



An Analysis of the Environmental Transition in the United Kingdom and its Continental Shelf in Relation to Oil Spill and Current Legislative Proposal Arising from the Regime: A Contrast to the United States of America

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Abstract

The environmental structures of United Kingdom (UK)-the United Kingdom Continental Shelf (UKCS) and the United States of America (USA) are two regimes that has received academic and professional cognisance over the years especially due to the industrial strength and technological wealth of both regimes. While generating oil and gas either offshore/onshore environmental risks have been an un-avoidable topic on the lips of many. This is because the nature of the business is risk oriented. A lot of environmental accidents has been recorded during Exploration and Production (E and P) of oil and gas. These include the Macondo disaster, the Montara disaster and even the Piper Alpha incident. It is notable that most environmental spills occur offshore. This is because on most occasions, a greater amount of this conventional source of energy is generated in the coastal fields. Because of these environmental risk consequences, there has been successive move and change of existing environmental science and technology especially relating to E and P towards preventing a repeat in occurrence or even first occurrence (for nations that are yet to experience) of such environmental spills.

This work hence seeks to address the core deficiencies of the respective environmental and safety regimes, before the Macondo disaster, while highlighting progress made thus far in the resolution of the deficiencies of Macondo. Safety in this work is concentrated on process of technical safety instead of personal safety to streamline the topic.

Keywords: Macondo; Piper Alpha; Environmental Risk; Exploration and Production; Spill

Introduction

The extraction of hydro-carbons is a very hazardous activity with great potential risk to the general environment. It has further been opined that the impacts of oil and gas exploration and production (E and P) activities depends on the stage of the process, the size and complexity of the project, the nature and sensitivity of the environment and the effect of planning, pollution, prevention, mitigation and control techniques. Most environmental woes of the oil and gas industry occur more notably during the upstream stages of operation inclusive of water and land pollution during seismic survey as a result of accidental spill. Air pollution during exploration and appraisal due to atmospheric emissions as well as soil and water contamination due to waste disposal. This impacts further go for the production phase and abandonment.

Some environmental issues observed at this stage include accidental spills and blow out during the development stage and operational discharge and atmospheric emissions such as the gas flaring during the production stage. Few incidents that can be used to buttress these include the Piper Alpha offshore explosion of 1988, the Macondo blowout of 2010, the Montara accident of 2009, and the Niger Delta gas flaring and water pollution in Nigeria among others.

Most environmental regulatory successes and failures have been proven to be consequences of substantive reforms designed to mitigate safety and environmental concerns in offshore oil and gas development [1]. Some scholars have argued that the United States' (USAs') and United Kingdom's (UK's) post-Macondo safety and environmental regulatory regimes are either deficient or non-responsive to threats presented in their oversight of deep water drilling environments [2].

According to this work, there has been substantive regulatory changes, in a post-Macondo regime [3], which inadvertently stands to benefit both the USAs' and UK's oil and gas regimes. The oil and gas industry, operating on a multi-national level, sets up a prime opportunity for one state to learn from another's regulatory regime [4]. However, it is notable that each state must tailor its regime to meet specific domestic needs [2].

Regulation of oil spill in UKCS (before and after Macondo disaster)

The current United Kingdom safety case regime is the result of many years of reform [5]. According to Taverne, the UK has two types of internal legislation: formal acts and subsidiary legislation, such as regulations created under authority of those acts [6]. Furthermore, the United Kingdom is bound by EU regulations and directives (until 2019) [5]. The UKCS oil and gas exploration and production has been active for over 40 years and the area is defined under the Continental Shelf Act, 1964 [7,8]. The regime initially had been described as *laissez faire* to safety since the section that was purported to cover safety was vague [9]. Paterson observed that the remedies available to redress safety challenges were limited to revocation of the license hence, limited to the "most egregious behaviour [2]". This was soon to improve. Subject to the recommendations made upon the Sea Gem collapse of December 1965 [2], the Robens Report, asserted that the UK offshore sector could benefit from a more unified structure [10] and self-regulatory structure [11]. The regulations made upon the Sea Gem recommendations were promulgated from The Mineral Workings (Offshore Installations) Act of 1971 [12,13]. The decision to hold a licence round requires the preparation of a Strategic Environmental Assessment (SEA) under Council Directive (2001/42/EC) [14,15]. The SEA Directive is implemented in the UK by the Environmental Assessment of Plans and Programmes Regulations 2004 (SI 2004/1633) [16].

If the Secretary of State believes that the grant of any prospective licence is likely to significantly affect a Special Protected Area (SPA), he is required under the Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (SI 2001/1754) to undertake a Habitats Regulations Assessment (HRA) for that area [2]. The Offshore Habitats Regulations implement Council Directive 92/43/EEC [17] and Council Directive 2009/147/EC [18,19]. Furthermore, the Secretary of State will not grant consent for drilling until the operator has undertaken an environmental impact assessment.

The Health and Safety at Work, etc., Act. 1974 (HSWA) [20] provides regulation on the health and safety of workers and was also adopted on the offshore rigs. This imposes criminal liability on both companies and individuals who are in breach.

The health and safety legislative regime in the UK, including offshore, is deemed as robust, complex and far reaching [19]. Prior to the commencement of operations, a safety case must be prepared under the Offshore Installations (Safety Case) Regulations 2005 (SI 2005/3117) (SCR) demonstrating that all major accident risks have been assessed and adequate control and mitigation measures put in place [21]. The SCR implement the central recommendations of Framework Directive 89/391 and of the Cullen Report and should be read in conjunction with Health and Safety Executive (HSE) Guidance [22]. The case must be submitted to and accepted by the HSE before offshore operations can commence [19]. Furthermore, the Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (SI 1995/743) set out the requirements for protecting personnel from fire and explosions, and securing an effective emergency response [2]. The two legislative enactments that can be used to provide punitive measures against intentional violations of offshore health and safety regulations-The Corporate Manslaughter and Corporate Homicide Act 2007 [23] and The Health and Safety (Offences) Act 2008 [24].

As a party to the United Nations Convention on the Law of the Sea (UNCLOS) [25], the UK has an obligation to protect and preserve the marine environment [26]. The formulation of a National Contingency Plan for Marine Pollution from Shipping and Offshore Installations (NCP) [27] is one of the measures the UK has taken to meet this obligation, setting out the circumstances in which the Maritime and Coastal Agency's (MCA's) national assets are deployed [28]. The NCP provides an operator's required Oil Pollution Emergency Plan (OPEP) [2,29]. These include installation-specific risk assessments that model the likely path of an oil spill and environmental sensitivities [2].

The OPEP must meet the requirements of the Merchant Shipping (Oil Pollution Preparedness, Response and Co-operation Convention) Regulations 1998 (SI 1998/1056) [30]. OPEPs set out the arrangements for responding to oil spill incidents that have the potential to cause marine pollution [2]. It aims at preventing such oil spill incidents and reducing its effects should it occur [2]. The 1998 Regulation provide for the Department to direct that an OPEP be amended if it is not considered appropriate for dealing

with any particular incident [2]. Mr Naylor asserted that the MCA has changed the OPEP requirements in light of the events in the Gulf of Mexico [2]. Following the Gulf of Mexico incident, operators are now required to carry out additional modelling for deep water drilling installations, including an extended assessment of oil spill beaching predictions [2].

OPEPs use computer models to determine the likely movement of any spilled oil and the environmental sensitivities of the location [2]. DECC is aware that the computer model used industry-wide (OSIS) has limitations with regard to predicting long term spill and deep water effects [31]. The Oil Spill Response and Advisory Group (OSPRAG) are undertaking a review of this model and in its report published in 2011, advised on a minimum list of staff that should be formally educated as to their critical positions; well control schemes; blowout preventer usage; performance standards and audit procedure; and record keeping [2].

Depending on the nature of the spill, the response can range from monitoring slick behaviour, through to the use of chemical dispersants along with physical containment (the use of booms and skimmers) and recovery of the oil [2]. To ensure the OPEP is, and remains, fit-for-purpose operators are obliged to hold a personnel and equipment exercise every five years with the MCA [20]. Under the International Convention on Oil Pollution Preparedness, Response and Co-operation, adopted by the UK in 1994, all operators must test their OPEP offshore with every shift at least once a year.

The MCA maintain stockpiles of counter pollution equipment at various sites throughout the UK, with oil spotting and dispersant spraying aircraft located in Inverness and Coventry. If this equipment is required, control of the incident will pass to the MCA and the Secretary of States' Representative for Maritime Salvage and Intervention (SOSREP) [32]. The Offshore Installations (Emergency Pollution Control) Regulations 2002 empowers SOSREP to: act at the earliest point during a shipping or offshore incident to assess the risk to safety, prompt the end of any such incident and to ensure that increasing risk is evaluated and appropriate measures taken to prevent or respond to escalation; monitor all response measures to significant incidents involving shipping and the offshore industry; if necessary, to exercise ultimate control by implementing the powers of intervention, acting in the overriding interests of the UK and its environment; and reviewing all activities after significant incidents and exercises [20]. Furthermore, DECC will not issue a licence for exploration unless the operator is a member of the Offshore Pollution Liability Association Ltd (OPOL) [20].

Deficiency in the UK Pre-Macondo regulation on oil spill

The House of Commons Energy and Climate Change Select Committee (HCE Committee) upon collection of evidence, and deduction of conclusions [33], observed that many of its inquiries were adequately resolved through the Safety Case Regulations [34]. The HCE Committee report further observed a deficiency in the UK regime, pre-Macondo with regards to high-consequence, low probability events, and offers the lack of a capping device prior to the Macondo incident [35].

The Key Programme 3 (KP3), designed by the HSE, as a response to fears on the “risk of major accidents” on the UKCS [2] concluded that both management supervision and reporting to senior management were effective [36]. However, the report further clarified that there was low performance of system critical elements (SCE) [2]. It noted that the poor performance could be a consequence of “poor understanding of the function of SCEs as barriers,” risk assessments not being conducted, and severe maintenance issues [2].

The UK oil and gas industry conducts its activities on behalf of shareholders that are apparently more interested in the economic viability of operations than safety; thus the responsibility placed on the UK government to ensure that the industry lives up to its duty of providing a safe working environment [2]. This role proves that poor performance is possible and could be expected at some point in order to justify the role of the regulator in this regime [37]. Hence, the revelation of shortcomings of the industry in understanding the interconnectedness of basic infrastructure to SCEs tends to establish that the UK regime was not operating entirely out of expectation.

Directive 2013/30/EU on the Safety of Offshore Oil and Gas Operations

Some share the view that the UK's offshore environmental regime as “more robust than that applicable in the United States” [5]. This is because of the division of roles between the HSE and DECC in contrast to what is obtainable in USA where the MMS had jurisdiction over licensing, safety and environmental obligations, prior to the Macondo disaster, thus the potential for conflicts of interest [38]. The Deepwater Horizon incident prompted the EU to reassess its lax position on the offshore industry [2]. On the 28th June 2013, the Council of the European Union adopted Directive 2013/30/EU on the safety of offshore oil and gas operations [39]. The Directive sets out the minimum requirements for preventing major accidents at offshore oil and gas facilities and for limiting the consequences of any such accident [40]. It delineates the role of a single regulatory agency, requiring the EU Member States to “ensure the independence and objectivity of the competent authority in carrying out its regulatory functions” [41].

The Department of Energy and Climate Change (DECC) and HSE will jointly lead the transposition of the Directive as it contains requirements relating to licensing, environmental protection, emergency response and liability, in addition to safety [42]. Legislative proposals to be borne out of this directive include:

- The appointment of a competent offshore authority, independent from those with interests in the economic development of offshore resources, by member states [43]. The new competent authority will merge both safety and environmental regulatory functions. There may well be a change to DECC's powers so that it no longer handles certain environmental regulatory functions and these functions are passed to the regulator [2].
- The integration of the management of safety and environmental risks [44]. This will impact on the safety case, well notification, independent verification scheme of safety and environmental critical elements and well examination requirements [2].
- New requirements for the production of emergency response plans. Operators must [45]:
 - Prepare and submit emergency response plans – taking into account the risk assessments undertaken as part of the major hazards reporting, including an analysis of the oil spill response effectiveness.
 - Notify Member States without delay if a major accident occurs, or there is a risk of any occurring.
 - In the event of a major accident, 'all suitable measures' are to be taken to prevent escalation and to limit its consequences upon human health and the environment. 'All suitable measures' is not defined in the Directive, however, it does state that 'Operators should reduce the risk of a major accident as low as reasonably practicable, to the point where the cost of further risk reduction would be grossly disproportionate to the benefits of such reduction'. In addition, the Directive provides that Operators are not to be relieved of their duties under the due to actions or omissions leading or contributing to major accidents by their contractors.
- New requirements on liability for environmental damage [2]. The Directive amends the 2004 Environmental Liability Directive (2004/35/EC) to extend the scope of liability to include damage to waters within the entire UK Continental Shelf (UKCS) [2]. This was previously restricted to territorial waters (i.e. up to 12 nautical miles) so is potentially very significant and could have some effect on the insurance industry [2].
- The reporting on major hazards for installations prior to commencement of operations and ensure that this is updated when appropriate or when required by the competent authority [2]. The report must consider both safety and the environment [2]. Currently in the UK, as described in this work, the Offshore Installations (Safety Case) Regulations 2005 covers just safety and not the environmental aspect. Hence this proposal is likely to be transposed into a new Offshore Installation (Safety Case) Regulations, amending the Offshore Installations (Safety Case) Regulations 2005 [2].
- Duties on operators registered in EU member states to report major accidents that occur outside of Europe [2].
- Decisions on granting or transferring licences must consider the applicant's ability to meet its financial liabilities for operations under the licence and the Directive [2]. This includes having the financial capability to deal with a major accident - including remediation and third-party claims (subject to the licensee's financial liability stated above). Furthermore, the licensing authority must consult with independent safety and environmental competent authorities prior to granting a licence and must not grant one unless the licensee has or will make adequate provision to cover their potential liabilities [2].
- Transitional arrangements for existing installation and wells [2].

The Directive may be implemented on 19th July 2015 [42]. The EU asserts that Member States, such as the UK, refuse to recognise that their regime has correlative features that put their respective offshore safety and environmental regimes at risk [5].

USA regulation on oil spill

There has been offshore exploitation of hydrocarbons in the United States Continental Shelf (USCS), especially the Gulf of Mexico, since 1938 [46]. This industry grew exponentially over the years venturing further out into deep water horizons [2]. It is believed that the advancement of the hydro carbon industry soon outpaced the safety practices and governmental regulations, hence creating a situation of legislative responses after incident occurrences [2].

As at the time of the Macondo incident, certain regulations that were already in place to regulate offshore oil and gas exploration and production in America included the: National Environmental Policy Act (NEPA) [47,48]; Oil Pollution Act of 1990 (OPA) [49];

Outer Continental Shelf Lands Act (OCSLA) [50,51]; Coastal Zone Management Act (CZMA) [52]; Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) [53]; Endangered Species Act (ESA) [54]; Marine Mammal Protection Act (MMPA) [55] and the National Marine Sanctuaries Act (NMSA) [56].

Deficiency in the USA Pre-Macondo regulation on oil spill

It is believed that the regulatory agencies, pre- Macondo, lacked technical knowledge and resources to provide a meaningful contribution to offshore safety or environmental oversight [57].

Under-valuations of potential damages from offshore oil spills put arbitrary financial challenges on the OPA that quickly proved insufficient to cover the effect of the Macondo disaster [58]. Major industry players put substandard efforts in constructing an emergency response plan, under the OPA [59].

Prior to Macondo, Mineral Management Service (MMS) flouted statutory environmental laws [60]. This slack led to a space that was filled by a cost-driven organisation [2]. This was the condition of the oil and gas industry at the time. The MMS's statutory gaps could be viewed as an extent to which the MMS disrupted its own risk awareness mechanisms [2]. The Presidential Commission's allusion to the routine of ignoring environmental law was a picture of a failure in the safety culture [2].

Critics argue that instead of the congress making a body to manage health, safety, and environmental issues in offshore oil and gas, the DOI separated the departments already under it, renamed them, and presented it as a solution [61]. Nonetheless, the revenue division and the safety and environmental division are still under the same leadership, thus creating a conflict of interest [62].

USA changes to environmental and safety agencies and legislations (Post Macondo)

After the Macondo incident, the MMS, was restructured into the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) and the Office of Natural Resources Revenue (ONRR) [63]. BOEMRE is fused into the Bureau of Ocean Energy Management (BOEM) [64] and the Bureau of Safety and Environmental Enforcement (BSEE) [65,66]. The ONRR, BOEM and BSEE are all under the Department of Interior (DOI) [67]. President Obama, directed the DOI to develop the Safety Measures Report to identify measures necessary to improve the safety of oil and gas exploration and development on the Outer Continental Shelf (OCS) [68]. The recommendations made in the report include a number of specific measures designed to ensure sufficient redundancy in the BOPs, to

promote the integrity of the well and enhance well control, and to facilitate a culture of safety through operational and personnel management [2]. Recommended actions include prescriptive near-term requirements, longer-term performance-based safety measures, and one or more Department-led working groups to evaluate longer-term safety issues. Regulations established post Macondo include [2]:

- **The Drilling Safety Rule [69]:** The Drilling Safety Rule is issued under an emergency rule-making process [70]. This regulation is an interim final rule, published in the Federal Registrar that became effective on October 14, 2010. The rule changes represent the implementation of the recommendations made in the May 27, 2010, DOI report entitled "Increased Safety Measures for Energy Development on the Outer Continental Shelf" [2]. To enforce the practices recommended in the Report, the BOEMRE amended drilling regulations related to well control, including: subsea and surface blowout preventers, well casing and cementing, secondary intervention, unplanned disconnects, recordkeeping, well completion, and well plugging [2]. This rule clarifies and incorporate safeguards that will decrease the likelihood of a blowout during drilling operations on the OCS [2]. The Drilling Safety Rule addresses both well bore integrity and well control equipment [2].
- **The Workplace Safety Rule [71]:** The BOEMRE published the Workplace Safety Rule in the Federal Register on October 15, 2010 [72]. This rule requires offshore operators to set out clear programs to identify potential hazards when they drill, clear protocol for addressing those hazards, and strong procedures and risk-reduction strategies for all phases of activity, from well design and construction to operation, maintenance, and decommissioning [2].

The Workplace Safety Rule requires operators to have a Safety and Environmental Management System (SEMS), which is a comprehensive safety and environmental impact program designed to reduce human and organizational errors as the root cause of work-related accidents and offshore oil spills [73]. The development and implementation of SEMS has heralded a change in the United States regime [2]. Funny though, the SEMS does not need to be directly proven, or delivered, to the regulator prior to the operator being allowed to drill. Instead, the operator is merely required to complete the plan, hold it, and ensure it is implemented [67]. It is my opinion that this limits the true knowledge of the effectiveness of the SEMS. It is however, a work yet in progress.

The Workplace Safety Rule makes mandatory American Petroleum Institute (API) Recommended Practice 75, which was previously a voluntary program to identify, address and manage safety hazards and environmental impacts in their operations [72].

In applying for a permit to drill (APD), the operator must provide details of the hole, casing setting depths, assumptions, type and amount of cement, ability to isolate flow zones and do so in a statement that explains how it is comparable to the best practices of the American Petroleum Institute's standards [2]. Furthermore, besides the APD, operators now have a duty to ensure their casing and cement programs: control pressures and fluids; prevent flow of fluids into offshore waters; "prevent communication between separate hydrocarbon-bearing strata;" "protect freshwater aquifers from contamination;" support "unconsolidated sediments;" and to have a USA registered professional engineer to sign a certification that the casing and cementing design is "appropriate for the purpose" [2].

Conclusion

The Macondo accident and spill made obvious, safety deficiencies of oil and gas Deep water operations in the U.S. In contrast, there has been tremendous improvement in the USA regulation for oil spills after the Macondo disaster. There has apparently been a trend towards a performance-based regulatory response. This change of the United States regime structure seems to be the development and implementation of the SEMS. The USA regime has developed substantive prescriptive regulations that appear to be commensurate with the threats presented in the Gulf of Mexico. SEMS brings the U.S regime closer to a functional goal-oriented and hybrid regime. It is however notable that the current state of SEMS does not provide substantive regulatory shield to the U.S, the environment, or for the workers, boaters, and citizens that depend on ocean waters in America since it is not tested before use. However, it seems to be a work in progress and would need more time to assess.

As a matter of fact, offshore vessel owners in the Gulf of Mexico have expanded safety and environmental training, kept detailed records on those activities, and conducted self-audits in adjusting to regulations adopted by the Bureau of Safety and Environmental Enforcement (BSEE) in 2011 [74]. Currently, operators are required to use "best available and safest drilling technology" to mitigate potential for the well to be penetrated by hydrocarbons or kicks [2].

A report by GL Noble Denton observed that despite new regulations, a majority of operators believe that the US will continue to be a leading oil and gas investment destination, while the changes are necessary to improve the safety and reputation of the industry [75].

The UK regime has progressed at equal pace with its dynamic nature, rapidly advancing technology, and ever changing best practices; to mitigate risk in oil and gas production on the UKCS. This work has however, noted some deficiencies in the regime, such as the KP3. I am of the opinion that despite the high regulatory standards in the UK, the offshore oil and gas industry seems to be responding to disasters, rather than anticipating worst-case scenarios and planning for high-consequence, low-probability events.

The Macondo incident has apparently taught some lessons that should agitate the UK. Proposals arising from the EU Directive seem to tend towards a reconciliation of some of the deficiencies observable in the UK regulation previously hence a proof that the UK is duly learning. This directive advocates on separation of the environmental and safety division from the licensing division thus addressing the concerns of a potential conflict of interest. Further is the realization that in oil and gas operations, environmental issues are linked with safety issues. Thus, regulations arising from each other should complement the other. I believe an adoption of the proposals arising from the EU directive will significantly address the minor loopholes in the UK regulation.

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