REGULATING INTEGRITY OF ASSETS, PLATFORMS & WELLHEADS TO AVERT CATASTROPHY IN THE OIL AND GAS INDUSTRY: DRAWING LESSONS FROM THE MACONDO OIL SPILL

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Abstract
The paper examined the regulation of assets, platform, and wellhead integrity in the oil and gas industry, drawing critical lessons from the 2010 Macondo oil spill disaster. The incident, which resulted in massive environmental and economic damage, underscored systemic failures in risk management, regulatory oversight, and integrity assurance of key Infrastructure. A doctrinal legal research methodology was employed, analyzing existing regulatory frameworks, industry standards, and judicial findings post-Macondo. Challenges encountered included fragmented international standards, inconsistent enforcement mechanisms, and limited transparency in private sector compliance data. Findings revealed that regulatory gaps, combined with cost-cutting practices and insufficient safety culture, significantly contributed to the catastrophe. The paper concluded that maintaining the integrity of oil and gas assets, platforms, and wellheads requires a unified, risk-based regulatory approach, robust enforcement, and continuous monitoring.

Keywords: *Regulation, Assets, Macondo and Oil Spill*

1.0 Introduction

The Macondo oil[1] spill (otherwise called The Deepwater Horizon oil spill) raises a lot of questions about the legal regime regulating integrity of assets, platforms and well heads in order to avert catastrophe in the petroleum industry.[2] The Deepwater Horizon oil spill was an industrial disaster that began on 20 April 2010, in the Gulf of Mexico on the BP-operated Macondo Prospect. It is considered to be the largest marine oil spill in the history of the petroleum industry and estimated to be 8 to 31 percent larger in volume than the previous largest spill, the Ixtoc I oil spill, also in the Gulf of Mexico.[3] The U.S. federal government estimated the total discharge at 4.9 Mbbl (210 million US gal; 780,000 m3). After several failed efforts to contain the flow, the well was declared sealed on 19 September 2010. Reports in early 2012 indicated that the well site was still leaking. The Deepwater Horizon oil spill is regarded as one of the largest environmental disasters in American history.

A massive response ensued to protect beaches, wetlands and estuaries from the spreading oil utilizing skimmer ships, floating booms, controlled burns and 1.84×10^6 US gal (7,000 m3) of oil dispersant. Due to the months-long spill, along with adverse effects from the response and cleanup activities, extensive damage to marine and wildlife habitats and fishing and tourism industries was reported. In

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[1]https//www.Daily.gstor.org.accessed 24th January 2022
[2]R Pallardy, Deeper Horizon oil Spill, Environmental disaster, Gulf of Mexico(2010) <https://www.researchgate.net> accessed 24th January 2022
[3] Deepwater Horizon Oil Spill, < https;/www.en.m.wikipedia.org.

Louisiana, 4,900,000 lb. (2,200 t) of oily material was removed from the beaches in 2013, over double the amount collected in 2012. Oil cleanup crews worked four days a week on 55 miles (89 km) of Louisiana shoreline throughout 2013. Oil continued to be found as far from the Macondo site as the waters off the Florida Panhandle and Tampa Bay, where scientists said the oil and dispersant mixture is embedded in the sand. In April 2013, it was reported that dolphins and other marine life continued to die in record numbers with infant dolphins dying at six times the normal rate. One study released in 2014 reported that tuna and amberjack that were exposed to oil from the spill developed deformities of the heart and other organs that would be expected to be fatal or at least life-shortening and another study found that cardio toxicity might have been widespread in animal life exposed to the spill.

Numerous investigations explored the causes of the explosion and record-setting spill. The U.S. Government report, published in September 2011, pointed to defective cement on the well, faulting mostly BP, but also rig operator Transocean and contractor Halliburton. Earlier in 2011, a White House commission likewise blamed BP and its partners for a series of cost cutting decisions and an inadequate safety system, but also concluded that the spill resulted from "systemic" root causes and "absent significant reform in both industry practices and government policies, might well recur"..

The drilling platform which built by Hyundai Heavy industries was owned by Transocean, but leased to BP exploration and production company. The Macondo prospect actually belongs to the American Government (Federal) but it was awarded to BP, to drill on a joint venture which includes some smaller companies[4]. It was off the coast of Louisiana, BP held about 90% of the equality capital, MOEX Offshore 2007 owned about 10% equity capital (the equity capital widely was later-transferred to BP as settlement in October 2011, Also, 25% equity capital was owned by Anadenko Petroleum but BP brought it up in 2011.

In November 2012, BP and the United States Department of Justice settled federal criminal charges, with BP pleading guilty to 11 counts of manslaughter, two misdemeanors, and a felony count of lying to Congress. BP also agreed to four years of government monitoring of its safety practices and ethics, and the Environmental Protection Agency announced that BP would be temporarily banned from new contracts with the US government. BP and the Department of Justice agreed to a record-setting $4.525 billion in fines and other payments. As of 2018, cleanup costs, charges and penalties had cost the company more than $65 billion. In September 2014, a U.S. District Court judge ruled that BP was primarily responsible for the oil spill because of its gross negligence and reckless conduct. In April 2016, BP agreed to pay $20.8 billion in fines, the largest corporate settlement in United States history.

2.0 Legal Regime on Assets, Platforms and Wellheads Integrity

In this regard, the paper shall examine hard and soft international instruments on the subject-matter. Macondo disaster deals with pollution, there are various types of pollution, intentional pollution, accidental pollution, operational pollution, pollution caused by negligence of industry operators, pollution caused by act of God and pollution caused by sabotages.

[4]<https://www.epa.gov> accessed 24th January 2022.

3.0 International Convention

The first convention is the Convention on the Continental Shelf (Geneva 1958) it provides for safety zones around oil and gas installations. Coastal states have an obligation in such zones to take all appropriate measures for protection of the environment and living resources of the sea from harmful agents. However, it did not adequately deal with the matter of decommissioning, there are no fundamental advances for environment protection. The United Nations Law of the Sea Convention, 1982, this recognizes the sovereign right of states to exploit their natural resource, it require states to make regulations on design, construction, equipment operation, crew safety: States are also required to establish practice and procedure to prevent and control marine pollution arising from offshore units and sea bed activities, it also recommended provision of adequate compensation for damage caused by pollution to the marine environment. There is also a provision for removal of abandoned structures which are adverse to protection of marine environment and safety of navigation.[5]

The next is International Convention for the Prevention of Pollution from Ships (Marpol73/78)
Marpol has a broad definition which include fixed and floating platforms – it does not apply generally to operational pollution which is small in quantity, example pollution by use of oil- based mud or leakage of oil during well testing and water production, garbage and chemical residues, oily resolves from the vessels engineers however massive pollution are covered by the convention. The fourth is Civil liabilities Convention for Oil Pollution Damage, 1969 and the civil liabilities and fund Convention 1992, this applies to transportation of crude oil to be loaded in another place but does not apply to offshore installations or oil tanker that are converted to production platform.

Convention on the control of harmful anti-fouling systems on ships (2009) it prohibits use of harmful anti-fouling paints. Ship in the convention is defined to include floating production storage and off-loading units and floating storage unit it includes floating craft, fixed or floating platforms.

The convention on the prevention of marine pollution by dumping waste and other matters, 1972, and the London Protocol 1996 contain rules on incineration at sea, dumping at sea of waste products generated on land, it applies to platform and manmade structure. The salvage convention 1989, which applies to platforms and units used in exploitation and production of mineral resource. It dials with issue of repair, supply, and transportation.International convention for the safe and environmentally sound recycling of ships (Hong Kong 2009) regulates recycling of ships, self-elevating platforms, floating storage units.

4.0 International Maritime Organization Guidelines, Standards and Regulations

E.E. Mitropoulos stated[6]

> The international maritime organization a specialized agency of United Nations dealing with maritime affairs, started considering

[5]S Violeta, Radovich, International legal Regime of offshore structure - environmental concerns, (CMI newsletter no 1 January-April 2004) 1

[6]EE Mitropoulos, the work of International Maritime Organization (IMO) IMO Maritime safety division's international maritime organization in safety offshore (www.witpress .com issn 1734-3509) accessed on 4thFebruary 2022.

> offshore safety matters in the early 70s and has ever since been reviewing and updating international regulations for the construction and equipment of mobile offshore drilling units, for the prevention of marine pollution from the units, and for ensuring safety in other related matters include training of mobile offshore drilling unit (MODU) personnel. However, safety cannot be ensured by having regulation alone, it is their strict implementation that matters most. IMO, its member governments and the industry must work together in order to ensure the highest practicable standards of safety on MODUs and offshore activities.

IMO operates in accordance with international convention for the safety of life at sea 1974, and the International Convention on Load Lines, 1966.

IMO came up with the 1979 MODU code, which was later updated and reviewed in 1989, and the Imo assembly has as far back as 1983 come up with resolutions to bring about improvement in safety standards and guidelines. There is the Resolution A.538 (13), Resolution A712 (17) of 1991, Resolution A671 (16) of 1989. it endeavors to cover the whole field of maritime safety including constructions, subdivision, repairs, stability free boarding, machinery and electrical installation, fire safety, life safety appliances radio communication, lifting devices, helicopter facilities and the operation of units. Coaster states are also enjoined to impose additional requirement regarding operational aspects of industrial systems not covered by the code.

IMO codes do not cover requirement for drilling or procedure for the control of subsea wells or mineral resources being exploited in the subsea belt. This is a very grave pit fall of the whole IMO administration.

While ISO deals mainly with assets, platforms and wellheads integrity onshore, while IMO area of coverage is only in the maritime zone. Much development has taken place in the petroleum industry through the ISO guidelines and standards, examples is ISO/TS29001which[7] defines the quality assurance needed for management system required for the design, development, production, installation and service of products for petroleum, petrochemical and natural gas industries. The United state has its own API standards, API is the same as America Petroleum institute, it has also adopted more than Fifty ISO guidelines and standards as joint API/ISO Standards. The European Union has also adopted more than one hundred ISO standards as joint European E.N 150 standards. These allow for company and nation states partnership to develop global standards which are expected to apply operators in the oil and gas industry.

These ISO standards are consensus based, market driven, technical current, international expertise, voluntary not mandatory, and meet the requirements of world trade organization technical barriers to trade. Pit falls of ISO standards and guidelines, its application is voluntary not compulsory, a company

[7]www.bsigroup.com) (ISO 29001 oil and Gas) last Accessed on 29/1/2022

or a nation may choose to ignore them except where they have been incorporated or adopted in local statutes of host nations having petroleum resources

5.0 Response of International Community to Macondo Oil Spill

This section considers the response of the international community to the Macondo Oil Spill either negatively or positively regarding the cause and damage to the aquatic community and the level of environmental damage. The views and response of selected international bodies will be discussed hereunder.

British Response

British petroleum is a company formed and owned by the British government. The purpose was to break the monopoly of standard oil company, an American company that was having a strong control over the supply of petroleum products to Britain and the far East. BP thus is a British company, owned but not under the control of the British government.

The first response of the government Is to create a frame work, where operations and pollution caused by actions or conduct of BP, would not affect in any way diplomatic relations that the British government has with America and any other country.

The second is to ensure that whatever damages are awarded against BP, for its Macondo oil spill and any other oil spill or pollution does not in any way affect the treasury of the United Kingdom. This was a wakeup call, before the spill, United Kingdom had witnessed Oil spills and taken actions to address issues raised by the effect of the spills. Notable is the Torrey canyon spill in 1967[8], this was a spill of about 119,000 tons of crude oil into the exclusive economic zone of England, in Cornwall, England, super tanker ran aground and caused the spill. The response was far reaching it led to international community establishing two international conventions. International convention of civil liabilities for oil pollution damage 1969 and international convention on the establishment of an International Fund for Compensation for 0il Pollution Damage, 1971. The later required ship owner and platform operators to have a maximum insurance cover of fifteen million dollars per incident of oil spill.

The philosophy behind introduction of insurance cover for oil spill was to spread the cost of damages and to make the petroleum industry to invest their funds from their profit to prepare for possible oil spill which may damage their operation. This principle brings in more players and financial institutions to bear the burden of damages awarded as a result of oil spill and gas spills. However, under the International Fund Convention, 1971, what was required was insurance cover of fifteen million dollars. This is too small and outdated given the fact that Macondo of spill incurred damages of billions of dollars, in fact about 20 billion dollars. The British government response was to initiate independent reviews of UK off shore regulating regime. In 1992 both international conventions were renewed and by 2005 more than one hundred countries have ratified them. The International maritime organization is the treaty secretariat of the two conventions. America Petroleum Institute promised to set up a separate API offshore safety institute to prevent recurrent of deep-water horizon spill.

[8]<https://www.itopf.Com >accessed in 1st December 2021,

6.0 Nigerian Laws, Guidelines, Standards and Regulations

Nigeria response to oil spills began before Macondo oil spill, the international convention on civil liability for oil pollution damages (ratification and Enforcement) Act 2006[9] and international convention on the establishment of an international fund for compensation for oil pollution damage (Ratification and Enforcement) 2006,[10] were all ratified before Macondo oil spill. Also, the Oil in Navigable waters Act, [11]There is also regulations made pursuant to section 9(1) (b)iii of the Petroleum Act 1969. which was amplifies in Regulation 25 of the Petroleum (Drilling and Production) Regulation 1969. Even the establishment of National Oil Spill Detection and Response Agency, which referred to the international conventions were all before the Macondo oil spill. However, after the spill we have the Nigeria oil and gas content development board and the new Petroleum Industry Act.

7.0 The Petroleum industry Act provisions on Asset integrity and other related matters.

The Petroleum industry Act, 2021 vest on the Nigeria upstream regulatory commission various powers which include powers to[12] regulate, determine, administer, implement and maintain technical standards, codes, practices and specifications applicable to upstream petroleum operations pursuant to good international petroleum industry practices. it went further to state that it has the powers to set, define, establish, maintain, monitor, develop, issue, make, review, update, amend, strengthen, publish, design, control, promote and enforce approved standards and regulations for design, construction, fabrication, operation and maintenance for plants, installations and facilities used or to be used in upstream petroleum operations.

Nigerian midstream and downstream petroleum regulatory authority is responsible for the technical regulation of the midstream and downstream petroleum operations in Nigeria, its power includes to ensure safe, effective and sustainable infrastructural development, regulation of bulk storage facilities. Marketing and transportation pipelines or petroleum product and enforcement of approved standards, and regulation of the design, construction, fabrication, operation and maintenance of plant, installation and facilities used or to be used in midstream and downstream petroleum operation.

The Department of Petroleum Resource[13]was responsible for technical supervisory and enforcement functions of the Federal Ministry of Petroleum resources, it was a part of the ministry under the Petroleum Act (as amended) 1969 currently it is dismantled into the Nigeria upstream regulatory commission and the Nigeria mid and downstream regulatory authority. These bodies are to report to the minister of petroleum resources.

By virtue of 311 (1) of the PIA[14]

> "Any Act, subsidiary legislation or regulation, guideline, directives and order made under any principle legislation repealed or amended by the Act shall in so far as it is not inconstant with this Act, continue in force

[9] Chapter 129 Laws of the Federation of Nigeria 2010.
[10] Cap 130 LFN 2010.
[11]Cap 06 LFN 2010
[12] Petroleum industry Act 2021, sections 6 and 7
[13]M Molisa, *Nigeria petroleum law and practices* (2nd edition Jonia limited – 1997) P-228-229
[14] PIA 2021, S. 311

> mutatis mutandis as if they had been issued by the commission or authority under this Act until revoked or replaced by an amendment to this Act or by subsidiary legislation made under this Act and shall be deemed for all proposes to have been made under this Act.

The doctrine of good international petroleum industry practice was introduced by the Act. There is reference to gas flare (prevent of waste and pollution) Regulations. Section 102 requires an Environmental management plan with respect to projects that requires Environmental impact assessment. This must be submitted within one year of effective date of the Act or six months after grant of applicable license or lease. The plan must comply with extent Acts, this include Environmental guidelines and standards of the Petroleum industry in Nigeria made pursuant to the petroleum industry Act and the operator shall demonstrate that it has capacity to rehabilitate and manage negative impact on the Environment. Section 103 provides for the setting up of Environmental remediation fund, established by the commission for upstream operations and by the authority for mid and downstream operators. There is the process of annual assessment of Environmental liability and this will may lead to increase in financial contribution to the satisfaction of the commission or the authority as the case may be. They may even appoint an independent assessor where they are not satisfied with the assessment done by holder of license or lease and by the amount of financial contribution to the remedial fund. The situation for natural gas requires that by section 108 a licensee or lessee, producing natural gas shall within a period of 12 months from the effective date of the license or lease submit a natural gas flare Eliminating and monetization plan to the commission.

8.0 Nigeria content Development and Issue of Assets Integrity

Petroleum technology[15] is a systematic and formulated knowledge about the industry and capable of driving change through researches leading to new discoveries. This has two aspect intangible, which deals with the acquisition of required knowledge and skills to fabricate, repairs, manufacture, produce, maintain, modify, operate, innovate, physical assets and systems imported from abroad. The second aspect is tangible which is the physical embodiment of technology including equipment, wellheads, tools machinery and plants.[16]

1. Nigeria content development short term directives are provided here under-[17] FEED and detailed engineering design for all project is to be domiciled in Nigeria
2. Project management Teams and Procurement Centres for all projects in the Nigerian Oil and Gas industry must be located in Nigeria.
3. Fabrication and integration of all fixed (offshore and onshore) platforms weighing up to 10,000tons are to be carried out in Nigeria. For the fixed platforms (offshore and onshore)

[15]DHN Alloyne, "The state petroleum enterprises and the transfer of technology, in united Nations, ed. State petroleum enterprises in developing countries (New York- pergamon press 1980) P.109 or 111,

[16]K khan 'the transfer of technology and petroleum Development in Developing countries with special reference to Trinidad and Tobago (1986) (4) (No 1) *JENRL* 10

[17]L Atsegbua , *Oil and Gas law in Nigeria- Theory and Practice* (4ed four pillar publishers 2021) P.227

greater than 10,000tons, all items in directive 5, pressure vessels and integration of the topside modules are to be carried out in Nigeria.

4. Henceforth, fabrication of all piles, decks, anchors, buoys, jackets, pipes, racks, bridges, flare booms and storage tanks including all galvanizing works for LNC and process plants are to be done in Nigeria.
5. Henceforth, all flow lines and risers must be fixed and must be fabricated in Nigeria except for special cases to be demonstrated and approved by NCD.
6. Henceforth, assembling, testing and commissioning of all subsea valves, Christmas trees wellheads and system integrations tests are to be carried out in Nigeria.
7. All FPSO contract packages are to be bided for on the basis of carrying out topside integrations in Nigeria, A minimum of 50% of the total tonnage of FPOS topside modules must be fabricated in Nigeria.
8. All third party services relating to fabrications and constructions including but not limited to NDT, mechanical tests PWHT as well as certification of welding procedures and welders must be carried out in Nigeria. Nigerian institute of welding must certify all such tests in collaboration with international accreditation bodies.
9. All operators and project promoters must ensure that recommendations for contracts awards in respect of all major projects being forwarded to NNPC constituted boards of such oil and gas companies for approval must include evidence of binding agreements by the main contractor with Nigeria content subcontractors. Such agreements shall indicate the cost and detailed scope including total man hours for engineering, tonnage and man hours of fabrication and relevant defining parameters for materials to be procured locally as well as oilers services.

Thus, we do not have up to date facilities to carry out design and fabrication and manufacture in Nigeria. though it is admitted that we have qualified expertise to operate modern facilities needed in the petroleum industry.

9.0 Conclusion

The Petroleum Industry Act, The Petroleum Act, subsidiary regulations; the Petroleum Drilling and Production Regulation, the oil in Navigable Waters Act and Environmental guidelines and standards in petroleum industry in Nigeria did not make provisions that cover the whole field of Assets, wellhead and platform in Nigeria, the solution by legislators and industry regulators to adopt international good oilfield practices is vague and just another weak attempt to adopt API and ISO standards. The Macondo oil spill was cause by leakage of gas due to insufficient cement casing of the pipelines used for the project.

10.0 Recommendations

The paper recommends that the whole regime concerning assets integrity be reviewed and updated

1. Any API or ISO standard which is relevant to the Nigeria situation should be express singled out and adopted.
2. The issue of petroleum technology is improving the situation for adoption of best technology should be moved side by side With the Nigerian local content policy – while it is laudable that the industry should be opened up for local content, this should be handled carefully persons of

dubious character will have access to knowhow and use such to carry out sabotage, or local money bags as contractors will allow inferior materials to be used in design and fabrication of assets.

3. The petroleum industry has been noted for allowing a regime of business as usual. Regulations and operators frequently change roles. This is the need to separate regulation role from operating roles- the federal Government is both, it regulates and also operates. It has equity holdings in the major oil and gas companies and is exempted to pay cash calls which are requires to purchase assets, well heads and platform. Nigeria is in arrears of such payment. This system of running the industry responsible for the state of hopelessness. Nigeria, can adopt the American model, where the government is only a regulator, and it gets its revenue from taxes. The Macondo spill, clearly demonstrate that even with best technology, the industry operates a value chain, from cradle to grave or from design, fabrication and manufacture to decommissioning. In between are a lot, which require regular audits Nigeria regulators have failed to properly regulate the industry.