOT authority includes:

Responsibility in the anti-pollution area relating to water quality in navigable waters;

Inter-face of authority over non-transportation related oil facilities with EPA and Department of the Interior; and

Jurisdiction over transportation of natural gas under Natural Gas Pipeline Safety Act of 1968 (49 U.S.C. 1671 et seq.).

Those offices or entities within DOT which have functions especially related to deepwater ports include:

U.S. Coast Guard.—U.S.C.G. is the Federal Maritime Law enforcement agency. It is, therefore, the Coast Guard's function to:

Maintain a system of rescue vessels, aircraft, and lifeboat stations to protect life and safety in navigable waters;

Enforce Federal laws on the High Seas;

Prevent, detect and control pollution on and adjacent to the navigable waters of the United States;

Maintain ocean stations to provide meteorological information to ships, aircraft and to the Weather Bureau;

Collect oceanographic data and furnish navigation information to ships and aircraft;

Maintain merchant marine safety through inspection and regulation of vessels;

Investigate and review marine casualties and acts of incompetency;

Maintain aids to navigation; and

Enforce rules and regulations governing the security of ports and anchorage and movement of vessels in U.S. waters.

National Transportation Safety Board.—NTSB has responsibility for surface transportation accident cause determination and safety promotion.

DEPARTMENT OF THE INTERIOR

Interior Department responsibilities include administration of public lands; conservation and development of mineral and water resources; conservation, development of fish and wildlife resources; and coordination of Federal and State recreation programs.

Offices or entities within the Department which have functions particularly relevant to deepwater ports include:

Bureau of Land Management.—The BLM administers programs and policies on Federal Lands including leasing mineral deposits on the Outer Continental Shelf.

Office of Oil and Gas.—The OOG functions relate to petroleum policy, programs and problems. It provides a channel of communication between the Federal Government, petroleum industry, petroleum producing States and the public.

Geological Survey.—USGS is responsible for the classification of the public lands and the examination of the geological structure, mineral resources and products of the national domain including those of the Outer Continental Shelf.

Other offices within the Department of the Interior which have some functions which may relate to deepwater port development include the Office of Water Resources Research, the Office of Land Use and Water Planning, the U.S. Fish and Wildlife Service, and the Bureau of Sport Fisheries and Wildlife.

DEPARTMENT OF COMMERCE

The Commerce Department is responsible for promoting the United States international economic position, fostering the development of the U.S. merchant marine and for protecting and promoting the development of marine fisheries.

Offices or entities within the Department which carry out functions relating to deepwater port development include:

National Oceanic and Atmospheric Administration.—In addition to assimilating information and data on the ocean environment and living marine resources, NOAA also:

Administers and directs the National Sea Grant Program by providing grants to institutions for oceanographic and marine environmental studies; and

Has authority over the Coastal Zone Management Program, the National Weather Service, the Marine Mammals Protection Act; and the Marine Protection, Research and Sanctuaries Act.

Maritime Administration.—MARAD administers programs to aid in the development, promotion and operation of the U.S. merchant marine and implements the Merchant Marine Subsidy Program.

CORPS OF ENGINEERS (DEPARTMENT OF THE ARMY)

Pursuant to the Rivers and Harbors Acts and the Refuse Act the Corps regulates rivers to improve water quality and enhance fish and wildlife; protect shores, oceans and lakes and to protect and prevent the obstruction of U.S. navigable waters. In carrying out these responsiblities the Corps issues permits for dredging, discharging effluents and erecting structures in navigable waters.

The Corps is also involved in overall regional planning for water resources management, and in the development and construction of projects in the nation's ports and waterways.

OTHER AGENCIES

Other Federal agencies or entities which administer programs or policies especially relevant to deepwater port development include:

The Environmental Protection Agency.—EPA is responsible for air and water quality programs including oil pollution control, and enforces among other laws, the Federal Water Pollution Control Act and the Clean Air Act.

The Council on Environmental Quality.—CEQ is responsible for assessing trends in, and recommending policies concerning, the quality of the environment.

Federal Maritime Commission.—The Commission carries out regulatory authorities under the Shipping Act, the Merchant Marine Acts and the Intercoastal Shipping Act, in addition to certain provisions of the Water Quality Improvement Act. The Commission, therefore, approves or disapproves agreements filed by common carriers including cooperative working agreements between common carriers, terminal operators, freight forwarders and other persons subject to the shipping laws.

Interstate Commerce Commission.—ICC regulates freight forwarders, water carriers and oil pipelines subject to the Interstate Commerce Act. In carrying out its functions the ICC assures that common carrier oil pipelines will be operated without discrimination against any shipper.

Federal Trade Commission.—FTC was created to promote free and fair competition in interstate commerce.

Justice Department.—The Justice Department is charged with responsibility for administering the anti-trust laws of the United States.

Department of State.—The State Department represents U.S. interests in international affairs.

In addition to those listed above, other Federal entities such as the Bureau of Customs in the Department of the Treasury and various offices, bureaus and administrations within the Department of Labor, have particular authority which could be brought to bear on the construction and operation of deepwater ports.

State Interests

States have significant and understandable interest in both the economic and environmental impacts within their boundaries, of deepwater ports off their shores. States have the power of approval over construction of onshore port-related facilities and pursuant to the Submerged Lands Act, over offshore pipelines within their territorial waters. A State's enthusiasm for or opposition to a deepwater port requiring landside facilities in its territory thus becomes a significant factor in authorizing and regulating such offshore tanker terminals.

The Federal government has legitimate interest in activities within State territorial waters under the Commerce clause of the Constitution. By virture of its authority over interstate and foreign commerce, the Federal government could conceivably preempt State and local jurisdiction in territorial waters for the purpose of regulating deepwater ports and their associated components. Regardless of whether or not the Federal government establishes a deepwater port authorization and regulatory process which covers facilities *within* as well as outside U.S. territorial waters, administering deepwater port policy will require close coordination of State and Federal activities from the early stages of planning deepwater ports through the regulation of their operations. In addition, the inclusion of private, industrial and public interests in these decisionmaking processes is essential to achieving fully effective planning and enironmental management goals.

Uncertainty over the State role in a Federal deepwater port authorization process has led some States and their elected representatives to seek a policy allowing State governments to veto Federal approval of deepwater port development affecting their coasts. Federal officials who oppose State veto power assure that State governments would be consulted in the Federal deepwater port authorization process, and that the Federal Government does not have sufficient authority to exercise the right of eminent domain for the purpose of siting deepwater port related facilities within State controlled waters thereby overriding a State's decision not to grant the necessary permits to complete connections between a deepwater port and the shore. Accordingly, deepwater port development would not be authorized off the coast of a State where substantial objection exists. However, officials of the States involved remain unconvinced and feel that the pressures for expanding petroleum related industrialization and the subsequent impacts at the State level are sufficient to justify allowing the final deepwater port siting decision to rest with the affected States.

A possible remedy to this dilemma which has been recommended is to require that each deepwater port proposal be congressionally approved following an appropriate agency review process. Those promoting this approach believe that requiring congressional approval of deepwater port projects would provide for representation of States' interests through their elected officials. Many also feel that congressional review of deepwater port proposals would allow decisions to be made within the context of the circumstances and conditions of energy resource development and supply which existed at the time the proposal was reviewed.

Alternative Institutional Arrangements

Several institutional mechanisms have been suggested for coordinating the functions and responsibilities of the various government authorities concerned with deepwater ports. These proposed institutional arrangements logically fall into two rough categories, those providing a modified continuation of existing authorities, and those requiring the creation of a new Federal entity. Such alternatives can be described as follows:

A. Extension of existing authority

The functions and responsibilities of all Federal agencies as previously described could be extended to deepwater port facilities constructed off the coasts of the United States. This action could result in requiring a party proposing to construct a deepwater port to obtain a permit from some established Federal agency. Such an agency might be the Corps of Engineers, which has authority to grant permits for the construction of structures in navigable waters or the Department of Interior which grants permits for the construction of oil and gas drilling platforms and pipelines on the Outer Continental Shelf; the Department of Transportation with its broad mandate to coordinate national transportation policies or the Department of Commerce with its involvement in maritime affairs and matters of commerce. Extending the authority of an existing Federal agency over deepwater port development might result in creating a new bureau or office of deepwater port policy administration within a department, or in expanding the functions of some existing bureau or office within the designated agency.

The party proposing to construct the deepwater port under this regulatory framework would have to meet the requirements of other Federal agencies and obtain such additional permits and licenses as may be necessary to construct pipelines and operate the facility.

Deepwater port legislation would also need to provide whatever additional authority would be necessary to cover those actions unique to the construction or operation of deepwater ports which are not sufficiently covered by existing Federal law.

However, in the interest of providing a more unified application review and approval process and to facilitate the coordination of Federal agency responsibilities it may be desirable to establish a deepwater port authorization procedure which would eliminate the need to file multiple applications for the various Federal authorizations required to construct and operate a deepwater port. This could be accomplished by any of the institutional arrangements described below.

B. Lead coordinating agency

The Federal Government could authorize and oversee the development of offshore supertanker terminals by designating one Federal agency and empowering it with the necessary authority to serve as the lead coordinating agency for U.S. deepwater port development.

Under this arrangement an application for deepwater port authorization filed with the lead agency, would constitute the application for all Federal authorizations which might be required to construct and operate the port. The head of the lead agency would then consult

with the heads of other Federal agencies to assure that the application met the requirements of all other Federal laws.

As discussed previously, there are several Federal agencies with functions and responsibilities directly related to the development of deepwater ports. Almost every one has been suggested by some source, as the agency best suited to assume the lead in the administration of a U.S. Deepwater Port policy. For example, the Department of the Interior, the U.S. Coast Guard and the Department of Commerce are each designated by different legislative proposals pending before the 93d Congress, as the principal licensing authority for the construction of offshore deepwater ports. Those who view deepwater port development as primarily an "energy" issue with broad implications for land use favor the Department of the Interior with its wide range of functions in these areas as the lead agency for deepwater port development.

The Department of the Interior is the focus of a government reorganization proposal transferring almost all functions of that department together with some of the energy and natural resource management functions of other Federal agencies to a new Department of Energy and Natural Resources. This proposal, now pending before the 93d Congress, has been offered as one justification for placing deepwater port policy anministration functions in the Department of the Interior.

The view that deepwater ports should be administered primarily as navigation or transportation facilities which have significant impact on the marine environment has led some to recommend that deepwater port development be placed under the auspices of an agency or department with navigation and/or transportation related functions such as the Department of Transportation, the U.S. Coast Guard, the Corps of Engineers, the Maritime Administration, the Department of Commerce or the National Oceanic and Atmospheric Administration. The latter has been recommended especially because of its jurisdiction over both marine environmental affairs and the Coastal Zone Management Program.

In addition to a lack of agreement over which Federal agency is best suited to serve as the lead coordinating agency for deepwater port development there is also considerable disagreement over the degree of authority which a lead agency should have and the manner in which such authority should interrelate with or possibly supersede the authority of other Federal agencies.

For example, Congressional attention has in some cases focused not on designating an agency to authorize deepwater port development but on assuring that such development will not conflict with the functions carried out or policies promoted by other Federal agencies. Several measures pending before the 93d Congress propose to define the roles which agencies such as the Environmental Protection Agency or the National Oceanic and Atmospheric Administration must play *should* some other Federal agency authorize the development of deepwater ports, by requiring these agencies to grant express certification of permit applications and plans for construction and operation.

The extent to which the advantages of providing a focus for the administration of deepwater port policy in one lead agency could be

realized depends in large measure on the success of those procedures established to coordinate the functions of the various Federal agencies concerned. It is possible that enactment of a Federal reorganization plan consolidating many of the energy and natural resource related functions within one agency would eliminate at least some of the administrative difficulties involved in coordinating such a broad range of actions and functions required to oversee the development and operation of deepwater ports.

C. Interagency task force or commission

Creating an interagency task force or commission to authorize deepwater port development could provide an effective means of coordinating Federal responsibilites relating to deepwater port policy.

The interagency task force or commission would consist of the heads of those Federal agencies with a broad range of expertise and authority applicable to deepwater port development. One of its members would serve as Chairman.

This group could be authorized to establish rules and regulations governing the application review process and to consider applications and grant permits for the construction of deepwater ports in accordance with Federal law. These responsibilities could be carried out in consultation with the heads of Federal agencies who are not members of the group, but who have a particular interest in one or more aspects of deepwater port development.

In practice, interagency task force membership might include the Secretaries of the Department of the Interior, the Department of Commerce, the Department of the Army (acting on behalf of the Corps of Engineers) and the Administrator of the Environmental Protection Agency, with the Secretary of the Department of Transportation serving as Chairman. Applications could be reviewed and licenses granted or denied in consultation with the Council on Environmental Quality, the Department of State, and the Department of Justice.

Once a deepwater port proposal had been authorized, the construction and operation of the facility, its associated pipelines and other components could be regulated by the various Federal agencies with relevant expertise and appropriately expanded legal authority. This arrangement of shared responsibility would be similar to that governing Outer Continental Shelf resource development.

D. *Federal ownership*

Providing for Federal ownership of deepwater ports might result in the creation of a single-purpose Federal deepwater port development agency patterned after the Tennessee Valley Authority (TVA) to undertake the siting and development of deepwater ports. TVA was created for the sole purpose of producing electric power in the Tennessee Valley, and to implement programs relating to the social and economic impacts of carrying out this mission. TVA dams and power plants are thus federally owned and operated facilities. It is possible that deepwater ports could be similarly constructed as Federal property, the proceeds of their operation reverting to the Federal treasury as do the revenues from TVA power sales. This alternative has been repeatedly discarded with the argument that substantial private

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industry interest in developing deepwater ports renders public funding unnecessary. However, if Government ownership is considered desirable, direct public subsidy could be supplanted by a guaranteed loan program whereby initial Federal expenditures are recovered from revenues generated by the deepwater port, or the publicly owned corporation could be empowered to seek financing in the private sector from the outset.

CHAPTER 8.—FEDERAL GOVERNMENT RESPONSE

Of the agencies with expertise and interest in the area of deepwater port development, many have formally addressed themselves to the issues raised in this report. The Maritime Administration, the Corps of Engineers, and the Council on Environmental Quality have all conducted, or are in the process of completing studies related to the development of deepwater ports.

The Maritime Administration within the Department of Commerce has pursued investigations of deepwater port facilities with the objective of promoting the development of such facilities offshore. A MARAD contract awarded to the consulting engineering firm of Soros Associates "in an effort to stimulate the development of deep draft marine terminals in the United States" resulted in the publication of a three part study entitled "Offshore Terminal System Concepts" in September 1972.[1]

At the time it was published, the Maritime Administration report's assessment of pressures on U.S. ports and harbors that would result from increasing volumes of U.S. petroleum imports was generally regarded as sound. However, the conclusions of the report were the subject of considerable concern for two reasons. The report recommended that a deepwater port facility be constructed off the Delaware coast where opposition to such development is especially strong. It also assumed that the major portion of east coast energy demand would be met by importing crude petroleum from the Middle East, and that refinery capacity sufficient to process this crude would be built on the Atlantic Coast where, due to localized opposition, petroleum related industrial expansion is unwelcome.

Further promotion of U.S. deepwater port development has resulted from efforts to reinstate the United States with a major role in the world tanker market pursuant to the U.S. Merchant Marine Act of 1970. Prior to 1970 the MARAD program to assist in the construction of bulk cargo carriers was extremely limited. In 1972, oceangoing bulk carriers transported about 85 percent of U.S. foreign commerce, yet American-flag vessels carried less than 4 percent of the 408 million tons of bulk commodities that moved in this trade.

Since the economics of U.S. tanker construction and operation have militated against significant U.S. participation in the world tanker market, the construction differential subsidy and operating differential subsidy provisions of the Merchant Marine Act of 1970 are designed to reduce the cost differences between U.S. and foreign-flag vessels.

As of November 1973, 9 contracts to subsidize the construction of U.S. supertankers had been granted under the Merchant Marine Act and 50 more applications have been filed for 1974. All of these contracts are for VLCC's ranging in size from 225,000 deadweight tons to 425,000 deadweight tons.

[1] *Offshore Terminal System Concepts*, U.S. Department of Commerce, Maritime Administration, September 1972 (p. 1 and generally).

Regardless of whether or not the U.S. Merchant Marine Act is being implemented with the express intent of promoting deepwater port development in the United States, the prospect of operating American owned deep draft vessels in world trade frequently serves as an argument for those who favor constructing deepwater ports off U.S. coasts.

Other Federal agencies investigating the issues related to deepwater ports include the Corps of Engineers in the Department of the Army which has undertaken the task of examining various aspects of deepwater port development through its Institute of Water Resources (IWR). In addition, through its regional offices, the Corps has also carried out studies to determine the needs and potential sites for deepwater port development on the Atlantic, Gulf and Pacific coasts pursuant to congressional authorization under the Rivers and Harbors Act. The results of these studies are detailed reports of the environmental, engineering, economic and sociological aspects of deepwater port development on each of the United States coasts.

Early in 1972, the Council on Environmental Quality was charged with the responsibility of conducting an interagency study of the environmental impacts of deepwater ports. The scope of the study extends to both the primary effects of constructing and operating deepwater ports and to the landside secondary impacts associated with deepwater port facilities.

The study of primary environmental impacts assessed in detail the potential adverse consequences of oil tanker casualties at various locations, assuming both low level and high volume cargo loss. The study of secondary growth impacts reported on what expansion of refinery and related industrial facilities and subsequent environmental impact could be expected to result from deepwater port development at various locations along the U.S. coasts.

The CEQ studies led to recommendations for developing deepwater port terminal buoys of limited throughput far offshore in order to minimize both adverse secondary growth impacts and the potential for environmental damage to the coastline in case of a spill.

In addition to these Federal agency activities, an interagency task force coordinated at the White House level was formed to study the economic, legal, and environmental aspects of deepwater port development. Following the interagency review, the Administration proposed and recommended the enactment of S. 1751, "The Deepwater Port Facilities Act of 1973," authorizing the Secretary of the Interior to grant licenses subject to certain conditions, for the development of offshore deepwater port facilities beyond the territorial waters of the United States. This measure was jointly referred to the Senate Committees on Interior and Insular Affairs, Commerce and Public Works. A special joint subcommittee composed of five members from each of the three full Committees was formed to consider this legislation.

In addition to the Administration's proposal over fifteen other measures relating to deepwater port development were introduced in the 93d Congress.[2]

[2] See Appendix E for a summary of deepwater port legislation pending before the Senate in the 93d Congress.

CHAPTER 9.—OVERVIEW

Throughout the world, large capacity deep draft vessels known as "supertankers" are being used to transport oil between petroleum producing and consuming nations. However, supertankers cannot deliver their cargo directly to the United States because most American ports are too shallow for the deep draft vessels to enter.

While existing U.S. ports could be dredged to create deepwater ports, monobuoy pumping facilities located in naturally deep water offshore are considered the most desirable type of supertanker terminal, both from an economic and environmental point of view. Because most potential offshore deepwater port sites are located outside U.S. territorial limits where only the Federal government exercises authority (albeit limited), Congress must enact legislation to authorize and regulate the construction and use of these deepwater ports.

Proposals to develop deepwater ports in the United States were originally based on projections that this country would soon depend heavily on the Middle East nations for increasing volumes of crude petroleum imports. Accordingly, it was argued that:

1. Deepwater ports offer a cheaper means of transporting imported petroleum supplies and can stimulate beneficial economic growth in adjacent coastal areas;
2. Offshore deepwater ports and supertankers are environmentally preferable to the use of conventional tankers, harbors and ports at a given level of imports;
3. Failure to build deepwater ports in the United States would encourage the construction of refinery capacity at foreign sites. This "exportation" of refinery capacity would result in an adverse impact on U.S. balance of payments and reliance on the more costly and environmentally hazardous practice of transshipping petroleum in smaller vessels from foreign deepwater ports. It could also lead to a loss of employment and other economic benefits associated with domestic deepwater ports, refineries, and petrochemical industrial development.

However, circumstances have changed since deepwater port development was first proposed in the United States. As a result of the Arab oil embargo, which began in October of 1973, and continued to March, 1974, reducing the United States' reliance on foreign petroleum supplies and attaining domestic energy self-sufficiency have emerged as high priority national goals. This has created some uncertainty over the future of U.S. demand for petroleum imports over the long-term. This uncertainty, coupled with doubts about the rate at which domestic refinery capacity will expand, has raised questions as to the need to develop U.S. deepwater ports.

Even though a number of economic and environmental benefits are associated with deepwater ports, the risks involved are great enough to

warrant asking whether establishing a Federal policy authorizing deepwater port development is consistent with the economic and environmental interests of the United States.

For example, it has been suggested that deepwater port and related development may actually inhibit the transition to domestic energy self-sufficiency by creating an infrastructure which must be sustained by continued petroleum imports.

There are, however, different interpretations of what the term "U.S. energy self-sufficiency" means. Some view the self-sufficiency goal as one of achieving total reliance on domestic energy supply, therefore advocating that we turn our efforts toward conserving energy, developing alternative energy forms, and accelerating the exploitation of resources on the United States Outer Continental Shelf in order to achieve this goal. Others argue that energy self-sufficiency is a matter of attaining the capability to be totally reliant on domestic energy supplies but continuing to rely on energy imports as long as it is economically and politically feasible to do so. If the latter interpretation is accepted, then U.S. deepwater port development could be viewed as consistent with the energy self-sufficiency goal.

In any event, all available evidence suggests that the United States will need to import substantial quantities of oil for the next decade at least. As a result, State and Federal government interest in deepwater port development has remained strong. In addition, on the West Coast, several officials of State government and a number of individuals and interest groups have expressed their preference for using offshore deepwater ports to unload oil supplies arriving from Alaska's North Slope. To meet the need for deepwater ports on the West Coast, and enable deepwater port development on the Gulf and Atlantic Coast as the need arises, it would, therefore, seem desirable for Congress to enact legislation specifying the conditions which must be met if deepwater ports are to be built. The number of such ports and the timing of their development can then be determined by subsequent events.

Ultimately the form of legislation authorizing and regulating deepwater port development will depend on the manner in which several major policy issues are resolved. These include: a determination of the international legal justification for the construction and operation of deepwater ports; a decision as to the institutional arrangements for administering Federal deepwater port policy; and a decision as to the nature and extent of Federal participation in the siting and regulation of deepwater ports. Congress must, therefore, address the following questions:

Question 1. What are the international legal implications of U.S. deepwater port development?

Several proposals to build U.S. deepwater ports involve siting monobuoy facilities in naturally deep water several miles offshore. Such deepwater ports would be located beyond U.S. territorial limits, in waters known under international law as the high seas.

According to available evidence, there is no express precedent in international law for a nation to exercise jurisdiction over the high seas in order to authorize and oversee the development and operation of deepwater ports. Absent such precedent or established interna-

tional legal principle, a nation wishing to develop and regulate deepwater ports beyond its recognized territorial limits might pursue one of three courses of action:

(*a*) Unilaterally extend its territorial jurisdiction over such facilities;

(*b*) Find residual authority for such action within the existing body of international law; or

(*c*) Seek clarification of and agreement on the deepwater port issue by the international community prior to exercising such jurisdiction.

Official and non-official American sources alike argue against unilateral extension of territorial jurisdiction on the grounds that such action would disadvantage the United States' position vis-a-vis the current Law of the Seas negotiations, where this nation is seeking limitations on unilateral extensions of maritime boundaries. These same sources also feel that while the United States should unquestionably seek clarification of the deepwater port issue at the 1974 International Law of the Sea Conference, to await final agreement by the international community would involve a significant loss of time and resources. Prior international accord is unnecessary, it is argued, because there is residual authority within the existing body of international law for a nation to use the high seas for the purpose of developing deepwater ports. By far the most compelling argument in this regard is that the construction and operation of deepwater port facilities constitutes a "reasonable use" as contemplated by Article 2 of the Convention on the High Seas.

Question 2. What institutional arrangements should be established to administer U.S. deepwater port policy?

The expertise and authority which could be applied to the regulation of deepwater port development now reside in a number of Federal agencies while no one agency has sufficient authority to issue a permit or otherwise allow such development to begin. Thus, in addition to extending Federal jurisdiction over U.S. deepwater port development on the high seas, legislation to authorize and regulate deepwater ports must also establish an institutional arrangement to carry out deepwater port policy and coordinate that policy with other government policies and programs.

The goal in establishing an institutional arrangement to administer deepwater port policy should be to provide the greatest possible coordination of Federal government functions and achieve maximum utilization of Federal expertise.

The most practical means of achieving this goal would be to:

(*a*) Authorize an existing Federal agency to act as the lead coordinating agency for administering deepwater port development; or

(*b*) Create a Federal interagency task force or commission to license and oversee the regulation of deepwater ports.

If a single Federal entity rather than an interagency or joint institutional organization were authorized to license deepwater port development the licensing process should be carried out in consultation with other Federal agencies having relevant expertise. Once a deepwater port was licensed whether by a lead agency or an interagency task force or commission, various aspects of deepwater port development could then be regulated by different Federal agencies with relevant expertise and appropriately extended jurisdiction.

For example, once a deepwater port was licensed, its construction might be regulated by the Department of Interior or the Corps of Engineers. Pipeline saftey would be regulated by the Department of Transportation and navigational safety and oil spill prevention by the U.S. Coast Guard. The National Oceanic and Atmospheric Administration and the Environmental Protection Agency would oversee certain aspects of deepwater port development to assure compliance with environmental quality laws. In addition, the Interstate Commerce Commission, the U.S. Bureau of Customs, and the Department of State would carry out their responsibilities with respect to deepwater development.

Such a regulatory scheme would operate in much the same way as the Outer Continental Shelf Oil and Gas Leasing Program.

Question 3. Should the Federal Government establish a single licensing and regulatory procedure to cover deepwater port development within as well as beyond U.S. territorial limits?

As far as constructing deepwater ports within U.S. territorial waters is concerned, the States, by virtue of their rights under the Submerged Lands Act and authority over landside activities, are viewed as having dominant control over deepwater port development. Nevertheless, the Federal government retains authority over matters of interstate and foreign commerce, flood control, dredging, environmental quality, and navigational safety in territorial waters. Even though state authorized deepwater port development must also meet the requirements of these Federal laws, the procedure for licensing—and in some cases, regulating—such facilities, would be different from that established for facilities beyond U.S. territorial waters unless new legislation provided otherwise.

There is little dispute that deepwater ports involve interstate and foreign commerce. Congress may, on this basis, wish to bring deepwater port authorization within territorial waters under direct Federal control by establishing a single Federally administered licensing and regulatory process to cover *all* deepwater port development regardless of location. If it was concluded that the Federal government should be the principal licensing authority for all deepwater ports within as well as outside territorial waters, it would be necessary to establish criteria to determine what, in fact, constitutes a deepwater port. Such criteria might be based on the throughput capacity of the facility or on the size of the tankers which it serves.

Question 4. What role should the Federal Government play in selecting deepwater port sites?

Questions of controlling the direct and secondary environmental impacts of deepwater port development lead to a consideration of what role the Federal government should play in selecting deepwater port sites. At a minimum, the Federal government must prescribe standards necessary to assure that a deepwater port facility will be constructed and operated with a minimum of risk to the environment and without interfering with other authorized uses of the Continental Shelf and its overlying waters.

However, it may be desirable for the Federal government to exercise a more decisive role in the deepwater port site selection process. Federal investigations concerning deepwater port development,

especially those conducted by the Corps of Engineers and Council on Environmental Quality, have produced a substantial body of data and information which could serve as the basis of Federal deepwater port siting decisions.

Beginning with a determination of those market areas which might be beneficially served by deepwater port facilities, potential deepwater port sites could be evaluated to determine those sites which might be developed with a minimum impact on the marine and coastal environment, where navigational safety can be assured, and where such development would not interfere with other uses of the oceans including marine resource development and scientific research.

A Federal system of designating potential deepwater port sites prior to the time that applications for Federal authorization are received could be used to:

(1) Assure that deepwater ports are located in areas where the potential for environmental degradation is at a minimum;

(2) Control the number of deepwater ports developed; and

(3) Encourage the development of refineries and petrochemical industries in those adjacent coastal areas which can best bear industrial expansion in an environmental sense and which might benefit from accelerated economic growth.

In addition, by pre-determining deepwater port sites, the Federal government could establish a time frame within which applications to develop deepwater ports serving a particular market area would be received, reviewed, and compared with one another.

Those who argue for limited Federal involvement in deepwater port site selection feel that those entities which will ultimately build and operate deepwater ports are best equipped to determine, from an economic and environmental point of view, where such ports should be built. Furthermore, the proponents of limited Federal involvement in deepwater port development feel that market forces will determine the number of deepwater ports developed while existing Federal and State laws will operate to control the secondary landside development generated by such ports.

Depending on the extent of involvement desired, alternative Federal government roles in the deepwater port site selection process include the following:

(*a*) Establishing standards for site selection to assure that deepwater port construction and operation proceeds with minimum environmental risk and without interfering with other authorized uses of the Continental Shelf and its overlying waters;

(*b*) Designating those areas off the coast of the United States which are suitable for development as deepwater sites. The Federal deepwater port licensing authority could establish a time frame within which applications to develop deepwater ports in designated areas would be received. The basis for approving an application would depend on the objectives desired. For example, the basis of determination could be strictly environmental and could include consideration of what secondary development might be involved in a proposal. Deepwater port ownership might also be considered, e.g., a proposal by a State government might be preferred over one involving integrated oil companies or some other form of private ownership; and

(c) The Federal government could identify those areas which, either because of vulnerability to direct environmental impacts or because deepwater port development could be expected to produce particularly severe impacts on the adjacent coastal areas, are unsuitable as deepwater port sites. Applications involving such areas would automatically not be considered.

Question 5. What type of controls are needed to safeguard against the direct environmental impacts of deepwater port development?

The unique characteristics of deepwater port development will require the U.S. to utilize, and in some cases to improve, regulatory and monitoring abilities with respect to the construction and operation of submarine pipleines, petroleum transport and transfer facilities, and oil spill prevention and containment systems.

Those Federal laws which are designed to prevent environmental degradation from platform and pipeline construction and operation or from vessel operations and cargo transfers in navigable waters include the Outer Continental Shelf Lands Act, the Rivers and Harbors Acts, the Ports and Waterways Safety Act, the Federal Water Pollution Control Act and the National Environmental Policy Act. However, there is some uncertainty as to the manner in which these laws would apply to deepwater port development beyond U.S. territorial limits.

In order to minimize the environmental risks involved and assure the most complete coverage of deepwater port facilities and supertanker operations, those Federal agencies with appropriate functions and expertise such as the Department of the Interior, the Department of Commerce, or the Department of Transportation, the Environmental Protection Agency, the Coast Guard, and the Corps of Engineers, should be authorized to impose and enforce certain conditions with respect to supertanker design and operation, and deepwater port terminal facility and pipeline siting, design, construction, and use.

Such conditions should include:

(a) Specific engineering design, construction and operation criteria for deepwater port facilities including pipelines and storage tanks;

(b) Such specific design, construction and operation criteria for vessels utilizing deepwater ports, including double bottoms, segregated ballast, advanced navigation systems, and manning requirements as may be necessary to minimize the risk of tanker collision and operational or accidental spills (deepwater port use could be limited to only those vessels which comply with standards of construction and design as may be prescribed by deepwater port legislation); and

(c) Such requirements and criteria for oil spill prevention and containment systems and equipment as may be necessary to provide the greatest possible safeguard against oil pollution damage to the marine and coastal environment.

Legislation should also establish some form of liability to provide compensation for any persons injured as a result of oil pollution damage resulting from the operation of a deepwater port.

Question 6. What types of controls are needed to safeguard against the secondary environmental impacts of deepwater port development?

Secondary envionmental impacts which result from expanded refinery and petrochemical development in coastal areas adjacent to

deepwater port sites can be equally or more severe than the direct environmental impacts of deepwater port construction and use.

In general, the greater the volume throughput of a deepwater port facility, the greater the potential for adverse secondary environmental impacts to result from its development. It may be argued that if oil import levels are high, operating a number of deepwater ports of limited throughput, and dispersing them at various locations along the coast is preferable to operating a limited number of facilities with high throughput capacities.

Laws such as the Coastal Zone Management Act; the Marine Protection, Research and Sanctuaries Act; the Clean Air Act; the Federal Water Pollution Control Act and the National Environmental Policy Act afford some protection against environmental degradation of land and water resources. Another measure, pending before the 93rd Congress, which could offer some means of controlling environmental degradation in coastal areas adjacent to a deepwater port site is S. 268, the Land Use Policy and Planning Assistance Act. However, there is some feeling that, rather than leaving secondary environmental impacts to be controlled solely by existing laws, legislation to authorize the development of deepwater ports might provide additional safeguards against adverse secondary environmental impacts by:

(*a*) Making Federal approval of deepwater port projects contingent upon a determination that the project is consistent with the land use, coastal zone management or environmental protection policies and programs of the adjacent coastal states;

(*b*) Requiring that the coastal state adjacent to a proposed deepwater port site have in force a Coastal Zone Management Program;

(*c*) Requiring the adjacent coastal state to produce an environmental protection plant specifically designed to control the secondary environmental impacts of deepwater port development;

(*d*) Limiting the throughput capacity of deepwater ports to encourage the dispersion of secondary environmental impacts.

Question 7. What form of State, Local and public participation is needed in the deepwater port authorization process?

States and localities will ultimately experience economic and environmental impacts as a result of deepwater port development. While some states expect to benefit from such impacts, others believe that their economic and environmental interests will be adversely affected by deepwater port development and, therefore, oppose the location of a deepwater port off their coasts. It has been suggested that in order to prevent an unwilling state from being forced to accept deepwater port development off its shores, the coastal state adjacent to a proposed deepwater port site should have final say over whether a Federal license to build the port will be granted. Thus a state could prevent a port which met all other requirements of Federal law from being built, even though the port would be located beyond U.S. territorial waters—i.e., in an area of exclusive *Federal* jurisdiction.

Those arguing against state veto power believe that:

(1) State land use and environmental controls including Coastal Zone Management Programs, should be the vehicle for dealing with secondary growth;

(2) The Federal government would not, as a matter of policy, authorize a deepwater port over the objection of the adjacent coastal state; and

(3) The State could effectively prevent deepwater port development off its coast by denying pipline and other permits for deepwater port facilities located within state jurisdiction.[1]

However, many officials and residents of coastal states are not reassured by these arguments. Regardless of whether or not states are given the power to veto deepwater port proposals, the farreaching impacts of deepwater port development make ample provision for state, local, and public participation in the deepwater port authorization process desirable to assure that such development proceeds in a manner consistent with state economic and environmental interests.

Legislation to authorize and regulate deepwater port development could provide for state, local, and public participation by any one, or combination of the following means:

(*a*) Requiring that a public hearing be held at the locality nearest to a proposed deepwater port site before license approval is granted;

(*b*) Requiring consultation with the affected state or states, prior to granting Federal approval for any deepwater port project, and empowering the state or states to require modifications in such a proposal prior to its approval;

(*c*) Requiring an application for Federal authorization of a deepwater port project to be accompanied by all necessary state authorizations and permits;

(*d*) Providing for preferential treatment of deepwater port project proposals in which the state is directly involved. Under this system, a state meeting certain requirements could be granted "first option" over deepwater port development off its shores in anticipation that the state would ultimately join in or lend its support to some private entity's deepwater port project proposal. Alternatively a state might, on its own or in cooperation with an adjacent state or states, undertake to construct, own, and operate a deepwater port facility.

Question 8. What action is necessary to protect against the anticompetitive implications of deepwater port development?

Even though deepwater ports would be subject to the antitrust laws and regulated by the Interstate Commerce Commission as "common carriers," there is reason to believe that additional safeguards are needed to protect against the anticompetitive implications of deepwater port development. For example:

(1) Deepwater ports will be similar, in some respects, to the pipelines which transport oil supplies in interstate commerce. They will be relatively few in number and strategically placed in relation to the petroleum distribution and supply system;

(2) If, as has been proposed, deepwater ports are owned by joint-venture corporations formed by integrated oil companies, these corporations will enjoy some manner of control over both the deepwater port facilities and the refineries and pipelines which corporate shareholders own individually or jointly in the adjacent coastal areas; and

[1] There is a possibility that such a denial could be challenged on the grounds that the state was placing unreasonable burdens on interstate and foreign commerce or as exceeding the authority granted to the States by the Federal Government under the Submerged Lands Act of 1953.

(3) The FTC, the Antitrust Division of the Department of Justice, and the ICC have all testified in Congressional hearings that there is considerable potential for deepwater port owners to increase their control over the oil market even if all antitrust laws and regulations are applied to deepwater port development.

Officials representing FTC, ICC, and the Department of Justice testified that the potentially anticompetitive characteristics of deepwater port development might be eliminated by:

(*a*) Requiring the appropriate Federal agencies to conduct a thorough review of deepwater port project proposals before a license is granted to certify that such proposals would not violate antitrust laws or tend to create a monopoly;

(*b*) Applying a "commodity clause" feature to deepwater port development whereby a deepwater port owner and operator could not handle any commodities in which he has direct or indirect interest; or

(*c*) Prohibiting "joint venture" involvement by integrated oil companies in deepwater port development by allowing only single oil companies or companies completely independent of the petroleum industry to own and operate deepwater ports. (The investment required to build deepwater ports is not high enough to make joint-venture efforts absolutely necessary on financial grounds).

State governments and industrial interests outside the integrated oil companies are prepared to undertake deepwater port development on their own. Thus, a prohibition against joint-venture involvement would not cause significant delay in bringing deepwater ports on line. However, an alternative to prohibiting joint-venture involvement in deepwater port development would be to encourage state governments on their own or in contract with companies of their choosing to build and operate deepwater port facilities. The objective of such an approach would be to provide for public representation, whatever the deepwater port ownership arrangement, to assure that the facility was operated in a manner consonant with the public interest.

Another approach would be to grant licenses to construct deepwater ports on a priority basis. For example, consider a situation where only one deepwater port is needed to serve a particular market area, and several applications to construct such a facility are received by the Federal agency with deepwater port licensing authority. Applications would then be considered on the following scale of priority:

(1) Application in which a state is directly involved;

(2) Application by a firm independent of the oil industry;

(3) Proposal by an individual company affiliated with the oil industry; or

(4) Proposal by a joint-venture corporation with integrated oil companies among its members.

Question 9. Is some form of financial payment necessary to compensate adjacent coastal states for burdens incurred as a result of deepwater port development?

The need to supply additional services and provide for the protection of environmental values as a result of deepwater port development may place increased burdens on the financial resources of adjacent coastal states. It has, therefore, been suggested that states should receive financial payments to compensate for such burdens. Proponents

of this recommendation feel that a suitable compensation scheme could act as an incentive for states to approve deepwater port development off their coasts and undertake the actions necessary to protect their environmental interests.

Other sources argue, however, that the secondary growth stimulated by deepwater port development should generate sufficient revenues to compensate an adjacent coastal state for any burdens which might also be imposed.

If some form of compensation to state governments were deemed appropriate, such compensation could be provided by one of the following means:

(*a*) Where a program such as the Coastal Zone Management Act, the Federal Water Pollution Control Act, or the proposed National Land Use Policy and Planning Assistance Act provides payments to the states in support of environmental planning programs, the amounts of funds granted could be increased by a certain percentage for states affected by the development and operation of deepwater ports and their associated components; or

(*b*) A per-barrel charge could be placed on deepwater port throughput. Revenues generated by such a charge could be used to establish a fund from which states adjacent to or affected by a deepwater port received payment in support of environmental protection programs designed to provide such additional services as may be required to meet the pressures of deepwater port development.

How a Federal Deepwater Port Program Might Be Organized and Administered

In light of the foregoing discussion, deepwater port policy might be organized and administered in the following way:

DEEPWATER PORT FACILITIES LICENSING BOARD

A Deepwater Port Licensing Board would be formed by the heads of the following agencies, one of whom would serve as Chairman:

Department of the Interior;
Department of Transportation (Coast Guard);
Department of Commerce;
Department of the Army, acting through the Corps of Engineers; and
Environmental Protection Agency.

The Licensing Board would be authorized to:

Determine the number of deepwater ports required and identify possible sites;
Establish rules and regulations governing the application review process;
Receive applications;
Conduct hearings;
Approve, disapprove or require revisions in deepwater port license applications;
Grant licenses for deepwater port development;
Prepare a single, detailed Environmental Impact Statement and circulate it for review;

Coordinate the promulgation of rules and regulations governing deepwater port construction, operation and use;

Collect and serve as a central clearing house for information and data relevant to deepwater port development; and

Maintain an overview of deepwater policy administration with particular emphasis on the manner in which deepwater port policy interrelates to other Federal policies concerning energy resource supply, environmental quality and economic viability.

The Licensing Board would carry out its responsibilities in consultation with other Federal agencies with a particular interest in one or more aspects of deepwater port development. Such agencies would include, the Department of Justice, ICC, FTC, Council on Environmental Quality, and the Federal Maritime Commission.

APPLICATION REVIEW PROCESS

The Deepwater port license application review process would operate as follows:

1. The application would be filed in the office of the Chairman of the Licensing Board. This office would house a permanent professional staff drawn from the Licensing Board member agencies.
2. An application would constitute the application for all Federal authorizations which might be required to build a deepwater port.
3. The application would be accompanied by all State permits which might be required to complete landside installation of deepwater port facilities.
4. The application would be circulated for comment to all Federal agencies with review functions and to the adjacent or affected states.
5. An official of the adjacent State would be enlisted as an ad hoc member of the Licensing Board.
6. All review agency views and the views of the adjacent and affected coastal states would be considered.
7. A hearing would be held at a location in proximity to the application as they deemed appropriate.
8. A single detailed Environmental Impact Statement concerning a license proposed to be issued would be prepared by the Commission and circulated for review.

APPLICATION APPROVAL

A deepwater port license application would be approved and a license granted if:

1. The application met all the requirements of the Deepwater Port Act;
2. All Licensing Board member agencies certified that the application met the requirements of the laws they administer;
3. The Department of Justice and Federal Trade Commission certified that the proposal would not tend to violate the antitrust laws; and
4. The adjacent coastal state certified that the deepwater port proposal was consistent with the environmental protection and land use management programs of the state.

REGULATION OF DEEPWATER PORT FACILITIES

Once a deepwater port proposal was authorized, its construction, operation, and use would be regulated as follows:

USGS, Corps of Engineers: engineering and structural aspects of deepwater port facility.

Coast Guard: safety, equipment, vessel transportation and accidents.

Coast Guard, EPA, NOAA: marine environmental quality, oil spill prevention and containment.

Office of Pipeline Safety (DOT), USGS: offshore pipeline design and performance standards.

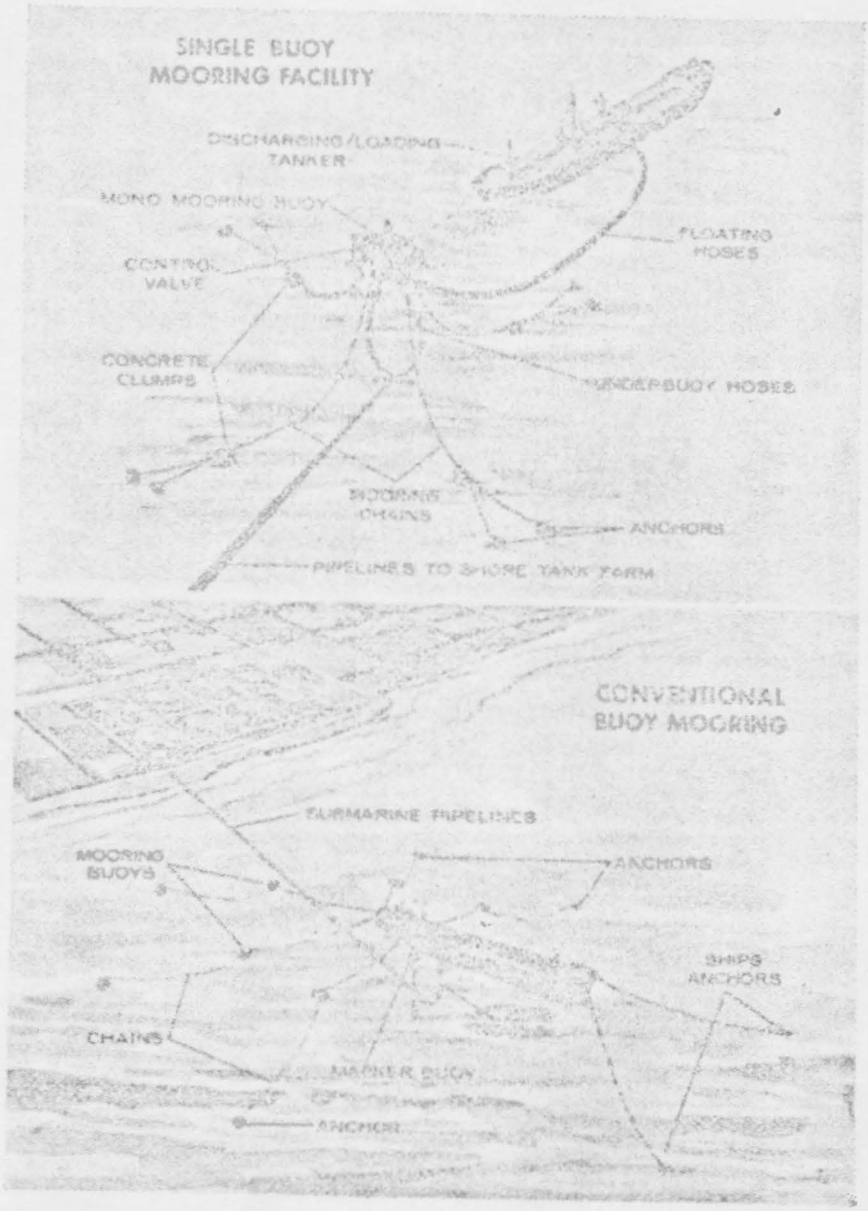
ICC: pipeline regulation, reasonable access, rates, tariffs.

Department of Labor, Coast Guard, State Government: civil and criminal law.

EPA, NOAA, State Government: Coastal and land based environment concerns.

APPENDIX A

OFFSHORE DEEPWATER TERMINAL DESIGNS*



*Source: U.S. Army Corps of Engineers

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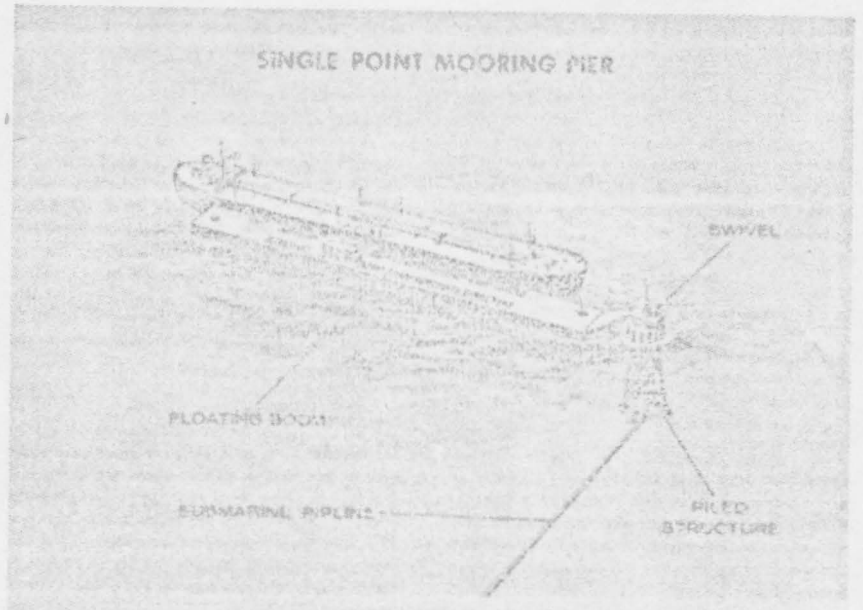

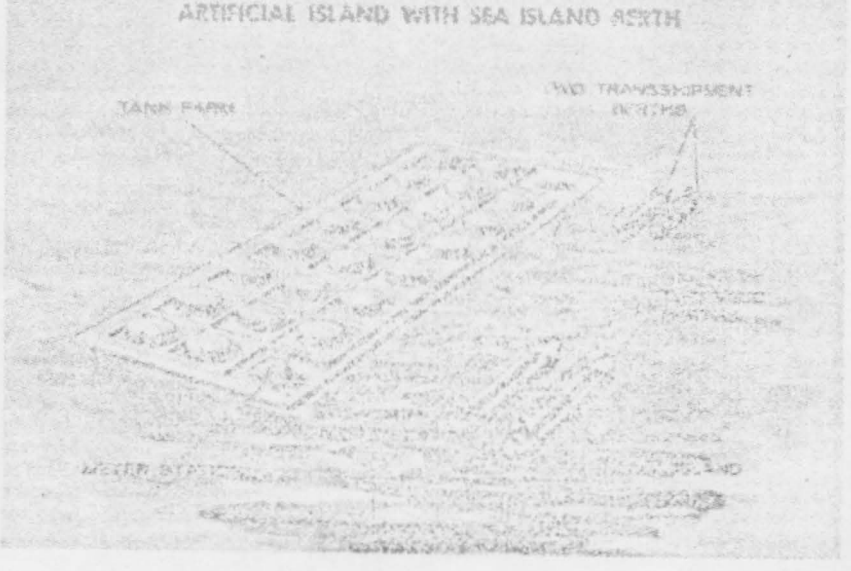

APPENDIX B

EXECUTIVE COMMUNICATIONS

U.S. DEPARTMENT OF THE INTERIOR,
OFFICE OF THE SECRETARY,
Washington, D.C., January 24, 1974.

Hon. JOSEPH R. BIDEN, Jr.,
U.S. Senate,
Washington, D.C.

DEAR SENATOR BIDEN: This replies to your letter of November 30, 1973 asking for updated projections of U.S. reliance on Persian Gulf petroleum supplies reflecting the President's announced goal of U.S. energy self-sufficiency by 1980. You also ask whether these updated projections will affect the need or economic feasibility of deepwater ports.

"Project Independence", in our view, does not aim at eliminating U.S. imports of petroleum after 1980. The goal is to achieve the capability of self-sufficiency in energy by that date so that disruption in foreign supplies will not cause serious economic repercussions or jeopardize national security. It is freedom from *dependence* on foreign fuel supplies that we are seeking.

Project Independence has two basic thrusts: To develop alternate domestic fuel sources and to reduce wasteful and unnecessary consumption. It is clear that the United States, with six percent of the world's population, cannot continue to consume one-third the world's energy output. Most Americans realize that the era of cheap energy is over and have already begun to adjust to this fact in their consumption patterns. Further adjustments will undoubtedly be required in the future. Therefore, it is extremely difficult to project with any accuracy the demand levels and import levels over the next several decades. Historical trends will hopefully not be indicative of future demand. We would defer to the Federal Energy Office for the most up-to-date projections.

We feel, therefore, that petroleum imports will continue through the 1980's in sufficient quantities to justify the development of deepwater ports. The Administration's proposal[1] does not identify the location or number of ports we expect to license. That decision is to be made by the industry. The Administration's proposal is intended to create a licensing authority in the Federal Government so that such ports can be developed under full environmental safeguards and other regulations if the economics warrant it. We hope the Congress will continue to treat this legislation with high priority.

Sincerely yours,

JOHN C. WHITAKER,
Under Secretary of the Interior.

[1] Note. S. 1751, "Deepwater Port Facilities Act of 1973".

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF MANAGEMENT AND BUDGET,
Washington, D.C., December 26, 1973.

Hon. HENRY M. JACKSON,
Chairman, Committee on Interior and Insular Affairs, U.S. Senate,
Washington, D.C.

DEAR MR. CHAIRMAN: The President has asked me to reply to your letter of December 7, 1973, seeking the current Administration position regarding the "Deepwater Port Facilities Act of 1973" vis-a-vis "Project Independence."

While the President has called for the capacity of self-sufficiency, this does not necessarily mean zero imports. If by 1980 world conditions are sufficiently stable and world sources of oil sufficiently diverse, it may well be in the national interest to continue the importation of some limited amounts of crude oil.

In the meantime, we most surely will want to continue importing some part of our total crude oil supplies, availability permitting.

Since the payback period of a deepwater port facility for crude oil can be as short as two years, it is entirely possible that private interests might wish to construct such a facility. In the President's view, the Nation might well benefit from the flexibility and cost advantage of having such facilities.

There is also the possibility that private interests might wish to construct a deepwater port facility for some commodities other than oil. For these reasons, the President still strongly supports S. 1751, which you introduced.[2]

We thank you for the opportunity to explain our position on this bill in view of recent events. We deeply appreciate your cooperation to date, and count on your vital support on this matter in the future.

With warmest regards,

Sincerely,

ROY L. ASH, *Director.*

[2] Note. S. 1751, "The Deepwater Port Facilities Act of 1973" was introduced by Sen. Jackson and others by request.

APPENDIX C

UNITED STATES OF AMERICA: DRAFT ARTICLES FOR A CHAPTER ON THE RIGHTS AND DUTIES OF STATES IN THE COASTAL SEABED ECONOMIC AREA [1]

ARTICLE 1

1. The coastal State shall have the exclusive right to explore and exploit and authorize the exploration and exploitation of the natural resources of the seabed and subsoil in accordance with its own laws and regulations in the Coastal Seabed Economic Area.

2. The Coastal Seabed Economic Area is the area of the seabed which is:

(a) seaward of —; and

(b) landward of an outer boundary of —.

3. The coastal State shall in addition have the exclusive right to authorize and regulate in the Coastal Seabed Economic Area or the superjacent waters:

(a) the construction, operation and use of offshore installations affecting its economic interests; and

(b) drilling for purposes other than exploration and exploitation of resources.

4. The coastal State may, where necessary, establish reasonable safety zones around such offshore installations in which it may take appropriate measures to protect persons, property, and the marine environment. Such safety zones shall be designed to ensure that they are reasonably related to the nature and function of the installation. The breadth of the safety zones shall be determined by the coastal State and shall conform to international standards in existence or to be established pursuant to Article 3.

5. (a) For the purposes of this Chapter, the term "installations" refers to all offshore facilities, installations, or devices other than those which are mobile in their normal mode of operation at sea.

(b) Installations do not possess the status of islands. They have no territorial sea or Coastal Seabed Economic Area of their own, and their presence does not affect the delimitation of the territorial sea of the coastal State.

6. The coastal State may, with respect to the activities set forth in this Article, apply standards for the protection of the marine environment higher than those required by applicable international standards pursuant to Article 2.

7. The coastal State may, with respect to the activities set forth in this Article, take all necessary measures to ensure compliance with its laws and regulations subject to the provisions of this Chapter.

[1] This Chapter deals with seabeds resources, and does not deal with fisheries. The proposal of the United States with respect to fisheries beyond the territorial sea was introduced in Subcommittee II on 4 August 1972 (A/AC.138/SC.II/S R.40) (*Official Records of the General Assembly, Twenty-seventh session, Supplement No. 21, A/8721*).

ARTICLE 2

The coastal State, in exercising the rights referred to in Article 1, shall ensure that its laws and regulations, and any other actions it takes pursuant thereto in the Coastal Seabed Economic Area, are in strict conformity with the provisions of this Chapter and other applicable provisions of this Convention, and in particular:

(a) the coastal State shall ensure that there is no unjustifiable interference with other activities in the marine environment, and shall ensure compliance with international standards in existence or promulgated by the Authority or the Inter-Governmental Maritime Consultative Organization, as appropriate, to prevent such interference;

(b) the coastal State shall take appropriate measures to prevent pollution of the marine environment from the activities set forth in Article 1 and shall ensure compliance with international standards in existence or promulgated by the Authority or the Inter-Governmental Maritime Consultative Organization, as appropriate, to prevent such pollution;

(c) the coastal State shall not impede, and shall co-operate with the Authority in the exercise of its inspection functions in connection with subparagraph (b) above;

(d) the coastal State shall ensure that licenses, leases, or other contractual arrangements which it enters into with the agencies or instrumentalities of other States, or with natural or juridical persons which are not nationals of the coastal State, for the purpose of exploring for or exploiting seabed resources are strictly observed according to their terms. Property of such agencies, instrumentalities or persons shall not be taken except for a public purpose, on a non-discriminatory basis, nor shall it be taken without the prompt payment of just compensation. Such compensation shall be in an effectively realizable form and shall represent the full equivalent of the property taken and adequate provision shall have been made at or prior to the time of the taking to ensure compliance with the provisions of this paragraph;

(e) the coastal State shall make available in accordance with the provisions of Article ——, such share of revenues in respect of mineral resource exploitation from such part of the Coastal Seabed Economic Area as is specified in that Article.

ARTICLE 3

1. All activities in the marine environment shall be conducted with reasonable regard to the rights of the coastal State referred to in Article 1.

2. States shall ensure compliance with international standards in existence or to be promulgated by Inter-Governmental Maritime Consultative Organization in consultation with the Authority:

(a) regarding the breadth, if any, of safety zones around offshore installations;

(b) regarding navigation outside the safety zones, but in the vicinity of offshore installations.

ARTICLE 4 [2]

Nothing in this Chapter shall affect the rights of freedom of navigation and overflight and other rights to carry on activities unrelated to seabed resource exploration and exploitation in accordance with general principles of international law, except as otherwise specifically provided in this Convention.

ARTICLE 5

Any dispute with respect to the interpretation or application of the provisions of this Chapter shall, if requested by either party to the dispute, be resolved by the compulsory dispute settlement procedures contained in Article —, of Chapter —.

[2] It is assumed that the general articles of the Law of the Sea Convention will contain an article such as Article 4 applicable to all areas beyond the territorial sea. Such an article would obviate the need for several articles making the same point here and in other chapters of the Convention.

APPENDIX D

Onshore Secondary Impacts of Deepwater Terminal Facility Development

(Prepared by Jean March, Environmental Policy Division, Library of Congress at the Request of Senator Henry M. Jackson, Chairman, Senate Interior and Insular Affairs Committee)

SUMMARY

A major controversy surrounding the development of deepwater terminal facilities concerns the landside impacts from induced refining and petrochemical industrial growth. Studies of the landside effects of deepwater terminal development have concluded that if induced industrial growth is concentrated in the vicinity of a terminal, unplanned and uncontrolled development could have serious environmental, social, and economic effects. In this Federal system, the authority and responsibility for governing much of this industrial growth resides in the State and local governments.

A major factor in decisions to permit deepwater terminal facility development may be the readiness and ability of State and local jursidictions to prepare and carry out comprehensive planning for land use and economic development in order to minimize any possible adverse economic and environmental effects of secondary growth.

INTRODUCTION

The construction of deepwater ports or terminals off the coast of the United States for receiving supertanker traffic has been advocated by the present Federal Government Administration and by oil industry representatives as a means of reducing the transportation cost of importing increasing quantities of foreign oil to meet the nation's burgeoning energy demands. Because no existing United States harbor is adequately developed to accommodate the largest supertankers in worldwide use, one or more methods (including dredging existing channels, and developing offshore terminal systems) might have to be relied on to provide U.S. unloading facilities for supertankers.

The case has been made that use of supertankers and deepwater facilities for oil importation will provide certain advantages such as significant economies in transportation costs, reduction of the risks of ship collision and grounding, and reduction of oil pollution probabilities. By contrast, arguments have been advanced by opponents of deepwater facilities that, directly or indirectly, use of supertankers will generate serious negative impacts on the marine and coastal environment. The critics of a policy of rapid deepwater terminal facility

(4) a four-fold increase in air pollutant emission from the new industrial sources.

In contrasting testimony, General J. L. Kelly, Deputy Director of Civil Works, Corps of Engineers contended that "development of deepwater port facilities in the North Atlantic region need not entail industrial development in the immediate vicinity of the facilities." General Kelly expressed his belief that proper land use planning is needed to determine if industrial expansion would be desirable and, if so, where the development should occur.

Testimony at subsequent Senate hearings [4, 5] demonstrated that many State and local officials feel that the potential landside impacts from deepwater port-generated secondary growth must be analyzed more fully to minimize possible adverse effects.

II. TYPES OF POTENTIAL SECONDARY GROWTH IMPACTS

So far there has been no development of a deepwater terminal facility in this country, and no existing U.S. ports handle the volume of oil imports projected for proposed deepwater terminal facilities. Most predictions about resultant secondary growth rely, therefore, on information stemming from foreign experience.

Experience abroad

In 1971, Arthur D. Little, Inc. (ADL) under contract to the Army Corps of Engineers, Institute for Water Resources, completed a study of the development and operations experience of selected foreign deepwater ports.[6] The report focused on problems which might be relevant to deepwater terminal facility planning in the United States, including secondary growth effects.

The researchers found that there had been a "visible trend of movement of heavy manufacturing facilities to deepwater coastal industrial zones" in Europe. After deep port construction, there had been an increased migration of petroleum refining, petrochemical, chemical, steel, alumina and power plants to the coastal region.

However, this industrial movement was in part due to the fact that the ports had been designed as "integrated" ports used for the transfer of bulk cargo as well as petroleum, rather than as the "monoport" type, used solely for the transfer of petroleum.

ADL also reported that deepwater port-associated land requirements were often much greater than anticipated. For example, in Dunkirk, France, deepwater port planners eliminated proposed greenbelts (open space buffers) due to the unexpected heavy demand for future industrial sites. In Rotterdam, Netherlands, heavy demand for industrial sites near the deep port was anticipated but industrial land requirements nevertheless exceeded the supply of available land. Enterprises which could have been sited further inland demanded space near the deepwater industries. Petrochemical producers preferred to locate in close proximity to the refineries, and petroleum

[4] U.S. Congress. Senate. Committee on Commerce. Offshore Marine Environment Protection Act of 1973. Hearings, 93d Congress, 1st session. Washington, U.S. Govt. Print. Off., 1973. 335 p. Serial No. 93-20. Hearings held March 5, 6, and 12, 1973.

[5] U.S. Congress, Senate. Special Joint Subcommittee of the Committees on Interior and Insular Affairs, Commerce and Public Works. Joint hearings to consider deepwater port facilities legislation. Washington, 1973. Hearings held July 23, 24, 25; August 1, 1973; October 2 and 3, 1973.

[6] de Frondeville, Bertrand L., and others. Foreign deepwater port developments—a selective overview of economics, engineering and environmental factors, by Arthur D. Little, Inc. Alexandria, Virginia, Army Engineer Institute for Water Resources. (1971) (Institute for Water Resources report 71-11).

refiners in turn chose to reduce transportation costs by locating near the port. Local officials indicated that due to their underestimation of industrial land requirements, residential areas had been sandwiched in between industrial zones. Rotterdam and Antwerp port officials reported that in building deepwater ports "you always need twice the land acreage you originally planned."

These experiences indicate that even if planners anticipate secondary growth requirements, but lack adequate mechanisms for planning enforcement, undesirable effects may be induced by growth pressures.

Other landside impacts which the ADL researchers found abroad included:

(1) industrial expansion which engulfed existing communities and destroyed their value as residential environments;

(2) noise intrusion from refineries and other plants;

(3) water pollution, particularly from refinery and petrochemical discharges;

(4) degradation of air quality from emissions of new industrial and residential development; and

(5) difficulties in finding for employees of ancillary industry new or relocation housing sites which would result in both acceptable commuting distances and acceptable residential environments.

Transfer value in predicting U.S. deepwater terminal facility (DWTF) impacts

Caution should be exercised in extending the ADL landslide impact findings to deepwater development elsewhere for a number of reasons.

First, their findings apply primarily to shoreside, integrated industrial ports, which contain both dock facilities and industrial sites. The ADL researchers concluded that the adverse landside impacts they found would not be generated by a well designed transshipment deepwater terminal facility unless it were allowed to develop into an integrated port complex. In the absence of industrial growth, the terminal would not substantially increase employment and population. It is industrial expansion and the population growth it generates which can result in negative environmental landside impacts. (See Fig. 1.)

Second, several foreign nations had encouraged deepwater port industrial growth as deliberate public policy. Development of deepwater terminals in many foreign locations was undertaken with the aim of creating coastal industrial complexes. National objectives to be served by such development ranged from promotion of regional development to dispersal of population from congested urban centers. A policy of deepwater terminal development for reasons other than fostering industrial growth might generate less severe landside impacts than most of the foreign ports studied. For example, construction and operations at Bantry Bay, Ireland, a transshipment terminal, were found to have caused negligible landside impacts.

Finally, it should be noted that the impacts described are not created by the deepwater terminal facility or reliance on supertankers for oil transport. As long as increased fuel needs increase the level of a region's oil imports and production, negative landside impacts could result. The types of fuels used (i.e. clean or dirty fuels), the cost of inputs to

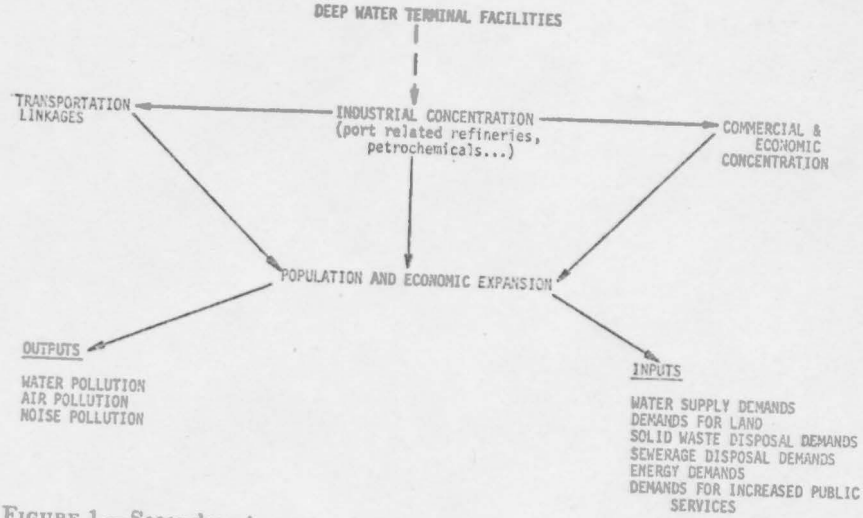

FIGURE 1.—Secondary impacts which an integrated industrial deepwater terminal facility (DWTF) may generate. If a DWTF is not allowed to induce industrial concentration, it does not substantially increase local demands for water supply, sewerage disposal, energy or solid waste management. Nor does it cause significantly increased air, water or noise pollution. However, a DWTF may still increase demands for public services and land somewhat, but the magnitude of these demands will be much smaller than those which could have resulted from industrial concentration.

the production process (i.e. land, water, energy), and the nature and extent of State and local comprehensive planning can affect the severity of landside impacts associated with increased oil imports and production. The development of deepwater terminal facilities does affect to some extent how and where these impacts will be distributed, however.

Potential Landside Impacts of U.S. Deepwater Terminal Facilities

Other studies conducted for the Army Corps of Engineers [7] and several State studies [8,9,10] have also warned against the adverse shoreside impacts which could result from U.S. deepwater terminal facility development.

As well as the impacts cited in the ADL study of foreign deepwater ports, these reports cite the following potential problem areas:

(1) processing facilities' requirements for waste product disposal;

(2) excessive demands of new industry and new population on area water and power supplies and transportation and service delivery systems;

(3) pressures to critical coastal areas for conversion of land to industrial and residential use; and

[7] U.S. Corps of Engineers. U.S. deepwater port facilities study, v. I-V. Alexandria, Virginia, Army Engineer Institute for Water Resources. (1972). (Institute for Water Resources report 72-8).

[8] Delaware. Governor's Task Force on Marine and Coastal Affairs. The coastal zone of Delaware: a plan for action in Delaware. Newark, Delaware, College of Marine Studies, University of Delaware, 1972.

[9] Maine. Governor's Task Force on Energy, Heavy Industry, and the Maine Coast. Report. Augusta, Maine, 1972.

[10] Louisiana State University. Center for Wetlands Resources. Louisiana superport studies, preliminary recommendations and data analysis, report 1. Baton Rouge, Louisiana, 1972. (Louisiana State University Sea Grant report 72-03).

(4) increased disaster hazards (e.g. hurricane or flood damage) posed by intense use of fragile coastal environments.

Several studies pointed out that there will be threats to the coastal zone absent any deepwater terminal facility development. The relevant question posed in most coastal States was not whether coastal development would occur but rather what type of coastal development was preferable and ought to be encouraged. An outright ban on deepwater port and industrial development would not assure wise use of coastal resources. The Allagash Group Report to the Governor's Task Force on Energy in Maine [11] explored the consequences of excluding all heavy industry from the Maine coast. The report's findings can be summarized as follows:

(1) there is no inherent incompatibility between heavy industries and high quality coastal resources if heavy industry is clustered in a few coastal locations and is strictly regulated; and

(2) even excluding heavy industry from the coast, the shore would experience heavy economic, social and environmental consequences from rapid growth in the tourist and recreational sectors over the next twenty years. Without careful planning and enforcement mechanisms, the magnitude of environmental demands posed by tourism may be equally as severe as those associated with industrial growth. Recreation demands pose particularly severe environmental problems, the report notes, because they occur in seasonal patterns which place high peak stresses on all natural resources and public services.

The Allagash Group pointed out that:

> Choosing a future for the Maine Coast which excludes heavy industry does not eliminate the problem of maintaining environmental quality. Given the incremental, decentralized nature of this nonindustrial coastal development, it is not even clear that the problem is made easier by banning heavy industry. Demands on resources by large industries are at least easily detected . . . the dispersion of recreation businesses and second homes makes monitoring and enforcement quite expensive.

Solutions to these coastal zone problems are compounded by multiple State and local jurisdictions. Even if coordination mechanisms could be established, inequities would likely occur. In deepwater port development, some jurisdictions could be the recipients of most of the adverse landside impacts and costs and others would reap the benefits. Policies designed to protect the coastal zone alone from secondary development might create industrial sprawl at non-protected areas further inland or in an adjacent unrestricted locality. In some cases, such as a proposed Louisiana deepwater port facility, crude oil would be piped more than 100 miles through pipeline to inland refineries. In this instance, a decision to construct a deepwater facility off the coast of one jurisdiction could pose serious problems of induced growth for other jurisdictions hundreds of miles inland. State reports indicated a need to deal with such impacts at both State and interstate levels.

[11] Maine, op. cit. The Allagash Group (now named the Allagash Environmental Institute affiliated with the University of Maine Center for Research and Advanced Study) is a non-profit organization performing environmental research on the edge of implementation. It has been in existence for roughly three years.

III. MAGNITUDES OF POTENTIAL SECONDARY GROWTH IMPACTS

The magnitude of the secondary growth problems associated with deepwater terminal facility development is dealt with in recent reports of the Council on Environmental Quality. CEQ is directing interagency studies of environmental impacts of deepwater development which should provide some estimates of landside impacts for various terminal locations described by different parameters. During the period of this study, the results of the completed CEQ landside impact studies, contracted to Arthur D. Little, were not yet available. Pending public release of the CEQ studies, other estimates of shoreside effects must, therefore, be relied upon.

Landside impact studies

The CEQ landside study (referred to above) examines various deepwater terminal facility proposals for several locations including the coast of Maine, the Mid-Atlantic Coast and the Gulf Coast. Although no other study has examined these alternatives simultaneously, partial data can be accumulated by examining existing studies which pertain to various different DWTF proposals and locations.

Mid-Atlantic Estimates of Secondary Impacts: Preliminary estimates for one hypothetical set of deepwater terminal facility conditions were developed for the CEQ and subsequently served as a basis for the Army Corps of Engineers Atlantic Coast Regional Study of Deepwater Port Facilities, authorized by the Senate Public Works Committee.[12] The results of the Corps of Engineers' study for the Mid-Atlantic were based on the following assumptions: by year 2000 the North Atlantic demand for oil products will reach 9.9 million barrels per day (b/d). To supply this amount, approximately 6.6 million b/d of crude and residual fuel oil must be imported from overseas;[13] approximately 3 million b/d crude must be refined elsewhere and brought by pipeline to the East. Existing refineries will be able to expand capacity from a present 1.4 million b/d to 2.5 million b/d; an additional 4.5 million b/d crude will be refined within the North Atlantic region, but will require construction of at least 10 additional refineries which could achieve capacities of 400–450,000 b/d each by year 2000.

Another basic assumption of the CEQ–Corps study (and of most other studies concerned with deepwater port secondary growth impacts) is that in the future petrochemical plants will increasingly locate where petroleum refining capacity is expanding. Presently petrochemical production is based on obtaining natural gas liquids for producing chemical intermediate hydrocarbons. By 1980, however, it is estimated that a short supply of natural gas liquids will dictate an increased reliance on petroleum-based feedstocks for petrochemical

[12] U.S. Corps of Engineers, Philadelphia District, op. cit.

[13] The Corps considered three alternative crude oil import levels for year 2000. The high projection, 6.6 million b/d, which the Corps relied on for the landside impact estimates, is based on an Office of Oil and Gas, Department of the Interior projection of the maximum North Atlantic refinery capacity attainable by year 2000. The high projection assumes no stimulation of U.S. oil and gas production and assumes expansion of East Coast refinery capacity to 50 percent of the area's petroleum requirements by year 2000. A medium projection, 4.0 million b/d, which assumes maximum expansion of existing refinery capacity in the North Atlantic but no new refinery growth or production of crude oil in the region, was not examined by the Corps in terms of landside impacts. A third alternative, a low projection of 1.0 million b/d, based on no refinery expansion in the region even at existing sites, was also rejected by the Corps.

production. Between 1970 and 1980, use of heavy oils in production of ethylene and propylene is expected to increase from 130 million b/d to 780 million b/d in the United States. Few new petrochemical plants utilizing natural gas liquids will probably be constructed and some existing plants may have to convert to use of heavy oils from refineries. Because of increased petrochemical demands, new refineries are expected to be designed to have a larger feedstock capacity than existing refineries. Thus, petrochemical growth will most likely occur in areas of refining growth where needed supplies of feedstocks for petrochemical production could be obtained.

The CEQ–Corps figures were also based on a "worst case" situation in which all the oil imports to the region would enter at one deepwater terminal creating a throughput there of 6.6 million b/d. Approximately 85 percent of these imports were assumed to be refined in the Mid-Atlantic area and the other 15 percent at other locations on the East Coast. For a deepwater terminal based on these assumptions and located off the Delaware Bay [14] the following estimates of Mid-Atlantic impacts were determined for year 2000:

(1) Approximately 45,000 acres of land would be diverted to refinery, crude oil storage and petrochemical uses. An additional 63,470 acres of land would be required merely to house the persons directly employed in terminal, refinery and petrochemical operations. Including land needs for population growth due to increased indirect employment, a total residential land requirement of over 250,000 acres was estimated. None of these figures include land required for provision of community facilities due to increased population or land needed by induced commercial growth.

In deriving the land required for new population growth, the researchers apparently did not examine how much natural population growth would have occurred in the region by year 2000 even without a deepwater terminal. In all the CEQ-Corps landside impact estimates, year 2000 projections are compared with existing 1972 conditions. No comparison of a deepwater port option versus a no-deepwater port option for the region in year 2000 was made. The analysts apparently did not consider the effect which existing or future State and local planning and controls could have in minimizing negative secondary impacts. Thus, these estimates represent "worst case" landside estimates for a "worst case" Delaware deepwater port option.

(2) Water needs of new refineries and petrochemical plants would be approximately 1 billion gallons per day. This figure does not include water requirements of other new industry or of residential or associated commercial growth.

(3) Biochemical oxygen demand (BOD) from plant effluent would be equivalent, even using advanced treatment, to the BOD of raw untreated sewage of 250,000 people. Without upgraded treatment by year 2000, the BOD would be almost three and a half times greater. The BOD analysis apparently did not take into account the requirements of the Federal Water Pollution Control Act Amendments of 1972 (P. L. 92–500). The figures seem to presume that, in spite of con-

[14] This location was studied by the Corps despite State of Delaware opposition to such a facility since the oil industry was giving strong consideration to a Delaware Bay location as a potential site for deepwater terminal operations. The Delaware location appears to be the most favored East Coast site by a consortium of fifteen major oil companies known as the Delaware Bay Transportation Company Project.

straints imposed by water quality standards enforcement, there will be little or no improvement in waste treatment technology by year 2000.

(4) Even using favorable assumptions (low sulfur, low ash fuels, or control equipment) potential air pollution loads would be over four times as great as their 1972 levels. The effect which State implementation plans under the Clean Air Act Amendments of 1970 (P.L. 91–604) might have in limiting such emissions is not discussed.

The results of the final CEQ landside studies reportedly do not appear as severe as the preliminary data from the CEQ-Corps' study since the earlier study was based on a "worst case" scenario for high throughput at a single location. The Corps of Engineers recently published an interim report on the Atlantic Coast Deepwater Port Facilities Study [15] which did not contain detailed information about secondary impacts. However, the Corps did revise the original assumptions on which the impacts were based. The Corps revised downward their estimate of the most likely year 2000 North Atlantic level of crude oil imports. Based on the assumption that in the future local and State opposition would limit refinery growth to areas with existing refineries and petrochemical plants, the Corps determined that their original estimate of 6.6 million b/d was too high and that the medium projection, 4.0 million b/d, was the most likely year 2000 crude oil import level. With reduced levels of regional oil imports and production, one could expect the magnitude of induced landside impacts to decrease.

If the new assumptions were used, the Mid-Atlantic landside impacts appear to be less severe than estimated in the original Corps of Engineers report.

Comparison of East Coast Sets of Data: Several sources, including the CEQ-Corps study, were used for partial data to calculate secondary impacts magnitudes of a North Atlantic deepwater terminal. To insure comparability, the calculated impact magnitudes were all based on the CEQ-Corps "worst case" assumptions. A comparison of results is presented in Table 1.

Gulf Coast Estimates of Secondary Impacts: Because the levels of fuel demand and the nature and extent of present industrialization are quite different on the Gulf Coast, the East Coast estimates do not apply and separate Gulf Coast studies must be examined to obtain reliable data on landside impacts. (West Coast impacts have not been examined as thoroughly as Atlantic and Gulf Coast impacts, primarily because the oil industry has favored Atlantic and Gulf Coast locations for such facilities in the short-term and because major U.S. fuel deficit areas are on the East Coast and in the Mid-West.)

One report, prepared by the Lower Mississippi Valley Division, Corps of Engineers,[16] contains the best Gulf Coast data directly comparable to the Mid-Atlantic landside impact estimates. The final Corps report on Gulf Coast Deepwater Port Facilities, released in June 1973, contains an analysis of landside impacts from secondary growth for 7 combinations of possible monobuoy deepwater port locations and five alternative cases of refinery capacity distribution.

[15] U.S. Corps of Engineers. Philadelphia District. North Atlantic Division. Interim report, Atlantic Coast deepwater port facilities study, Eastport, Maine to Hampton Roads, Virginia. Philadelphia, Pennsylvania, 1973.

[16] U.S. Corps of Engineers. Lower Mississippi Valley Division. Report on Gulf Coast deepwater port facilities, Texas, Louisiana, Mississippi, Alabama and Florida. Vicksburg, Mississippi, 1973.

TABLE 1.—MAGNITUDE OF SECONDARY IMPACTS OF MID-ATLANTIC DEEPWATER PORT DEVELOPMENT, BASED ON CEQ-CORPS "WORST CASE" ASSUMPTION FOR YEAR 2000, SELECTED SOURCES

	CEQ-Army Corps [1]	Oil and Gas Journal [2]	App. I, Maine coast [3]	Georges Bank petroleum study [4]
Land requirements (acres):				
Refineries and some petrochemicals on refinery sites		[5] 30,200–[6] 70,000		
Refineries and all petrochemicals	45,000			
Water needs (million gallons per day):				
Refineries			36	[7] 95–[8] 500
Refineries and all petrochemicals	1,000			
BOD load (lbs. per day):				
Refineries				[9] 80,000–[9] 390,000
Refineries and all petrochemicals	[10] 143,650			
Air pollutant emissions (pounds per day):				
Refineries:				
Particulates				475,000
SO_x				2,097,000
NO_x				1,425,000
All sources:				
Particulates	1,173,000			
SO_x	2,388,400			
NO_x	3,684,000			
Electricity requirements (kilowatt hours per year): Refineries			8,000,000,000	
Employment (people):				
Refineries	5,900		4,700	
Refineries and petrochemicals	139,000			

[1] U.S. Corps of Engineers, Philadelphia District, op. cit.
[2] Nelson, W. L. "How much land investment needed for grass-roots refineries?" Oil and Gas Journal. Dec. 4, 1972: pp. 56–57.
[3] Veazie, Carl E. app. I. "Heavy Industry on the Maine Coast", in report of the Governor's task force on energy, heavy industry, and the Maine Coast. Augusta, Maine, 1972.
[4] Offshore oil task group. The Georges Bank petroleum study: v. I, impact on New England real income of hypothetical regional petroleum developments; v. II, impact on New England environmental quality of hypothetical regional petroleum developments; summary. Cambridge, Mass., Massachusetts Institute of Technology, 1973. (MIT sea grant report 73-5).
[5] Based on 100,000 barrels per day capacity refineries (1970) which could be expanded to handle 400,000 barrels per day by year 2000.
[6] Based on historical land use acquisition averages of the oil industry and existing capabilities.
[7] Represents oil industry's "optimistic" projection.
[8] Represents average of most recent refineries' reported figures.
[9] Average of high and low data points.
[10] Computed from Corps' population equivalents for BOD content and per capita figures for an average domestic sanitary sewer.

Combining different strategies of monobuoy siting and refinery locations, the Corps considered 15 choices of facility alternatives for Gulf Coast deepwater port facilities and ranked these alternatives for a variety of impacts. (Although the Corps examined such deepwater port alternatives as dredged channels and artificial islands as well as monobuoys, they performed quantitative environmental analyses for only the monobuoy alternatives.) Only one of the Corps alternatives (D7-monobuoy off Sabine Pass, bordering Texas and Louisiana, with a year 2000 throughput of over 11 million b/d in one location and no change in historical patterns of refining capacity distribution) represented an option of developing only one port facility with a high-volume throughput. All other fourteen alternatives examined combinations of several low-volume monobuoy systems at several locations to achieve the requisite level of oil throughput.

Gulf Coast environmental landside impacts: All of the Corps alternatives were based on a Gulf Coast year 2000 crude oil throughput of 11,380,000 b/d. They arrived at this projection based on the assumption that PAD III will need to continue meeting its own fuel needs and also continue supplying crude oil and products for PADs I and II as their fuel demands mount. PAD refers to Petroleum Administration for Defense districts. (The United States is divided into five major

regions for which petroleum data are regularly reported by the Bureau of Mines. PAD I includes the entire East Coast, including Florida. PAD II is roughly the Mid-West plus Kentucky, Tennessee and Oklahoma. PAD III is the Gulf Coast plus New Mexico. For the purposes of the Gulf Coast study, the Corps treated Florida as a part of PAD III instead of PAD I.) Gulf Coast refinery capacity was projected to grow from 4,818,000 b/d (1972) to 15,175,000 b/d by year 2000. Using historical trends and information on planned future expansion of existing pipelines, the Corps allocated all projected crude oil imports among 10 coastal refining complexes up to 1980. The ten complexes are: Panama City, Florida; Pensacola, Florida; Mobile, Alabama; Pascagoula, Mississippi; Baton Rouge, Louisiana; Lake Charles, Louisiana; Beaumont-Port Arthur, Texas; Galveston-Houston Area, Texas, and Corpus Christi, Texas. By 2000, however, they predicted that an additional 1,695,000 b/d of coastal refinery capacity will be required in excess of what could be obtained by expanding existing pipelines. They assumed that a new pipeline would be required to provide this capacity and that the requisite refinery expansion could occur anywhere on the Gulf. (See Table 2 for a summary of the location of refining capacity. The year 2000 figures do not include the additional 1,695,000 b/d.)

TABLE 2.—PROJECTED COASTAL REFINERY CAPACITY, PAD III

[Barrels per day times 1000

Coastal complex	1972	Capacity 1980	2000[1]
Panama City			
Pensacola			
Mobile	18	19	23
Pascagoula	270	519	707
Baton Rouge	585	1,334	1,847
New Orleans	548	872	1,270
Lake Charles	306	438	770
Beaumont-Port Arthur	1,291	1,915	3,333
Galveston-Houston area	1,460	3,160	4,434
Corpus Christi	340	805	1,096
Total	4,818	9,062	13,480

[1] Year 2000 figures do not include an extra 1,695,000 barrels per day required by PAD I beyond PAD I's year 2000 allocation of 7,300,000 barrels per day from the Gulf Coast. Thus, year 2000 figures are short by 1,695,000 barrels per day.

The Corps then investigated five alternative cases of refinery distribution for the additional 1,695,000 and these cases were used in the impact analyses. (See Table 3, footnotes, for a description of the assumptions used by the Corps for Cases I–V for future refining capacity distribution). The Corps used the coastal refinery capacities to allocate the 11,380,000 b/d imported crude oil among refining complexes. All the oil was assumed to be free to be used on the Gulf Coast with no prior commitment of oil to refineries located outside PAD III.

TABLE 3.—SUMMARY OF CORPS ESTIMATES OF ONSHORE IMPACTS FROM GULF DWTF DEVELOPMENT

Monobouy alternative and refinery location[1]	DWTF locations	Year 2000 crude oil throughput, barrels per calendar day[2]	Impact location	Year 2000 impacts							
				Land requirements (acres)		Water requirements (mg/d)		Water pollution (BOD in thousands of pounds per day)		Air pollution (particulates in thousands of pounds per day)	
				Refineries	Petrochemical	Refineries	Petrochemical	Refineries	Petrochemical	Refineries	Petrochemical
D1—Case III[3]	Panama City	2,208,000	Louisiana[4]	6,223	20,731	311.00	2,073.00	15.0	93.30	466.40	1,762.00
	Southwest Pass	3,035,000	Texas[5]	15,215	27,271	709.00	4,727.00	34.0	212.70	1,063.60	4,018.00
	Sabine Pass	6,137,000	Gulf Total[6]	28,252	80,401	1,206.00	8,040.20	57.9	361.90	1,809.00	6,834.20
D2—Case II[7]	Pensacola	852,000	Louisiana	8,055	23,446	351.70	2,344.60	16.9	105.50	527.50	1,992.90
	Bayou Lafourche	3,374,000	Texas	18,265	51,787	776.80	5,178.80	37.3	233.10	1,165.20	4,402.00
	Freeport	7,154,000	Gulf Total	28,612	80,935	1,214.00	8,093.60	58.3	364.20	1,821.00	6,879.00
D3—Case III[3]	Mobile-Pascagoula	2,208,000	Louisiana[4]	6,223	20,731	311.00	2,073.00	15.0	93.30	466.40	1,762.00
	Bayou Lafourche	3,035,000	Texas[5]	15,215	27,271	709.00	4,727.00	34.0	212.70	1,063.60	4,018.00
	Freeport	6,137,000	Gulf Total[6]	28,252	80,401	1,206.00	8,040.20	57.9	361.90	1,809.00	6,834.20
D4—Case I[8]	Mobile-Pascagoula	608,000	Louisiana	8,743	24,464	367.00	2,446.40	17.60	110.10	550.40	2,079.40
	Bayou LaFourche	3,435,000	Texas	18,455	52,071	781.00	5,270.00	37.60	234.30	1,171.60	4,426.00
	Freeport	7,337,000	Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	364.20	1,821.00	6,879.40
D5—Case I[9]	Mobile-Pascagoula	4,043,000	Louisiana	8,743	24,464	367.00	2,446.40	17.60	110.10	550.40	2,079.40
	Freeport	7,337,000	Texas	18,455	52,071	781.00	5,270.00	37.60	234.30	1,171.60	4,426.00
			Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	364.20	1,821.00	6,879.40
D6—Case I[8]	Bayou LaFourche	4,043,000	Louisiana	8,743	24,464	367.00	2,446.40	17.60	110.10	550.40	2,079.40
	Freeport	7,337,000	Texas	18,455	52,071	781.00	5,270.00	37.60	234.30	1,171.60	4,426.00
			Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	364.20	1,821.00	6,879.40
D7—Case I[8]	Sabine Pass	11,380,000	Louisiana	8,743	24,464	367.00	2,446.40	17.60	110.10	550.40	2,079.40
			Texas	18,455	52,071	781.00	5,270.00	37.60	234.30	1,171.60	4,426.00
			Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	364.20	1,821.00	6,879.40
D8—Case V[9]	Mobile-Pascagoula	5,243,000	Louisiana	6,223	20,731	311.00	2,073.00	15.00	93.30	466.40	1,762.00
	Freeport	6,137,000	Texas	15,215	47,271	709.00	4,727.00	34.00	212.70	1,063.60	4,018.00
			Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	364.20	1,821.00	6,879.40
D9—Case III[3]	Mobile-Pascagoula	5,243,000	Louisiana[4]	6,223	20,731	311.00	2,073.00	15.0	93.30	466.40	1,762.00
	Freeport	6,137,000	Texas[5]	15,215	27,271	709.00	4,727.00	34.0	212.70	1,063.60	4,018.00
			Gulf total[6]	28,252	80,401	1,206.00	8,040.20	57.9	361.90	1,809.00	6,834.20

D10—Case III [8]	Bayou LaFourche	5,243,000	Louisiana [4]	6,223	20,731	311.00	2,073.00	15.0	93.30	466.40	1,762.00
	Freeport	6,137,000	Texas [5]	15,215	27,271	709.00	4,727.00	34.0	212.70	1,063.60	4,018.00
			Gulf total [6]	28,252	80,401	1,206.00	8,040.20	57.9	361.90	1,809.00	6,834.20
D11—Case V [9]	Mobile-Pascagoula	2,208,000	Louisiana	6,223	20,731	311.00	2,073.00	15.00	93.30	466.40	1,762.00
	Bayou LaFourche	3,035,000	Texas	15,215	47,271	709.00	4,727.00	34.00	212.70	1,063.60	4,018.00
	Freeport	6,137,000	Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	364.20	1,821.00	6,879.40
D12—Case IV [10]	Bayou LaFourche	5,243,000	Louisiana	12,325	29,771	446.60	2,977.00	21.50	134.90	669.80	2,530.40
	Freeport	6,137,000	Texas	15,215	47,271	709.00	4,727.00	34.00	212.70	1,063.60	4,018.00
			Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	365.10	1,821.00	6,879.40
D13—Case V [9]	Mobile-Pascagoula	2,208,000	Louisiana	6,223	20,731	311.00	2,073.00	15.00	93.30	466.40	1,762.00
	Bayou LaFourche	3,035,000	Texas	15,215	47,271	709.00	4,727.00	34.00	212.70	1,063.60	4,018.00
	Freeport	5,330,000	Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	364.20	1,821.00	6,879.40
	Corpus Christi	798,000									
D14—Case III [9]	Mobile-Pascagoula	2,208,000	Louisiana [4]	6,223	20,731	311.00	2,073.00	15.0	93.30	466.40	1,762.00
	Bayou LaFourche	3,035,000	Texas [5]	15,215	27,271	709.00	4,727.00	34.0	212.70	1,063.60	4,018.00
	Freeport	5,339,000	Gulf total [6]	28,252	80,401	1,206.00	8,040.20	57.9	361.90	1,809.00	6,834.20
	Corpus Christi	798,000									
D15—Case I [8]	Mobile-Pascagoula	608,000	Louisiana	8,743	24,464	367.00	2,446.40	17.60	110.10	550.40	2,079.40
	Bayou LaFourche	3,435,000	Texas	18,455	52,071	781.00	5,270.00	37.60	234.30	1,171.60	4,426.00
	Freeport	6,314,000	Gulf total	28,613	80,935	1,214.00	8,093.40	58.30	364.20	1,821.00	6,879.40
	Corpus Christi	1,023,000									

[1] All refinery capacity except additional 1,695,000 barrels per day required by year 2000 is allocated using historical trends and information on planned future expansions. See table 2 for a listing of how this capacity is allocated. The excess 1,695,000 barrels per day is allocated according to five hypothetical cases, case I–V.

[2] Barrels per calendar day is essentially the same unit as barrels per day (b/d). It is an expression of the operating capacity of a refinery, generally with an allowance over a period for downtime. Another unit used to measure refinery capacity, b/sd, measures the capacity of a refinery in barrels per day during the time the refinery is operating or "on stream."

[3] Under case III, the external demand of PAD I is assumed to shift the 1,695,000 barrels per day eastward. It is assumed that it will be refined at Pascagoula, Mobile, Pensacola, and Panama City with 25 percent of the capacity at each of these locations.

[4] Louisiana total equals the combined Corps impacts for Baton Rouge-New Orleans and Lake Charles.

[5] Texas total equals the combined Corps impacts for Beaumont-Port Arthur, Galveston-Houston, and Corpus Christi.

[6] Gulf total equals the sum of the Louisiana and Texas totals plus the impacts determined by the Corps for the rest of the Gulf, namely: Panama City, Pensacola, and Mobile-Pascagoula.

[7] Under case II it is assumed that a gradual shift eastward in refining capacity occurs due to the demand of PAD I. Twenty percent of the 1,695,000 capacity is distributed among each of the following: Panama City, Pensacola, Mobile, and Pascagoula; Baton Rouge and New Orleans; Lake Charles and Beaumont-Port Arthur; Galveston-Houston area; Corpus Christi.

[8] Under case I, it is assumed that the historical pattern would continue. Each complex capacity was determined using the ratio of its base capacity (1972) to the base capacity for the entire coastal region (1972) and multiplying by 1,695,000 barrels per day.

[9] Under case V, it is assumed that the 1,695,000 barrels per day capacity would shift to the Mississippi-Alabama coast and be distributed equally between Pascagoula and Mobile.

[10] Under case IV, it is assumed that the 1,695,000 capacity would shift to the Mississippi River and be distributed equally between New Orleans and Baton Rouge.

On the basis of these assumptions, the Corps performed their environmental analyses on the 15 alternative systems and then applied subjectively derived weighting factors to determine an environmental ranking for the alternatives. As a result, the port system offshore of Sabine Pass was deemed to have the least potential environmental impact. The Sabine Pass alternative was one of the least desirable from the standpoint of onshore impacts (land and water requirements, air and water pollution), but it had an excellent offshore environmental rating. Even though onshore impacts were weighted 50 percent more than offshore impacts, Sabine Pass' offshore values outweigh its negative onshore impacts. This result points up a serious problem in trying to locate a DWTF with minimal environmental risks. Whereas one high-volume offshore facility may be environmentally preferable when considering marine impacts of the terminal itself (i.e. risk of collisions, risk of oil spills reaching coastal areas and estuaries), an alternative to a massive concentrated landside area would be several smaller ports and dispersal of associated refining capacity in smaller units. This alternative may be environmentally preferable in terms of landside impacts (i.e. secondary growth demands and landside pollution potential).

The Corps estimates of onshore impacts for all 15 alternatives are summarized in Table 3 for the entire Gulf. Land requirements were calculated by the Corps on the following bases: 900 acres of land required per each 250 million b/d refinery; 200 acres of land per each 1-billion lb. (37,550 b/d) ethylene-based petrochemical complex. Existing refinery capacities were considered and a 50 percent future expansion of existing refineries was assumed. Water resource calculations were based on the following: 8 million g/d water needs per each 100,000 b/d refinery; 20 million g/d water needs per each 1 billion lb. ethylene-based petrochemical complex; 960 lb./d BOD (using "advanced technology") per 250,000 b/d refinery; and 900 lb./d BOD (with "advanced technology") per each 1 billion lb. petrochemical complex. Air pollutant loads were calculated assuming 30,000 lb./d particulate emissions per 250,000 b/d refinery and 17,000 lb./d emissions per 1 billion lb. petrochemical complex. The analysis did not indicate what air and water quality standards and controls, if any, were assumed.

The Corps data appear to be based solely on impacts from petroleum and petrochemical industrial growth. Estimates of additional land and water needs and pollution which could be generated by induced commercial and residential growth are not examined. In addition, the Corps data appear to be based on technical criteria alone.

In fact, the overriding factor in predicting landside impacts, according to the Corps analysis, would be the assumptions made about future expansion of refining capacity rather than the choice of individual deepwater port locations or throughput. For all alternatives sharing the same assumptions about refining growth, the magnitudes of a range of landside impacts were identical (see Table 3; i.e., impacts of monobuoy alternative, D1-D3-D9-D10-D14; D4-D5-D6-D7-D15; D8-D11-D13).

The question ought to be asked whether or not all of the combinations of deepwater port locations and refining patterns examined by the Corps are realistic. No assumptions apparently were made of the effect which the port location(s) might have on location of new refinery

capacity. Instead, the Corps treated the two types of location decisions as separate events. For example, landside impacts for the one high-throughput port alternative off Sabine Pass were calculated based on the same assumptions about refinery capacity that were used to calculate the impacts for four multiple-terminal alternatives. The landside impacts at all Gulf Coast locations were found to be identical for all Case I alternatives, including an alternative with 4 DWTF locations spread out across the Gulf Coast (1 off Mississippi-Alabama, 1 off Louisiana, 2 off Texas).

Based on the Corps assumptions, one can say little about the effect which various deepwater port locations might have on Gulf Coast landside impacts.

Gulf Coast socio-economic landside impacts: Other landside impacts which the Corps Gulf Study discussed were various social and economic effects, including: effects on population, employment, total personal income, per capita income, total earnings and earnings per worker; and effects on housing, transportation, educational systems and public facilities. For each monobuoy alternative, D1–15, the Corps attempted to predict Gulf Coast socio-economic conditions with the port alternative and compare them with conditions which would exist without deepwater terminal development.

Depending on which monobuoy alternative and refining distribution case was examined, the year 2000 predicted total employment increase in the Gulf Region generated by deepwater port development ranged between 854,357 and 929,528; predicted year 2000 population growth attributable to DWTF development ranged between 1,123,808 and 1,272,112 (these figures are based on the same assumptions discussed previously in regard to environmental landside impacts). The Corps used essentially the same methodology for this analysis as they used to determine environmental impacts (see Gulf Coast Environmental Landside Impacts section).

The Corps estimated that in the long run the positive economic effects, such as increased total personal income and per capita income, would outweigh negative social effects, such as overcrowding of housing, transportation, education systems and public facilities, which might result in the short-run from rapid population increases.

The Corps found once again that distribution of additional refining capacity was a major determinant of the severity of landside impacts. The assumption made about refinery capacity distribution determined a monobuoy system's social and economic ranking. Case III alternatives, for which refinery capacity was assumed to shift eastward and be divided equally among Pascagoula, Mobile, Pensacola and Panama City, were found to have the most positive landside social and economic impacts. Alternatives which would result in greater concentrations of refinery expansion in already developed or industrialized areas were found to be less desirable with regard to these impacts.

Gulf Coast economic impact studies: Two other studies have been completed which provide partial data on secondary impacts from DWTF construction off the Gulf Coast. These are a report prepared for the Louisiana Superport Task Force, Loop Inc.[17] and others to

[17] In 1972, Governor Edwards of Louisiana appointed a high-level Louisiana Superport Task Force to push for and coordinate efforts to build a deepwater terminal off the Louisiana coast. At the same time a group of major oil companies were planning to construct a deepwater oil terminal in the Louisiana Gulf. This private consortium of thirteen oil companies is known as Loop Incorporated.

year 2000 if a DWTF were operating by 1977. (The number of employees per 1000 b/d refined has been declining in Louisiana from 16.4 in 1961 to 7.9 in 1971. New refineries are being built to be even more highly automated than existing plants. New refineries average from 2.5–3.5 employees/1000 b/d. Also, the trend toward subcontracting of maintenance operations has reduced the employee ratio. Kaiser and Gulf South Research Institute assumed that these trends would continue, but with a decreasing rate.) Projected growth in petrochemical employment was based on an observed relationship during 1965–71 between refining and petrochemical growth. For every refining job generated over this period, 2.3 jobs were created in the petrochemical industry. This multiplier was expected to hold for the area affected by the deepwater port. The analysis assumes this figure to be conservative. The offshore oil terminal was estimated to initially employ 315 people with a small increase in employment beyond this level possible at a later date. However, secondary employment is expected to be much greater. See Table 4 for a chronology of port-generated direct employment.

TABLE 4.—ESTIMATED DIRECT EMPLOYMENT GAIN IN LOUISIANA STEMMING FROM AN OFFSHORE OIL TERMINAL (DWTF)

Item	1980	1990	2000
Construction employment:			
Offshore terminal	707	294	
Refineries	2,179	1,538	5,142
Petrochemical plants	823	748	1,340
Total	3,709	2,580	6,482
Operating employment:			
Offshore terminal	315		
Refineries	2,848	5,456	6,837
Petrochemical plants	6,550	10,300	22,900
Total	9,713	15,756	29,737
Total direct employment gain	13,422	18,336	36,219

Source: Taken from H. J. Kaiser Co. and Gulf South Research Institute, op. cit., p. 48.

The total employment gain Louisiana would experience from the deepwater port was determined using OBERS [22] projections to calculate the induced employment stimulated by DWTF-generated direct employment increases. Table 5 shows these gains through year 2000. These gains were derived by means of a computer program which calculated induced increase in employment in all remaining industries resulting from employment increases in the petroleum industry.

The population increases resulting from these employment gains in Louisiana were estimated to be 99,135 in 1980 and 303,733 by year 2000. The analysis did not estimate how much of the increase would be in the vicinity of the deepwater port. The computer program used to calculate induced employment was also used to produce these population growth estimates. The above projections of increase in population actually attributable to the deepwater port were obtained based on projections of natural population growth which would occur even without deepwater port construction and on assumed labor participation rates.

[22] U.S. Water Resources Council. OBERS projections of regional activity in the United States, v. 1–5 Washington, 1972.

TABLE 5.—DIRECT AND INDUCED EMPLOYMENT GAINS GENERATED IN LOUISIANA BY AN OFFSHORE OIL TERMINAL (DWTF)

Item	1980	1990	2000
Direct employment gain:			
Construction	3,700	2,600	6,500
Manufacturing:			
Refining	2,800	5,400	6,800
Chemical	6,600	10,300	22,900
Total	13,100	18,300	36,200
Induced employment	21,970	39,720	76,170
Total net gain	35,070	58,020	112,370

Source: Taken from H. J. Kaiser Co. and Gulf South Research Institute, op. cit., p. 52.

The labor participation rate reflects the ratio of total employment to total population. A ceiling was imposed on this ratio so that if employment increases substantially, it becomes necessary ultimately to specify that the increase in labor participation cannot be satisfied by natural regional population growth, and this labor demand must be met by in-migration to the region.

Impacts on local and State governments: The Louisiana study concluded with a benefit-cost analysis of secondary growth caused by Louisiana offshore oil port construction from the viewpoint of State and local government. Impacts on local and State government revenues and expenditures resulting from development stimulated by an offshore deepwater port over a 24-year period were measured and compared.

Categories included individual taxes, corporate taxes, and operating and capital costs for State and local services (such as higher education, schools, police, highways and others). The resulting revenues and expenditures were compared to determine a benefit-cost ratio from the viewpoint of the affected governments. See Table 6 for a summary of these results.

TABLE 6.—IMPACT OF AN OFFSHORE OIL TERMINAL ON GOVERNMENT REVENUE AND EXPENDITURES

[In millions]

	Present value
Revenues:	
Individual	$194.3
Corporate	284.9
Total revenue	479.2
Costs:	
Capital costs:	
State	7.9
Local	25.9
Total	33.8
Operating costs:	
State	141.5
Local	264.1
Total	405.6
Total costs	439.4
Revenue-cost ratio	1.09:1

Source: Taken from H. J. Kaiser Co. and Gulf South Research Institute, op. cit., p. 73.

The resulting ratio, 1.09:1, indicates that, at the end of the 24-year period, for every dollar governmental entities have had to expend on services as a result of deepwater port induced growth, they will have received 1.09 dollars in revenues. This ratio is not highly favorable inasmuch as the discovery of a small estimating or projection error could easily reduce the ratio below the break-even point (i.e. it does not appear that State and local environmental protection costs have been accounted for). Also, no breakdown of State versus local benefits and costs is given, so it is not clear that the division of benefits and costs would be equitable among all governmental entities. Lastly, the benefits and costs are aggregated for the 24-year period which does not permit analysis of how costs and benefits will be distributed over time. Governments could be required to provide services and incur costs at an early state of DWTF development and wait for a number of years before increased revenues begin to balance these costs.

Texas Impacts: Daniel Bragg and James Bradley [23] estimated in 1972 the economic impact on the State of Texas of a deepwater port which would have by 1985 a throughput of 3.5 million b/d. Such a throughput level is approximately equal to the 1985 throughput projected for a Louisiana port.

Most of the economic and other impacts of a deepwater port were projected to occur in the Texas coastal zone, partly because of the tendency which industry would have to achieve economies by clustering around such a facility. In addition, Bragg and Bradley expect future refinery growth to occur where refinery capacity already exists, for reasons previously cited in connection with the Louisiana study, and Texas' coastal region already contains almost 90 percent of the refining capacity in the State.

Employment Impacts: Using input-output models developed for Texas, future gains in employment statewide from deepwater port construction and operation were calculated to be 336,770 by 1985, of which nearly 40,000 would be in oil refining.

The total increase in State employment from offshore oil port development was determined by applying the input-output model's State labor multiplier to projected growth in oil refinery output.[24] See Table 7 for a chronology of deepwater port impacts on employment.

TABLE 7.—NEW JOBS RESULTING FROM TEXAS DEEPWATER TERMINAL

Source	1975	1980	1985
Oil refining industry	8,498	22,595	39,266
Total in State (including refining)	72,887	193,789	336,770

Source: Taken from Daniel M. Bragg and James R. Bradley, op. cit., p. 43.

These employment figures were substantially greater than those calculated for the same years in the Louisiana study for an offshore port with a similar volume of throughput. One possible explanation for this difference is that deepwater terminal facility construction was projected to expand Texas refinery capacity from 3 million b/d

[23] Bragg and Bradley, op. cit.

[24] Growth in port-related activities such as ship repair, chandlering, and bunkering, tug and towboat services, pilotage and longshore labor was not calculated by Bragg and Bradley. Though these activities would be affected by operation of the terminal the total impact of this growth was not expected to be significant compared to refinery growth.

Unfortunately, none of the landside impact studies adequately identified what standards (either technological or legal) were used to determine landside impacts. No study discussed assumptions made for all of the factors cited by the NPC as influencing environmental impacts. Without this information, it is difficult to determine if the magnitudes cited refer to "worst case", "optimistic" or "most likely" projections. Comparison of results of several studies is hampered unless all underlying assumptions are known.

IV. CONTROLS FOR MANAGING SECONDARY GROWTH AND MINIMIZING IMPACTS

Deepwater terminal-related activities abroad are developed and regulated through diverse institutional arrangements, with the national governments taking the initiative in planning for and controlling the development. In this country, control over port economic activity has traditionally been with the States and local governments. In some of the 30 coastal States (including the Great Lakes States) a single statewide authority develops, improves, and regulates ports. In North Carolina both coastal and inland ports and related facilities are under the jurisdiction of a single agency, the North Carolina Port Authority. However, this is not the case in the majority of coastal States. Most coastal States have a number of agencies, State, regional and local, which have port planning, development, construction or regulatory functions. Statutory authority to control ports or other coastal development also varies widely from State to State. In some States both statutory and constitutional autonomous or semi-autonomous local ports, port parishes or port districts regulate port activities. In other coastal States, various regional or interstate compacts and commissions have responsibility, advisory or administrative, for some aspects of port-related activity. Local political jurisdictions along the coastline share these responsibilities through their exercise of police powers and general governmental functions.

The Federal Government also divides responsibility with the States and localities for port regulation. For coastal ports, the Department of Transportation, through the Coast Guard and Office of Pipeline Safety, has responsibility for navigational and vessel safety, for spill prevention and cleanup, and for pipeline configuration and operation. The Army Corps of Engineers has responsibility for the maintenance and protection of navigable waters. The Department of Commerce, through the National Oceanic and Atmospheric Administration, administers the Coastal Zone Management Act (P.L. 92–583) although this Act has not yet been fully funded by the Administration. The Department of the Interior, through the Office of Oil and Gas, issues import licenses for and allocates imports of crude oil and, through the Bureau of Sport Fisheries and Wildlife, is involved in the management of wildlife resources including protection of wetlands in the coastal zone.

If deepwater terminals were to be constructed offshore outside State territorial waters (in most cases State control extends to the 3-mile limit), the Federal Government would have to assume new responsibilities for port terminal regulation and control, but the major responsibility for control and planning of onshore, landside facilities would still remain with the States and localities.

State action

Over the last ten years, increasing concern over protection for rare or unprotected natural resources has led the coastal States to take a more active role in planning and controlling land use. Most of the early State programs for coastal areas focused either on wetlands preservation or protection of public beach access. Later, some coastal States took the initiative in regulating power plant siting and the locating of industrial and large-scale residential development. More recently, partly in response to the Coastal Zone Management Act of 1972 (P.L. 92–583), coastal States have become active in the areas of shoreline zoning and coastal planning and management.

The Atlantic Coast States have generally focused on programs of wetlands protection. Going beyond this type of critical areas protection, Maine, Delaware, New Jersey and Florida have enacted innovative legislation to control or direct development along their coastlines. Gulf Coast States have tended to approach coastal zone management by regulating some, but not all, landside activities having environmental impacts. Unusual recent coastal activity among these States includes the Texas 1969–1973 moratorium on sale, leasing or alteration of State-owned submerged lands pending completion of a statewide comprehensive study, and creation of authorities with specific responsibility for phases of deepwater terminal planning or construction. In general, the Pacific Coast States have been most active in comprehensive coastal regulation and planning. California, Oregon and Washington have taken inventive legislative or administrative steps to oversee management of their coastal resources.

State actions with the greatest bearing on possible secondary development from deepwater terminal facilities include the following: (1) Delaware's Coastal Zone Act of 1971, which barred new development of oil refineries, paper and steel mills and petrochemical companies in coastal regions and established State permitting authority over new industrial development in the coastal region. In April Governor Sherman introduced environmental legislation to: (a) supplement the State Coastal Zone Act with a State Coastal Zone Management Act which would provide for regulation of residential and commercial coastal zone development of greater than local impact (this bill has gone to committee but has not yet been enacted); and (b) provide for statewide regulations over private and public wetlands and marshes. The Wetlands Bill has been passed by the General Assembly.

(2) Maine's Site Location Regulation Act requires a permit to undertake any large-scale industrial or residential development. Maine's Mandatory Zoning and Subdivision Control Law gives the State zoning control over any shoreline areas lacking local zoning control. Legislative proposals to create a Maine Development Corporation and limit heavy industry and port or harbor development to specific coastal zones were proposed but not passed in 1973.

(3) California's Coastal Conservation Act involves planning for and regulating all development in the State's coastal region.

(4) Creation on the Gulf Coast of two State political subdivisions (Louisiana Deep Draft Harbor and Terminal Authority; Texas Offshore Terminal Commission) and one corporation (Ameraport Corporation, Alabama) with responsibility for deep port planning and/or development; and

(5) Enactment of the New Jersey Coastal Area Facility Review Act on June 20, 1973. An earlier environmental package submitted by Governor Cahill included a ban, later compromised to a 4-year moratorium, on deepwater port development within the New Jersey 3-mile zone and a ban in this same zone on off-shore nuclear generating stations. No legislation dealing directly with deepwater ports was enacted but provisions strictly regulating offshore nuclear facilities waste disposal were incorporated into a modified Coastal Area Facility Review Act which was passed. (In the modified version of the Act which was enacted, certain already industrialized coastal areas, including the Delaware River refining complex, were excluded from the zone and thus from control.) The Act gives the New Jersey Department of Environmental Protection permit authority over all major construction within a defined zone (to the 3-mile limit and a 1,380 square mile zone landward), and requires the preparation of environmental statements for all major proposed development.

In terms of secondary impacts, Maine may have the most interesting set of existing and proposed legislation for deepwater terminal facility planning. Other States have taken action which would either: (1) help prevent undesirable port activities or industrial development on or off shore but would not help determine where and how such development might be acceptable or provide mechanisms which could guide and implement desirable development, or (2) have established institutional mechanisms which could facilitate deepwater development while leaving the major initiative in terms of siting of facilities in the hands of private enterprise.

Maine's existing law is aimed at preventing negative impacts from unplanned large-scale development, which would clearly impose constraints on landside deepwater port development. As a result of the recommendations of the Governor's Task Force on Energy, Heavy Industry and the Maine Coast, however, legislation [27] was proposed in the last legislative session which, had it passed, would have permitted the State to take the initiative in deepwater port siting. The bills would have created two coastal zones in which heavy industrial development would be permitted, one of which could be used for deepwater oil terminal related activities. These zones were chosen on the basis of a mix of economic, environmental and other factors. The proposed legislative package included a plan to create a Maine Development Corporation with authority to facilitate development of refineries and pipelines and other facilities in the coastal zone, or to oversee the development of private industrial proposals in the zone. Requirements for economic impact statements, analogous to the statements required under the Section 102(2)(c) provision of the National Environmental Policy Act of 1969, to be filed on all major developments were also contained in the Maine proposals.

The bills will be reintroduced in the next session as they were defeated in both the Maine legislative chambers by narrow margins. The proposals' rejection apparently was due in part to the pending proposal of the Pittston Company to construct a $350 million oil refinery at Eastport, a location not included in the two-zone proposal.

The Gulf Coast deepwater port authorities are also innovative institutions, but their mandates are not aimed at secondary landside

[27] Maine. Laws, 1973, Legislative documents 1663, 1759.

impacts or regulation. The Louisiana Deep Draft Harbor and Terminal Authority enabling legislation [28] does call for the establishment of an Environmental Protection Plan which must state how the design of the deepwater port will control long-term terminal development so that growth and additions to the terminal do not result in random growth or environmental degradation, but it does not specify comparable requirements with respect to the secondary growth and industrial development induced by the deepwater port. The Texas Offshore Terminal Commission is required by law [29] to have as part of its plan a proposal for environmental protection and an analysis of the benefit-cost ratio of a proposed facility. Again, no specific instructions to plan for or control landside development are contained in the legislation.

V. CONCLUSIONS

All studies examined agree that major landside impacts from deepwater port construction will follow if uncontrolled refinery and petrochemical concentration is allowed to occur in adjacent coastline areas.

The argument is made in the Department of the Interior's Legislative Draft Environmental Statement that dispersion of deepwater facility-induced refinery and petrochemical growth would be preferable to concentration of capacity in a few locations. Although some new land would be industrialized with dispersal of capacity, the total effect was estimated to be less severe than if all new capacity were located in a heavily industrialized area. The Interior statement does not contain concrete proposals to achieve such dispersion. Other Administration sources also support dispersal of refining capacity and deepwater facilities. Governor John A. Love, former Director of the Energy Policy Office, testified on October 3, 1973, before the Special Joint Subcommittee of the Senate Interior and Insular Affairs, Commerce and Public Works Committees to the effect that:

> Both the economic incentives and our environmental preferences should heavily favor dispersion of deepwater port facilities, in other words a reasonable number of these facilities somewhat evenly distributed over our coast . . . For environmental reasons, both onshore and offshore, I favor a larger number of ports and thus dispersion of the ship traffic, operating spills and associated refinery development.[30]

Governor Love expressed his belief that between the Coastal Zone Management Program and the National Land Use Program, the effects of landside secondary development could be controlled and dispersed.

Most studies conclude that the major industrial growth would probably occur, particularly for an Atlantic Coast deepwater terminal, in the political jursidictions adjacent to the terminal and its support activities. No available studies measure the potential for controlling this growth through application of additional planning controls.

The findings regarding secondary growth are supported and constrained by the following factors:

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[28] Lousiana Laws, 1972, Act 444, regular session. (Louisiana revised statutes title 35, section 3101 et seq.)
[29] Texas Laws, 1972, Vernon's Texas statutes and codes annotated. Water code, sections 12.001–12.003, 12.011–12.027, 12.061–12.067. West Publishing company.
[30] U.S. Congress, Senate, Special Joint Subcommittee, op. cit.

employment generated would amount to nearly 1 million.[32] The magnitude of this second "induced" growth would depend on the region in question. In an already highly urbanized region such as the Mid-Atlantic with a high regional multiplier most of the induced growth to service direct employment would be likely to be captured by the region and the "induced" impact would be significant. In a less highly urbanized region, current economic theory holds that this would be less true, with more of the "induced" economic growth occurring outside the region. Yet for a region with a relatively small economic base and low population density, even an induced growth of small absolute magnitude could produce significant effects.

Role of planning

Perhaps the most important conclusion to be drawn from studies of deepwater port secondary impacts is that narrowly conceived policies directed solely at advancing or halting such port development alone cannot produce an optimal plan for coastal zone resource allocation. Planning to direct and control heavy industry growth may be a necessary policy for coastal States as the projected year 2000 high level of oil throughput will cause pressures for industrial expansion even without deepwater port development. Given pressures on the coastal zone from non-industrial growth, however, industrial controls alone will probably not be sufficient to protect the coastal environment.

If U.S. public policy is shaped with a disregard for past deepwater port experience overseas, particularly the results of dealing with such development separately from other demands for coastal zone resources, predictable adverse landside effects may be the result. A major factor in decisions to permit superport operations may be the readiness and ability of State and local jurisdictions to prepare and carry out a comprehensive plan for land use and economic development so as to keep undesirable effects within bounds. It appears that the nature, extent, and timing of secondary impacts associated with deepwater terminal facility development may be controllable to some extent. In this Federal system, the authority and responsibility for governing much of this secondary development resides in the State and local governments or perhaps in special regional bodies.

Whether in the future the secondary effects of deepwater port development discussed in this analysis will be acceptable to society will depend greatly upon the vigor and quality of the land use planning and control of industrial development which is in the hands of the local and State governments.

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[32] The Corps derived the total employment projection from the direct employment increase based on a regional multiplier of 4 (e.g. each oil refining and petrochemical job created will create 4 other jobs). The Louisiana study was based on a multiplier of 2.677 in 1980, rising to 3.171 by 1990 and then leveling off to 3.107 by year 2000. In the Texas study, a direct employment increase of 39,266 by 1985 was projected to create a total employment increase of 336,770. This implies a multiplier of over 7.5.

APPENDIX E

Legislation Before the Senate in the 93d Congress Relating to the Development of Offshore Deepwater Ports

Eleven legislative proposals related to U.S. deepwater port policy have been introduced in the 93d Congress. In order of their dates of introduction, bills pending in the Senate and House are summarized as follows:

S. 80, Mr. Hollings, Mr. Magnuson, Mr. Kennedy, Mr. Stevens, and Mr. Roth.—A bill to amend the Ports and Waterways Safety Act of 1972 to provide for authority to be placed in the National Oceanic and Atmospheric Administration for the evaluation and certification of the environmental soundness of the site selection, construction, and operation of offshore artificial structures for ports and terminals, powerplants, airports, and other such facilities to be located in coastal waters.

The statement of findings and purposes of S. 80 indicates that there is a nationwide need to oversee the planning, construction, and operation of such facilities to prevent damage to coastal navigable waters, the coastal zone, and the resources therein. These resources include but are not limited to fish, shellfish, and wildlife; marine and coastal resources; and scenic values.

S. 80 authorizes the Secretary of the Department of Housing and Urban Development, and the Director of the National Oceanic and Atmospheric Administration, to ascertain and certify that a proposal for the construction and operation of offshore facilities covered by the Act "does not pose unreasonable threat to the integrity of," and that "all possible precautions have been taken to minimize adverse impact on" the marine environment.

The Act requires the Secretary to establish criteria and consult with officials of Federal, State and local government entities having relevant jurisdiction or expertise and to hold public hearings prior to granting certification for the development and operation of offshore facilities. Offshore facility projects which have not reached the construction stage by the effective date of the Act are also subject to the certification process. Such certification is based on an examination and evaluation of project plans which must be submitted to the appropriate authority at least two years in advance of the anticipated date of beginning construction.

The measure also authorizes the Secretary of the Department in which the Coast Guard is operating to promulgate and enforce "such reasonable regulations with respect to lights and other warning devices, safety equipment, and other matters relating to the promotion of safety of life and property on artificial structures" covered by the Act.

Additional provisions provide for a penalty of $50,000 to $200,000 for violation of the Act and empowers the Secretary to initiate injunctive proceedings to halt the uncertified construction or operation of any artificial structure subject to the Act.

S. 80 is now pending before the Committee on Commerce.

S. 180, Mr. Williams, Mr. Hathaway, Mr. Inouye.—To amend the Federal Water Pollution Control Act in order to require the approval of adjacent coastal States prior to the construction of certain offshore facilities.

Essentially the same as a measure introduced in the 92d Congress by Senator Boggs as S. 3844, this measure, entitled "The Coastal Environment Protection Act" is proposed as an assertion that "coastal States have clear authority to approve or disapprove nuclear power generators which are to be built off their coast in the ocean."

Senator Williams summarized the provisions of his bill as follows:

> My bill provides that a Federal department or agency which is considering the construction, licensing or approval of any facility beyond the territorial sea off the coast of the United States must submit a complete report on the facility to the Administrator of the Environmental Protection Agency who will forward the report to the Governor of each adjacent coastal State which might be adversely affected by pollution from such a facility. Then, those Governors have 90 days to evaluate the report and disapprove if they choose to. If a Governor does disapprove it, the facility cannot be licensed or constructed. [1]

S. 180 excludes facilities constructed under leases pursuant to the Outer Continental Shelf Lands Act.

The measure was referred for consideration to the Committee on Public Works.

S. 568, Mr. Tower.—To amend the Outer Continental Shelf Lands Act by providing authority for the issuance of permits to construct, operate, and maintain port and terminal facilities.

This measure is identical to S. 4092, introduced by Senator Tower in the 92d Congress. Entitled the "Outer Continental Shelf Ports and Facilities Amendments of 1972," the measure authorizes the Secretary of the Interior to issue permits "for the construction, operation, and maintenance of port and terminal facilities on the submerged lands of the Outer Continental Shelf."

Pursuant to S. 568, the Secretary must promulgate rules and regulations and, in granting port and terminal facility permits, take into consideration the need for, environmental impact of, and alternatives to, the construction of such facilities. He must in addition provide for public hearings.

S. 568 was referred for consideration to the Committee on Interior and Insular Affairs.

S. 836, Mr. Case.—To amend the Federal Water Pollution Control Act in order to require specific approval by the Congress and by adjacent coastal States prior to the construction of certain offshore facilities.

This bill would amend that Act by adding a new section at the end of Title IV, "Specific Congressional and State Approval of Certain Ocean Facilities."

Paragraph A of the proposed new section sets forth Congressional findings that offshore construction of deep draft oil docking, electric

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[1] Congressional Record, January 4, 1973, p. S. 167.

generating plants and oil drilling facilities may cause massive pollution problems for neighboring states. An additional finding provides that all such construction must be specifically reviewed and approved by Congress and the adjacent States.

Paragraph B prohibits any Federal department or agency from constructing, approving or licensing the construction of any facility in or beyond the territorial waters off the coast of the United States except under certain specific conditions. First, the bill would require the department or agency to file a complete report on the proposed facility with the Administrator of the Environmental Protection Agency, which he must then forward together with his own views to the Governor and legislative leaders in each adjacent coastal State that might be adversely affected by the facility. Secondly, Congress must pass a law approving such construction and the Governor of each affected State must file a notice of State approval with the Administrator.

Failure by the Governor to file a notice of approval or disapproval of construction within ninety days after receiving the Administrator's report is considered an action of approval under the Act.

S. 836 is pending before the Committee on Public Works.

S. 1316, Mr. Biden and Mr. Muskie.—To amend section 311 and section 509 of the Federal Water Pollution Control Act.

Section I adds definitions of deepwater development and adjacent State to section 311(a) of the Act. Deepwater development is defined as any man-made structure either fixed or floating, or dredging activities related to such structure, which is located in or may affect the navigable waters of the United States or the water of the contiguous zone, and which is intended for such uses as: a port or terminal for the loading or unloading of cargoes; or a site for powerplant or airport development, or for solid waste disposal.

S. 1316 further amends the Federal Water Pollution Control Act by prohibiting any Federal agency from permitting the construction or operation of a deepwater development until the Administrator of the Environmental Protection Agency has certified that such development meets certain criteria of site selection, method and type of construction, and environmental protection.

The Act provides that any person desiring to construct or operate a deepwater development shall at the time of application for approval from any Federal agency submit, in accordance with regulations promulgated by the Administrator, detailed plans of such development within two years prior to the expected date of the beginning of construction. Those deepwater developments which are not in the construction phase on the date of enactment of the Act but which will reach the construction phase at any time within two years after the date of enactment must submit plans to the Administrator "as soon as possible."

Copies of such materials as may be required under the Act in connection with a permit application must be submitted to the Governor of each adjacent State, and made available for public inspection at a place to be designated by the Administrator.

The Administrator may certify a deepwater development only after he has received the concurrence of the Governor of the adjacent State or States; held a public hearing in accordance with the Ad-

generating plants and oil drilling facilities may cause massive pollution problems for neighboring states. An additional finding provides that all such construction must be specifically reviewed and approved by Congress and the adjacent States.

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Copies of such materials as may be required under the Act in connection with a permit application must be submitted to the Governor of each adjacent State, and made available for public inspection at a place to be designated by the Administrator.

The Administrator may certify a deepwater development only after he has received the concurrence of the Governor of the adjacent State or States; held a public hearing in accordance with the Ad-

ministrative Procedure Act; and determined that the location, construction, and operation of the proposed deepwater port facility will not cause or contribute to environmental degradation or cause violations of this Act, the Clean Air Act or any other Act administered by the Environmental Protection Agency.

The Act provides for the Administrator to set a reasonable applicant's fee sufficient to cover the cost of processing applications. It further provides that constructing a deepwater development without prior certification by the Administration shall result in a minimum fine of $50,000 per day for each day that construction continues after notice of the violation.

Also under the Act, a State Governor's right to concur in certification may be waived after two years unless such State has adopted and had approved by the Administrator, an environmental permit plan applicable to areas affected by deepwater port facilities.

The Act requires such a plan to include the following provisions:

"(A) public or private development will be permitted only if in the process of development, and in the completed project, the development will not result in violation of emission or effluent limitations, standards, or other requirements of the Clean Air Act and this Act;

(B) industrial, residential, or commercial development will not occur where it would exceed the capacity of existing systems for power and water supply, waste water collection and treatment, solid waste disposal and resource recovery, or transportation, unless such systems are planned for expansion and have adequate financing to support operation and expansion as necessary to meet the demands of the new development without violation of the emission or effluent limitations, standards, or other requirements of the Clean Air Act or this Act at any place where such expansion of such systems or any activities relating thereto may occur;

(C) industrial or commercial development shall occur only where there exist adequate housing opportunities, on a nondiscriminatory basis and within a reasonable distance of any such development, for all persons who are or may be employed in the operation of such development;

(D) development shall be prohibited on water saturated lands such as marshlands, swamps, bogs, estuaries, salt marshes, and other wetlands;

(E) there shall be no further commercial, residential, or industrial development of the flood plains of the navigable waterways in the State;

(F) those responsible for making less permeable or impermeable any portion of the landscape will be required to hold or store runoff from such lands so that it does not reach natural waterways during storm conditions or times of snowmelt;

(G) to the extent possible, upland watersheds will be maintained for maximum natural water retention;

(H) utilities, in locating utility lanes, shall make maximum possible multiple use of utility rights of way; and

(I) any major residential development will include open space areas sufficient to provide recreational opportunities for all residents of the proposed developments."

The final provision of S. 1316 asserts that nothing in the Act shall be interpreted as allowing the construction or operation of deepwater developments against a State or local government's will.

The Act also amends Sec. 509(b) of the Federal Water Pollution Control Act in order to make it consistent with the other changes in the Act.

S. 1316 has been referred to the Committee on Public Works.

S. 1558, Mr. Roth.—To amend the Federal Water Pollution Control Act in order to require the filing of certain environmental impact reports and the approval of affected coastal States with respect to the construction of offshore docking facilities for vessels transporting petroleum or petroleum products.

This measure amends Title IV of the Federal Water Pollution Control Act by adding a new section 406 entitled "Reports and State Approval of Certain Offshore Docking Facilities."

Paragraph A provides that no Federal department or agency shall construct, license or approve the construction or operation of any offshore docking facility within the territorial seas, the contiguous zone or the ocean unless three specific conditions have been met:

First, such department or agency must file with the Administrator of EPA a complete report on the environmental and land use impacts of such facility. Secondly, the Administrator must forward copies of all reports with respect to such a facility (including reports prepared by the Administrator pursuant to this section) to the Governor and the legislature of each coastal State which may be significantly affected by pollution or land use problems as a result of the construction or operation of such facility. Following receipt of such reports, each State has 120 days to approve or disapprove the construction of such facility.

Paragraph B of the proposed Sec. 406 stipulates that the Governors of the affected States may submit, with any notice of approval, recommendations concerning the location, construction, operation or use of the proposed facility. The Federal department or agency authorizing the facility is directed to heed those recommendations to the greatest extent possible under Federal law.

The Bill provides no definition of the terms used therein.

S. 1518 was referred to the Committee on Public Works.

S. 1751: Mr. Jackson, Mr. Baker, Mr. Cotton, Mr. Fannin, Mr. Johnston, and Mr. Randolph (by request).—A bill to amend the Outer Continental Shelf Lands Act and to authorize the Secretary of Interior to regulate the construction and operation of deepwater port facilities.

As proposed by the Administration, the "Deepwater Port Facilities Act of 1973" amends the Outer Continental Shelf Lands Act to authorize the Secretary of the Interior to prescribe rules and regulations necessary to coordinate activities for the exploration and exploitation of the oil and gas and other mineral resources of the OCS with the construction and operation of deepwater port facilities.

Title I of S. 1751 sets forth Congressional findings that onshore port facilities are increasingly congested and inadequate for large vessels; that the national interest in terms of resources, environmental protection, transportation safety, world trade and security is best served by the use of larger vessels and development of deepwater ports to accommodate them; that construction of such facilities would be a

reasonable use of the high seas in accordance with international law; and that such actions should be subject to Federal license and regulation and closely coordinated with the regulation of exploration and exploitation of offshore resources.

Under the measure a deepwater port is a "facility constructed off the coast of the United States, and beyond three nautical miles from such coast, for the principal purpose of providing for the transshipment of commodities between vessels and the United States. It includes all associated equipment and structures beyond three nautical miles from such coast, such as storage facilities, pumping stations, and connections to pipelines, but does not include pipelines."

The Secretary of the Interior is authorized to grant to any citizen of the United States; any State or political subdivision of a State, or any private, public or municipal corporation meeting criteria of financial responsibility, a license to construct and operate a deepwater port facility. Such authorization is conditioned on a finding by the Secretary that the facility will not unreasonably interfere with navigation or otherwise violate international obligations of the United States; and that the facility will be constructed and operated in a manner to minimize or prevent any adverse impact on the marine and coastal environment.

Additional provisions require the Secretary to consult with the Governor of any State off whose coast the facility will be constructed and to consult with "all interested or affected Federal agencies".

Application filed under S. 1751 would constitute an application for all Federal authorizations required for construction of the port. The Secretary of the Interior must be notified by the appropriate Federal agencies that the application meets the requirements of the laws they administer prior to granting a permit. In granting a license pursuant to the Act, the Secretary is required to file a single detailed environmental impact statement pursuant to Section 102(2)(c) of the National Environmental Policy Act which will serve as the environmental impact statement for all Federal authorizations required to construct the port.

The Deepwater Port Facilities Act of 1973 sets forth an administrative process for consideration of deepwater port project proposals including public notification, hearing and judicial review procedures.

Additional provision of S. 1751 authorize the Secretary to include in a deepwater port license such conditions as he deems necessary to comply with international legal obligations; prevent or minimize pollution in surrounding waters; assure that operation of the facility will not "substantially lessen competition or tend to create a monopoly," and to assure that upon expiration or revocation of a license, the deepwater port licensee will render the facility harmless to navigation and the environment.

S. 1751 establishes civil and criminal penalties for violations of the Act and extends the Constitution and the laws and treaties of the United States over deepwater port facilities insofar as they are consistent with international law. Additional provisions set forth judicial procedures for enforcing compliance with laws governing the facility. Pursuant to the measure deepwater ports would be regulated in the same manner as though they were located within the navigable waters of the United States. Foreign flag vessels utilizing the facility are

deemed to consent to the jurisdiction of the United States for the purpose of the Act which also extends the civil and criminal laws of the nearest coastal State over the facility.

Final provisions of the bill authorize the Secretary to promulgate rules and regulations governing the health and welfare of persons using deepwater port facilities and further, to consult with appropriate Federal agencies and seek appropriate international measures regarding navigation in the vicinity of the port.

S. 1751 was jointly referred to the Senate Committees on Interior and Insular Affairs, Commerce and Public Works. A special joint subcommittee composed of five members from each Committee was established to consider the bill.

S. 2232, Mr. Hollings and Mr. Magnuson.—A bill to promote commerce and protect the environment by establishing procedures for the siting, construction, and operation of deepwater port facilities off the coast of the United States.

Entitled the "Offshore Marine Environmental Protection Act of 1973" S. 2232 amends the Ports and Waterways Safety Act of 1972. The bill sets forth Congressional findings that deepwater port facilities are proposed for construction off the coast of the United States and that a uniform Federal regulatory mechanism is required to oversee their development and use. S. 2232 also finds a need to insure that each coastal state has an approved coastal zone management program to assure that the marine and coastal environment will be effectively protected and managed.

A deepwater port facility as defined by the bill is "any manmade structure, either fixed or floating, located in the navigable waters of the United States more than five hundred feet to the seaward of the mean low-water mark or located beyond the territorial sea of the United States and which is intended for use as a port or terminal for transportation of goods and commodities from vessels to shoreside."

The bill authorizes the Secretary of the Department in which the Coast Guard is operating to issue a license to construct and operate a deepwater port facility if he determines that the applicant is financially responsible, that the facility will not unreasonably interfere with navigation or other uses of the high seas; threaten the integrity of the marine environment or infringe upon any international legal obligations of the United States. S. 2232 also established conditions for transfer, modification, revocation or suspension of a license.

A license pursuant to the Act may not be granted until the Secretary of the Department of Commerce through the National Oceanic and Atmospheric Administration has certified that the adjacent State or States has an approved coastal zone management program in accordance with the Coastal Zone Management Act of 1972. In addition, The Administrator of the Environmental Protection Agency and the Secretary of the Department of Interior must certify that the deepwater port project proposal is consistent with the policies and programs they administer. The Secretary of Commerce through NOAA is authorized to establish and apply criteria pertaining to the quality and use of the marine environment and its resources for reviewing and evaluating deepwater port project proposals, and to recommend such license conditions as he deems necessary to protect the marine and coastal environment.

The bill requires that detailed plans for a deepwater port be submitted to the Secretary, the Secretary of the Department of Commerce, the Administrator of the Environmental Protection Agency and the Secretary of the Interior at least two years prior to the proposed commencement of construction. Submission and approval of the application as specified by the Act constitutes an application and approval for all Federal authorizations which may be required for construction and operation of the facility.

S. 2232 requires a public hearing to be held at a location in the vicinity of a proposed deepwater port site as part of the application review process. Upon issuance of a license, the Secretary, Secretary of Commerce, Administrator of the Environmental Protection Agency and Secretary of the Interior must jointly prepare and circulate for review, a detailed environmental impact statement pursuant to Sec. 102(2)(C) of the National Environmental Policy Act.

Further provisions of S. 2232 establish standards of record-keeping and maintenance, inspection, public access to information, and criminal and civil judicial proceedings together with penalties for violation of the Act. The bill also establishes an Advisory Council for Deepwater Port Policy composed of members representing shipping, labor, petroleum industry and scientific interests and both Federal and State government officials. According to the Act, the Council would be supported by staff provided by various Federal agencies with interest and expertise relating to deepwater ports.

Finally the bill establishes the procedures for civil action to obtain injunctive relief, and authorizes appropriations for administration of the Act. S. 2232 also mandates an interagency task force study to prepare plans for development and protection of the offshore marine environment of the United States to be submitted to Congress two years after enactment of the Act.

S. 2232 was referred to the Committee on Commerce.

APPENDIX F

Areas Requiring Further Investigation

Executive Departments identified specific further actions, including additional studies or investigations, concerning U.S. deepwater port development which, in their view, the Federal Government should undertake, as follows:

THE COUNCIL ON ENVIRONMENTAL QUALITY

First, of course, we recommend passage of the Administration bill S. 1751. The Department of the Interior should develop a comprehensive and effective licensing program that will require applicants to conduct detailed studies of the proposed port sites and alternatives and will assure the selection of port locations and the operation of ports in a manner that will minimize or avoid significant adverse environmental impacts.

THE DEPARTMENT OF STATE

Although development of deepwater port facilities is a reasonable use of the high seas within international law, the State Department feels it is important to continue to seek multilateral agreement on an exclusive coastal State right to authorize and regulate such facilities within its Seabed Economic Area. In this connection, we have introduced the proposals discussed in question 2. Because legislation is required to ensure adequate federal licensing and regulatory authority over deepwater port facilities, the Department of State supports the enactment of S. 1751, the Deepwater Port Facilities Act of 1973. The Department of State believes, however, that more detailed consideration should be given to questions such as shipping and navigational safety requirements, storage and transshipment, environmental requirements, customs laws and civil and criminal jurisdiction as related to the operation of deepwater facilities. Such consideration could provide input for further decisions on regulatory and licensing policies.

THE U.S. ARMY CORPS OF ENGINEERS

An important area of further study remains if deepwater ports are to be constructed in a timely fashion, and if their environmental and economic characteristics are to be compatible with the public interest. This is the area of the specific design, equipment, and operating criteria to apply to the delivery system of which the offshore terminal would be a part. If the system is to operate in the public interest, there must be scientifically determined and publicly accepted determinations of anticipated environmental an operating performance. Whether the

terminal and/or other parts of the system are to be privately or publicly built and operated, the Federal government must develop the capability to initiate or to evaluate relevant design, equipment and operating standards. Additionally, environmental studies will be required for any specific site location(s) for which a permit application is received.

THE DEPARTMENT OF INTERIOR

(a) The Department of the Interior will complete a final environmental impact statement.

(b) Development of detailed institutional and organizational relationships between the Interior Department and the other various public agencies which will have management, technical advisory, or review roles.

(c) Development of licensing system including specific deepwater port regulations to fully implement the legislative authority.

(d) In cooperation with sister departments, continue necessary and related environmental and economic studies including siting criteria, pollution dispersal and related containment measures, and regional and local economic impacts.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
(U.S. DEPARTMENT OF COMMERCE)

Information on coastal zone and port related subjects is still being produced by the Sea Grant Program, but at a slower rate than anticipated. Over 1,200 reports have been issued under the Program's sponsorship during its six and one-half years of existence; well over a third relate to coastal zone topics.

In addition, much of the information needed for deepwater port siting decisions is being collected under direct NOAA programs. These include biological studies of the National Marine Fisheries Service; tides and currents measurements and nautical mapping activities of the National Ocean Survey; meteorological studies of the National Weather Service; studies of ocean and atmospheric processes by the Environmental Research Laboratories; and other NOAA programs. We believe that these programs represent a significant capability and nucleus of effort for providing information required to assess the environmental impacts of deepwater ports, and we would anticipate that much of the necessary information will stem from these ongoing efforts. In addition, however, it would be necessary to extend and strengthen the present programs to assess fully the environmental issues associated with location of specific deepwater ports as these are considered in the future.

DEPARTMENT OF TRANSPORTATION

The most urgent action for the Federal Government is to enact legislation giving the responsibility of licensing deepwater port construction and operation to a Federal Agency.

Additional studies are needed in the environmental area on operational and technological aspects to reduce potential oil spills and to improve existing methods in containment and recovery of oil spills.

In the economic area additional investigations are needed to determine the overall impact to the national economy of alternative locations and the transportation and distribution system requirements of deepwater port development. Also on-shore environmental and secondary economic impacts of deepwater port development need further study.

U.S. COAST GUARD (U.S. DEPARTMENT OF TRANSPORTATION)

Based on general knowledge of the numerous studies and reports made on the subject, the Coast Guard feels that an adequate federal statute dealing with the development and operation of deepwater port facilities is required. The requirements established by this federal legislation, in all probability, will lead to the identification of topics which must be studied by a number of federal, state and local agencies. The Coast Guard, because of its responsibilities in maritime law enforcement, port safety, merchant vessel safety, aids to navigation and marine environmental protection as well as search and rescue, will be vitally interested and involved in any federal actions planned in connection with deepwater port facilities. Details of this projected involvement are discussed in response to Question 8, below.

Question 8. What role would you view for your department, agency or office in the accomplishment of such further actions? (Refer to previous responses whenever applicable.)

Response 8. Throughout all the responses to the questions above, the Coast Guard has identified program responsibility in maritime law enforcement, port safety, merchant vessel safety, aids to navigation, marine environmental protection and search and rescue. Assuming that any federal statute would include provisions which would make applicable the existing federal laws of the United States to the deepwater port facility, the Coast Guard program responsibilities listed above and including, in certain cases, the Bridge Administration program, would reflect considerable Coast Guard involvement.

Although any request for the establishment of a deepwater port facility will undoubtedly include the rationale for site selection and the complete plans for site development and operation, for purposes of clarity, the deepwater port facility concept can be reviewed in three functional stages: site selection, site development, and facility operation.

Site selection

The evaluation of deepwater port facility sites should include consideration of the safety, environmental and security elements of U.S. national interests. Safety and environmental factors must be balanced with other considerations in site selection. Navigational patterns, feasibility of establishing aids to navigation, vessel maneuvering characteristics, necessity for maritime pilots, vessel traffic control patterns, etc., also are some of the necessary ingredients to a proper site evaluation.

With respect to safety and environmental factors, the Coast Guard should be consulted in the review of site selection so as to ensure minimal navigational interference in approaches, sea lanes and possible structures in the vicinity, fishing, and other uses, as well as hazards to the environment.