Disposal of Offshore Platforms

Committee on Disposition of Offshore Platforms,
Marine Board,National Research Council
ISBN: 0-309-57472-2, 98 pages, 8.5 x 11, (1985)

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Marine Board
Commission on Engineering and Technical Systems
National Research Council

National Academy Press
Washington, D.C. 1985

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This report represents work supported by cooperative Agreement No. N00014-82-C-0032 between the Department of the Interior and the National Academy of Sciences.

0-8357-7692-1

Limited copies are available from:
Marine Board
Commission on Engineering and Technical Systems
National Research Council
2101 Constitution Avenue, N.W.
Washington, D.C. 20418
Printed in the United States of America

COMMITTEE ON DISPOSITION OF OFFSHORE PLATFORMS

William M. Benkert, Chairman U.S. Coast Guard (retired) McLean, Virginia
Roger D. Anderson Gulf and South Atlantic Fisheries Development Foundation, Inc. Tampa, Florida
Robert B. Ditton Texas A&M University College Station, Texas
Francis P. Dunn Shell Oil Company Houston, Texas
Griff C. Lee Griff C. Lee, Inc. New Orleans, Louisiana
Maurice H. Rindskopf Westinghouse Electric Corporation Annapolis, Maryland
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Staff

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Preface

In compliance with the 1958 Continental Shelf Convention, the current U.S. regulatory requirements governing fixed offshore structures (also called platforms) on the outer continental shelf (OCS) stipulate their complete removal to a depth 5 meters below the sea-floor. The general practice is to remove all structural elements after petroleum production has ceased and return these to shore for salvage or scrap. In a few instances, offshore structures have been towed to deep water and dumped, or placed in specified locations to serve as artificial reefs to enhance living resources.

The Department of the Interior (DOI) is considering changing these rules. The offshore industry is reaching a state of maturity such that the number of platforms to be removed in the Gulf of Mexico will increase dramatically. Moreover, it is predicted that the number of large deep-water platforms, which are expensive and difficult to remove, will increase. Some argue that complete removal of all OCS platforms may not be beneficial to local biological communities. There is increasing support among various constituencies, especially recreational fishing interests, for using offshore platforms as artificial reefs at additional locations on the continental shelf. In the international arena, the Law of the Sea Convention, which may enter into force even without the ratification of the United States and several other industrial nations, provides for the International Maritime Organization (IMO) to develop new international guidance on such matters as the disposition of offshore structures. New international rules will probably be written over the next few years. It is appropriate for the United States, having hundreds of offshore structures in relatively shallow water in the Gulf of Mexico, to develop the technical basis for its national position in advance of international negotiations.

For all of these reasons, the DOI considered it timely and necessary to evaluate alternative dispositions for offshore oil and gas platforms after petroleum production has ceased. The DOI requested advice from the National Research Council. Accordingly in 1984 the Research Council appointed the Committee on Disposition of Offshore Platforms under its Marine Board to document and assess alternatives for removing, disposing, or reusing fixed offshore platforms that are past their useful service life, and to make recommendations concerning government policy on their disposition.

Members of the committee were selected with regard for the expertise necessary for the assessment and also knowledge of activities affected by alternative dispositions of offshore structures. Committee members' backgrounds spanned the fields of offshore structures, marine transportation, marine environment, marine policy, naval operations, and ocean law. Biographies of the committee members appear in Appendix A. The principle guiding the constitution of the committee and its work, consistent with the policy of the National Research Council, was not to exclude the bias that might accompany expertise vital to the study, but to seek balance and fair treatment.

The platform types considered by the committee included steel-jacket, tension-leg, concrete, guyed-tower platforms, and subsea oil and gas structures. Excluded from the study were pipelines and gravel islands as well as the operations of abandoning wells and removing wellhead equipment.

The areal extent of the study is the OCS of the United States (lands under federal jurisdiction). This fact notwithstanding, much of the issues analysis is directly relevant to the disposition of platforms located on offshore lands under state jurisdiction.

With these limitations, the committee considers its work to be applicable to the disposition of all existing offshore platforms on the OCS and all platforms to be installed on OCS lands within the next five years. Considering the average productive life of offshore structures, the time horizon of the study is 35 years.

The committee proceeded by identifying options for the removal and disposal of offshore structures, as well as issues for assessment. To ensure that the committee addressed all the issues, the Mineral Management Service (MMS) of the DOI requested public comments on the disposition of offshore platforms (see Appendix B). Committee members then prepared a set of background papers, which assessed the issues that were identified. This provided the basis for considering policy alternatives and developing conclusions and recommendations.

At the time of the study, there was considerable national interest in an expanded program for planning, financing, and constructing artificial reefs to enhance fishing opportunities. The National Fishing Enhancement Act of 1984 mandates a national plan for siting and developing artificial reefs. The plan is being developed by the National Marine Fisheries Service, with technical assistance from the Sport Fishing Institute's Artificial Reef Development Center and others. Concurrently, with the leadership of the DOI, federal agencies were negotiating a memorandum of understanding to plan and direct a national program to encourage proper placement and use of artificial reefs. The committee considers its work to be a necessary and timely contribution to artificial reef planning--putting the potential use of petroleum platforms as reef-building materials into proper perspective.

The committee acknowledges with gratitude the material and invaluable assistance provided by Richard Krahl of the Minerals Management Service, the Office of Navigation, and the Eighth District of the U.S. Coast Guard, as well as Rex Alford of Conoco, Inc. who provided liaison with the American Petroleum Institute.

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Summary, Conclusions, and Recommendations

This report assesses alternatives for disposing of fixed offshore oil and gas structures (also called platforms) after petroleum production has ceased. It was prepared at the request of the Department of the Interior (DOI). In 1984 DOI asked the Marine Board of the National Research Council to document and assess alternatives for removing, disposing of, or reusing fixed offshore platforms that are past their useful service life, and to make recommendations concerning government policy on their disposition. Considered in the assessment are technical issues of engineering feasibility and cost, legal issues, environmental concerns, safety, and maritime and naval operational considerations.

In 1983 there were 4,094 fixed offshore oil and gas drilling and production structures located in the territorial sea or on the continental shelf of the United States. An additional 1,461 structures are projected for installation through 1990. More than 95 percent of the structures are or will be located in the Gulf of Mexico. This is the population of structures that may have to be disposed of in the next 35 years, the time-frame of this study.

Under current rules, offshore installations are to be entirely removed at the end of their useful life. The committee found that this rule is achievable since all structures installed to date in U.S. waters can be removed and returned to shore for disposal using current technology, even though the largest platforms will involve great expense. The committee also found sufficient evidence to conclude that there is substantial justification for the U.S. government to adopt a more flexible policy on the disposition of offshore platforms.

RECOMMENDATION: The Department of Interior should amend its removal policy to allow determination of the ultimate disposition of offshore platforms on a case-by-case basis in accordance with predetermined standards and criteria. These standards and criteria should be consistent with international law and preferably the product of explicit international agreement.

RECOMMENDATION: The United States should develop a national position on the disposition of offshore platforms for sub

mission to the International Maritime Organization for international consideration. The U.S. Coast Guard should initiate this process promptly, in concert with the Department of State, Department of Interior, Department of Defense, Environmental Protection Agency, other interested agencies, and nongovernment interests.

The amended policy and national position should retain the presumption that platforms installed on the outer continental shelf (OCS) can be removed. In all instances, offshore structures in water depths of less than 200 feet should be removed unless they are dedicated to an alternative, permitted use.* Decisions concerning the removal of all other platforms or parts thereof (including deep-water fixed steel platforms, subsea template installations, and large concrete gravity-base structures) should be made after considering the cost of removal versus public benefit, liability aspects, safety and freedom of surface and subsurface navigation, possible alternative uses, and potential interference with other uses of the sea and seafloor. Moreover, all platforms should be removed to a depth suitable for the safety of surface navigation, unless those portions of the structure above the surface or in the upper water column are specifically permitted for another use. Although approvals of plans and designs for final disposition of platforms are best made at the time of original approval for emplacement, the amended policy and national position should provide for review at the time of final disposition.

Irrespective of government policy, those harmed as the result of the presence in the sea of an offshore platform or any of its parts could claim against the last entity that owned it: there is now no way that the platform--or any other wreck--could be abandoned in such a way as to eliminate the risk of legal liability (see Wyandotte Transportation Co. v. United States, 389 U.S. 191, 88 S. Ct. 379, 1967 A.M.C. 2553 (1967), discussed in the footnote on page 41 herein). This continues unless and until the platform is disposed of on shore or disposed of at sea in accordance with ocean dumping rules, or the owner is indemnified by the government. Thus, the avoidance of potential liability generates, in itself, an inducement for the removal of a platform in less than 200 feet of water (93 percent of all platforms). Additionally the difficulty of obtaining permission for ocean dumping and the relatively few opportunities for some alternative uses favor removal to shore of platforms in waters out to 200 feet.

With regard to implementation of a case-by-case decision-making policy, an alternative for the largest fixed steel structures located far offshore that would address engineering and cost concerns, legal and safety issues, and possibly environmental considerations is removal of the entire structure or the upper portion to a depth

* This guidance is based on and specific to conditions in the Gulf of Mexico, as elaborated in the text. Conditions in other regions may make a different depth choice more desirable.

suitable for safety of surface and subsurface navigation; the removed structure or parts thereof could then be disposed of in a designated ocean dumpsite.

RECOMMENDATION: The Environmental Protection Agency should establish a limited number of ocean dumpsites for the disposal of offshore platforms and a policy and permitting procedure regarding use of these dumpsites. In addition, the Environmental Protection Agency should consider establishing a general permit, similar to that for the disposal of ships, for the disposal at an ocean dumpsite of the few largest offshore platforms.

In some cases, such as use as a fishing reef, all or part of the structure may be left in place or relocated to another marine location. This creates a difficult situation for the owner, since he may be subject to claims on tort liability principles. If case-by-case decision making is to work, some solution must be found for the problem of tort liability. Complete removal of a platform with disposition ashore removes the tort liability burden completely from the owner. Complete removal and ocean dumping, given faithful compliance with the Environmental Protection Agency (EPA) permit, has the same effect. No other method of disposition affords the same degree of protection from continuing liability. This reduces the practical value of other alternatives, and impairs the effectiveness of case-by-case decision making.

RECOMMENDATION: The Department of the Interior should develop a proposal designed to provide relief from liability to former owners of platforms where the means of disposition approved by the government does not do so.

Relief might be provided in several ways; for example, through government indemnification of former owners or conceivably through the creation of an industry-based trust fund or insurance scheme. Implementation of the liability relief proposal that is developed could possibly require an act of Congress.

A policy of case-by-case decision making will result in a limited number of whole or partial structures left in place. This could impair navigation safety, naval operations, and commercial fishing. The government would probably assume some additional responsibility, perhaps liability, by authorizing all or part of a structure to be left in place. Some would view this policy as overly generous to the oil industry. Nonetheless, the committee considers it difficult to justify a government requirement for expenditure of very large sums of private monies where marginal public benefit would result.

Regardless of ultimate disposition, design should consider disposal requirements and should guard against features that make final disposition any more difficult than is inherent in the operations. Designs might include, for example, planning to provide adequate buoyancy at

time of removal, positive connections for bolt-on clamps for auxiliary or temporary buoyancy, and planned separation points in the jacket, which would allow cutting fewer structural members. It is not likely, however, that a weak link such as a bolted or other easy-to-remove joint on jacket legs would ever be desirable or acceptable because it could weaken the overall structure. Furthermore, it is not likely that enhancement reasonably achievable in the initial design can have substantial impact on the cost or choice of ultimate disposition for major structures.

2

Description of the Problem

Fixed offshore structures consist of three main components--the superstructure or deck, which provides work space; the jacket; and the piling (see Figure 1). The jacket rests on the ocean floor and has open pipe columns, or legs, which extend above the water surface. Tubular bracing members interconnect the legs to make the jacket a single rigid structural unit or space frame. Pilings are driven through the legs of the jacket into the ocean floor. Some jackets are as large as tall buildings or the largest ships (see Figure 2). The jacket serves as a guide during pile installation and as a structural unit to support the deck and resist horizontal loads from wind, waves, earthquakes, and currents.

For deep water, or for soft foundation conditions, it is often necessary to splice the piling by welding to reach the required penetration. For shallow water, the jacket is completely fabricated upright, carried to location on a cargo barge, picked up and set on bottom by a floating crane or derrick barge, and the piling then driven. In deeper water, the jacket is usually fabricated on its side, carried to location on a special launch barge, and launched into the water on location where it floats in a horizontal attitude. It is then rotated into the vertical position and lowered to the bottom by a derrick barge or by controlled flooding. The superstructure, consisting of several units or deck sections, is built onshore in a fabrication yard, carried to location by barge, and lifted into position by a derrick barge.

NUMBER OF PLATFORMS

The committee assembled information on the number of U.S. offshore structures, their size, water depth, and year installed from a variety of sources. Figure 3 shows total platforms installed per year and the cumulative number in the U.S. Gulf of Mexico, both in state and OCS waters. Table 1 shows the water depth of structures installed in the Gulf of Mexico, off California, and off Alaska. These data show that in 1983 there were 4,094 fixed offshore oil and gas drilling or production structures located in the U.S. territorial sea or on the continental shelf of the United States. An additional 1,461

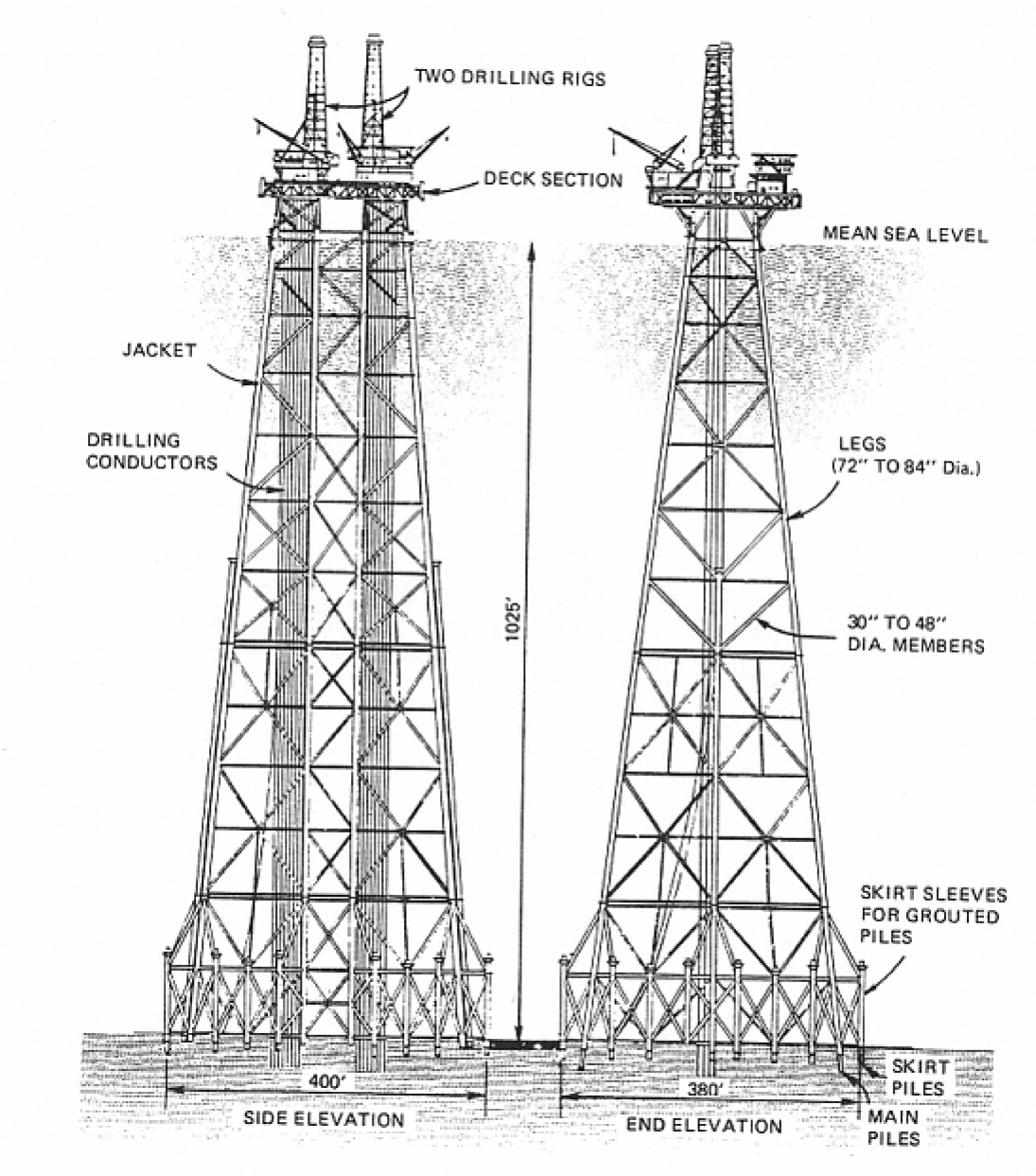

Figure 1
Deep water platform.
SOURCE: Shell Oil Company.

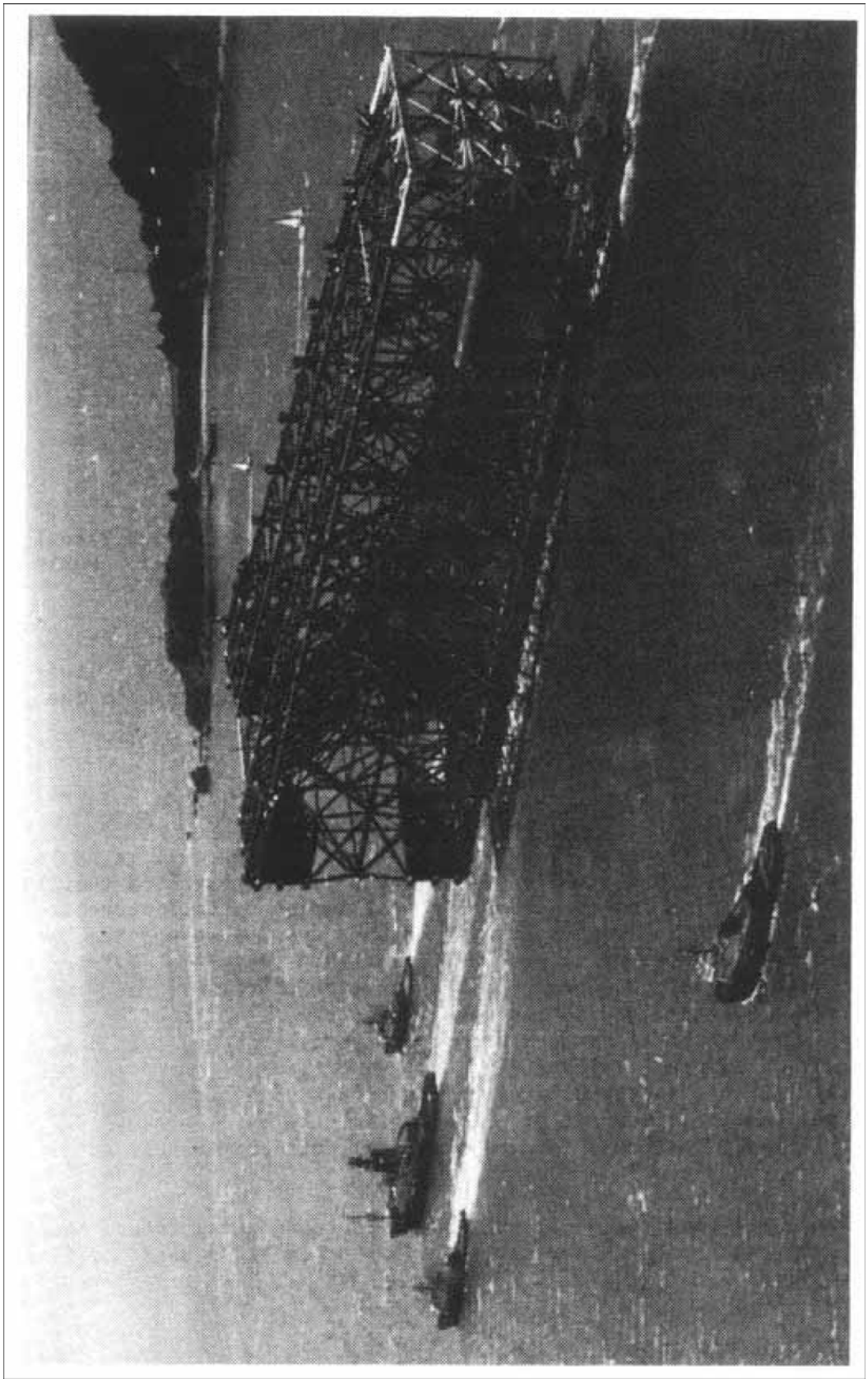

Figure 2
A 700-foot jacket being towed out of San Francisco, California for installation off southern California.
SOURCE: Shell Oil Company.

structures are projected for installation through 1990.* This is the population of structures that may require disposal in the next 35 years, the time-frame of this study.

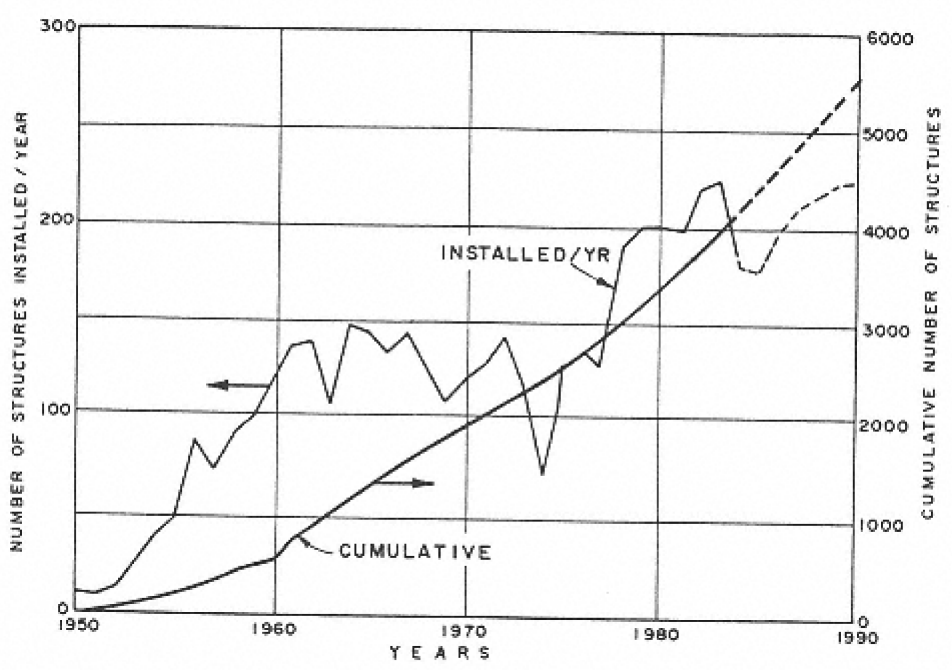

Figure 3
Gulf of Mexico offshore structures.
SOURCE: Minerals Management Service (total federal OCS lands); Offshore Oil Scouts Association (state offshore lands). Number of structures after 1982 based on committee estimates.

PLATFORM LIFE

The life of an offshore structure extends until it is no longer serviceable and must be replaced, or until the function that it performs is no longer needed. A well-designed steel structure has no defined life as long as it has not been overloaded and has been properly maintained to prevent corrosion. The useful life of an offshore platform depends on the duration of oil and gas production from that location, not necessarily on the strength of the structure.

Offshore platforms are subject to repeated loads that can cause fatigue damage. Fortunately, fatigue has not been a problem of any significance in the Gulf of Mexico because the normal day-to-day wave environment is very mild. In addition, the early structures built in relatively shallow water are stiff and not particularly subject to

* Absent a completely reliable basis for predicting future platform requirements, the committee's projection is based on general industry opinion.

fatigue damage. As structures are built in deeper water they are more slender, and, therefore, more flexible. Platform motions and the resulting fatigue problems become more significant. However, better procedures are available allowing design of structures to resist fatigue loading based on a prediction of the loading history expected during the life of the structure. Few, if any, structures have been removed because they were no longer structurally sound or serviceable (except for structures damaged by collision, fire, or storm).

TABLE 1 Water Depth of Structures Installed in the Gulf of Mexico, off California, and off Alaska as of 1983

Water Depth	Number of Structures			
(feet)	Gulf of Mexico	California	Alaska	Total
0–20	1,152			1,152
21–50	1,414			1,414
51–100	650	7	14	671
101–150	329			329
151–200	240	10		250
201–300	206			206
301–400	52	6		58
401–500	5			5
501–900	4	1		5
>900	4			4
Total	4,056	24	14	4,094

[a] Depth categories for California data are <100', 100'–200', 200'–400', >400'.
[b]All Cook Inlet, Alaska platforms are in water approximately 100' deep.
SOURCES: See Figure 3. Also, Alaska Department of Environmental Conservation and California Division of State Lands.

Presently there are numerous offshore structures in moderate and deeper water depths that are 15 to 20 years old. Based on experience, it is possible, though not anticipated, that fatigue of existing fixed platforms will be of significance. Future platforms in very deep water and nonconventional structures may be more likely to suffer fatigue damage, though advanced analysis, design, and construction techniques will minimize the likelihood. Better assessments can be made when the detailed designs are completed and structure response predicted.

These discussions assume that platforms are properly maintained (e.g., painting system, cathodic protection system, and general maintenance and repair). If a platform is not so maintained, gradual deterioration and eventual failure will inevitably result.

REMOVAL SCHEDULE.

A survey of the experience of several offshore operators indicates that offshore production platforms are typically kept in service about 25 years; larger structures tend to be kept in service for longer periods. The reason is that, as operations in deeper water are more expensive, only the larger and more productive fields are developed, and these tend to produce longer.

Presently the Minerals Management Service (MMS) requires that all structures be removed after production ceases. The removal schedule developed herein is based upon this requirement. Thus it is predicted that (1) the smaller structures, single-well protectors, and well caissons in very shallow water will be removed after 20 to 25 years; (2) somewhat larger structures with more wells, in shallow to intermediate water, are projected to have a useful life of 25 to 30 years; and (3) larger structures in deeper water should have a service life of at least 30 years. The removal of structures to date tend to follow this pattern.

Using data on the number and age of structures and assumptions of structure life as described above, a forecast of structures to be removed was developed (see Figure 4).

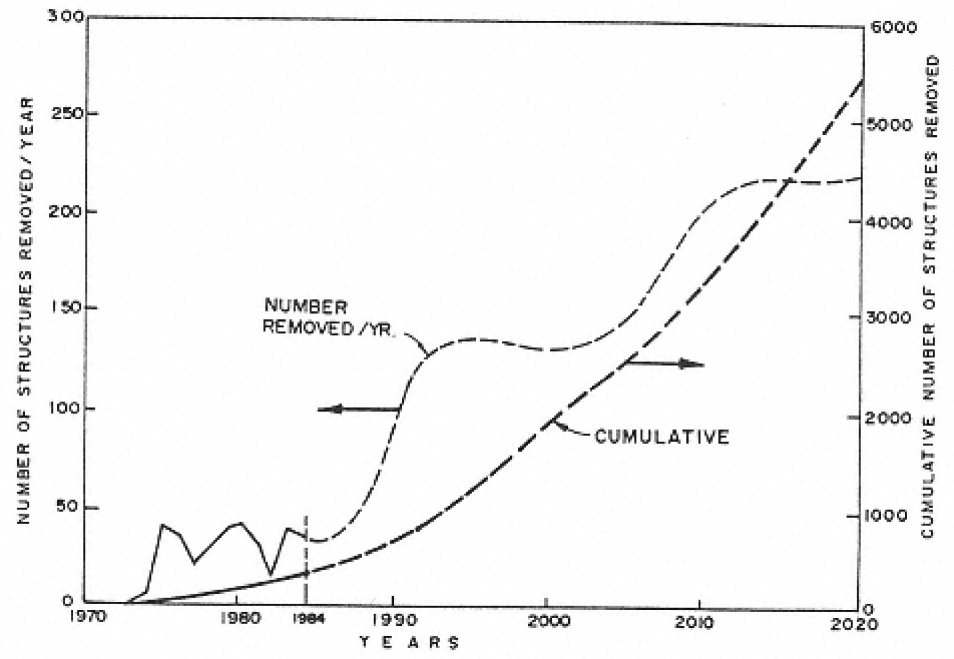

Figure 4
Structures removed and to be removed--Gulf of Mexico.
SOURCE: Historical data from Minerals Management Service and industry sources; forecast developed by committee based on assumptions described in the text.

OPTIONS FOR DISPOSING OF OFFSHORE PLATFORMS

Disregarding current regulations, there are two basic options concerning the ultimate disposition of offshore platforms. They can be left in place (presumably for some other use), or they can be removed. If a platform is to be removed, it can be removed completely or partially. The platform or pieces of it can either be taken to shore, toppled in place, or emplaced or disposed of elsewhere in the marine environment. These options are arrayed in Figure 5. The figure also shows where a number of proposed disposal options fit into the general logical framework. These include:

(1) * Existing Rules. Removal of a platform is stipulated in the OCS lease. OCS Order No. 3 requires the lease operator to clear the location of obstructions to at least 5 meters (16 feet) below the mud line prior to relinquishing the lease.

(2) * Removal to Allow Safe Subsurface Navigation. In a 27 July 1984 letter to the American Petroleum Institute, the Secretary of Defense proposed draft removal standards with the objective of providing for safe subsurface navigation (see Chapter 7 and Appendix C). The proposed Department of Defense (DOD) standards provide that "removal shall be to within 5 meters above the seafloor in waters less than 400 meters, to within 15 meters above the seafloor in waters less than 2,000 meters and greater than 400 meters."

(3) * Removal to Allow Safe Surface Navigation. Various oil industry positions have been developed calling for the removal of offshore structures to a depth sufficient for the safety of surface navigation. One such position, expressed by the Oil Industry International Exploration and Production Forum Position (May 1984)** calls for complete removal of structures in less than 40 meters (132 feet) of water when they are no longer needed. In water deeper than 40 meters, it calls for clearing navigational obstructions to a depth of 40 meters, and also for marking the position and size of remaining installations on nautical charts. This industry policy statement is included in Appendix C.

* Numbers are keyed to Figure 5.

** The Oil Industry International Exploration and Production Forum is an international technical organization of oil industry operators. It provides a focus for national oil industry organizations in Europe, the United States, and elsewhere to seek common approaches to international authorities and nongovernment safety and environmental groups, with special emphasis on operations in the North Sea. The Forum policy statement in Appendix C is supported by a technical report (E&P Forum, 1984).

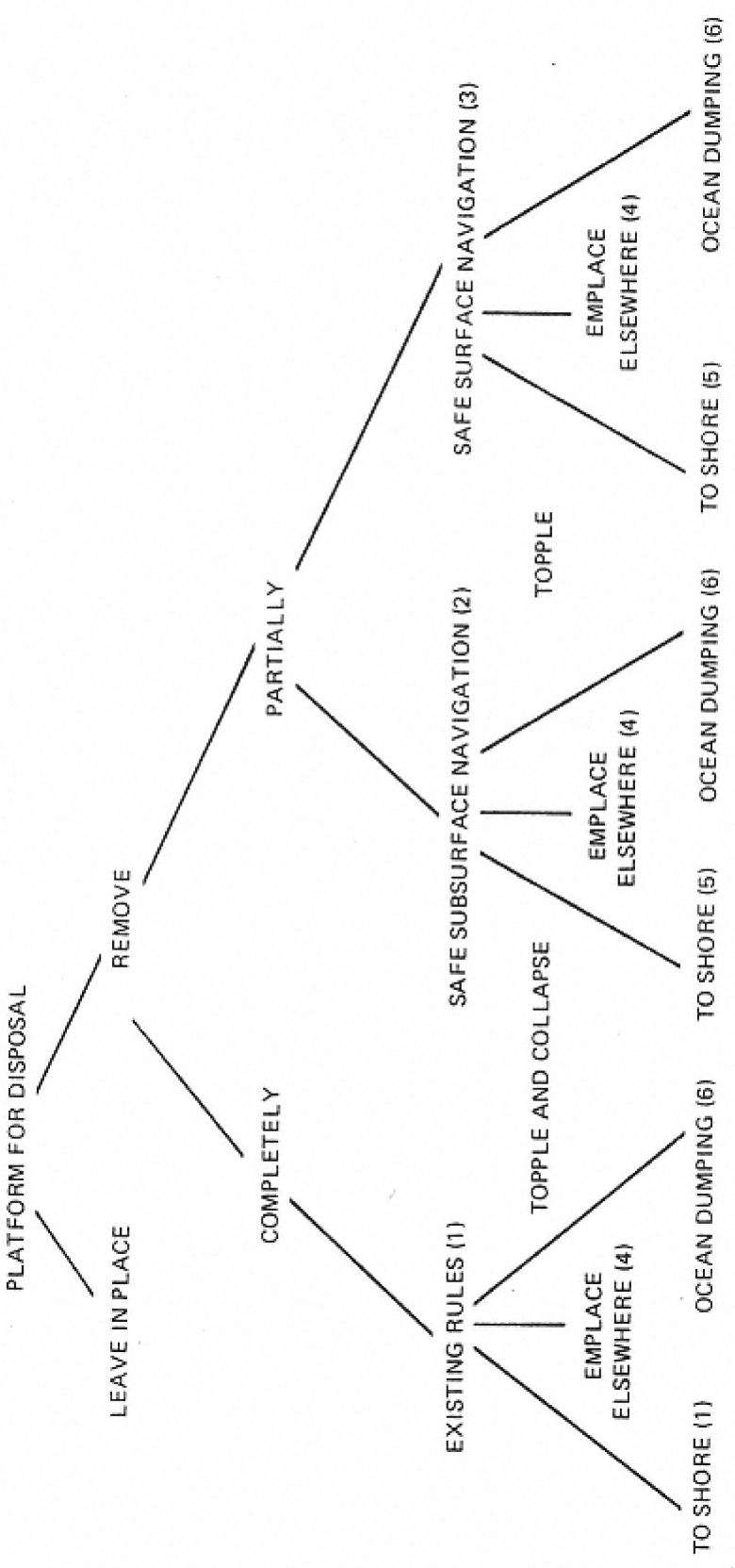

Figure 5
Options for disposing of offshore platforms.

(4) * Emplace Elsewhere. This implies locating an obsolete structure purposefully in the marine environment for another use, e.g., for use as a fishing reef. Options for reef development include leaving platforms in place, toppling them in place, or locating them elsewhere.

(5) * Remove to Shore. In this option, similar to option 1, structural elements are cut free, towed to shore, and offloaded on shore for ultimate disposal.

(6) * Ocean Dumping. Some have advocated towing obsolete platforms to deeper water for ultimate disposal under authority of federal ocean dumping regulations. The Environmental Protection Agency has granted permits for the ocean dumping of structures that have been severely damaged by storm or accident.

REFERENCE

E&P Forum. 1984. The Decommissioning of Offshore Installations--A Worldwide Survey of Timing, Technology and Anticipated Costs. London, U.K.: The Oil Industry Exploration and Production Forum. Report No. 10.5/108

* Numbers are keyed to Figure 5.

3

Engineering and Cost of Platform Removal

REMOVAL PROCEDURES

During the 38-year life of the offshore industry, about 350 structures have been removed in the Gulf of Mexico. In simplest terms, the procedures for removing fixed steel platforms are the reverse of the installation procedure. The primary procedure has been to cut the platform into sections and remove by lifting. The size of the component to be lifted is determined by the capacity of the lifting equipment. In some instances it has been possible to separate the structure into its original components of deck and jacket. In others, deck and jacket have had to be cut into smaller components because of the limited size of the lifting equipment employed.

Occasionally, the procedure used has been to dismember the structure, separating it into small components or individual members that can be picked up by a small floating crane. In a very few instances, auxiliary flotation has been used. The jacket has been lifted off the bottom using temporary, clamped-on buoyancy tanks for it to go to deeper water for ocean dumping, or, for one structure, to enable it to be moved to another area to serve as a fishing reef. A few platforms that were to be reused have been lifted or winched back onto launch barges, then relaunched at another location. One platform, a structure located near Bermuda in about 200 feet of water, was dismantled in place using explosives.

Before a platform is to be removed, miscellaneous equipment, such as living quarters and generators, is returned to shore for scrap or reuse. The deck section can then be cut into sections, lifted from the platform, and placed on cargo barges for transportation. Removal of the piles and jacket then follows. The piles and the jacket are grouted together on many structures; skirt piles are always grouted. On the majority of structures, the piles and the jacket are connected only at the top of the jacket by welding.

By removing the weld, the piles and the jacket can be handled separately. A major difficulty has been cutting the piling below the mudline. The easiest procedure has been to wash the soil out from inside the piling and detonate a charge inside the pile to sever it. However, this is not always satisfactory. Even when shaped charges are used, this procedure tends to expand the pile where it was cut so

that it cannot be lifted out of the jacket leg. Thus, it becomes necessary to lift the piling and the jacket as a unit. When the weight of the jacket in combination with the piles is too heavy for the lifting equipment, other procedures to cut the piles are necessary. The piles can be cut from the inside using procedures that do not expand the piles. The most frequent procedure has been to use divers inside the piling, making the cut-off with a carbon arc. Various mechanical cutters also have been used, such as a milling machine, a liquid sand blast, or a drill string with expanding casing cutter.

A major portion of the removal procedure, is the actual disposal or scrapping of the components of offshore structures after they have been returned to shore. Few components are suitable for reuse. (This will be discussed later in this study.) All items--equipment, modules, deck units, jackets, and piles--of significant size and weight must be cut into components that are compatible with the offshore removal procedures and the capacity of the derrick barge. These components must then be offloaded on shore. This can present a problem, since the lifting capacity of land-based cranes is usually much less than offshore derrick barges. It may be necessary for an offshore derrick barge to accompany the salvaged components to shore for offloading, or special skidding arrangements must be developed. Onshore, the small equipment items and components can be transferred directly to a commercial salvage yard. This is usually a no-cost item since the salvage value of the components almost equals the transfer cost.

This is not the case, however, for large structural units such as jackets and deck sections. These must be cut into small sections, which can be handled by commercial salvage yards. This dismembering process is slow, expensive, and far exceeds the commercial value of the scrapped steel. Production equipment and piping that have contained natural gas or crude oil must be purged and flushed before they are safe to dismantle. They can then be processed by salvage yard procedures similar to those used for automobile engines. Thus, although not truly part of the marine removal, the onshore disposal of an offshore structure is a very complex and expensive operation to be carefully considered.

TECHNOLOGY ADVANCES AND NEEDS

To date, removal of offshore structures has not been a major industry. The removal of structures has been occasional, which has not promoted the development of more economical procedures. When the removal of offshore structures grows into a significant market, the technical proficiency in platform removal will improve. The industry has shown continuing developments in two areas that will improve removal capabilities. One is the development of larger, more weather-resistant crane barges. The other is the improved technology

in working under water with remotely operated vehicles and with improved diving systems that allow deeper dives for a longer period of time.

Certain other technical developments could assist platform removal capabilities. For example, pile cutters, which can sever the pile below the mudline without using divers or without expanding the pile diameter, can be improved. Also, the ability to cut jacket members, legs and braces within the structure using a remotely operated vehicle and cutter not requiring divers would be very advantageous. Also possibly of benefit would be the development of temporary buoyancy systems with a positive means of attaching to the jacket legs to assist in lifting the larger sections by flotation.

For the typical Gulf of Mexico structure, the development of removal procedures is not a normal part of the original design effort. For most of the structures designed to date, the removal procedure has been considered primarily a reverse of the installation procedure. If the structure had been designed for installation by lifting, then the same or larger equipment could remove it. If the structure had been designed to float before installation on bottom, the jacket could likely be refloated by capping the legs and blowing out the water. No detailed analysis of platform removal procedures is normally performed other than to ensure in the design of the structure that adequate buoyancy is available. However, for deeper water depth structures that are likely to be cut into several sections, a more detailed analysis of a removal procedure is sometimes performed to ensure that removal is possible and to obtain a rough estimate of the removal cost.

Actually a detailed removal procedure cannot be developed until the condition and ultimate disposition of the structure are known. For example, a different procedure would be used if the jacket is to be cut off below the waterline and the upper sections floated with auxiliary buoyancy to deep water for ocean dumping. Unless the final disposition of the structure is known when the structure is designed, the development of a detailed removal procedure during the design and approval phase of a project is probably a waste of effort. Moreover, since any removal procedure is necessarily based on equipment available at the time, and since it is impossible to establish, say, in 1985 what capacity crane barges will be available in 2010, the effort spent would probably be wasted. Consider, for example, a removal prognosis written in 1960, when 250-ton crane barges were the largest available. That prognosis would be of little value today, 25 years later, when barges with 2,000-ton plus capacity are available.

There are some enhancements, however, that could be included in the original design that might make removal easier no matter what procedure is used. For example, the designer could ensure that adequate buoyancy is available for removal and allow for a certain loss of buoyancy because of leakage through the years, as well as take into account buoyancy that would be lost from normal installation flooding. Lugs could be welded on legs of structures to allow a

positive connection for bolt-on clamps for auxiliary or temporary buoyancy. In all probability the very large structures will have to be cut into sections for removal. It is not likely that a definite weak link such as a bolted or other easy-to-remove joint on the jacket legs would ever be acceptable since the weak link could weaken the overall structure. However, it might be possible to include planned separation points that would allow cutting fewer structural members. In any case, special care must be exercised to ensure that in-place integrity is not compromised.

The removal of offshore structures is not a standard construction procedure. Because of modest weight and size, removal of the majority of structures will be relatively straightforward. As the structures become heavier and more complex, removal requires more detailed and sophisticated engineering. The removal of the largest structures will require state-of-the-art engineering, planning, and execution. Only the most experienced marine contractors are likely to have the engineering, technical, and logistical resources necessary to execute the largest jobs safely.

REUSE OF PLATFORMS

The reuse of the platform is an ideal concept, but not often practical (Lawlor, 1975). An important aspect in considering reuse is that the offshore industry has been in operation for less than 40 years and is relatively young compared to most other types of construction. The design and construction of offshore platforms has been a rapidly advancing technology. Designs have improved as a result of increased knowledge of the marine environment and consequent enhanced understanding of design loads. Platforms have become stronger and heavier, and able to withstand more substantial storm forces. Many older platforms that met the design criteria in effect at the time they were built do not measure up to current design criteria. The historical service experience does not suggest actual inadequacy of existing platforms. However, any significant departure from current design criteria would likely make operators and regulators reluctant to accept reuse of many older platforms.

A major concern in removing offshore structures is the disposal of equipment and the structural sections of the platform that have been removed. Individual items of deck equipment, such as cranes, generators, living quarters, buildings, and heliports can be refurbished and reused with little difficulty. The same is true for individual production skids. Production piping, built into deck sections, and purpose-built deck modules have less chance of being reused. The drilling rig itself is not a part of the platform--it is moved to the next platform once all wells are completed.

The structural portions of the jacket and deck are not as reusable as the deck equipment. On relatively rare occasions, an almost new platform needs to be relocated. In this instance, reuse presents

little difficulty, provided the new location has approximately the same water depth. Naturally, new piles will be necessary since most of the original piles are left in the ground. Also, different soil conditions will require different foundation design. In other instances, it is necessary to return the jacket to shore, modify the lower portion of the jacket to accommodate different water depth, and return it offshore for installation.

Since most platforms are not suitable for reuse as platforms, they must be scrapped on shore or at sea. If a structure is to be emplaced elsewhere in the marine environment, for use as an artificial reef for example, then the smaller and lighter individual equipment items on deck probably have to be removed. In addition, all tanks, piping, and other vessels that have contained oil or gas have to be removed or completely decontaminated. If the structure is returned to shore, shorebased equipment can often be used to remove the material from the barge and cut it up for scrap. If the structure is relocated to a marine site, the offloading has to be performed with higher cost marine equipment. The length of the tow to the ultimate destination is another consideration. While it is true that structures with sufficient reserve buoyancy or with buoyancy tanks attached can be towed to shore, to an ocean dump-site, or to an artificial reef site, there is a definite risk of loss of buoyancy during the tow, especially if the structure is old. Moreover, buoyancy tanks as well as the entire towing operation are expensive (see discussion of cost in next section).

COST OF PLATFORM REMOVAL

With several thousand structures in existence, it is impractical for a study of this type to analyze the cost of removing each offshore structure. Rather, the structures were divided into five categories on the basis of size and type. A removal estimate was performed for each category and a total estimate was developed accordingly. These estimates are based on current techniques and 1985 dollars not adjusted for inflation. Allowances are made for techniques expected to be developed in both design and removal technology, however, it is not expected that these will substantially reduce costs.

Category I includes smaller structures, single-well caissons, well protectors, and other items that can be removed using equipment with lifting capacity not over 100 tons (jacket weighing less than 100 tons). Generally, these structures are in water depths of 20 feet or less. However, some of the very old structures in deeper water (up to 50 feet) also fall into this category.

Category II covers typical eight-pile structures in water depths up to 100 feet, with jackets weighing 500 to 700 tons. Until better techniques become standard, these structures will also be removed by lifting.

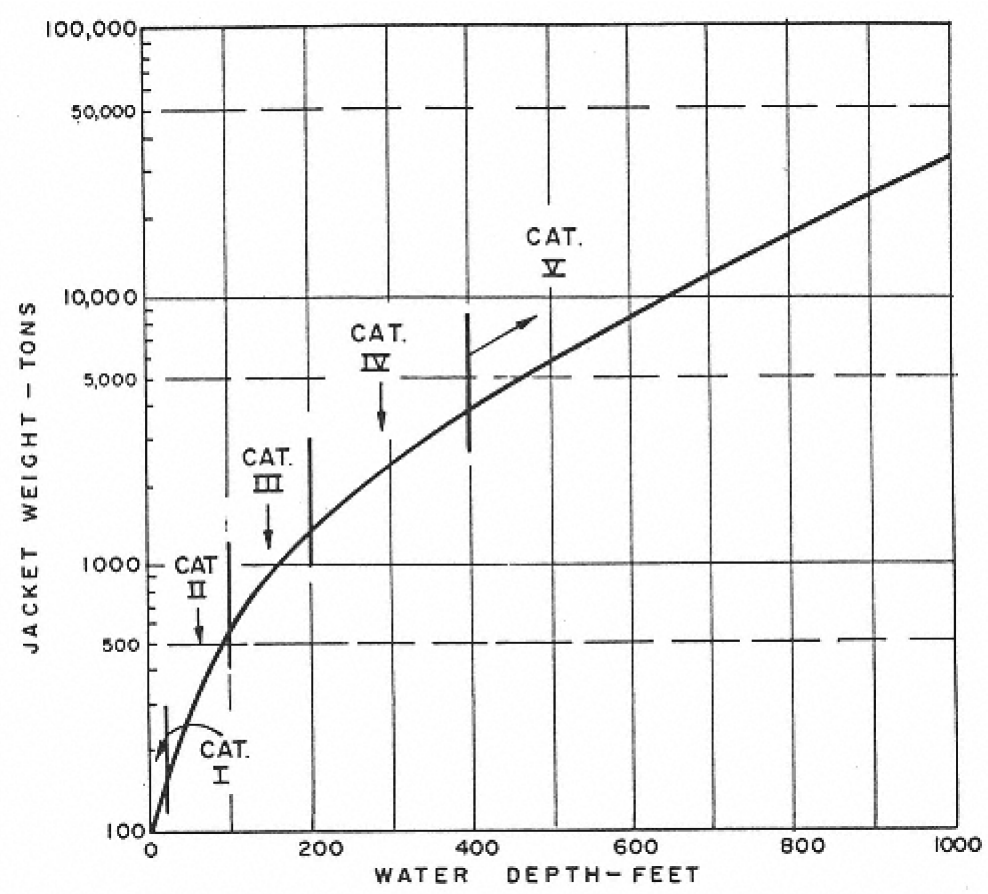

FIGURE 6
Comparison of jacket weight versus water depth.

Category III includes structures with jackets weighing from 1,200 to 1,500 tons. This encompasses typical present-day structures in water depths of 100 to 200 feet.

Category IV covers structures located generally in 200 to 400 feet of water. The cost estimates are based on cutting the jacket into sections, lifting the sections onto cargo barges, and returning them to shore.

Category V includes all structures installed beyond the 400-foot water depth. Generalizations about the most favored removal procedure are not practical for structures of this size; each requires custom development of removal procedures.

Figure 6 shows a comparison of jacket weight versus water depth for typical Gulf of Mexico drilling-production structures. Figure 7 employs the platform population data and life expectancy estimates presented in the previous chapter to estimate the number of structures in each category to be removed each year. The number of structures to be removed will gradually increase from about 30 a year, at present, to well over 200 in the future. However, as is shown, the bulk of these will be the small structures of Category I and Category II. These are relatively inexpensive structures to remove. The real

problems will not begin until Category IV structures begin to be removed somewhere in the 1995 to 2000 time-frame. Removal of the deep-water Category V structures built in the past few years, as well as others being contemplated, is not anticipated until around 2005.

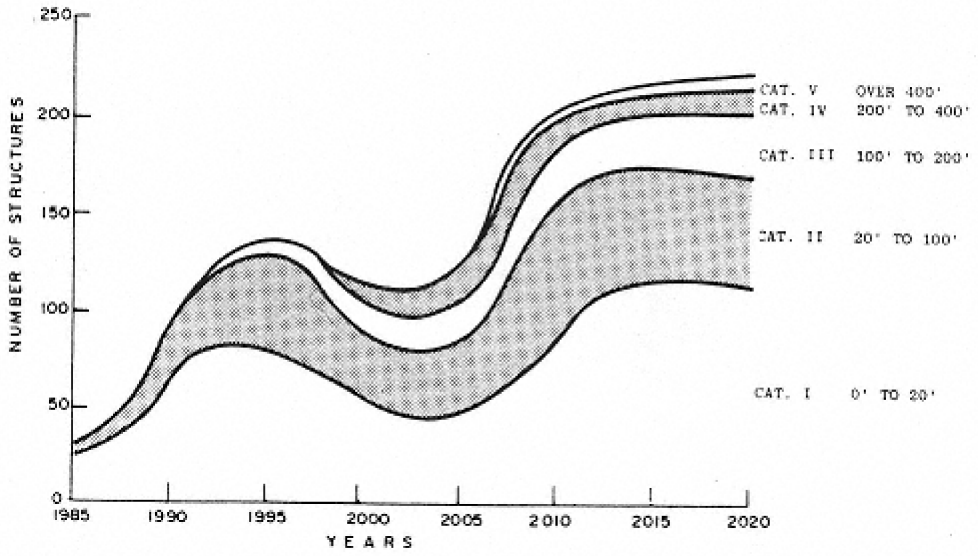

FIGURE 7
Estimated number of structures to be removed by category--Gulf of Mexico.

With few exceptions, Category I and II structures will be completely removed and returned to shore. These are not difficult to remove, and therefore can be removed cheaply when no longer useable. Even if operators were allowed to leave structures in place, liability considerations and maintenance costs would dictate the removal of the bulk of these structures. Since the water depth of these structures is also relatively shallow, they are not likely to be treated as structures to be cut off at some point below the waterline with the bottom section left in place. For purposes of preparing an overall estimate, typical removal procedures were developed for a structure of this category. The normal removal cost of a Category I structure is estimated to be in the range of $50,000 to $400,000. Larger equipment and more time on location is required for Category II. It is estimated that the average removal cost of these structures will range from $600,000 to $1.3 million.

For this study, it was assumed that structures in Categories III, IV, and V would also be removed completely and returned to shore. Considering the additional size and complexity of these structures, it is estimated that the removal of Category III structures by present techniques would cost from $1 million to $2.5 million. For Category IV structures, an average cost would be between $5 million and $15 million. Similar removal procedures would be used, except when the weight of the jacket requires cutting into sections for convenient lifting and transporting to shore on cargo barges. Onshore dismantl

ing and disposal costs represent about 20 percent of the total removal costs for Category I–IV structures.

For Category V, the very deep-water structures, the cost of removal would begin at $15 million. An unpublished, detailed cost study, prepared by an owner of one of these structures several years ago, estimated the removal cost at over $70 million. At the present time, this estimate would probably range from $90 million to $100 million. Very special and specific procedures would be required for each structure in this category in order to make a satisfactory estimate. Onshore disposal costs for Category V structures would range from $3 million to $6 million. The committee's estimates of removal cost are comparable to estimates prepared by the E&P Forum (E&P Forum, 1984).

Based on the number of structures shown in Figure 7, and using the cost of the categories described, the total cost of removing the platforms in the Gulf of Mexico has been projected, as shown in Table 2.* Cumulative costs are shown in Figure 8. Assuming 1985 dollars, the committee estimates that by the year 2005 about $2 billion will be required to remove the structures; this cost will rise to about $7.5 billion by 2020. These estimates do not take into account structures in Alaska and California, some of which will be expensive to remove. The estimates do not address advanced platform concepts intended for deeper water. Only one of these structures, a guyed tower, is in place on the U.S. outer continental shelf. When Alaska and California platforms are included (see Tables 3, 4A, and 4B), these costs increase to an estimated $2.5 billion by 2005 and $8.5 billion by 2020.

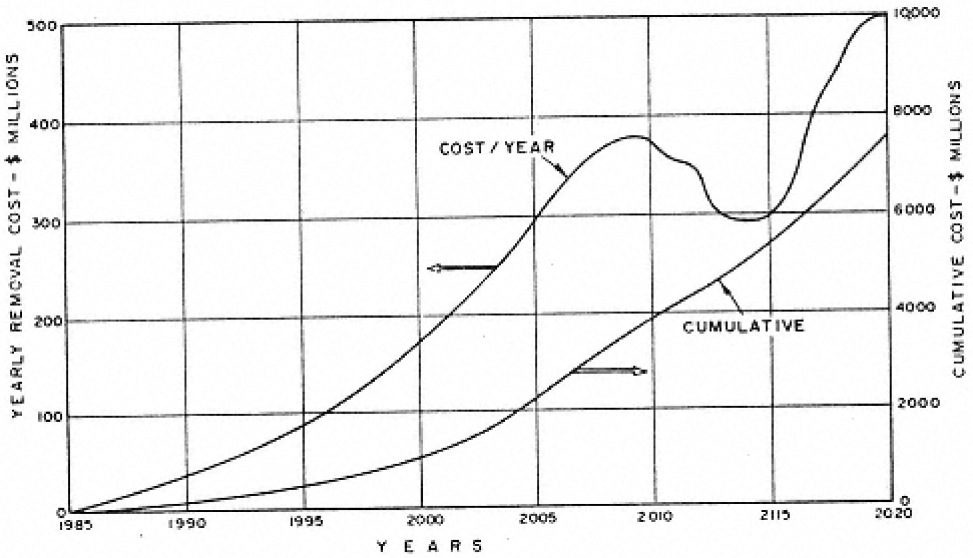

FIGURE 8
Total cost of removing Gulf of Mexico structures.

* The estimates of costs shown in the tables and figures are based on the committee's experience and judgment.

TABLE 2 Number of Structures to be Removed and Estimated Removal Costs in the Gulf of Mexico

Time of Removal	Category						Cost (millions)
I	II	III	IV	V	Total		
1985	27	5				32	9
1986	35	5				40	11
1987	26	21				47	24
1988	34	22				56	26
1989	48	18				66	25
1990	68	24				92	34
1991	92	34	1			127	49
1992	85	41	5			131	63
1993	68	36	2			106	49
1994	86	50	12			148	83
1995	74	60	9			143	84
1996	75	57	4			136	73
1997	77	62	5			144	80
1998	61	40	18	5		124	129
1999	54	26	19	11		110	177
2000	59	30	26	8		123	163
2001	56	46	25	3		130	125
2002	59	36	29	18		142	273
2003	59	29	23	9		120	167
2004	37	15	12	9		73	131
2005	63	24	18	23		128	295
2006	60	30	18	28		136	350
2007	44	46	20	17	1	128	294
2008	65	53	36	29	3	186	532
2009	103	47	28	20	1	199	351
2010	89	56	35	19	2	201	398
2011	79	68	37	12	2	198	340
2012	101	63	28	1	2	209	355
2013	132	67	14	8	2	223	271
2014	105	53	16	5	2	181	226
2015	105	53	14	7	1	180	203
2016	105	63	19	10	2	199	290
2017	105	65	25	13	4	212	412
2018	105	65	30	14	4	218	431
2019	105	65	30	20	4	224	491
2020	105	65	30	20	4	224	491
Totals	2,746	1,786	588	328	34	5,482	$7,505
Previously removed	95	246		5		346	

TABLE 3 Number of Structures to be Removed Off Alaska and Estimated Removal Costs

Time of Removal (millions)	Number Removed	Cost[a] (millions)	Cost[a]
1985–1990			
1990–1995	2	50	36
1995–2000	6	150	108
2000–2005	6	150	108
2005–2010			
2010–2015			
2015–2020	3	75	54
Total	17	$425	$306

NOTE: All structures located in about 100 feet of water.
[a] This column assumes mobilization/demobilization of marine equipment from California, and both deck and jacket removed, taken to shore, and cut apart. Onshore dismantling and disposal costs will be about $6 million per structure (included in above figures).
[b] This column assumes mobilization/demobilization of marine equipment from California, the deck taken to shore, and cut apart, but the jacket removed and sunk in deep water.

TABLE 4A Number of Structures to be Removed Off California and Estimated Removal Costs by Water Depth

Water Depth	Removal Costs (Millions)	
<100'	5[a]	5[b]
100' – 200'	7[a]	7[b]
200' – 400'	21[a]	14[b]
>400'	25[a]	18[b]

[a] These costs assume complete removal and transportation to shore to be cut apart. Onshore dismantling and disposal costs represent about 20 percent of total removal costs.
[b] These costs assume complete removal and transportation of jacket to a deep-water site for disposal with the deck taken to shore.

TABLE 4B Number of Structures to be Removed and Estimated Costs by Time of Removal

Time of Removal	Water Depth				Cost (millions)	
<100'	100'–200'	200'–400'	>400'			
1985–1990	1				5	5
1990–1995	4	1			27	27
1995–2000		7	1		70	63
2000–2005						
2005–2010		2	1	1	60	46
2010–2015	1		4		89	61
2015–2020			10	10	460	320
Total	7	10	16	11	$711[a]	$522[b]
Previously removed	1					

[a] These costs assume complete removal and transportation to shore to be cut apart. Onshore dismantling and disposal costs represent about 20 percent of total removal costs.
[b] These costs assume complete removal and transportation of jacket to a deep-water site for disposal with the deck taken to shore.

COMPARISON OF COST OF RETURN-TO-SHORE AND OCEAN DISPOSAL OPTIONS

The discussion above of cost of removal has been based on existing requirements for complete removal with disposal ashore. As has been explained, to remove a Category III–V jacket completely and return it to shore, it is usually necessary to cut it into sections to be lifted onto a barge for transportation. Then it must be offloaded and further cut into sections for salvage. For the larger platforms (Categories III–V), the cost of removal and disposition could be substantially reduced if other removal options were employed. For example, a large jacket could be lifted off the ocean bottom with auxiliary buoyancy or with a derrick barge after the piling has been cut. The jacket could then be towed to deep water for dumping (equipment and piping that had contained petroleum would be removed to shore). A recent unpublished study of the removal of a Gulf of Mexico eight-pile structure in over 300 feet of water estimated that marine operations would cost $3.9 million and an additional $1.3 million would be required for offloading, dismantling, and disposal, for a total cost of $5.2 million. It is estimated that the total cost

estimate would be reduced to $3.2 million using a derrick barge to transport the partially buoyant jacket to deep water.

TABLE 5 Comparative Costs for Several Removal Options

	Category III (millions)	Category IV (millions)	Category V (millions)
Option A[a]	1.0 – 2.5	5 – 15	15 – 90
Option B[b]	0.8 – 1.5	3 – 5	6 – 12
Option C[c]		3 – 4	4 – 8

[a] Jacket severed below mudline, everything taken to shore.
[b] Jacket severed below mudline, lifted off bottom, and transported to nearby (~25–30 miles) deep-water site and dumped. Deck and equipment returned to shore.
[c] Jacket in ~500–600 feet of water, severed at mudline, and toppled in place. In waters deeper than 500–600 feet, only the top 200 feet would be removed and set on bottom adjacent to portion of structure remaining. Deck and equipment taken to shore.

This procedure may not be cost-effective for shallow water structures (Category I and II), but total savings on the disposal of deep-water structures (Category III–V) would be substantial. Ocean dumping of Category III–V structures would reduce the total estimated cost to remove all offshore structures through the year 2020 by about $2.5 billion, or one-third. (This estimate is necessarily very uncertain since each of the largest platforms will have to be treated as a special case.) Estimated differences in costs for several removal options are shown in Table 5. Tax implications to the owner or the government are not included in Table 5.*

ENGINEERING AND COST OF REMOVAL OF OTHER PLATFORM TYPES.

As the industry moves into deeper water, other types of offshore platforms may be the technology of choice as a result of performance

* The extent of the government's financial interest in offshore development can possibly influence the government's choice among alternative platform dispositions. Where petroleum taxes are very high or where the government owns a major share in the offshore concessions, a least cost disposition could have a significant impact on the federal treasury.

evaluations and cost estimates. These may include compliant structures such as guyed towers or tension-leg platforms (see Figures 9 and 10), or subsea well completion structures coupled with floating storage systems. One guyed tower is in place on the OCS of the United States. Large concrete or steel gravity-base structures are also likely to be used. A concrete and steel gravity-base structure is already in use in the Alaskan Beaufort Sea. One or more concrete gravity-base structures, similar to those in the North Sea, could possibly be chosen for use in the southern Bering Sea.

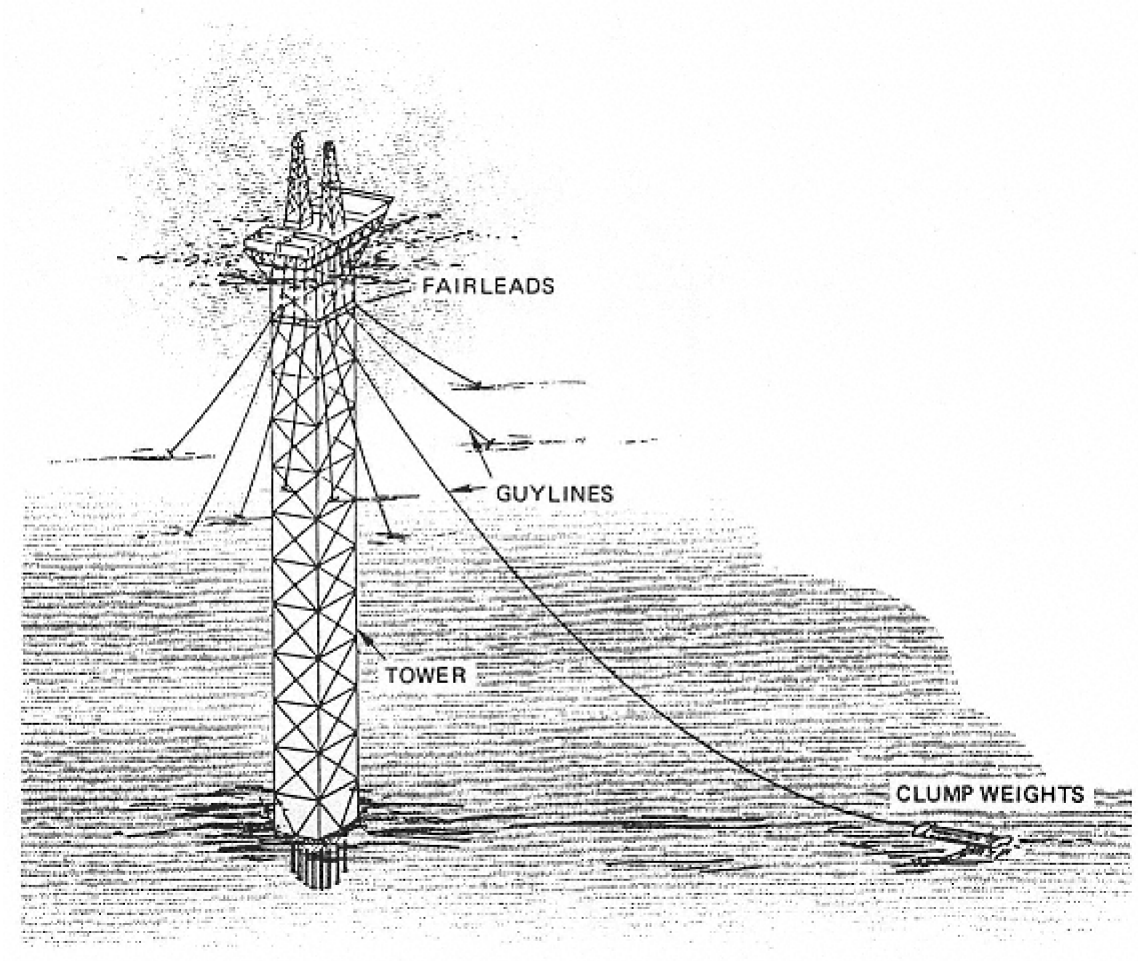

FIGURE 9
Guyed tower (water depth 1,100 feet).

Removal of a guyed tower will be similar to the removal of a fixed platform, possibly easier. The structure has fewer piles and substantially more buoyancy, which may make the structure easier to float on its own. The removal of other types of structures, however, will be totally different from a fixed platform. For example, the removal of the upper portion of a tension leg platform will be substantially easier, since it will only be necessary to slacken and remove the others and then tow the upper section away.

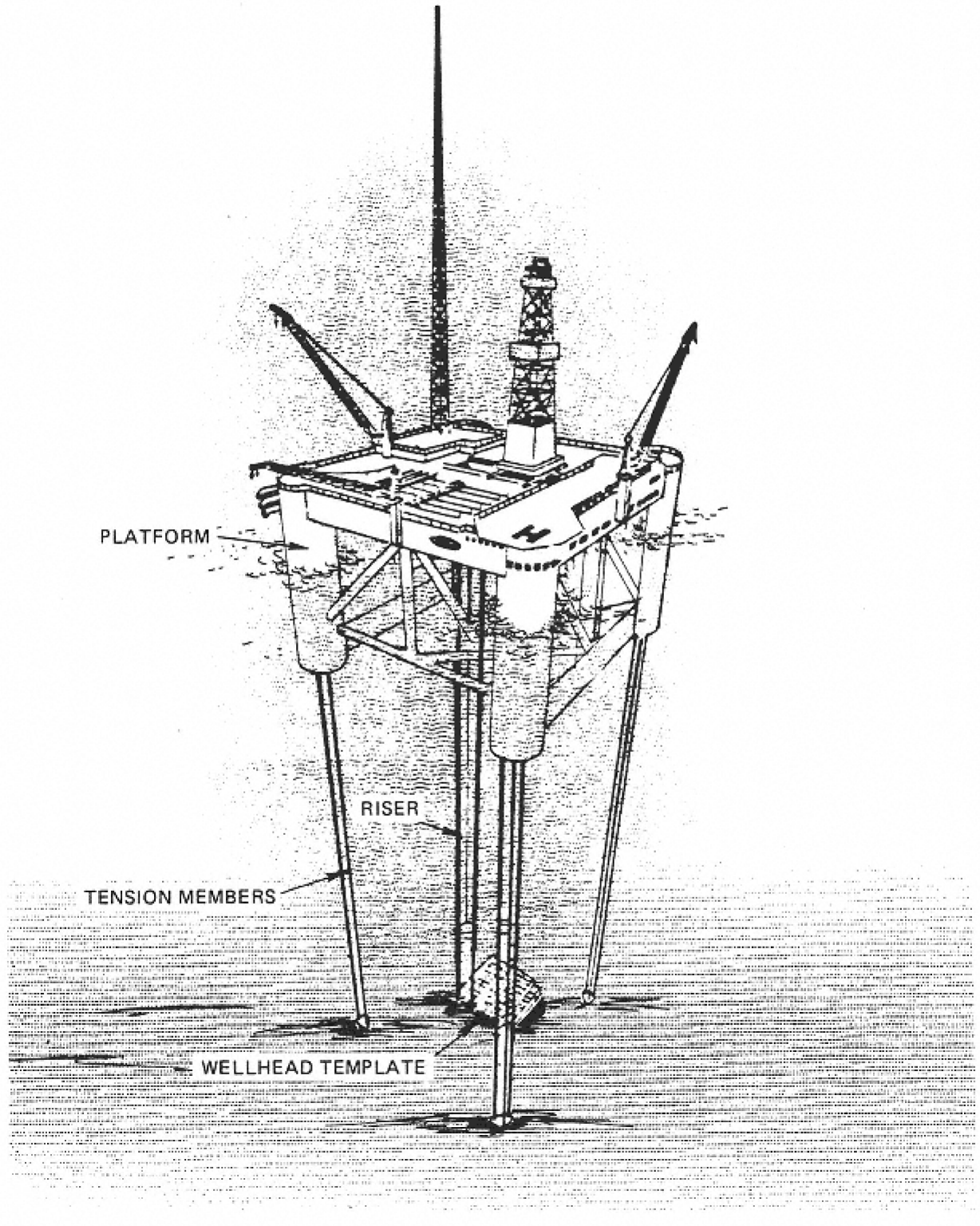

FIGURE 10
Tension leg platform (water depth 485 feet).

Removal of the lower portion or foundation unit of this structure on the ocean floor will be an entirely different and a more difficult operation. This on-bottom template foundation may protrude 5–10 meters above the seafloor (see Figure 10).* Complete removal will involve procedures and techniques that are essentially a reverse of the initial installation operations, with several notable additional complications. Severing foundation piles below the mudline is similar to well abandonment operations and can readily be accomplished by floating deep-water drilling vessels. Rigging the structure for lifting to the surface is likely to include reestablishing structure buoyancy, either by deballasting or attaching buoyancy modules.

Beyond saturation diver depths, presently about 1,150 feet, these operations will entail extensive use of remotely operated vehicles and purpose-built equipment. Lifting the structure through the water column, although straightforward in principle, will generally require the use of purpose-built heavy-lift systems operating from large surface support vessels outfitted to moor in deep water or dynamically positioned. At the surface, the structure will either be loaded on barges, most likely after disassembly into pieces of manageable size and weight, or made seaworthy for surface transport by the addition of buoyancy and towing appliances.

Although each of these tasks is technically feasible, they promise to be expensive and burdened with engineering and logistical difficulties, raising serious questions about the cost-effectiveness of this approach. Alternatives to complete removal, beyond the obvious approach of leaving the structure intact on the seafloor, would include destruction in place by explosives, leaving structural debris scattered over a small area. The dumping of rock or other fill material to cover low profile bottom structures could also be considered.

Since on-bottom template structures will probably be installed only in deep water (greater than 1,000 feet) they will not interfere with navigation. Leaving on-bottom template structures in place would simplify salvage substantially. If total removal of these on-bottom units is required, it will be very expensive, even with the use of auxiliary buoyancy and dumping at sea.

There are about 200 concrete structures, some gravity-base and some pile supported, located in state waters in the Gulf of Mexico. These shallow water structures will be comparatively easy to remove. Their removal, in principle, consists only of removing topside facilities and any ballast, breaking loose from the seafloor, and then towing away.

Removal of a large, North Sea-type, concrete, gravity-base platform (Figure 11) would be much more difficult. Refloating the whole structure may be impractical because of the sheer weight (some are more than 500,000 tons), or much of the buoyancy available during installation is lost, or, on some, tons of grout injected into the

* Similar on-bottom templates may be used with subsea production systems and clusters of subsea wells.

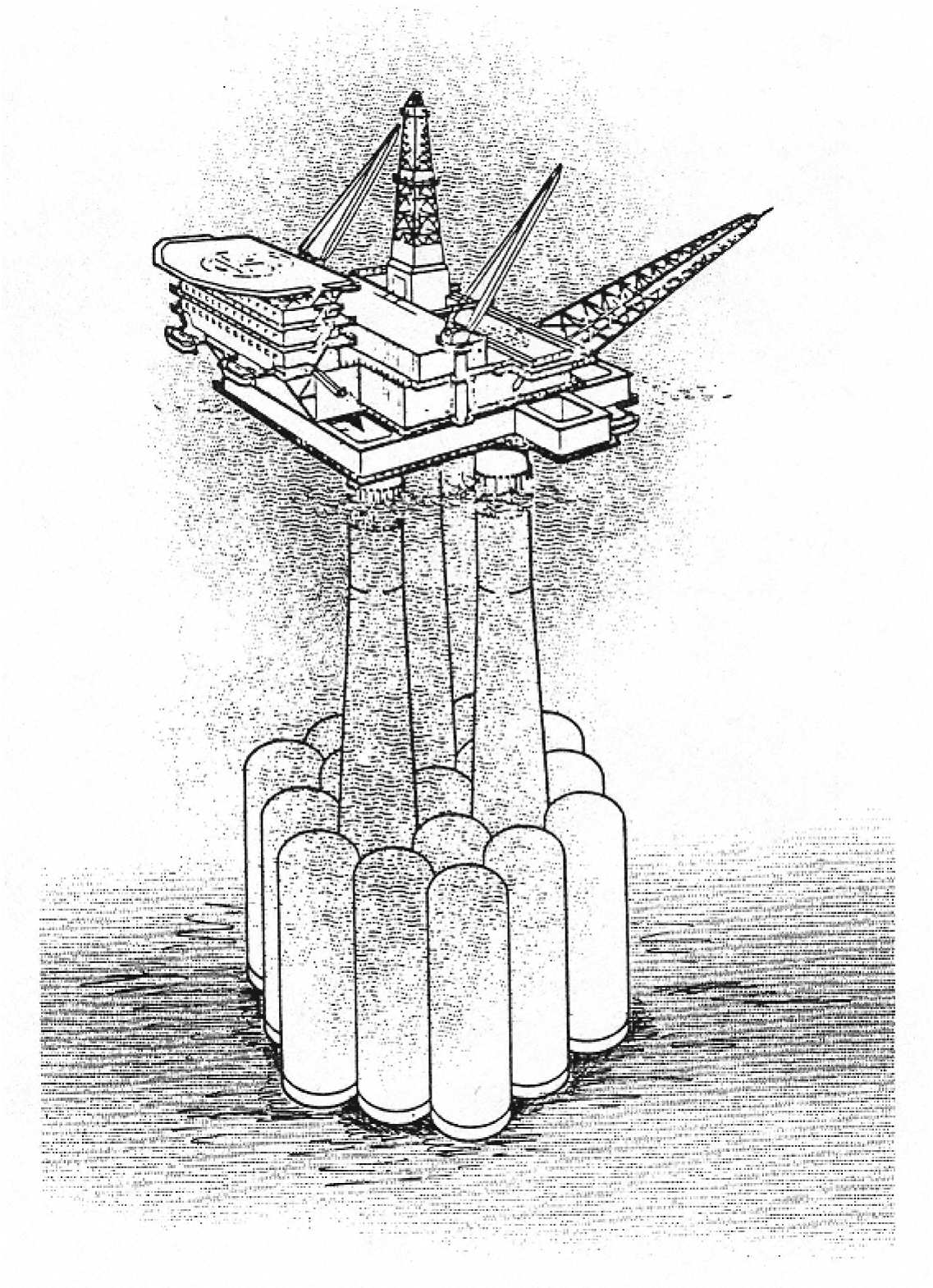

FIGURE 11
Concrete gravity-base platform--North Sea (water depth 520 feet).

spaces between the base of the structure and the supporting soil will adhere to the underside of the structure.

Dismantling a concrete structure in place also has major problems. The decks can be removed without too much difficulty and the columns can be severed above the base, probably by explosives. It is the base that presents the major removal problem, for reasons noted above. One option would be to use explosives to reduce the base to rubble.*

Off Norway where there are some 15 huge concrete gravity-base platforms, the Norwegian Petroleum Directorate requires that for each such platform, a complete Manual for Removal be developed, fully engineered, and approved prior to issuance of a permit for construction. In all recent platforms, complete piping systems, disconnect devices, etc., have been installed. Careful analyses have been made of soil adhesion to skirts and dowels, and detailed deballasting plans, stability analyses, etc., have been prepared. In these instances, the same degree of engineering has been incorporated in planning for removal as in planning for construction and installation.

Removal of conventional deep-water structures is difficult, complex, and expensive. For other types of platforms, removal may require even more thorough engineering and execution. The operations must be planned with the same degree of care as the original installation, to avoid serious consequences.

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* Shaped or block charges are used routinely to sever piles under-water and for other demolition tasks. Demolition of a large concrete gravity-base structure with explosives is technically feasible, but has never been tried. The use of explosives underwater may kill fish in the area. The size of the fish kill depends on the amount of explosives used and the fish population in the area.

4

Legal Issues

INTRODUCTION

So far as removal of offshore platforms is concerned, the law seems clear, at least within the jurisdiction of the United States. The 1958 Convention on the Continental Shelf, a treaty to which the United States is party, states in paragraph 5 of Article 5: "Any installations which are abandoned or disused must be entirely removed." The Outer Continental Shelf Lands Act (1953) gives broad authority to the Secretary of the Interior to administer leasing of the outer continental shelf (OCS) and to prescribe rules and regulations for the prevention of waste and conservation of the natural resources of the OCS. The Secretary has exercised that authority through regulations, OCS orders, and standard leasing terms. OCS Order No. 3 of January 1980 on "Plugging and Abandonment of Wells" requires that "all casing, wellhead equipment, and piling shall be removed to a depth of at least 5 meters (16 feet) below the ocean floor…." The Minerals Management Service (MMS) standard oil and gas lease (From MMS-2005, August 1982) requires the lessee, within one year after lease termination, to "remove all devices, works and structures from the premises" in accordance with MMS regulations and orders. Complete removal is the rule that appears in the 1958 convention.

But what then? Removal, where required, is but one step toward ultimate disposition. As it stands in the United States today, the law places limitations on the disposition process. Transportation of the platform to final destination is governed by the rules of navigation. Placement of the platform on the ocean floor requires one permit for disposal by dumping and another if the structure is to be used as an artificial reef. And, during and after the disposition process, one or more of the parties involved will probably be liable for damages should an innocent third party suffer harm. The disposition process is rich in legal issues and each one is potentially a centerpiece for controversy.

At the United Nations Conference on the Law of the Sea (LOS), convened in Geneva, Switzerland, for two months in 1958, the delegates adopted four treaties. In one of those, the Convention on the Continental Shelf, appeared the sentence quoted in the first paragraph. In due course, with sufficient ratifications and acceptances, the

convention entered into force for many nation-states around the world. Those States implemented the removal provision in various ways, not always so rigorously as the United States. As it turns out, some States allow for official discretion in making removal decisions. It is evident that discretion on removal broadens the options base for platform disposition.

The Third United Nations Conference on the Law of the Sea, when considering a removal provision for the new LOS treaty, at first accepted the language of the 1958 convention with all its apparent certainty. By the time the conference accepted the LOS convention in final form, however, the removal provision had been transformed to allow some degree of discretion, and specified were factors to be taken into account in arriving at a removal decision. It may be debated whether this is a change in the law on removal or is merely a restatement of the 1958 provision in light of state practice. Either way, the new provision is a departure from the hard-and fast complete removal policy presently in force in the United States. This suggests, at the least, that a reassessment of removal requirements in this country is appropriate, not only in light of developments in competing uses of the sea, but also to assure that no disadvantage befalls U.S. interests because of a unilaterally rigid policy.

Offshore platforms, while actively engaged in exploration or production, obviously represent serious problems involving competing uses of the sea. Some solutions ad interim have been found, and lingering problems have been tolerated because of the utility of these structures in meeting society's energy needs. When usefulness in extracting oil or gas ends, however, new and substantial justification is needed if the platforms are to be left, in whole or in part, on the seafloor. In this report, and in the wealth of literature on this subject, can be found sufficient evidence to conclude that substantial justification may exist in a given situation to leave all or part of a platform and its appendages on the seafloor, either in its original location or elsewhere. In other words, occasionally or even rarely it could be better, all things considered, to dispose of platforms at sea rather than bringing them ashore. Clearly, that possibility exists.

What may be needed, therefore, for deciding on platform disposition, is a sensible policy, reflected in rules and procedures, allowing discretionary decisions based on accepted criteria. The appropriate authority could decide the case-by-case merits, taking all factors into account. The rules and criteria to be applied should have the force of law, and it is highly desirable that they be the product of international agreement. Such matters are already the subject of treaty law, and international agreement on rules and criteria would promote uniformity in the interest of trade and commerce and protect the competitive position of U.S. industry. An intergovernmental organization exists, the International Maritime Organization (IMO), with the competence to develop rules and criteria. Fortunately, the United States has a strong voice in IMO, earned over years of substantial contributions to the work of the organization, and this would help assure a leadership role for the United States in developing a new system for managing disposition.

This introduction has been both a look back and a look ahead, coupled with the suggestion that changes may be in order. Next it is appropriate to examine more closely the options for disposition of offshore platforms in light of international and national law.

THE OPTIONS

Following is a restatement of the options for removing and disposing of offshore platforms organized in a way that facilitates identification of the legal issues involved.

- Option 1. Complete removal from site, with jacket severed below the mudline, and with all parts:

  (a) transported to shore for scrapping or reuse;
  (b) transported to approved site for ocean dumping; or
  (c) transported to approved site for use as artificial reef.

- Option 2. Partial removal from site, with some parts left projecting above the mudline, and with removed parts handled as in (a), (b), or (c) above.
- Option 3. Toppling or dismantling in place.
- Option 4. Leave on-site in the original upright position for use in some capacity other than gas or oil exploration and production.

This discussion will return to the options as set out above after consideration of applicable international and national law. The central question is this: What are the legal limitations on actions to be taken pursuant to disposition under each option?

INTERNATIONAL LAW

Conventional international law offers relatively little concerning the disposition of offshore platforms. While a number of treaties speak generally about rights and obligations pertaining to activities on and in the sea, only the 1958 Convention on the Continental Shelf contains a rule specifically dealing with what is to be done with a platform when its usefulness for exploration or exploitation has ended. That provision is found in Article 5, already quoted. To provide context, pertinent parts of Article 5 are as follows:

Article 5

1. The exploration of the continental shelf and the exploitation of its natural resources must not result in any unjustifiable interference with navigation, fishing, or the conservation of the living resources of the sea, nor result in any interference with fundamental oceanographic or other scientific research carried out with the intention of open publication.

2. Subject to the provisions of paragraphs 1 and 6 of this article, the coastal State is entitled to construct and maintain or operate on the continental shelf installations and other devices necessary for its exploration and the exploitation of its natural resources, and to establish safety zones around such installations and devices, and to take in those zone measures necessary for their protection.
3. [Not quoted]
4. [Not quoted]
5. Due notice must be given of the construction of any such installations, and permanent means for giving warning of their presence must be maintained. Any installations which are abandoned or disused must be entirely removed [emphasis added].
6. Neither the installations or devices, nor the safety zones around them, may be established where interference may be caused to the use of recognized sea lanes essential to international navigation.
7. The coastal State is obliged to undertake, in the safety zones, all appropriate measures for the protection of the living resources of the sea from harmful agents.
8. [Not quoted]

The provisions of Article 5 create a careful balance among competing uses of the sea as they may be affected by the presence of "installations and other devices" on the shelf. Other articles in the convention follow the same pattern: Article 2 recognizes the sovereign rights of the coastal State over the shelf while Article 3 safeguards the legal status of superjacent waters as high seas, and Article 4 protects the rights of other States to lay and maintain submarine cables and pipelines on the shelf. Paragraph 5 of Article 5 may be viewed in light of the balance clearly intended by the other provisions: the requirement to remove is absolute, mandating a return to the status quo ante because the justification for the obstruction, allowed only as an exception to the principle of freedom of the seas, has ceased to exist.

Along these lines, one legal scholar, Professor E. D. Brown of the University of Wales, believes that the removal provision allows no room for flexibility: If there is to be scope for greater flexibility, it will have to result from a change in the law. Others disagree. Messrs. Peters and Soons and Ms. Zima of the Netherlands branch of the International Law Association raise a number of questions: What is meant by "installations"? When is an installation to be deemed "abandoned" or "disused"? What is the significance of "entirely"? These three scholars conclude, pointing to State practice in justification, that the removal provision found in Article 5 has always allowed considerable room to exercise discretion, although the discretion of which they speak seems to be vested in government officials, not offshore operators.

These differences of scholarly opinion are mentioned mainly to show that the apparently unqualified terms of the removal provision are open to varying interpretations and to serious debate. This fact is further illustrated by State practice, to which this discussion turns next.

State practice, as the term is used here, has to do with the way States party to the 1958 convention interpret treaty provisions as demonstrated by their implementation of them. Implementation may be through national legislation, bilateral treaties on similar subject matter, or industry practice as permitted or condoned by the State. Except in the Gulf of Mexico, actual removal of platforms has occurred very rarely around the world. Therefore, implementation must be judged not by what was done when removal decisions were made, but by expressions of policy on how the decisions will be made when the time comes. State practice is important when considering the removal provision of the 1958 convention because it can lend weight to a particular interpretation of the provision, or it can indicate that the provision no longer is valid in its literal meaning.

A review of the national legislation and regulatory programs of several Western European countries, together with a number of bilateral and multilateral treaties applicable in that region, discloses that complete removal is not generally required by national law. In fact, only one country (i.e., Netherlands) has a rule that directly reflects the convention provision. Some countries make provision for removal, but leave to government officials the extent to which removal must be effected. Other countries make no such provision, but grant broad discretion to officials to decide what measures should be taken when an installation is to be abandoned or disused. Typically, the other uses of the sea that could be affected by the installation are required to be taken into account in deciding what to do. This comparatively soft position originally taken in the 1960s and 1970s on a 1958 hard-line provision has been further qualified by official expressions of concern made in the 1980s. Government studies suggest that removal policies applicable to large installations on Europe's continental shelf are uncertain now and will remain so until the time for decisions is much closer. Furthermore, the questions of removal will be addressed in light of the economic consequences of removal that pertain today, as contrasted with those pertaining in 1958.

The attitudes represented by state practice are indicators that a new and more flexible rule for removal is taking shape and gaining acceptance. This is confirmed by events at the Third United Nations Conference on the Law of the Sea before its adoption of the LOS treaty in 1982.

The text of the draft convention on the Law of the Sea that emerged from the tenth session of the conference in August 1981 contained a provision on removal of offshore installations in Article 60, entitled “Artificial Islands, Installations, and Structures in the Exclusive Economic Zone.” This provision, paragraph 3 of the article, was almost identical to paragraph 5, Article 5, of the 1958 Convention on the Continental Shelf; the changes that were made were merely to fit the context of Article 60, but the thrust on removal was unchanged. There

had been little discussion of this provision for the first several years of the conference, but in 1980 and 1981 concerns were raised about its implications--the provision was stated in unqualified terms, and no discretion in its implementation would be permitted no matter how minor the safety and pollution risks of leaving the installation in place or how major the expense of its removal. During the tenth session the British delegation proposed an amendment to paragraph 3 that was responsive to the concerns that had been raised. The British proposal gained support and became the focus of considerable discussion, although the draft removal provision produced by the tenth session was, as stated above, practically verbatim with the 1958 convention.

At ensuing sessions, however, the British formulation, after considerable debate and a number of amendments, gained wide support. It was adopted by the conference with the adoption of the LOS convention. The final version of the article is as follows:

Article 60 Artificial Islands, Installations, and Structures in the Exclusive Economic Zone

1. In the exclusive economic zone, the coastal State shall have the exclusive right to construct and to authorize and regulate the construction, operation, and use of:

(a) artificial islands;
(b) installations and structures for the purposes provided for in Article 56 and other economic purposes;
(c) installations and structures which may interfere with the exercise of the rights of the coastal State in the zone.

2. The coastal State shall have exclusive jurisdiction over such artificial islands, installations, or structures, including jurisdiction with regard to customs, fiscal, health, safety, and immigration laws and regulations.
3. Due notice must be given of the construction of such artificial islands, installations, or structures, and permanent means for giving warning of their presence must be maintained. Any installations or structures which are abandoned or disused shall be removed to ensure safety of navigation, taking into account any generally accepted international standards established in this regard by the competent international organization. Such removal shall also have due regard to fishing, the protection of the marine environment, and the rights and duties of other States. Appropriate publicity shall be given to the depth, position, and dimensions of any installations or structures not entirely removed.
4. The coastal State may, where necessary, establish reasonable safety zones around such artificial islands, installations, and structures in which it may take appropriate measures to ensure the safety both of navigation and of the artificial islands, installations, and structures.

5. [Not quoted]
6. All ships must respect these safety zones and shall comply with generally accepted international standards regarding navigation in the vicinity of artificial islands, installations, structures, and safety zones.
7. Artificial islands, installations, and structures and the safety zones around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation.
8. [Not quoted]

A full analysis of the meaning in all its aspects of paragraph 3 of Article 60 would require a searching appraisal of the debate surrounding the adoption of the new formulation, including the reasons for acceptance or rejection of each amendment that was offered. There will come a time when such an analysis must be done, but, for now, it should be sufficient to examine the paragraph and draw some conclusions about its principal components as compared with the 1958 removal provision.

The LOS provision is more flexible than its predecessor and invites consideration of the effects of leaving an installation on-site, in whole or in part, in reaching a decision on removal. Not all installations would need to be entirely removed; only those where the combined effect of a number of criteria or the crucial importance of one governing criterion make inescapable the decision to remove entirely. The criteria to be considered are specified: safety of navigation; fishing; protection of the marine environment; and the rights and duties of other States. The formulation seems to give safety of navigation a priority among these criteria, although an examination of the record of the treaty negotiations might support giving all equal weight.

In any event, the provision contemplates generally accepted international standards to be applied in ensuring safety of navigation and cites the competent international organization, presumably IMO, to develop those standards. One can envisage an IMO code to meet this purpose, with gradations of area sensitivity based on traffic density, water depth, presence of natural and man-made hazards, and configuration of channels or sea lanes. Or IMO could devise a matrix of weighted factors, whereby individual candidates for removal could be assessed case-by-case. However approached, the goal would be objectivity in standards for safety of navigation, so that the pleas of special interests would not drive the decisions of coastal States having jurisdiction. This would not be the case, apparently, with the other criteria (i.e., fishing, marine environment, and other States) where governments would have wide discretionary latitude. This dichotomy is probably consistent with one of the main themes of the new LOS convention, under which coastal States have new-found rights in the Exclusive Economic Zone.

Whether one argues that paragraph 3 of Article 60 is a newly minted provision of conventional international law or that the paragraph is for the most part a statement of emerging customary international law, the provision is consistent with the argument that the 1958 removal provision cannot today be taken literally. The argument also finds support in state practice, discussed earlier. To the extent that the present U.S. policy of complete removal is based on the 1958 convention's removal provision, this argument may be crucial in the quest for a more flexible policy.

OCEAN DUMPING

The law on ocean dumping is found both in conventional international law and in U.S. federal law. The two are closely linked and will be considered together here. The law is clear where disposition of offshore platforms is concerned; the discussion, therefore, will not be elaborate.

The 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter was ratified by the United States in 1974 and entered into force in August 1975. Congress enacted the Marine Protection, Research, and Sanctuaries Act in October 1972, before the convention was open for signature. Title I of the act, which deals with ocean dumping, is consistent with the serves to implement the convention. The title was amended in 1974 to make this explicit.

"Dumping" means the deliberate disposal at sea of wastes or other matter, and, in the words of the convention, "any deliberate disposal at sea of vessels, aircraft, platforms, or other man-made structures at sea." The convention categorizes certain materials through lists in two annexes: in Annex I are listed materials for which dumping is prohibited entirely and in Annex II are listed materials for which a special permit to dump is required. All other materials require a prior general permit. Under the U.S. implementing act, the Environmental Protection Agency (EPA) administers the ocean dumping permit program for all materials except dredged material (the permit program for dredged material is administered by the U.S. Army Corps of Engineers).

Both the convention and the act contemplate special permits for most instances of dumping, but allow for general permits under specified circumstances. The act authorizes EPA to issue general permits for dumping specified materials and to set forth classes of materials for which permits may be issued and that are determined to have "minimal adverse environmental impact."

Among the "substances and materials requiring special care" listed in Annex II are "containers, scrap metal, and other bulky wastes liable to sink to the sea bottom which may present a serious obstacle to fishing or navigation." This sounds as though offshore platforms

would constitute materials falling under the strictures of Annex II: special permit required and no general permit allowed. EPA long ago, however, issued a general permit for transportation and disposal of vessels. If vessels do not fall into the Annex II category, it would seem that platforms should not. Furthermore, at least one EPA official has suggested that platforms could qualify for a general permit if other criteria are met. Perhaps this is on the theory that, if the water at the dumping site is deep enough, even a large and bulky object like a platform would not be a serious obstacle to fishing or navigation. But the issue is clouded, and further research and analysis is in order if a general permit for platforms is to be sought.

General permits aside, the detailed information and compelling arguments required to justify any permit constitute a serious challenge. The federal statute, buttressed by exacting regulations, lays out an arduous route to be followed in filing a permit application. The statement of the need for proposed dumping is especially crucial. One can conclude from the criteria, together with the preliminary attitudes expressed by EPA officials, that successful justification of disposal of offshore platforms by dumping would require considerably more than data and arguments pertaining to costs.

The 1982 Law of the Sea Convention takes its definition of dumping from the 1972 Ocean Dumping Convention. The LOS convention distills the main features of the 1972 convention into two relatively short articles that, on cursory inspection, seem intended to bring a large number of States into a uniform regulatory scheme for dumping rather than to supplant the more detailed and cohesive 1972 convention. The key point concerning platforms is that the LOS convention, just as the 1972 convention, requires that the dumping of platforms be controlled by coastal States.

LAW IN THE UNITED STATES.

When all options are open to consideration, a profusion of federal statutes surrounds the subject of disposition of offshore platforms. The principal statutes follow, each with a functional description of provisions related to disposition:

- Outer Continental Shelf Lands Act (OCSLA). The act gives the Department of the Interior broad authority to manage all aspects of the oil and gas leasing program on the OCS. It gives the Coast Guard authority to regulate in the interests of safety of life and property on OCS installations. The act extends to OCS installations the authority of the U.S. Army Corps of Engineers to prevent obstruction to navigation in U.S. navigable waters, established by the Rivers and Harbors Act of 1899. OCSLA applies the laws and jurisdiction of the United States to the OCS and installations attached to it, and to the

extent applicable and not inconsistent with federal law, the act applies the civil and criminal laws of each adjacent U.S. state.

- Marine Protection, Research, and Sanctuaries Act of 1972. The ocean dumping statute is discussed in the preceding section.
- Ports and Waterways Safety Act. The act gives the Coast Guard broad authority to control marine traffic and designate fairways and traffic separation schemes.
- National Fishing Enhancement Act of 1984. The act establishes national standards for siting, construction, and monitoring artificial reefs. It requires the Corps of Engineers to assure that title to reef material is unambiguous and that maintenance responsibility and financial ability to cover future liability is established. The act declares a permittee not liable if cause of damages or injury results from terms and conditions of permit and the permittee is in compliance.

Many other provisions of federal law would apply to the family of alternatives for disposition of offshore platforms.* The Coast Guard has the responsibility and enforcement powers to assure that obstacles to navigation are properly marked. Title III of OCSLA and other pollution liability and compensation laws prescribe strict liability for oil spill damage and clean-up. Navigation of the tug and tow laden with platform parts is governed by the Regulations for Preventing Collisions at Sea and other rules with the force of law designed to enhance the safety of such operations and to protect others navigating nearby. These requirements of law are noted here not only to fill in the picture somewhat, but also to emphasize that each step of any disposition alternative involves duties and obligations and a consequent risk of liability under statute or regulation if those duties and obligations are not met. This sort of liability may involve payment of damages or a civil penalty, and, in certain instances, a criminal penalty may be involved.

The alternatives for disposition also involve liability under the law of torts. To complicate the picture, state law (made applicable by the OCSLA) or admiralty and general maritime law may apply, depending on the facts and circumstances in a particular case. If harm were to occur as the result of the presence of a platform, wherever and however located in the sea, tort principles of negligence, trespass, nuisance, and unseaworthiness might be relied upon by the injured party to bring suit against the owner of a platform or platform

* The National Environmental Policy Act of 1969 requires an environmental impact statement (EIS) to be filed with "every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment" [42 USC §4332 (C)]. Accordingly, any legislative or regulatory proposal substantially to alter the rules governing removal of offshore platforms would entail either preparation of an EIS by the sponsoring agency or a formal determination that no EIS is required.

materials in the appropriate court.*

A previous owner of a platform could not be protected in all circumstances from becoming a defendant. This aspect of liability, i.e., liability after title has passed, is obviously of great concern to present owners of platforms as they contemplate the disposition alternatives. A statute such as the National Fishing Enhancement Act can help, but where a platform is left in place (in whole or in part), the terms and conditions of the artificial reef permit would need to be very specific and comprehensive to afford to the donor the protection from liability contemplated by the act. In short, complete invulnerability in these circumstances to assertions of legal liability is virtually impossible to achieve.

LEGAL LIMITATIONS ON PLATFORM DISPOSITION

This review of legal issues leads to some general conclusions:

1. Any transportation of platform materials from the production site to another location involves observance of all applicable rules for safe navigation. (In this context, the term "transportation" includes removal operations on site and offloading operations at the new location.) This obvious fact is important because risk of liability, as well as costs, attaches to transportation. The risk, as the costs, will be borne by the party holding title as well as by others associated with the move, unless contractually placed elsewhere through indemnification.
2. Where disposition of a platform is to be at sea and involves no new use, a dumping permit will be required from EPA. This will apply regardless of the location of disposal.
3. If platform materials are to be used as an artificial reef, a permit from the U.S. Army Corps of Engineers will be required. The Corps and the new owner will have to meet strict statutory requirements before the permit may be issued.
4. Any disposition at sea will involve meeting two requirements set by the Coast Guard to protect the safety of navigation: (a) sufficient clearance between the surface of the sea and the highest projection above the seafloor, and (b) marking by suitable aids to

*In Wyandotte Transportation Co. v. United States, 389 U.S. 191, 88 S. Ct. 379, 1967 AMC 2553 (1967), the Supreme Court rejected the argument that nonstatutory law establishes the rule that one who has negligently sunk a vessel (and, presumably, any other object) may abandon it and be insulated from all but in rem liability. The same principle would apply a fortiori where the sinking had been intentional. The Wyandotte case actually involved interpretation of 33 USCA 409. The annotation to that statutory provision provides interesting reading. The court's decision put an end to the principle that abandonment of a wreck terminates the risk of liability.

navigation as determined to be necessary according to the depth of the highest projection.

5. Any disposition at sea will have to meet Coast Guard requirements involving sufficient horizontal clearance from fairways and traffic separation schemes.
6. Existing international law as interpreted to be applicable to the United States requires complete removal of an installation at the conclusion of its useful economic life.* Any means of disposition involving leaving a platform on-site, in whole or in part, without subsequent dedicated use will require either a change in applicable international law or an interpretation of international law that would allow a change in present U.S. requirements.
7. Owners of platforms and platform materials put to new use would be subject to liability under traditional tort principles.
8. Liability of former owners of platforms put to new use could occur in some circumstances. This residual liability will be difficult to avoid with certainty, even with protections afforded under federal statute.

In light of these general conclusions, the legal limitations on the options for disposition are as follows:

- Option 1. Complete removal from site, with jacket severed below the mudline, and with all parts:

(a) transported to shore for scrapping or reuse

(i) risk of liability in connection with transportation
(b) transported to approved site for dumping

(i) risk of liability in connection with transportation
(ii) dumping permit required
(c) transported to approved site for use as artificial reef

(i) risk of liability in connection with transportation
(ii) permit required to place as artificial reef
(iii) requirements for depth clearance, aids to navigation marking, and horizontal clearance from fairways and traffic separation systems
(iv) principal and residual tort liability

- Option 2. Partial removal from site, with some parts left projecting above the mudline, and with parts that are removed handled as in (a), (b), or (c) above:

(a) parts left on site

(i) permit required either for dumping or artificial reef
(ii) requirements for depth clearance, aids to navigation marking, and horizontal clearance from fairways and traffic separation systems

* This requirement is enforced on the U.S. outer continental shelf by the Minerals Management Service of the Department of the Interior. It may be assumed that any new rules governing disposition would be similarly enforced as to the original installation site.

(iii) principal and residual tort liability

(b) parts removed: see Option 1, (a)–(c)

- Option 3. Toppling or dismantling in place:

(a) permit required either for dumping or artificial reef
(b) requirements for depth clearance, aids to navigation marking, and horizontal clearance from fairways and traffic separation systems
(c) principal and residual tort liability

- Option 4. Leave on-site in the original upright position for use in some capacity other than gas or oil exploration and production:

(a) permit required for artificial reef or, as appropriate, for other designated purpose
(b) requirements for aids to navigation marking and horizontal clearance from fairways and traffic separation systems
(c) other requirements to safeguard life and property
(d) principal and residual liability

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5

Environmental Considerations

The installation and operation of offshore platforms has attracted environmental attention for almost 40 years. From a historical perspective, concerns, whether focused on the issue of offshore leasing or on the environmental effects of drilling and production operations, have been addressed through the regulatory process and environmental law. Environmental concerns associated with the disposition of offshore platforms are relatively new since only a small number of structures have been removed. To define the consequences and concerns, leading spokesmen from environmental interest groups were surveyed,* and public comments were obtained by the Minerals Management Service (MMS) on the committee's behalf (see preface and Appendix B).

Disposing of offshore structures results in both positive (enhancement) and adverse (disruption) environmental impacts. The positive impacts are related to potential fisheries aggregation and enhancement values of structural elements left in the marine environment. Potential adverse concerns include continuing navigational risks (which could lead to pollution damage) as well as the appropriate cleaning of structures, their physical removal, resulting bottom clean-up, the logistics associated with transport, and ultimate disposition. While each of these potential impacts is a subject of environmental concern, properly executed disposition was not cited as a major problem by those surveyed. Indeed, commentors expressed as much concern for

* Records of the following telephone conversations are in committee files. Randy Lanctot, Louisiana Wildlife Federation, 5 December 1984; Marsha Rockefeller, Massachusetts Aububon Society, 5 December 1984; Herman Rudenberg, Lone Star Chapter, Sierra Club, 5 December 1984; Hal Scott, Department of Interior OCS Policy Advisory Committee, 21 December 1984; Sharron Stewart, Texas Environmental Coalition, 21 December 1984; Michelle Perrault, Sierra Club, 13 January 1985; Sarah Chasis Natural Resources Defense Council, 17 January 1985; Ralph Rayburn, Texas Shrimp Association, 25 March 1985; and David Hickok, Alaska Environmental Information Data Center, 27 March 1985. See also letters from Sarah Chasis dated 26 April 1985 and David Hickok dated 30 April 1985.

habitat loss as for all other impacts associated with disposition. This probably reflects the regional perspective of the activity in the Gulf of Mexico.

Environmental concerns were expressed as to the mortgaging of future opportunities at the expense of simple or cost-effective platform removal options. For example, deep-water disposal was generally considered shortsighted, recognizing potential future impacts on other ocean users. Toppling in place received similar expressions of concern, because reviewers were reluctant to make the ocean a "junkyard." While disposition options received a broad array of environmental expressions, they were often regionalized, reflecting historical perspectives as well as the economic consequences appreciated by the respective respondents.

EFFECT OF OFFSHORE PLATFORMS ON BIOLOGICAL RESOURCES

When offshore structures are installed, they are colonized by a diversity of marine life. These may include barnacles, oysters, mussels, bryozoans, sponges, and (in subtropical or tropical waters) corals. These organisms attach and grow on the structure and provide a source of food and habitat for many invertebrates and fishes. Collectively, these life forms comprise the structure's biofouling community (Galloway and Lewbel, 1982). This community typically supports an assemblage of pelagic and demersal fishes that, in certain circumstances, has implications for recreational and commercial fisheries.

A diversity of fishes can be associated with offshore structures. As Galloway and Lewbel point out:

> The available data and information about these characteristic fish assemblages seem to indicate that they are more dictated by the physical factor of substrate than by biological interrelationships. If this is true, the fish assemblages associated with petroleum platforms are not true biological communities, but rather only flexible confederations of species loosely allied by a similar environmental requirement or preference, i.e., the presence of structures.

The fisheries aggregation and enhancement values of offshore oil and gas structures are well recognized in the Gulf of Mexico region. Interests outside the Gulf of Mexico region, however, have questioned these enhancement values in their respective regions. For example, state agency officials on the east and west coasts generally consider oil and gas structures as obstructions to navigation and commercial fishing interests, and take positions that protect these traditional industries. The diversity of regional perspectives is perhaps a reflection of the historical experiences of commentators as well as the uniqueness of regional fishery resources.

Petroleum platforms in the Gulf of Mexico serve as aggregation

points for large numbers of fish of many species. However, the extent to which this aggregation increases exploitation (greater catch per unit of effort), possibly to the point of overexploitation, is of concern to fisheries managers. Where reefs enhance fisheries, management regimes are necessary to avoid this possibility. States with active offshore development (i.e., Louisiana and Texas) are now concerned that when production ceases, they may lose valuable fisheries habitat (in place or emplaced elsewhere) and are working to identify critical habitat areas. Some states bordering the Gulf of Mexico, including some without offshore oil and gas development, are working to secure obsolete structures for deployment as artificial reefs off their coasts.

ENVIRONMENTAL RAMIFICATIONS OF DISPOSAL OPTIONS

Complete Removal With Disposal Onshore

When a structure is removed from the OCS, as under current regulations, organisms that have attached and grown on the structure are destroyed. Also, the substrate that has attracted important recreational and commercial fisheries is lost. As these losses occur, the fish are attracted elsewhere for food and shelter. Fishermen likewise must seek new fishing locations that are within their operational constraints. The significance of these losses is perhaps best understood in light of a proposal several years ago to have the Shell Oil Buccaneer Field designated a marine sanctuary. Though the associated marine life is attached to the man-made structures, the reef-like communities are comparable to natural reefs and, it can be argued, worth keeping as a sanctuary area. During onshore dismantling operations, there is the possibility of air pollution and environmental degradation. There are opportunity losses, as well. At a time when suitable reef materials are in short supply, onshore disposal eliminates the possibility entirely that these materials can be used as reefs.

There are, however, gains associated with onshore disposal. Not the least of these is the removal of a potential hazard to navigation. When the structure is removed for transport to shore, the bottom is to be restored so that trawl fisherman can again make use of the site without the prospect of destroying their nets. If the structure was in an area once heavily used for trawling, this gain can be an important benefit. The “remove to shore” alternative is almost universally favored by environmental interests located outside the Gulf of Mexico area who reject the reef benefits of structures as not relevant to circumstances in their regions. This option is also favored by fishermen who use new gear types that may be adversely affected by underwater obstructions. Included here are such items as bottom longlines, deep-water traps, and underwater trawls. Some of this gear may be used in depths as great as 1,000 meters.

Ocean Dumping of Obsolete Structures

A letter to the committee from the Environmental Protection Agency (EPA) states that the EPA has a policy of recycle and reuse of offshore platforms.* This includes the options of onshore disposal (with recycling of salvaged materials) and the use of platforms as artificial reefs once removed from the production site. Ocean disposal of offshore platforms has to date only been permitted where safety is an issue or there has been an emergency. In February 1984, for example, EPA issued a permit for ocean disposal of a platform that had been damaged as the result of collision with a tanker in 1980. The current practice, therefore, is to place the burden of proof on the platform owner to demonstrate why reuse and recycling are not feasible, that the public safety is threatened, and that there is good and sufficient reason for ocean disposal as an alternative of last resort. However, the letter from EPA does state, "We are considering a general permit for those platforms or jackets damaged by storms or collision, etc. and [which] are creating a hazard to navigation as determined by the Coast Guard and/or the Corps of Engineers, and [for which] disposal in a better location would be more advantageous."

Environmental spokesmen generally opposed ocean dumping of obsolete platforms, or they expressed caution because of a lack of information. Most viewed it as misusing the ocean as a "junkyard" and saw platform disposal as a bad precedent. They were deeply concerned with safety and navigation hazards because of the potential environmental harm that often accompanies accidents. Consequently, there was little support for ocean dumping of structures except as an emergency provision. Those who believe that artificial reefs are in the public interest argued that dumping is a poor use of materials that could otherwise be used as reef building material.

Ocean dumping is regulated under the EPA Ocean Dumping Regulations and Criteria (40 CFR 220–229), as has been described. Specific environmental concerns are addressed through requirements for siting, predisposal cleanup, and monitoring. The general concern about conflict with other ocean uses is not so easily addressed. The practice of ocean dumping, even if carefully sited and controlled, could preclude future deep-sea mining and fishing activities, for example.

A related point of interest is the disparity in the environmental policy and requirements that apply to the disposition of offshore structures as compared with those that apply to the disposition of obsolete ships. A general permit for the ocean disposal of obsolete ships is in effect (40 CFR 229.3). The terms of the permit require that (except in emergencies) the dumper provide advance notice to the EPA, that the operation be supervised by the Coast Guard, and that the vessel be cleaned of possible pollutants. Other requirements of the

* Letter of 27 November 1984 from Tudor Davies, EPA to W. M. Benkert.

general permit pertain to the choice and charting of sites for disposing of ships and the method of sinking.

The Leave-in-Place Option

The leave-in-place option is not feasible given legal requirements for the removal of obsolete structures. There has been public support for this option as evidenced by an MMS notice of interpretation published in the Federal Register (Notice of Interpretation, 1983).

Generally speaking, when a platform is left in place the reef-like community that has developed on the structure remains to sustain fish populations at all levels in the water column. As substrate in the water column is removed, environmental benefits are lost. While the leave-in-place option is biologically appealing, there are questions as to who will bear the liability and funding responsibilities for maintenance. There are concerns about navigational hazards and a need to restore trawlable bottoms for commercial fishermen. Some of the environmental spokesmen were skeptical and saw the leave-in-place option as providing the oil and gas industry with unwarranted and uncompensated relief from a major (and costly) obligation.

Environmental spokesmen in the Gulf of Mexico recognized that existing structures provide important habitat benefits and that efforts should be made to perpetuate these benefits. While existing structures all provide substrate and a reef community to some extent, depending on the age and location of the structure, it is recognized that they do not all provide the same level of fisheries benefits. This was supported in a recent study by Ditton and Auyong (1984) which showed that all structures do not receive the same level of use. Some, because of their proximity to shore access points, are used more by recreational fishermen than others located further offshore.

A case can be made for limited application of this option in the Gulf of Mexico. The leave-in-place option would be appropriate in close proximity to an onshore recreational fishing access point (10 to 20 miles offshore) or where extensive recreational fishing use is documented. The exclusion mapping procedures developed by the Sport Fishing Institute (Anon., 1984) currently being implemented in the Gulf of Mexico with support from the National Marine Fisheries Service, are useful for identifying the structures that have the greatest probability of use and where conflict with other marine uses can be avoided. This option merits consideration to the extent that liability and maintenance issues are handled, conflicts with other uses of ocean space are avoided, and constituent support is demonstrated.

The Partial Removal Options.

The partial removal options are accompanied by the losses of substrate-related reef community and a diverse fishery. Though fisheries would continue to be enhanced to a limited degree, partial

removal in some instances would reduce the public benefits associated with recreational fishing activity. Only fishermen with radio navigation capability would be able to locate and fish the habitat, unless the artificial reef was marked with a buoy, which would need to be maintained. Commercial fishermen would likely be opposed to any removal options that would exacerbate the problem of bottom hangs and debris on the bottom. Under the partial removal option, there would either be little recreational fishing because of the distance from shore required to attain the necessary navigation clearance, or, in the case of structures closer to shore, there would be little profile remaining to support a diverse fish population.

The Topple-In-Place Option

When an obsolete structure is toppled, the resultant benthic reef would have a much less diverse fishery than previously when the structure was in place and provided substrate at all depths. The topple-in-place option could lead to a distribution of additional materials on the bottom that could lead to increased snagging of fishermen's nets. Commercial fishermen would favor the restoration of trawlable bottoms. Persons contacted by the committee with a knowledge of structures in the Gulf of Mexico and their associated enhancement benefits felt that the topple-in-place option could pose a hazard to navigation as well as problems for commercial fishermen. To the extent that toppling in place could be implemented judiciously following established procedures (Sport Fishing Institute, 1984) for artificial reef planning, this opposition could be overcome.

The Emplace Elsewhere Option

To date, there have been three cases where obsolete oil and gas structures have been removed, transported to a new location, and deployed as a reef for fishing enhancement purposes at a permitted site. Although there are environmental costs associated with the conversion of a standing platform to a benthic reef, there are numerous benefits as well if reef deployment is conducted in a well-planned manner. If platform reefs are sited on the basis of the best combination of physical, biological, social, and economic considerations rather than expedience, tangible benefits are likely. When a platform is removed and redeployed as a reef near a major population center or tourism destination in conjunction with a formal plan, economic benefits associated with increased recreation and tourism activity will be forthcoming for the adjacent community. The economic impacts associated with artificial reefs are well documented in the technical literature. Environmental spokesmen in the Gulf region favored this option because they were aware of the biological and economic benefits involved. They also appreciate the reduction of user conflicts that occurs as a result of the permitting process.

Environmental spokesmen outside the Gulf area generally rejected these benefits, primarily because of the lack of demand for reef development to enhance fisheries or because the concept was considered inappropriate to their regions. To the extent that obsolete structures are poorly sited as reefs and public use benefits are limited, it can be argued that this option is often little more than ocean dumping.

To avoid misuse of the emplace elsewhere option, the state of the art of artificial reef planning needs to be improved. In this regard there are several positive forces at work: (1) the recently passed National Fishing Enhancement Act (P.L. 98–623), (2) the National Artificial Reef Plan to be implemented as a result of this Act, (3) the work of the National Artificial Reef Development Center of the Sport Fishing Institute to rationalize the reef planning process, and (4) the general permit for artificial reef development recently developed in the Jacksonville, Florida office of the U.S. Army Corps of Engineers.

There appear to be fewer problems associated with the emplace elsewhere option. Liability problems remain to the extent that the reef deviates from permit requirements. Siting problems can be overcome through communication and negotiation in the permitting process. Funding still presents problems for the reef sponsor as well as the oil company with a disposal problem. Mechanisms are needed for funding reef maintenance in perpetuity. Likewise, oil companies need incentives above and beyond “good public relations” to implement this disposal option on a long-term basis. This option is likely to be pursued only to the extent that the cost to the structure owner for artificial reef development does not exceed the cost of other options.

REGIONAL CONSIDERATIONS

Support for reuse of offshore structures is limited primarily to the Gulf of Mexico because that is where the problems and the opportunities lie. There are no offshore oil platforms in the Atlantic OCS to date. While 14 platforms in Alaska state waters are approaching retirement, the waters themselves are heavily laden with glacial silt and subject to high currents.* The platforms do not support local fish populations, and there is no recreational fishery around them. Off California, the number of current and projected offshore platforms is small, in relation to the Gulf of Mexico. Thus, the size of the recreational fishery that targets the platforms is also much smaller. It should be noted, however, that at least one company harvests mussels off California platforms for sale to restaurants.

Decisions on ultimate disposition should properly reflect environmental benefits and costs on a case-by-case basis. Where intensive

* Letter and attachment from David M. Hickok, Alaska Environmental Information Data Center, to C. A. Bookman, Marine Board, dated 30 April 1985.

recreational fishing use can be documented (and where there are no other structures available to attract fish), where important regional economic impact losses are foreseen due to removal, and where constituent pressure is brought to bear, alternatives to onshore disposal should be considered. Competing uses of the area for commercial fishing and navigation need to be fully considered as well. For the foreseeable future, the colocation of aging platforms with this combination of circumstances is found only in portions of the Gulf of Mexico. Under other circumstances in other regions, it may be appropriate to consider innovative uses of obsolete platforms--for example, for weather observation, mariculture fisheries, and research.

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6

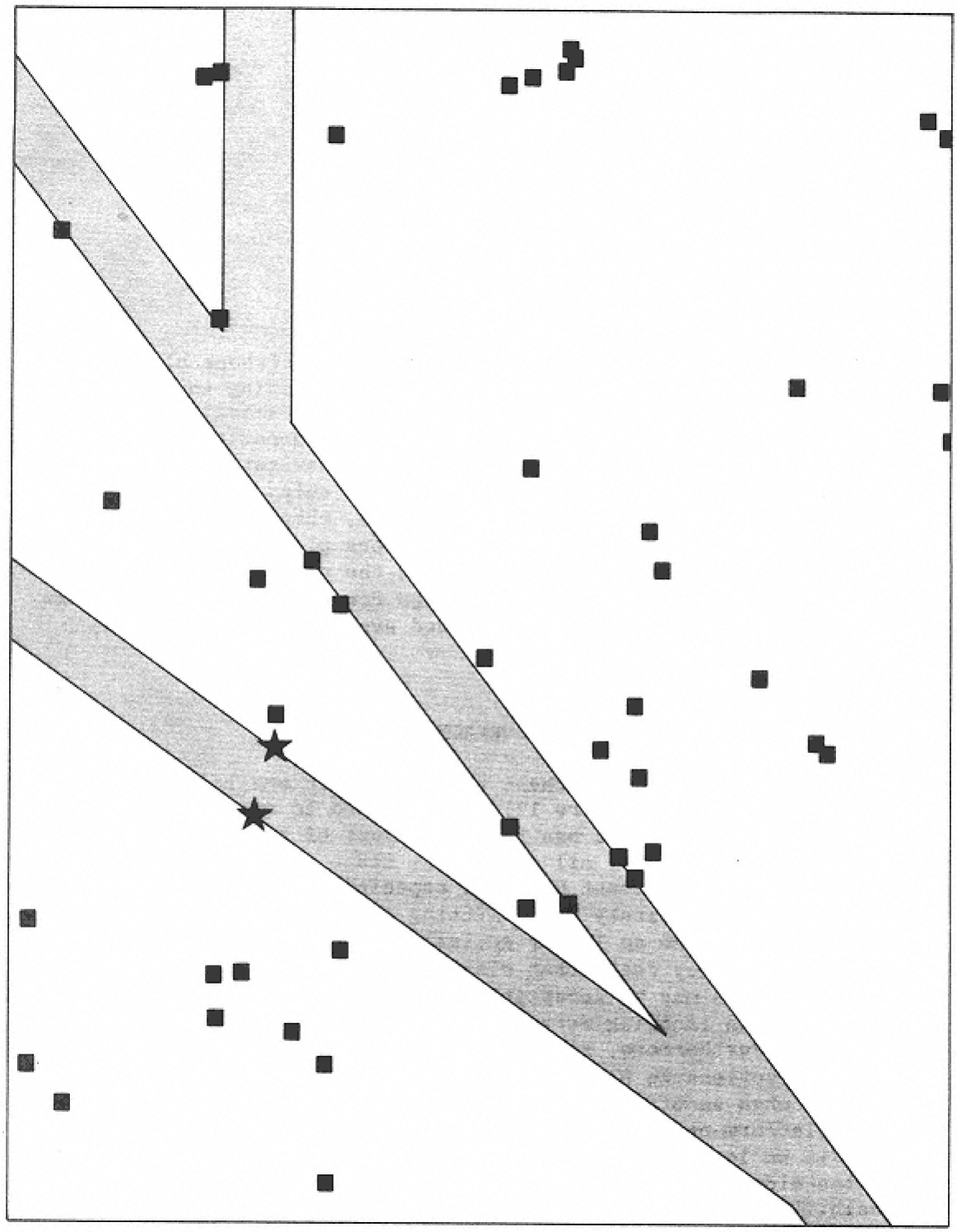
Safety

Safety issues attendant to the disposition of offshore platforms include concerns about the safety of vessels navigating in the vicinity of structures and the safety of platform removal operations. Navigational safety issues are an important consideration. If offshore platforms are a significant hazard to navigation (as demonstrated by the incidence of collisions of ships with platforms and as supported by estimates of probability), then safety concerns weigh in favor of completely removing offshore platforms from the ocean at the end of their useful life. On the other hand, if the platforms aid navigation or provide refuge for small boats, then some will argue that they should be maintained even after petroleum production has ceased.

HAZARD TO SURFACE NAVIGATION

Offshore platforms and merchant vessel traffic are in close proximity in many areas (see Figure 12). The hazard to surface navigation posed by offshore platforms has been a subject of keen interest to ship operators and owners, oil companies, state governments, and federal agencies. The Coast Guard is especially concerned about the threat to navigation safety of permitting offshore platforms to remain in place when they are no longer actively being used to produce oil and gas.* The agency feels that risks to navigation and the environment, which may be acceptable when the national interest in energy production is being served, may not be justified when production ceases. Furthermore, since the Coast Guard is responsible for marking obstructions to navigation, Coast Guard officials are concerned that when an offshore platform has been negligently maintained, when the platform operator's identity is ambiguous, or when the operator is no longer financially able or willing to maintain navigation aids on structures, the Coast Guard will inherit these responsibilities by default. In their view, these eventualities, and

* See Coast Guard response to Federal Register (49FR44924, 13 November 1984). Letter no. 16670. RIGS, 7 December 1984.



Note to Figure: Extract from navigation chart 11340. Note designated shipping fairways to Lake Charles, La., Port Arthur, Tx., and Galveston, Tx. (and Houston ship channel). The shipping fairway is bracketed by a confusing array of offshore platforms. One platform, located at a branch in the fairway, has a radionavigation aid. Two platforms adjacent to the fairway were struck by large, deep draft ships in the 5-year period 1980-1984.

Figure 12
Proximity of offshore platforms and merchant vessel traffic.

TABLE 6 Hazard of Offshore Platforms to Surface Navigation in the Gulf of Mexico

Type of Data	Amount	Source[a]
Number of platforms to 1983	4,078	Committee data
Major structures[b]	1,645	Minerals Management Service
Estimated average number of new platforms per year (through 1990)	205	Committee estimate
Major complexes	78	Committee estimate
Gulf of Mexico port calls (measure of ship traffic, 5-year estimate)	52,000	Merchant traffic, draft 19 feet or greater[c]
Galveston	17,000	
Collisions (1980–1984)		
Large, deep-draft ships	5	U.S. Coast Guard, 8th DIST.
Offshore industry support craft	27	CORR. No. 16613, 1/30/85
Fishing vessels	6	
Towboats or barges	15	
Unknown	2	

[a] These data are comparable to those used in a study of ship collisions with offshore platforms containing a method, applied herein, for estimating the probability of collision (Failure Analysis Associates, 1978).
[b] Major structures are defined by the Minerals Management Service as those having at least two pieces of production equipment, six drill slots, a heliport, or permanent quarters.
[c] Data from Waterborne Commerce of the United States as published in Marine Salvage in the United States (NRC, 1982).

the liabilities and accidents that will ensue, will be much more likely if obsolete platforms are allowed to remain in place.

Most of this concern is centered in the Gulf of Mexico, where 99 percent of all offshore structures are situated. However, navigation safety is a major concern in other regions of offshore oil and gas activity as well, especially the Santa Barbara Channel.*

Data on the number of offshore platforms, collisions of vessels with platforms, and ship transits are available to describe the historical situation and estimate the probability of collision in the Gulf of Mexico. These data are presented in Table 6 and Figure 13.

* In at least one instance, a ship handling simulator has been used to study the interactions of offshore petroleum structures and the navigation of large vessels (Nieri, 1981).

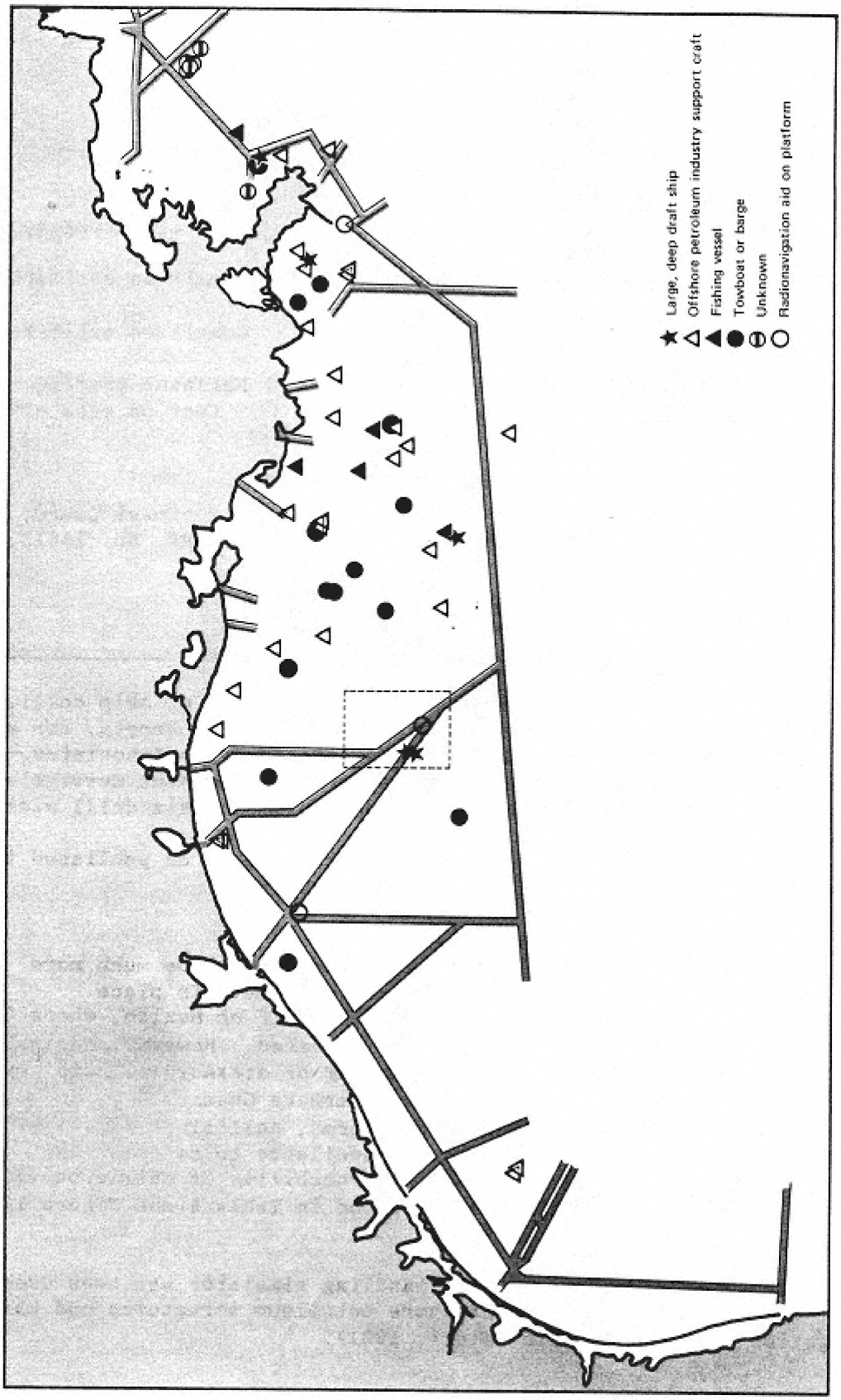


Figure 13
Collisions of ships with offshore structures, Gulf of Mexico.

Because of the magnitude of potential consequences, the committee was interested in the probability of collision of deep-draft ships with offshore platforms. The committee employed a method of estimating the probability of collision that had been applied to the problem in a previous study (Failure Analysis Associates, 1978). The probability of collision outside established traffic lanes is 3.3×10^{-4} platform years, or one collision in 3,000 platform-years. Within 1 mile of an established traffic lane, the probability of a large vessel collision is 2.86×10^{-2}, or 1 collision in 35 platform-years. A 1977 study for the Coast Guard estimated the probability of collision in the Santa Barbara Channel at 1 in 8,000 platform-years (Reese et al., 1977). Intuitively, the probability of collision increases as the number of offshore platforms increases.

HAZARD TO SUBMERGED NAVIGATION

The operating population of submarines is quite different from surface ships. Submarines are sophisticated ships with a wealth of electronic and visual navigation equipment at the beck and call of the operators. Submarine crews are highly trained and always operate with several men on watch. Further, the ever-present threat to submarines in confined waters has engendered an operating doctrine that puts the submarine on the defensive, prepared to react quickly to avoid collision.

U.S. Navy operating doctrine generally requires that submarines submerge on sortie as soon as water depth permits. This, of course, is subject to modification if hazards to navigation are numerous, for example, where the combination of platform density and visibility increases the risk of collision to an unacceptable degree.

Submarines operate in all areas of the world oceans. To suggest that submarines would rule out a particular area, such as the North Sea, as a wartime patrol zone is to underestimate the guile of the submarine commanding officer, or to oversimplify the realities of war planning. The committee, therefore, considers the entire North American littoral as a potential submarine operating area. In short, with few exceptions, areas where platforms exist, or where they may appear, including the Arctic, are potential submarine transit or operating areas.

The foregoing suggests that submerged submarines are less at risk to collision with a platform than the average merchant ship, and certainly less than the numerous small craft that ply platform waters. Surface warships are also likely to be less at risk than merchant ships, as the result of operating doctrine.

The committee is not aware of any reports of submarine collisions, submerged or surfaced, with offshore platforms in more than 30 years. This is understandable since submarine operating doctrine generally is to avoid operating in proximity to fixed structures. The worldwide population of submarines is known. There are about 1,000 of all types, nuclear and diesel. About 140 of these belong to the U.S. Navy. However, information on submarine traffic is not available.

Thus, the aforementioned analysis of collision probability cannot be meaningfully extended to the submarine problem.

PLATFORMS AS AIDS TO NAVIGATION OR HAVENS

Do offshore platforms help or hinder mariners? Do they augment aids to navigation to a degree that suggests they assist the mariner significantly? Do they provide a haven for small craft in bad weather? Or do they present a collision hazard that outweighs any positive answers to these questions?

Navigation Aids.

Where ship traffic or platform density warrants, the Coast Guard has authority to establish navigation fairways or traffic separation schemes. These are charted routes that ships are expected, though not required, to follow in congested areas. There are several instances of these traffic control schemes being instituted to improve navigation safety in areas of offshore oil and gas production.* Several platforms located in strategic positions close to traffic control schemes are used by the Coast Guard for siting visual and radio navigation aids.

The Coast Guard will not assume responsibility for maintaining an obsolete platform solely because the platform is being used as a site for a navigational aid. In presentations and letters to the committee, the Coast Guard made it very clear that navigation aids were placed on platforms as a matter of convenience or, rarely, to ensure the electronic visibility of the offshore structure upon request of the operator of the structure. When an offshore petroleum field becomes obsolete and structures are removed, the necessity of traffic control in that area is lessened. Maintaining structures simply as sites for navigational aids is not cost-effective.

Another concern, arguing for platform removal, is that a dense population of offshore platforms, which would be more likely if obsolete platforms were not removed, reduces the Coast Guard's flexibility for realigning traffic control schemes to address future developments. If structures are permitted to remain in place as offshore leases expire, and new structures are located in the area, there may be no areas into which traffic routing systems can be shifted to allow for other future uses of some offshore areas.

Navigational safety concerns for small craft, less than 500 tons, are different. These include offshore petroleum industry support craft, tow boats and barges, fishing vessels, and recreational craft.

* U.S. Coast Guard District 11, letter no. 16711 dated 5 November 1984, to the committee. U.S. Coast Guard District 8 presentation to the committee on 7 January 1985.

Traffic control schemes service large commercial vessels and ports, and may be incidental or irrelevant to small vessels. Small vessels also are likely to have less extensive navigational equipment on board (possibly just a compass and the human eye). They may travel on random tracks, including line of sight from platform to platform. For this class vessel, every navigational aid and offshore structure helps to get from point to point. Some small vessel operators would opt for leaving platforms in place. Platforms scattered generally throughout a sea area, as in the mid-Gulf of Mexico or the North Sea, are especially useful as navigational aids for small vessels because there may be no conventional aids nearby.

Platforms as Havens

Sometimes small craft are caught at sea when the weather turns. Occasionally, they take refuge at or in the lee of offshore structures (even though insurance rules typically prohibit uninvited guests on offshore platforms). While the Coast Guard does not keep records of such incidents, isolated instances of mariners taking refuge on or in the lee of offshore structures are acknowledged by offshore platform operators, vessel operators, and the Coast Guard.

Another view is that the very existence of offshore platforms far from land tempts some sport fishermen away from the protection and more benign conditions closer to shore.

HAZARD TO PERSONNEL IN DISMANTLING OFFSHORE PLATFORMS

As discussed in an earlier chapter, the work involved in dismantling and removing an offshore platform is comparable to the installation of the platform. However, the risks to workers will be somewhat greater because of uncertainties as to the condition of the platform and the strains in the structural elements. Good planning and cautious operations will minimize risks. The total worker safety risks will vary directly with the number of individual worker actions, the time necessary to carry them out, and the water depth at which they occur. Thus, the safety risks will be greater for dismantling and removing a large complex structure in deep water that cannot be removed as a single unit and for full removal of such a structure as compared to partial removal.

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7

Naval Operations

INTRODUCTION

The Department of Defense (DOD) is concerned that a proliferation of offshore platforms left in the marine environment after their useful life will adversely affect national security by constraining offensive and defensive naval operations. To fulfill its mission, the Navy must have the freedom to utilize the seas, both surface and subsurface. Safety of navigation is of critical concern. From a defensive perspective, the Navy must also be concerned with detection of unfriendly forces off U.S. coasts. Offshore installations complicate that mission because of their acoustical saturation of the water column and the restrictions they inherently place on the mobility of U.S. seaborne forces. The DOD has conveyed its concern and position to the oil and gas industry by producing a draft "Minimum Standards for the Removal of Offshore Structures and Installations" (see Appendix C). These draft standards are intended to influence industry practice, domestic regulation, and the development of international guidelines within the International Maritime Organization (IMO). Since the DOD has no direct decision-making role in any of these fora, as a practical matter the draft DOD standards set forth a negotiating position. The committee assessed the DOD position itself, considered its operational implications (if implemented), and also considered the international implications of the position.

THE DOD DRAFT STANDARDS

The DOD draft standards have been promulgated for interagency and industry consideration and are intended for ultimate submittal to the IMO. The most significant platform removal provisions of the standards are:

a. All fixed structures utilized in the Exclusive Economic Zone or on the continental shelf shall, as an essential component of their design, provide for their effective and expeditious removal.

This design provision is intended to impact mainly on the new generation of platforms which have increased dramatically in size as industry has moved further offshore into deeper and often rougher water. Platform design has therefore evolved over the years to the extent that the removal process has received increasing visibility. Small platforms in relatively shallow water, which can be lifted intact, do not demand unique design characteristics to permit removal.

b. It shall be the obligation of the coastal state to require that the corporate entity, individual or government under whose control the structure existed, ensure that it is removed and disposed of when no longer used for hydrocarbon recovery.

   This provision is consistent with existing international law in that the nation that exercises resource jurisdiction in the area of the platform bears the ultimate responsibility for ensuring compliance with international removal standards. However, it would appear that this is a strict interpretation of the law, which could run counter to developing international practice (see Chapter 4).

c. In order to maintain an environment suitable for all forms of navigation and other uses of the sea, removal shall be to within 5 meters above the seafloor in waters less than 400 meters, to within 15 meters above the seafloor in waters less than 2,000 meters and greater than 400 meters.

   This apparent relaxation of removal standards may not be that. Current law and practice results in removal of structures approximately 5 meters below the mudline. Cutting at 5 meters above the seafloor, (or 3, 20, or 40 meters) may be more difficult and dangerous. (The proposed DOD standards would of course permit continued cutting below the mudline if that option is preferred.) In deeper water, toppling of platforms has been considered an alternative. It is unlikely that platforms currently on the disposal list would meet the DOD 15-meter limit in the toppled condition unless additional portions of the jacket were collapsed or removed. If industry were to come forward with reasonable alternative depth removal figures that would still protect U.S. submerged mobility and security concerns, the DOD would be open to discussing them.

d. All structures not entirely removed shall at a minimum be modified to the above height and depth standards, shall be indicated on marine charts prepared by the coastal state, and under guidelines provided by IMO, appropriate publicity shall be given regarding the depth, position, and dimensions of any installations or structures not entirely removed.

This requirement is similar to accepted practice for providing notice of wrecks and submerged obstructions.

e. Nothing shall preclude any coastal state depositing concentrations of removed structures in special areas for living resource sanctuaries or related purposes so long as such placement does not interfere with navigational and other nonfishing activities.

This provision is in accord with the Law of the Sea Convention provisions concerning the rights and privileges of coastal states in the exclusive economic zone.

f. Except in archipelagic sealanes and in international straits, nothing shall preclude the coastal state, in its territorial sea (up to a limit not exceeding 12 nautical miles) or in waters less than 20-meters in depth, from permitting exemptions from these provisions.

This provision recognizes the increased discretion of the coastal state in its own territorial waters to adopt more lenient standards (except in international navigation routes, such as straits and archipelagic sealanes, where the interests of the international community continue to control). The 20-meter depth exemption, which pertains to the continental shelf, takes into account the fact that in such shallow areas certain forms of navigation are restricted in any event (e.g., unsafe for submarines submerged or for deep-draft vessels), and thus, removal standards may be less stringent.

IMPLICATIONS FOR SUBMERGED NAVIGATION

The partial removal criteria under discussion essentially rule out collision between a surface ship and the platform residual material. There remains the operational concern of submarine collision.

Platform bases may cover a few hundred feet on a side. They are comparable in size to another submarine, but when considered from a “density” viewpoint--that is, structure volume or area per square mile--the obstruction represents less than 1/2 of 1 percent of the area. A discussion of density, however, does little to assuage a submarine operator's safety and security concerns, even if low risk of collision does exist (see Chapter 6). Accordingly, U.S. Navy Submarine Force practice prohibits submerged operations within a radius of 5 nautical miles of fixed offshore platforms. This means that each platform reduces the area available for submarine operations by as much as 80 square miles, depending on the density of platforms.

The most practical and widely used underwater detection system for avoiding collision is sonar. Platform residuals present an effective target to certain types of sonar and may not be visible to other types

designed for totally different missions. The typical platform target is a collection of hollow pipes with considerable space between them. In addition, it is on the ocean floor, returns from which may effectively mask target echoes. Lastly, it is not a moving target, and thus presents no doppler distinguishing echoes.

Principal active submarine sonars are designed for search and detection of other submarines and surface ships. They are relatively low frequency, low resolution (related to detectable object size), and long range. In brief, platform residuals and principal submarine sonars are not especially compatible. Irrespective of performance, submarines do not customarily use their principal sonars in an object avoidance or navigation obstruction role. Furthermore, other sonars designed for shorter range, smaller object detection are not routinely used. Any active sonar compromises the position of the submarine, contrary to its mission to run silent and avoid detection. However, should submarines chance to operate in areas where partially removed platforms exist, it is reasonable to expect they might use their fathometer to maintain sufficient altitude to remain clear of residuals.

DISPOSITION OPTIONS

The DOD draft standards are not specific with respect to actual platform disposition except that they recognize the permitting of platforms as artificial reefs. Whatever the ultimate disposition of the structure, whether removed to shore, emplaced elsewhere, or ocean dumped, the DOD draft standards would apply. They would require that no residual material be left that is higher than 5 meters or 15 meters; that artificial reef permitting procedures be adhered to; and that ocean dumping must be in deeper depths than 2,000 meters if structure size is greater than 15 meters in any dimension.

The DOD draft standards do not specifically address the options of toppling in place, but if the residual material meets the maximum permissible heights off the bottom, and other constraints are met (e.g., charting) toppling would appear to be consistent with the draft standards.

However, the large size of complex platforms, which would most likely be selected for toppling (as a cheaper removal alternative), makes it all but certain that additional dismemberment would be required either prior to the toppling or after the structure is lying on the seabed. This added demolition or cutting cost militates against toppling as the disposition choice.

It appears, then, that the DOD draft standard and the disposition matrix are compatible only in the complete or partial removal categories, unless industry and DOD can agree on somewhat modified depth standards to allow for toppling.

INTERNATIONAL IMPLICATIONS.

As discussed elsewhere in this report, removal standards are likely to be the subject of discussion at the Intergovernmental Maritime Organization in the relatively near future. Formulation of a U.S. position for presentation may perhaps take some time because of the complexity of this issue and the varied approaches being taken by responsible agencies and affected interests. The Department of Defense proposals on removal standards will be an important contribution in the process of preparing for IMO negotiations.

The United States will be well served by the achievement of international agreement on standards that are acceptable to this country. In anticipation of difficulties in negotiations to accomplish that result, interagency coordination and discussions on removal standards should begin promptly, with the Department of Defense as an active participant.

8

Alternative Policies for Disposing of Offshore Platforms

As discussed in Chapter 4, the United States may have the flexibility within international law to develop, adopt, and administer rules for platform disposition that address the unique concerns of the U.S. outer continental shelf (OCS), especially the large number of aging platforms of relatively modest size in the Gulf of Mexico. In summary terms, the rules or policy can take one of two alternative forms: (1) The government can implement a literal interpretation of the 1958 Convention on the Continental Shelf and require that all platforms be removed at the end of their useful life. Current U.S. policy approximates this in that there have been very few exceptions to this rule, and all exceptions have been specifically permitted uses. (2) Alternatively, the government can implement a discretionary policy, determining whether platforms should be kept or removed on a case-by-case basis in accordance with accepted criteria. Such a policy of coastal state discretion is consistent with one of the main themes of the new Law of the Sea Convention, under which coastal states have new-found rights in the exclusive economic zone. Following is a summary assessment of the alternatives.

STRICT REMOVAL POLICY

A strict removal rule would be predictable in that it would maintain the existing order. Moreover, it would be acceptable from the maritime safety standpoint and also from the standpoint of naval operations. User groups favoring strict removal will include commercial fishermen who want to reestablish bottom areas for trawling, as well as minimize any obstruction that could entangle mid-water trawls, bottom longlines, trap gear, and other equipment.

A strict removal policy is not compatible with alternative uses of platforms, such as fishing reefs for enhancement purposes. Also, some platforms--up to 7 percent of the total (Categories IV and V)--will be very costly to remove, while the public benefit from their removal is marginal. Another factor arguing against a strict removal policy is the fact that a few platforms, especially subsea template foundations

and North Sea-type concrete gravity-base structures, will be very difficult to remove. A strict removal policy would generally eliminate negotiated solutions and the economic efficiency they may provide.

A DISCRETIONARY POLICY

Two approaches to a discretionary policy are suggested for the sake of completeness. In the first approach, the government would empower each owner to make his own removal decision. In the second, the government would make decisions on the disposition of offshore platforms on a case-by-case basis; it would require that some platforms be removed and would allow others to be kept on the OCS in accordance with accepted guidelines.

Owner Discretion

With this alternative, platform removal decisions would be made by the owner on an economic basis. The underlying assumption is that if the location of the platform is deemed acceptable from navigation safety, environmental, and naval operations standpoints at the time of installation, then leaving the platform in place for an indeterminate length of time is not a public concern.

A policy of owner discretion runs counter to the state of practice in the United States and other countries, as well as international law. However, such a policy is conceivable in countries where the government has significant ownership interests in offshore platforms. A major difficulty with such a policy in the United States is that it does not take into account public interests such as marine environmental protection and safety.

The effect that such a policy would have is not clear. Since the owners would still be liable for platforms, it is likely that many platforms would continue to be removed. At best, the net effect of the policy is unpredictability concerning platform removal. At worst, there could be a proliferation of abandoned platforms, which could adversely affect public safety. Ultimately, the government could inherit a great deal of unwanted liability.

Government Discretion

This alternative calls for removal decisions to be made by the government on a case-by-case basis. To be equitable, determinations would have to be made in accordance with guidelines that would be adopted in advance both nationally and internationally.

Such a policy of government discretion appears to be consistent with the practice of other countries and emerging international law. It would enable the dedication of platforms to alternate uses. It would also allow exceptions to the complete removal to shore for a few of the largest deep-water platforms, where few or no public benefits would result.

For the majority of U.S. platforms--Categories I–III comprise 93 percent of the total--the ultimate disposition would still be removal to shore because it is less costly to remove to shore than to address the residual liability if the platform is left in place; it is difficult to obtain permission for ocean dumping; and there is a paucity of opportunities for some alternative uses. Nevertheless, this policy would likely result in a limited number of structures left in place in whole or in part. This could have some negative effect on navigation safety, naval operations, and commercial fishing. The government would probably assume some additional responsibility and perhaps liability by approving all or part of a structure to be left in place. A concern is that some would view relief as a "no-cost break" for the oil industry. Furthermore, the relief might be inequitably distributed, unless there were strict guidelines for implementing the policy.

In assessing the case-by-case alternative, it is instructive to consider what the guidelines for platform disposition decisions might entail. Several criteria were suggested during the Law of the Sea negotiations [Such removal shall have due regard to fishing, the protection of the marine environment and the rights and duties of other states. (Article 60, Law of the Sea Convention)], but these are hardly adequate for regulatory guidance. The committee's assessment of issues points to the following guidelines for case-by-case decision making:

- Presumption at the time of installation that platforms installed on the OCS are to be removed unless the government, on the basis of information available, deems otherwise.
- All steel structures in water depths less than 200 feet are to be removed to shore unless they are dedicated to an alternative, permitted use (such as a fishing reef that conforms to the National Fishing Enhancement Act of 1984).
- Approvals of plans and designs for final disposition of all other structures or parts thereof, including deep-water fixed steel platforms, subsea template installations, and concrete platforms, are to be established on a case-by-case basis, preferably at the time of original approval for emplacement, with final decision on disposition subject to review at the time of disposition. Consideration is to be given to cost of removal versus public benefit of removal, ultimate assumption of liability, safety and freedom of surface and subsurface navigation, possible alternative uses, and potential interference with other uses of the sea and seafloor. In any event, all platforms should be removed to a depth suitable for the safety of surface navigation, unless those portions of the structure above the surface or in the upper water column are permitted for another use.

With regard to implementation of this policy in the Gulf of Mexico, an alternative for the largest fixed steel structures located far offshore that would address engineering and cost concerns, legal and safety issues, and possibly environmental considerations would be removal to a depth suitable for safety of surface and subsurface navigation; the removed structures could then be disposed of in a designated ocean dump-site.

An alternative for subsea template foundations would be to reduce their vertical profile with explosives, and then abandon them. If a template foundation is abandoned in an area of bottom trawl fishing, then leveling or burial could be required.

If case-by-case decision making is to work, some solution must be found for the problem of tort liability. Complete removal of a platform with disposition ashore removes the tort liability burden completely from the owner. Complete removal and ocean dumping, given faithful compliance with the EPA permit, has the same effect. None of the other methods of disposition affords the same degree of protection from continuing liability. This reduces their practical value as alternatives, and impairs the effectiveness of case-by-case decision making. Indemnification of former owners by the government is the most effective means of addressing this problem.

Appendix A

Biographies of Committee Members

RADM. WILLIAM M. BENKERT, chairman of the committee, spent more than three decades in the U.S. Coast Guard, retiring in 1978 with the rank of rear admiral. His career consisted almost entirely of extensive sea and marine safety duties. As a flag officer, he directed the Office of Marine Environment and Systems and the Office of Merchant Marine Safety. From 1978–1984, Adm. Benkert was president of the American Institute of Merchant Shipping, a trade organization of U.S.-flag tanker operators. Adm. Benkert is currently president of Petroferm Marine, Inc., a company which is developing new products for marine applications. Adm. Benkert has served on the Marine Board of the National Research Council for five years.

DR. ROGER D. ANDERSON is the executive director of the Gulf and South Altantic Fisheries Development Foundation, Inc., which coordinates and funds fisheries research and development. Prior to his appointment with the foundation in 1977, Dr. Anderson was a senior marine scientist at the Virginia Institute of Marine Science, where his responsibilities included the technical administration of the advisory service, sea grant, and coastal zone management programs. His research interests include fisheries development, mariculture, pollution ecology, and marine education and training.

DR. ROBERT B. DITTON is professor of recreation and parks at Texas A&M University. He teaches courses in coastal recreation management and development, and environmental impact analysis. His research interests are in outdoor recreation activity and behavior patterns, human dimensions of natural resources and their management, coastal resources management, and environmental policy formulation. Dr. Ditton has conducted research on the recreational use of offshore platforms, and is an adviser to the Artificial Reef Development Center.

MR. FRANCIS P. DUNN is manager of offshore construction and design for Shell Oil Company and also is a consultant in civil engineering for offshore and arctic operations. Earlier professional activities included responsibility for design of offshore facilities and platforms, and offshore economic studies.

MR. GRIFF C. LEE is a consulting ocean engineer. From 1954–1983, Mr. Lee was associated with McDermott Company, designers and constructors of offshore platforms, where he retired from the position of vice president, McDermott Marine Engineering. Mr. Lee is responsible for technical innovations in platform design and installation that are now standard in the industry. Mr. Lee is a member of the National Academy of Engineering and a former member of the Marine Board of the National Research Council.

RADM. MAURICE H. RINDSKOPF (U.S. Navy retired) is associated with Westinghouse Oceanic Division. From 1938–1972, he served with the U.S. Navy, where he retired with the rank of rear admiral. With the Navy, he had command of submarines and a destroyer, held senior positions in deep submergence, and was assistant oceanographer for operations. With Westinghouse, he has concentrated on the development of international markets for new technologies.

SIDNEY A. WALLACE is an attorney with experience in maritime and international law. For much of his career, he served with the Coast Guard, retiring in 1978 as a rear admiral. Senior assignments with the Coast Guard included program manager, Marine Environmental Protection Program; chief, Office of Public and International Affairs; and maritime policy adviser to the Secretary of Transportation. Upon retiring from the Coast Guard Adm. Wallace served as counsel to the Committee on Merchant Marine and Fisheries, U.S. House of Representatives, for two years. He was also counsel to the law firm of Haight, Gardner, Poor, and Havens. Adm. Wallace continues to participate actively in the work of the International Maritime Organization and is chairman of the Marine Ecology Committee of the Maritime Law Association.

Appendix B

Federal Register Request for Comments and List of.

Respondents
DEPARTMENT OF THE INTERIOR
Minerals Management Service
30 CFR Part 250
Oil and Gas and Sulphur Operations in the Outer Continental Shelf
AGENCY: Minerals Management Service, Interior.
ACTION: Advance Notice of Proposed Rulemaking.

SUMMARY: The Minerals Management Service (MMS) is requesting responses to questions regarding the economic, technologic, legal, and environmental components involved in 30 CFR Part 250 concerning removal of postproduction platforms. This Advance Notice is to solicit comments. DATE: Comments must be postmarked or received no later than December 13, 1984.

ADDRESS: Written comments should be submitted to the Department of the Interior. Minerals Management Service, 12203 Sunrise Valley Drive, Mail Stop 646, Room 6A110, Reston, Virginia 22091. Attention: David A. Schuenke.

FOR FURTHER INFORMATION CONTACT: David A. Schuenke, telephone (703) 860-7916, (FTS) 928-7916.

SUPPLEMENTARY INFORMATION: The MMS has recently funded a study to be conducted by the Marine Board of the National Research Council to analyze and advise on the national and international ramifications of platform removal and disposition. The platforms in question were used for oil or gas operations on the Outer Continental Shelf (OCS) but are no longer needed for such operations. The MMS is investigating the implications of platform removal in light of the objectives of the Recreational and Environmental Enhancement for Fishing in the Seas (REEPS) Task Force cochaired by the Secretary of the Interior, proposed legislation (H.R. 5447) concerning artificial reef: possible economic savings to be derived; studies demonstrating considerable incidental biological, social, and economic value associated with offshore structures; and the absence of objection from State or Federal Agencies having jurisdiction. Therefore, we request comments as to the need for a provision, relating to platform partial removal or nonremoval, the limitations or conditions that should be included, and a general expression of the benefits and drawbacks.

In view of the foregoing, we request your responses to the following:
Alternative Dispositions

1. What are the alternatives for the disposition of offshore platforms after they have reached the end of their useful life as oil and gas facilities? What are the opportunities for reusing platforms or sections of platforms as oil and gas facilities or for other industrial purposes? What are the costs of the alternatives? Status of Technology
2. What are the technical problems in dismantling, transporting, relocating, and reusing platforms? What are the technological capabilities? Environmental Protection
3. What disruption of fisheries' habitats is likely to result from the removal of platforms?
4. The question of the reuse of offshore platforms for the enhancement of fisheries' habitats is of widespread interest. To this end, the structures can be left in place, toppled in place or removed, or transported and relocated as an artificial reef. What are the potential: benefits of this alternative? What orkeria could be used to identify platforms that have potential for the enhancement of fisheries' habitats? Economic
5. What percentage of the cost of offshore resource development can be attributed to platform removal? How might this vary in the different Regions? Legal
6. How is liability for safety, maintenance, marking, and third party damage affected by the alternative strategies for the disposition of offshore platforms? This issue will be readdressed in the Notice of Proposed Rulemaking intended to reorganize and reform offshore oil and gas operating regulations now under review within MMS. However, because of the complexity of the issues involved and the concerns of a number of Federal and State agencies with responsibilities in this area, we are requesting comments and suggestions now to assist in the discussion and development of the appropriate policies.

List of Subjects in 30 CFR Part 250

Continental shelf, Environmental impeot statements. Environmental protection, Government contracts, Investigations, Mineral royalties, Oil and gas reserves, Penalties, Public land/mineral resources, Reporting requirements.

Dated: November 2, 1904.
William D. Bettenberg,
Director, Minerals Management Service.
[FR DOC. 84-29428 Filed 11-6-94: 8:45 am]
BILLING CODE 4310-MR-M

LIST OF RESPONDENTS

J. Donald Annett
Texaco USA
Washington, D.C.

Michael J. Atherton
Columbia Gas System
Wilmington, DE

Gilbert W. Bane
Center for Wetland Resources
Louisiana

State University
Baton Rouge, LA

A. B. Boubel
Pennzoil Co.
Houston, TX

B. M. Boyce
Phillips Petroleum Co.
Bartlesville, OK

O. G. Byrd
Cities Service Oil and Gas Corp.
Houston, TX

J. E. Coe
Miss. Gulf Fishing Banks Inc.
Biloxi, MS

H. E. Collier
Offshore Operators Committee
New Orleans, LA

P. J. Early
AMOCO Production Co.
Chicago, IL

V. C. Eissler
Conoco Inc.
Houston, TX

Michael L. Fisher
California Coastal Commission
San Francisco, CA

John M. Green
Gulf of Mexico Fishery Management
Council
Tampa, FL

C. G. Groat
Louisiana Geological Survey
Baton Rouge, LA

Gerald F. Guidroz
Louisiana Office of State Parks
Baton Rouge, LA

B. R. Hall
American Petroleum Institute
Dallas, TX

Steve Helburn
Oceaneering International Inc.
Houston, TX

Shelly E. Hill
Panhandle Eastern Pipe Line Co.
Kansas City, MO

Allen Hirsch
Environmental Protection Agency
Washington, D.C.

Joseph E. Howard
Oil Industry International
Exploration and Production Forum
London, United Kingdom

J. P. Keehan
Mobil Oil Corp.
New York, NY

H. H. Kothe
U.S. Coast Guard
Washington, D.C.

A. V. Martini
Chevron U.S.A. Inc.
San Francisco, CA

Charles D. Matthews
National Ocean

Industries
Association
Washington, D.C.

Thomas D. McIlwain
Gulf Coast Research Laboratory
Ocean Springs, MS

Robert P. Meek
ECOMAR
Goleta, CA

L. Ralph Mecham
Atlantic Richfield Co.
Washington, D.C.

Robert K. Oja
Continental Shelf Associates
Galveston, TX

Hugh O'Neill
Office of the Secretary of Defense/
Joint Chiefs of Staff
Washington, D.C.

M. A. Osborne
SoHio Co.
Houston, TX

William "Corky" Perret
Department of Wildlife
and Fisheries
Baton Rouge, LA

H. P. Perrin
Forest Oil Corp.
Lafayette, LA

Alan D. Powers
Minerals Management Service
Anchorage, AK

Gilbert C. Radonski
Sport Fishing Institute
Washington, D.C.

John L. Rankin
Minerals Management Service,
Gulf of Mexico Region
Metairie, LA

F. Hermann Rudenberg
Sierra Club Lone Star Chapter
Galveston, TX

Larry B. Simpson
Gulf States Marine Fisheries
Commission
Ocean Springs, MS

Steve Somerville
Broward County Environmental
Quality Control Board
Fort Lauderdale, FL

Glen E. Taylor
Tenneco Oil
Houston, TX

Hugh A. Swingle
Department of Conservation
and Natural Resources
Dauphin Island, AL

Rolf L. Wallenstrom
U.S. Fish and Wildlife Service
Washington, D.C.

B. L. Walters, Jr.
Marathon Oil Co.
Houston, TX

J. J. Wasicek
Union Oil Company of California
Los Angeles, CA

Ted G. White
Elf Aquitaine Petroleum
Houston, TX

Larry E. Wine
Sport Fisherman
Pensacola, FL

Rob E. Working
John E. Chance and Associates Inc.
Lafayette, LA

Appendix C

Positions of the Department of Defense and the Oil Industries International Exploration and Production Forum (Exchange of Correspondence)

THE SECRETARY OF DEFENSE

WASHINGTON, THE DISTRICT OF COLUMBIA

22 AUG 1984

RECEIVED

AUG 27 REC'D
#1187
CHARLES J. DiBONA

Mr. Charles J. DiBona
American Petroleum Institute
1220 L Street, N.W.
Washington, D.C. 20005

Dear Mr. DiBona:

Thank you for your letter of July 27, 1984 regarding the need for appropriate international standards for the removal of abandoned offshore structures. As you noted, because of its implications for navigation, this issue is of particular importance to us. Maritime mobility is vital to the U.S. national security, and our submerged forces are a critical component in our efforts to ensure strategic deterrence.

From a global perspective, the proliferation of nonproducing offshore structures could seriously degrade the mobility and flexibility of our seaborne forces. Therefore, we agree fully that international removal standards are required.

To be effective, the removal standards must be binding, and coastal state discretion must be minimized. Without these elements, coastal states could come to their own conclusions as to what is "reasonable", which would defeat the very purpose of uniformity that international standards are meant to serve. Only globally established standards, which carefully delimit minimum and maximum depths for removal, can protect against abuse by other countries.

For this reason I have recommended the attached draft standards for interagency consideration. The draft standards have been carefully crafted to ensure that maritime mobility will be protected, while providing industry with a more flexible alternative to the current "entirely remove" standard. Your input will be extremely helpful in fine-tuning our proposal before it is submitted to the International Maritime Organization.

I welcome your offer to work closely with my staff on this important issue. My representative for Ocean Policy Affairs, Mr. Hugh O'Neill (694-0207), will be contacting you for that purpose.

Sincerely,

Attachment

Proposed Minimum Standards for the Removal of Offshore Structures and Installations

- All fixed structures utilized in the EEZ or on the continental shelf shall, as an essential component of their design, provide for their effective and expeditious removal.
- It shall be the obligation of the coastal state to require that the corporate entity, individual or government under whose control the structure existed to ensure that it is removed and disposed of when no longer used for hydrocarbon recovery.
- In order to maintain an environment suitable for all forms of navigation and other uses of the sea, removal shall be to within 5 meters above the sea floor in waters less than 400 meters, to within 15 meters above the sea floor in waters less than 2000 meters and greater than 400 meters.
- All structures not entirely removed shall at a minimum be modified to the above height and depth standards, shall be indicated on marine charts prepared by the coastal state and, under guidelines provided by IMO, appropriate publicity shall be given regarding the depth, position, and dimensions of any installations or structures not entirely removed.
- When removing structures and installations components may remain or be installed in or on the sea floor as necessary to protect the environment or prevent interference with other uses of the sea. Components remaining or installed for this purpose must not exceed the distance above the sea floor stated above.
- Nothing shall preclude any coastal state depositing concentrations of removed structures in special areas for living resource sanctuaries or related purposes so long as such placement does not interfere with navigational and other non-fishing activities.
- Except in archipelagic sealanes and in international straits, nothing shall preclude the coastal state, in its territorial sea (up to a limit not exceeding 12nm) or in waters less than 20 meters in depth, from permitting exemptions from these provisions.
- Nothing shall preclude the coastal state from imposing more stringent removal standards for new or existing fixed structures.
- Structures existing prior to the adoption of these standards may be grandfathered into the new standards, thereby avoiding the “entirely removed” 1958 Geneva standard.

American Petroleum Institute
1220 L Street, Northwest
Washington, D C 20005
202-682-8100

July 27, 1984

The Honorable
Caspar W. Weinberger
Secretary of Defense
The Pentagon
Washington, D.C. 20301

Re: Appropriate International Standards for the Removal of Abandoned Offshore Structures

Dear Mr. Secretary:

Over the past several years, both the oil industry and the Department of the Navy have wrestled with the issue of appropriate removal requirements for offshore petroleum structures once they have ceased operations. This matter has arisen, inter alia, in the context of the Department of the Interior's efforts to implement a "Rigs to Reefs" program. See, 48 Fed. Reg. 31397 (July 8, 1983). The question of removal is particularly important to the Navy because of its implications for navigation. Obviously, the issue of what international removal standards are or should be is of significant concern to the American petroleum industry, as well as to our counterparts throughout the world.

In early 1983 the American Petroleum Institute (API), the National Ocean Industries Association, and several of their member companies met with representatives of the Departments of Defense, State, Interior and Transportation. At that time we expressed our concern about precipitous U.S. action concerning the development of an international removal standard. We were assured that no such action was imminent an d that a dialogue with industry on its views regarding an appropriate standard would be encouraged. Over the intervening months industry, through the E&P Forum, has developed a consensus view on this matter. As a member of the Forum, API herewith formally submits the views of the E&P Forum to your Department for its consideration (Attachment 1).

The recently concluded Convention on the Law of the Sea includes a provision which serves to make current the removal requirements applicable to abandoned offshore structures (Article 60.3). The

Convention recognizes that appropriate international standards to ensure safety of navigation are to be developed by "the competent international organization." Although undefined, it is believed that this term refers to the International Maritime Organization (IMO). Irrespective of the U.S. refusal to sign the Convention on the Law of the Sea and the uncertainty attendant to the Convention ever going into force, we understand that efforts may be mounting to address this issue in the IMO, an organization of which the U.S. is a member.

Fearful of premature consideration of this issue before the IMO and cognizant of the desirability of industry reaching a consensus on appropriate removal requirements, the E&P Forum began considering this issue in late 1982. The E&P Forum is an international organization comprised of public and private oil companies and trade associations (Membership list: Attachment 2). Significantly, the E&P Forum has consultative status with the IMO.

Given the strong possibility that this issue will be discussed at an international level, API supports the prompt development of a coherent Administration position on this issue and believes that the position developed by the E&P Forum would be a useful tool to aid this process. In addition, the Forum will soon finalize a series of background papers that will address:

- world wide cost implications of various removal scenarios
- legal issues
- utility of abandoned structures for man-made reefs
- water depth requirements of present and future maritime craft
- submarine lurking area risks
- fisheries concerns
- safety aspects of structure removal

A composite briefing package containing these materials will be available and forwarded to you in the fall. These materials should be useful in future discussions between governmental agencies and the private sector.

The American Petroleum Institute would welcome the opportunity to discuss this matter with you or appropriate members of your staff. Although some background materials will not be available for several months to come, the removal standard is of sufficient importance that the development of any administration position in this matter should include early consideration of industry's views. Further, we solicit any comments you may have on the attached E&P Forum position paper.

The industry presented its views to the Departments of State and Interior on July 13, and we look forward to an opportunity to do

so with your Department. In this vein, we request that your staff contact us to arrange a meeting to discuss this matter at whatever level you consider appropriate.

Sincerely,

cc: The Honorable George P. Shultz, Secretary of State
The Honorable William P. Clark, Secretary of the Interior
The Honorable James A. McClure, Chairman, Senate Committee on Energy and Natural Resources
The Honorable Walter B. Jones, Chairman, House Committee on Merchant Marine and Fisheries
bcc: The Honorable J. Steven Griles, Deputy Assistant Secretary for Land and Water Research
The Honorable Richard T. McCormack, Assistant Secretary for Economic and Business Affairs Bureau
Brian Hoyle, Department of State

E&P FORUM

REMOVAL OF OFFSHORE INSTALLATIONS

AN INDUSTRY POSITION PAPER

Whilst every effort has been made to ensure the accuracy of the information contained in this publication, neither E&P Forum, nor any of its members will assume liability for any use made thereof.

May 1984

E&P FORUM

Introduction

Following the completion of the E&P Forum questionnaire and the results of the technical workshop it was clear there was a broad industry consensus on the technical and cost aspects of platform removal. This was recorded in the Forum's paper "The Development and Promotion of an Industry Position on Platform Removal".

Further consideration of the reasons whereby this technical consensus could be translated into satisfactory removal standards/requirements indicated that two papers were called for:

i) Our Legal Committee advise that the international removal standard which it envisages will be developed in IMO should only address the issue of safety of navigation. This has been reflected in the text of Annex 1.

ii) The other paper, Annex 2, addressing all other relevant issues should be regarded as a general statement of objectives to be achieved in discussions with coastal states and regional authorities.

Members may wish to use these papers at their discretion when discussing the matter of platform removal with either national or international agencies.

May 1984

E&P FORUM

ANNEX 1 Standards on Removal of Offshore Installations for Safety of Navigation

In order to ensure safety of navigation in the waters of its EEZ and above its Continental Shelf, each Coastal State in considering removal of installations and structures (hereinafter called installations) in such waters upon their abandonment or permanent disuse shall take into account the following standards:

1. Any installation shall be removed, in so far as it protrudes above the seabed, if and to the extent necessary to ensure safety of navigation in the relevant waters,

provided that no other means are available which are reasonable in all the circumstances (taking into account inter alia the risk and cost of removal) to achieve the same without removing such installation or part thereof

and further provided that, if on the basis of the foregoing removal is necessary, in water depths of more than 40 metres measured at lowest astronomical tide such removal shall ensure an unobstructed water column of at least 40 metres measured as aforesaid.

2. Removal shall be performed as soon as reasonably practicable after abandonment or permanent disuse of such installation.

3. Removal operations shall be performed in such a way that they cause no significant adverse effects upon navigation.

4. The above standards do not apply to pipelines.

In addition the Coastal State concerned shall ensure that the position, depth and dimensions of each installation which has not been wholly removed after abandonment or permanent disuse is marked on charts maintained by the appropriate international maritime bodies.

E&P FORUM

ANNEX 2 General Requirements on Removal of Offshore Installations

In considering removal of installations and structures (hereinafter called installations) in such waters of the EEZ and above the Continental Shelf upon their abandonment or permanent disuse, the following shall be taken into account :

1. In water depths of less than 40 metres any installation shall be completely removed to the extent it protrudes above the seabed except in the following circumstances:

(i) it is manifest that such removal would serve no significant legitimate interest existing or foreseeable at that time, including but not limited to the safety of navigation, the enhancement or protection of the marine environment, the conduct of fisheries, mining operations or the exercise of other legitimate uses of the sea, the seabed or subsoil; or

(ii) the adverse effects of non removal are small and the risks and costs of removal are disproportionate in relation to such adverse effects, or

(iii) it is proposed that the facility be retained in place for alternative use.

2. Any installations in water depths greater than 40 metres shall be cleared of obstruction to navigation upon cessation of approved activities in such a way that there is a depth of at least 40 metres of unobstructed water, at lowest astronomical tide (l.a.t.) above any remaining residues, except in the exceptional circumstances specified in 1.

3. The Coastal State shall ensure that such removal operations as are required shall be performed as soon as reasonably practicable after

abandonment or permanent disuse of such installations.

4. Installations or parts thereof which are removed may be disposed of in manners which include:

(i) disposal on site, and

(ii) disposal in areas designated by Coastal States as artificial reef sites,

provided that there shall, except in the exceptional circumstances specified in paragraph 1 and 4(ii), be an unobstructed water column at lowest astronomical tide (l.a.t.) of at least 40 metres above anything so disposed and provided further that anything so disposed may not create a significant risk to the marine environment, or cause undue conflict with the interests of other users of the sea.

5. States shall require the owner to ensure that the position and size of any installations remaining after the removal operation shall be marked on navigational charts.

6. States shall require the owner to ensure that removal and disposal operations are executed in such a way that they cause no significant adverse effects on the marine environment, with due regard to fishing activities.

7. Compliance with these and any additional requirements imposed by a Coastal State shall be a full discharge of all continuing liabilities and obligations in respect of installations and any parts thereof.

8. The above does not apply to pipelines.

MEMBERS OF E&P FORUM AND THEIR REPRESENTATIVES

Member	Country
Agip s.p.a.	Italy
American Petroleum Institute	USA
Amoco Production Company International	USA
Arabian American Oil Company	Saudi Arabia
Britoil p.l.c.	UK
BP Petroleum Development Limited	UK
Burmah Oil Exploration Limited	UK
Compagnie Francaise des Petroles (TOTAL)	France
Chambre Syndicale de la Recherche et de la Production du Pétrole et du Gaz Naturel	France
Chevron Petroleum (UK) Limited	UK
Conoco Inc.	USA
Dansk Boreselskab A/S	Denmark
Exxon Corporation	USA
Gulf Area Oil Companies Mutual Aid Organisation (GAOCMAO)	Bahrain
Gulf Oil Corporation	USA
Hispanica de Petroleos S.A.	Spain
Institut Francais du Petrole	France
Japan National Oil Corporation	Japan
Kuwait Oil Company (K.S.C.)	Kuwait
Marathon Oil Company	USA
Mobil Oil Corporation	USA
Norsk Industriforening for Operatørselskaper (NIFO)	Norway
Nederlandse Olie en Gas Exploratie en Produktie Associatie (NOGEPA)	The Netherlands
Occidental Petroleum Corporation	USA
Petrofina S.A.	Belgium
Petroleos de Venezuela S.A.	Venezuela
Phillips Petroleum Company	USA
Shell Internationale Petroleum Maatschappij B.V.	The Netherlands
Société Nationale Elf Aquitaine	France
Sun Oil Company	USA
Texaco International Petroleum Company	USA
UK Offshore Operators Association Limited (UKOOA)	UK
Wirtschaftsverband Erdol- und Erdgasgewinnung e V. (W.E.G.)	FRG