Decommissioning is the final stage of the lifecycle for an oil and gas asset and is a rapidly developing sector of the petroleum industry. Over the next 30 to 40 years, industry experts expect to see around 600 installations decommissioned in the wider North Sea (470 in the UK sector), thus the oil and gas sector is seeking methods to improve the efficiency of the process.

Currently in the North Sea, decommissioning involves the plug and abandonment of wells, removal of well structures, platforms and pipelines, unless under derogation, aiming to achieve a ‘clear seabed’ philosophy.

The North Sea offshore industry did not predict the effect that deep sea disposal of oil and gas platforms would have on public perception. Although Shell’s application for the disposal of Brent Spar in deep Atlantic waters to the west coast of Scotland was lawful and scientifically justified at the time, the resulting public backlash was strong enough to shape future legislation. This included the Protection of the Marine Environment of the North-East Atlantic convention (OSPAR Convention) and more specifically OSPAR Decision 98/3, which states that disused offshore installations should be disposed of onshore and prohibits submerging or leaving infrastructure in place, totally or partially within the OSPAR maritime area while encouraging the recycling and reuse of offshore materials. In the UK we are driven by the prevention of marine pollution by dumping of wastes and other matter, no longer being used for its original purpose, at sea under the 1972 London Convention and 1996 Protocol.

From an environmental perspective, the role of oil and gas infrastructure as a habitat for marine biota cannot be dismissed. Our knowledge and understanding of risk assessments, risk management and impacts on marine wildlife of in-situ infrastructure has developed since the 98/3 decision was made 20 years ago.

There is increasing evidence suggesting that offshore oil and gas platforms provide significant ecosystem services. The open nature of most subsea structures allows water circulation, energy dissipation and access to hard substrate habitat, attracting diverse fish and invertebrate populations. Studies worldwide using novel analytical techniques such as remotely operated vehicles (ROVs), baited remote underwater stereo-video systems (stereo-BRUVs), 3D photogrammetry and eDNA have demonstrated increased biodiversity and biomass at these structures, both of fish aggregations and the formation of reefs formed by sessile organisms (such as mussels, barnacles, sponges, tunicates, corals etc.).

Academic research provides evidence of the role that oil and gas infrastructure plays in marine ecosystems and is a major driving force for the ‘rigs-to-reefs’ debate and on policy change. There are currently two ‘rigs-to-reefs’ options: 1) preserving an established ecosystem by relocating the rig to a suitable new site and 2) the remain in-situ approach through removal of the topsides but leaving much of the jacket and associated established ecosystem in place.

The ‘rigs-to-reefs’ method has proven successful elsewhere around globally and is now an accepted practice in the Gulf of Mexico, Brunei, Malaysia and Japan.

The Gulf of Mexico ‘rigs-to-reefs’ programme officially commenced in 1986 and 1989, when Louisiana and Texas, respectively, passed legislation. Since then, around 420 platforms have been converted into artificial reefs. It is estimated that offshore platforms constitute 30% of the entire Gulf “reef” habitat. Installations themselves have been designated as “marine protected areas”, reflecting the net environmental benefit that can result from the considered retention of infrastructure in the marine environment.
Studies carried out on seven oil platforms, located in the Santa Barbara Channel area (California), found that the process of removing installations (explosives/mechanical) would endanger the large accumulation of fish existing around the foundations\(^2\), confirming the developed ecosystem around the concrete pylons occurred preferentially over other parts of the ocean. Further studies in California using a multibeam survey found that platform Hidalgo supplies approximately 46% of the total suitable substrate for coral growth in the local area (within about 1.5 miles of the platform). Though the myriad benefits have been demonstrated, leaving rigs in place is still controversial in California with no rigs having been converted.

The successful implementation of a ‘rigs-to-reefs’ programme in parts of the US has attracted interest in Australia, where decommissioning is expected to increase sharply in the near future, as many fields approach ‘end of life’. Although Australia’s current regulations favor complete removal, the National Offshore Petroleum Safety and Environmental Management Authority is exploring the possibility of an in-situ decommissioning policy and amending existing legislation.\(^2\)

In the Southern North Sea, harbour porpoise were found to be present at offshore installations, feeding below or around the platform.\(^3\) Installations enhanced porpoise habitat by acting as artificial reefs and feeding stations, especially during the winter months. The SNS Special Area of Conservation has been identified as an area of importance for harbour porpoise which is an Annex II Species.\(^4\) Removing these “feeding stations” from a designated area raises on the impact associated with this protected species and whether a more evidence-driven case by case method should be taken when considering decommissioning solutions for these assets.

International law and policy have a significant role to play in setting standards in the marine environment including providing a decommissioning framework. Governing bodies and industry need to carefully study the implications realised in other nations, as well as current understanding of the UKCS to best identify and adopt best practice.

Finally, substantial investment in coordinated cross-sector research across the many fields (scientific, industrial, social and economic) relevant to decommissioning is required to attain the best outcome.

There is usually economic benefit to the community by supporting recreational fishing or having a demonstratable benefit at population level to some species within the marine environment. The UK doesn’t have a recreational fishery this far offshore to see a significant benefit from turning these sites into fishing grounds for sea angling. Providing a significant evidence base or establishing a clear economic/ natural capital benefit to society by doing this is hard to find but would be needed to support a justification to decommission offshore installations in-situ in line with the London Convention. However, the big question remains; exactly how much research is enough to drive policy?

Alythea Maggett (Alythea.Magentt@xodusgroup.com, 01224 628 300) is a Graduate Environmental Consultant in the Environment Team at Xodus Group, Aberdeen, November 2019.

References


