Safety Assurance in the oil and gas industries—Review of practices and way forward for Nigeria

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Abstract

Amongst the benefits of industrialisation are improved welfare and social standards of the citizens, while the dangers of industrialisation often manifest in the many industrial based health, safety and environmental challenges across the world. As Nations strive steadily towards improvement in the welfare and social standards through industrialisation, it is also the statutory responsibility of national Governments to keep safe her people. One way safety is achieve is through legislations, policies and regulation. In this article, the use of Policies, Legislations and Regulations in ensuring safety is discussed in details. Useful examples from countries where these means to safety assurance are well established like Europe and America are further cited. Emphasis is laid on the fact that risk is mostly location-specific as such safety policies, legislations and regulations may reflect country-specific experiences with activities in the industry. The position of the article is that while it may beneficial to share experiences by a way of interchange of regulatory document, caution should be applied not to overuse such documents. Rather such documents may either serve as a guide for countries intending to create their own regulatory documents or be reviewed and adapted in light of localised experiences before being applied.

1 Safety amidst Industrial Development:

Every national government strives towards self-sufficiency: utilising her natural resources to improve the quality of lives of citizens. The Millennium Development Goals(MDGs) indicator for quality life, according to United Nations Industrial Development Organisation (UNIDO) includes reduction of poverty, hunger and child mortality, access to quality education (United Nations Industrial Development Organization, 2014). Industrialisation has been shown to have direct impacts on quality of life: economies develop creating opportunities for skilled labour; schools are established to teach requisite skills; good education guarantees improved individual and national income; and improved income can get good healthcare and so on. However, with industrialisation comes high risk. In other words, there is always present the

likelihood that somethings might go not as planned and have huge consequences(International Standard Organisation, 2009). To sustain industrialisation therefore, it is equally necessary to ensure health and safety of the people and environment.

National Governments are bound by statute to keep *safe* her people, properties and environment in pursuit of industrialisation. They promulgate laws to promote her business interests. Inherent in these laws are rules (or statutes) principles -standards that are to be observed and policies that are kind of standards which set out goals to be reached. These laws promote safety. Safety is a decision made by qualified persons (usually Government agencies) on the 'level of risk' which is acceptable.

In most case determination of level of risk and decision on acceptability (or order wise) are accomplished using a tool called Risk assessment. Technically, risk assessment involves identification, analysis and evaluation of risk (International Standard Organisation, 2009). The process of risk assessment as depicted in Figure 1 is a continuum within industries. This implies that, at a stipulated interval of time, the activities with the industries are reviewed in line with the provisions of the prevailing regulation and the risks inherent in them evaluated leading to decision on whether to permit them. Usually, as will be seen later, either of the outcome of the decision has its consequences.

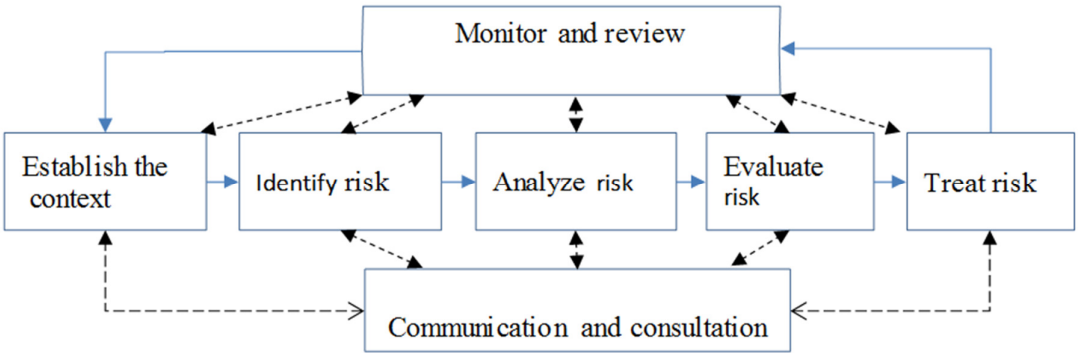

Figure 1 System's Safety cycle

Without loss of generalization; risk assessment is central to building effective strategy for safety. All **formal safety management systems** require the provision of risk assessment techniques for all aspects of operations. Some industries have higher risk exposure than others: to such industry with high risk exposure, safety discussions maybe predominant. These industries are characterized by massive investment cost (in personnel and infrastructure) as well as huge returns on investment. Example of such industries are the oil and gas, Aviation, Maritime, Manufacturing to mention but a few.

As has been implied earlier, risk has many gradations depending on the severity of the consequences and probability of occurrence while safety implies the *level of risk* which is tolerable (AvenVinnem and Wiencke, 2007). The philosophy of safety assurance in this context, therefore, is based on figuring out ways in which systems could be planned, executed and managed in a way that -easily detect impending hazards, reduced their probability of occurrence as well as severity and escalation of their effects. Fortunately, the requisite skills for these aforementioned actions abounds in the sector as evident in the level of tacit knowledge in industries most of which were acquired through lessons learnt from terrible accidents (Bea, 2011; ,House of Commons, 1991; NASA, 2013; Officer of the watch, 2013; Paté-Cornell, 1993). These practices had advised the formulations of safety Legislations and directives as will be reviewed once again in this paper.

2 Safety Legislations

Safety Legislations are (safety) laws passed by congress of a government and spell out the rights to, and responsibilities for safety of the individuals or companies to which it applies. It gives directives to operators on safe conducts (i.e., the dos and don'ts) which must be complied with to remain within the legal boundaries of the industry. Most safety legislations have been developed as response to major accidents or from complaints of possible threat to public safety from concerned citizens(Crawley, 1999). Take the Safety Case Regulation of 2005 (SCR05) (House of Commons, 1991) for example which came into force in the UK after the Piper Alpha Disaster of 1988 and the subsequent review and modification that formed the SCR 2015 after the Macondo blow out disaster in 2010 (Michalis and Konstandinidou, 2012). Usually the attention of the government is drawn to cases of major accidents or possible threats to public safety through *bills*. These bills propose safety legislations and are passed by representatives of the people or simply the Parliamentarians. Once such bill is received, the government through its agency in charge of public safety may call for public inquiry/investigations. If the inquiry confirms the threat (or the investigation validates the bill), the safety recommendations within are further reviewed to consider their relevance (to the industry) and the extent they might inform either introduction of new or modifications/improvement of the existing regulatory *regime*. Then the bill is passed as an Act of the parliament and becomes Law (House of Commons, 1991). The transition process from bill to regulation is shown in Figure 2.

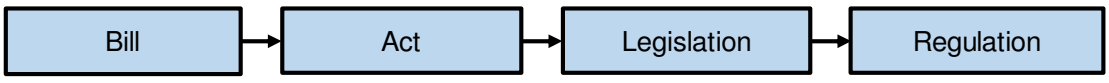

Figure 2 Transition process from bill to regulation

3 Safety Regulations and Regulators

3.1 Regulation

In the form as law, a Legislation does not often include all the details needed to explain how an individual, business, state or local government, or others to whom it applies might follow the law. It is left certain government agencies to examines the law passed and work out the specific details that need to be enforced so that they are followed. The worked-out details become the *regulation*. Regulations are created in order to make the legislation work on a day-to-day level. They specify actions/activities which are -and which is not -legal. Regulation set specific requirement (within legislation) about what is and isn't legal. They are basically the way the legislation is enforced by regulators and they support the requirements of the legislation. In the UK continental shelf for example, the main health and safety legislation come under the Health and Safety at Work Act 1974 (HSWA). Under the authority contained within that Act, Offshore Installation (safety Case) Regulations was drafted and enforced in 1992 and later upgraded in 2005 (SCR 05) after 13 years of existence. In response to the EU directive on safety and environment of offshore oil and gas operation(European Commision, 2013), the SCR 05 was replaced with Safety Installations (Offshore Safety Directive) (Safety Case etc.) Regulations, which came into force in 19 July, 2015 (,Health and Safety Executive, 2015).

3.2 Regulators

In the form as law, a Legislation does not often include all the details needed to explain how an individual, business, state or local government, or others to whom it applies might follow the law. R*egulators* are government agencies saddled with the responsibility of examining the law passed and working out the specific details that need to be enforced so that they are followed. Offshore oil and gas industries has, by the virtue of high-risk exposure, both national and/or international regulators. The difference between the two kinds of regulators lies in the extent of their jurisdictions: The National regulators has jurisdictions which ends within the national continental shelf while the powers of International regulators extend beyond the boundaries of a nations continental shelf. Some examples of National regulators and regulations are shown in Table 1 (Germanischer Lloyd, 2011; Oil and Gas Producers, 2010). Others National regulatory bodies are: The Netherlands –State Supervision of Mines (SODM); India – Oil Industry Safety Directorate (OISD); Italy – National Agency of Petroleum Natural Gas and Biofuels (ANP); Thailand – Ministero dello Sviluppo Economico (MES); New Zealand – Department of Mineral Fuels (DMF); China waters – China National Offshore Oil Company (CNOOC) of P.R. China; Russia waters – Ministry of Natural Resources of the Russian Federation (MNR), The Ministry of Industry and Energy of the Russian Federation; The UK-

Offshore Safety Directives Regulators (OSDR) is the competent authority responsible for the regulation of major safety and environmental accident hazards, and their consequences, in the offshore oil and gas sector (Health and Safety Executive, 2016a).

In some instances, some National regulators could also function as International regulators. Examples of International regulators are PSA –Norway; DoL –New Zealand; Canada-Nova Scotia Offshore Petroleum Boards and Canada-Newfoundland & Labrador Offshore Petroleum Boards (CNSOPB/C-NLOPB); Brazilian National Petroleum Agency, (ANP); The Health and Safety Executive (HSE) –Great Britain; and State Supervision of Mines (SSM) – Netherlands, European Commission (EC) Directive on safety and environment of offshore oil and gas operations.

Table 1 Some popular regulatory bodies in some countries

Country	Regulators	Regulation
Australian waters	National Offshore Petroleum Safety Authority Department of Mines and Petroleum	Petroleum (Submerged Lands) "Management of Safety on Offshore Facilities" Regulations 2007 Petroleum (Submerged Lands) "Management of Well Operations" Regulations 2004.
Brazilian waters (GS[1])	Agência Nacional do Petróleo Gás Natural e Biocombustiveis (ANP) National Offshore Petroleum Safety Authority (NOPSA)	Resolution No. 43 Technical resolution Safety Management System (SGSO) CONAMA Resolution No. 23: Licensing of drilling and production activities.
Canadian waters (GS)	National Energy Board The Canada Nova Scotia Offshore Petroleum Board (CNSOPB) The Canada Newfoundland & Labrador Offshore Petroleum Board	Canada Oil and Gas Operations Act (COGOA) SOR/2009-315 Canada Oil & Gas Drilling and Production Regulations Draft Safety Plan Guidelines Draft Drilling and Production Guidelines
Danish waters	Danish Energy Agency Department of Labour (DoL)	Offshore Safety Act No. 1424 of December 21, 2005 Executive Order No. 729 of 3rd July 2009 Guidelines for the Design of Fixed Offshore Installations 2009 Guidelines for Drilling – Exploration 1988 (2009), attachment to "A Guide to Hydrocarbon Licenses in Denmark
Norwegian waters	Norwegian Petroleum Directorate (NPD)	Regulations relating to Design and Outfitting of Facilities etc. In the Petroleum Activities (The Facilities Regulations) Chapter IV-I, Sections 48 – 55 and

[1] GS—Goal Setting

Country	Regulators	Regulation
	Petroleum Safety Authority (PSA)	Guidelines thereto. This references NORSOK D-001, D-002 and D-010, with additional requirements to D-001. Regulations relating to Conduct of Activities in the Petroleum Activities (The Activities Regulations). Section 9 and Guidelines thereto –Chapter 4 / Sect. 30a and Chapter 7 /Section 46 Regulations Relating to Material and Information in the Petroleum Activities (The Information Duty Regulations) Chapter III Section 7 and Guideline thereto. Refers to reporting according to NORSOK D-010
UK waters (GS–SCR)	Health & Safety Executive (HSE)	SI 1996/913 The Offshore Installations and Wells (Design and Construction, etc.) Regulations 1996 (DCR) Safety Case Regulation (SCR) 2015 (HSE, 2015) Prevention of Fire and Explosion, and Emergency Regulations (PFEER) Management and Administration Regulations (MAR) Design and Construction Regulations (DCR), 1996
US waters	Bureau of Ocean Energy Management, Regulation and Enforcement BOEMRE) US Coast Guard (USCG) US Minerals Management Service (US MMS)	30 CFR Part 250 - Oil and Gas and Sulphur Operations in the Outer Continental Shelf NTL No. 2010-N10 US Department of the Interior BOEMRE, National Notice to Lessees and Operators of Federal Oil and Gas Leases, Outer Continental Shelf, "Statement of Compliance with Applicable Regulations and Evaluation of Information Demonstrating Adequate Spill Response and Well Containment Resources", November 08, 2010 NTL No. 2009-G07, US Department of the Interior Minerals Management Service Gulf of Mexico OCS Region, National Notice to Lessees and Operators of Federal Oil and Gas Leases, Outer Continental Shelf, Gulf of Mexico OCS Region, "Location of Choke and Kill Lines on Blowout Preventer Stacks", May 1, 2009

4 Regulatory Regimes, Process and Documents

4.1 Regime

The nature of the regulations is determined by the regime in existence. Regime, in the context of regulation, refers to a method/style of management. Two kinds of regimes are rife: prescriptive and goal-setting regimes (Leveson, 2011). In prescriptive regime of regulation, standards and guideline are given for development/production processes. These guidelines

must be strictly adhered to: assurance of safety is based on compliance with the set (safety) rules and is demonstrable. Goal setting (or Performance-based) approach on the other hand, focuses on desired, measurable outcomes. It specifies desired results without specific direction regarding how these results are to be obtained (Leveson, 2011). The regime sets goals (which may be a risk target) that must be attained, but how to reach the target is up to the assurer to decide. In clearer terms, the difference between both regimes can be stated thus: in the goal-setting regulation, a threshold of acceptable performance is specified together with a means for assuring that the threshold has been met; while in prescriptive regulation regime, safety assurance is based on adherence to prescribed set of rules without recourse to the outcome.

The UK oil and gas industry operates a goal setting regime. Under Safety Case Regulation (SCR) 2015, operations within the UK continental shelf can only be approved or otherwise by a *competent authority* upon receipt and acceptance -or rejection respectively -of a ``safety case'' prepared and submitted by the *Duty holders* (operators, owners of installations). A safety case is defined in SCR 2015 as "a document that gives confidence to operators, owners, workers and the competent authority that the duty holder has the ability and means to manage and control major accident hazards effectively"(Leveson, 2011). Similar regime is in operation in India offshore oil and gas industry. Practitioners in the offshore oil and gas industry in India must comply with the provisions in Petroleum and Natural Gas (safety in the Offshore Operations) Rules/Legislation, 2008 (India Ministry of Petroleum and Natural Gas, 2008). The Oil Industry Safety Directorate (OISD) is the competent authority in India, empowered by law (Section 8 of the Oil Fields Regulation and Development) Act, 1948 to enforce the goal setting rules. In order to enhance compliance with the requirements of the rules from operators, the OISD published 'Guidance note' to Petroleum and Natural Gas (Safety in Offshore Operations) Rules, (Oil Industry Safety Directorate, 2009).

4.2 Regulatory process: Certification

Operations in Offshore industries are regulated by a way of certification: operators and operations must be certified by regulators or their appointees. To be certified, there must be a demonstrated evidence that the person has enough expertise to execute the operation and that the system will be acceptably safe in each operating context. Evidences to be presented are usually provided in the regulatory regime in operation. Certificate of fitness-for-purpose is issued by a *Certifying Authority* (CA) to a duty holder (of a producing unit) or owner of a non-producing unit, upon demonstration of compliance with prevailing regulations (Hansard, 1988). The approved Certifying Authorities in the UK are; American Bureau of Shipping, Bureau Veritas, Det Norske Veritas, Germanisher Lloyd, Lloyd's Register of Shipping (LR), and Offshore Certification Bureau

The CA's are required to be independent in their functions, however, they are subject to continuous reassessment by the regulatory bodies to ensure quality of their services. These reassessments involve further detailed studies of the methodology applied by the authorities to ensure compliance with regulations; verifying that update of standards used in certification process; and ensuring correct interpretation is given to the design and construction guidance notes issued by the regulatory agencies. Before issuing a certificate of fitness, the CAs are required to examine plans, drawings, specifications, reports and other documents submitted by the owners of offshore installations. The certifying authorities must also carry out, or ensure that there has already been carried out (by auditors), an independent assessment of the design and method of construction of each installation (Health and Safety Executive, 2016b). They also carry out an initial major survey of each installation. Only when satisfied that it is proper to do so can a certifying authority issue a certificate of fitness. Each certificate issued is valid for a period of five years (in the UK), after which a further major survey must be carried out before renewal is authorized. Annual surveys of installations are also required. Offshore installations can be subjected to continuous assessment in lieu of subsequent major surveys based on agreement between certifying authorities and owners of the installation. Under this procedure annual surveys continue to take place but additionally the installation is continuously surveyed and the need for a separate major survey every fifth year is therefore removed.

If a certifying authority considers that an installation is no longer fit for its intended purpose, it is required that the owner as well as the regulatory agency be notified so that appropriate action can be taken. This may include if necessary, the withdrawal of a certificate of fitness. The certifying authorities may, as part of their powers, impose limitations on location, operation and movement of offshore installations. They may also decline to issue a certificate of fitness. Though, the certifying authorities operates independently and can liaise directly with offshore operators, however, the authorities are, under the terms and conditions of their appointment, required to send to the regulators, an annual report of their activities together with any report that they have prepared or obtained in carrying out their duties which the regulators may require. Figure 3 shows the Lloyds registers certification process for a Blow-out Preventer (BoP)(Germanischer Lloyd, 2011).

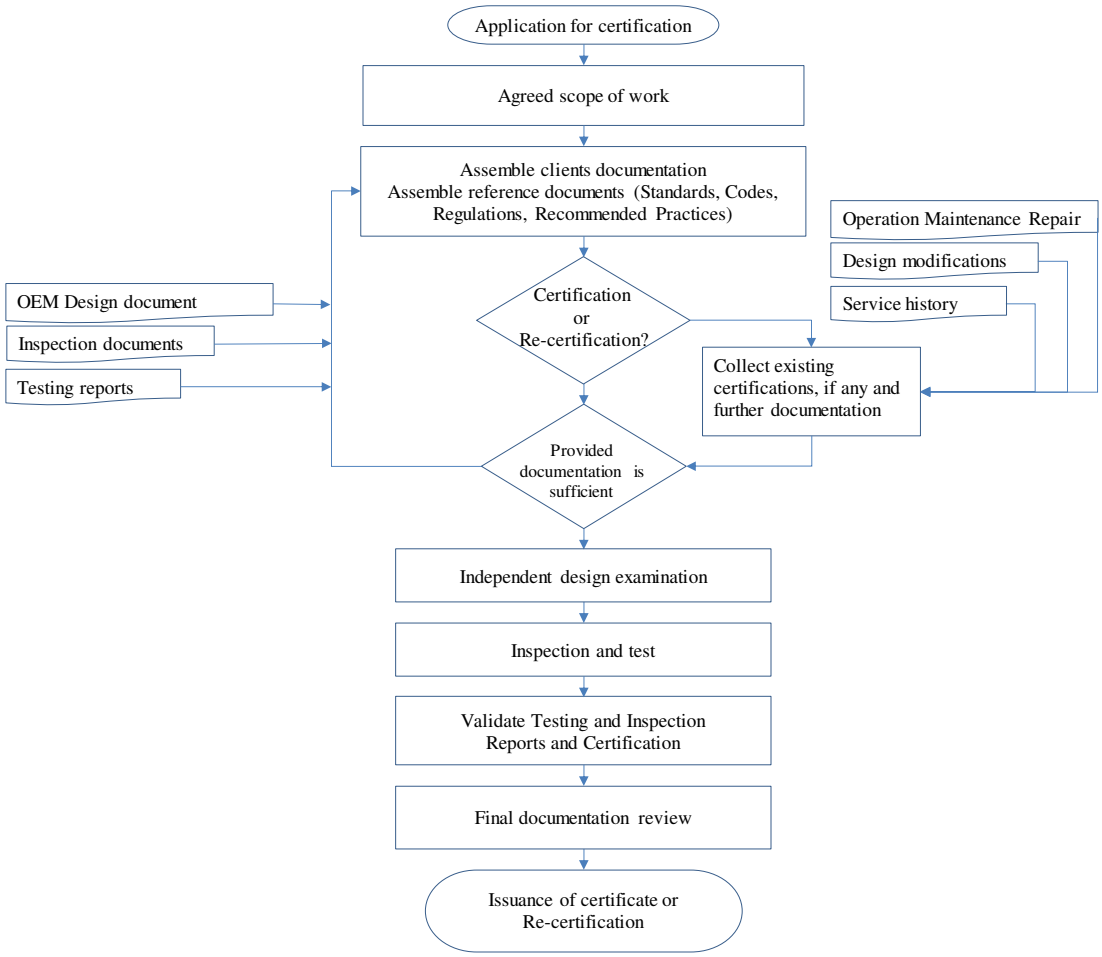

Figure 3 Certification process

4.3 Regulatory documents: codes, standards, recommended practices

As can be seen from the above discussion, certification is based on conviction that safety has been assured through either of the regime. Certification are granted after evidences of compliance with the regulations of the relevant (national/international) authority, based on requirements contained in recognized codes and standards. Codes provides a set of rules that specify the minimum acceptable level of safety for manufactured, fabricated or constructed objects, which in most cases incorporates regulatory requirements. they often make references to standards or specifications where specific details not specified in the code itself are required. Examples of codes are ASME B31.8S (American Society of Mechanical Engineers, 2004); ASME B31G (American Society of Mechanical Engineers, 1991) ASME Boiler and Pressure Vessel Code (B&PVC) (American Society of Mechanical Engineers, 2015) and the AWS D1.1 Structural Welding Code – Steel (American Welding Society, 2000). *Recommended practices* provide guideline for performing operations or functions. Some examples of recommended practices are (Det Norske Veritas, 2006), (American Petroleum

Institute, 2002), (American Petroleum Institute, 1993), (American Petroleum Institute, 1991) and (Det Norske Veritas, 2010). On the other hand, Specifications provide specific requirements for materials, components or services and are often generated by private companies to address additional requirements applicable to a specific product or application. They often are listed in procurement agreements or contract documents as additional requirements above and beyond code or standard requirements.

The word Standard refers to any document that is published by the *Standards Developing Organizations* (SDO) around the globe and that can be specifically identified by standard number and/or title (Oil and Gas Producers, 2010). Standards is defined by International Electro-technical Commission (IEC) as "…a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context (IEC, 2017)." It sets out requirements for a specific item, material, component, system, or service, or describes in detail a method or procedure. However, in some other contexts, standard may refer to recommended practices, specification, or technical reports. They can also be test methods, codes of practice, management system standards, recommendations, or guidelines (guidance) on an agreed best practice. Standards have no predefined lifetime but undergo periodic review to ensure that they consider the latest technological developments and market trends. Some examples of SDOs in Europe are; European Committee for Standardization (CEN), International Standard Organization (ISO), CENELEC and ETSI etc. Other regional standards groups exist as well, such as in Latin America (COPANT), or the Asia-Pacific region (PASC). Standards may be used to support technical regulations depending on the prevailing regime. It is only in is this context (i.e., when used as basis for legislation) that they become mandatory within the jurisdiction covered by the legislation. There are some standards that are active even outside the country of origin. These International standards are adopted and made available to the public by the ISO. Some examples of International Standards applicable to risk assessment are as follows;

Table 2 International Standards

Standard number	Title	Reference
BS 8444–3/IEC 60300-3-9	Dependability management–application guide; risk analysis of technological system	(British Standard, 1996)

BS EN ISO 12100	Safety of machinery – general principle for design: risk assessment and reduction	(British Standard Publication, 2011)
BS ISO 31000	Risk management: principles and guidelines	(International Standard Organisation, 2009)
BS EN ISO 31010	Risk Management – risk assessment techniques	(International Standard Organisation, 2010)
BS EN ISO 17776	Petroleum and Natural Gas Industries – offshore production installations: guidelines on tools and techniques for hazard identification and risk assessment	(International Standard Organisation, 2002)
DNV-RP-H101	Risk management in marine and subsea operations	(Det Norske Veritas, 2003)

Besides the International Standards, there are also National risk assessment standard (simply called National standards). As the name implies, National standards are applied in all operations within the continental shelf under the authority of the National government. Some examples of National standards are; Norwegian standard – NS5814 Requirement to risk assessment; British standard – BS 31100 Risk management-code of practice and guidance for the implementation of BS ISO 31000; Canadian standard –CAN/CSA-Q634-91 Risk analysis requirements and guidelines, CAN/CSA-Q850-97 Risk management guidelines for decision-makers, CCPS Guidelines for chemical process quantitative risk analysis; Australian/New Zealand standard – AS/NZS 4360 Risk management. It is possible to have industry-specific and even structures/system-specific standards. Take ISO 1990X series for example which is developed specifically for Risk assessments of offshore installations (where –X ranges from 0 to 6. X = 0, i.e., ISO 19900, is the general requirements for offshore structures. Similarly, 2–: Fixed offshore steel structure; 3–: Fixed offshore concrete structures; 5– talks about Jack-ups and 6– is for structures in the Arctic region). Other important standards in this category are API standards. Some examples include API –581; –RP 17B; –RP 2A-LRFD; –RP 1111; –RP 571; –1160; –1104. In additions to standards, risk assessments may also refer to codes. For examples, ASME B31.8S has many useful codes that are often referred to, in the integrity management of gas pipeline. The contents there-in describe risk assessment practices on component basis for offshore installation.

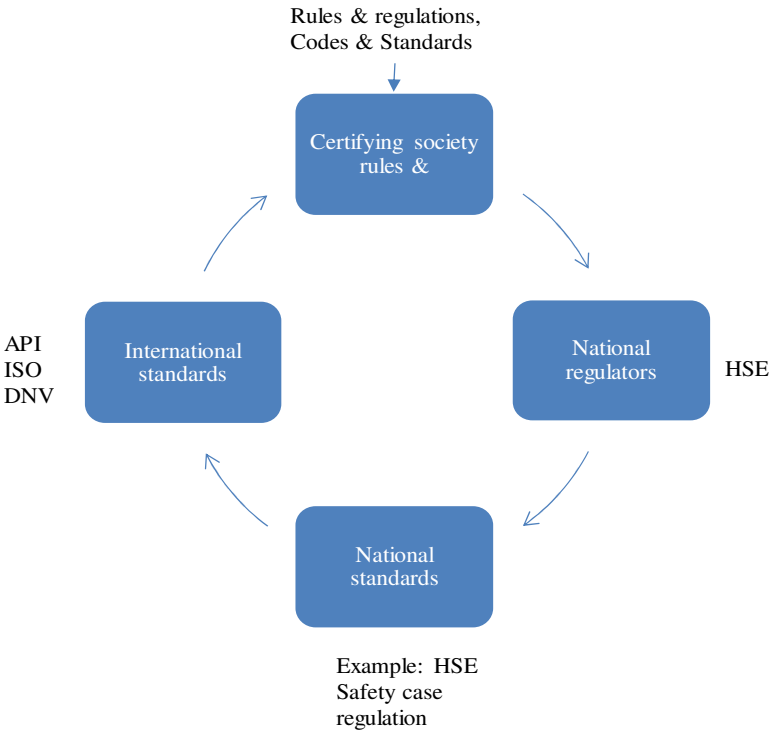

Figure 4 Regulator, Certifying Authorities use of Regulatory documents

The Guidance note recommended the following standards for use in risk assessment of production facilities such as oil and gas platforms;

- API RP 14C: Analysis, Design, Installation, and Testing of Safety Systems for Offshore Production Facilities
- API RP 14J: Design and Hazards Analysis for Offshore Production Facilities
- NORSOK standard Z-013 on 'Risk and Emergency Preparedness analysis' for quantitative risk assessment (QRA)
- ISO 17776: Petroleum and Natural Gas Industries Offshore Production Installations – Guidelines on tools and techniques for hazard identification and risk assessment.
- ISO 13702 on 'Control and mitigation of fires and explosions on offshore production installations – Requirements and guidelines.

API RP 14C and API RP 14C 14J are specific for offshore production facilities while Standards ISO 17776 and ISO 13702 are for general guidance.

5 The Nigerian oil and gas industry in context

Most host countries (HC) in Africa like Nigeria lack the technological expertise of the sophisticated working of such risky and huge capital-intensive industry like oil and gas industry: this opens opportunities for the International Oil Companies (IOC) to fill the gaps and

dominate the sectors -upstream and downstream, till today. While the HC and the IOC may have a common interest in maximising the returns on investment (RoI) accruing from extraction and development of the crude oil, the state has additional responsibility of shielding the citizens from the negative risk impacts of these activities (Hunter, 2014). The state exert control on the activities of the IOC through Policies, which are strengthen by the enabling laws (Legislations and Regulations) and enforced by the Regulators.

At the centre stage of regulations of oil and gas activities in Nigeria is the Petroleum Act: section 9 of this act grants the Nigerian Minister of Petroleum the power to form regulations in pursuant of the act. Some of these regulations in force includes but not restricted to the 'Mineral Oil (Safety) Regulation', the Petroleum (Drilling and Production) Regulations (1969), the Petroleum Refining Regulations 1974. Most of these regulations provide that all oil companies operating in Nigeria should imbibe 'good oil field practice' in all their activities. Though this phrase is not explicitly defined within, however Section 7 of the Petroleum Act draws in the enabling International standard to suffix. This is also the practice recommended by European Union Offshore Oil and Gas Authorities Group by for countries without regulation in their national bodies. The European directives reads in part… "to further promote offshore safety, the European Commission works with its international partners on the implementation of the highest safety standards worldwide. The offshore inspectors of EU countries also work together through the European Union Offshore Oil and Gas Authorities Group (EUOAG) (http://euoag.jrc.ec.europa.eu/) to share best practices and improve standards."

Though such approach to safety assurance, given the peculiar scenario at play in oil and gas industries in these countries (i.e., IOC dominance), may appear logical to some researchers, however, it may be far from being realistic. In fact, an argument may be made here that a people lacking in capacity to participate actively in the extraction, and processing of these natural resources may not fully know the risks that go into the business and as such may not understand the decisions that had advised some of these European and American regulations. In a related argument risks, as viewed in every dimension is location specific: whence adoption of regulation made in a different (no matter how closely related) context need a clinical adaptation as is the practice in Ethiopia, India etc. Afterall, risk is a probability.

6 Conclusion

From the ongoing discussions, it can be said that the paramount interest of every national Government is in welfare of her citizens. In bid to improve their welfare and social standards, governments create enabling environment that attracts investment in industrialisation from

both within and outside the country (Multinational companies). Because there are risks involved in every business, the government makes policies, legislations and regulations to ensure safety of the citizens. Hence, it can be implied that regulations and Legislation which supports policies are meant first and foremost to be country specific. Formulation of safety policies draws from long standing experience in the various high-risk industries such as aviation, maritime and oil and gas industries. Sharing experience with same and/or allied industries may not be overtly a bad idea, however caution should be taken not to overuse or over depend on the experience of others.

A look at the prevailing situations in high-risk industries (such as the oil and gas industries) in Africa paints a picture of dominance by European-American influence. The dominance is in two fronts- dominance with respect to major players in the extractive and processing business and 2) dominance with respect to enabling regulations. The author is of the opinion that these countries stand to benefit more if they would rather review these regulations and adapt it to reflect their experiences in the industries so far.

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