

Risk Management in the Oil and Gas Sector, Analytical Discourse: A Case of Shell Petroleum Development (SPDC) Company Nigeria.

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Abstract

This research is conducted as an analytical discourse to determine and evaluate the type of risks, present, in the business of the oil and gas sector and further determine the frequency and severity of risk occurrences and how they are also managed in this sector. The aim and objectives also include assessing the effectiveness and efficiency of risk management skills, techniques and approaches present, in this sector, choosing Shell Petroleum Development Company (SPDC) as the case, for the study. Both exploratory research method and qualitative research design were adopted with the application of risk management methodology. This however led to the conclusion that risk retention techniques are more available in this sector than the risk transfer mechanism which further implies that this sector is more interested in retaining and managing their various risks internally rather than transferring them to insurance companies. However, other physical risk control measures like minimization/reduction and elimination/avoidance are also applied in this sector. The study however revealed that different types of risks are involved in the business of this sector and the frequency and severity of risk occurrences are equally high and complex because of the business nature and capacity. This study finally concluded that, oil firms are rather, more conservative with their kind of risk management approach in Nigeria. Recommendations were finally made.

Keywords: *Risk management, Oil and gas sector, Shell petroleum development company (SPDC).*

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Background to the Study

Risk has been defined in so many ways. This is because risk is not only the centre of insurance, but also inseparable from life. Risk is at the centre of life itself and as a result, many people in different walks of life are concerned with it. The educationist, the economist, doctor and psychologist, businessmen, engineers, etc are all interested in the concept with different insurers defining risk as follows: consequently, Isimoya (2000) defines it as “the possibility of an unfortunate occurrence” or “as the uncertainty as to the economic loss”. Isimoya (1999) finally added that risk is a peril which is capable of causing a misfortune or damage leading to an economic loss. In summary, risk is an event or chance of happening which can lead to either a financial or physical loss (Akenni, 2006) or the degree of the probability of the possible outcomes of a particular course of action (Jones & Greg, 2000).

Onu (2010) opined that management itself involves designing and maintaining an environment in which individuals working as group can accomplish pre-determined goals and objectives. This implies that management is involved in taking actions that would enable individuals to make contributions the groups' objectives. Risk management like any other management is a means of achieving objectives (Ezema, 2000). For instance, a manufacturing plant cannot achieve its objectives if the machinery is rendered uninsurable as a result of fire incident or any other fortuitous even. Again, an educational institution cannot achieve its objectives where the classrooms have been broken into and its facilities like; air conditioners, public address systems have been carted away by burglars (Ojogbo, 2010).

Therefore, in line with the above, there is no more important activity for man than managing the fortuitous event that might occur and the consequences is the art of risk management. Effective risk management therefore promotes the attainment of organizational objectives despite the presence of these risks. It involves the action taken before and after the materialization of the risks i.e. the actions to prevent their occurrence or actions to minimize their adverse effects whenever they occur. The objectives of a firm's risk management are central to the firm's general or corporate goals. Isimoya (ibid) citing Darwin (1976) states that risk management objectives are a function of corporate goals, corporate environment and attributes peculiar to a particular organization.

Generally, organizations pursue the following objectives in their in their risk management policy with varying degrees of emphasis: survival, peace of mind, lower risk management cost, high profits, fairly stable earnings, little or no operational interruptions, unlimited growth, social responsibility and desire for good public image and satisfaction of statutory or industry-imposed regulations. The general objective of most business firms are survival and profits with special emphasis on growth and stability in accordance with the taste and preferences of the top management. For instance, a director emphasizing stability might have conservative risk management philosophy. On the other hand, a firm emphasizing growth is likely to take more chances because of her desire for more capital for expansion. Since the company environment and

attributes peculiar to organizations vary, these would also affect their risk management objectives. For instance, a company operating in a stable homogeneous business environment can to some degree, predict what steps the government suppliers, competitors and even customers are going to take in specific situations and can adopt risk management objectives that are specific, uncompromising and not subject to frequent review or change. An attribute peculiar to an organization's internal environment such as historical development, personality and tastes of top management, financial standing of the firm and nature of her operations are variables that affect risk management objectives.

The purpose of risk management is to minimize the adverse effect of the occurrence of risk. What then are the possible benefits of risk management to business, individuals and society at large? Risk management is therefore beneficial to business in the following ways; (i) improving the profit earnings (ii) effective risk management reduces anxiety and stress (iii) improved quality of decisions (iv) reduces the fluctuations in annual profits (v) involves post loss management which through preparations make it possible to continue operations after a loss (vi) employee satisfaction (vii) can possibly either make or mar organization (viii) creates social responsibility for good public image. Having gone so far, therefore, it would be pertinent to recall the main objective of this research which is to identify and analyze the possibility of risk management in the oil and gas sector. However, Asika (2011) identified and criticized the conservative approach of oil and gas firms to risk management. He further observed that oil and gas firms are yet to embrace the application of standard and universally accepted risk management methodology. To him, the rare application of oil & gas insurance as a transfer mechanism is dicey and critical. He also advised that the oil & gas sector should learn the relief advantage in spreading risks rather than retaining and managing risks themselves. Inversely, to the society, since organizations and families belong to the society, to the extent that individuals and companies gain from good risk management plans, the society benefits. Finally, the social costs associated with business and family losses that are averted by business/individual risk reduction methods are also gains to the society.

Objectives of the Study

1. The study therefore aims at: To identify and assess the type of risks that are available in the oil and gas sector.
2. To determine the frequency and severity of risk or currencies.
3. To know the risk management skills and techniques.
4. To know the applicable process or methodology of risk management in this sector.
5. To assess their feasibility at different stages involved.
6. To decide the possible final results.

Statement of Problem

Oil and gas sector are made up of hi-tech firms. From reliable statistics, it is evident that the frequency and severity of risks incurred in this sector are monumental under annual evaluation or assessment. This is because employees in this sector are exposed to various

risks and the efficiency and effectiveness of the management of these risks are continuously under intensive research. For instance, workers at the rig are exposed to different potential health hazards, safety challenges and various economic jeopardy are identified, environmental degradation (air & water pollution), oil spills, oil pipe vandalization and bunkering, kidnapping & assassination of oil workers by restive indigenes, industrial waste disposal, etc. This is why the major sources of risk generation in this sector are; Health, Safety, Environment and Security (HSES). In retrospect, many risk management researchers accused this sector of conservatism to risk management for as much as their techniques have been proving poor results (Asika, *ibid*). Eromosele (1997) asserted that the challenges faced by this sector in managing their risks are because of their freedom of choice of skills or techniques. Precisely, Isimoya (*ibid*) is yet to understand why oil and gas insurance is yet to be fully embraced by this sector in Nigeria. The assumption still lies in the fact that the potential premiums may be high. The underlying fact is that these firms chose to retain and manage their risks, themselves. These 'apparent biases' found in the most recent researched opinions and reports, hence, form the need and basis for this research.

Research Methodology

This research shall adopt an exploratory research method and a qualitative research design (Ojogbo and Ezema, 2019), through the application of the risk management methodology to identify the potential risks in the oil and gas sector. It shall also use the same process to evaluate the frequency and severity of these risks and further observe the possible risk control techniques as; financial and physical methods, furthermore breaking them down as; risk retention & risk transfer (financial control), risk elimination & and risk minimization (physical control), (Irukwu,1991).

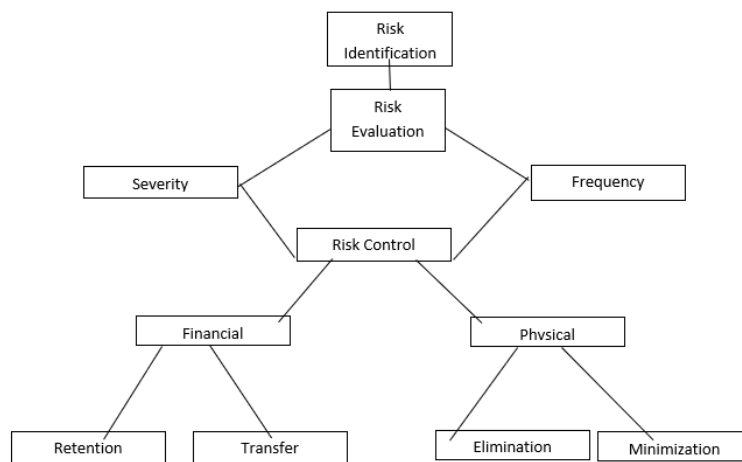


Figure 1: Risk Management Methodology (Paradigm)

Source: (Asika, 2011)

Conceptual Framework

- (a) **Risk identification:** This is an attempt to identify all possible events, situations or activities that could cause or enhance losses. They are:

- (i) Analysis of major types of losses affecting the individuals or firms.
 - (ii) A systematic search for all the immediate causes of such losses.
 - (iii) A systematic assessment of the underlying causes and their consequences.
 - (iv) a physical inspection of the property.
- (b) **Risk evaluation/Assessment/ Measurement:** This is the assessment of the impacts of a possible loss on the organization. In measuring risks, the risk manager ascertains the frequency and severity of the occurrence of each risk. A risk can have high frequency of occurrence, but low severity when it occurs. This means that an accident may occur frequently but the financial loss attributable to each occurrence might be low. Conversely, an accident might occur seldom, but the financial implication of each occurrence might be high. In risk measurement, statistical data become invaluable. Insurance companies have a lot of data that are cumulated over the years in respect of information on life assurance, motor vehicles, insured houses, export goods, burglary insurance, pecuniary insurance etc. Statistical information can also be obtained on the number of deaths in life assurance policies within age groups in a year, the number of Vehicles that were accidental, houses that went up in flames, thefts etc. The number of claims and the amount paid on each class of insurance are also obtainable from the statistical data bases of insurance companies. Statistics can be divided into three broad groups: They are descriptive statistics, inferential statistics and probability theory. Risk control: The third and final step in the risk management process as shown in figure is the control of risk. It can be seen from diagram that falls into two parts, physical and financial. In the end, it is the economic control of risk which is the objective of the risk manager. He has identified and evaluated risk only so that he can decide how best he can respond to it. This final step is the important decision stage where he must use all of the information, he now has in his possession to make the best decisions on behalf of his company.

There are two methods of risk control which are; physical control and financial control.

Physical Risk Control: Physical Control includes all techniques designed to reduce either the frequency or the severity of losses occurring in a particular period, for example, in a year. There are two ways of physical risk control:

Risk Avoidance: A risk can be avoided if one avoids the activity that generates the cigarette smoking could cause lung cancer. However, some risks are inevitable, for instance, selling one's house because of fire outbreak or refusing to buy a car because of road accident.

Risk Reduction: Since some risks cannot be avoided or eliminated, the risk manager embarks upon loss reduction or minimization measure if the unexpected event should occur. For example, vehicle accident injuries can be minimized or reduced by wearing of seat belts. Safety training and courses could also minimize industrial accidents. When a loss has occurred, it can also be reduced or minimized through some actions. Property

can be salvaged from a burning building and sold later. The cost of fire injury to a worker could be reduced if an industrial nurse gives a first aid before the victim is taken to the hospital. Similarly, the installation of an automatic water sprinkler can minimize loss in a fire outbreak. Also, the installation of iron gates and bars on windows and doors can discourage burglary.

Financial Risk Control: Financial risk control can be carried out through these two ways:

Risk Retention: An individual or company can take a deliberate or conscious decision to retain the consequences of a risk and bear the loss when it occurs. Risks can be retained in the following circumstance.

Self-Insurance: Large companies may decide not to purchase insurance covers for certain activities and decide to absorb the loss arising from such a risk by setting up a contingency fund.

Operating Loss: Undertaking a business venture as had been mentioned earlier has some risks. The owner of the business might decide to write off or charge such losses against the operating profit.

Captive Insurance Company: A captive insurance company is an insurance company set up by a parent insurance company to underwrite some or all of the subsidiary companies' insurance business. A captive insurance company has the disadvantage of ensuring a cheaper and more flexible re-insurance market. Another advantage is that some of the covers issued by a captive insurance company (CIC) might not be obtained from the regular insurance companies. And above all, the operation of CIC increases the parent company's profits.

Risk Transfer: Risk transfer is the process of shifting the responsibility for meeting one's own losses from oneself to someone else. Risk transfer is carried in two ways: Transfer the Activity of or Creating the Potential Loss: This can be done, for example by sub-contracting the activity, or hiring another enterprise to do the job. For example, in civil engineering under water-works and pile driving are in many cases sub-contracted to specialists in such cigarette smoking could cause lung cancer. However, some risks are inevitable, for instance, selling one's house because of fire outbreak or refusing to buy a car because of road accident.

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Company: A captive insurance company is an insurance company set up by a parent insurance company to underwrite some or all of the subsidiary companies' insurance business. A captive insurance company has the disadvantage of ensuring a cheaper and more flexible re-insurance market. Another advantage is that some of the covers issued by a captive insurance company (CIC) might not be obtained from the regular insurance companies. And above all, the operation of CIC increases the parent company's profits.

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Brief History of Shell Petroleum Development Company (SPDC) and the Nigerian Oil & Gas Sector

Exploration for oil and in Nigeria started at the turn of the 20th Century, through the efforts of the German Bitumen Company. However, the efforts by Shell, which eventually discovered commercial crude oil in Nigeria, started in 1937 when it operated and traded as **Shell De' Arcy**. But it was not until 1956 that commercial oil was discovered in Oloibiri in the present day Bayelsa State and a production of about 5,000 barrels per day started in

1958. Thereafter, other oil companies like; Gulf, Chevron, Mobil, Texaco, *et cetra*, came into the race. Today, Nigeria can boast of over 2.5 million barrels per day of production capacity with a reserve base of over 40 billion barrels of crude oil and over 180 trillion cubic feet of gas.

The Niger Delta Region of Nigeria, from where all the oil gas are produced at the moment, has some of the most challenging and diversified terrains in the world-over covering dry land, galloping swamp, swamp, shallow waters, offshore and deep offshore. The oil producing areas of Nigeria are precisely located both in the fresh and salt water swamp ecological belt, lying just north of the Niger Delta and running all the way from Cross River in the East, through Akwa Ibom, Imo, Abia, Rivers, Bayelsa, Delta, Edo and Ondo state in the west, and in the off-shore fields hugging the coast of the same belt of territory in the Nigerian continental shelf straddling the Niger Delta bulge. The oil production in Nigeria is over two million barrels per day.

Excerpts from a Book Preface, "Understanding the Nigerian Oil & Gas Industry: A Development Perspective", by HRM (Dr) Edmund Maduabebe Daukoru, Amanyanabo of Nembe Kingdom.

Conceptual Clarifications

The Concept of Risk and Risk Management

Asika (ibid), citing Isimoya (1999) declared that uncertainty surrounds everything we do in life. Ojogbo (ibid) defined risk as the pivot on which life, in all its ramifications, depends. In other words, at the centre of life, you have risk manifesting itself. In our daily life, we see, hear and read about the manifestation of risk, in one form or the other. Such may be multiple collisions on our highways, major fire outbreaks and explosions, earthquakes, industrial and domestic accidents, robberies and burglaries, oil spillages and pipe leakages, airplane crashes etc. As individuals or families, are faced with the stark realities of risk of risk in our daily activities. One's vehicle may be involved in an accident, which may lead to either death or disability, total or partial, temporary or permanent. Also accompanying such could be damage to the said vehicle. Also, our houses are at risk of burglars and armed robbers. The family is also faced with the risk of sicknesses, untimely death, etc.

Every business venture is risk potential and every risk is loss potential. Any attempt to establish business is also an attempt to generate risks. Synonymously saying, the management of risks is the management of businesses because in this process, uncertainties of economic losses are anticipated. This is why the debate on the appropriate definition of an entrepreneur remains an unsettled one. It continues as business concepts and ownership structures keep expanding depending on the subject and methodology employed in the investigation of the entrepreneurial phenomenon (Asika, ibid). In reviewing Mill (1934), Asika (ibid) observed that the characteristic feature of an entrepreneur includes; directing, supervising, controlling and risk-taking. It is his (the entrepreneur) affinity to risk which according to Mill distinguishes him from

the manager. However, differing from Mill's viewpoint, Asika (ibid) also pointed out where Schumpeter (1934) later emphasized on innovation rather than risk-taking as the most important distinction between the two. In his opinion, an entrepreneur's goal broadly defined is to develop new products or services as well as new methods of production; identify new markets; discover new sources of supply and develop new organizational forms.

No matter how well an individual or a business establishment executes the plans to achieve predetermined goals; her efforts may be thwarted by unforeseen circumstances or events such as; fire, embezzlements, riots/strikes, liability suits or other fortuitous events. It is the need to fit the management of these fortuitous events into the general framework of management, in order to minimize the adverse financial effects, that the techniques of risk management were devised. Finally, worthy to note here that insurance is not risk management no matter how popular and profitable it could mean to both the insurers, but an off-shoot of risk management methodology known as financial risk management mechanism further designed as risk transfer mechanism.

Nigerian Oil & Gas Sector and Risk Management

For the purpose of this work, it is pertinent to briefly and precisely describe the composition of the Nigerian oil and gas sector. *This sector is divided into two broad subsectors, namely; the upstream and the downstream sectors.* The upstream sector includes; (i) production of the crude oil and gas (ii) exportation of the same products, while the downstream sector includes; (i) local refining (ii) importation of the finished products (iii) distribution network where individuals major (iv) retail networks.

The management of risk focuses or centers on properties and potential liabilities (Durfman, 2007). Going by the above description and standard, it is therefore no gain saying that employees in all areas of this sector of the national economy are exposed to potential risks in social, health/life and engineering or technical capacities. There is also need to continuously and statistically measure and record the frequency and severity of the occurrences of these risks, design adequate strategies for effective and efficient management for possible control. For instance, workers at the rigs are exposed to potential technical injuries in the dispensation of their jobs. Also, various risks are identified in the oil refineries and gas plants that are capable of causing fire accidents and other health hazards both to the workers and the environment, also potential monumental economic and financial losses to business organizations. The workers at the distribution channels and retail networking are also exposed to potential fire accidents and other consequential losses at quite high frequency and severity because of the high inflammable nature of petroleum and gas products, to mention but a few, all these are classified as hi-tech risks.

For these reasons, insurance companies are now challenged with the exploration of oil and gas underwriting policies under financial risk transfer mechanism, but because of the complexity of their risks, most oil firms are not accepting this offer. Some of the insurance

companies that may wish to enter this contract relationship seldom with few oil firms can cede some of their contracts through coinsurance, or prefer principle of contribution or even reinsure to ensure that potential claims are properly and completely settled. Inversely, some oil firms may choose to adopt captive insurance technique, alternatively, opt for physical method of risk control because of expensive premiums and likely difficulties in indemnity (Asika, *ibid*). In the light of the above, it is quite credible to say that this sector may find it difficult to effectively respond to insurance facility, rather, they use other possible techniques in reducing their annual losses. This consequently places them on the conservative direction of risk management.

Data Presentation

Adopting an exploratory research method and a qualitative research design (Asika, 2004), through the application of the risk management methodology (Asika, 2011), the research thus identifies the following potential risks in the oil and gas sectors as; oil pipe line vandalization capable of causing oil spills, leakages as a result of sabotage by use of hacksaws, opening or tampering with valves, environment and ecology degradation resulting to water and air pollution, corrosion of oil pipes and other facilities because of old age consequent to spills and leaks, fire accidents and loss of lives, kidnapping, motor accidents, thefts & burglary, engineering accidents, business interruption, flaring of gas liquid, emissions, effluents and discharge of waste materials that are known to have negative impacts on the health of inhabitants etc.

However, some of these risks could measure high frequency and some low severity when they occur, also, some might frequently occur but the financial impacts might be low while some of these risks might seldom occur and the financial losses attributable to each occurrence might conversely be high. The above is followed up here as: (i) risk identification (ii) risk evaluation, assessment or measurement. The final step in this methodology which is risk management control as the (iii) step is thus presented with the case study as:

Risk Control Techniques in Shell Petroleum Development Company (SPDC) Nigeria

Omene (2009), therefore, authoritatively presents the following information as secondary data of risk control techniques or rather how risks are managed in this case study, (SPDC) Nigeria.

SPDC Management of Health, Safety, Environment and Security (HSES) Risks in Nigeria

It is important to share our experiences concerning health, safety, environment and security issues in the oil and gas industry. Our treatment of this subject draws largely from the Shell Nigeria experience from which we shall endeavour to draw the essential learning points and provide these for the benefit of industries. Our experience indicates it often difficult to discuss health and safety in isolation without involving their environmental and security issues.

Mission: SPDC's attitude towards health, safety, environment and security, hereinafter called HSES derives from the company's mission who is: to find, produce and deliver hydrocarbons safely, responsibly and economically for the benefit of the Nation, the joint and its employees. Encapsulated in this company's mission statement is the company's desire to form a close relationship with the society from where it draws sustenance and in so doing, contribute to sustainable development in Nigeria – a development that satisfies the aspirations of the present generation without compromising the ability of the future generation to meet the challenges of their era.

It should be noted that this goal is not different from the other organizations. Responsible management has, amongst its objectives, the obligations to conduct its activities in a socially responsible and economical manner. Drucker (1980) recognized this concept when he explained that “the first duty of business is to survive and the guiding principle of business economics is not maximization of profit – it is the avoidance of loss. It is only by so doing that an organization can claim to be contributing to the sustenance of the society”. It is clear that any person who cannot fulfill this basic goal will only constitute a parasite of labour, materials, financial resources plants and equipment which must always be available to undertake productive activities. No effort should therefore be spared to ensure that the interaction of these assets in accordance with preconceived plans. Avoidance of preventable deviations from plans – the focus of HSES management – is therefore a cornerstone of effective management.

Data Analyses

HSES Policy

To cope with HSES responsibilities incorporated into the company's mission statement, a policy to provide the strategy focus in HSES was formulated. This states in part that the company's activities shall be conducted in such a way as to:

1. Avoid injury to and preserve the health and safety of the its own employees, those of its contractors and of any other member of the public that may be affected;
2. Minimize the impact on the environment in which SPDC operates.

The policy recognized the need to continually mobilize staff in the safety effort and explains the individuals' contribution in what we term the “Blue word” as follows:

“Every SPDC employee must plan and perform his or her day day's work in accordance with the HSES. If the employee believes that it cannot be carried out in accordance with the policy, he or she must report this immediately to the supervisor”.

Management employs every opportunity to bring the contents and intent of the attention of every staff. Induction processes, meetings, project initiation procedures, end-year activities, all contain measures for reiterating management commitment to the letters of the HSES policy. In addition, each employee has a copy of plasticized copy of the policy he/she is expected to refer to always. The “blue words” seek to make right to make every employee exercise control over his activities as he has a right to stop any activity and seek assistance from more experienced persons.

Procedures

Converting the policy into practice follows the normal management route planning, organizing, directing and controlling. In carrying out these activities with respect to HSES in SPDC, a distinction is not made between economics and HSES goals. The company believes they are integral and cannot be separated. This belief led to the adoption of line responsibilities for the safety of every operation. In this respect, it is therefore the duty of every line manager, supervisor and employee to integrate HSES into all facets of the operations.

The SPDC, Chief executive fully supports this as part of the HSES policy which states the “Health, Safety, and Environmental management will be an integral part of SPDC's business. Supervisors will be held just as accountable for HSES targets”. Five-year rolling HSES plans define the strategic direction of the company in HSESs matters. These are prepared at corporate and divisional levels. Based on these 5-year plans, annual plans at the corporate, divisional, departmental/sectional levels are drawn up. This cascade of plans with ever increasing detail touches all aspects of the company business; plans should be appropriate and consistent with the corporate policy objectives. Line responsibility for HSES ensures that line departments prepare for their own plans which provide ownership and encourage commitment. This is distinct from the outdated practice where a safety department drew up the plans which are “imposed” on others. Each department plan reviews the performance of the previous period; identifies lapses, constraints, and strengths and uses this as a basis for setting out the objective and targets for the succeeding period (year). It draws up a programme that will be employed for achieving targets and deals in broad terms with an analysis of:

1. Potential for deviation from plans.
2. Technical and managerial measures for eliminating hazards associated with activities.
3. Procedural measures for preventing substandard behavior.
4. Detecting system for identifying deviations.
5. Contingency measures for dealing with emergencies and mitigation of losses.
6. Post emergency measures for quick return to normal operating conditions.

HSES Organizations

SPDC maintains a well-staffed HSES department comprising some well qualified personnel with broad expertise and headed in each division by a manager. Their role is essentially advisory. They provide required expert advice to line departments on HSES, monitor the “Health” of operations and bring their expertise to bear on operations during emergencies e.g. major fires, oil spills and gas release. The department also helps to draw up company standards, scans the international arena to keep the company abreast of developments, helps in training of staff and contractor personnel and advises management on required intervention when the need arises.

Tools for Implementation

A matrix of measures, procedures, strategies and techniques have been developed to enable SODC staff predict, cope with and control the myriad potential deviations and

encountered in the oil field. Complex as these may appear to be, these measures consist of some tested basic HSES management tools and techniques that are well known to the most oil industry professionals. Essentially, these measures seek to:

1. **Carry out a prior analysis of each job, process or plant with the view of identifying potentials for deviations and critical process (a variant of critical path analysis)**

Unsafe Act Audit (UAA), Job Safety Analyses (JSA) Fault Tree Analysis (FTA), Event Tree Analysis (ETA), Environmental Impact Analysis (EIA), Hazard and Operability Studies (HAZOP) and a host of other techniques are some of the common tools that are used here.

2. **Design out the identified hazards through technical and social engineering**

Phasing out hazardous operations or the use of hazardous materials is an example here. For instance, SPDC has phased out asbestos and sand blasting from her operations in the recent past in order to satisfy medical requirements. Measures have also been put in place to phase out halons from her operations. Liaison with the various communities in the oil producing areas to foster understanding and good relationship is in itself, the action to avoid the hazard of confrontation.

3. **Equip operatives with appropriate protection to cope with continuous hazards that cannot be engineered out of the operations**

For example, it is mostly impractical to remove water from the operational area to eliminate drowning hazards. Attempts are made however to ensure that anyone deployed to such an area can swim (workers are trained to swim) and is provided with buoyancy aid, which he is required to wear. Investments in training, certification for certain processes (e.g. driving, swimming et cetera), the permit to work system, procedure guides and personal protective equipment are also associated with protection against the identified hazard.

Monitor performance with a view of ascertaining the integrity and operability of persons, equipment, and the impact of activities on the environment and early detection of deviation from accepted norms

These take different forms depending on what is being monitored.

1. Medical and biological monitoring for workers
2. Technical safety audit and inspections for plant and equipment
3. NDT for certain classes of facilities
4. EIA for monitoring environmental parameters
5. Monitoring of the quality of wastes e.g. effluent, drill cuts and so on.
6. UAA, Hazop and JSA for procedures and practices.

Prepare contingency programmes which will reduce the adverse consequences of such deviations and consequences of such deviations and ensure quick recovery by appropriate intervention

Simulated evacuation exercise and drills help to assess and maintain capabilities for response to emergency situations.

Investigate deviations with a view to learning salient lessons and use lessons to avoid recurrence.

Lessons from investigations are useful when trying to pinpoint problem areas.

All these steps are integrated into the business process and are complemented with other management tools and techniques designed to ensure visible management involvement, commitment and employee participation. Management uses different e.g. meetings, policies, inspections, visible involvement in HSES matters etc. to demonstrate its commitment to the policies. Employee enthusiasm for HSES into work procedures, incentive schemes, meetings etc. worthy of note is the cooperation that exists among oil companies on HSES matters. No one organization can claim to have the fullest knowledge of HSES, and certainly, none can claim to have the capability to effectively deal with certain emergencies independently. The petroleum industry in Nigeria maintains a mutual assistance programme that allows one company to draw on the expertise, facilities and goodwill of a sister company in terms of emergencies. We exchange notes on HSES matters to foster understanding amongst the competitors. The Clean Nigeria Associates (CAN) covers environmental matters, the The Oil Producers Trade Section of the Lagos Chamber of Commerce (OPTS) discuss general management matters, whilst a nascent forum for safety professionals in the oil industries has recently started holding meetings to exchange information.

Safety at Work

The practical interpretation of the listed steps produces a number of approaches. We shall examine how this works in a typical project.

Pre-Qualification of Contractors

As it is normal in the petroleum industry, SPDC employs the service of a large number of contractors. Managing the safety of shell personnel and the activities in which they are involved in a considerable task. However, the management of HSES of contracted activities is far more challenging since we have to ensure that contractors adopt work ethics which are in line with laid down standards, something which is often more alien to them. On HSES issues, SPDC does not differentiate between contracted work and activities carried out by its own staff. The explanatory note to the SPDC HSES policy quoted earlier declares in part that:

“No distinction will be drawn in HSES standards and requirements between the SPDC and contractors' operations. SPDC assists its contractors in raising their HSES management capabilities.

For contracted work, contractors must be pre-qualified and those assessed as not meeting the company's HSES standards are not invited to bid. A new company inexperienced in the Shell's way of doing things would need to demonstrate willingness to improve, if its HSES standards are regarded as falling below expectations. Bid assessment make specific

analyses of the HSES capabilities as well as commercial and technical parameters. A company will only be awarded a job on a matrix of scores based on those three items. Before any field work is backed upon, pre-mobilization meetings and an inspection of the equipment and facilities to be deployed for jobs are conducted. At such meetings, HSES and technical issues that make for successful implementation of the contract are tabled and discussed. A prediction is made of the hazardous operations to be expected during the life of the project and a plan is prepared to control all the hazards associated with the job. Such control may involve elimination of certain equipment (PPEs), close supervision at certain stages etcetera. It is at such meetings that company rules are discussed and contingency plans for operation are finalized. For large projects, personnel from departments other than the contract holding departments other than the contract holding department (e.g. Transport, HSES) are always involved.

Pre-mobilization inspection of all equipment including vehicles to be deployed for the job is conducted to ascertain their integrity and ensure that they comply with ALL statutory requirements concerning maintenance, certification and documentation. Prior to executing the project, the contractor and company will agree the milestones to be achieved during the course of the contract against a critical path programme of the resource deployment against activities. This is essential to ensure that we know precisely what progress has been achieved at any point in time and the dependency of each activity. Each activity often brings with each different HSES aspect. For major projects as a preparation of well sites, flow sign stations or major pipe line construction work, Baseline environmental Impact Assessments (EIA) are conducted to ascertain the state of the environment before construction commences. The EIA assists in identifying sensitive parts of the area and is useful in helping to design protection facilities should a spill, for example, occur. For instance, a source of drinking water for the community must be protected from any potential pollution. A post impact assessment (PIA) is also conducted at the end of such projects to measure the impact of activities on the environment. As part of social engineering efforts, local communities are contacted and briefed before their land is entered. Agreement regarding the possible relocation of artifacts and sacred places are reached before project takes off. Measures put in place to prevent the adverse consequences of work activities on the communities are equally discussed. Also identified and discussed are the steps to be taken should any emergency situation that may impact on communal life be encountered.

During the life of the project-from mobilization to project close out-the contract holder monitors the quality and safety of all activities and periodically participates in site meeting, pep talks and drills. Supervisors from other relevant departments e.g. transport, production (eventual asset holder) or HSES, may visit the site. Inspections cover a wide range of HSES matters. These include among others, access control system, site management system, work place, use of PPEs, the suitability and integrity of the equipment deployed on the site, welfare practices, health matters documentation, information system, equipment deployed on site, welfare practices, health matters, documentation, information systems, emergency plan and preparedness, drills,

housekeeping, accident reporting investigation systems and waste disposal techniques. Discussions are held with site superintendents, supervisors and workers and their views on how to solve identified substandard practices and situations sought. This helps in winning their commitment to suggested solutions.

Experience

SPDC has promoted a structured approach to issues relating to HSES for some time. Her pioneering efforts in the Nigerian oil and gas industry are not limited to commercially well-known issues of being the first to discover, exploit and export crude oil in Nigeria. Shell can equally lay claim to being among one of the first organizations to give the highest priority to HSES. It will be of interest to look back and as if the heavy investment in HSES has been worth the effort. Before providing a response to such a question, we will draw your attention to certain facts. The petroleum industry is involved in some very hazardous operations. A wide range of activities are carried out in diverse terrains, some hostile, and some sensitive such as seismic data acquisition, construction (civil and mechanical), drilling, production, refining, storage, transportation and distribution. To appreciate the wide range of hazards associated with these activities, we need to remind ourselves that the major products/raw materials of the industry constitute some of the most flammable materials known to man. This compounded by the fact that activities are carried out in all types' terrain imaginable-offshore, swamps, virgin forests, onshore, built up areas and deserts. Equally worthy of note are the detrimental effects of exploration and production activities on the environment.

Results

Shell's efforts in this direction have paid some dividends. Today, they have positively influenced a large number of contractors and their personnel in and in and around their operational areas. Indeed, quite a number of those who have little or no interaction with shell operations have come have come to recognize that SPDC gives a high priority to HSES matters and if they are to be considered for work with SPDC, they must change their mode of operations.

The Way Forward

The positive picture of facts painted above should not be construed to mean that everything is OK. A lot of room for improvement still exists. We still record accidents that can be prevented. That ubiquitous factor "Human Failure" rears its head in circumstances which we believe could have been controlled. The gas we flare due to a web of complex, technical social and inability of Shell and other IOCs to make some oil host communities accept them whole heartedly, points to deviations and social engineering goals.

Emerging technological developments continually introduce increasingly complex tasks, sophisticated processes and more appropriately designed equipment into operations. The oil and gas industry must adopt some of these as they facilitate certain oil related processes which pose new challenges for HSES. With these developments, the

potential cost of errors will be high. Fortunately, the possibilities presented by new technology show that total safety is technically feasible. With the wide distribution of knowledge made possible by improvements in telecommunications, societal demand for safer environmentally friendly systems will increase. The effect of these advances will be a greater insistence on safety where risk had previously been accepted. The unrest of oil producing communities in recent times, a producer of complex socio-political errors is an example. The trend will continue and management decision making must be broadened to encompass the potential the potential application of sophisticated techniques in the management of these loss-producing deviations from plans. It is very clear to us therefore that we cannot rest on our laurels. We will continue to strive for improvement at all times. In this respect, we shall investigate the world market for technical and managerial tools which will improve our performance in meeting the Health, Safety, Environment and Security related issues in our operations. The duty of striking a symbiotic relationship is a never-ending process.

Strands of Management Practice

The description given above referred to certain basic HSES tools and techniques that make for success in risk management. Some of these characteristics are listed out here to enable each of us to be in good position to modify this to suit his/her own organization. While the application of these concepts will vary from consist of:

1. Management commitment
2. Integration of HSES management into the business process
3. Setting standards against which performance will be evaluated
4. Workers participation
5. Line of responsibility for the safety of owned operations
6. Monitoring of performance
7. Supervision
8. Training
9. Investigation of deviations
10. Contingency programme/plans

These characteristics can be grouped under the management roles of planning, organizing, leading (directing) and controlling. This suggests that HSES can be subjected to the same principles guiding the execution of management responsibilities and by exercising effective control over HSES matters in an industry; management is simply discharging its duty to the company, the society and the world at large.

Summary of Findings

The research conducted, finally came out with these reliable findings to further substantiate its conclusions and possible recommendations as thus declared:

1. That the oil and gas sector in Nigeria has a common method of risk management approach generally applicable in their operations other than the classical risk management methodology.
2. The identified major sources of risk generation in the business of oil and gas in

- Nigeria are as follows: Health, Safety, Environment and Security and the consequent risks are; environment and ecology degradation (air & water pollution)
3. The management of risks in this sector is called, “The Management of Health, Safety, Environment and Security (HSES) in Nigerian.
 4. The oil and gas sector do not apply insurance which is the most popular risk transfer technique. In their own approach, they rather choose to retain and manage or control their risks financially and physically than transferring them to insurance companies.
 5. The study further revealed that different types of risks are present in the business of this sector from the identified sources and the frequency & severity of their occurrences are equally high and complex because of the business nature and capacity.
 6. These risks are potentially costly or expensive to manage also because of the nature and capacity of their business. This is why they concentrate more on risk avoidance/elimination than minimization and other financial risk controls.
 7. The research also discovered that oil and gas sector have a more conservative approach to risk management in Nigeria.
 8. They also have the choice or freedom to adopt their own risk management techniques.
 9. The study finally discovered that their risk management techniques have been yielding good results.

Conclusions

The aim and objectives of every study usually set the standard for the findings, conclusions and possible recommendations (Asika, 2004). The main objective of this study therefore is to identify and assess the types of risks available in the business of oil and gas sector in Nigeria and further determine the frequency and severity of their occurrences, finally, find out the applicable techniques in managing them. With these, the study therefore concludes that:

1. The oil & gas sector in Nigeria earnestly adopted a standard internal method and methodology for managing their risks which is located within the ambits of; risk retention, risk elimination/avoidance, risk minimization/reduction techniques, distinctively expunging Insurance, even as a major risk transfer mechanism.
2. No doubt, Eromosele (ibid) identified and asserted as early signal warning (EWS) that the challenges faced by this sector in managing their risks are because of their freedom of choice of skills and techniques.
3. Asika (ibid) therefore concludes that this sector is conservative with their risk management approach, going by the past research accounts and reports, made available by researchers.
4. The risks involved in this business are complex and expensive. This may be the reason why this industry is avoiding insurance because the anticipated or potential premiums may be too high.
5. The rate or frequency of risk occurrence is also high because of the type of risks

they are exposed to, because of their business nature and capacity.eg, pipe line vandalism, bunkering, oil spills, fire incidents, environmental degradation etc.

6. The severity of the risks that occur are also high because of the same nature and business capacity. For instance, pertinent to recall here that the products of this industry are over 99% inflammable, as a result, exposes these products to quite severe and frequent fire incidents, either at the upstream or downstream sector.

Recommendations

In spite of the true findings and quite reliable conclusion that the oil and gas sector adopted a voluntary and acceptable standard method of risk management, the study inevitably joins Eromosele (ibid) to solicit for the integration of the oil and gas sector into the limitation and control of such freedom of choice of skills and techniques in managing their risks, with these recommendations as follows:

1. Requesting for Government's intervention by using statutory means to integrate this sector into a more social, liberal and professional framework of insurance, to easily spread their business risks.
2. This will consequently expunge conservatism in their methods or techniques of risk management as solicited by Asika (ibid).
3. The study further recommends that organizational corporate social responsibility (CSR) should equally be considered as a major part of risk management approaches in the oil and gas sector. This will be more proactive, effective and efficient in reducing; pipe-line vandalism, bunkering, kidnapping of expatriates, killings etc. as resultant crimes from youth's restiveness and hyperactivities in the oil produced ng areas as these are considered as risks, emerging from insecurity (Asika, Ojogbo, Okolo, Asielue 2019).

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