ONSHORE DISPOSITION OF OFFSHORE OIL AND GAS PLATFORMS: WESTERN POLITICS AND INTERNATIONAL STANDARDS

by

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ABSTRACT

Onshore-only disposition of retired offshore oil and gas platforms has become a core strategic objective for ocean/environmental advocates and policy-makers. Although international oil companies oppose an onshore-only requirement, its rejection is no longer a high priority for them. The ascendancy of onshore-only disposition reflects a rational and predictable response to political attitudes, values, and expectations in Western Europe by both governmental policymakers and petroleum industry strategists. Repercussions from the fight over the disposition of the obsolete Brent Spar offshore oil storage and transfer facility are the proximate cause of the shift. It was not the result of new scientific information, better engineering practice, or changes in the offshore experience of the oil and gas industry worldwide. Onshore disposition has been used voluntarily for most platforms that oil and gas companies have retired because it was the least expensive course of action. But as platforms move further from shore toward deeper waters onshore disposition is more frequently inferior to other disposition alternatives–from both an environmental and economic point of view. If onshore-only disposition were to become an international standard, either *de facto or de jure,* some offshore producing areas would incur significantly higher disposition costs and lose opportunities to better utilize and protect their marine resources.

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1. Making onshore-only disposition[2] of platforms an international standard

A common wisdom has been forming among environmentalists that the only "right" or "environmentally correct" thing to do with retired offshore oil and gas platforms is to dismantle

impossible to remove entirely. Fourteen of the seventy platforms under Norway's jurisdiction are of this type, as are nine of the 180 installations under British control. Their complete removal has been estimated to *add* as much $16.5 billion to the North Sea platform disposition costs.[5] Moreover, some suggest that other implicit exemptions or loopholes, were also included in the OSPAR agreement. Consequently, the onshore-only provisions of the agreement may not be as unambiguous as they appear.

- Second, the success of environmental organizations who triumphed in the battle over the disposition of the Brent spar boosted their political clout,. The environmentalists were led by Greenpeace, but included the "Green" political parties prominent in Western European countries. In the eyes of many, their victory validated both Greenpeace's assumption of environmental leadership in this area and their claim that onshore-only disposition of platforms is the only environmentally responsible and morally defensible policy for countries to follow. [6]

These two considerations are closely interrelated. The "political clout" that Greenpeace and its allies demonstrated in the Brent Spar episode made the oil and gas industry willing to pay more for "insurance" against having to spend yet billions more trying to remove the very large, concrete North Sea structures. Had Greenpeace's efforts failed, it is likely that the U.K. and Norway would have maintained their opposition to the onshore-only requirement. Further, the perception of and respect for the political power of the environmental advocates of onshore-only disposition may well prevent the loopholes in the OSPAR agreement from being utilized.

1.2 The relevance and irrelevance of the Brent spar campaign

The Brent spar episode was an international news event that has clearly, if misleadingly, defined the platform disposition issue for the public, as well as most private and public environmental/ocean organizations.

A point regularly glossed over in the debate was that the Brent spar was neither an oil

action and civil disobedience, announced its opposition to the plan, which it termed "flagrant ocean dumping." Toxic residues remaining in the Spar's storage tanks and piping after they were cleaned and flushed were the focus of Greenpeace's concern. Their argument was that since the facility began operating in the 1970s, toxic heavy metals had accumulated in the sludges in the tanks and remained there after the tanks were emptied. The consequences of introducing such toxic sludges to the deep ocean were unknown, they said. Further, they could not be adequately monitored nor, if necessary, retrieved if the facility were sunk in 6000 feet of water. Thus the environmentally correct course was to bring the facility to shore.[8]

In the summer of 1995–following an unexpectedly fierce campaign featuring widespread consumer boycotts, letter and fire bombs, vandalism,[9] and Greenpeace's very telegenic boarding of the spar from helicopter at sea as it was being towed to the deep ocean disposal site -- Shell declared defeat and canceled its at-sea disposition. Figures 1.1 and l.2, taken from the German news magazine *Der Spiegel*[10], capture better than words the intensity of the "debate."

Research completed subsequent to Shell's capitulation has strengthened the case for Shell's original proposal.

- First, measurements of the residual sludges showed that Greenpeace's estimate of the tonnes remaining in the spar's tanks and pipes was too high by an order of magnitude.
- Second, scientists reported in Britain's flagship scientific journal *Nature* that natural vents and seeps in the deep ocean floor at the proposed disposal site were releasing toxic heavy metals in amounts many times greater than Greenpeace's original estimate of the spar's load.

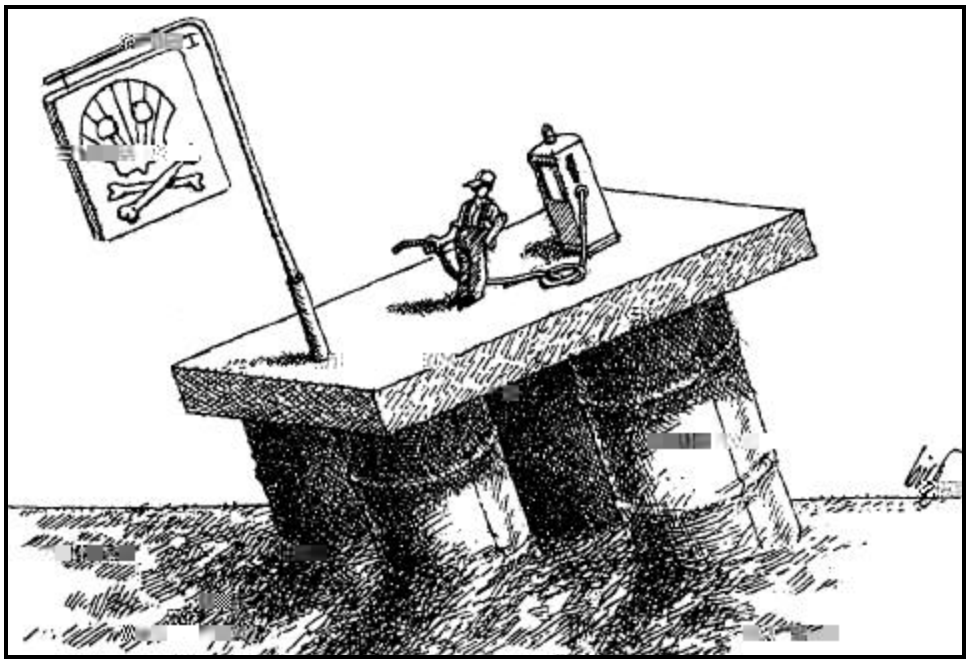


Fig 1.1

Figure 1.2

- Further, some of the deep ocean life forms at the proposed "dump site" use and, perhaps, depend on many of the same "toxic" materials resident in Brent Spar's residual sludge. As *Nature* editorialized about its article: "[T]he bacteria on the ocean floor would have greeted the arrival of Brent spar as if all their Christmases had come at once."[11]

By January of 1998, Shell was reported to have spent $33 million simply to remove, repair, tow and store the facility while deciding on its disposition. Shell's new plan for disposal of the platform was estimated to cost about $41 million. This is about $10 million more than the cost of the original disposition plan (not including the $33 million for interim storage). Ironically, perhaps, the new disposition plan calls for "slices" of the storage facility to be cut and submerged and used as part of the foundation for a new wharf.[12]

The "real" costs to Shell, however, were current and future sales lost as a consequence of the boycott and damage to Shell's public image as a trustworthy and environmentally responsible

Standard engineering practice for decommissioning a platform for at-sea disposal requires that the structure be stripped to its bare steel or concrete. No storage tanks or residues of any kind are submerged if the structure is sunk. Brent spar *was* a large "floating" storage tank.

Concerns about residual toxic sludges do not apply to bare steel or concrete structures. Prior to platform disposition, all wells and well conductors are cut and permanently plugged as they would be if the structure were brought to shore. There are neither persuasive theoretical arguments nor empirical evidence that a submerged platform so decommissioned has caused or will cause damage to ocean environments.

This factual engineering distinction underscores a key point. Opposition to at-sea disposition, at its core, is political or moral, not scientific or environmental. Of course this does not mean onshore-only proponents are "wrong." Political or moral arguments often outweigh scientific or environmental considerations, but it is good to be clear as to the terms of the argument. Further, although the scientific and engineering aspects of the Brent Spar controversy have little policy relevance to the larger "at-sea versus onshore-only" platform disposition dispute, the political and economic aspects of the controversy are relevant and instructive.

2. Some micro-politics of platform disposition policy

Although private-sector oil companies believe that "onshore-only disposition" is an unnecessary, unwise, and inefficient policy based on their evaluation of the scientific evidence (*i.e.*, their acquiescence is not a result of inadequate information or faulty analysis) apparently they also do not believe it would be prudent economically or, more important, politically to make a consequential effort to oppose its adoption given the prevailing attitudes and circumstances. In the world of large (and larger) international corporations, future pain is discounted heavily, and

raising pessimistic expectations is usually labeled “asking for trouble.”

Similar reasoning prevails on the governmental side. It is just as unappealing politically for leaders in the public sector to oppose the onshore-only standard as it is in the private sector, especially in those jurisdictions in which the decommissioning phase of oil’s life cycle is just beginning or has yet to begin. Thus, this is a case where the incentives facing decision-makers in *both* the private *and* governmental sectors are likely to result in *socially inefficient* decisions.

2.1 - Industry decision-making.

The profits of oil and gas companies would increase, all else equal, if a more efficient and cheaper method of platform disposition were to be adopted. The magnitude of such savings, however, would be less than it would cost to deal with a public relations nightmare like the Brent spar episode. Even in strictly monetary terms, the Brent spar’s costs have outweighed the prospective cost savings from deep ocean disposition several times over.

Although disposition costs will increase substantially as larger platforms further from shore are decommissioned, the attention of top management at large companies is usually focused on quite short-term financial results. Further, rising costs or their cumulative magnitude over the long term are often seen by top managers as “the next guy’s problem.”

2.2 - Environmental Politics

A similar logic explains the attitudes of politicians. Decommissioning and disposition of offshore platforms is a specialized, complex process. There is not much incentive for politicians’ constituents or for politicians themselves to invest the time and effort necessary to become informed. The lack of information or misinformation evident in the Brent spar case was explicitly recognized by Greenpeace, as is clear in a much cited statement made by Greenpeace’s pointman

Jochen Lorfelder during an exchange with the chairman of Shell's German subsidiary. In response to the chairman's explanation of scientific superiority of at-sea disposition, Lorfelder is reported to have replied: "But Joe Six-Pack won't understand your technical details. All he knows is that if he dumps his car into a lake, he gets fined. So he can't understand how Shell can do this."[16]

In this and many other areas of public policy, individuals and their legislative representatives rely on a more general ideology or "attitude" that reflects values and perspectives with which they usually agree. It is just too "expensive," usually in time, to try to become well informed about complex issues that do not have a direct impact on an individual's own well being. Instead we rely on "ideological habits," sometimes characterized negatively as "knee jerk reactions."

Similarly, within the community of organizations with a common concern for the protection of the environment, there is considerable specialization and division of labor. Greenpeace is the environmental organization that provides the ideological backdrop for platform disposition policy–especially in Europe and in international organizations[17]. Greenpeace is a direct-action-oriented, more-militant-than-average environmental organization for whom issues are usually seen as "good or bad," "black or white," but rarely as shades of grey. Comparing costs and benefits of alternative courses of action is not a strategy or tactic they use.[18]

disagree with what is perceived as an "environmentally correct" proposal or authority. Thus, politicians naturally support, or avoid, environmental issues unless the allegiance of a strong source of their own core support is at stake.

2.3 - "Public" or "nonmarket" attributes of offshore platforms

Even if politicians, bureaucrats and businessmen were to agree, there are attributes of offshore platforms that may lead to bad public policy. Specifically, there are services that platforms provide that are not, and perhaps cannot, be included in the ordinary calculations of the market place–as a consequence of what economists call their "public" or "nonmarket" attributes.

For instance, in the Gulf of Mexico some offshore platforms have become important navigation references for recreational and commercial fishermen and other boat owners. In this aspect they correspond exactly to the example that economists since the time of John Stuart Mill have used to explain the characteristics of a "pure public good," *i.e.*, a good or service that the government, or some sort of a cooperative or club, but not the market, must provide–the lighthouse.

As the story goes, once a lighthouse exists, it is difficult to deny anyone its services. If the lighthouse's services can be consumed without paying for them, then potential consumers have no incentive to pay for them voluntarily. If potential entrepreneurs cannot exclude consumers that don't pay from consuming the services of the lighthouse, they will not build lighthouses. Thus, by default the government will have to pay for lighthouses with taxes collected coercively, if necessary. To complete the analogy, since the companies that own platforms have no way to sell the platform's services as a navigational aid to consumers individually, those services never enter the revenue/cost calculus that the company uses to make decommissioning and disposition

decisions.

There are other such “non-marketable” attributes of offshore platforms.

- Migratory birds and migratory butterflies both use platforms as rest stops.
- Marine mammals and sea turtles have also been seen making use of platforms for transitory resting or sleeping.
- Commercial fishermen use platforms as dump sites for marine debris that they “catch” in their nets while trawling.
- Existing platforms provide “trawl-free zones” that protect a multitudinous collection of bottom-inhabiting creatures whose role in ocean ecology is not very well understood. Larger “trawl-free zones” could be created quite cheaply by strategic placement of retired platforms.[19]
- In some ocean environments, offshore platforms have added very significantly to the available habitat required by some highly valued species of fish. Surveys of recreational fishermen on party boats indicate that the destination of about two-thirds of their trips in the Gulf of Mexico is an active platform or an artificial reef made from a platform. Removing platforms to shore decreases habitat that often has been in place for two or three decades.

These “nonmarket” or “external” services of offshore platforms will not be reflected in the decommissioning plans and decisions determined solely by market factors. Whether they are significant enough to warrant inclusion in the procedures or regulations governments implement depends on the importance of such factors in each unique setting. But, regardless, in purely economic terms, disregard of these “public” aspects of platforms will tend to push or bias

decisions toward onshore disposal.

3. Alternative methods of platform disposition

Does the adoption by the industrialized countries operating in the North Sea of the "onshore disposition only" rule imply that it would be a good international standard? To answer this question, the alternatives to onshore-only disposition need to be articulated.

. **3.1 Common characteristics or assumptions**

Before comparing options, some assumptions common to all of the disposition alternatives should be understood.

- First, all of the options are assumed to require the removal of all equipment, crew quarters, storage tanks etc., before disposition of the platform begins. The "platform" to be disposed of in all of the alternatives, thus, is assumed to be a steel or concrete structure cleaned and cleared to its structural elements.
- Second, all wells and well conductors are assumed to be required to be severed and plugged according to uniform regulations. Site clearance or clean-up procedures and costs, however, as discussed subsequently, vary with the disposition option compared.
- Third, it is important to note that the environmental and economic consequences of each option are dependent to a considerable degree, upon the unique characteristics of the platform and the site on which it is located. For example, in areas of the world's oceans where "hard bottom" or "reef" habitat is relatively scarce or inaccessible, such as the Gulf of Mexico, the value of a platform, either operating or made into an artificial reef, is higher than it is in those areas where this type of habitat is plentiful and easy to get to. These regional and site-specific differences make it impossible to calculate an unambiguous

overall "score" for the options compared.

3.2 - Defining disposition alternatives

The options to be compared are defined as follows:

- **Onshore Disposal Only (ODO)**. All elements of the platform are removed to shore for salvage or reuse, and the site is cleared of all obstructions and debris.
- **Postponing Platform Removal (PPR).** The platform is permitted to remain in place for some length of time after production ceases.
- **Platform-To-Reef (PTR).** The platform is converted to act as an artificial reef for fishing or diving or used in some other way to improve marine habitat.
- **Partial Removal of Platform (PRP).** Only the upper portion of the platform is removed, to avoid risks to safe navigation, but the lower portion remains in place
- **Platform Toppled in Place (PTP).** The platform elements are severed at the mudline and toppled to sea floor
- **Deep Ocean Disposal (DOD).** The decommissioned platform is towed to a deep ocean disposal site and sunk, as is commonly done with ships.

3.3 - Direct costs of alternative disposition procedures to platform operators.

As the size of the platform, water depth, and distance from onshore salvage facilities increase, the economic gain possible from at-sea disposition grows. An ICF Resources study for the American Petroleum Institute estimated that the at-sea options "can result in savings of 30% to 65% over the cost of total removal."[20] Although the physical, economic, and political environments differ in each country and in each offshore producing region, the basic economic relationships among platform size, water depth, and distance to shore will still hold. Some large

operators in the Gulf of Mexico assume that platforms in water deeper than 150 feet (46 meters) will be "reefed" rather than brought to shore because of the large cost differential.[21]

The two principal oil-and-gas-related artificial reef programs operating in United States, those administered by the States of Louisiana and Texas respectively, both incorporate the principle that cost savings (*i.e.*, reductions in disposition costs calculated from an estimate of the costs of onshore disposal) to platform operators are to be shared equally with the state's treasury. In this sense the state's taxpayers also will "lose" if the least expensive disposition procedure is not employed. This effect, along with others, is discussed below as an external or indirect effect.

Table 3.3 - Platform disposition options compared and ranked by their effects on the direct costs of platform operators.

OPTION	**ODO -** Onshore Disposition Only	**PPR -** Postponing Platform Removal	**PTR -** Platforms to Reefs	**PRP -** Partial Removal of Platform	**PTP -** Platform Toppled in Place	**DOD -** Deep Ocean Disposal
Relative Rank: 6 = highest, 1 = lowest	**[1-6]**	**[1]**	**[3-4]**	**[2-6]**	**[2]**	**[3-6]**
Comments	- Cheapest for smaller platforms near onshore salvage facilities. - Costs rise with size, water depth and distance.	-Discounted costs are less than current costs. - May lower eventual disposition costs via scale and marshaling economies.	- Size/depth/ distance and any required sharing of cost-savings determine costs. - Costs of site clearance and towing incurred.	-No towing or site clearance costs -But some support this option only if explosives are not used	- No towing or site clearance costs - No ban on explosives has been advocated.	- Site clearance and towing costs incurred - Distance to "deep ocean" site could make most expensive option for most platforms.

As compared in Table 3.3, either Onshore Disposition Only **(ODO)** or Postponing

Platform Removal **(PPR)** could be the least-cost option depending on the circumstances of size, distance, and water depth. The **ODO** option could also be the most expensive option, depending on these same circumstances. For small platforms in shallow water, located close to salvage and refurbishing facilities, especially if the structure can be rehabilitated and recycled for use elsewhere--onshore disposition usually will be the least-cost alternative. But it can also be the most costly if it is a large platform, in deep water, far from salvage facilities.

Although complementary rather than competitive to the other five options, the cost savings from Postponing Platform Removal (**PPR**) depend on the costs of preventing corrosion

Towing costs depend on the size and complexity of the structure to be transported and the distance to its final destination. Moving large structures with large equipment is feasible only when weather conditions are favorable. Unanticipated changes in weather patterns can prolong "day charges" for towing equipment that often can exceed $100,000 per day. Under current conditions, it is likely that **DOD,** if allowed, would be cost efficient for only the largest fixed structures in the deepest waters. The largest fixed structure now operating is Shell's Bullwinkle platform located in 1350 feet (411 meters) of water in the central Gulf of Mexico.

The structures being used to develop the "deep water" reserves in the Gulf of Mexico are not fixed but are in some sense floating structures. Most are designed with reuse in mind. However, if regulations were to require such structures be taken to shore for salvage, this may not be feasible without an expensive, major, dismembering at-sea.

3.4 - Effects on marine habitat and other ocean users

3.4.1 – Habitat. Many of the principal indirect or external costs and benefits of platform disposition practices are driven by the consequences of removal or non-removal on marine habitat. Keeping in mind that the significance and magnitude of habitat effects depends on the unique physical, ecological, and geographic characteristics of the marine environment in which the particular platform in question is located, clearly the best disposition option judged by effects on the marine environment and other oceans users (as shown in column two) is simply postponing the disposition process. It is not a parallel option, of course, since it could precede any of the others. The option should be included as a relevant managerial and policy alternative, however, since platforms have remained in place for thirty, forty, or more years, and, from an

and safe for at least one or two decades beyond the time that current regulations require.

The United States' disposition rules require the removal of the platform within one year after production on the lease, not on the platform, ceases. Exceptions to this rule are possible when the platform is used for other functions such as a component of a pipeline system. The oldest platform still standing in the Gulf was installed in 1942.[query to ric still open]

Table 3.4 - Platform disposition options compared and ranked by their relative effects on marine habitat and other ocean users

Option	**ODO -** Onshore Disposition Only	**PRP -** Postpone Platform Removal	**PTR -** Platforms To Reefs	**PRP -** Partial Removal of Platform	**PTP -** Platform Toppled in Place	**DOD -** Deep Ocean Disposal
Relative Rank 6 = worst, 1 = best	**[6]**	**[1]**	**[2-4]**	**[2-4]**	**[2-4]**	**[6]**
Comments: Habitat	**–** Reef/hard-bottom habitat lost permanently.	–Marine Habitat unchanged until eventual removal.	–Habitat lost at one location but reestablished at another. –Most productive upper part is lost.	**–**Most productive upper part is lost.	**–** Same as or worse that **PRP** in deep water. –Net gain possible in shallow water.	**–** Same as **ODO.**
Comments: other effects	–Habitat lost is valued highly by recreational fish/dive industry/en-thusiasts. –Area open to trawl is increased. –State loses its share of cost-savings realizable under other options.	**–**Barriers to trawling remain. –Continued "aesthetic interference" for some coastal residents or conservat-ionists. –Sharing of cost-savings (from postponing) possible.	**–**Although habitat lost is established elsewhere, it may be less accessible**,** thus less valuable to recreational fishers and divers. –Sharing of cost-savings with state is customary practice.	–Less productive habitat remains and supports fewer fish, but, snappers and groupers probably not affected. –Sharing of cost-savings possible.	–Same as **PRP.** **–**Sharing of cost-savings possible.	--Habitat lost as in **ODO** but likely to have been much less accessible, hence, less valuable. –Sharing of cost-savings possible.

The onshore-only, **ODO,** and deep ocean disposition, **DOD,** have the worst negative impacts, totally eliminating habitat which often has supported marine life for twenty or thirty years. The significance of the loss of habitat under either of these two disposition alternatives depends on relative scarcity of natural reef habitat and the stress that users may be creating for such habitat.

In the Gulf of Mexico the installation of offshore platforms is estimated to have increased reef habitat by from 50 to 100 percent, depending on the estimate of the naturally occurring reef habitat used in the calculation. Very active sport and recreational fishing industries use this "new habitat" extensively. In 1987, an MMS analyst estimated that 70 percent of all fishing trips in Louisiana to offshore Gulf of Mexico sites had offshore platforms as destinations.[23]

Although the habitat impacts of the three other options shown in Table 3.4 are more destructive than postponing removal and probably less destructive than onshore or deep ocean disposition, the relative ranking among them can not be determined without reference to the unique setting of each platform, particularly its water depth. Recent research indicates that evaluated in terms marine life supported, the first 80 to 100 feet of the structure below water is the most important.[24] A before-and-after study of platforms that were severed and partially removed at a depth of 85 feet, and a platform toppled in place in about 300 feet of water showed a "before" total fish population of 30,000 fish and an "after" population of about 10,000 fish at the partially removed platform and only 5,000 fish at the platform toppled in place. However, almost all of the population drop took place among fish that are not sought by recreational fishermen. The population of groupers and red snappers that most recreational fishers and charter boat operators target showed little if any before/after change at the two platforms. Since fish censuses have shown very large and irregular swings in the number and species resident at platforms, more data are needed to establish the habitat consequences of partial removal.[25]

If such studies confirm that highly valued fish are unaffected by partial removal, then this option as well as toppling in-place and artificial reef options would have larger habitat conserving impacts – at least in shallow or intermediate water depth locations. If studies find that the fall in

the total fish population leads to changes in the population of highly valued species, then partial removal (**PRP)** or toppling (**PTP**) or artificial reefs (**PTR)** may not be much different than **ODO** or **DOD.** Whether existing minimum depths required for navigation or, more importantly, trawling reduce significantly the potentially positive habitat impacts of these options clearly is a question that needs to be answered before platform disposition standards are adopted.

3.4.2 – Other ocean users. The controversy created by platform disposition policies or proposals arises largely from concerns about possible external effects on, or conflicts with, other ocean users or beneficiaries. But few of these effects have been described and fewer still quantified. For example, although there has been much favorable comment about the artificial reef programs in the Gulf of Mexico, there has been no estimate of their value or return to the recreational fishermen and charter boat operators that make use of them. Without such data, planning or managing artificial reef programs remains a subjective and, some would argue, paternalistic activity.

Some analysts believe the concerns of other users could be incorporated into and reflected by the allocation of ocean uses among ocean users, if the important external effects created or canceled by platform disposition activities could be bought and sold in the market place . For example, if the platform owner controlled access to the water column in and around the platform and could sell such access to fishers or fish farmers, then the returns from these activities would be incorporated into managerial decisions concerning platforms–including disposition alternatives. Others argue that ocean management involves considerations that rise above such economic considerations and must be decided directly by governments.

However, as outlined previously, existing legal and regulatory regimes for ocean resources

permit and create many important external effects. Further, although costs to some ocean users under one alternative may be of benefit to other users (*e.g*., benefits to recreational fishers of using retired platforms as artificial reefs) impose a cost on commercial fishers and shrimpers by decreasing the area available to trawl, there is no presumption that benefits are equal to, greater than, or less than their corresponding costs.

In the United States the savings from at-sea disposal are divided between the company who owns the platform and the governmental agency responsible for the at-sea disposition program. Thus, every platform that is brought to shore that could be disposed of less expensively at sea, also represents an external cost in terms of governmental revenues that are lost permanently.

The most important external cost that the disposition of retired platforms may create for other ocean users is the loss of habitat for reef fish that may be valued very highly in some marine environments such as the Gulf of Mexico. Again, disposition options **ODO** and **DOD** would impose the largest "losses" (or failure to realize benefits) of this kind. Table 3.4 makes a modest distinction between them on the grounds that most platforms for which **DOD** would make economic sense are likely to be less accessible and hence less valuable to fishers and divers.

The aesthetic or scenic costs which some coastal residents and environmental groups argue platforms create, particularly if they are visible from land, are also acknowledged in the table. Just as many individuals believe they are better off if a scenic or wilderness area is preserved–whether or not the area is visible or accessible to the individual–so some coastal residents and others argue their wellbeing or satisfaction would be enhanced if no new platforms were installed. Similarly, commercial fishers who trawl for a living argue that failure to remove

platforms prevents a recovery/expansion of their rightful domain.[26]

Considered in the abstract, the arguments of preservationists and fishermen are powerful determinants of public attitudes, especially the former. The power of the preservationists' arguments is reflected in the fact that either state-level or federal moratoria now block the installation of new platforms along most of the U.S. coastline except the western and central Gulf of Mexico.

In the case of platform removals, however, only very modest weight is given these considerations in the ranking shown in Table 3.4. In terms of aesthetics and freedom to trawl, platform removals proceed too slowly and incrementally, relative to the total stock of platforms in place, to elicit the intensity of concern that platform installations in a new, undeveloped area do. In environments such as California which has only 23 operating platforms, some large and in relatively deep water, this generalization may not apply as well as it seems to in the Gulf of Mexico with its approximately 4,000 platforms.

In Louisiana, the approved artificial reef sites reside an average of 30 miles from shore and range between 15 and 100 miles from shore. Especially those at the distant end are not very accessible to recreational fishermen making day-trips. However operating platforms are accessible and are used heavily.

From a marine environment/habitat perspective, as platforms are decommissioned and removed, there is a net loss, both as direct habitat and as a factor that reduces the pressure on natural reef habitat. The economic impact of this loss is multiplied by the fact that the more accessible platforms, closer to shore, are usually those that are likely to be the first to be removed.

So far, in the U.S. Gulf, only about one out of every fourteen decommissioned platforms

ends up as artificial reefs.[27] There are two reasons for this low conversion rate. First, the platforms that have been decommissioned have been relatively small and close to shore, which makes onshore salvage or refurbishing for reuse a better option from an economic point of view. The economic disadvantage of onshore disposal grows as the size of the platform and the distance to shore increase.

The second reason for the low conversion rate is that the areas authorized by Louisiana for creating artificial reefs are quite far from shore, which increases the economic advantage of onshore disposition. Texas' program is more liberal and authorizes the creation of an artificial reef by toppling platforms in place as long as doing so does not interfere with other ocean users. The areas off the Texas coast where toppling is permitted are residuals remaining after areas required by other users are specified. But the relative discrepancy between the Texas- and Louisiana-administered programs is still dramatic. A recent paper by L. Dauterive of MMS' New Orleans Office indicated that the Louisiana artificial reef program had attracted 83 platforms compared to 45 in Texas[28]. However, there are almost seven times as many platforms (3,466 according to our data base) in the waters feeding the Louisiana program as are eligible for Texas' program (509), and, more specifically, 1,488 platforms have been removed from Louisiana's waters compared to 217 from Texas'. Thus Louisiana has retained about 5.5 percent of its retired platforms as artificial reefs while Texas has retained almost 21 percent.[29]

Similarly, the relative advantages and disadvantages of the alternatives to onshore disposal will change with the economic, political, and physical attributes and aspirations of each country. For example, a wealthy country with only a few offshore platforms close to shore, extensive natural reef or hard bottom habitat, and an active environmental movement might rationally select

a quite different policy option than a poor country with many large platforms, located far offshore, with little hard-bottom habitat, whose political agenda is driven by aspirations for more rapid economic development.

4. What is a “large” platform?

The previous analysis indicates that economic evaluations will quite likely suffice to ensure that smaller platforms, in relatively shallow water, close to shore, will be brought to land for salvage,

percent for platforms cut at 55 meters. Even for an engineer, this seems too cautious. But in the following section we use a 4,000 tonne weight and 55-meter water depth as a conservative minimum criteria to define a “large” platform.

The other rationale for the IMO requirements may be to avoid interfering with trawling by commercial fishermen. While such deep trawling may take place on a limited scale, any fishermen doing so in all likelihood would have to have global positioning and navigation systems capable of recognizing and avoiding remnants of partially removed platforms. In a relative sense, the area precluded from trawling by a partially removed platform is insignificant.

4.2 - The geographic distribution and vintage of “large” platforms.

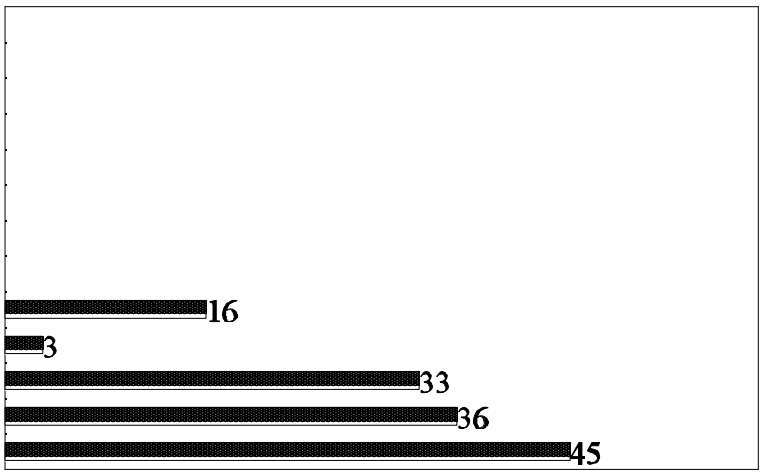
Figure 4.1 shows the distribution of platforms among major producing regions. Only “major structures” are included. Major structures are those that have at least six wells and two


11
73
44
44

distributed than is the case for all platforms. Forty-eight percent of all the platforms included in the tabulation used to make Figure 4.1 were located in the U.S.'s portion of the Gulf of Mexico with 62 percent in other petroleum regions of the world. The U.S. Gulf of Mexico's share of large platforms is 29 percent with other regions accounting for the other 71 percent..

To see the relative importance of the disposition of large platforms in each region, the relevant measure is large platforms as a percentage of all platforms. This is depicted in Figure 4.3. The North Sea/North West Europe, Indian Sub-Continent, Brazil, Australia/New Zealand, and the Far East, all show a *relative proportion* of large platforms at least three times larger than is the case for the U.S. Gulf of Mexico. Further, four other regions (Southeast Asia, West Africa, Central and South America except Brazil, and the Mediterranean/Black Seas) show proportions larger than the U.S. Gulf, leaving only three with a smaller proportion. Thus, in relative terms, the disposition of large platforms is not a U.S. Gulf of Mexico or a North Sea/Northwest Europe problem.

The other measure needed to assess the severity of the offshore platform issue, in addition to the geographical disposition, is how soon the disposition decision will be have to be made. This depends on several factors: the nature of the geology, the life of the field, the development strategy used to produce the field, whether the platforms perform other functions such as pipeline pumping, processing, servicing, and quartering, the relevant regulatory requirements, and so on. Each platform will be somewhat unique and should be evaluated on a platform-by-platform basis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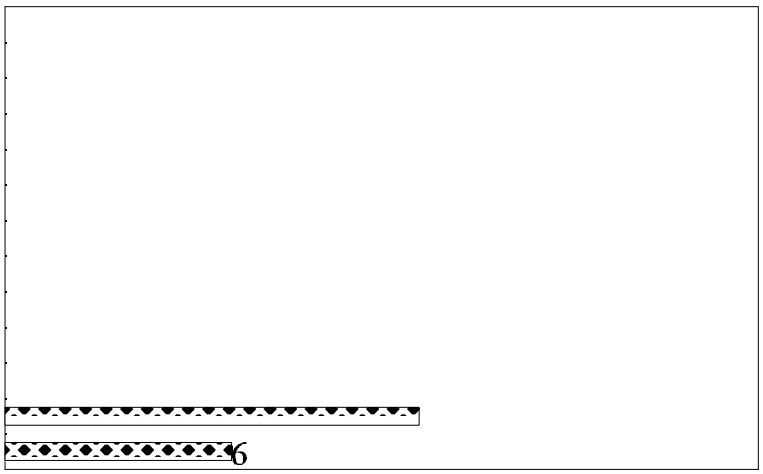
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1997, the average age of major structures that had been removed was only 14 years. Not all of these are “large platforms” using our definition. Using those located in waters at least 200 feet deep as an approximation, 331 such platforms had been removed as of 1997. The average age of these platforms at the time of their removal was 12.8 years.

These data reinforce the previous three graphs’ implication that platform disposition policies are not a matter of concern only in the North Sea or the U.S. Gulf of Mexico. Indeed the data suggest that the disposition of large platforms is an issue that is, in a relative sense, about as imminent in 10 of the other 12 regions as it is in the U.S. Gulf of Mexico.

6. Implications and conclusions

6.1. Onshore disposition should be an option not a goal - In many natural resource policy debates, the frequently idealized, pre-human-intervention situation is implicitly assumed to be a state superior to all others. Given this assumption, the “relevant” policy question becomes: How much would it cost to regain or make progress toward that “ideal,” and would the costs result in serious, irreparable economic harm to those on whom they would ultimately rest?

Despite the strong support by environmental organizations for onshore-only-disposition, there is little evidence that any of the other alternatives involving disposition at-sea would damage the marine environment significantly or place it at risk. Accepted engineering practices require that all wells be severed and permanently plugged and all the platform components other than bare steel or concrete be removed under all disposition alternatives. We know of no studies that have shown generic, detrimental environmental consequences from any of the disposition-at- sea alternatives.

The primary effect on the environment of platform decommissioning is the reduction of reef-like marine habitat that takes place when platforms are towed to shore or to deep ocean sites for disposal. We know of no studies that argue that the value of leaving all or part of the platform at sea is less than the value of complete removal and onshore salvage. Further, onshore disposal also entails a number of risks to worker safety and environmental amenities that at-sea disposal may avoid.

The inference of the commonly used pejorative for at-sea disposition,“ocean dumping,”is

6.2 - International Standard Setting - The campaign by Greenpeace to prevent the sinking of the North Sea storage and transfer facility Brent Spar was so successful that it not only achieved the immediate goal but secured their claim for leadership among environmental organizations in this area of ocean and coastal policy. It also increased the political power of environmental groups and the green political parties in Western Europe. As disposition decisions come closer and the political power of the environmentalist side of the debate strengthens, siding with "ocean dumpers" has become an increasingly uncomfortable position for many western European politicians and their parties. This is an observation not a criticism. As a general principle political response to changing public opinion is a good thing.

But it is important to understand that this is a response largely to political attitudes, values and strengths in Western Europe, not to new scientific information, better engineering practice, or changing economic analysis.

implicit in the onshore-disposition-only standard or retain the options involving disposition at sea.

1. This article is based on a presentation at the APEC (Asia Pacific Economic Commission) workshop on platform decommissioning held in Jakarta Indonesia in October 1998.

2. "Onshore-only platform disposition" is usually stated in the negative as "no ocean dumping," but "ocean dumping" covers too wide of a range of activities and its connotations are too prejudicial for balanced public policy discussions. "Onshore-only disposition" is used here as a more descriptive and more neutral term.

3.OSPAR is the Oslo-Paris Environment Ministers organization that deals with maritime pollution in the North East Atlantic. Belgium, Denmark, France, Finland, Germany, Iceland, Ireland, Norway, Portugal, Spain, Sweden, Switzerland, the UK and the European Union are its members.

4. See "What goes down must come up," in *Financial Times-Energy World,* No. 99 (August, 1998) for a forthright and spirited, if openly disdainful, discussion of the meeting. The article also points out the irony of OSPAR's concern that the industry would turn to concrete platforms to avoid costs of onshore disposition. In fact, some of the most modern platforms designed to be removed and reused or, if desired, disposed of most easily and cheaply are made of concrete. Further the, *Financial Times* article points out, there are far more accessible and practical loopholes in the agreement. Conversion of a steel platform to an artificial reef, for example, could be treated as a "new use" not subject to the on-shore only requirement and "derogations"or cases-by-case exceptions are allowed on economic as well as environmental grounds.

5. ICF Resources Inc. 1995 *Impact on U.S. Companies of a Worldwide Ban on Disposal of Offshore Oil and Gas Platforms at Sea.* Prepared for the American Petroleum Institute, p. i.

6. In a Greenpeace press release, a spokesperson said, "The ban on dumping steel oil installations is a total vindication for Greenpeace's three year campaign, which began with the Brent Spar in 1995. The European public–which did not want the sea used as a dump site–has won and our seas will be the cleaner for it." Press Release" GREENPEACE CLAIMS HISTORIC VICTORY AT OSPAR CONFERENCE, Greenpeace International, dated July 23, 1998.

7. Ironically, after pipeline technology and economics had made such structures rare for two decades, they again are being seriously considered for use in deep water producing regions in the Gulf of Mexico and elsewhere. The U.S. Minerals Management Service has issued request for proposals to address the environmental impacts that may result from their use.

8. See Clifton Curtis' letter "You Can't Hide, Even in the Sea,"

Science Loses to Joe Six-Pack," *Wall Street Journal*, July 7, 1995, p. A1

10. June 6, 1995, the cover and much of the issue featured the controversy.

11. Nesbet, E.G. and C.M.R. Fowler, "Is metal disposal toxic to deep oceans?" *Nature* Vol 375, (June 29, 1995) p.715, the editorial is entitled "Brent Spar, broken spur: Shell Oil's decision not to sink a used oil-rig is a needless dereliction of rationality" *Ibid*., p. 708.

12. "Shell Finally Finds Home for Brent Spar As Wharf in Norway," *The Oil Daily*, January 30, 1998, p. 5.

13. Letter to the editor by Jonathan Hall, "Lessons of the Brent Spar," *Washington Post*, July 7, 1995, p. A20.

14. "Shocked Shell," *Wall Street Journal*, June 20, 1995, p. A22.

15. See subtitle of editorial cited in note 9.

16.Bahree, B. et al., "Giant Outsmarted: How Greenpeace Sank Shell's Plan to Dump Big Oil Rig in Atlantic," *Wall Street Journal*, (July 7, 1995) p. A3.

17. See the nineteen point position paper by Clifton Curtis, Biodiversity/Oceans Advisor, Political Division, Greenpeace International, in Pulsipher, A.G. (ed)

22. Pulsipher, A.G. (ed.) *Proceedings: An International Workshop on Offshore Lease Abandonment and Platform Disposal–Technology, Regulation and Environmental Effects*, LSU Center for Energy Studies, Baton Rouge, Louisiana, p.111.

23. Reggio, V.C. Jr., *Rigs-to-Reefs: The use of obsolete petrolelum structures as artificial reefs.* OCS Report MMS. 87-0015. New Orleans, LA U.S.D.O.I., MMS, 17p.

24. Wilson, Charles A., David R. Stanely, and Mark Miller, *Louisiana's Artificial Reef Program: Comparison of the Assemblage of Organisms at Two Artificial Reefs and a Production Platfrom in the Northern Gulf of Mexico.* 1998-99 Annual Report to the Louisiana Artificial Reef Program Louisiana Department of Wildlife and Fisheries, Coastal Fisheries Institute, Center for Coastal, Energy, and Environmental Resources; and Wilson, Charles A. and David R. Stanley *The Louisiana Artificial Reef Research Program* 1997-98 Annual Report *Ibid.*

25. *Ibid.*

26. See a letter to the editor of the *Oxford Energy Forum* of February 1995 (p. 17-18) from Michael Sutherland, Offshore Liaison Executive, Scottish Fishermen's Federation for a forceful argument on this point

27. In a presentation included in the Proceedings of an MMS-sponsored workshop, *Decommissioning and removal of oil and gas facilities offshore California: recent experiences and future deepwater challenges,* Bud Danenberger, Chief of MMS' Engineering and Technology Division, reported that of a total of 1,559 platforms removed, only 113 had been converted into artificial reefs. This represents a decline in the percentage converted from the ten to twelve percent usually cited in the literature to only slightly more than seven percent.

28. Dauterive, L. "Rigs-to-Reefs Policy, Progress, and Perspectives," *Proceedings: 1999 SPE/EPA Exploration and Production Environmental Conference, Austin TX, 28February - 3March, 1999.* p. 316.

29. There may be other reasons for this difference, but the fact that Louisiana uses designated areas for artificial reef sites while Texas allows platforms to be toppled in-place if doing so would not interfere with other ocean uses, e.g., navigation, is likely to be the most important factor.

30.It had been expected for some time that the 75 meter requirement would be "lowered" to 55 meters. See Knott, David. "Brent spar experience haunts N. Sea platform abandonments," *Oil&Gas Journal*, June 3, 1996.p.18. However the International Maritime Organization (IMO) has deepened the requirement to 100 meters for structures put in place after January 1, 1998 that weigh less than 4,000 tons. IMO LC/SC 21/2/10 "Waste Assessment Guidance: Development of Waste-Specific Guidance." IMO standards permit partial removal and toppling in place as long as the water column is cleared to a depth of 55 meters.

31.Pulsipher, Allan G. Iledare, O.O., Mesyanzhinov, D. V., Dupont, Alan, and Qiaozhen, Lucy Zhu. *Forecasting the number of offshore platforms on the Gulf of Mexico to the year 2023.* Draft

report submitted to the Minerals Management Service, Contract Number 14-35-0001-30660-19923. By the Center for Energy Studies, Louisiana State University, under a cooperative agreement between MMS and LSU's Coastal Marine Institute.

32. Prasthofer, P.H. *Offshore Decommissioning and Disposal: Background Issues and Facts,* Report No. 10.12/232 . E&P Forum: London 1995.

33. Watling, Les and Elliot A. Norse. "Disturbance of the Seabed by Mobile Fishing Gear: A Comparison with Forest Clear-Cutting." Pre-publication version, published in December 1998 *Conservation Biology*.