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**OSPAR's exclusion of rigs-to-reefs in the North Sea**

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## OSPAR's exclusion of rigs-to-reefs in the North Sea

### Abstract

This article focuses on how the debate over the deepwater disposal of offshore oil and gas installations has been central to shaping North Sea artificial reef policy. Through a close empirical historical study, this article reconstructs how Greenpeace's protest of the deepwater disposal of the Brent Spar spurred the exclusion of rigs-to-reefs (the conversion of obsolete offshore oil and gas structures into artificial reefs) as a viable decommissioning option by the primary international treaty organization with jurisdiction over North Sea waters, the Oslo-Paris Commission (OSPAR). During OSPAR's artificial reef guideline development, several OSPAR contracting parties implied that there is a conspiracy among oil companies to use rigs-to-reefs as a cover for evading the deepwater disposal rules, although they never presented evidence to back up these claims. In the face of pressure to "close the loophole" for deepwater disposal and in spite of scientific objection, OSPAR's final guidelines excluded all non-virgin materials as acceptable reef construction materials, essentially banning rigs-to-reefs. Because a significant number of steel offshore installations will be decommissioned in North Sea waters in the decade and the most up-to-date science has concluded that manmade deepwater reefs may be beneficial to some species including threatened coldwater coral, this article suggests that OSPAR revise its guidelines. Rigs-to-reefs should be not categorically excluded; a case-by-case determination of the suitability of a structure for reuse as an artificial reef would be most appropriate.

### 1. Introduction

We are at a particularly critical moment in North Sea offshore oil and gas installation decommissioning. As of 2009, there were 1 212 offshore installations in the North Sea region; 129 installations had been decommissioned to date. Installations in Norwegian and UK waters dominate, with 354 and 612 operational structures respectively (OSPAR, 2009). According to estimates, over 220 production fields and their associated structures will be decommissioned in UK waters by 2025 (UK Department of Energy and Climate Change, 2011). This means that the next ten years will be a high point for offshore structure removal.

Rigs-to-reefs, the conversion of obsolete offshore oil and gas structures into artificial reefs, has been used in the US since the late 1980s as an option for reusing offshore structures as functional reefs instead of disposing of them onshore (Kaiser and Pulsipher, 2005). The conversion process can involve toppling in place, partial removal or relocating a structure to a designated reef planning area in order to create habitat for fish and other marine life. Generally, only the support structure known as the jacket is used in reef construction. The states of Louisiana (in 1987) and Texas (in 1990) developed artificial reef plans in compliance with the National Artificial Reef Plan in order to create state-level rigs-to-reefs programs (Wilson et al., 1987; Stephan et al., 1990). Industry donated 147 structures for artificial reefs under Louisiana's plan between 1987 and 2006 and 91 structures to the Texas Artificial Reef program between 1991 and 2006, meaning that less than ten percent of the structures removed from Gulf waters have been turned into reefs (Kaiser and Kasprzak, 2007). The programs have been touted as a win-win by all of the interest groups, including recreational fishermen and environmentalist organizations (Jørgensen, 2009).

Scientific studies have indicated that rigs-to-reefs might be appropriate for fish conservation in the North Sea. A recent comprehensive review of the scientific literature on rigs-to-reefs concluded that it can have positive effects on deep-sea benthic communities and the upcoming decommissioning surge could provide the opportunity to create large scale deep-sea artificial reef complexes to benefit ocean life (Macreadie et al., 2011). Studies targeting the North Sea have concluded that an artificial reef complex from offshore structures could act as fish stock safe harbors (Cripps and Aabel, 2002), cod have some fidelity for offshore platforms (Jørgensen et al., 2002), offshore installation may be important nocturnal porpoise-feeding stations because they protect fish populations (Todd et al., 2009), and some offshore platforms host threatened cold-water coral colonies (Gass and Roberts, 2006). An extensive commissioned study of the Ekofisk field installations in Norwegian waters recommended the creation of a large artificial reef complex for stock protection out of redundant platforms (Cripps and Aabel, 1998).<sup>1</sup>

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<sup>1</sup> The study was commissioned by Philips Petroleum as part of their Ekofisk decommissioning planning. Although the scientists who wrote the report strongly advocated creation of the reef, Philips opted for removal of all facilities

If a North Sea rigs-to-reefs program is ever going to be founded, now is the time. But in contrast to the US case, there has never been a rigs-to-reefs project in the North Sea. The controversial nature of rigs-to-reefs in the North Sea has been mainly attributed to fishermen objections and the debate over offshore installation disposal (Baine, 2002; Baine and Side, 2003; Sayer and Baine, 2002). This article focuses on the debate over deepwater disposal and shows how it has been central to shaping North Sea artificial reef policy. In this case, a particular political event—Greenpeace’s protest of the deepwater disposal of the Brent Spar—spurred the exclusion of rigs-to-reefs alternatives as a viable decommissioning option by the primary international treaty organization with jurisdiction over North Sea waters, the Oslo-Paris Commission (OSPAR).

## **2. Methods**

Through a close empirical study, this article reconstructs how OSPAR's North Sea artificial reef policy was shaped by particular political circumstances in the late 1990s and how that has had lasting effects on the possibility for rigs-to-reefs. Documents related to the development of OSPAR's *Guidelines on Artificial Reefs in relation to living marine resources*, including both publically available meeting summaries and internal documents requiring permission from the authors to see them, were obtained directly from the OSPAR archives. These documents come from relevant OSPAR committees and head of delegation meetings for the time period that the guideline was under discussion, 1995–1999.

## **3. Results and discussion**

First, section 3.1 presents background material on the deepwater disposal protest that arose in 1995 and served as the context for OSPAR’s artificial reef policy. Second, using the OSPAR documents, section 3.2 shows how the deepwater disposal issue created friction within OSPAR about the language of its artificial reef guidance document and directly affected the final text.

### **3.1 Deepwater disposal protest**

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other than one large concrete tank in the decommissioning plans submitted to the Norwegian government.

On April 30, 1995, a group of Greenpeace protestors boarded the Brent Spar buoy to protest Shell's plan to dispose of the facility in a deepwater trench, which had been approved by the UK government in February 1995. This was the first time that an oil and gas installation would have been disposed of at sea in the North Sea. The protestors occupied the Brent Spar for 24 days before being removed, but reoccupied the facility on June 16. Although the scientific basis of both the protests and the disposal plans were questioned after the fact (Rice, 1996), the protest captured significant media attention, and Shell gas stations were boycotted and even physically attacked during the standoff (Rice and Owen, 1999). By the time Shell decided on June 20 not to dispose of the Brent Spar at sea and bring it to shore for dismantling instead, a new political climate against deep-water disposal had taken shape.

The Brent Spar incident has long been identified as a turning point in North Sea decommissioning policy (Gage and Gordon, 1995; McIntyre, 1995; Osmundsen and Tveterås, 2003; Pulsipher and Daniel, 2000; Side, 1997). In the wake of Greenpeace's protest of Shell's planned deepwater disposal of the Brent Spar facility and subsequent public outcry, the international political community worked swiftly to ban the disposal of most types of offshore installations in the North Sea. At the 4<sup>th</sup> International Conference on the Protection of the North Sea on 7 June 1995, Denmark's delegation asked for an international prohibition on the disposal of platforms at sea, termed "dumping." The Esbjerg Declaration issued by the Conference (with reservations from Norway and UK) included a paragraph stating that disposal on land was preferred for offshore installations (International Conference on the Protection of the North Sea, 1995, paragraph 54). OSPAR likewise issued OSCOM Decision 95/1 on 29 June 1995 calling for a moratorium on all platform disposal at sea until formal rules on disposal could be established. Norway and UK did not agree to the decision, making it non-binding on those nations.

Over the next three years, OSPAR members debated the terms of acceptable and unacceptable deepwater disposal. In July 1998, OSPAR ministers instituted a ban on dumping and toppling of all steel platforms in North Sea, although steel bottoms weighing over 10 000 tonnes could remain in exceptional circumstances (per OSPAR 98/3 on the Disposal of Disused Offshore). Norway and UK agreed to the decision, saying that the exceptions made the ban acceptable (OSPAR, 1998, Agenda item 5).

As we will see in section 3.2, although the Brent Spar decommissioning was not directly related to reef creation—it was always presented by Shell and the UK government as a deepwater disposal with no environmental benefit as a reef—the Greenpeace protest and subsequent international reactions fundamentally influenced the development of OSPAR’s artificial reef policy.

### **3.2. OSPAR’s artificial reef guidance**

At the same time as the dumping discussion was taking place in 1996, OSPAR was also considering an artificial reef guidance document. In this section, the OSPAR archival materials are analyzed to show that during the debates about the contents of such a guidance, two sides emerged: (1) those who believed that OSPAR had mandated the committee to draft a guidance specifically to address proper ways to use wastes or other matter as artificial reefs and (2) those who wanted to make sure former offshore installations could not be used as reef material. Those in the second group, particularly the delegation from Germany, built their position around the fear of dumping created by Greenpeace and the Brent Spar incident.

#### *3.2.1 Dumping enters the discussion*

In the discussion of the artificial reef guidance that took place in the late 1990s, references to the potential misuse of artificial reefs for the illicit dumping of offshore installations surfaced again and again. OSPAR’s 1996/1997 Action Plan mandated the development of a guideline for “Matter placed in the maritime area for a purpose other than that for which it was originally designed or constructed” and the task was assigned to the UK delegation in the Working Group on Sea-based Activities (SEBA) (OSPAR, 1996). When the UK delegation presented the draft text to SEBA (UK delegation to OSPAR, 1996), the delegations from Germany and Sweden complained about a “loophole” that “might result in the disposal of wastes at sea in the guise of artificial reefs.” Germany listed the rigs-to-reefs idea in this context (Germany delegation to OSPAR, 1996). These delegations believed that because the artificial reef guidelines did not forbid the reuse of material that could not be dumped under the Disposal of Offshore Installation guidelines, oil companies would try to use artificial reef creation as a mask for dumping. At the end of the meeting, the UK agreed to

work on a revised version of the guidelines for presentation the following year (OSPAR SEBA, 1996, Agenda item 11).

Conflicts over the document's wording continued to plague the SEBA committee. The UK delegation presented their revised draft at the 1997 SEBA meeting. In the UK's opening remarks, the delegation pointed out that OSPAR had a duty to write the guidelines specifically "relating to the placement of matter, or disused offshore installations and offshore pipelines for a purpose other than that for which the material was constructed" (UK delegation to OSPAR, 1997). This meant that the UK wanted to write guidelines that addressed the reuse of material as artificial reefs, which would have included the rigs-to-reefs concept. The German delegation continued to protest that the artificial reef guidelines did not prevent the disposal of waste at sea and several other countries shared their concerns. Germany specifically wanted no allowance for offshore installations in the guidelines because it would not be consistent with the installation disposal prohibitions currently under negotiation within OSPAR (these talks would result in OSPAR 98/3). The German delegation cited a European Commission study that had determined that artificial reefs in the North Sea from offshore structures would "have very limited environmental or socio-economic benefits" (Germany delegation to OSPAR, 1997). Norway and UK both disagreed with the objections. At the end of the discussion, the UK indicated that they could not continue as the lead country on the issue. Germany and Spain were subsequently given the task of rewriting the draft guidelines for presentation at the 1998 meeting (OSPAR SEBA, 1997, Agenda item 12). In this turn of events, the responsibility for the guidelines switched from the side that wanted to address the use of waste in artificial reefs to the side that rejected all waste as source material. This would open the door for a rigs-to-reefs exclusion.

### *3.2.2 New leaders, new guidelines*

At this stage, language excluding rigs-to-reefs as a valid artificial reef project entered the guideline. When Spain and Germany presented the new draft in 1998, the guidelines specifically restricted the construction of artificial reefs to structures designed and built on land using new materials and forbade the use of recycled material: "No materials should be used for the construction of artificial reefs, whose



disposal at sea is otherwise prohibited (in particular post consumer materials and offshore installations)” (Spain and Germany delegations to OSPAR, 1998, §2.2). Both UK and Norway objected to this new version saying that the guidelines were intended to address artificial reef construction from reused materials but the Spain/Germany version excluded all re-used material, meaning that the guidelines did not fulfill their original function. The Working Group realized that they had reached an impasse (OSPAR SEBA, 1998, Agenda item 10).

To work through the issues, Spain agreed to host a workshop on the technical and environmental aspects of artificial reefs 30 September – 2 October 1998. The workshop included technical presentations by Dr. Antony Jensen of the European Artificial Reef Research Network (EARRN) on general European artificial reef trends, Dr. John Campbell and Bill Griffin of the E&P Forum on oil installation conversions to reefs, and Dr. Aud Vold Soldal on a fish survey around a currently unused Norwegian platform. The ecological benefit of rigs-to-reefs was highlighted in several presentations (OSPAR AR, 1999). We should note that artificial reef scientists had not been directly involved in the guideline development during the earliest phases. At a meeting of the EARRN in January 1998, the scientists had in fact complained about their lack of involvement, stating, “Communication between the scientific body involved in reef science and ‘decision makers’ was poor. The example of almost non-existent communication with SEBA the scientific committee advising the OSPAR convention on guidelines for permitting artificial reef deployment was used as an example” (Jensen 1998). The network, which had been funded by the European Commission Agriculture and Fisheries programme since 1995, had already had three meetings and the proceedings from their first meeting had been published in 1997 (Jensen 1997). The group decided to forward a copy of the January 1998 meeting proceedings, which included discussions touting the acceptability of waste materials as reefs under certain conditions, to the chair of SEBA (Jensen 1998).

In spite of the scientific information presented at the workshop in Spain and the EARRN proceedings, when Spain presented the next draft guidelines to SEBA in February 1999, the language had not been substantially changed from the prior version and still included the paragraph prohibiting the use of offshore installations as reefs. Norway and UK again objected. The Netherlands delegation replied that

OSPAR Decision 98/3 did not leave any possibility for offshore installations to be used as artificial reefs so therefore the guidelines were appropriate (OSPAR SEBA, 1999). In spite of this Dutch claim, we should note that OSPAR Decision 98/3 had not banned rigs-to-reefs because such a conversion would technically not be disposal or dumping since the jacket would be “serving another legitimate purpose in the maritime area”; in addition, steel jackets weighing over 10,000 tonnes as well as some concrete installations were exempt from the disposal requirements and could also legitimately be included in a rigs-to-reefs program. The guidelines were forwarded up the OSPAR chain-of-command over the objections.

When the artificial reef guidelines were presented at the meeting of the Procedures and Rules (PRAM) committee in May 1999, the UK and Norway again objected to the guidelines as written. Both countries still maintained that by excluding reused materials like offshore installations, the guidelines would not serve their original intent. PRAM decided to forward the text to the Head of Delegation (HOD) meeting in June over the objections (OSPAR PRAM, 1999).

### *3.2.3 OSPAR adopts artificial reef guidelines*

The final OSPAR *Guidelines on Artificial Reefs in relation to living marine resources* adopted in June 1999 included two statements with a direct effect on potential Rigs-to-Reefs conversions: “No materials should be used for the construction of artificial reefs which constitute wastes or other matter whose disposal at sea is otherwise prohibited” and “Modules for artificial reefs are generally built on land unless they consist solely of natural materials placed in an unmodified form” (OSPAR, 1999a, paragraphs 13 and 14). The specific language prohibiting “post-consumer materials and offshore installations” which had been in previous drafts had been deleted, but the artificial reefs are limited to virgin materials since wastes are prohibited as reef construction material.

The final guidelines split the previous alliance of the UK and Norway. In a surprising twist, the UK backed down from its objections and agreed to the guidelines (OSPAR, 1999b, item 3.25). It is not clear from the sources why the UK changed its position. Britain’s Secretary of State for Environment, Transport and the Regions John Prescott

was quoted by the trade journal *Upstream* as saying, “Everyone is now content that the wording of these guidelines will provide safeguards against any loophole by which offshore installations could be dumped at sea” (Hopson, 1999). This statement would appear to indicate that UK government had now bought into the “loophole” language pushed by the German delegation and Greenpeace from the beginning of the guideline development process. Norway, meanwhile, stuck to its position and refused to adopt the guidelines, arguing that the reuse of offshore installations needed to be exempted. Although Norway’s objection means that they are not bound to the guidelines, the opinion of the international political community had been made clear: rigs-to-reefs in the North Sea is equal to illicit dumping of offshore structures.

#### 4. Conclusion

This historical analysis reveals how the Brent Spar protest and subsequent demand to ban deepwater disposal of installations loomed large during the development of the OSPAR artificial reef guidelines. Because of the Brent Spar incident and pressures to “close the loophole” for deepwater disposal, the guidelines ended up excluding all non-virgin materials as acceptable reef construction materials. We can thus conclude that the guidelines ultimately signed by the OSPAR participants (except Norway) did not meet the convention’s original mandate to develop guidelines for the creation of reefs with “matter placed in the maritime area for a purpose other than that for which it was originally designed or constructed”.

The OSPAR stance has created a legacy that has entered other artificial reef guidance as well. The London Convention and Protocol, which consists of contracting parties to global treaty instruments preventing pollution from dumping of wastes, and United Nations Environment Programme recently issued their own *Guidelines for the Placement of Artificial Reefs* (LCP/UNEP, 2009). The guideline preparation activities were led by Spain, at the same time that that party led the OSPAR artificial reef guidelines. In the LCP/UNEP guideline, the use of offshore installations as artificial reefs is acknowledged, but is qualified with the statement “although there is not general agreement on their acceptability” (LCP/UNEP, 2009, p. 4). In the appendix dedicated to offshore oil and gas structures as reefs, the authors consistently use language such as “disposal at sea” and “dumping site” and never the term rigs-to-reefs

or reef creation. In other words, just like the debate within OSPAR, the LCP/UNEP guidelines frame rigs-to-reefs as waste disposal rather than an alternative repurposing of the structure as a reef. This is in contrast to the London Convention's own Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone (IMO Resolution A.672(16), adopted 19 October 1989) which permits offshore installations to “serve a new use ... such as enhancement of a living resource” .

Because the LCP/UNEP guidance admits the possible acceptability of using waste materials as reefs, albeit heavily qualified, the UK delegation to OSPAR recently tried to get the language of OSPAR's artificial reef guidelines changed (OSPAR EIHA, 2009). When the Biodiversity Committee considered the UK's suggestion, some of the contracting parties did not want to lessen the current restriction of only “virgin” material (OSPAR BDC, 2010). After debate about new language creating possible loopholes for the dumping of wastes, a proposal to change the term “virgin material” to “inert material” was forwarded to the Jurists/Linguists committee in 2011 (OSPAR EIHA, 2011), but the results of their deliberation are not yet available. While OSPAR's *Guidelines on Artificial Reefs in relation to Living Marine Resources* is only a guideline, and thus not legally binding, it sets acceptable international practice in the North Sea region. As long as the guidelines contain the provision that restricts reefs to “virgin materials,” rigs-to-reefs may be difficult to implement in the North Sea.

It is time for OSPAR to rethink their artificial reef guidelines and its exclusion of rigs-to-reefs. This historical analysis shows that the exclusion was grounded in particular concerns arising in light of the Brent Spar protest about deepwater disposal. Several OSPAR contracting parties consistently implied that there is some kind of conspiracy among oil companies to use rigs-to-reefs as a cover for evading the deepwater disposal rules, yet they never presented evidence that this is the case. The most up-to-date science has concluded that manmade deepwater reefs may be beneficial to some species (Macreadie et al., 2011), and offshore structures are known to provide habitat for threatened coldwater coral (Gass and Roberts, 2006)—the same corals that have received significant conservation attention, not least from OSPAR (e.g. OSPAR, 2003). A categorical exclusion of rigs-to-reefs is not therefore scientifically justifiable; rather a case-by-case determination of the suitability of a structure for

reuse as an artificial reef would be most appropriate. OSPAR should consider rigs-to-reefs not as a disposal method for offshore installations, but rather as an alternative use of existing material to create intentional artificial reefs for environmental enhancement under the right conditions.

## References

- Baine, M., 2002. The North Sea rigs-to-reefs debate. *ICES J. Mar. Sci.* 59, S277–S280.
- Baine, M., Side, J., 2003. The role of fishermen and other stakeholders in the North Sea rigs-to-reefs debate. *Am. Fish. S. S.* 36, 1–14.
- Cripps, S.J., Aabel, J.P., 1998. EKOREEF – Report 1: Summary. Report RF-98/022 – D&M 37363.001. Rogaland Research / Dames & Moore, Stavanger.
- Cripps, S.J., Aabel, J.P., 2002. Environmental and socio-economic impact assessment of Ekoreef, a multiple platform rigs-to-reefs development. *ICES J. Mar. Sci.* 59, S300–S308.
- Gage, J.D., Gordon, J.D.M., 1995. Sound bites, science and the Brent Spar: Environmental considerations relevant to the deep-sea disposal option. *Mar. Pollut. Bull.* 30, 772–779.
- Gass, S.E., Roberts, J.M., 2006. The occurrence of the cold-water coral *Lophelia pertusa* (Scleractinia) on oil and gas platforms in the North Sea: Colony growth, recruitment and environmental controls on distribution. *Mar. Pollut. Bull.* 52, 549–559.
- Germany delegation to OSPAR, 1996. Comments on draft guidelines for the construction of artificial reefs. OSPAR archives, London, SEBA 96/11/2.
- Germany delegation to OSPAR, 1997. Comments on the revised version of the draft guidelines for the construction of artificial reefs (SEBA 97/12/1). OSPAR archives, London, SEBA 97/12/3.
- Hopson, C., 1999. Rigs-to-reefs ban divides Ospar allies. *Upstream*, 2 July 1999.

International Conference on the Protection of the North Sea, 1995. Esbjerg Declaration 1995, Ministerial Conference on the Protection of the North Sea, Esbjerg, Denmark, 8–9 June 1995. Ministry of Environment and Energy, Danish Environmental Protection Agency, Copenhagen.

Jensen, A.C. (ed), 1997. European Artificial Reef Research. Proceedings of the 1<sup>st</sup> EARRN conference, Ancona, Italy, March 1996. Southampton Oceanography Centre, Southampton.

Jensen, A.C., 1998. Report of the results of EARRN workshop 4: Reef design and materials. European Artificial Reef Research Network AIR3-CT94-2144. Report to the DGXIV of the European Commission, SUDI/TEC/98/10.

Jørgensen, D., 2009. An oasis in a watery desert? Discourses on an industrial ecosystem in the Gulf of Mexico Rigs-to-Reefs program. *Hist. Technol.* 25, 343–364.

Jørgensen, T., Løkkeborg, S., Soldal, A. V., 2002. Residence of fish in the vicinity of a decommissioned oil platform in the North Sea. *ICES J. Mar. Sci.* 59, S288–S293.

Kaiser, M.J., Pulsipher, A.G., 2005. Rigs-to-reef programs in the Gulf of Mexico, *Ocean Dev. Int. Law* 36, 119–134.

Kaiser, M.J. Kasprzak, R., 2007. Louisiana adds new reef sites for storm-damaged structures. *Oil Gas J.*, 11 June 2007.

LCP/UNEP [London Convention and Protocol/UNEP], 2009. Guidelines for the Placement of Artificial Reefs. LCP/UNEP, London.

Macreadie, P.I., Fowler, A.M., Booth, D.J., 2011. Rigs-to-reefs: will the deep sea benefit from artificial habitat? *Front. Ecol. Environ.* 9, 455–461.

McIntyre, A.D., 1995. The Brent Spar incident – a milestone event. *Mar. Pollut. Bull.* 30, 578.

Osmundsen, P., Tveterås, R., 2003. Decommissioning of petroleum installations – major policy issues. *Energy Policy* 31, 1579–1588.

OSPAR, 1996. 1996/1997 Action Plan of the Oslo and Paris Commissions. OSPAR archives, London, OSPAR 96/17/1-E, Annex 26.

OSPAR, 1998. Summary Record, Meeting of the OSPAR Commission, Sintra, 20-24 July 1998. OSPAR archives, London, OSPAR 98/14/1-(A-B)\* -E.

OSPAR, 1999a. OSPAR Guidelines on Artificial Reefs in relation to Living Marine Resources, Agreement 1999-13 (1999).

OSPAR, 1999b. Summary Record, Meeting of the OSPAR Commission, Kingston Upon Hull, 21–24 June 1999. OSPAR archives, London, OSPAR 99/15/1-E.

OSPAR, 2003. Bremen Statement. OSPAR archives, London, OSPAR 03/17/1-E, Annex 33.

OSPAR, 2009. 2009 Biennial update of the inventory of oil and gas offshore installations in the OSPAR maritime area. OSPAR archives, London.

OSPAR AR [Workshop on Artificial Reefs], 1999. Note of proceedings. OSPAR archives, London, SEBA 99-13-Info-1 note.

OSPAR BDC [Biodiversity Committee], 2010. Summary Record, 15–18 June 2010. OSPAR archives, London, BDC 10/11/1-E.

OSPAR EIHA [Environmental Impact of Human Activities], 2009. Summary Record, 3–5 November 2009. OSPAR archives, London, EIHA 09/11/1-E.

OSPAR EIHA, 2011. Summary Record, 31 January–4 February 2011. OSPAR archives, London, EIHA 11/10/1-E.

OSPAR PRAM [Programmes and Measures Committee], 1999. Summary Record, 3–7 May 1999. OSPAR archives, London, PRAM 99/13/1-E.

OSPAR SEBA [Working Group On Sea-Based Activities], 1996. Summary Record, 12–16 February 1996. OSPAR archives, London, SEBA 96/17/1-E.

OSPAR SEBA, 1997. Summary Record, 17–21 February 1997. OSPAR archives, London, SEBA 97/18/1-E.

OSPAR SEBA, 1998. Summary Record, 16–20 February 1998. OSPAR archives, London, SEBA 98/16/1-E.

- OSPAR SEBA, 1999. Summary Record, 15–19 February 1999. OSPAR archives, London, SEBA 99/19/1-E.
- Pulsipher, A.G., Daniel, W.B., 2000. Onshore disposition of offshore oil and gas platforms: Western politics and international standards. *Ocean Coast. Manage.* 43, 973–995.
- Rice, A. L. 1996. The lessons of Brent Spar. *Endeavor* 20, 47–49.
- Rice, T., Owen, P., 1999. *Decommissioning the Brent Spar*. Spon Press, London.
- Sayer, M.D.J., Baine, M., 2002. Rigs to reefs: A critical evaluation of the potential for reef development using decommissioned rigs. *Underwater Technology* 25, 93–97.
- Side, J., 1997. The future of North Sea oil industry abandonment in light of the Brent Spar decision. *Mar. Policy* 21, 45–52.
- Spain and Germany delegations to OSPAR, 1998. Draft guidelines for the construction of artificial reefs. OSPAR archives, London, SEBA 98/10/1, §2.2.
- Stephan, C.D., Dansby, B.G., Osburn, H.R., Matlock, G.C., Riechers, R.K., Rayburn, R., 1990. Texas Artificial Reef Fishery Management Plan. Fishery Management Plan Series No. 3, Texas Parks and Wildlife Department, Austin.
- Todd, V.L.G., Pearse, W.D., Tregenza, N.C., Lepper, P.A., and Todd, I.B., 2009. Diel echolocation activity of harbour porpoises (*Phocoena phocoena*) around North Sea offshore gas installations. *ICES J. Mar. Sci.* 66, 734–745.
- UK delegation to OSPAR, 1996. Draft guidelines for the construction of artificial reefs. OSPAR archives, London, SEBA 96/11/info-1-E.
- UK delegation to OSPAR, 1997. Draft Revised Guidelines for the Construction of Artificial Reefs in Relation to the Provisions of the OSPAR 1992 Convention. OSPAR archives, London, SEBA 97/12/1.
- UK Department of Energy and Climate Change, 2011. Forecasting removal dates, [https://www.og.decc.gov.uk/upstream/decommissioning/forecast\\_rem.htm](https://www.og.decc.gov.uk/upstream/decommissioning/forecast_rem.htm)



Wilson, C.A., Van Sickle, V.R., Pope, D.L., 1987. Louisiana Artificial Reef Plan. Louisiana Department of Wildlife and Fisheries Technical Bulletin No. 41, Louisiana Sea Grant College Program, Baton Rouge.

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**Research highlights**

- The deepwater disposal debate affected North Sea artificial reef policy.
- Bowing to political pressure, OSPAR's reef guidelines exclude non-virgin materials.
- This has, in practice, banned rigs-to-reefs in the North Sea.
- In light of available science, OSPAR should not categorically exclude rigs-to-reefs.