Marine Policy 59 (2015) 53–60

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

Offshore installations, decommissioning and artificial reefs: Do current legal frameworks best serve the marine environment?

Erika J. Techera*, John Chandler

The University of Western Australia, 35 Stirling Highway, Crawley WA 6009, Australia

ARTICLE INFO

Article history:
Received 23 January 2015
Received in revised form
29 April 2015
Accepted 29 April 2015

Keywords:
Energy law
Environmental law
Marine environmental law
Regulation
Decommissioning
Artificial reefs

ABSTRACT

The offshore oil and gas industry is facing the prospect of de-commissioning thousands of installations in the coming decades. In some parts of the world the issue is already pressing. The financial cost of complete removal is significant, and therefore the prospect of leaving part of the installation in situ is attractive. The way forward, though, is not clear. Despite the success of rigs-to-reef projects in the US it is unclear whether such initiatives are transferable to other contexts given very different physical and jurisdictional contexts. This paper explores current legal frameworks including international law and the state of play in Australia compared with that in the US and UK. Tentative recommendations are made for future developments in this area.

1. Introduction

There are now over 7000 oil and gas installations and platforms on the continental shelves of over 53 countries around the world.[1] Many have been in service for 15–20 years, others have already been abandoned and are waiting to be decommissioned.[2] Although the first offshore installations were constructed in the early 1920s, the disposal of them did not begin until the last quarter of the 20th century; and the more 'complex structures began to be decommissioned around the 1990s'.[3]

Offshore installations are composed of the substructure – either a concrete structure remaining on the sea bed through its own weight (gravity based) or footings and a jacket adhered to the seabed, which may be surrounded by drill cuttings (rock particles and fluids created during construction) – as well as the topside structure (above the surface of the water).[4] Installations vary significantly in size and weight, depending on the sea depth and conditions and the extent of their processing, accommodation and other functions. Large topsides can be in excess of 50,000 t and gravity based structures in the hundreds of thousands of tonnes. On the other hand some small installations can be only 200 t. Decommissioning arises when offshore installations reach the end of their useful life. The word "decommissioning" simply means to take out of service. Somewhat surprisingly it is not generally defined in legislation, which may be a contributing factor to its confusion with removal and disposal, which are two possible processes in decommissioning, and sometimes with abandonment. The word "abandonment" means leaving finally and completely. It is an expression used particularly where a well is to be closed permanently, when it will be "plugged and then abandoned".[5] But sometimes in the petroleum industry the words "decommissioning" and "abandonment" are used as alternatives, which is unfortunate given their very different resonances. There are several options available to dispose of installations including

* Corresponding author. Tel.: +618 6488 2949; fax: +618 6488 1045.
E-mail address: erika.techera@uwa.edu.au (E.J. Techera).

[1] Virginia Parente, Doneivan Ferreira, Edmilson Moutinho dos Santos, Estanislau Luczynski, 'Offshore decommissioning issues: Deductibility and transferability' *Energy Policy* 34 (2006) 1992–2001, 1993.

[2] B.A. Hamzah, 'International rules on decommissioning of offshore installations: some observations' (2003) 27 *Marine Policy* 339, 341.

[3] Athanassopoulos, J.D.E., Dalton, J.S., Fisher, A.P., 1999. Offshore oil platform decommissioning: a comparative study of strategies and the ecological, regulatory, political and economic issues involved in the decommissioning planning. Masters project, University of California Santa Barbara, Santa Barbara, quoted in Parente et al., op cit, 1994.

[4] Paul Ekins, Robin Vanner, and James Firebrace, 'Decommissioning of offshore oil and gas facilities: a comparative assessment of different scenarios', *Journal of Environmental Management* 79 (2006) 420–438, 422; Petter Osmundsen and Ragnar Tveteras, 'Decommissioning of petroleum installations—major policy issues' *Energy Policy* 31 (2003) 1579–1588. Installations will vary according to local conditions. For more on the Gulf of Mexico see Mark J. Kaiser, 'The Lousiana artificial reef program' Marine Policy 30 (2006) 605–623.

[5] The authoritative petroleum dictionary, the *Schlumberger Oilfield Glossary* does not define 'decommissioning' at all. It refers to 'abandonment' only in relation to wells as the process of closing the well permanently. See ⟨http://glossary.oilfield.slb.com⟩. In relation to international treaties, similar definitional problems exist. See Hamzah, op cit, 339–348.

http://dx.doi.org/10.1016/j.marpol.2015.04.021
0308-597X/

complete removal and re-processing of the materials, partial removal of the surface structure leaving the lower portions in situ, and also toppling or dismantling the structure and placing the materials on the seabed. As will be seen below international legal frameworks have favoured complete removal. However, 'most offshore structures were not designed to be removed' and thus 'decommissioning may become one of the major issues facing the global offshore industry in the near future.'[6] This brings sharply into focus the need to explore the various decommissioning options and to analyse laws and policies that provide the framework for such activities. The oil and gas industry may be global but there are a wide range of different legislative frameworks across the world, creating a complex regulatory landscape.

The laws that apply include international and regional treaties as well as domestic regimes; international law and its domestic implementation as well as additional State obligations imposed by national governments. Much of the international law is several decades old and focuses upon addressing the risk of marine pollution that was pressing at the time of drafting. In the intervening years scientific advances have been made with evidence emerging of the benefits of permanent ocean structures to living marine resources. Although rules and regulations have been tightened in response to new risks, less attention has been paid to facilitating new disposal options. Domestic laws will include those regulating petroleum (including the licence, concession or contract giving rights to produce), environmental legislation, safety legislation, tax laws and marine protection legislation. Some countries, such as Norway and the United Kingdom, have complex decommissioning regimes. But that is not always the case.

Decommissioning laws have tended to focus upon requirements to completely remove installations, although not all decommissioning regimes state that expressly. One possible reason for this is that decommissioning does not necessitate complete removal and can involve partial removal and disposal at sea or leaving the installation in situ. Scientific research suggests that the latter two options may well be advantageous to the marine environment, in part, because of the role that submerged structures can play as artificial reefs. These can potentially provide significant benefits, in particular to marine living resources. Thus the advantages of in situ decommissioning may outweigh removal. Nevertheless, there is no international law on the creation of artificial reefs through decommissioning or otherwise. Clearly this area is worthy of further exploration given the number of installations likely to require decommissioning now or in the near future, the significant cost of removal and the pressing need to explore innovative options for marine conservation.

Australia has yet to engage with this new scientific evidence and legal frameworks as they currently stand focus on compliance with international law and favour complete removal, rather than exploring the benefits of leaving installations in situ. There is little if any law and policy on the establishment and facilitation of artificial reefs in this country. In other jurisdictions, however, governments have recognised the role that can be played by installations and legal frameworks for their decommissioning provide for the conversation of rigs to reefs. This paper will explore the international law that influences decommissioning, and the Australian implementation of such law favouring removal. A comparative analysis with the US and UK regimes will demonstrate alternative approaches based upon scientific evidence of the benefits of in situ decommissioning versus perceived risks to the environment and of marine pollution. The paper will conclude with tentative recommendations for reform and areas where further research is required.

[6] Parente et al., op cit, 1994.

2. Decommissioning and artificial reefs

Artificial reefs may be defined as 'submerged structures placed on the seabed deliberately, to mimic some characteristics of natural reefs'.[7] They have been used across the globe from the US to Australia, India to the Philippines.[8] They vary considerably in terms of materials used for their construction; Pickering et al. point to concrete being commonly used in Europe and tyres are often used in Australia and elsewhere. Particularly in the US there has been a focus on 'materials of opportunity' which include offshore infrastructure.[9] This has in large part been driven by the financial cost of complete removal, particularly in situations where non-scarce materials are recovered and are often not recycled, but placed in landfill. The cost and tax implications of decommissioning need to borne in mind, as it will not just be the oil company that bears them. Removal costs are tax deductible in some countries, causing a loss in revenue to the government or even a refund of past tax paid. A lower cost decommissioning solution can therefore be financially beneficial to the host country and the oil company. In some cases installations may start to take on the characteristics of artificial reefs during active operations, as marine flora and fauna 'build' an ecosystem around structures. This possibility is enhanced by exclusion zones around oil rigs preventing vessels from entering those waters. This means the underwater substructures remain largely untouched allowing marine life to accumulate and an artificial reef to develop.[10] At this stage such structures tend to be referred to as secondary artificial reefs, as they have not been deliberately placed on the seabed for this purpose.[11]

Scientific research indicates that there are significant benefits of artificial reefs broadly,[12] although there is some debate about whether they attract fish from surrounding areas and thus cause a concentration in one area or truly contribute to enhanced production.[13] In the context of decommissioning, scientific research also points to a number of advantages in the use of offshore installations as artificial reefs. In such circumstances manmade structures may become havens for marine life where natural environments have become degraded or destroyed, or where climate change has altered habitats. Artificial reefs may become permanent habitats for marine life or contribute to connectivity conservation by providing a biodiversity corridor between discrete marine ecosystems. In addition, artificial reefs may have intrinsic value to the marine environment itself and also provide enhanced opportunities for tourism (diving), and recreational and, in some cases, commercial fishing.[14] In the US for example, over 420 platforms have been 'donated' for the construction of artificial reefs.[15]

[7] The European Artificial Reef Research Network (EARRN).

[8] Pickering includes some case studies; Antony Jensen, 'Artificial reefs of Europe: perspective and future' *ICES Journal of Marine Science*, 59 (2002) S3–S13.

[9] Stone RB, McGurrin JM, Sprague LM, Seaman W Jr. Artificial habitats of the world: synopsis and major trends. In: Seaman W Jr., Sprague LM, editors. Artificial Habitats for Marine and Freshwater Fisheries. pp 31 + 60. San Diego: Academic Press; 1991. [Referred to in Pickering et al., op cit].

[10] The 1958 Geneva Convention for example mandates at 500 m safety zone around installations.

[11] Pickering et al., op cit.

[12] David Whitmarsh, Miguel Neves Santos, Jorge Ramos and Carlos Costa Monteiro. Marine habitat modification through artificial reefs off the Algarve (southern Portugal): an economic analysis of the fisheries and the prospects for management. *Ocean & Coastal Management* 2008;51: 463–468; Cf Mark Baine. Artificial reefs: a review of their design, application, management and performance. *Ocean & Coastal Management* 2001;44: 241–259. [where the author found that only 50% of artificial reefs analysed met their goals].

[13] Helen Pickering and David Whitmarsh, 'Artificial reefs and fisheries exploitation: a review of the 'attraction versus production' debate, the influence of design and its significance for policy', *Fisheries Research* 31 (1997) 39–59.

[14] Pickering et al., op cit.

[15] Decommissioning and Rigs to Reefs in the Gulf of Mexico, Frequently Asked Questions, Available at: http://sero.nmfs.noaa.gov/habitat_conservation/documents/pdfs/efh/gulf_decommissioning_and_rigs_to_reefs_faqs_final.pdf.